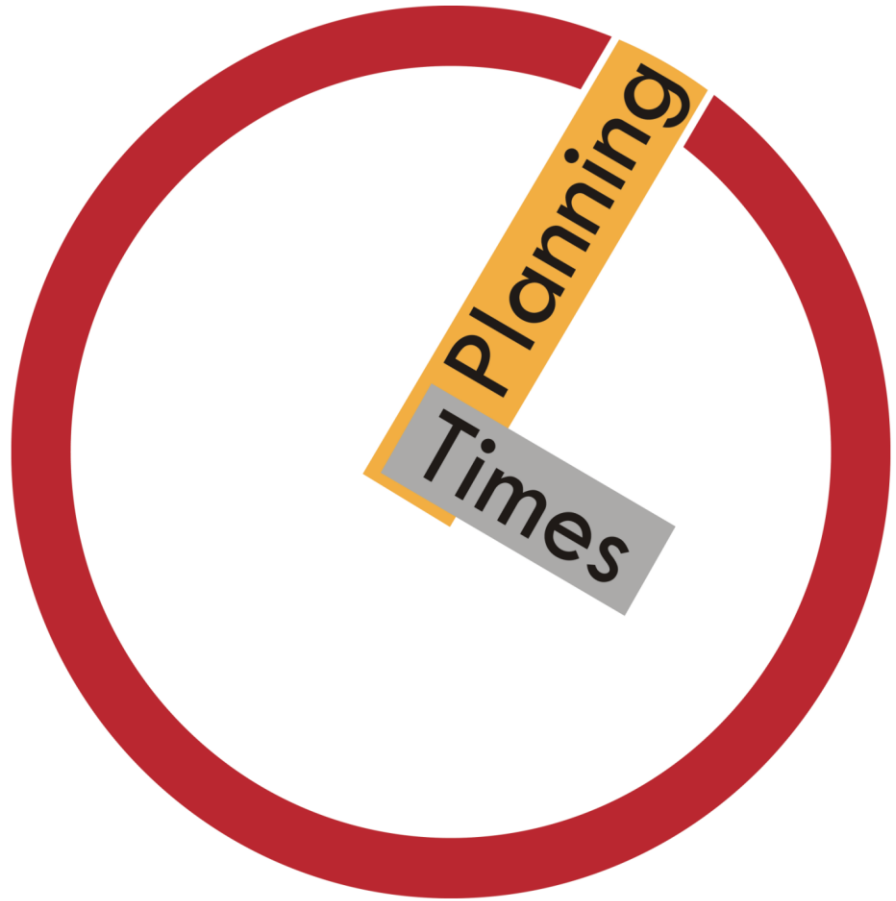Manfred SCHRENK, Vasily V. POPOVICH, Peter ZEILE, Pietro ELISEI (Eds.)

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18th International Conference on Urban Planning, Regional Development and Information Society

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(Augustine, Confessions XI.18)

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Beiträge zur

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Edited by

Manfred SCHRENK, Vasily V. POPOVICH, Peter ZEILE, Pietro ELISEI

Schwechat, 2013

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PREFACE

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WELCOME to REAL CORP 2013, the 18th International Conference on Urban Planning, Regional Development, Information Society and Urban/Transport/Environmental Technologies.
When holding an urban planning conference in Rome, one cannot but think about the great history testified by the many monuments, the rise and fall of many Empires and powers that the city has absorbed in its changing form but also about the future challenges that cities are confronted with when dealing with the management of human and natural resources or by their fragility, as shown by the many natural disasters that have hit also cities in the Country hosting us. The past CORP conferences discussed the concept of constant change in cities which we would like to now enrich by exploring the relationship between space and time.

It's 'Planning Times'!

It is therefore a pleasure to discuss with all our participants how we all constantly work between space and time when planning our cities, when defining projects that may improve the conditions of our society, when proposing decision processes that manage the space around us, when implementing techniques to foster development.

But 'Planning Times' also means that we must plan today for a long term future, regardless of the contingent economic interests or the administrative changes. Time has come to plan for the society we wish future generations live in: hopefully inclusive, sustainable and just. How to arrange the steps along the way?

During the four conference days we will explore this complex synergy by discussing how planning practice and theory have dealt with concrete issues such as:

- How to plan taking into account time, both past history and future development?
- How to integrate monitoring within the planning decision processes, such as in the case of natural disasters?
- How to handle time that cannot be planned, such as long decision processes or real time decisions?

REAL CORP 2013 in Rome is a moment of discussion and reflection about theories and methods but also hands-on experiences from all over to world on how planning deals with space in time in order to plan our cities and regions.

A city with such a long planning tradition and with such diverse challenges like Rome is a great occasion to have the city itself giving valuable input and inspiration to the conference, making every walk through the city, every espresso in some café and each conversation with Romans an occasion to bring back to the conference table even more content and reflections, which we are looking forward to sharing.

As when thinking of Urbanity and Time, the Eternal City of Rome appears to be the perfect location to hold this conference, even more so it is within the House of Architecture of the Acquario Romano, where our local partner the Chamber of Architects of Rome and Province is based and who we would like to thank for their support.

The building we stay in already shows some of this complex relationship between past and future of cities as this was the Roman Aquarium. Only for a few years it hosted an aquaristic show, the project failed only little later to then be used as storage room of the nearby Opera House. Besides that, it temporarily served as venue for fairs and exhibitions, to then be a storage space until in 1984 when the renovation works started which were funded by the city administration. Now the building is usable as museum and event facility und currently hosts the House of Architecture and the Chamber of Architects of Rome and Province.

We are happy to say that we add a new role to this building by opening a window on 5 continents thanks to all the people from around the globe that are here.

REAL CORP 2013 brings together nearly 350 experts from different fields and from all over the world and provides the stage for meeting and learning from each other how to deal with city structures and prepare them for a sustainable future enhancing their resilience.

REAL CORP 2013 covers many different topics in more than 200 presentations. The proceedings comprise about 1,500 pages of hand-picked knowledge for planners and for cities.
Since our first conference in 1996, REAL CORP has turned into a real interdisciplinary and international event. During the upcoming four days, The Acquario will be the host of an incredible exchange of planning knowledge, face to face networking and development of new thoughts, ideas and projects.

Welcome to Rome and the beautiful Acquario Romano!

Have a great conference!

Manfred SCHRENK, Daniela PATTI. Christian EIZINGER, Clemens BEYER and the REAL CORP Team

"For if there are times past and future, I desire to know where they are."
(Augustine, Confessions XI.18)

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A new Approach in the Visualization of Georeferenced Sensor Data in Spatial Planning

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1 ABSTRACT

There are multiple ways to visualize geotagged information. The most commonly used tools are GIS (Geospatial Information Systems) to show the data on a 2D map. For 3D visualization of geospatial information only a few systems exist, e.g. Google Earth, NASA World Wind, etc., which only provide basic visualization techniques and also only allow to visualize a small number of data attributes at the same time. In addition the user has to put a lot of effort into producing meaningful visualizations to be able to compare and analyze the data. In this paper we present a new approach to the visualization of geotagged sensory data in the context of spatial planning. We use a tool called GeoVisualizer, which aims at providing planners the possibility to show and analyze their multivariate sensory data in a 3D geospatial context.

In a cooperation project between DFKI and CPE, a variety of human sensory assessment test data sets, recorded with the BMS Smartband, were visualized. The Smartband is a small wristband that can detect negative arousals of test people. In combination with a GPS device, it is possible to geotag "stress hotspots" in a city. Recorded situations in this paper are for example how people feel during a hike in the forest, watching a football game, going through the city in crowded situations or walking along a touristic path. The focus of the presented new workflow is not only to integrate sensor data, but also traditional sources like WebMapSevices and 3D-content from KMZ files in order to combine them in a way which can be used for various kinds of urban planning projects. The paper will give a short overview of GeoVisualizer and present a planner's workflow how to integrate their data and how they can edit the look of the integrated data in a fast and easy way.

2 INTRODUCTION

The visualization of sensor-based geotagged data in spatial planning increased considerably in the last few years. Virtual globe systems like NASA World Wind and Google Earth, virtual 3D-city models as well as new approaches of immersive techniques became important not only in spatial planning, but also gain increasing importance in social, cultural and everyday context (ZEILE 2010). According to experts, virtual globes became a 3D-GIS standard (RUSH 2006), and stimulated the discussion about visualization and benefits of geodata for all user groups, even besides spatial planning (ZEILE 2010).

Last but not least with the help of automated calculation of traffic density, supported by the data of mobile phone users and the works of MIT SENSEable City Labs like LIVE Singapore! and Copenhagen Wheel (MARTINO ET AL. 2010, RESCH ET AL. 2011) this field of research entered general publicity. These systems present the vision, what would be possible with these techniques in the future, but they are still not designed for daily use. In practice, planners need a tool, which can import sensor data and visualize them in realtime in an easy way. This easy to use feature is essential, because the results of these sensor based data should be used in political decision processes and serve as a basis for communication between planners and stakeholders.

One solution is the "GeoVisualizer" which delivers very good results for this kind of work in a planning context. In this paper, some use cases will be presented which were results of a cooperation project about "human sensory assessment" between DFKI and the University of Kaiserslautern, CPE. In these use cases, all data belong to the research field of "spatial psychophysiological monitoring". Metaphorically, the „Citizen as Sensor" (GOODCHILD 2007) learns to walk virtually. The required methods and techniques, in an especially tailored workflow for spatial planning, will be presented in the following chapters.

3 STATE OF THE ART

Following some backgrounds and state of the art developments concerning the research field of Digital Globes / Virtual Earth Browser as well as state of research in the field of psychophysiological urban

monitoring (measurement of humans' emotions in urban environment/ human sensory assessment) were elaborated.

3.1 Visualizing Geodata and Virtual Earth Browser

The most important prerequisite for planning activities was and is knowledge that planners collect, sort, constantly renew and prepare to get complex and compressed information for a specific planning decision (STREICH 2005:11). Digital Globe Systems meet these requirements and offer the possibilities to planners to get own spatial information to geotag a special planning task and redistribute these datasets to a specific circle of users (ZEILE 2010). The idea of a "digital earth" was described for the first time in 1991 by Neal Stephensons' novel „Snow Crash": „A globe about the size of a grapefruit, a perfectly detailed rendition of Planet Earth, hanging in space at arm's length (…) It is a piece of (…) software called, simply, Earth. It is the user interface that (…) uses to keep track of every bit of spatial information that it owns -- all the maps, weather data, architectural plans, and satellite surveillance" (STEPHENSON 1992: 127).

In 1994, the Berlin company ART+COM developed „TerraVision", inspired by Stephensons' novel as a standalone system on SGI-units. TerraVision is a 1:1 virtual copy of planet earth. One significant feature of TerraVision is the human machine interface. With the help of an interface, designed like a globe, the so called Earthtracker, the user gets the possibility to navigate to every desired spot on earth interactively and in realtime over the virtual globe (ART+COM 1994).

The first and free consumer based virtual globe system was developed by NASA and was called World Wind (NASA 2013). For the first time, it was possible to import and export spatial data through a user interface. In addition, the integration of Web Map Services and the visualization of textured meshes were realized. Keyhole Earth Browser, in the beginning operated by Keyhole, was the initiation point for the development of Google Earth, which is today the best-known and widespread software for digital globes. As associated programming language, the Keyhole Markup Language (KML), also developed by Keyhole, is established as an Open Geospatial Consortium (OGC) standard by now.

All the above-mentioned systems offer different import and export functions, but there are only a few options to develop some additional new types of visualization. There are some software tools available, which can transform collected data into 3D visualizations, which need to be combined manually for an appealing look. An integrated and interactive 3D-GIS application, which allows the easy integration, visualization and animation of heterogeneous data is not available today.

3.2 Human Sensory Assessment

Human sensory assessment in spatial planning is based on the approach to use people as sensors and at the same time as producers for emotional data in real time (Exner et al. 2011). This approach aims to deepen the knowledge of continuous interdependencies between humans and their environment. Here, the aim is to identify specific stress-inducing structural or environmental situations and also places having positive effects on the well-being. Based on this, comprehensive measures can be identified to optimize the respective study area.

The used sensor for the measurement of human emotions is the BMS Smartband (Papastefanou 2009), which is used to detect psychophysiological values of the body according to the environmental circumstances. The approach of psychophysiological monitoring enables to correlate physiological data (e.g., skin temperature and skin conductance changes) to emotional states of the people (Kreibig 2010). A GPS-logger is used additionally for simultaneous localization of the emotional data.

The major challenge is to get the combined spatial data across to decision makers as well as visualizing it adequately for the academic sector. Existing visualization software reaches its limit especially when multiple data attributes have to be visualized simultaneously. For that reason, it is interesting for the academic sector to visualize various data attributes within a presentation, either individually or simultaneously. This includes, the skin temperature, skin conductance, and the combination of both which can be used to derive stress events. Policy makers on the other hand want focused information that is limited to the essential content.

Until now, many manual steps had to be made with various software products such as ArcGIS, the GPS-Visualizer or Google Earth to achieve a high quality and precise visualization of georeferenced human sensory data. That complex procedure was accompanied with a large amount of time.

4 GEOVISUALIZER

3D data visualization is a common feature of modern GIS. There are a multitude of standalone applications as well as plugins allowing the user to visualize his three dimensional data in a geographic context. However, the use of state of the art visualization techniques and methods are usually reserved for expert users due to the complex nature and complicated setup of these visualizations. This is where GeoVisualizer ties in by giving even non-visualization experts the tools and possibilities to produce meaningful visualizations based on state of the art techniques and to get a better insight into the underlying georeferenced data.

GeoVisualizer is based on the Open-Source NASA World Wind SDK (NASA 2013) which provides a 3D virtual globe and different import plugins for geodata. In addition, GeoVisualizer is realized with the Java Web Start Technologie (ORACLE 2013a), which allows starting the application on every computer connected to the internet and providing the basic Java libraries. Once installed, GeoVisualizer resides on the hard disk of the computer and can be run in offline mode. However, if the computer is connected to the internet GeoVisualizer will execute a check for updates to ensure that the user always has the latest, up to date components.

GeoVisualizer uses an intuitive and easy to use graphical user interface (GUI) as well as a flexible and extendable architecture for the visualization of 3D and 4D (3D plus time) georeferenced data sets. Using the time dimension allows animated presentations and the interactive exploration and analysis of the data.
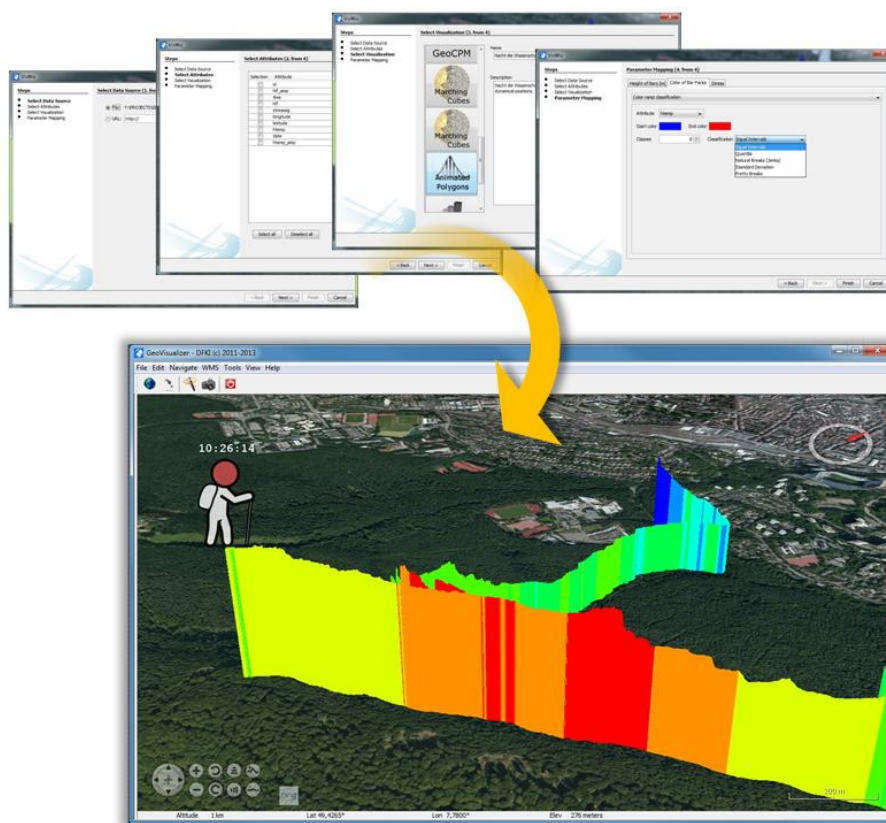
Figure 1: By using the visualization wizard "VisWiz" (top) the user is able to produce different 3D visualizations without the need of expert knowledge (bottom).

4.1 GeoVisualizer Components

GeoVisualizer is split into two main components, the GeoVisualizer-UI and GeoVisualizer-Core.

The GeoVisualizer-UI component provides the necessary methods and functions for the graphical user interface. Besides the functionalities like the integration and management of GIS web services (i.e. Web Map Service and Web Feature Service) already integrated into the NASA World Wind SDK, the component provides the visualization wizard VisWiz which guides the user through the process of generating 3D and 4D representations based on his own data (see Figure 1). In addition, the GeoVisualizer-UI allows the use of stereoscopic displays (Side-by-Side, horizontal and vertical interlaced) for presenting the visualization on real 3D hardware.

The GeoVisualizer-Core component provides the basic visualization techniques and the interface specification for the extension of the application with new visualization techniques for different georeferenced data sets. The interface uses the Service Provider Interfaces (SPI) (ORACLE 2013b) which allows the easy integration of new extensions. Within GeoVisualizer SPI is used to integrate user specific visualizations, data import and export modules. The combination of Java Web Start and SPI technologies allows the use of private, local visualization concepts next to the always up to date public GeoVisualizer components. Besides the basic visualization techniques (e.g. point clouds) the GeoVisualizer-Core component provides different color palettes and color encodings (see e.g. BREWER 2013). For more details on the technical implementation of GeoVisualizer please refer to (STEFFEN ET AL. 2013).

4.2 Visualization Components

Within this cooperation project, we developed different visualizations for static, stationary as well as dynamic sensor data. The two visualization extensions "Animated Polygons" and "Scrolling 3D Bars" are depicted in Figure 2. "Animated Polygons" (see Figure 2 left) is used for the visualization of continuous-dynamic or spatio-temporal data. To visualize time-dependent variables "Animated Polygons" offers the attributes height, color and spatial position of the polygon. All time steps are visualized and a new time step usually refers to a new spatial position.

For the presentation of continuous-static sensor data "Scrolling 3D bars" has been implemented as a visualization extension (see Figure 2 right). Attributes for mapping different variables are height, depth, width and color of the three-dimensional column. As the position of the sensor data is static, older data points are moved (scrolled) away from the spatial location, so the latest time step is always visualized at the real data position. In contrast to the "Animated Polygons", only a user defined time span is shown, e.g. the last 10 time steps.
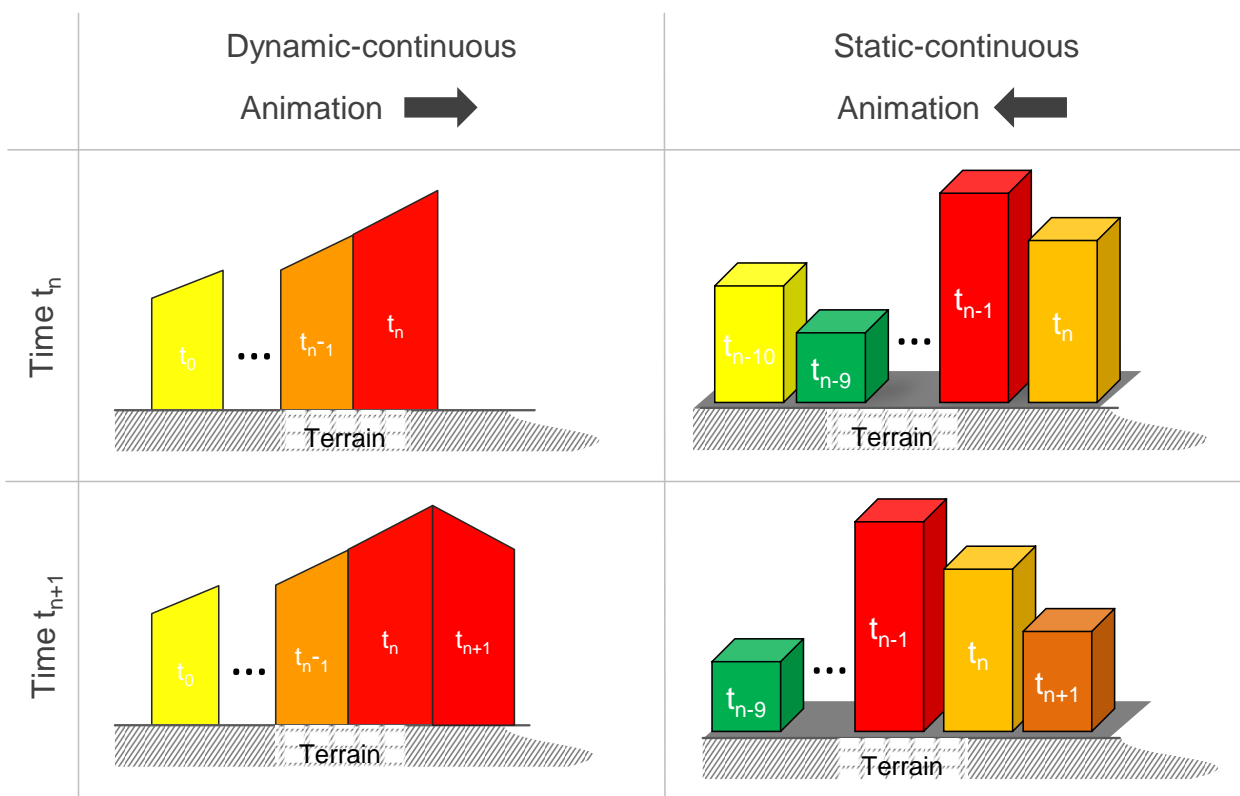
Figure 2: Visualization „Animated Polygons" (left) and „Scrolling 3D Bars" (right) for time steps t_n and t_{n+1}.

5   WORKFLOW FOR PLANNERS

The planner is relying on clear and understandable visualizations for the presentation of his complex analysis. The workflow to achieve this goal consists of a number of individual steps (see Figure 3). This embraces the equipment of test people with various kinds of sensor devices, the measurement of the data as well as its analysis and interpretation. As a first step, the determination of the required data is necessary. For the case studies mentioned this means that relevant geodata (the tracked paths), human sensory data, personal

video material and data extracted from the questionnaires must be processed and merged. For correlating geodata with human sensory data (skin conductance, skin temperature), it is necessary to use statistical methods (statistical outlier removal, smoothing, scoring) to clean the human sensory data.
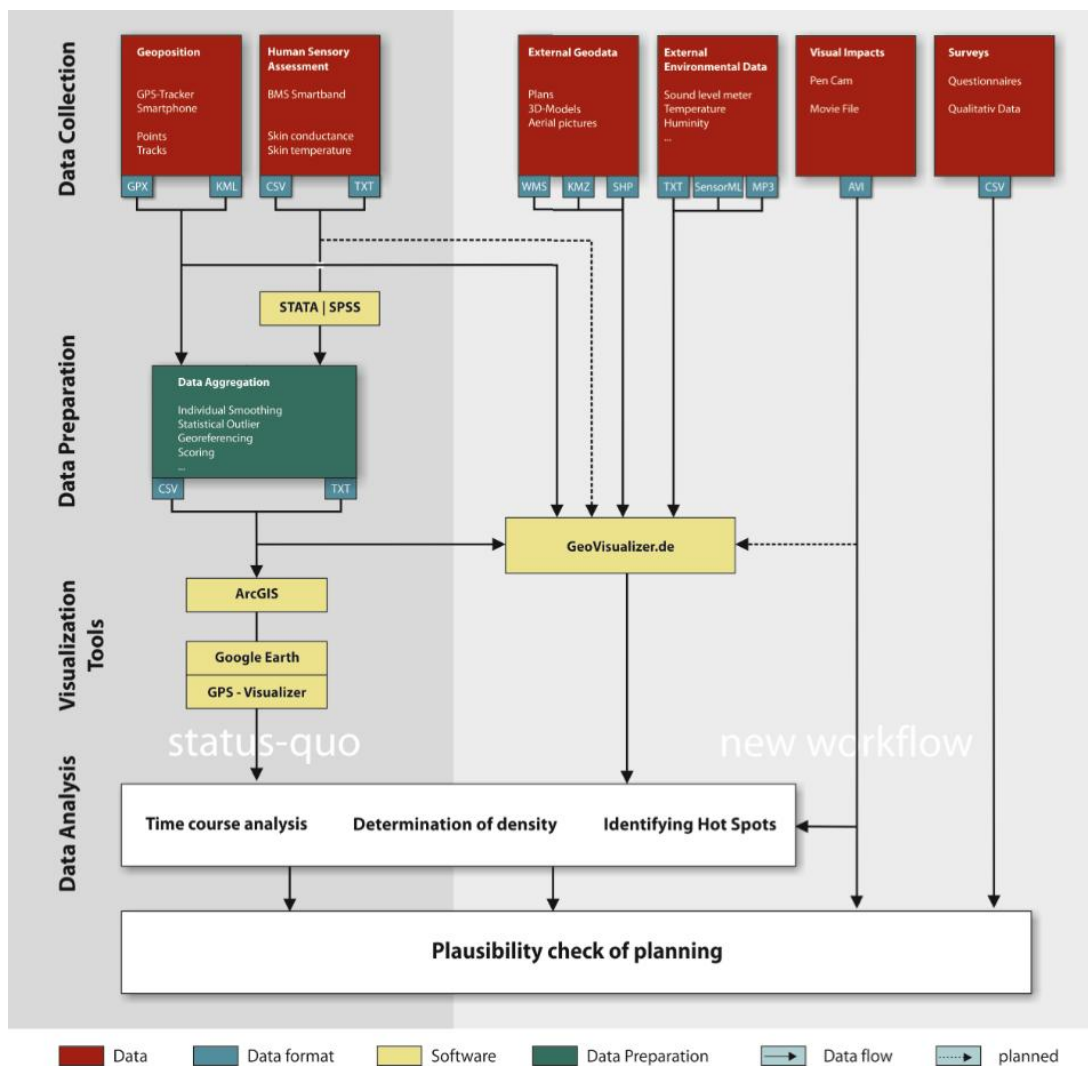
Figure 3: Workflow Human Sensory Assessment & GeoVisualizer (Source OWN FIGURE 2013)

In previous studies, the workflow for visualization was separated in complicated steps with different data formats using different programs. Statistical methods and geodata-analysis had to be made separately and were merged together under a complex approach. By using GeoVisualizer it is now possible to combine these steps into one workflow within a single software solution. The GeoVisualizer can easily read and process different data formats. This embraces data like various kinds of geodata (e.g. SHPs, KMLs) and external environmental sensor data like temperature or humidity for example. The functionalities replace the need for the obligatory use of ArcGIS or Google Earth at this point. The necessary statistical methods will be also part of the GeoVisualizer in the future.

In test studies Shapefiles with embedded emotional data were created. .The GeoVisualizer is able to represent the respective attributes directly with his component VisWiz. It provides a variety of different visualization options as output, such as timing analysis or density determination of e.g. stress responses. Stress hotspots of test people or other spatial patterns can be identified and a plausibility check for planning purposes of the examined phenomenon can be made.

6 INTEGRATION OF SENSOR DATA – USE CASES

In order to test the developed approaches, suitable use cases were designed. Following a pre-study, the first test study took place during a football match. It provides interdependencies between external triggers inducing emotional reactions and the immediate environment. In the case studies, the measured and derived physiological values were assigned to specific attributes which can be seen in the subsequent figure (see

Figure 4): The measured skin conductivity is represented by the height of the column, the skin temperature by the color of the column. The software also provides additional project-based visualizations. The perception of stress, for example, is represented by a red-colored head of the visualized icon, respectively the hiker.

6.1 Pre-Study for dynamic-continuous sensor data

Before conducting the main study, a pre-study was set up to check the functionalities of the GeoVisualizer. This was done in the context of a hike through the Palatinate Forest, where a test person had to wear the sensor devices. The results have shown that the functionalities of the GeoVisualizer are suitable to illustrate the emotional arousal in multiple ways for further analyzing processes. Furthermore, the graphical analysis provides comprehensive possibilities to detect and display emotional stress, or in case of a solely high skin conductivity, exhaustion.
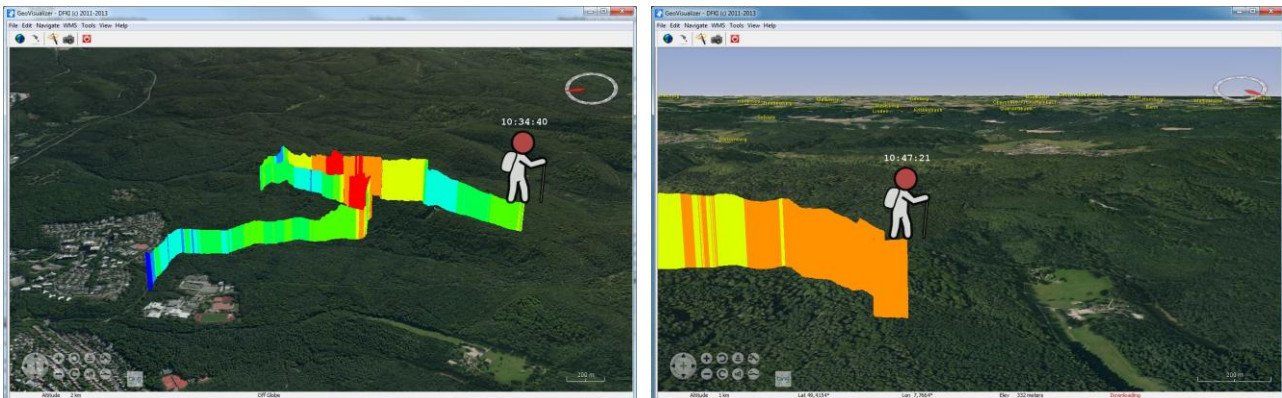
Figure 4: Virtual Globes enable visual analysis from different angles (Source OWN FIGURE 2013)

6.2 Static-continuous sensor data – Results and visualizations

In the main study, two different scenarios were designed. First scenario was a test setup with static sensors that were subsequently visualized with the GeoVisualizer. The limitation to a determined location also offers the advantage that no location inaccuracies due to unstable GPS signals will occur. The test people were equipped with the BMS Smartband and visited a football match of the local team of Kaiserslautern on the 30th of September 2012. In this test scenario, psychophysiological measurements of the volunteers were taken and validated in the aftermath. The emotional reactions of the participants can easily be connected to the course of the match. Based on the presentation of the data, the correlation of emotional stress reactions and specific situations in the match can be identified (e.g. goal and red card). Both goals show effects in the physiological data. Due to the chosen visualization mode (see Figure 5), it was easier to illustrate specific situations (peak of the 3D bars to the right in Figure 5a & b) as well as the time period before the situation (3D Bars scroll from the right to the left over time). The influencing factors for the participants were mainly limited to the events of the match, because the location was static. Furthermore, video data from the match as well as the match-ticker were used to compare the specific events with the measured data sets.

6.3 Dynamic-continuous sensor data – Results and visualizations

In addition to the first experiment, the second one is characterized by using a dynamic component, namely the walk down from the football stadium to the inner city of Kaiserslautern. The participants were equipped with the same instruments, but additively with a GPS logger, which was used to locate the collected physiological values.

After the end of the match, the study participants went on a pre-defined route to the inner city together with the other spectators from the stadium (see Figure 6). The first third of the walk was right in the flow of the crowd, while the rest of the walk was in a quieter area of the city. The data shows that the arousal level of the person's stress in the early part is much higher than at the end of the trail, which was less crowded. Based on these measurements, it can be observed that there is a connection between the stress signals and the local circumstances of the route (Fig. 6 a). By creating a density map with places of stress reactions, critical points of the walk were pointed out. Those were mainly in the first part of the route where a dense crowd still was present (risk of congestions). These congestions reducing the walking speed and the feeling of being trapped

in a crowd are impacts to induce emotional stress for the participants. People of the research group without measurement devices confirmed this impression of the crowded and congested route in a retrospective interview. The findings are useful hints in further urban planning projects, like evacuation scenarios.

In addition, this approach was used for two other participants, who had to walk a pre-defined route while passing some touristic and architectural hot spots of the city. Due to manifold influences on the participants during such a trip, it is still very complicated to detect specific urban patterns. Results of this study example will be used for further research.
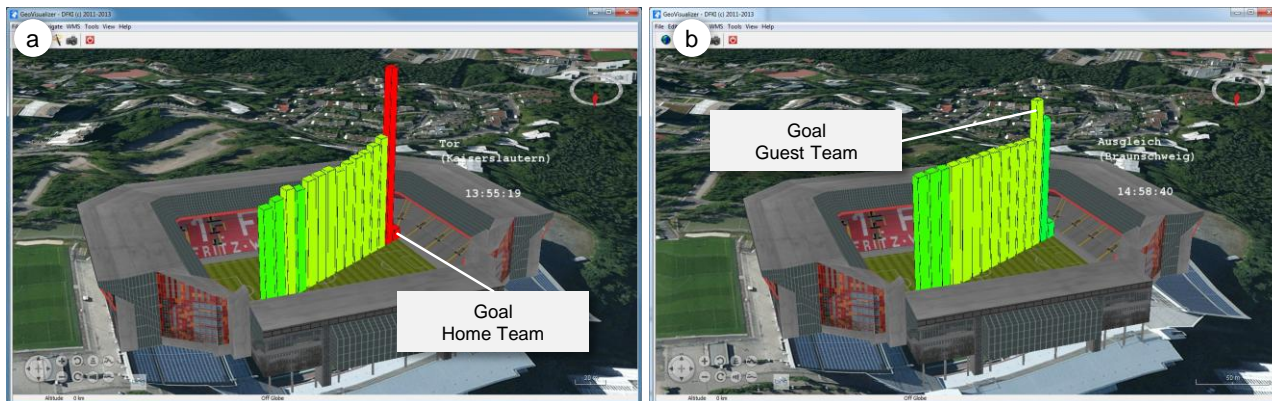
Fig 5: Visualization of sensor data during a soccer match. „Scrolling 3D Bars" help to identify on which specific situations emotions occur for the participants (Source OWN FIGURE 2013)
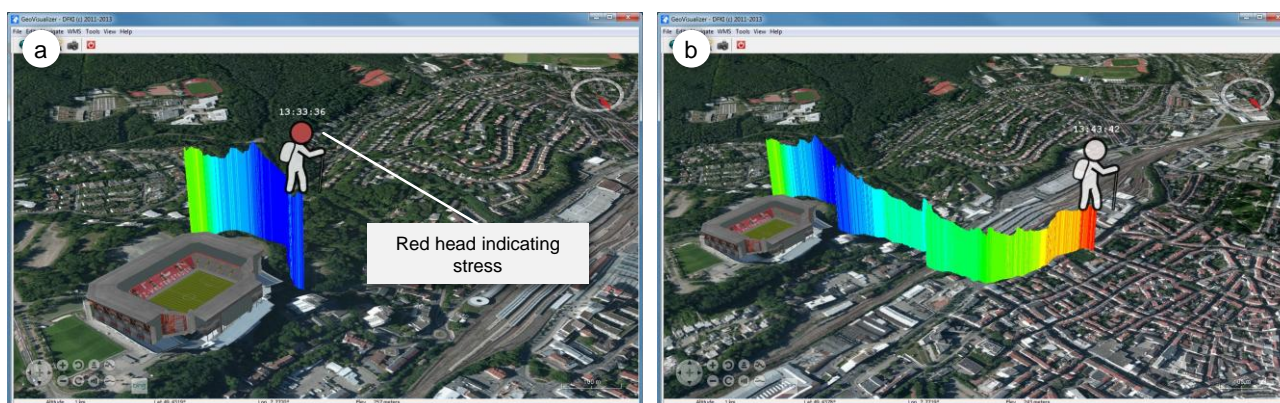
Fig. 6: Enhancement of the „Animated Polyons" with a specific user-icon. The reddish head (a) emphasizes the stress-reaction during the congested street part (Source OWN FIGURE 2013)

7 CONCLUSION

The GeoVisualizer turned out to be a suitable tool for the complex requirements of the representation of (human) sensory data for spatial planning. This includes in particular the modular functionalities and the various display modes for the observation of phenomena in urban spaces during time. The previously mentioned approach offers chances for planners to allow emotional monitoring and to use its results for urban planning. The study cases gave a glance on how such approaches can be integrated in planning processes.

For both study cases, the GeoVisualizer was able to execute the complex analysis tasks. It reduces the complexity of the previously used workflow: It is an easy-to-use tool, which has a modular structure and allows quick changes between the different modes of visualizations. This offers opportunities for planners to perform spatial monitoring using multiple spatial data sources. Hence, human sensory data, characterized by a high spatial and temporal complexity, can be visualized easily and in a sophisticated way. Communication of these sometimes very complicated facts and results is easier with this kind of presentation, especially for laymen. Presenting this system on an open scientific night (Lange Nacht der Wissenschaft), a large number of citizens were interested in this new approach. During the event, a large number of visitors gave positive feedback that GeoVisualizer is a kind of catalyst to transform complex data in an easy, transparent and understandable format.

In the future, there will be more visualization features for the complex human sensor data analysis: The direct integration of human-sensor measurements without a primary use of statistical programs is the main goal. In addition, an automatic creation of small video clips for a retrospective assessment of stress responses is a further goal as well as the integration of other (environmental) sensor data via a SensorML interface in order to achieve a better understanding of the processes and interactions in the system of human sensory data and the environment.

8   ACKNOWLEDGEMENT

9   REFERENCES

AFFEKTIVE WISSENSCHAFTEN. (O.J.) http://www.affective-sciences.org/themes-common/public_img-files/pdf/NCCR_FLYER_D.pdf (21.01.2012).
ART+COM (1994): TerraVision, http://www.artcom.de/en/projects/project/detail/terravision/ (21.03.2012).
BERGNER, B. S.; ZEILE, P.; PAPASTEFANOU, G.: RECH, W. (2011): Emotionales Barriere-GIS als neues Instrument zur Identifikation und Optimierung stadträumlicher Barrieren, in: Strobl, J.; Blaschke, T.; Griesebner, G. (Hrsg.): Angewandte Geoinformatik 2011, Berlin – Salzburg, 430-439.
BREWER, C. A. (2013): http://www.ColorBrewer.org (01.02.2013).
BUSCHMANN. (2012): http://www.blm-research.de/humansensorik.php (21.03.2012).
EXNER, J.-P.; BERGNER, B.S.; ZEILE, P.; BROSCHART, D. (2012): Humansensorik, in: Strobl, J.; Blaschke, T.; Griesebner, G. (Hrsg.): Angewandte Geoinformatik 2012, Berlin – Salzburg, 690-699.
GOODCHILD, M. F. (2007): Citizens as Sensors: the World of Volunteered Geography. Geo- Journal, 69 (4), 211-221.
KREIBIG, S. D. (2010): Autonomic nervous system activity in emotion: A review. Biological Psychology, 84 (3). 394-421.
MARTINO, M., BRITTER, R., OUTRAM, C., ZACHARIAS, C., BIDERMAN, A. (2010): Senseable City: Digital Urban and Modelling.
NASA (2013): The World Wind SDK. http://goworldwind.org (01.02.2013).
ORACLE (2013a): Java Web Start Overview.   http://www.oracle.com/technetwork/java/javase/overview-137531.html (01.02.2013)
ORACLE (2013b): Introduction to the Service Provider Interface.   http://docs.oracle.com/javase/tutorial/sound/SPI-intro.html (01.02.2013).
PAPASTEFANOU, G. (2009): Ambulatorisches Assessment: eine Methode (auch) für die Empirische Sozialforschung. In: Weichbold, Martin; Bacher, Johann; Wolf, Christof (Hrsg.): Umfrageforschung: Herausforderungen und Grenzen. Österreichische Zeitschrift für Soziologie: Sonderheft, 9, Wiesbaden: VS Verl. für Sozialwiss., S. 443-469
RESCH, B., MITTLBÖCK, M., KRANZER, S., SAGL, G., HEISTRACHER, T., BLASCHKE, T. (2011): „People as Sensors" mittels Personalisierten Geo-Trackings, Salzburg, in: Strobl, J.; Blaschke, T.; Griesebner, G. (Hrsg.): Angewandte Geoinformatik 2011, Berlin – Salzburg, 682-687.
RUSH, W. (2006): Annotating the Earth, MIT Technology Review, 2006.
SCHNEIDER, A. (2011): GPS-Visualizer. www.gpsvisualizer.com.
STEFFEN, D.; MICHEL, F. (2013): GeoVisualizer – Towards an Open Source Toolkit for 3D/4D Geospatial Data Visualization, CORP 2013, May 20-23 2013, Rome
STEPHENSON, N. (1992): Snow Crash. Bantam, New York, 1992.
STREICH, B. (2011): Stadtplanung in der Wissensgesellschaft: ein Handbuch. 2. überarbeitete Auflage. VS Verlag. Wiesbaden.
ZEILE, P. (2010): Echtzeitplanung – Die Fortentwicklung der Simulations- und Visualisierungsmethoden für die städtebauliche Gestaltungsplanung. Dissertation TU Kaiserslautern.

A Study on Thermal Comfortable following the Thermal Environment Migration in Detached Housing Area in Korea

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1 ABSTRACT

The purpose of this study is to increase thermal comfort within a detached housing area by improving the thermal environment. Therefore, it suggests application of various greening methods, taking into account the materials and shape of the outdoor space, as a systematic approach to reducing sensible heat by lowering the surface temperature.

As to Case 1 and Case 2, there was no significant difference in the surface temperatures within the detached housing area, but Case 1 showed lower surface temperature distribution around the fence due to shade during the daytime. Case 3 showed the low surface temperature distribution of 10℃ around the planted trees during the daytime and temperature of 15℃ around the green roof. With respect to MRT the green roof showed a temperature difference of 3℃ or more and the vacant land covered by the grass also showed a difference of 2~3℃. In addition, Case 3 with increased green coverage showed the temperature 10℃ lower than Case 2.

Meanwhile, changes in the wind velocity may cause dispersion of sensible heat and thus affect the temperature. And higher trees are more effective in blocking solar radiation and lowering the temperatures.

2 INTRODUCTION

2.1 Backgrounds and Purpose

Temperature rises in detached housing area are caused by various climate factors including not only a temperature but also wind and humidity, which all affect human senses and behaviors. And creating a thermal comfort environment by considering such various climate factors is critical to designing detached housing area. In particular, the surface temperature of the components of an actual detached housing area such as a building or the ground is closely related with space design involving materials or the shape of outdoor space, indicating that outdoor space should be carefully designed by taking the thermal environment into account.

The purpose of this study is to examine how fence demolition affects the thermal environment of outdoor space in a detached housing area and to highlight the positive effects of greening, which is expected to improve the thermal environment. This can provide a basis for a continuous fence demolition campaign by assessing the thermal environment of outdoor space in a detached housing area.

In addition, this study suggests greening methods considering the materials or shape of outdoor space as a systematic approach to improving the surface temperature with the purpose of increasing thermal comfort within a detached housing area by controlling sensible heat. To that end, we have reproduced the materials or the shape of the outdoor area, which affects the surface temperature of a case study area, with 3D-CAD and applied relevant climate factors to a computer simulation.

3 METHODOLOGY

The simulation process is outlined in Fig. 1. The simulation is performed using 3D-CAD models (shown at the upper left in Fig. 1) for buildings, trees and other structures in the area being analyzed. As shown at the top right corner of Fig. 1, three-dimensional spatial forms of buildings, trees and other structures, and two-dimensional ground surfaces are divided into mesh grids. Thermophysical data of construction materials such as albedo, conductivity, and solar transmittance are assigned to the grids. An automatic mesh-dividing process with a spatial resolution of 0.05-5m(a practical size is 0.1-0.4m) has been designed and only uniform mesh can be used in the present version of the tool. A uniform mesh size of 0.4m was used in this study.

Three-dimensional radiation (solar radiation and longwave radiation) from surroundings (the sky, ground and surroundings) was considered in the heat balance calculation for each mesh. Conduction heat was assumed to

be transferred in one direction which is normal to the mesh surface. The following assumptions were also used in the thermal simulation. Ambient air temperature and wind velocity are uniformly distributed in the outdoor spaces at an analysis time. Indoor air temperature is uniform in a room at an analysis time. The effect of heat bridges is not considered in the building heat load simulation.[1]
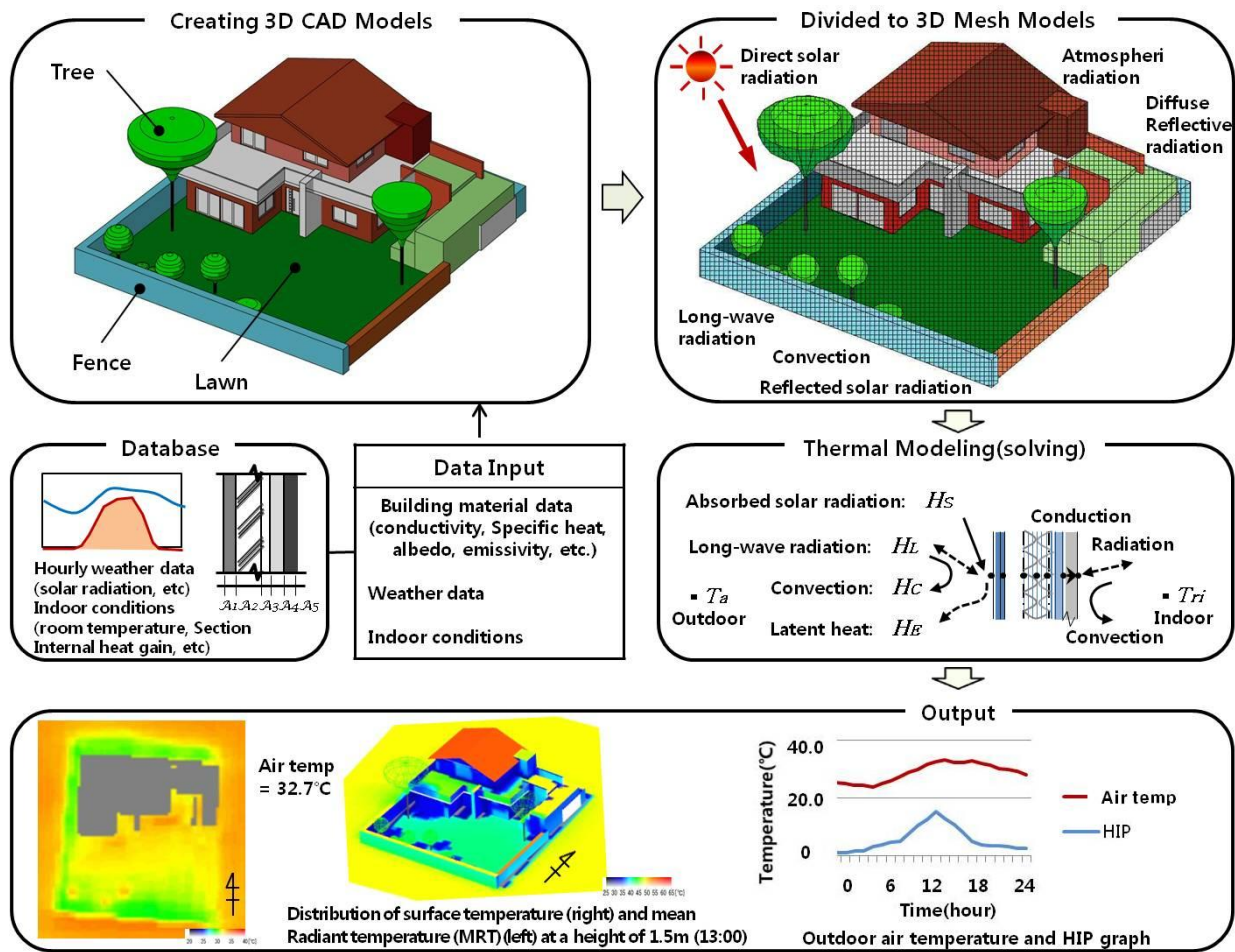
Fig. 1: Diagram of the simulation tool.

3.1 External surface temperature simulation

The energy balance equation at each mesh surface can be written as Eq. (1). The left term of Eq. (1) is the conductive heat at the mesh. The first right term is the absorbed shortwave (solar) radiation by the mesh. The second right term is the net longwave radiation. The third right term is the convective heat transfer from ambient air. The fourth right term is the latent heat from evaporation Eq. (1) accounts for three-dimensional radiation irradiated on the surface. Short-wavelength radiation on the surface includes direct solar insolation, sky solar radiation and reflected solar radiation. Reflected solar radiation includes both specular reflection and isotropic diffuse reflection. The first reflected solar radiation is considered in the calculation. Atmospheric radiation and longwave radiation from the surroundings are considered in the longwave radiation irradiated on the surface. Sky solar radiation and atmospheric radiation are calculated from the sky view factor for each mesh.

The sky view factor is calculated by the multi-tracing simulation from the mesh toward multiple hemispherical directions. The tracing direction is established so that the tracing density (interval) comes to have the same shape factor. The sky view factor is estimated by counting the number of tracers reaching the boundary surfaces. The shape factor for calculating the reflected solar radiation and long-wavelength

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[1] He J, Hoyano A, Asawa T. A numerical simulation tool for predicting the impact of outdoor thermal environment on building energy performance. Applied Energy 2009; 86; 1597-1600.

radiation from the surroundings is determined by the same method used in the estimation of the sky view factor. A detail description of the calculation methodology can be found in Asawa et al.[2]

Convective heat transfer is calculated on the assumption that ambient air temperature and wind velocith are uniformly distributed in the outdoor spaces at the time of analysis. This assumption is valid under weather conditions with low wind velocity. The convection coefficient is considered as a function of wind velocity, and is given by Jurges' equation.[3]

The non-steady-state one-dimensional conduction equation inside each mesh is expressed by Eq. (2). The external and internal surface temperature for each mesh can be determined by solving Eq. (2), using Eqs. (1) and (3) as boundary conditions for external surfaces and internal surfaces, respectively. Boundary conditions for internal surfaces are indoor air temperature for buildings, and underground temperature for the ground, respectively. Rooms on the same floor of a building are assumed to be single rooms, as the influence of internal partitions is not taken into consideration. The indoor air temperature is assumed to be uniform at an analysis time, and its hourly data is given as follows. For the first calculation, the indoor air temperature is assumed to be equal to the ambient air temperature or setpoint temperature for the non-air-conditioned or air-conditioned period. Eq. (3) is a boundary condition for an internal surface. The energy exchange at the internal surfaces is considered to by radiative and convective exchanges with indoor air, where a combined heat transfer coefficient α_o is used and assumed to be constant at 9.3W/(m²K). In the second calculation, the indoor air temperature is given from the results of the building heat load calculation described below. The underground temperature at a depth of 0.6m is considered to be constant during the day, and is given from the input data.

The backward-difference method is used to solve the non-steady-state heat conduction equation (Eq. (2)). The calculation time-step used in this study is 5-min.

The tree shape is modeled as a 3D-CAD model and the crown is composed of meshes containing solar transmittance data. Solar transmission radiation decreases as it passes through the tree mesh model. As shown in Fig. 2, this mesh model makes it possible to quantify the influence of the position and distance of sunlight passage within the crown on solar transmission. The surface temperature of a tree's crown is calculated by empirical formulas derived from the experimental data, and can be expressed as a function of the solar radiation incident on the surface, ambient air temperature, and wind velocity.

$$H_G = H_S + H_L + H_C - H_E \qquad (1)$$

$$H_G = -\lambda \frac{\partial T}{\partial x}\bigg|_{x=0} \qquad H_S = a_{su}(\cos\theta \cdot I_{DR} + F_{sky}I_{SR} + I_{RR})$$

$$H_L = F_{sky}R_{La} + R_{LW} - \varepsilon_s \sigma T_s^4$$

$$R_{La} - \varepsilon_s \sigma T_s^4 = \varepsilon_s \sigma T_s^4 (a + b\sqrt{e}) - \varepsilon_s \sigma T_s^4 \text{ (clear sky)}$$

$$R_{La} - \varepsilon_s \sigma T_s^4 = \left(\varepsilon_s \sigma T_s^4 (a + b\sqrt{e}) - \varepsilon_s \sigma T_s^4\right) \times (1.0 - (1 - m_c)C/10))$$

(cloudy sky)

$$R_{LW} = \varepsilon_s \sum_{i=1}^{Nw} F_i \varepsilon_i \sigma T_{wi}^4$$

$$H_C = \alpha_c(T_a - T_s)$$

$$H_E = \iota\beta K(X_s - X_a)$$

$$pc_p \frac{\partial T}{\partial t} = \frac{\partial}{\partial x}\left(\lambda \frac{\partial T}{\partial x}\right) \qquad (2)$$

[2] Asawa T, Hoyano A, Nakaohkubo K. Thermal design tool for outdoor spaces based on heat balance simulation using a 3D-CAD system. Build Environ2008; 43(12); 2112-23.
[3] Jurges W. Der Wameubergang an einer ebenen Wand. Beihefte Zum Gesundheits-Ineenieu 1924;19 (in German).

$$-\lambda \frac{\partial T}{\partial x}\Big|_{x=L} = \alpha_o \big(T_{ri} - T_{sl}(i,j) \big) \qquad (3)$$

3.2 Simulation output

As outputs of the simulation, temperatures of all external surfaces can be predicted and visualized on the 3D models (see the lower left corner of Fig. 1). From the calculated results of surface temperatures, mean radiant temperature (MRT) at a point can be estimated. The mean radiant temperature at a point is defined as the uniform temperature of an imaginary enclosure in which radiant heat transter from the human body of object equals to the radiant heat transfer in the actual non-uniform enclosure. The MRT at a height of 1.5 m dbove the fround was used to evaluate thermal comfort in outdoor human activity spaces in the present study. In addition, diurnal variations of indoor air temperature, internal surface temperature and heating/cooling loads can also be obtained.[4]

4 ANALYSIS OF THERMAL ENVIRONMENT

4.1 Outline of study area

The exampled site is a fence demolition campaign district within Daegu Metropolitan City when has played a central role in the southeast areas, as one of 3 metropolitan cities in Korea. This site is limited to the first-type general residential areas where low-rise detached houses in good condition are concentrated. Preferably, the area should be the one intentionally formed for the purpose of providing additional houses to solve the housing shortage problem. Therefore, we have selected Daemyeong District, one of the land readjustment project districts formed between the 1960's and 1970's, after examining land readjustment project districts developed before the 1990's and land development project districts developed from the 1990's and up to now.

There was a clear street hierarchy in the area and a gridiron road pattern, directly connected with residence units, but street parking was threatening pedestrians' safety. In addition, there was a small number of a multiplex house but a large number of typical low-rise (two-story) detached houses with fences, which abutted on a road whose width is 10m or below.
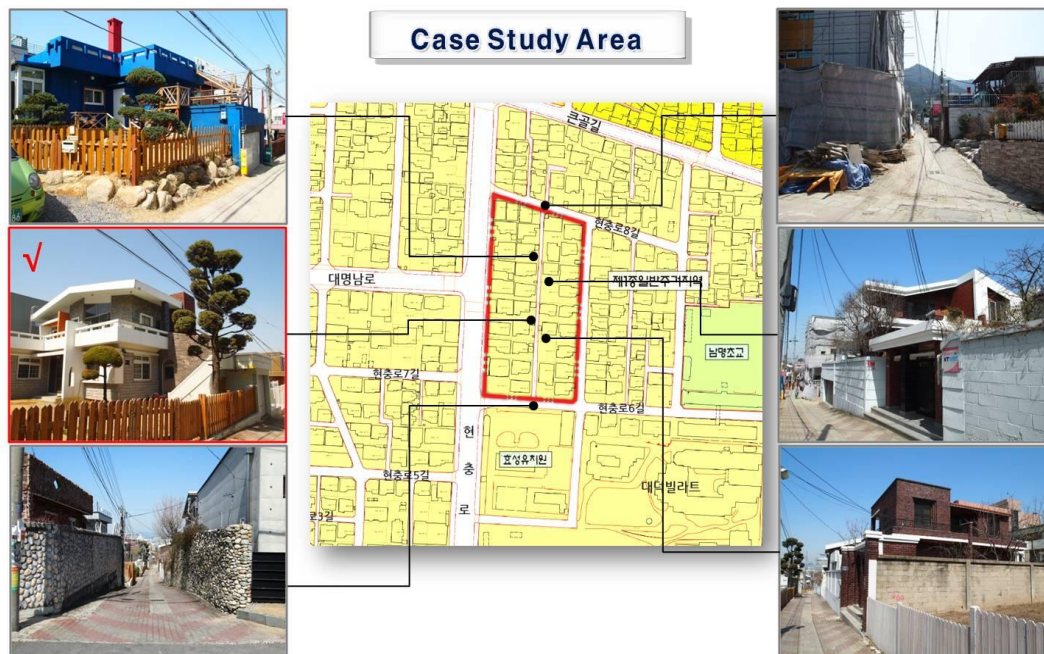
Fig. 2: Case study area.

4.2 Outline of study assumes

As described in Table 1, a simulation was run on the three conditions.

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[4] Jiwon R et al. Study on evaluation of thermal environment following alleviation of limit on number of floors of apartment complex. Real CORP2011;929.

Cases		Conditions
Before the fence demolition	Case1	- Surface: concrete - Road: asphalt - Vacant land and parking lot: vacant - Wall: cement bricks, R.C - Roof: concrete, slates - Green coverage: 5 %
After the fence demolition	Case2	– 8 houses removed walls - Green coverage: 7 % - Surface: grass and water retaining pavement - Tree planting
Greening after the fence demolition	Case3	- 16 houses removed walls - Green coverage: 25 % - Surface: grass and water retaining pavement - Tree planting and a green roof

Table 1: Simulation input conditions for the analysis of the thermal environment.

Based on these conditions, this study focused on reducing sensible heat generated by the surface and, especially, the effects of greening on the thermal environment of the outdoor space in the detached housing area. This study applied various greening methods such as vegetation, tree planting, improved artificial ground coverage, and a green roof in the detached housing area based on Figure 2, which shows thermal environment improvement methods by the scale.
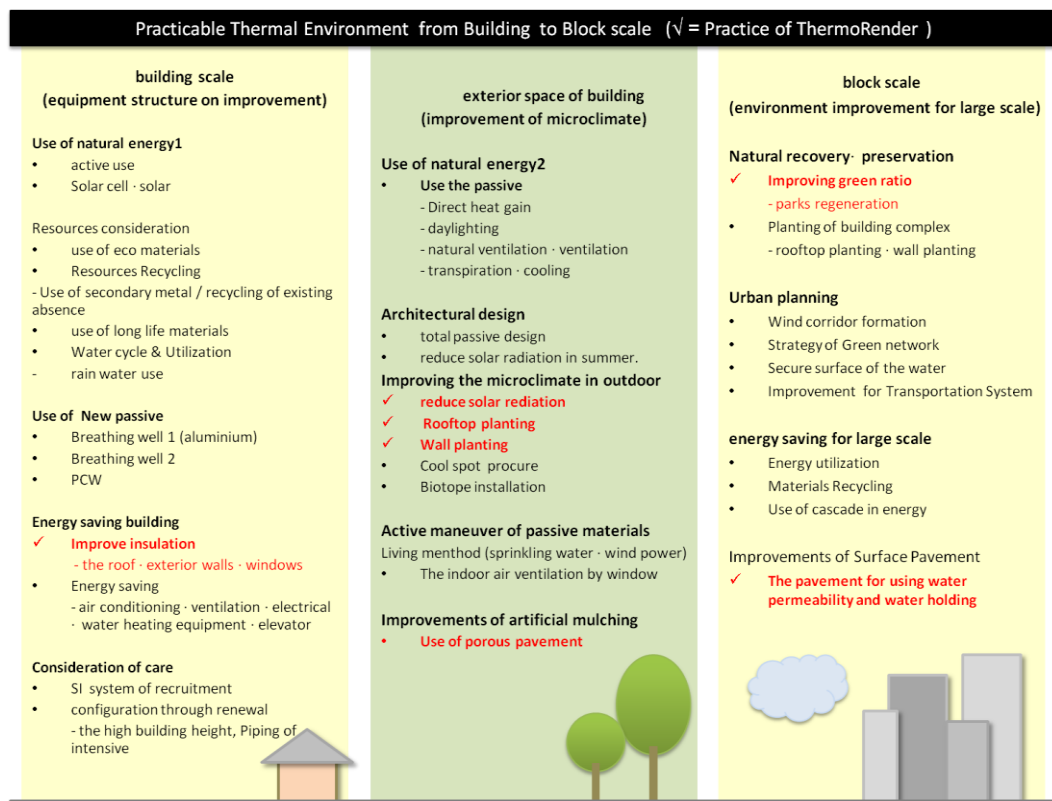
Fig. 3: Thermal environment measures of according to the scale.

4.3 Analysis of Thermal Environment

4.3.1 3D Surface Temperature Distribution

According to the 3D surface temperature distribution simulation for Case 1 and Case 2 (Figure 4), Case 1 showed the low surface temperature distribution during the daytime (15:00) because of the shade around the fence. Meanwhile, Case 3 showed the low surface temperature distribution of 10℃ around the planted grass/trees during the daytime and temperature of 15℃ around the green roof.

This result shows that the shading effects and evapotranspiration of planted vegetation/trees can lower sensible heat in the area and that use of ground coverage with bright colors and high reflectivity as well as increased greening with tree planting can reduce air/surface temperatures, eventually improving the thermal environment within the detached housing area. In addition, Case 3 shows that the green roof can also maintain the low surface temperature distribution of 15℃, which should be considered in order to improve the thermal environment and increase thermal comfort within a detached house as well as to save energy through enhanced insulation.
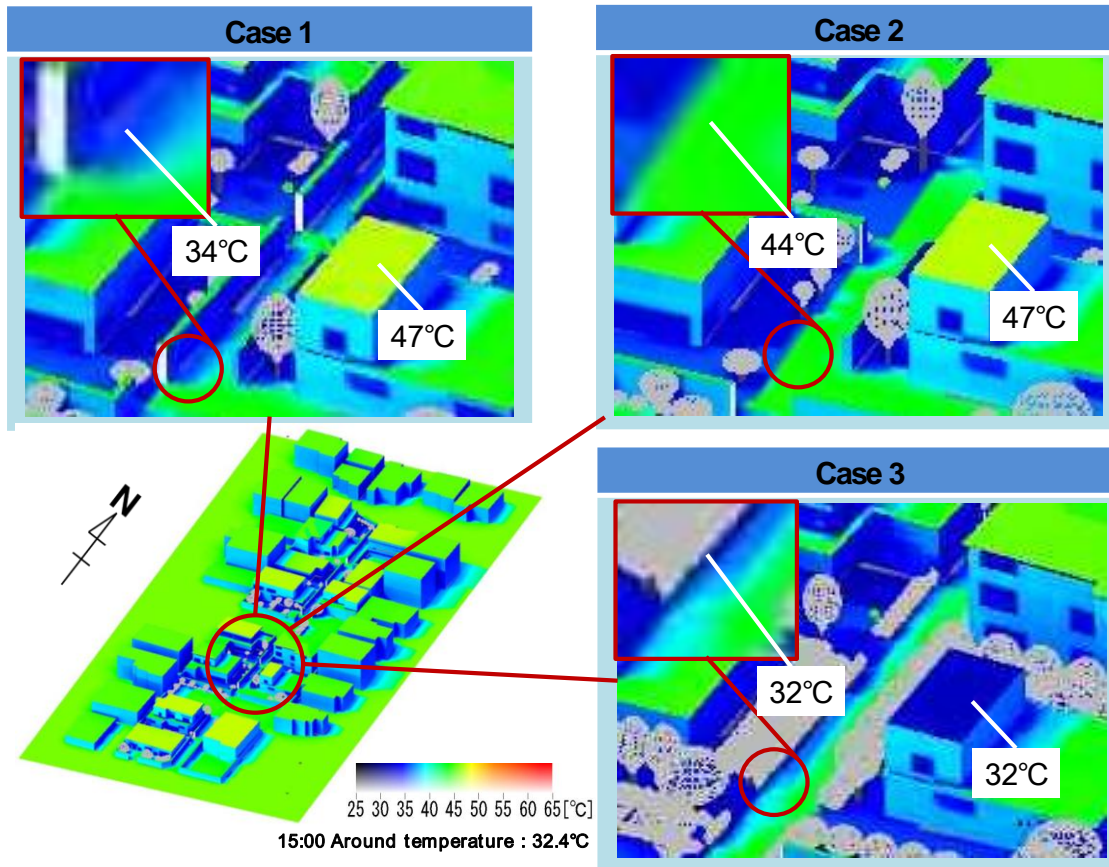
Fig. 4: Surface temperature distribution.

4.3.2 MRT Distribution

Mean Radiant Temperature (MRT) is the omnidirectional effect of radiant heat (which humans feel) converted into a mean temperature. According to Figure 5, Case 3 showed the low temperature distribution because of green coverage increased by tree planting and improved artificial ground coverage. In particular, the green roof showed a temperature difference of 3℃ or more and the vacant land covered by the grass also showed a difference of 2~3℃.

Higher MRT indicates a greater amount of radiant heat, which allows humans to feel higher temperatures than actual temperatures. In order to increase thermal comfort within a detached housing area, therefore, various methods to lower the surface temperature of a built-environment should be applied such as solar radiation blocking by trees, improved artificial coverage, a green roof, and so forth.

In particular, the radiant heat of the wall surface facing the west is enormous, which requires active efforts to find solutions. For example, high trees can be planted around the walls to block sunlight and radiation heat, and the greening of the wall facing the west with a green roof can produce similar effects as well.
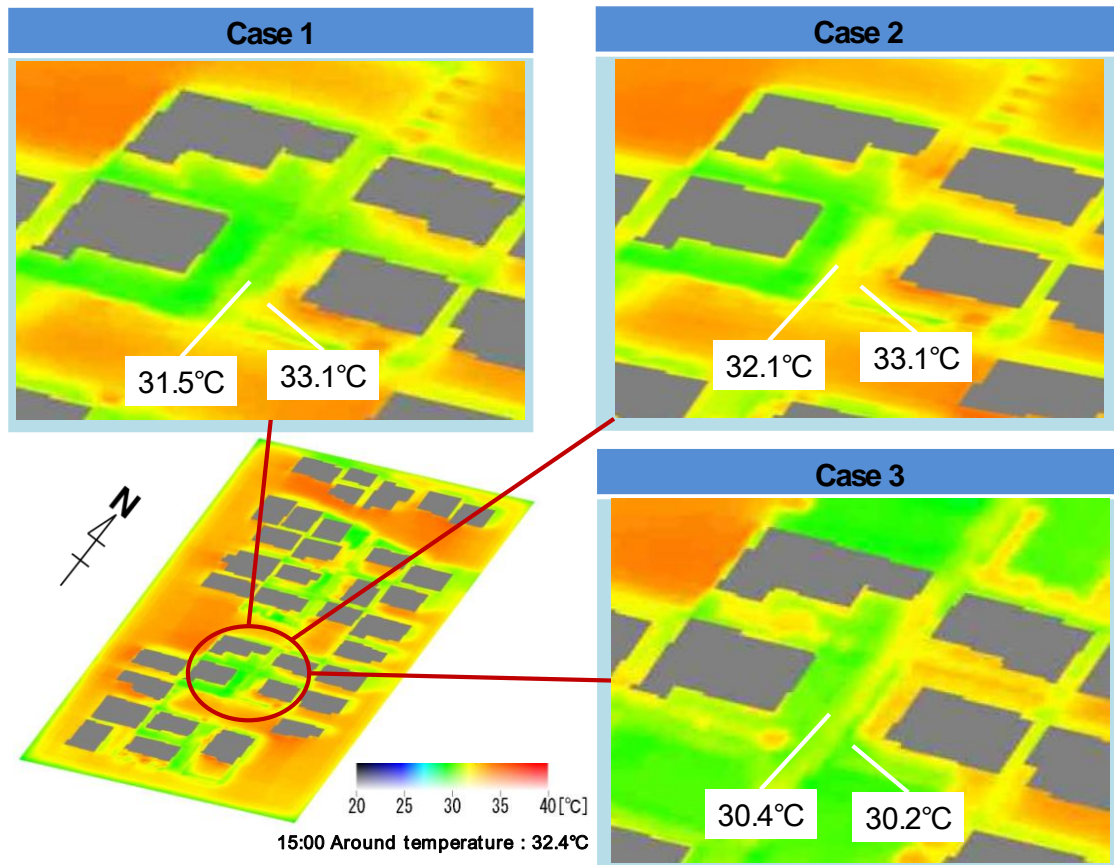
Fig. 5: MRT Distribution.

4.3.3 HIP Distribution

Figure 6 shows the HIP distribution of Case 3, in which the entire asphalt surface was compared with the grass/permeable pavement and green coverage was increased with vegetation, tree planting, improved artificial coverage, and a green roof. As a result, Case 3 with increased green coverage showed the temperature 10℃ lower than Case 2, and 5℃ lower than the grass pavers.

That is, higher HIP means a greater difference between the surface temperature and air temperature and also a greater amount of sensible heat emitted into the air, which is a major cause of a heat island. Such a situation may occur due to artificial coverage, the shape of the surface, a heat source, a water source, and so on. In particular, Figure 6 shows that artificial materials such as concrete and asphalt greatly contributed to heat accumulation and emission. The shape of the surface is closely related with radiant heat and cooling effects of wind may affect the temperature as well. In conclusion, increasing green coverage within the entire built environment is effective in improving the thermal environment than partial greening in the area.
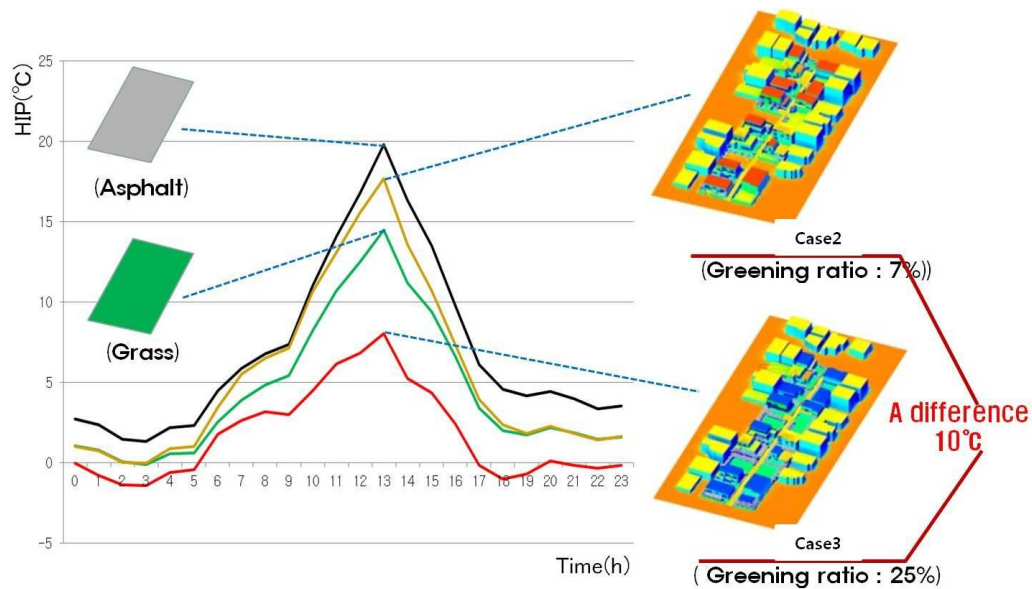
Fig. 6: HIP Distribution.

4.3.4 Wind velocity

Not only the air temperature but also wind velocity affects the human senses and behaviors, and wind is an important factor in creating a thermal comfort environment especially within a detached housing area. Figure 7 shows how the wind velocity affects the surface temperature during the daytime. It was observed that the surface temperature of the built environment went down when the wind velocity increases.
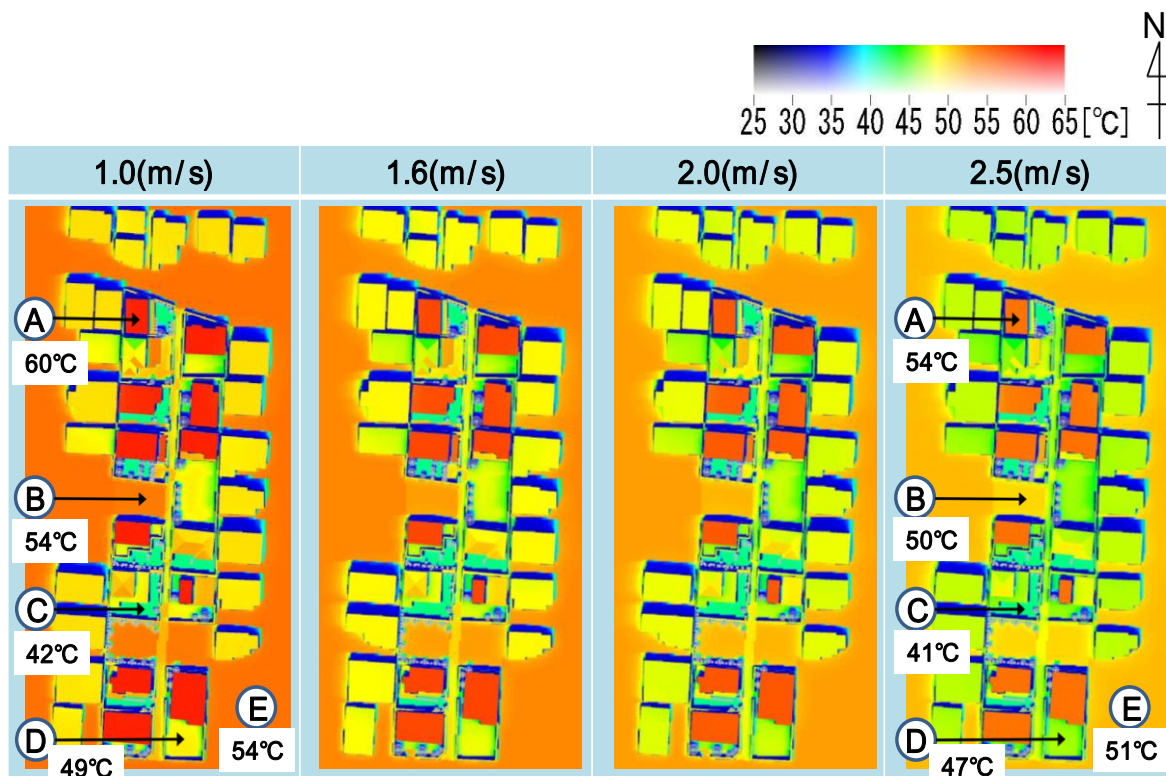
Fig. 7: Surface temperature distribution according to the wind velocity

The HIP values in Table 2 indicate the same results. Table 2 shows changes in the HIP values as the amount of sensible heat, emitted from the surface of the outdoor space, is high in the air due to direct solar radiation from sunrise to sunset. The direct solar radiation increased the surface temperature of the outdoor space during the daytime, which led to a rise in sensible heat in the air, and the changes in the wind velocity may cause dispersion of sensible heat and thus affect the temperature.

Time (h)	Wind velocity(m/s)				Time (h)	Wind velocity(m/s)			
	1.0	1.6	2.0	2.5		1.0	1.6	2.0	2.5
0	2.15	2.10	2.09	2.05	12	15.89	15.45	14.96	14.21
1	1.84	1.79	1.76	1.74	13	19.45	18.14	17.36	16.35
2	1.14	1.08	1.06	1.02	14	15.88	14.73	14.49	13.53
3	1.00	0.94	0.93	0.91	15	12.26	11.91	11.81	11.49
4	1.70	1.67	1.66	1.61	16	8.69	8.51	8.43	8.26
5	1.78	1.76	1.75	1.70	17	5.45	5.30	5.26	5.11
6	3.62	3.57	3.56	3.54	18	3.93	3.83	3.78	3.67
7	5.02	5.00	4.99	4.95	19	3.44	3.35	3.30	3.21
8	5.94	5.90	5.90	5.88	20	3.62	3.53	3.51	3.44
9	6.63	6.59	6.58	6.57	21	3.20	3.12	3.10	3.03
10	10.11	10.08	10.07	10.06	22	2.68	2.62	2.60	2.54
11	12.88	12.83	12.79	12.70	23	2.82	2.74	2.73	2.66

Table 2: HIP by changes in wind velocity. Unit : HIP(°C)

However, it was observed that existence of a fence did not significantly affect the temperature. Figure 8 shows that with the same wind velocity (2m/s) the surface temperature distribution was not significantly affected by the existence of fence but by materials of the ground, vegetation, trees, and so forth.
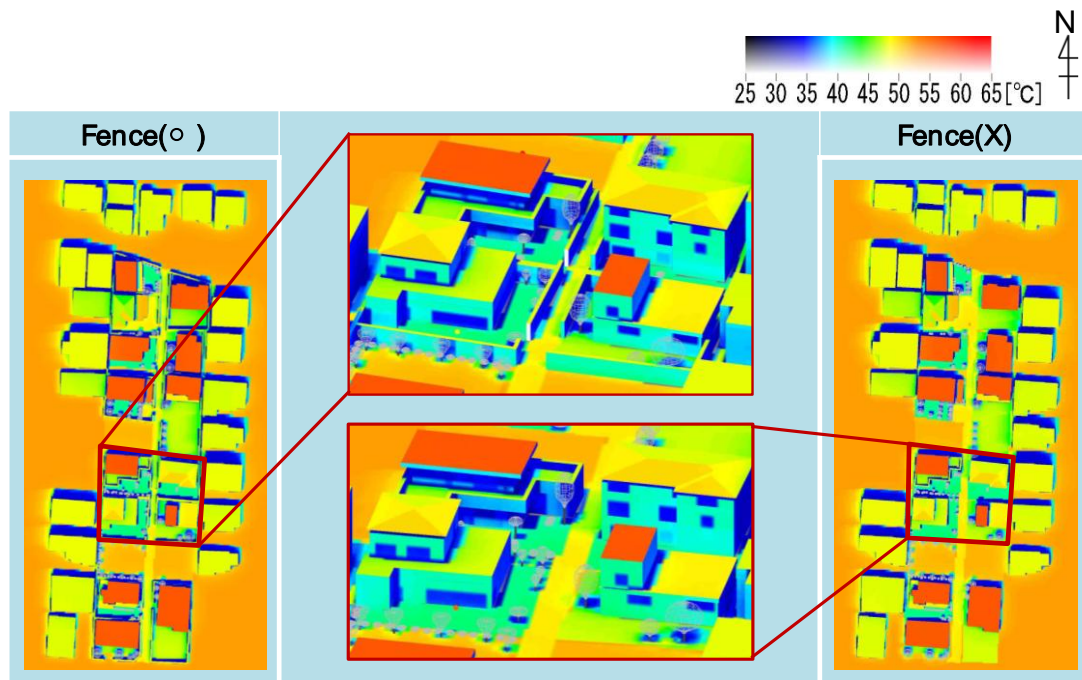
Fig. 8: Surface temperature distribution due to the presence of the fence.(wind velocity: 2m/s)

4.3.5 Tree planting

Various circumstances and methods should be taken into account in order to improve the thermal environment. Particularly, a site facing the west, which has the highest reflected heat from the ground or built structures around 15:00 should be considered sufficiently when greening methods are used to lower the surface temperature. Hence, this study also examined the temperature distribution according to the height of trees. Figure 9 shows that higher trees are more effective in blocking solar radiation and thus lowering the temperatures.
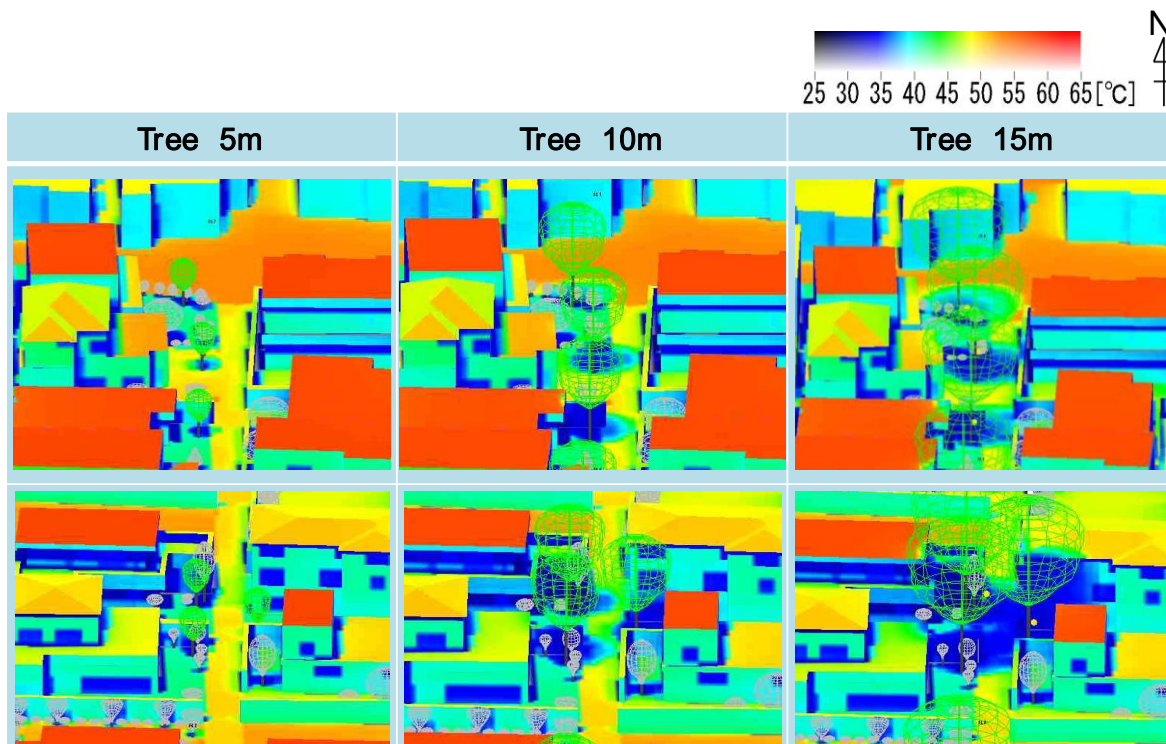
Fig. 9: Surface temperature distribution according to the height of trees

5   CONCLUSION

The purpose of this study is to increase thermal comfort within a detached housing area by improving the thermal environment. Therefore, it suggests application of various greening methods, taking into account the materials and shape of the outdoor space, as a systematic approach to reducing sensible heat by lowering the surface temperature.

As to Case 1 and Case 2, there was no significant difference in the surface temperatures within the detached housing area, but Case 1 showed lower surface temperature distribution around the fence due to shade during the daytime. Case 3 showed the low surface temperature distribution of 10℃ around the planted trees during the daytime and temperature of 15℃ around the green roof. With respect to MRT the green roof showed a temperature difference of 3℃ or more and the vacant land covered by the grass also showed a difference of 2~3℃. In addition, Case 3 with increased green coverage showed the temperature 10℃ lower than Case 2.

Meanwhile, changes in the wind velocity may cause dispersion of sensible heat and thus affect the temperature. And higher trees are more effective in blocking solar radiation and lowering the temperatures.

The study results indicate that controlling the surface temperature of the built environment is critical to improving the thermal environment and increasing thermal comfort within the detached housing area. Because wind and humidity as well as temperatures affect human senses and behaviors, the shape and layout of space should allow a constant and effective flow of wind within a detached housing area.

Therefore, it is important to predict and assess the thermal environment at an early stage, using computer simulations, to design pleasant space in terms of the thermal environment. However, it may not be practical to identify thermal characteristics of a detached housing area within limited time. Hence, we can analyze thermal characteristics identified from simulations in order to provide effective feedback for space design.

It is possible to identify and analyze thermal characteristics, using the data of HIP or the surface temperature distribution provided by simulations, and to utilize the results for another space design. Therefore, it is significant that this study has identified the thermal characteristics of an actual detached housing area and explored the possibility that the results can be used as effective indicators for designing general residential space and for determining when to carry out thermal environment analysis.

6 ACKNOWLEDGEMENT

7 REFERENCES

Givoni B, Noguchi M, Saaroni H, Pochter O, Yaacov Y, Feller N, Becker S. 2003. Outdoor comfort research issue. Energy & Buildings 35, 77-86.

He J, Hoyano A, Asawa T. A numerical simulation tool for predicting the impact of outdoor thermal environment on building energy performance. Applied Energy 2009; 86; 1597-1600.

Hoyano A, Asawa T, Murakami A, Sato R, Nakaohkubo K. 2007. 3D-CAD Modelling of a Substantial Urban area and Heat Island Potential of Urban Blocks in Summer. J. Archit. Plann. Environ 312, 97-104

Jiwon R et al. Study on evaluation of thermal environment following alleviation of limit on number of floors of apartment complex. Real CORP2011;929.

Jiwon R et al. 2011. Evaluation of Thermal Environment of External Space following the Fence Demolition Campaign in Detached Housing Area, Journal of the Korean housing association 23, 1-8.

Jiwon R, Eungho J, Hoyano A. 2011. A study on environment following the alleviation of the limit on number of floors of apartment, Journal of the Korean housing association 22, 93-100.

Jurges W. Der Wameubergang an einer ebenen Wand. Beihefte Zum Gesundheits-Ineenieu 1924;19 (in German).

Mayer H, Holst J, Dostal P, Imbery F, Schindler D. 2008. Human thermal comfort in summer within an urban street canyon in Central Europe. Meteorol Z 17, 241–250.

Nikolopoulou M, Lykoudis S. 2007. Use of outdoor spaces and microclimate in a Mediterranean urban area. Build Environ 42, 3691–3707.

Nikolopoulou M, Steemers K. 2003. Thermal comfort and psychological adaptation as a guide for designing urban spaces, Energ Build 35, 95–101.

Oliveira S, Andrade H. 2007 An initial assessment of the bioclimatic comfort in an outdoor public space in Lisbon, Int J Biometeorol 52, 69–84.

Yoon Y H, Park B J, Kim W T, Park S Y. 2008. Factor analysis of the relation between land cover ratio of green spaces and temperature, Journal of the Environmental Sciences 17, 485-491

Alpine Stadt-Landschaften. Beobachtungen zur Rolle von Freiräumen im Tiroler Inntal aus Sicht des Landscape Urbanism

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1 ABSTRACT

Die rasante Entwicklung der baulichen Strukturen des Tiroler Inntales treibt den Prozess des Zusammenwachsens von Siedlungsgebieten weiter voran. Dies wirft die Frage auf, welche Rolle den noch unbebauten und zum Teil agrarisch genutzten Flächen in Zukunft zukommen kann und wie mit diesen Flächen aus planerischer Sicht umgegangen werden soll.

Der von Rem Koolhaas im Wettbewerbsbeitrag zum Parc de la Villette in Paris und im Zusammenhang des Projektes Melune-Sénart formulierte Ansatz und die von Charles Waldheim James Corner formulierten Idee des landscape urbanism bilden dafür die theoretische Grundlage. Durch die Auswertung von Luftbildern, qualitativen und quantitativen Daten wie auch durch planliche Darstellungen wird gezeigt, dass im Umgang mit der weiteren Entwicklung des Inntales dem Thema der Landschaft eine neue Rolle zugewiesen werden muss.

Freiräume können nicht mehr alleine als landwirtschaftliche Produktionsflächen bzw. als Restflächen betrachtet werden. Vielmehr ist ein Perspektivenwechsel notwendig, der die heute noch unbebauten Flächen als zukünftige Parklandschaften eines immer stärker urbanisierten Raumes definiert.

2 EINLEITUNG

Der Prozess der Urbanisierung schreitet mit höherem Tempo, steigender Intensität und in globalem Maßstab voran. Zunehmend befinden wir uns in landschaftsverbrauchenden, automobilabhängigen Siedlungsstrukturen, in denen der historisch geprägte Kern nur mehr einen Bruchteil der Gesamtfläche ausmacht. Das Ensemble von Funktionen, die ursprünglich Wesen des Zentrums ausmachten, hat sich inzwischen entlang der Mobilitätsachsen auf das gesamte Stadtgebiet verteilt. Diese Entwicklung weicht dramatisch von den seit Jahrzehnten als erstrebenswert formulierten Zielen einer nachhaltigen Stadtentwicklung ab.

Klassische Methoden und Instrumente, wie etwa ein Bebauungsplan, stoßen bei Planungsaufgaben im Zusammenhang mit der Stadt von heute oftmals die Grenzen ihrer Effektivität bzw. unterstützen diese Instrumente das inselhafte Betrachten und Entwickeln von Städten. Häufig verstreichen lange Planungsphasen, bis Pläne von der Idee bis zur Umsetzung gelangen. Nicht selten verändern sich aber die Ausgangsbedingungen schon während der Planung, sodass ein Nachjustieren oftmals nur schwer möglich ist.

Aus diesem Grund konzentriert sich die Aufmerksamkeit von Theoretikern verstärkt auf das Thema Landschaft. Immer mehr Planerinnen und Planer bezweifeln die Lösungen des – nahezu ausschließlich vom Hochbau geprägten – Städtebaus des 20. Jahrhunderts. Als Alternative propagieren sie den freiraumbasierten Städtebau.

Gerade in einem – von der Natur und der Landschaft stark geprägten – Raum wie den Alpen, liegt es angesichts fortschreitender Urbanisierung nahe, Landschaft wesentlich stärker einzubeziehen, als das bei der Entwicklung des Siedlungsraumes seit dem Beginn des 20. Jahrhunderts der Fall war. Bis dahin waren die ebenen Flächen für den Anbau landwirtschaftlicher Produkte die wichtigste und wertvollste Voraussetzung. Bei der Wahl der Standorte von einzelnen Gebäuden und ganzen Ortschaften versuchte man möglichst flächensparend vorzugehen, die Gebäude wurden meist regelrecht in die Landschaft eingebettet. In einigen hochalpinen Siedlungen ist dieses ressourcenschonende Prinzip nach wie vor erkennbar und wird – wie etwa das Beispiel Vrin, einem Ort in den Schweizer Alpen zeigt –, bis heute beachtet.

In den meisten alpinen Regionen haben in den letzten Jahrzehnten aber dramatische Veränderungen in die genau entgegengesetzte Richtung stattgefunden. Die Region Nordtirol und hier vor allem der Raum Inntal können dafür geradezu als Paradebeispiel gelten. Fast nirgends mehr entspricht das Siedlungsbild den Vorgaben des Landschaftsraumes, im Gegenteil, innerhalb der letzten Jahrzehnte haben sich die Siedlungsräume immer weiter in noch unbebaute Landschaftsflächen hineingefressen. Es scheint mehr als zweifelhaft, ob hier sowohl die vorhandenen Regelwerke als auch die angewandten Planungsinstrumente

überhaupt geeignet sind, den fortschreitenden Prozess der Urbanisierung flächensparend und nachhaltig zu steuern.

In diesem Beitrag wird das Konzept des landscape urbanism, auf einen konkreten Ausschnitt des Tiroler Inntales angewandt. Die Annahme lautet, dass sich landschaftsorientierte Ansätze zur Analyse und Lösung der Probleme dieses Raumes besonders eignen. Es wird deutlich, dass es beim planerischen Umgang mit dem fortschreitenden Urbanisierungsprozess einer radikalen Neuorientierung bedarf. In diesem Sinne wird hier der freiraumbasierte Städtebau als mögliche Alternative zu den bisherigen Planungsansätzen für das Inntal vorgestellt.

Der Beitrag gliedert sich in drei Teile. Im ersten Teil rekonstruiere ich die Entstehung der landschaftsorientieren Ansätze im Kontext der Städteplanung. Der zweite Teil beschreibt die Phänomene der Urbanisierung im Raum Inntal. In Teil drei werden die Möglichkeiten der praktischen Anwendung dieser Ansätze erörtert.

3   LANDSCHAFT ALS PLANUNGSINSTRUMENT

Diejenigen Kräfte, welche die massive Ausbreitung der Siedlungsräume weiter vorantreiben, sind durch herkömmliche Planungsinstrumente nicht mehr zu bewältigen. Es bedarf neuer Ansätze, die auf das weiter beschleunigende Wachstum der Städte und den fortschreitenden Prozess der globalen Urbanisierung reagieren. Gerade hierin liegt nach Ansicht der Protagonisten des landscape urbanism dessen eigentliche Bedeutung.

Schon in den 1980er Jahren hatte Rem Koolhaas bemerkt, dass das „Gebaute, das Volle [...] unkontrollierbar geworden" sei, „dem Strudel der politischen, finanziellen und kulturellen Kräfte ausgeliefert und damit einer unaufhörlichen Veränderung unterworfen". Seiner Meinung nach gelte das nicht für Leerräume und vielleicht seien sie sogar „der letzte Ort, wo Gewissheiten noch Sinn machen können".[1]

In der Diskussion um die Stadtentwicklung und den damit verbundene Wandel des „Urbanen" wurden seit dem Beginn der 1990er Jahre eine Reihe von Begriffen eingeführt. Unter Bezeichnungen wie Edge City[2], Exopolis und Fractal City[3], Netzstadt[4] versuchte man, die verschiedensten Facetten und die Pluralität von Städten zu fassen. All diesen Konzepten gemeinsam ist, dass Stadt nicht mehr als ein klar ablesbares Konstrukt aus Zentrum und Peripherie verstanden wird. Vielmehr schieben sich die verschiedensten Bereiche und Themen der Stadt in- und nebeneinander und erzeugen damit insgesamt zersplitterte Stadtstrukturen. Gleichzeitig überlagern sich auch urbane und rurale Strukturen, wodurch sich die Grenzen zwischen „Stadt" und „Land" mehr und mehr auflösen. Neben den infrastrukturellen Einrichtungen, die bis vor kurzem noch ausschließlich in Städten und deren Zentren anzutreffen waren, sind es vor allem urbane Lebensstile, die in vermeintlich ländlichen Räumen Fuß fassen und mit dem Wandel sozialer Milieus auch die Entstehung von Hybridräumen bewirken.

Colin Rowe wie auch Thomas Sieverts haben in den 1990er Jahren Raumstrukturen beschrieben, die weder als Stadt noch als Land zu verstehen seien und Merkmale von beidem aufweisen würden. Sie prägten dafür die Begriffe middle landscape[5] und Zwischenstadt[6]. Als dem verbindendenden Element zwischen urbanen und ländlichen Räumen spricht Sieverts dabei dem Thema der Landschaft eine besondere Rolle zu: Solange die Zwischenstadt „insgesamt in ihrem Erschließungsnetz lesbar" und insbesondere „wie ein ‚Archipel' in das ‚Meer' einer zusammenhängend erlebbaren Landschaft eingebettet" bleibe, könne sie „eine beliebige Vielfalt von Siedlungs- und Bebauungsformen entwickeln".[7]

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[1] KOOLHAAS, Rem: Melun-Senart. In: Arch+ Zeitschrift für Architektur und Städtebau, Nr. 105/106, Arch+ Verlag GmbH, Aachen 1990, S. 78

[2] GARREAU, J., 1991. Edge City: Life on the new frontier. New York: Doubleday

[3] SOJA, E. D., 1992. Inside Exopolis: Scenes from Orange County. In: 1992. M. Sorkin ed. Variations on a Theme Park. New York: The Noonday Press, pp. 94–122.

[4] BACCINI, P. and OSWALD, F., 1998. Netzstadt: Transdisziplinäre Methoden zum Umbau urbaner Systeme. Ergebnisse aus dem ETH-Forschungsprojekt Synoikos – Nachhaltigkeit und urbane Gestaltung im Raum Kreuzung Schweizer Mittelland. Zürich: vdf Hochsch.-Verl. an der ETH

[5] ROWE, Colin: Making a Middle Landscape. MIT Press, Cambridge, Massachusetts 1991

[6] SIEVERTS, Thomas: Zwischenstadt. Zwischen Ort und Welt, Raum und Zeit, Stadt und Land. 3., verb. und um ein Nachw. erg. Aufl. Braunschweig, Wiesbaden: Vieweg (Bauwelt-Fundamente Stadtplanung/Urbanisierung, 118) 1999.

[7] ebd., S. 20

1997 prägte Charles Waldheim bei der gleichnamigen Konferenz und Ausstellung in Chicago den Begriff des landscape urbanism. Er beschreibt die Praktiken verschiedener Disziplinen, für welche die Landschaft – im umfassenden Sinne verstanden – die Architektur als wichtigstes Planungsinstrument im Städtebau ersetzt hat. Die Vorstellung der dezentralen, post-industriellen Stadt rückt den übriggelassen Raum, also den leeren Raum, in den Vordergrund. Die Landschaft, so Waldheim, wird damit zur Linse durch welche sich die zeitgenössische Stadt repräsentiert und zum Medium, durch welche sie konstruiert wird.[8]

Unter landscape urbanism versteht man mit Waldheim demnach eine auf den Zwischenraum fokussierte Planungsdisziplin, die mit den Räumen zwischen den Gebäuden, mit Infrastruktursystemen und natürlichen Ökosystemen arbeitet. Vor allem im Kontext der Dezentralisation, dem Ausufern der Siedlungsräume und der abnehmenden Siedlungsdichte erweisen sich traditionelle Planungsstrategien als unbrauchbar, weil sie zu kostenintensiv, zu langsam und auch zu unflexibel sind, um sich den rasch verändernden Bedingungen der heutigen Stadt anpassen zu können.

Die aktuellen Vertreter des landscape urbanism aus dem Umkreis von Charles Waldheim und James Corner kritisieren die Unfähigkeit von Architektur und Städtebau, kohärente und kompetente Erklärungen für die zeitgenössische Stadt anzubieten. Sie stellen dem das Konzept des landscape urbanism gegenüber, bei dem die Landschaft als das Organisationselement der Stadt fungieren soll und zusammenhängende Strukturen schaffen kann.

Für James Corner liegt der Ursprung des landscape urbanism in der Kritik der Postmoderne an der modernistischen Architektur und am modernen Städtebau [9]. Bekanntlich warfen ja vor allem Jane Jacobs [10] und auch Robert Venturi[11] den Modernisten vor, dass sie mit ihren Ideologien und realisierten Projekten nicht nur keine sinnstiftenden und lebenswerten öffentliche Bereiche schaffen, sondern sogar noch dazu beitragen würden, den Prozess der Dezentralisierung massiv zu beschleunigen.[12] In der Postmoderne wurden die Werte der historischen Stadt geradezu wieder neu entdeckt. Werte bzw. Konzepte wie die Stadt der kurzen Wege, die Bedeutung des durchgehenden Straßenrasters oder auch das Thema der kontextuellen Architektur wurden damals als wesentlich erachtet.[13] Allerdings konnte auch die Rückbesinnung auf diese Werte das weitere Ausufern der Städte nicht verhindern.

Im landscape urbanism wird die Landschaft zum Medium, das nicht nur den Umgang mit temporären Situationen, Transformations- und Anpassungsprozessen, sondern auch mit deren unterschiedlichen Intensitäten ermöglicht. Die wahrnehmbare Landschaft erscheint darin nicht nur als das formale Ergebnis fortschreitender Urbanisierung, sondern auch als Modell für den Prozess selbst. [14] Insofern als er nicht nur die naturgegebenen Bereichen, sondern auch die technischen Infrastrukturen, Industrieflächen und solche Flächen umfasst, die im Zuge des Wachstums der Städte entstehen, ist der Begriff von Landschaft in einem weiteren Sinn zu verstehen. Für landscape urbanism ergeben Freiraum und Landschaft eine Gesamtheit. Corner stellt fest, dass die verschiedenen Disziplinen der Landschaftsarchitektur, des Städtebaus und der Raumplanung sich in bestimmten Aspekten einander nähern und mit ihren Arbeitsweisen „toward a shared form of practice"[15] tendieren. Auch Corner räumt dem Thema der Landschaft zentrale Bedeutung ein. Die Verbindung der Begriffe landscape und urbanism in landscape urbanism unterstreicht den Zusammenhang und die Vielschichtigkeit des Konzept.[16]

Rem Koolhaas beschritt diesen Weg schon viel früher. Sein Wettbewerbsbeitrag zum Parc de la Villette in Paris im Jahr 1982 gilt als eines der ersten Projekte, in dem das Thema der Landschaft als strukturgebendes Element entfaltet wurde. Koolhaas wollte einen Park, der sich – um den immer schneller und häufiger

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[8] WALDHEIM, Charles: Landscape as Urbanism. In: The Landscape urbanism Reader, Princeton Architectural Press, New York 2006, S. 15

[9] ebd., S. 38

[10] JACOBS, Jane: Death and Life of Great American Cities, Vintage Books, New York 1961

[11] VENTURI, Robert: Complexity and Contradiction in Architecture, Museum of Modern Art, New York 1966

[12] CORNER, James: Terra Fluxus. In: The Landscape urbanism Reader, Princeton Architectural Press, New York 2006, S. 38

[13] ebd., S. 39

[14] CORNER, James: Terra Fluxus. In: The Landscape urbanism Reader, Princeton Architectural Press, New York 2006, S. 39

[15] ebd., S. 23

[16] ebd., S. 23

wechselnden Anforderungen der Gesellschaft gerecht zu werden – ständig verändern und den Bedürfnissen anpassen können sollte. Je stärker die Veränderungs- und Anpassungsprozesse das Wesen des Parks und seine sozialen Angebote bestimmen würden, desto besser würde der Park funktionieren. Koolhaas schlug deshalb ein Programm vor, in dem sich Bestimmtheit und Unbestimmtheit miteinander verbinden. Als bestimmendes Element sah er die Landschaft, die er streifenförmig über die gesamte Fläche einteilte. Diese Streifen wurden mit unterschiedlichen Inhalten versehen, wobei die Inhalte selbst an veränderte Bedürfnisse angepasst und mit neuen Inhalten versehen werden könnten. Der Park sollte durch die vorgegebene Infrastruktur organisiert und strukturiert sein und gleichzeitig unterschiedlichen Nutzungsansprüchen gegenüber offen sein.[17] Es blieb beim Konzept, das Projekt wurde nicht realisiert.
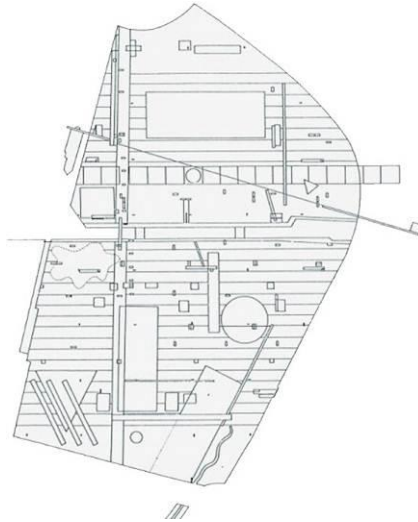
Fig. 1: Parc de la Villette. Rem Koolhaas/OMA

Ein weiterer Meilenstein auf dem Weg zum Konzept des landscape urbanism ist das von Koolhaas im Jahr 1987 erarbeiteten Projekt für die französische Stadt Melun-Sénart. Hier entwickelte Koolhaas seinen Ansatz der strukturschaffenden Organisation durch Landschaft weiter. In diesem Zusammenhang bemerkt er dazu:

„Der Kern unseres Projekts ist ein System von Leerräumen mit öffentlichen Funktionen die zugleich den Zugang zu den urbanen Nutzungen garantieren. Einige Leerräume konservieren Teile der existierenden Landschaft.“[18]
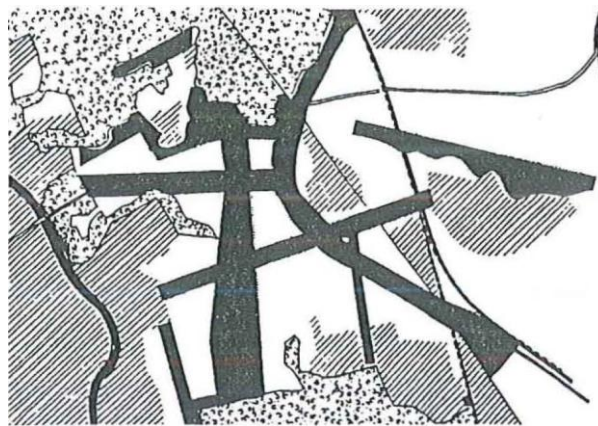
Fig. 2: Melun-Sénart. Rem Koolhaas/OMA

Den politischen, kulturellen und finanziellen Unsicherheiten, die bei der Planung einer neuen Stadt gegeben sind, stellte er ein tragfähiges Gerüst zu Verfügung. Die Basis bildeten mehrere, mit einander verwobene Landschaftsstreifen. Die zwischen ihnen liegenden Inseln waren für den Bau der Stadtviertel vorgesehen. Welche architektonische, städtebauliche Ausprägung diese Inseln auch immer bekommen würden, mit der

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[17] WALDHEIM, Charles: Landscape as Urbanism. In: WALDHEIM, Charles ed.: The Landscape urbanism Reader, Princeton Architectural Press, New York 2006, Seite 40

[18] KOOLHAAS, Rem: Melun-Senart. In: Arch+ Zeitschrift für Architektur und Städtebau, Nr. 105/106, Arch+ Verlag GmbH, Aachen 1990, Seite 79

Zeit würde durch die vorgegebene Landschaft als Verbindungselement eine Stadt werden, die auf Unsicherheiten und den ständigen Wandlungsprozessen reagieren könne.

Koolhaas war damit einer der ersten, der den landschaftsorientierten Entwurfsansatz im Rahmen eines Stadtentwicklungsprojektes anwandte. Seit den 1990er Jahren setzten auch andere Entwurfsbüros diese Ansätze fort. Das niederländische Büro West8 mit ihren vielschichtigen Projekten, wie auch das Schweizer Büro Latz und Partner, die für Projekte im Rahmen der Entwicklung des IBA Emscherparkes (D) verantworlich zeichnen, können hier als wichtige Protagonisten genannt werden. Es zeigt sich damit, dass dieser aktuelle Trend der Stadtentwicklung im Kontext mit der Thematik der Landschaft vor allem im europäischen Kontext zunehmend an Bedeutung gewinnt und aus diesem Gesichtspunkt stellt sich die Frage, ob das theoretische Konzept des landscape urbanism auch dazu geeignet ist, dem durch die alpine Bergwelt stark geprägten und immer stärker urbanisierten Raum Tirol eine neue planerische Perspektive geben zu können, die mit den wechselnden lokalen und globalen Einflussfaktoren produktiver umgehen kann, als es bisherige Planungsinstrumente können.

4 RESTRAUM TIROL

Zur Überprüfung der These, dass sich landschaftsorientierte Ansätze zur Analyse und Lösung der Probleme dieses Raumes besonders eignen, wurde ein Ausschnitt des Inntales in Tirol (Österreich) ausgewählt, in dem der Prozess der Urbanisierung zu einem mittlerweile unklaren Siedlungsbild geführt hat. Das Untersuchungsgebiet liegt zwischen dem östlichen Rand der Stadt Innsbruck und der etwa 15 km davon entfernten Gemeinde Wattens. Auf Grund seiner Nähe zu Innsbruck und seiner Einbettung in die eindrucksvolle Bergwelt Tirols gilt dieser Raum als besonders attraktiv.

Fig. 3: Projektgebiet

Bei der Untersuchung des Projektgebietes kamen mehrere Forschungsmethoden und Auswertungswerkzeuge zur Anwendung. Neben der quantitativen Auswertung statistischer Daten wurden historische und aktuelle Luftbilder ausgewertet und die Veränderungen grafisch markiert. Während des Untersuchungszeitraumes fanden mehrfach Begehungen innerhalb des Projektgebietes statt, die mittels Fotografien dokumentiert wurden. Zu den Fragen der strategischen Ansätze für die räumliche Entwicklung der Gemeinden wurden die Örtlichen Raumordnungskonzepte ausgewertet. Die erhobenen Daten bildeten die Grundlage für den daran anschließenden Schritt der Anwendung des Konzeptes des landscape urbanism im Rahmen eines Konzeptentwurfes für ein räumliches Entwicklungskonzept für die Projektregion.

Das Inntal insgesamt ist der Hauptsiedlungsraum Tirols. Die siedlungsräumliche Entwicklung dieses Tales hängt eng mit der Entwicklung der gesamten Region zusammen und dem damit verbundenen Wandel vom landwirtschaftlich geprägten Raum hin zu einem Raum der heute von den Anforderungen der Dienstleistungsgesellschaft geprägt ist.

Der Prozess der fortschreitenden Urbanisierung wird vor allem durch die steigende Bevölkerungszahl (1951: 27.781 EW; 2012: 53.635 EW[19] im Untersuchungsraum) und den steigenden Raumansprüchen der Menschen deutlich. Alleine im Zeitraum zwischen 1993 und 2012 wurden im Projektgebiet 1026 Gebäude mit Wohnungen errichtet.[20] Außerdem erfolgte ein massiver gesellschaftlicher Wandel von einer bäuerlich geprägten Gesellschaft hin zur Dienstleistungsgesellschaft. Ebenso hat der Ausbau der Mobilitätsachsen im

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[19] Statistik Austria, Volkszählungsergebnisse, Statistik der Standesfälle, Datenbank POPREG
[20] Statistik Austria, Wohnbaustatistik

Unterinntal – hier ist vor allem die Inntalautobahn zu erwähnen – und die massive Ausbreitung der Gewerbegebietsflächen unverkennbar Spuren hinterlassen.

Anhand der Auswertung historischer Luftbilder werden die Auswirkungen dieser Entwicklung deutlich sichtbar. Der Vergleich lässt unmissverständlich erkennen, dass in 1950er und 1960er Jahren noch relativ kompakte Siedlungsräume zu finden waren, während wir heute auf Siedlungsräume stoßen, in denen die Ortschaften miteinander verwoben und verwachsen sind. In der Abbildung Fig. 4 ist dieses Zusammenwachsen der Siedlungsstrukturen klar zu erkennen. Vor allem die Siedlungsform des Einfamilienhauses in Kombination mit dem steigenden Mobilitätsgrad hat zu dieser heute vorhandenen Siedlungsstruktur geführt. Ebenso haben aber auch die Entwicklungen entlang der Hauptmobilitätsachsen dazu beigetragen, dass sich der bebaute Raum massiv ausweitete. Hier wurden die Gewerbeflächen stetig ausgeweitet und so nehmen diese heute große Bereiche des Talbodens ein. Vor allem in den letzten 25 Jahren hat diese Entwicklung eine ziemliche Beschleunigung erfahren. Dies nicht zuletzt, weil auf Grund der finanziellen Situation vieler Gemeinden diese regelrecht gezwungen waren und heute immer noch sind neue Flächen für die Ansiedlung von Unternehmen bereitzustellen. So ist mittlerweile ein fragmentierter Raum entstanden, in dem die ursprünglichen Ortszentren nur mehr zum Teil als solche ablesbar sind. Viele Funktionen, die bis vor kurzem noch im Ortskern lagen, sind heute entweder entlang der Mobilitätsachsen angesiedelt oder im gesamten Raum verteilt zu finden.
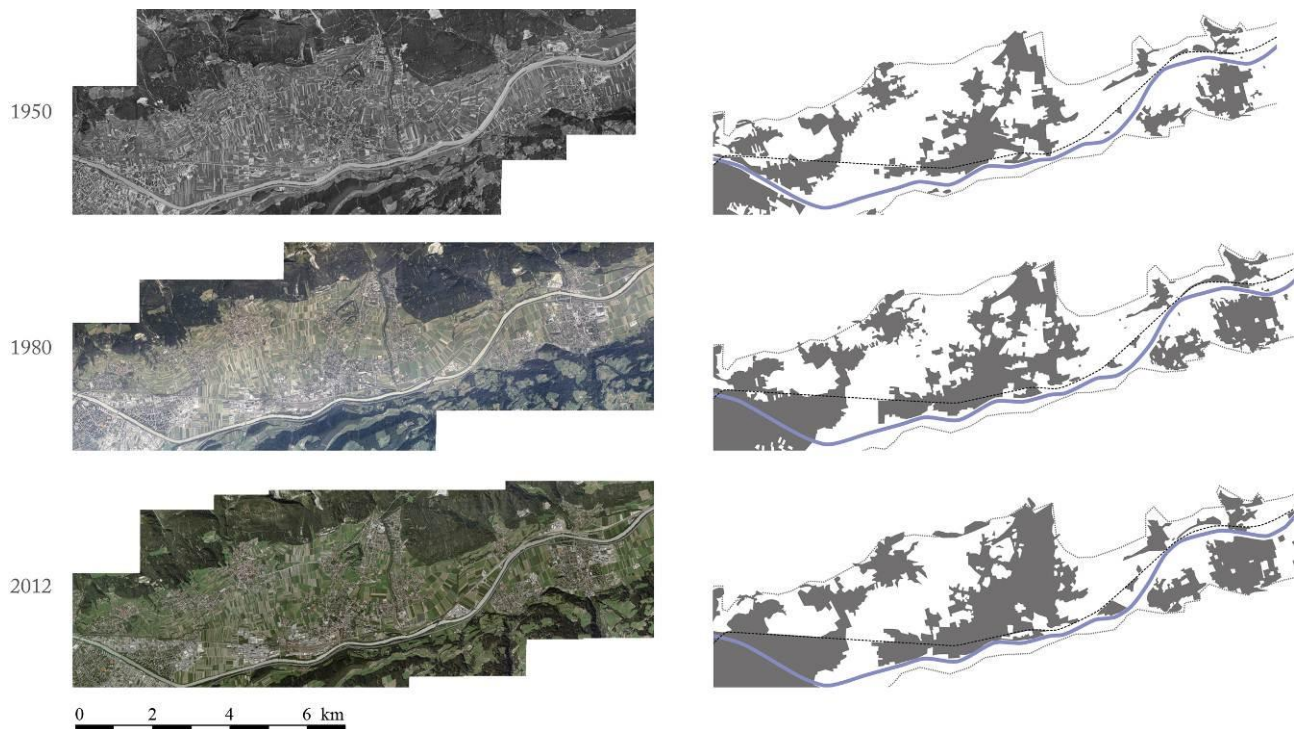
Fig. 4: Luftbildauswertung 1950, 1980, 2012

Auch die landwirtschaftlichen Flächen haben ihren Bedeutungsgehalt im Laufe der Zeit verändert. Prägten diese Flächen auf Grund ihres flächenmäßigen Anteils lange Zeit das Inntal, so werden diese Gebiete heute von der Bevölkerung oftmals nur mehr noch als Restflächen betrachtet. Diese Restflächen werden zwar landwirtschaftlich hochinfrastrukturell genützt und auch gewinnbringend bewirtschaftet, bei entsprechender Nachfrage und Druck werden sie aber stückchenweise immer weiter in bebaubares Gebiet umgewidmet.

Dieser Umwidmungsprozess erfolgt meist unter dem Gesichtspunkt, dass die Bebauung höhere finanzielle Einnahmen bringt als eine weitere landwirtschaftliche Nutzung. Das Ergebnis ist ein durch hunderte von Einzelentscheidungen geprägter Raum, in dem viele der vorhandenen räumlichen Qualitäten, wie beispielsweise differenzierte Siedlungs- und Naturräume sowie abwechselnde Raumsequenzen tendenziell zu verschwinden drohen oder sogar teilweise schon für immer verschwunden sind.
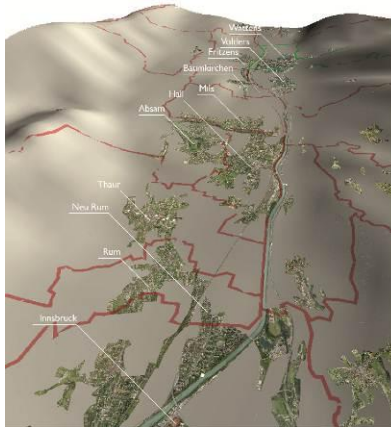
Wohngebiete   Gewerbegebiete   Grünräume
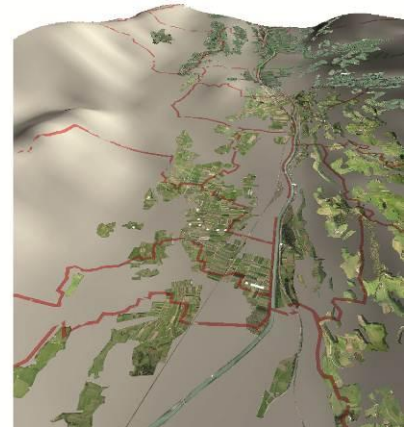
Fig. 5: räumliche Funktionsverteilung

Die Steuerung der räumlichen Entwicklung des Inntals passiert vor allem auf Gemeindeebene. Die räumlichen Überlegungen dazu werden zum Großteil aus dieser Sicht erarbeitet und umgesetzt. Der an sich richtige Ansatz, dass lokal gebundenes Wissen wichtig ist, um auf die vor Ort Gegebenheiten reagieren zu können, führt aber auch zu gewissen Problemen. Die Anzahl der Gemeinden, deren Planungen sich auf die Gesamtstruktur auswirken, sagt alles: 279 Gemeinden entscheiden darüber, wie die räumliche Entwicklung Tirols aussehen soll.

Im Rahmen von Örtlichen Raumordnungskonzepten sind die Gemeinden rechtlich verpflichtet, ihre zukünftige Entwicklung zu reflektieren und sie müssen dazu alle 10 Jahre strategische Ansätze für die weitere Entwicklung erarbeiten. Diese Örtlichen Raumordnungskonzepte müssen auch von der zuständigen Landesbehörde bewilligt werden. Der an sich richtige Ansatz, die Entwicklung der einzelnen Gemeinden über lokal gebundenes Wissens zu steuern, hat aber auch Nachteile. Die Örtlichen Raumordnungskonzepte betrachten nämlich jeweils nur das Gebiet innerhalb der jeweils eigenen Gemeindegrenzen. Gemeindeübergreifende Überlegungen spielen dabei so gut wie keine Rolle. Verstärkt wird dieses Problem dadurch, dass die jeweiligen Gemeinden meistens unterschiedliche Planungsbüros mit der Erarbeitung der Örtlichen Raumentwicklungskonzepte beauftragen. So weiß die eine Gemeinde nicht, was die Nachbargemeinde plant. Deutlich wird dies beispielsweise bei der Auswertung der aneinander grenzenden Gemeinden Wattens und Fritzens, die innerhalb des Projektgebietes liegen. Obwohl in Fritzens ein Regionalbahnhof liegt, an dem täglich allein 42 Züge halten die von hier nach Innsbruck fahren und die Gemeinde Wattens keine 100m von diesem Bahnhof entfernt auf der anderen Seite des Flusses Inn liegt, steht im Örtlichen Raumentwicklungskonzept, dass Wattens kein Öffentliches Personennahverkehrssystem (ÖPNV) besitzt und deshalb die Straßen weiter ausgebaut werden sollen.[21]

Um dem rein auf sich selbst bezogenen Planungsansatz der Gemeinden entgegenzuwirken ist im Jahr 2005 von Seiten der Tiroler Landesregierung die Bildung von insgesamt 36 Planungsverbänden (sowie einem eigenen Planungsverband für Innsbruck) beschlossen worden. Ein solcher Planungsverband wird durch den Zusammenschluss mehrerer Gemeinden gebildet. Aufgabe der Planungsverbände ist es an der Erstellung von Regionalprogrammen und -plänen mitzuarbeiten. Gleichzeitig sollen die Organe der Planungsverbände die Gemeinden in Angelegenheiten der örtlichen Raumordnung unterstützen. Eine zusätzliche fachliche Betreuung der Planungsverbände erfolgt durch die räumlich zuständigen Sachverständigen für Örtliche Raumordnung der Abteilung Landesentwicklung und Zukunftsstrategie des Landes Tirol.[22]

Dieses Instrument der Planungsverbände ist ein wesentliches Instrument zur Erarbeitung regionaler Entwicklungsansätze. Es wird jedoch nicht in dem Ausmaß eingesetzt, wie dies sinnvoll wäre. Vielerorts existieren die Planungsverbände (fast) nur auf dem Papier. Überlegungen, die über die Entwicklung von gemeinsamen Altenheimen und gemeinsamen Sportstätten hinausgehen, werden kaum angestellt. Ideen und Konzepte für eine gesamthafte räumlichen Entwicklung werden überhaupt nicht erörtert.

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[21] Örtliches Raumordnungskonzept der Gemeinde Wattens, 2012
[22] TIROLER LANDESREGIERUNG, http://www.tirol.gv.at/themen/landesentwicklung/raumordnung/regioro/planungsverbaende, (abgerufen am 26.2.2013)

5 ALPINE LANDSCAPE URBANISM

Es wurde deshalb der Versuch unternommen im Sinne des landscape urbanism das Projektgebiet zu betrachten und dazu ein Konzeptentwurf für ein räumliches Entwicklungskonzept erarbeitet. Anhand dieses Entwurfes wird deutlich, dass die heute vorhandenen Siedlungsräume nicht von landschaftlichen Resträumen umgeben sind. Vielmehr bieten diese Freiräume gemeinsam mit den im Raum vorhandenen Mobilitätslinien (Autobahn, Eisenbahn, Bundes- und Landesstraßen), dem Fluss Inn, wie auch unter Beachtung der Topografie des Raumes eine freiraumbasierte Struktur, die in weiterer Folge als tragfähiges Gerüst für den planerischen Umgang der Region dienen kann.

Damit die heute noch vorhandenen räumlichen Potentiale des Inntales auch noch für künftige Generationen zur Verfügung stehen, erscheint ein Paradigmenwechsel unumgänglich. Es ist dringend geboten, die Rolle der räumlichen Entwicklung aus einer neuen Perspektive heraus zu denken. Das Thema der Landschaft kann dafür der Schlüssel sein. Die Landschaft Tirols muss im umfassenderen Sinn des landscape urbanism verstanden werden.

Fig. 6: Inntal Parks

Die Grünräume sind gemeinsam mit den vorhandenen Infrastrukturen, den Siedlungsräumen und den Bergen als Landschaft zu verstehen. Erst durch dieses umfassende Verständnis von Landschaft werden die neuen räumlichen Potentiale der Region deutlich. Aus dieser Perspektive sind Grünräume nämlich nicht mehr „nur" landwirtschaftliche Restflächen, die zwischen den Siedlungsgebieten liegen. Stattdessen hat aus der Perspektive des landscape urbanism das Inntal viel mehr mit Räumen wie dem Ruhrgebiet oder auch der niederländischen Randstad gemeinsam als bisher angenommen. Die landwirtschaftlich genutzten und ungenutzten Flächen können als die Tiroler Variante des Parc de la Villette betrachtet werden. Sie sind die zukünftigen Parkanlagen (Inntal Parks) eines urbanisierten Inntales und bilden so eine tragfähige Struktur bei der weiter fortschreitenden Urbanisierung des Inntales.
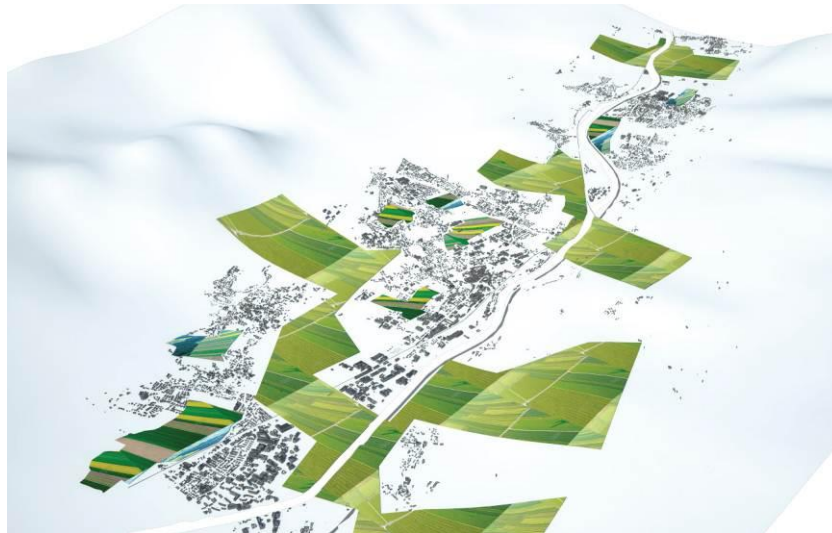
Fig. 7: Inntal Parks

6 LITERATURLISTE

CORNER, James: Terra Fluxus. In: The Landscape urbanism Reader. Princeton Architectural Press, New York 2006, Seite 21-33

JACOBS, Jane: Death and Life of Great American Cities. Vintage Books, New York 1961

KOOLHAAS, Rem: Melun-Senart. In: Arch+ Zeitschrift für Architektur und Städtebau, Nr. 105/106, Arch+ Verlag GmbH, Aachen 1990, Seite 78-80

KOOLHAAS, Rem; MAU, Bruce: S, M, L, XL. 010 Publisher, Rotterdam, 1995

KOOLHAAS, Rem: Stadt ohne Eigenschaften / Generic City. In: Arch+ Zeitschrift für Architektur und Städtebau, Nr. 132, Arch+ Verlag GmbH, Aachen 1990, Seite 18-27

KOOLHAAS, Rem (1998): IIT Student Center Competition Adress. In: WALDHEIM, Charles ed.: The Landscape urbanism Reader, Princeton Architectural Press, New York 2006, Seite 42

ROWE, Colin: Making a Middle Landscape. MIT Press, Cambridge, Massachusetts 1991

SIEVERTS, Thomas: Zwischenstadt. Zwischen Ort und Welt, Raum und Zeit, Stadt und Land. 3., verb. und um ein Nachw. erg. Aufl. Braunschweig, Wiesbaden: Vieweg (Bauwelt-Fundamente Stadtplanung/Urbanisierung, 118) 1999.

SHANNON, Kelly: From Theory to resistance: Landscape urbanism in Europe. In: WALDHEIM, Charles ed.: The Landscape urbanism Reader, Princeton Architectural Press, New York 2006, Seite 141-161

VENTURI, Robert: Complexity and Contradiction in Architecture, Museum of Modern Art, New York 1966

WALDHEIM, Charles: Landscape as Urbanism. In: WALDHEIM, Charles ed.: The Landscape urbanism Reader, Princeton Architectural Press, New York 2006, Seite 35-53

WALDHEIM, Charles ed.: The Landscape urbanism Reader. Princeton Architectural Press. New York 2006

7 ABBILDUNGSVERZEICHNIS

Fig. 1: Parc de la Villette. Rem Koolhaas/OMA.
Fig. 2: Melun-Sénart. Rem Koolhaas/OMA.
Fig. 3: Projektgebiet
Fig. 4: Luftbildauswertung 1950, 1980, 2012
Fig. 5: räumliche Funktionsverteilung
Fig. 6: Inntal Parks
Fig. 7: Inntal Parks

Alte Terre – Aree agricole di versante, nuovi modelli di sviluppo

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1 ABSTRACT

Il "Manifesto per lo sviluppo della Montagna" – redatto ad Asiago nel 2009 – fa rilevare i costi economici, ambientali e sociali prodotti dall'abbandono delle regioni montane e rurali e propone un'inversione di marcia oltre che di sguardo nei confronti di queste regioni. I territori montati e rurali possono essere considerati come portatori di nuovi modelli di sviluppo che si basano su filiere innovative e orientate ai temi della green economy, luoghi di nuove opportunità economiche e sociali. Ma ciò potrà avvenire solo cambiando i modelli di riferimento. Sono necessari l'emancipazione dal modello di sviluppo tradizionale e l'orientamento verso un modello che metta al centro la qualità e la sostenibilità assecondando l'urgenza di un approccio che sia attento alle questioni ambientali e che le trasformi in priorità. Lo studio "Indicazioni metodologiche per le trasformazioni delle aree agricole di versante a nuove tecniche produttive" – commissionato dalla Provincia Autonoma di Trento al gruppo guidato dallo studio RicciSpaini Architetti Associati srl – va nella direzione appena tratteggiata. Il paper presenta la ricerca evidenziandone in particolare gli aspetti metodologici e strategici.

2 TERRITORI MARGINALI (?)

"Negli ultimi '50 anni si sono manifestati in Italia rilevanti fenomeni di espansione delle aree urbane e metropolitane, a cui è corrisposto il progressivo abbandono della montagna e dei territori rurali meno accessibili. (...) È arrivato il momento di invertire questo processo, facendo della montagna e dello spazio rurale i fattori di un nuovo sviluppo dell'Italia. (...) si tratta di guardare alla montagna e allo spazio rurale come straordinarie risorse per il rilancio di processi di crescita nazionale basati sulle filiere più innovative e promettenti anche dal punto di vista economico. (...) Questo significa, perciò, un cambiamento di prospettiva nel guardare al ruolo della montagna e dello spazio rurale. Da aree marginali, a località centrali di un nuovo modello di sviluppo. Da luoghi di abbandono, a nuovi spazi di opportunità economica e sociale. Da condizioni di arretratezza che chiedono compensazioni economiche, a fattori di modernizzazione in grado di produrre servizi di mercato a domanda pagante. Da modelli insediativi in concorrenza con i sistemi urbani e metropolitani, alle complementarità ambientali, energetiche, sociali."

"Manifesto per lo sviluppo della Montagna", Asiago 2009

Il Manifesto è la chiara espressione di una tendenza in atto negli ultimi anni in ambito economico, sociale e territoriale a riconsiderare il ruolo delle regioni marginali, siano esse montane o rurali. L'idea sottesa a questa tendenza è che questi territori possano diventare, e che in parte già lo siano, fattori di un nuovo modello di sviluppo costituendo spazio di accoglienza e di incubazione per la filiera di quelle economie che si fondano sui nuovi paradigmi emergenti: ambiente, sostenibilità, identità, qualità, equità. E le possibilità sono molte, basti pensare a: fonti rinnovabili di energia, riduzioni di emissioni di carbonio, produzioni alimentari tipiche e/o biologiche, turismo culturale o naturalistico, funzioni ricreative e sociali sul modello dei grandi parchi urbani, bio-edilizia, sistemi di trasporto sostenibile, sviluppo intensivo di servizi alle persone e alle imprese basati sulle Ict.

"Tra la sfera indebolita dello stato-nazione e lo spazio finito dei sistemi locali protagonisti della riscoperta del territorio, prendono forma spazi intermedi in cui si sperimentano accordi e alleanze territoriali finalizzate a realizzare economie di scala nella produzione di servizi e beni competitivi comuni." Così Bonomi (2009) spiega l'emergere dei territori marginali che secondo Rullani (2009) "non sono tanto importanti per il peso oggettivo che (per ora) hanno, quanto per la loro capacità di prefigurare un futuro diverso da quello a cui ci ha finora abituato la lunga storia della modernità industriale che oggi è in crisi".

I territori marginali, considerati anticiclici rispetto alla grande congiuntura negativa dei centri urbani e metropolitani, si configurano così come nuove nicchie di produzione per la green economy il cui potenziale di crescita è tanto più elevato quanto più, rigettando il modello di crescita finora dominante, è orientato verso

quell'insieme di attività a elevato contenuto di conoscenze che pone al centro dei meccanismi dello sviluppo economico la riproduzione delle risorse – naturali, energetiche, sociali – necessarie allo sviluppo stesso.[1]

3   CONVENZIONE DELLE ALPI – PROTOCOLLO AGRICOLTURA DI MONTAGNA

L'agricoltura di montagna, se si mantiene questo punto di vista, può essere sicuramente definita come un'attività a elevato contenuto di conoscenze nella quale si riconoscono valori paesaggistici, culturali e ambientali da preservare, incentivare e riprodurre.

Anche la Convenzione delle Alpi [2] riconosce questi valori e la necessità di un impegno per la sua sopravvivenza. Nell'articolo 2 in cui si obbligano "Le Parti contraenti, in ottemperanza ai principi della prevenzione, della cooperazione e della responsabilità di chi causa danni ambientali, assicurano una politica globale per la conservazione e la protezione delle Alpi, tenendo equamente conto degli interessi di tutti i Paesi alpini e delle loro Regioni alpine, nonché della Comunità Economica Europea, ed utilizzando le risorse in maniera responsabile e durevole." (Art. 2 Obiettivi generali. Paragrafo 1) al paragrafo 2 si legge "Per il raggiungimento dell'obiettivo di cui al paragrafo 1, le Parti contraenti prenderanno misure adeguate in particolare nei seguenti campi" (Art. 2 Obiettivi generali. Paragrafo 2) e segue un elenco tra cui è presente l'agricoltura di montagna.

Nel dicembre del 1994 a Chambéry, viene firmato il Protocollo di Attuazione "Agricoltura di Montagna". Si tratta di un documento molto importante che trova fondamento nel riconoscimento dell'importante ruolo svolto dall'attività agricola nel territorio alpino e del contributo che questo settore dà "al mantenimento di un'adeguata densità di insediamenti, all'approvvigionamento alimentare della popolazione, alla produzione di prodotti tipici di qualità, alla conservazione e alla cura del paesaggio rurale – tra l'altro per la sua valorizzazione turistica –, alla difesa del suolo contro erosioni, valanghe e inondazioni" (Preambolo). Nel Preambolo, da un lato, si riconosce la grande utilità che le attività agricole hanno ai fini della tutela dell'ambiente e del paesaggio e, dall'altro, si evidenzia che le condizioni di vita e di produzione degli agricoltori nelle zone montane presentano molte difficoltà a causa delle caratteristiche geomorfologiche e climatiche dei territori. Per garantire la permanenza degli agricoltori e delle loro aziende nelle aree montane, affinché si possano conseguire gli obiettivi di cui sopra, si rende necessario un intervento degli Stati a scala economica e sociale.

Nel Protocollo vengono individuate misure che hanno, quindi, la finalità "di conservare e di incentivare l'agricoltura di montagna adatta ai siti e compatibile con l'ambiente, in modo che venga riconosciuto e garantito nel tempo il suo contributo sostanziale: alla permanenza della popolazione e al mantenimento di attività economiche sostenibili, – specie mediante la produzione di prodotti tipici di qualità, alla salvaguardia delle basi naturali della vita, alla prevenzione dei rischi naturali, alla conservazione della bellezza e del valore ricreativo del paesaggio naturale e rurale, nonché alla cultura nel territorio alpino." (Art. 1 Finalità) Quello che viene più volte rimarcato nel Protocollo è che l'agricoltura deve essere adatta e compatibile, sono proprio questi i termini che ricorrono maggiormente nel documento. L'agricoltura che va supportata e incentivata è un'agricoltura "adeguata ai luoghi e in armonia con l'ambiente" (Convenzione Quadro. Art. 2 Obiettivi generali. Paragrafo 2) in cui si svolge. Ed è anche un'agricoltura multifunzionale che è in grado di integrare nell'attività agro/pastorale vera e propria anche attività di tipo artigianale, turistico, energetico-ambientale, paesaggistico e culturale.

4   "FONDO PER IL PAESAGGIO"

Nel quadro di questa più ampia riflessione sull'attività agricola in contesto alpino si colloca la ricerca progettuale "Indicazioni metodologiche per le trasformazioni delle aree agricole di versante (AAV) a nuove tecniche produttive" che la Provincia Autonoma di Trento ha finanziato nell'ambito del "Fondo per la riqualificazione degli insediamenti storici e del paesaggio" (FP). Il Fondo viene istituito con la Legge Provinciale n. 1/2008 e ha come finalità il recupero, la valorizzazione e lo sviluppo degli insediamenti

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[1] Questo primo paragrafo è una rielaborazione di una parte del saggio: S. Staniscia, C. Ricci, M. Ricci, C. Rizzi (2011). Il paesaggio rurale dentro un obiettivo di qualità. PLANUM, vol. 23, ISSN: 1723-0993

[2] Trattato di diritto internazionale sottoscritto a Salisburgo il 7 novembre 1991 dagli 8 Stati alpini – Austria, Francia, Germania, Italia, Liechtenstein, Monaco, Slovenia e Svizzera – e dall'Unione Europea. Il processo di ratifica si è concluso il 27 marzo 2000.

storici, e la conservazione e la tutela del paesaggio; è destinato a finanziare sia interventi di recupero del patrimonio edilizio, pubblico e privato, sia attività di conservazione e ripristino del paesaggio, alla scala puntuale e territoriale.

È per attivare il FP che nel novembre 2010 il Servizio Urbanistica e Tutela del Paesaggio della PAT indice un bando per la presentazione di studi e proposte progettuali relativi ad alcuni temi individuati dalla Giunta Provinciale. Lo scopo degli incarichi è "di declinare efficacemente una politica attiva di intervento rispetto ad alcune tematiche particolarmente rilevanti nell'assetto paesaggistico del territorio provinciale" [3]. Il concorso [4] vede vincitori otto gruppi di ricerca – spesso numerosi, molto compositi e interdisciplinari, in alcuni casi provvisti di consulenti di fama internazionale – che hanno prodotto un importante patrimonio di riflessioni critiche, metodologiche e progettuali, frutto di una qualificata expertise professionale. Lo studio sulle AAV viene commissionato al gruppo multidisciplinare [5] guidato da RicciSpaini Architetti Associati srl.

Il bando per la presentazione degli studi contiene un allegato attraverso il quale vengono meglio definiti i contenuti dei progetti e degli studi messi a concorso. L'impostazione del documento è di natura quasi esclusivamente puro-visibilista ed estetizzante. Si riconosce il valore patrimoniale, culturale e identitario delle AAV – in particolare delle zone terrazzate frutto della cosiddetta agricoltura eroica – e si riconoscono i rischi ai quali sono sottoposte a causa delle nuove esigenze – per esempio la meccanizzazione e la variazione delle tecniche colturali – e dei cambiamenti climatici. Si tratta di fattori di trasformazione che incidono profondamente sugli aspetti visivi e percettivi ed è questa la maggiore preoccupazione della committenza che considera "importante conservare alcuni paesaggi rurali ritenuti di particolare testimonianza storica, culturale, agendo con regole, con incentivi, con interventi di manutenzione o ripristino." [6] In sintesi, si chiede al gruppo di lavoro di individuare le AAV maggiormente significative, di determinarne l'estensione, di valutarne le relazioni rispetto al contesto paesaggistico e di definire strumenti per il governo della loro trasformazione e "per assicurare il mantenimento della qualità paesaggistica complessiva del predetti versanti".

5 LA RICERCA ALPTER

Le aree agricole terrazzate sono state già oggetto di un lavoro importante e ampio che ha fatto il punto della situazione in tutto l'arco alpino: il progetto Alpter "Paesaggi terrazzati dell'arco alpino" – finanziato dal programma Interreg IIIB "Spazio Alpino" – che aveva come obiettivo la definizione di una metodologia per il rilievo dei terrazzamenti, lo studio di tecnologie e modelli gestionali specifici e la realizzazione di alcuni esempi di recupero produttivo. Questa ricerca, innanzitutto, dimostra che quello terrazzato è un paesaggio ricorrente ed emblematico del contesto alpino che ha vissuto fasi alterne di sviluppo e declino e che si trova, in questo momento, in una fase di deciso abbandono prodotto dai cambiamenti delle condizioni economiche, culturali e ambientali. Di fronte, però, a questi paesaggi storici non può che porsi il problema di definire strategie di restauro e recupero che vedono nel carattere integrato delle politiche e delle azioni l'unica possibilità di sostenibilità e di efficacia degli interventi.

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[3] Dal documento di affidamento di incarico dello studio alla Facoltà di Ingegneria dell'Università degli Studi di Trento – Corso di Laurea Edile-Architettura.

[4] Il Bando per la presentazione degli studi è stato approvato dal Servizio Urbanistica e Tutela del Paesaggio della PAT nell'ottobre del 2010. La Commissione tecnica di valutazione degli studi, nominata nel febbraio 2011, era composta da: Dott. Pier Giorgio Mattei – presidente (PAT), Arch. Angiola Turella (PAT), Arch. Giorgio Tecilla (PAT), Arch. Furio Sembianti (PAT), Arch. Chiara Bertoli (Scuola per il Governo del Territorio e del Paesaggio STEP), Ing. Giulio Andreolli (STEP), Prof. Arch. Giuseppe Scaglione (UNITN). Cinquantadue sono i gruppi che hanno partecipato al concorso, 8 quelli selezionati. La Commissione tecnica di valutazione si è riunita 9 volte da febbraio a giugno del 2011 quando sono stati nominati i vincitori. La spesa complessiva prevista per gli otto studi era di 800.000,00 euro.

[5] Gruppo composto da: Arch. Filippo Spaini (coordinatore della ricerca), Prof. Arch. Mosè Ricci (consulente per la pianificazione urbanistica e paesaggistica), Arch. Maddalena Ferretti (esperto in progettazione), Arch. Chiara Rizzi (esperto in progettazione ambientale), Arch. Stefania Staniscia (esperto in progettazione paesaggistica), Arch. Francesco Pontalti (esperto dell'architettura e del territorio trentini), Arch. Matteo Bonvecchio (giovane professionista), Dott.ssa Chiara Bragagnolo (consulente in ingegneria ambientale, pianificazione del territorio e valutazione ambientale strategica), Dott. Cristiano Belloni (consulente geologo), Dott. Alberto Gelmetti (consulente agronomo).

[6] Allegato A "Determinazione dei contenuti dei progetti e studi di cui alla deliberazione della Giunta Provinciale n. 2880 del 31 ottobre 2008 ai fini dell'affidamento degli incarichi."

Il tema sotteso a tutte le sperimentazioni progettuali avviate nella ricerca è: "come rendere coerente con i modi e le esigenze del vivere, del lavorare e, soprattutto, dell'abitare contemporaneo un ambiente di difficile, costosa e faticosa gestione come quello delle aree terrazzate. Il riconoscimento di valenze territoriali, come la difesa dal rischio idrogeologico, la tutela della biodiversità e della sostenibilità degli assetti territoriali, sono indispensabili ma non sufficienti per favorire l'avvio di un processo di recupero e riqualificazione di questi paesaggi." (Fontanari, Patassini, 2008) Le soluzioni individuate attraverso le esperienze progettuali fatte nell'ambito di Alpter sono, innanzitutto, il coinvolgimento delle comunità locali e, in secondo luogo, l'integrazione tra i vari strumenti messi in campo – progetto vero e proprio, alcune forme di incentivo, norme di governo del territorio e di intervento sugli edifici –. Si tratta, quindi, di associare agli interventi di trasformazione di carattere fisico la promozione di politiche di tipo economico e sociale.

Le azioni progettuali sulle aree terrazzate devono, per essere efficaci, basarsi su due componenti principali. Da un lato un lavoro di conoscenza delle caratteristiche e dei valori – di carattere storico, ecologico-ambientale, socio-economico, estetico-percettivo – di questi paesaggi singolari, dall'altro l'identificazione delle componenti di progetto e degli attori che saranno coinvolti dentro una visione progettuale coerente con gli obiettivi di salvaguardia e tutela insieme ad un'azione di riprogettazione e rivitalizzazione che ha precise finalità di tipo operativo.

6 AREE AGRICOLE DI VERSANTE TRENTINE

È a partire da questo contesto teorico di riferimento che muove la ricerca sulle aree agricole di versante. Il lavoro viene strutturato prevalentemente come un contributo teorico-metodologico e non unicamente come proposta di soluzioni progettuali specifiche. Il tema delle AAV, come dimostra lo studio Alpter, è complesso e molteplice per poter essere banalmente ricondotto alla sommatoria di singoli interventi locali che, seppur ben congegnati, non sono in grado di avere effetti sistemici e di definire un progetto di territorio. Per questa ragione l'approccio alla ricerca è di tipo multidisciplinare – le numerose figure professionali presenti nel gruppo e le competenze specifiche lo testimoniano – e integrato, così come emerso anche dalle sperimentazioni di Alpter.

L'obiettivo del lavoro di ricerca è di individuare possibili modalità di gestione delle trasformazioni che stanno investendo le AAV trentine e che, spesso, hanno esiti negativi sul paesaggio e sull'ambiente. Lo studio segue un percorso metodologico che parte dal riconoscimento dei valori e dei rischi delle AAV, per arrivare a definire alcune strategie di intervento per il recupero, la salvaguardia, la valorizzazione e il potenziamento delle aree stesse. Si prevedono anche politiche e forme di incentivazione per garantirne la fattibilità.

Il paesaggio è una risorsa – culturale, naturale ed economica – un bene patrimoniale da tutelare, valorizzare e gestire, ma è, allo stesso tempo, sottoposto a forti pressioni che costituiscono fattori di trasformazione spesso insostenibili e incoerenti con la matrice consolidata del paesaggio. Negli ultimi anni si è venuta a creare una profonda separazione tra tutela-conservazione del paesaggio e gestione-pianificazione dello stesso. Lo studio sulle AAV tenta di individuare una modalità per superare questa separazione con la proposta di un metodo che è in grado di stabilire, in modo quasi matematico, una sorta di gradiente degli interventi e delle priorità.

Quello che più interessa, in questa sede, è l'aspetto metodologico e strategico ed è per questa ragione che saranno approfonditi questi aspetti a scapito dei risultati specifici emersi.

6.1 Questioni di metodo

La Convenzione Europea del Paesaggio (Firenze, 2000), all'articolo 6 Misure specifiche, traccia un possibile percorso di lavoro per gli interventi di pianificazione sul paesaggio. All'attività di identificazione dei paesaggi nazionali e alla successiva valutazione degli stessi, "tenendo conto dei valori specifici che sono loro attribuiti dai soggetti e dalle popolazioni interessate", segue la fase della definizione "degli obiettivi di qualità paesaggistica riguardanti i paesaggi individuati e valutati" che porta, infine, all'attivazione di "strumenti di intervento volti alla salvaguardia, alla gestione e/o alla pianificazione dei paesaggi".

Il Codice dei beni culturali e del paesaggio (D. Lgs. 22 gennaio 2004, n. 42) recepisce e specifica il percorso proposto dalla Convenzione ai fini dell'elaborazione dei piani paesaggistici. Si ribadisce l'articolazione dell'iter nei tre momenti fondamentali: identificazione, valutazione e definizione degli obiettivi di qualità. È interessante, però, notare che all'articolo 143 Piano Paesaggistico l'aspetto estimativo viene declinato in

termini di valutazione della vulnerabilità e del rischio. Infatti, nell'enumerare, al comma 1, i contenuti minimi del piano paesaggistico, al punto f il legislatore precisa: "analisi delle dinamiche di trasformazione del territorio ai fini dell'individuazione dei fattori di rischio e degli elementi di vulnerabilità del paesaggio".

Diventa, quindi, necessario – ai fini degli interventi di pianificazione sul paesaggio – dotarsi di metodi e strumenti, teorici e operativi, di valutazione che richiedono l'uso di indicatori qualitativi e quantitativi, ossia di parametri in grado di descrivere il paesaggio nella sua dimensione ambientale, storico-culturale, estetico-percettiva, territoriale ed economica. Se l'Inghilterra e la Scozia hanno una tradizione nel Landscape Character Assessment, altri Stati, quali ad esempio la Germania, hanno mutuato l'approccio alla valutazione del paesaggio dalle scienze ambientali che già dai primi anni '90 elaboravano strumenti per l'Ecological Risk Assessment [7]. L'Italia, come noto, ha una tradizione molto forte nella tutela del patrimonio culturale, ed è da questa che si è avviato il tentativo di costruire un metodo per l'analisi del rischio del paesaggio.

Con la Legge n. 84 del 19 aprile 1990 "Piano organico di inventariazione, catalogazione ed elaborazione della carta del rischio dei beni culturali" si affida all'Istituto Centrale del Restauro (ISCR) la responsabilità scientifica di elaborare la carta "per l'analisi e prevenzione del rischio, finalizzato alla programmazione e attuazione di interventi atti a ridurre i possibili fattori di pericolosità ambientale e antropica sui beni culturali." (Ricci, 2003; p. 145) Il rischio viene definito come l'eventualità, per un bene, di subire un danno connessa a circostanze più o meno prevedibili ed è espresso in funzione di tre fattori: pericolosità e vulnerabilità – la presenza o la probabilità che si verifichino eventi dannosi per il bene e l'attitudine del bene ad essere danneggiato – e attribuzione di valore al bene.

L'attività dell'ISCR, ad oggi, ha prodotto un Sistema Informativo Territoriale della Carta del Rischio che costituisce il più ampio sistema di banche dati riguardanti un grande numero di beni distribuiti sull'intero territorio nazionale. Si tratta, però, di uno strumento che non fornisce un indice di rischio bensì un indice di sola vulnerabilità; la sperimentazione finora condotta si è, infatti, limitata a definire il grado di rischio attraverso processi di sovrapposizione tematica e non attraverso operazioni di interazione tra i dati di vulnerabilità e di pericolosità.

6.2 Rischiopaesaggio

La ricerca "Fattori di rischio ed elementi di vulnerabilità del paesaggio" coordinata nel 2001-2002 per l'ISCR e per il Ministero per i Beni e le Attività Culturali da Mosè Ricci ha verificato l'applicabilità della Carta del Rischio, elaborata per il patrimonio culturale, ai temi del paesaggio. Si tratta di estendere la filosofia della prevenzione, propria dell'approccio ai beni culturali, al patrimonio paesaggistico con le implicazioni conseguenti in termini di monitoraggio dello stato di conservazione del bene. Se, quindi, il paesaggio è assimilato al patrimonio culturale, l'applicazione del metodo Rischiopaesaggio, così come definito dal gruppo di ricerca, implica la valutazione dell'esposizione al rischio – di cancellazione, alterazione o di perdita di integrità – del bene paesaggio. Il metodo indaga, quindi, la possibilità di definire, in modo "certo", i rapporti tra conservazione del bene e fattori di trasformazione che investono la realtà territoriale in cui il bene si localizza per arrivare "a definire le politiche di intervento e a orientare gli investimenti tenendo conto sia delle risorse che dei valori" (Ricci, 2003; p. 14). L'applicabilità della Carta del Rischio si gioca tutta nella possibilità di "definire la natura e individuare la consistenza del bene. In altri termini non è possibile parlare di pericolo di compromissione dei paesaggi locali se non è chiaro il valore a rischio" (Ricci, 2003; p. 36).

Questo metodo è stato applicato già in alcuni casi, per esempio per la costruzione della carta del rischio per i paesaggi vitivinicoli di Langhe-Roero e Monferrato (Bertini et al., 2011).

6.3 Struttura della ricerca

La ricerca per l'ISCR fa da riferimento fondamentale alla proposta metodologica per lo studio sulle AAV. Lo sforzo fatto, nel corso della ricerca sulle AAV, è stato quello di determinare nello specifico contesto trentino sia i fattori di rischio che i valori intrinseci del paesaggio per arrivare alla definizione di strumenti e strategie

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[7] "Landscape indicators have only recently been used in the field of analysis and for the assessment of territorial transformation. These indicators derive from more consolidated and structured models, referring to environmental indicators in general" (Bottero, 2011; p. 15).

che coniughino tutela, valorizzazione e costruzione di nuovi paesaggi in una visione progettuale attenta e sensibile al contesto.

Il lavoro viene articolato in sei parti contraddistinte da successivi gradi di approfondimento. La prima dà una definizione di AAV e ne descrive gli elementi caratteristici. La seconda costituisce un censimento delle AAV dell'intera provincia – si tratta della fase di identificazione –; a questa fase segue l'elaborazione della carta dei valori e di quella dei rischi; è questo il nucleo centrale della ricerca perché è attraverso queste due mappe che vengono definite le cinque aree sensibili, oggetto della quarta fase di approfondimento analitico. La quinta è costituita dalle strategie di intervento. La sesta, infine, dai progetti pilota in cui vengono declinate le tattiche locali, interventi puntuali da applicare ai diversi contesti.

6.3.1   Definizioni

AAV non è una definizione che corrisponde a un'entità territoriale riconosciuta e ben identificabile neppure a livello di strumenti urbanistici locali. AAV è una definizione di nuovo conio alla quale lo studio ha avuto il compito di associare un corrispettivo in termini geografico/territoriali. Questo è stato, quindi, il primo impegno: distinguere, nell'ambito delle aree agricole, quelle che potevano essere definite "di versante". Queste sono connotate dalla convergenza/concorso di alcuni elementi distintivi: l'altitudine, una certa pendenza, la presenza di opere di sistemazione del terreno e di manufatti – i muri a secco, il sistema di accessibilità, il sistema di gestione delle acque, i manufatti e gli elementi accessori connessi alla coltivazione –, alcune specifiche caratteristiche agronomiche, paesaggistiche e colturali.

Una volta definite le AAV, sono state descritte le tendenze in atto che ne stanno determinando la trasformazione – in particolare i processi di abbandono e di hobby-farming –. Le dinamiche di trasformazione sono lette in continuità con l'evoluzione storica dell'agricoltura trentina che è stata ricostruita, per tratti salienti, soprattutto leggendo la relazione tra attività agricola e struttura del paesaggio.
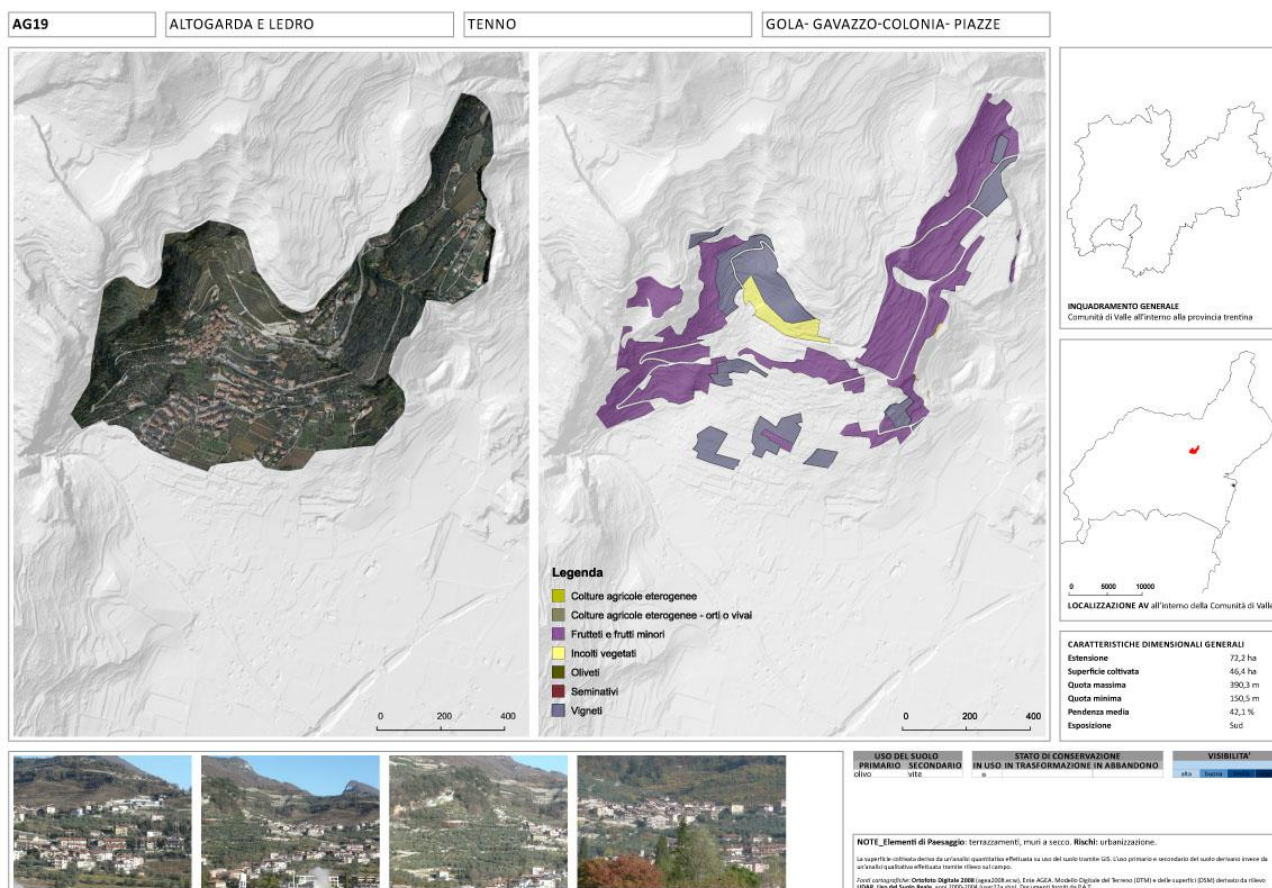
Fig. 1: Un esempio di scheda large

6.3.2   Apparato analitico | Contesti di area vasta

Alla definizione di AAV doveva corrispondere anche un lavoro di identificazione e perimetrazione alla scala del territorio provinciale. È stato prodotto un vero e proprio censimento delle aree attraverso un lavoro di

rilievo da fonti e sul campo e di interpretazione di informazioni derivanti da elaborazioni GIS. In particolare i sistemi informativi geografici sono stati utilizzati per identificare la probabile distribuzione territoriale delle AAV sulla base di alcuni criteri significativi – altitudine, pendenza, esposizione del versante, uso del suolo –. Questa operazione è servita a escludere dal rilievo sul campo interi territori dove era altamente improbabile la presenza di AAV.

Sono state censite oltre 200 AAV, ogni area è stata identificata e descritta attraverso una scheda – cosiddetta large con riferimento alla scala della lettura –. La scheda fornisce informazioni rispetto alla localizzazione dell'area, alle caratteristiche dimensionali – estensione, superficie coltivata, quota massima e minima, pendenza media ed esposizione –, alle condizioni orografiche, paesaggistiche, di uso del suolo e di visibilità, allo stato di conservazione – in uso, in trasformazione, in abbandono –. La scheda è, inoltre, corredata da documenti fotografici che mostrano la qualità del contesto nel quale l'area è inserita.

6.3.3   Valori e rischi del paesaggio delle AAV

Una volta identificate e descritte le AAV risulta necessaria la costruzione di mappe che aiutino a definire, rispetto a ogni singola area, i valori e i rischi presenti per arrivare a determinare il grado di tutela e il livello di intervento. La carta dei valori è il risultato della combinazione del valore ecologico, paesaggistico e produttivo. La carta dei rischi, invece, prende in considerazione i rischi: statico-strutturale, ambientale e antropico. Valori e rischi aggregati sono il risultato di un'operazione di normalizzazione che ha fornito un dato sintetico facilmente valutabile per ogni AAV.
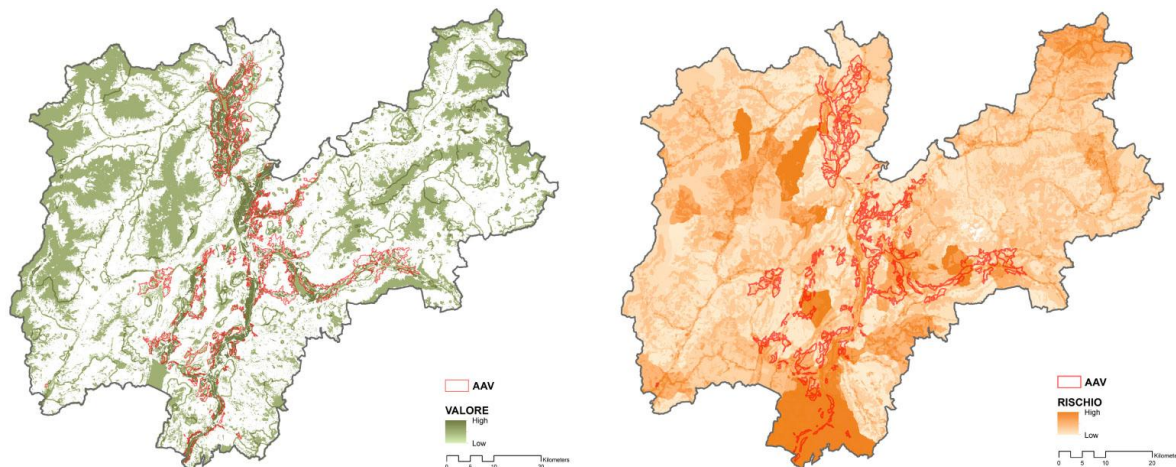
Fig. 2: Mappa del valore aggregato e mappa del rischio aggregato

6.3.4   Apparato analitico | Contesti locali

La lettura critica dei valori medi – corrispondenti alla media aritmetica dei valori e dei rischi all'interno della singola area – associati a ogni AAV ha consentito la valutazione dell'importanza relativa delle singole aree in termini di rischi che corrono e di valori, più o meno alti, da preservare. Questa lettura ha, quindi, consentito l'individuazione di cinque aree definite sensibili [8] che sono oggetto di un approfondimento analitico e progettuale. Si tratta di quelle aree che presentano una combinazione di maggiore rischio e maggior valore, alle quali, quindi, devono "essere prioritariamente destinate le risorse per la tutela e per la valorizzazione."[9]

Le aree sensibili vengono descritte dalle cosiddette schede medium, attraverso disegni, mappe, fotografie e schemi che danno indicazioni sulle caratteristiche generali – informazioni di tipo quali-quantitativo – sull'uso del suolo, sulle condizioni di visibilità e di accessibilità, sugli elementi del paesaggio presenti e sulle variazioni stagionali, sui valori e sui rischi specifici.

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[8] Con questo termine non si fa riferimento alla definizione di aree sensibili quali "aree richiedenti specifiche misure di prevenzione dall'inquinamento e di risanamento" (Art. 91 D.lg. 152/06).
[9] Tratto dalla Relazione Generale del lavoro di ricerca.
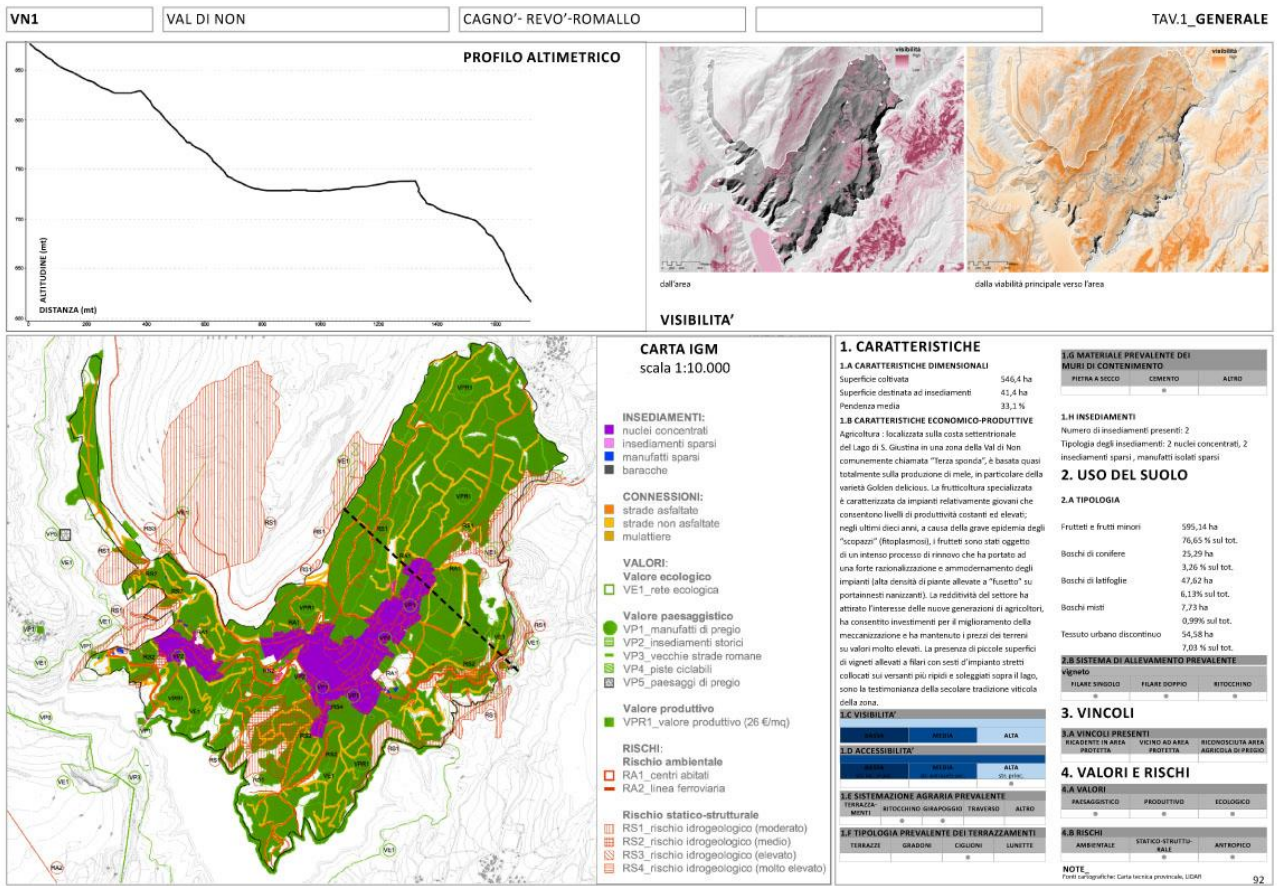
Fig. 3: Un esempio di scheda medium – caratteristiche generali
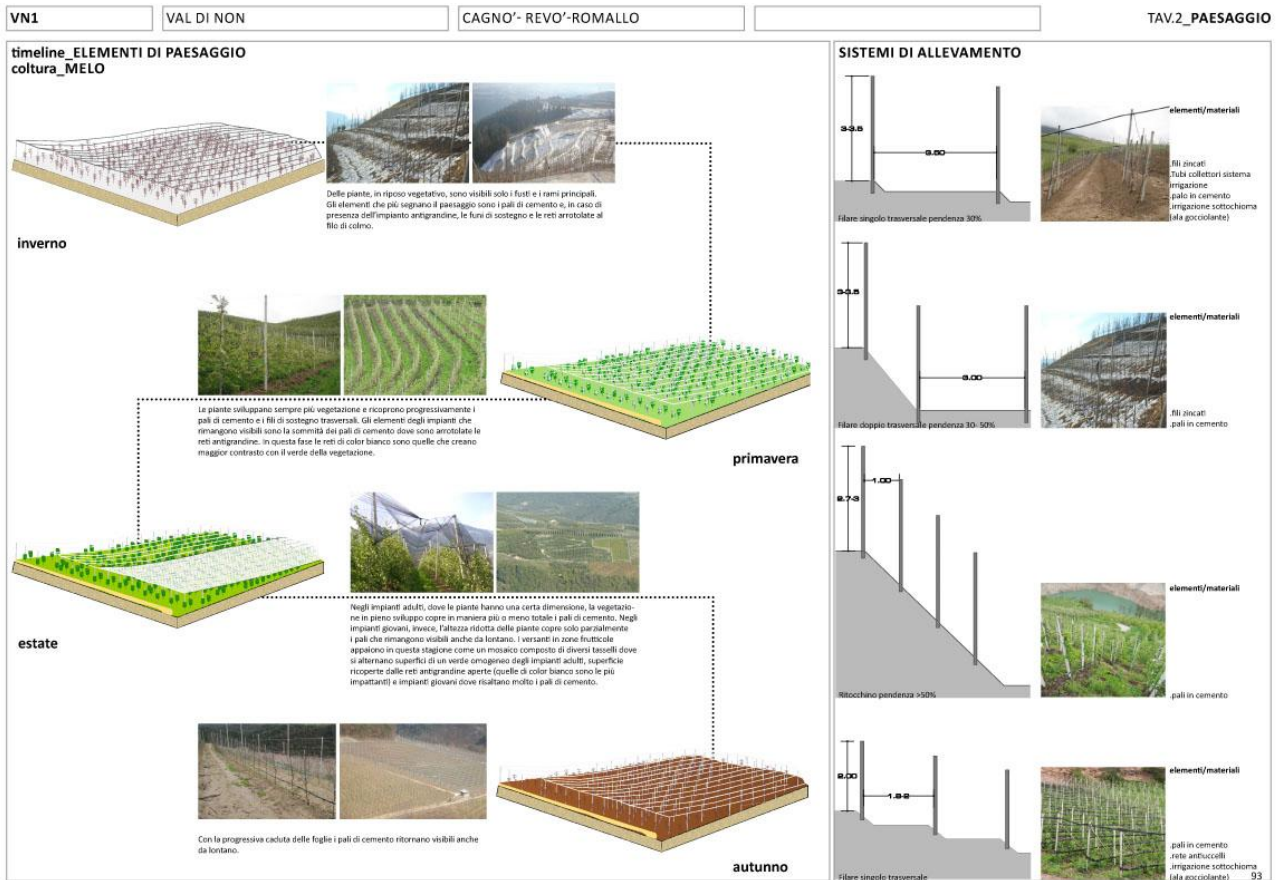
Fig. 4: Un esempio di scheda medium – elementi di paesaggio

6.3.5   Disciplinari | Strategie specifiche

Sulle aree sensibili vengono, in questa quinta fase, elaborate le proposte strategiche di intervento che si muovono su tre indirizzi principali: incrementare la tutela – su manufatti e colture –, incrementare il turismo – creazione di un sistema per l'ospitalità diffusa, introduzione di mercati a Km0 –, incrementare la sostenibilità – dei sistemi di produzione, dell'accessibilità, dell'edilizia –. Le strategie generali trovano applicazione su tre settori di intervento – i manufatti, i sistemi di produzione, l'accessibilità – e si declinano, in questo modo, in strategie specifiche.

6.3.6   Progetti pilota | Tattiche locali

Le strategie specifiche vengono testate attraverso l'applicazione contestuale. Le tattiche locali, che esprimono gli interventi puntuali da attuare nei diversi contesti, vengono verificate attraverso cinque progetti pilota che interessano le aree sensibili individuate. Ciascun progetto prevede l'applicazione di una selezione di strategie specifiche le quali vengono successivamente tra loro integrate.
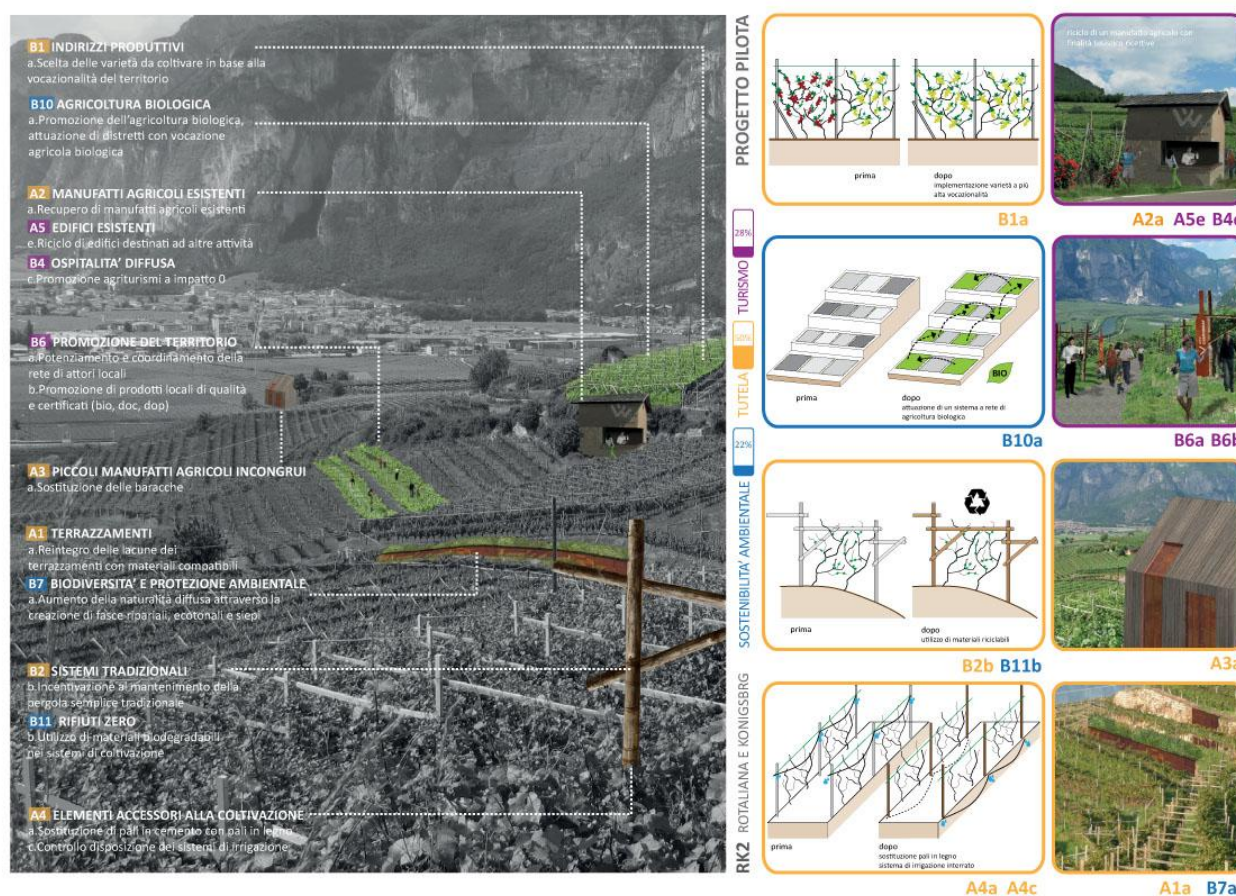
Fig. 5: Un esempio di scheda small

7   RIFLESSIONI CONCLUSIVE

Lo studio sulle AAV ha utilizzato il metodo Rischiopaesaggio per stabilire quali siano le aree maggiormente sensibili da destinare agli interventi prioritari. Le strategie, come obiettivi a lungo termine, e le tattiche, come risposte immediate alle questioni contingenti e alle peculiarità dei contesti, sono incentrate su una logica basata sulla premialità e sull'incentivazione, determinate in relazione al grado di rischio o di valore dell'area o a una combinazione di questi due fattori. A prescindere dalla futura scelta delle amministrazioni competenti in merito alle strategie da adottare per salvaguardare questi paesaggi, il contributo più significativo di questa ricerca consiste nella definizione della metodologia di individuazione e di classificazione delle aree. Il risultato principale dello studio è costituito dalle carte dei valori e dei rischi, che determinano l'importanza delle aree e stabiliscono la scala di priorità, considerando il paesaggio alla stregua di un bene culturale da conservare e valorizzare.[10]

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[10] Tratto dalla Relazione Generale del lavoro di ricerca.

8 BIBLIOGRAFIA

BERTINI, Alberto, BUZIO, Aldo, CIMNAGHI, Elisabetta, DONGIOVANNI, Arianna, FERRETTI, Valentina, ROSASCO, Paolo, SALVATORI, Lucia, VALLE, Marco, VITALI, Marco, ZANETTA, Elisa: La carta del rischio per i beni culturali: uno strumento per la tutela e la valorizzazione. Paper presentato alla XXXII Conferenza Italiana di Scienze Regionali, 2011.

BONOMI, Aldo: La piattaforma alpina nell'ipermodernità. In BORGHI, Enrico (ed.): La sfida dei territori nella green economy. Bologna, 2009.

BOTTERO, Marta: Indicators Assessment Systems. In CASSATELLA, Claudia, PEANO, Attilia (eds.): Landscape Indicators. Dordrecht Heidelberg London New York, 2011.

FONTANARI, Enrico, PATASSINI, Domenico: Introduzione. In FONTANARI, Enrico, PATASSINI, Domenico (eds.): Paesaggi terrazzati dell'arco alpino – Esperienze di progetto. Venezia, 2008.

RICCI, Mosè (ed.): Rischiopaesaggio. Roma, 2003.

RULLANI, Enzo: L'economia del margine scopre la nuova modernità. In BORGHI, Enrico (ed.): La sfida dei territori nella green economy. Bologna, 2009.

An Environmental Resilience based on Approaching Planners Triangle for Integrated Catchment Management

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1 ABSTRACT

Over recent decades, urbanization, industrialization, and floods have produced massive changes in the Zengwun River catchment in Tainan, Taiwan. Planners must reconcile at least three conflicting interests to facilitate the nation's rapid economic growth and to preserve the integrity of the catchment's water balance processes. Contributing to preexisting work done in integrated catchment management (ICM) and relying on the planner's triangle model to create a unique framework, this article proposes to encourage environment resilience in the urban, developing areas of the Zengwun catchment. The framework consists of two integrated models—water balance model and a geographic information system (GIS) to assess the conflicts among social, environmental, and economic interests. The empirical results obtained from our study of the Zengwun catchment's urban area have shown unequal regional spatial conservation and insufficient ICM strategies, both of which result in spatial mismatches and decrease urban environment resilience.

2 INTRODUCTION

The issue of integrated catchment management (ICM) has been investigated over the past several decades (Mitchell & Hollick, 1993; Batchelor, 1999; Verdonschot, 2000; Worrall et al., 2003; Wheater & Peach, 2004; Nunneri & Hofmann, 2005; Prato & Herath, 2007; Holzkämper, et al., 2012). More specifically, planning scholars have paid considerable attention to the conflicts that arise in ICM when individuals are unfamiliar with the three conflicting goals charted on the planner's triangle model—that is, economic development, environmental protection, and social justice—and the spatial mismatches that result from these divergent interests. In this article, these concerns are intimately linked. However, less attention has been paid to the role spatial analysis technology and the planner's triangle model can play in developing ICM policies. This paper proposes to enhance environmental resilience in urban, developing areas by using a modeling framework that contributes to preexisting work performed in ICM and on the planner's triangle.Arising as a result of divergent goals, the conflicts faced in catchment management are not superficial ones related to specific strategies.

From the point of view of climate and the hydrological cycle, room for the river linking spatial planning as an eco-regions zoning intervention, and by the resolve of environmental resilience and the environmental conflicts of the hydrological cycle, using incompatible land in order to reduce the damage to special ecological resources is a vital idea of practicing ecological urban planning thinking (Zhou, et al., 2003; Cook, 2007; Cesar et al., 2010; Galvan et al., 2010). The eco-regions zoning concept of imagination is not only the inspiration for disaster prevention and land use planning to prevent floods and control essential connotation of the exposition, but also makes us think carefully about responding to the city muscle and recognizing the unique natural and hydrological factors that could coordinate with one another in urgent need of ecological zoning to re-organize its system network.

The paper is organized as follows. It begins by reviewing pertinent literature about environmental resilience (ex. room for the river) in assessing water balance model, Eco-regions. Next, GIS is integrated into the research to enhance the effectiveness and precision of measurements Geographic information systems (GIS) is a new integrated modeling framework that contributes to the evaluation of water environment resilience based on the features of Eco-regions planning. To illustrate the entire process, Zengwun River basin, Tainan, Taiwan, is presented as an example in the case study. This combination enables researchers to fully attempting an overview of the Zengwun River basin water environment, through the analysis results of the water environment, spatial distribution, and finally with the establishing of the eco-regions program in order to understand the function and role of a regional water environment, such as assimilative central point (ACP), to identify the point of the runoff connection channel (RCC) and retention point (RP) of the water environment of the areas of urban development. Finally, the results will be helpful to the city planning

manager for the development of the water environment among urban development, drafting the management strategy of room for the river linking spatial planning.

3 ROOM FOR THE RIVER DEVELOPMENT IN TAINAN

Room for the river had always been one of the central issues for the Taiwan Government. The government has always devoted high levels of research and development resources and management funds to implement water disaster management (Chiang et al., 2009). For example, the recently implemented 8-year NTD116 billion (approximately US$3,515.4 million) 'Flood-prone Region Water Disaster Management Platform Initiative' aims to systematically manage major rivers, drainage and seawalls on a nationwide basis, and to make improvements to land subsidence areas, low lying land areas and urbanized areas that face flooding problems. Due to Taiwan's unique geological conditions it is very susceptible to natural disasters such as floods, droughts, landslides and earthquakes every year. The occurrence of typhoons and floods is even more frequent, and the disaster reduction section of the World. According to the statistics provided by the Central Emergency Operation Center (CEOC) on 2009, Morakot killed 619 people, left 76 missing and 35 injured, damaged over 200 bridges, and caused more than 19.4 billion dollars of loss in agriculture. Therefore, dealing with the relationship between the catchment basin land development and the water environment and further drafting room for the river linking spatial planning strategy have become important issues. Assessment of urban water environment resilience not only represents benefits for both the economic and natural environment, but also means the improvement of management efficiency and competitive advantage of the urban water environment in an urban space unit by reducing the depletion of environmental resources for water and protecting resources of the ecological environment. Tainan City is located in southern Taiwan; it is the fourth largest city in Taiwan, after Taipei, Kaohsiung, and Taichung, with a population of almost 1,880,000. Tainan City proper covers 2,192 square kilometers of land, and statistics from 2010 show that each square kilometer of land is occupied by approximately 857 persons. Since the activities in the Tainan city are growing, people have converted the usage of land in order to meet the needs of urban economic development, and, although increasing the effectiveness of the economy, it has meant sacrificing the environment.
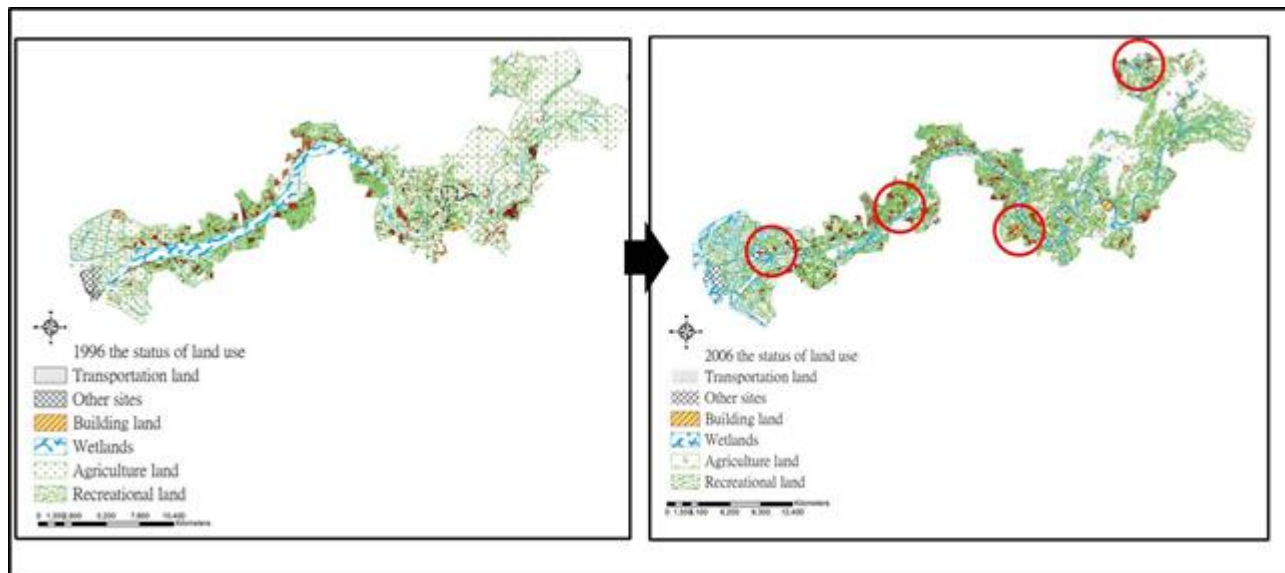
Fig. 1. The status Land use changes in Tainan's Zengwun River basin

Past settlement history and implementation policies have promoted the cultivation of agricultural produce and casual activities in the water catchment areas, enhancing the over-development of those areas without regulations. For the Zengwun River basin in Tainan, for the land use situation had the majority of the water environment as hinterland. Comparing 1996 and 2006, the pattern of land use change displays loss of function of land of more than 8 % water and agricultural land and culvert water, influencing the water environment for floods to occur, as shown in Figure 1. On the other hand, the damage caused by Typhoon Nari, and Typhoon Morakot can be found in the catchment areas within the watershed due to past settlement history of the evolution and implementation of the policy to promote planting settlements for the alpine agricultural needs of the economy and recreation booming of development, causing the river catchment to

have intensive reclamation areas, and most of them beyond the limits of over-exploitation of uncontrolled behavior, which can easily induce landslides of the hillsides and flooding in the middle and lower reaches. The interpretation of this concept on flood and water logging control will extensively interpret the concept of flood prevention and control and face the challenges of design with more delicate thinking about land usage for room for the river, and further propose functional suggestions for urban planning and urban flood prevention and control.

4 ROOM FOR THE RIVER LINKING SPATIAL PLANNING

4.1 Relationship between water environment and land use planning

There are a variety of discussions on the interaction between the urban hydrological cycle and the change of land use over the past decade (Niehoff et al., 2002). In natural science, the relationship between the urban hydrological cycle and land use that has been focused on is a very complex and dynamic process that includes closure, depression building, evapotranspiration, infiltration, seepage, surface runoff, etc. to consider different surface hydrological phenomena and analyze the hydrological cycle through long-term monitoring data, since the analyses of the hydrological cycle predicted and calibrated the basis of the fruitful results(Arnold & Gibbons,1996; Liu et al., 2007; Haase, 2009; Verbeeck et al., 2011). Such studies can be employed to explore the land-use impact on the hydrological cycle in the field of social sciences. In recent years, many studies have pointed out that the changes of land use have caused water environmental impacts, such as water resources, surface runoff, and micro-climate impact; from the above studies, in which emphasis is given to the phenomenon of exploration, those impacts without integrated planning control on land use and water environment must be further discussed (Haase and Nuissl, 2007; Lin et al., 2007; whitford et al., 2001). Regarding river management, exploring the relationship between the water environment and land use planning, there must be an integration of the upstream, midstream, and downstream parts of a coherent governance model, instead of segmentation of their governance, and the impact of the whole environment must be considered (van der Velde, 2006). For flood management in the international arena, such as the European Union's corresponding strategies, they have returned the room for rivers and implemented flood-preventing block strategies (Maltby, 2005). For a river water system that was originally within the land in the flood plain, there must be as many as possible land use governances and limitations to improve the integrated planning of land use and water and establish a hydrology land use management model. Goals for IUSM include (Chocat et al., 2001) 1.flood reduction—minimizing peak stormwater discharges from urban catchments; 2.Stormwater retention—harvest and beneficial reuse of rainwater and stormwater runoff within or near the urban catchment. 3. Urban landscape improvement—showing rather than hiding water by functionally incorporating stormwater into urban streetscapes and green areas. Looking abroad for flood management, successful stormwater runoff management and watershed management for water the environment management philosophy can be found in the minimum amount of impervious surface coverage, the minimum rainfall runoff, rainfall maximum time of concentration and water environmental impact assessment indicators as a basis for exploring the urban water environment and land use planning as an important strategy. Therefore, this article will transform those above factors into input indicators for important water environmental resources in the urban development process.

4.2 Measurement of the water balance

The resource conflict described in this article—that between the urban hydrological cycle and land use—involves a very complex and dynamic water balance process; for the purposes of examining different surface hydrological phenomena and analyzing the hydrological cycle through long-term monitoring, one must take account of groundwater, evapotranspiration, infiltration, seepage, surface runoff, etc (Arnold & Gibbons, 1996; Haase, 2009; Verbeeck et al., 2011). Thus, understanding of the changing impacts of land use on the catchment's surface run-off, urban impervious rate, and runoff time of concentration are of importance for the prediction and adjustment of flood hazards. Another model Arnold & Gibbons (1996) with an eye toward the urban impervious rate; numerous attempts have been made to develop suitable rainfall runoff indices by using land area and the runoff coefficient (Lin et al., 2007); empirical formulas developed by the Netherlands Institute for Inland Water Treatment and Waste Management (RIZA) and the California Department of Transportation have been proposed for estimating runoff time of concentration. Based on our prioritization of

research results, our water balance model calculates surface impervious rate, runoff time of concentration, land use, intensification of water balance, and surface runoff .

4.2.1 Impervious surface coverage

Impervious surface coverage is calculated according to the test of Arnold & Gibbons (1996). The purpose of using this formula and its parameters to calculate the impervious surface rate in urban areas is to understand how to improve the urban landscape and how to measure those improvements once they occur (see Table 2). The formula for estimating the surface impervious rate is as follows (Eq. 1):

$$I = \frac{A_P}{A} = \frac{\sum P_i \times A_i}{A} \quad (1)$$

Where I : Impervious surface coverage (%); A_P : Total impervious surface (ha); A : Land use area(ha); P_i : The imperviousness of surface coverage type (%); A_i : The area of surface coverage type (ha).

Table 2 Classification of land use by surface imperviousness

4.2.2 Rainfall runoff

The measurement of surface runoff on urbanized land will take three elements into consideration: rainfall intensity, runoff coefficients, and drainage area. Drainage area depends on the runoff coefficients pertinent to certain types of land use, as well as to the surface characteristics of the land. Studies about the calculation of runoff coefficients have been divided in their use of one of two methods: the first method obtains the runoff coefficient by estimating or directly measuring peak runoff and dividing it by the catchment's area; the second method takes into account how the area of a piece of land is used and calculates this type of use into the runoff coefficient. Numerous attempts have been made to develop suitable rainfall runoff indices for land used in particular ways. (Lin et al., 2007; Haase, & Nuissl, 2007). In the case of the second method, the runoff coefficient is arrived at by developing a ratio of land area by use and by including the rate of various types of impervious surfaces into the runoff formula. Hence, the formula for estimating surface flow is as follows (Eq. 2 and Eq. 3):

$$Q = 0.278CIA \quad (2)$$

$$I = \frac{500}{(t+5)^{0.413}} \quad (3)$$

Where Q is rainfall runoff; C is the runoff coefficient; I is rainfall intensity; A is land uses the type of drainage area; t is the rainfall duration.

4.2.3 Runoff time of concentration

Runoff time of concentration is defined as the time it takes rain water to travel from the remotest point in a water course to a gauging point in that same course; there are, however, some difficulties in determining its value in actual cases. Empirical formulas developed by the Netherlands Institute for Water Treatment and Waste Management (RIZA) and the California Department of Transportation have been proposed for estimating runoff time concentration. When the drainage area consists of different flow paths, the runoff time of concentration is the sum of the incremental travel times computed for each different reach of flow. The travel time in gutters, storm drains and channels is typically estimated using basic hydraulic data (t = distance/velocity). Thus, the formula for estimating surface runoff time of concentration in urban areas is as follows (Eq. 4):

$$t_c = t_1 + t_2$$
$$t_1 = l/v \quad (4)$$

where t_c is runoff time of concentration (min); l is overland flow length, m (ft); v is Manning's roughness coefficient; t_1 is time of surface rainfall runoff along the main storm drain to the main channel (min); t_2 is time on the watercourse from the basin outlet to the point nearest the basin centroid (min).

4.3Eco-regions planning in the application of the water environment

Eco-regions, a term first created in the mid-twentieth century, has now been used for more than 30 years; the partition of the eco-regions, however, has not yet had a common definition, but has long been widely used in different levels and areas, such as biology, hydrology, geology and natural environmental sciences（Bailey, 1983）. Some scientists believe that, to solve administrative problems and provide decision-makers with the information for managing environmental resources, the eco-regions principle is one method to consider for the assessment of productivity and environmental resource management units. In the United States as early as 1915, landscape planner, W. H. Manning, developed land-use planning aimed at the development of resource conservation and utilization strategies, and proposed land classification based on natural resources and the idea of natural systems. In 1950s, the rise of the green corridor movement, represented by ecological network planning and construction, had become the focus of the conservation of natural resources planning. For example, there are concepts of green corridors, ecological networks, and flood buffering regions etc. throughout the United States (Jongmana, 2004; von Haaren, 2006). On the other hand, in Taiwan, in the field of environmental planning, scientists have had discussions on different environmental physical properties of the partition characteristics of different natural ecosystems and energy flow trends, such as climate zones, catchment areas, topographic partitions, protected forest designated ecological energy partition, which have also had solid achievements. However, few of them have discussed land use planning from the point of view of land use in the face of ecological value, and the ecological function of different water environments should have a more extensive interpretation of land use in eco-regions to support eco-regions of the substructure or underlying foundation for a city or country continuing to grow on this basis. This article will define the application of ecological zones in land use planning, in the meaning of wanting to build a network of an interconnected water environment of their own water resource values and land use development planning and control, and lead to the creation of an open water environment of space distribution systems, as shown in Figure 2.
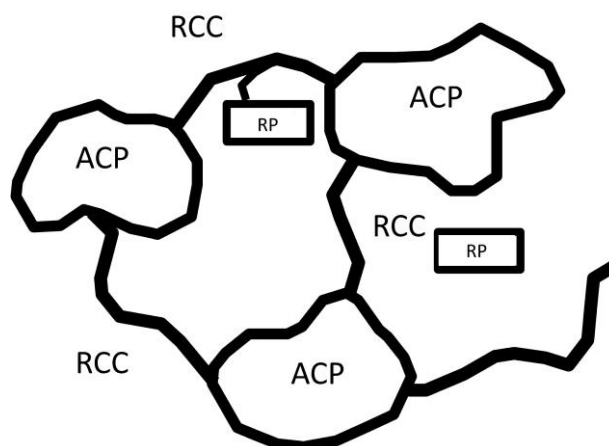
Fig 2. Eco-regions based on the water environment

First, the assimilative central point (ACP) of control on behalf of the surface runoff is still lower, representing the future of the region with the set assimilative as other high runoff of rain water in the village to guide the stranded buffer points with the setting of farmland, forests, regional parks, or water detention pond facilities. The runoff connection channel (RCC) is the bond of the water environment system integration, which will slow the runoff and maintain key biodiversity importance. Future assimilative control points can connect through the runoff to the channel identified, tried, through channels, tributary connections, so not only can existing parks, protected areas or natural detention ponds link up, the water environment of the corridor can connect the different ecosystems. The retention point (RP) is smaller than the control point, which is not necessarily connected to the overall network or regional protection system; different assimilative central points of control runoff connecting channels and water retention point scale create functional layouts of the overall water environmental network system. The analysis results will eventually be converted into the water environment relationship diagram, with which we can learn through the assessment of the spatial characteristics of the water provided in different environmental functions and in the future identify the center of runoff connection channel with the retention point to attempt to construct the prototype of a water environment.

5   ANALYSIS AND DISCUSSIONS

In addition to current data collection and the investigation of the two periods of land use in 1996 and 2006, we have built in this article the architecture required geographical database and socio-economic statistics, followed by the use of an assessment summarizing the resilience of the water environment analysis and DEA, such as integration, to estimate the resilience of the water environment profiles and assess the resilience of the water environment and its spatial difference characteristics.

5.1 Land use change analysis

For the Zengwun River basin in Tainan, for the land use situation in the 1996 survey of land use classification, we have categorized various land types of land use in Tainan's Zengwun basin, as shown in Figure 3 with the highest water conservancy land, followed by agricultural land. It has shown that the Zengwun River basin in Tainan had the majority of the water environment as hinterland. Comparing 1996 and 2006, the land use of the current status displays construction sites (1.16 %), transportation land (8.31 %), recreational land (0.12 %), other sites' (6.36 %) area ratio increased, while agricultural land (-28.6 %) and water conservancy land (-8.03 %) area ratio decreased. Zengwun watershed land use development has resulted in a loss of function of land of more than 8 % water and agricultural land and culvert water, influencing the water environment for floods to occur. In the future, land development should be strengthened to pay attention to preventing the loss of land resources of the water environment.

	Agriculture land	transportation land	Wetlands	Building land	Recreational land	other sites
Area(%) 1996(year)	46.76	0.01	19.12	2.757	0.155	1.138
Area(%) 2006(year)	16.4	8.32	11.08	3.922	0.285	7.49
Area(%) transition rate	-28.6	8.31	-8.03	1.16	0.129	6.36
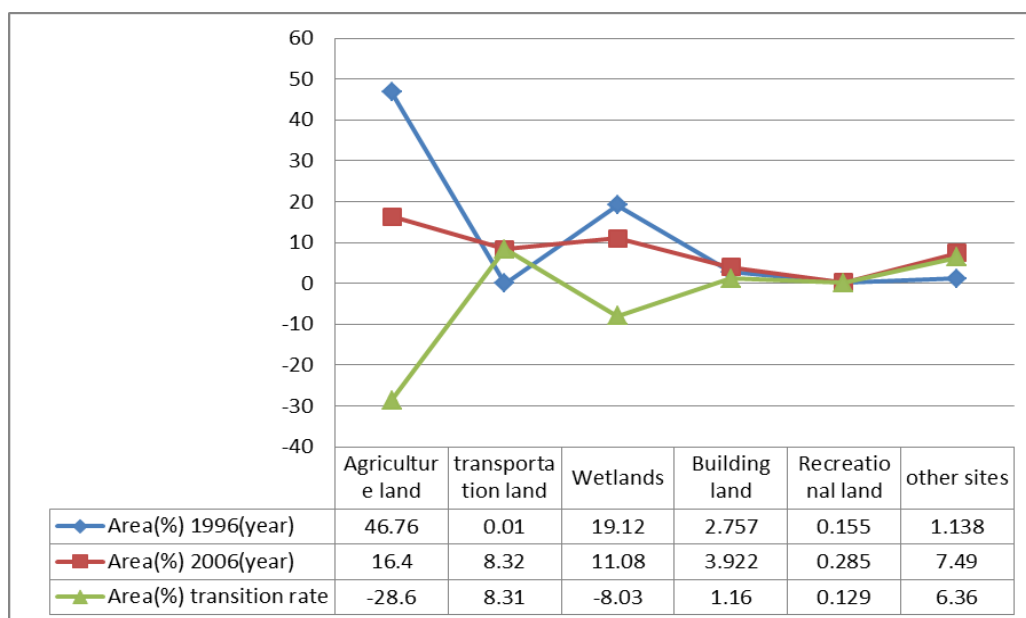
Fig 3. The Analysis of Land use changes in Tainan's Zengwun River basin

5.2 Division of eco-regions in the water environment

An ideal eco-regions system of the water environment is controlled with the center of an assimilative central point (ACP), runoff connection channel (RCC) and Retention point (RP) is connected to the water environment, as shown in Figure 4. The geographical type space of self-correlation and the representatives of the WEI in the space generated by the spatial characteristics are designated as judges of the standard. First, we want to identify the current ACP that can still slow down the Zengwun River basin for protection. For example, if it shows up as LOW-LOW, it represents the clustering phenomenon of low rainfall runoff in the village, Da-Ne Township, Lake Village Shanhua Township, Jia-Bei Village, etc., which represents a future in the region with the set assimilative as other high rainfall runoff in the village to guide the stranded buffer point with the setup of farmland, forests, regional parks or wetlands, or detention pool facilities. The RCC is the bond of the water environment system integration, and these ties have important functions to slow down runoff and maintain key biodiversity. Space characteristics of the RCC through time of concentration index, showing the HIGH-HIGH cluster village with high time of concentration in An-Ding Township, Guan-Liu Village, Surin village, etc., have future ACP to connect through the RCC that will be identified by different villages, and they will go through the channels and tributary connections, which not only can connect existing parks, protection and/or detention ponds, but can also be used as the water environment of the

corridor to connect different ecosystems. RP of the central point of control will not necessarily be connected with the overall network or regional protection system. In this article, we connect them through the spatial characteristics of each impervious rate analysis, showing the HIGH-HIGH with the high rate of impervious surface coverage cluster in villages such as Da-Ne Township, Cu-Si Village, and Da-Ne Village, etc. They can be connected with different ACP, RCC and RP, with a functional layout of the overall water environment of network systems.
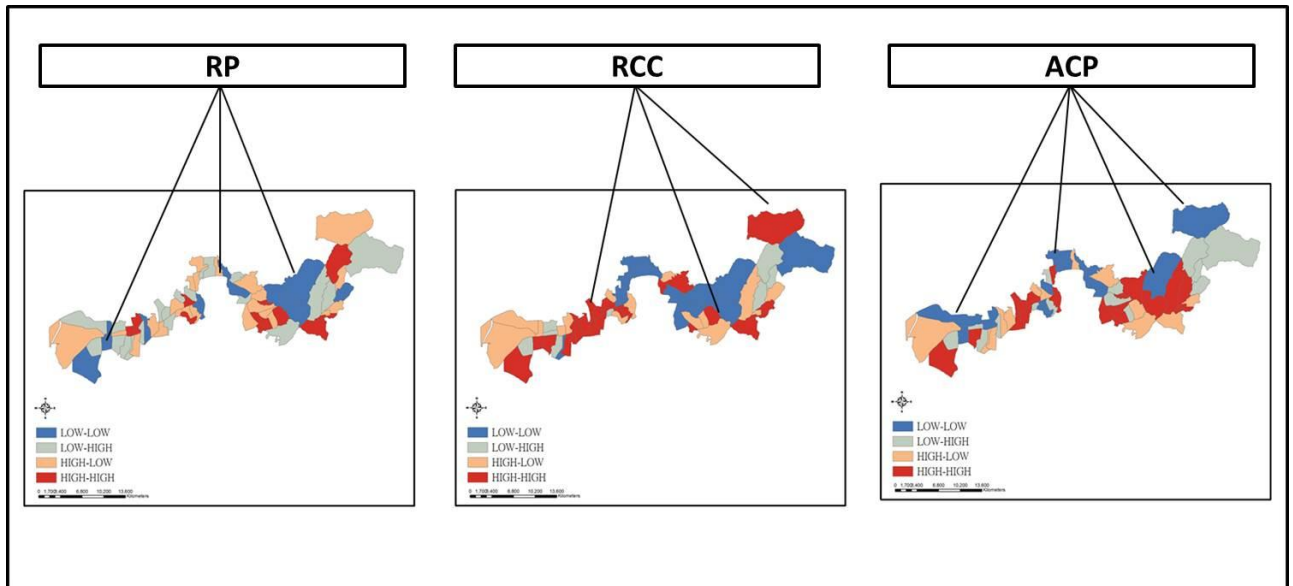
Figure 4. Spatial distribution map of eco-regions in Tainan's Zengwun River Basin in 2006.
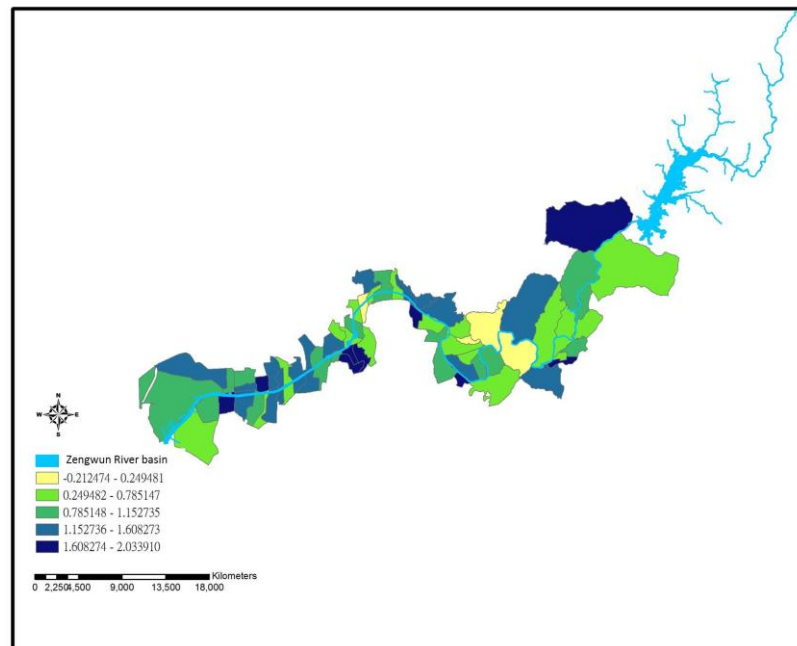
Fig 5 Proposed scheme of Tainan's Zengwun River basin with water space planning in 2006.

5.3 Room for river linking spatial planning proposal

In this article, we have also further examined the villages in Zengwun River basin that are still available for planning proposal with water districts. The principle of screening has the LM value of rainfall runoff, LM value of time of concentration and LM value of impervious surface coverage. Then they are converted into the same unit standards (e.g. percentage) for spreadsheet processing; the higher value represents the water environment, marked as dark blue in line with the room for the river of the village with water, as shown in Figure 8; there are nine places, including Tainan Dong-Shan Township, Nanshih Village, Yutian Village, Yujing Village, the mountain villages of the mountain Township, the Shanhua Town Wing, Anding Township, Su Cuocun and Surin Village, Chiku Township, Zu-Cia Village, Annan District, and Sharon

Village, with the follow-up to strengthen the analysis of the appropriate assimilative control point, runoff channels and water retention points in the village to carry on the layout of the Zengwun watershed network of defense and spatial planning strategies to practice room for river.

6 CONCLUSIONS

In this paper, we have proposed a set new integrated modeling framework that contributes to the evaluation of water environment resilience for eco-regions in urban development. The framework consists of two integrated models—water balance model and a geographic information system (GIS) to assess the conflicts among social, environmental, and economic interests for measuring the relative water environment resilience on controlling the strategy of land utility via eco-regions. After using the case of the Zengwun River basin in Tainan, we propose these conclusions and suggestions.

This article is based on the case of the Zengwun River basin as the empirical region and the 1996-2006 land use changes. The Zengwun watershed land use development has resulted in a loss of function of the land of more than 8 % water and agricultural land and culvert water, but has also influenced the water environment, and it may cause floods to occur; in the future, the development of land should be strengthened to pay attention to the influence of loss of the water environment and land resources.

For design of the eco-regions system, this article has attempted to propose a new spatial planning of room for the river designated space evaluation of the characteristics and function of the water environment in different villages, to identify the assimilative central point (ACP), runoff connection channel (RCC) and Retention point (RP) in an attempt to construct the prototype of a water environment in line with urban development and the water development policy to guide water environment to change the future land use changes required to withstand the force of water environmental conditions, and thus reduce the losses caused by disasters and improve the water environment's natural healing ability.

This article has proposed a spatial planning strategy of room for the river, by an objective measurement of the difference in the development of comparative urban development and the resilience of the water environment, by the design of eco-regions for land use planning strategy of room for the river. By pointing out relatively inefficient areas of the water environment, we hope to provide future planners the basis to combine water-related areas and try to adjust for the development of future urban water environments in spaces through planning tools and planning analysis of the application. Moreover, the planners can employ the assessment framework proposed in this article to enhance the goal of the resilience of the water environment and propose appropriate spatial development strategies.

7 REFERENCES

Arnold, C. L., & Gibbons, C. J. (1996). Impervious surface coverage – The emergence of a key environmental indicator. Journal of the American Planning Association, 62(2), 243-258.

Batchelor, C. (1999). Improving water use efficiency as part of integrated catchment management. Agricultural Water Management, 40(2-3), 249-263.

Cesar, R. G., Castilhos, Z. C., Colonese, J. P., Vidal, R. S., Egler, S. G., & Araujo, P. C. (2010). Hydrogeochemical response of land-use in the Aquatic Eco-region Xingu-Tapajos (Brazilian Amazon): Emphasis on trace elements. Geochimica Et Cosmochimica Acta, 74(12), A154-A154.

Chiang, S., Shieh, L. S., Kuo, F. Y., Mao, C. T., & Shiau, F. B. (2009). Comprehensive River Basin Management in Taiwan: Contributions of Yutaka Takahasi. International Journal of Water Resources Development, 25(4), 593-596.

Chocat, B., P. Kreb, J. Marselek, W. Rauch, and W. M. Schilling. 2001. Urban drainage redefined: From stormwater removal to integrated management. Water Science and Technology 43:61–68.

Chormanski, J., Van de Voorde, T., De Roeck, T., Batelaan, O., & Canters, F. (2008). Improving distributed runoff prediction in urbanized catchments with remote sensing based estimates of impervious surface cover. Sensors, 8(2), 910-932.

Cook, E. A. (2007). GREEN SITE DESIGN: STRATEGIES FOR STORM WATER MANAGEMENT. Journal of Green Building, 2(4), 46-56.

Forman, R. T.T. (1995), Land Mosaics--The Ecology of Landscapes and Regions, Cambridge University Press.

Galvan, C., Juanes, J. A., & Puente, A. (2010). Ecological classification of European transitional waters in the North-East Atlantic eco-region. Estuarine Coastal and Shelf Science, 87(3), 442-450.

Haase, D. (2009). Effects of urbanisation on the water balance – A long-term trajectory. Environmental Impact Assessment Review, 29(4), 211-219.

Haase, D., & Nuissl, H. (2007). Does urban sprawl drive changes in the water balance and policy? The case of Leipzig (Germany) 1870-2003. Landscape and Urban Planning, 80(1-2), 1-13.

Holzkämper, A., Kumar, V., Surridge, B. W. J., Paetzold, A., & Lerner, D. N. (2012). Bringing diverse knowledge sources together – A meta-model for supporting integrated catchment management. Journal of Environmental Management, 96(1), 116-127.

Lee, K. T., & Yen, B. C. (1997). Geomorphology and kinematic-wave-based hydrograph derivation. Journal of Hydraulic Engineering-Asce, 123(1), 73-80.

Lin, Y. P., Hong, N. M., Wu, P. J., Wu, C. F., & Verburg, P. H. (2007). Impacts of land use change scenarios on hydrology and land use patterns in the Wu-Tu watershed in Northern Taiwan. Landscape and Urban Planning, 80(1-2), 111-126.

Maltby, E. and Blackwell, M.S.A. (2005) Managing riverine environments in the context of new water policy in Europe. International Journal of River Basin Management. 3(2), 133-141.

Mitchell, B., & Hollick, M. (1993). Integrated catchment management in Western-Australia: Transition from concept to implementation. Environmental Management, 17(6), 735-743.

Niehoff, D., Fritsch, U., & Bronstert, A. (2002). Land-use impacts on storm-runoff generation: scenarios of land-use change and simulation of hydrological response in a meso-scale catchment in SW-Germany. Journal of Hydrology, 267(1-2), 80-93.

Nunneri, C., & Hofmann, J. (2005). A participatory approach for Integrated River Basin Management in the Elbe catchment. Estuarine Coastal and Shelf Science, 62(3), 521-537.

Prato, T., & Herath, G. (2007). Multiple-criteria decision analysis for integrated catchment management. Ecological Economics, 63(2-3), 627-632.

Shankman, D., & Liang, Q. L. (2003). Landscape changes and increasing flood frequency in China's Poyang Lake region. Professional Geographer, 55(4), 434-445.

van der Velde, G., Leuven, R., Ragas, A. M. J., & Smits, A. J. M. (2006). Living rivers: trends and challenges in science and management. Hydrobiologia, 565, 359-367.

Verbeeck, K., Van Orshoven, J., & Hermy, M. (2011). Measuring extent, location, and change of imperviousness in urban domestic gardens in collective housing projects. Landscape and Urban Planning, 100(1-2), 57-66.

Verdonschot, P. F. M. (2000). Integrated ecological assessment methods as a basis for sustainable catchment management. Hydrobiologia, 422-443, 389-412.

von Haaren, C., & Reich, M. (2006). The German way to greenways and habitat networks. Landscape and Urban Planning, 76(1-4), 7-22.

Wheater, H. S., & Peach, D. (2004). Developing interdisciplinary science for integrated catchment management: The UK LOwland CAtchment Research (LOCAR) Programme. International Journal of Water Resources Development, 20(3), 369-385.

Whitford, V., Ennos, A. R., & Handley, J. F. (2001). "City form and natural process" – indicators for the ecological performance of urban areas and their application to Merseyside, UK. Landscape and Urban Planning, 57(2), 91-103.

Worrall, F., Swank, W. T., & Burt, T. P. (2003). Changes in stream nitrate concentrations due to land management practices, ecological succession, and climate: Developing a systems approach to integrated catchment response. Water Resources Research, 39(7), 1-14.

Zhou, Y. C., Narumalani, S., Waltman, W. J., Waltman, S. W., & Palecki, M. A. (2003). A GIS-based Spatial Pattern Analysis Model for eco-region mapping and characterization. International Journal of Geographical Information Science, 17(5), 445-462.

An Experimental Study of Article-Finding Behaviors in a Shopping-Around Situation

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1 ABSTRACT

This paper reports, an experiment of 'article-finding behaviors (AFBs)' that are a typical shopping-around situation, under the following:

(1) incompleteness of mental-map, (2) loose time-constraints, (3) plural errands to be achieved, and (4) free walking in any remaining time.

Spatial behavior and cognition are measured by using an improved thinking-aloud-protocol method, GPS loggers, and video.

AFBs are often compared with 'way-finding behaviors' with a given goal point.

The findings are: (1) the layers of goal-subgoal of AFBs are fewer, (2) changes of the mental-map are observed, (3) walking speed is not different, and (4) walking routes are significantly different.

2 RESEARCH BACKGROUND AND OBJECTIVES

Modeling and simulation of downtown visitors' behavior is a great potential technique for supporting urban planning and design, thus one of the authors is recently tackling with research and development of a shop-around agent model. Recent research issues include agents' space cognition in their shopping-around situation.

A common factor of the typical shopping-around behavior observed in downtown is that (1) an actor's mental map of the district is incomplete, and the following can be observed: (2) under loose time-constraints; (3) they have plural tasks; and (4) they spend the remaining time strolling. It can be considered that complicated spatial cognition is involved in such spatial behavior; however, serious research has not been conducted yet.

Our research examines this kind of behavior as "article-finding behavior," and an experiment was conducted in the Osu district, Nagoya City; this research explores the characteristics of spatial cognition and behavior, through analyses employing the thinking-aloud-protocol method, and GPS loggers. In particular, this research clarifies the characteristics of article-finding behavior by comparing them to the experimental results of "way-finding behavior" with a focus on going to a given destination with an incomplete mental map.

3 EXISTING RESEARCHES AND FRAMEWORK OF THIS RESEARCH

This research focuses on shopping-around situations. As existing research on shopping-around behavior, questionnaire surveys by Takeuchi et al.(2011) and Oiwa et al.(2005) have been reported. In their research, to examine shopping-around behavior, in other words, typical behavior observed while shopping in a retail area, data for the shops visited or walking routes was collected by a questionnaire and analyzed; however, such research did not record or analyze the recognizing and thinking processes of a pedestrian while shopping, or the apparently insignificant behaviors that reveal these shopper's process. Therefore, this research defines general behavior while shopping, as the shopping-around situation, which includes not only walking-around behavior, but also cognitive behavior such as obtaining information by close observation or from studying a map. The methods described below are employed for analysis.

Section 4 describes the experiment, and Section 5.1 analyzes the spatial cognition that is seen when searching for articles, by employing the thinking-aloud-protocol method of Ericsson & Simon(1993). The section further conducts analysis by using the improved way-finding codes proposed by Hiiro et al.(1994) Then, by comparing the experimental results obtained this time with the results of the way-finding experiment previously conducted by Nakamura et al.(2011), the characteristics of article-finding behavior are clarified. Section 5.2 refers to the rough sketch maps to analyze spatial understanding used by Lynch (1960), and describes a map sketching exercise conducted to explore any relation between changes to the

before and after mental maps of each participant and their cognition level of the district (Funahashi, 1991a,1991b). In Section 6.1, with a focus on pedestrian insignificant behaviors, in a similar way to the analysis of finding behavior by Miura(2008), Mori & Oku(2002), and Suzuki et al.(2001), our research considers insignificant behaviors during the experiment, and examines the relation between spatial cognition and spatial behavior in article-finding behavior. Section 6.2 compares the walking route and walking distance of each participant, and from the viewpoint of route analysis, analyzes article-finding behavior in shopping-around situations.

4 ARTICLE-FINDING EXPERIMENT IN A SHOPPING-AROUND SITUATION

4.1 Classification of shopping-around behavior and selection of participants

In a large shopping street district, on a daily basis the structure and layout is daily changing its features; therefore, it is usual the visitor's memory, or their mental map would be incomplete. The experiment mainly focuses on the level of completeness of the visitors' mental map, in other words, the cognition level of the district (thereafter the cognition level). In the experiment, these levels were classified into three categories: High, Average, and Low.

To discover differences in visitors' cognition and behavior according to the cognition level, a questionnaire survey1) was first conducted among 21 university students to establish the cognition level, and a total of 8 students were selected as participants (3 High, 2 Average and 3 Low).
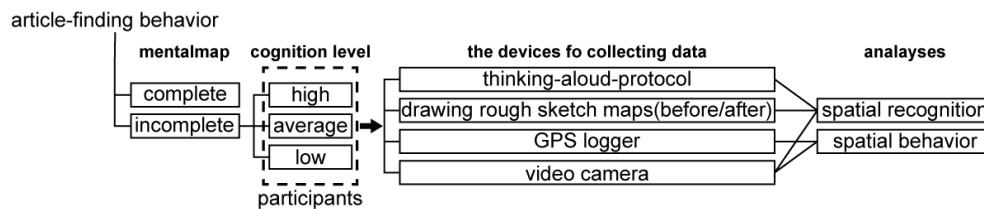
Fig. 1: Classification of article-finding behavior and its measurements

4.2 Experimental method of article-finding behavior

The experiment was conducted in the daytime on a non-rainy day in the Osu district, Nagoya City (Fig. 2). The Yabacho intersection was set as the starting point, and the following instructions were given to the participants: "Locate one example of each shop selling flowers, taiyaki pancake (fish-shaped pancakes filled with bean jam), or flashlights, (one shop per article). Return to the starting point within 60 minutes." Participants were given total freedom to decide the order of search for each article and how to allocate their time; they could also engage in free strolling at anytime. They were not allowed to carry a map of the district, but could refer to wall maps, signs, etc.

The thinking-aloud-protocol method was used to collect data. More specifically, participants were requested as much as possible to report out loud any thoughts that entered their minds; each participant was accompanied by an experimenter whose purpose was to encourage them to speak by asking appropriate questions. This spatial cognition process was collected as data by using a video camera to record speech and behaviors, and a GPS logger to track the actual walking route and speed. In addition, to explore any relation between their district cognition level and any changes of their mental map, before and after the experiment the participants drew a rough sketch map of the Osu district on a sheet of white paper.

4.3 Coding of thinking-aloud-protocols

The obtained thinking-aloud-protocols were segmentalized at each pause or at the end of a sentence, and then encoded as shown in Table 1. The codes employed were established by Nakamura et al.(2011), who added codes to the basic reference work of Hiiro et al.(1994), and moreover, in this research, to encode any remarks made by participants when they were unable to find their target store or article in a location where they had guessed they might find it, a new code "#: Awareness" was added.
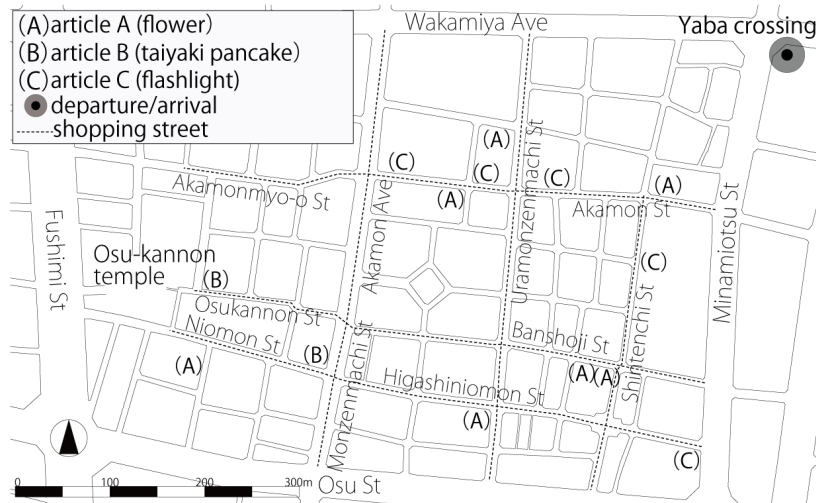
Fig. 2: Osu district map and Shop locations sell the articles

	code	name	example
directions-information	V	view	visual information
	S	sign	check information (map,traffic-sign)
	M	memory	remember the place of the store
plan	Ap	plan A	go to the specific area
	Bp	plan B	do something for the time being
	Cp	plan C	go with feeling
	Dp	plan D	return
expressing emotion	?	lostness	"let me see..." "umm..." "I'm lost."
	!	finding	"I know!" "I see."
	#	awareness	"There's no it in the place which intended."
	code	thinking-aloud-protocol about lostness	
cause of lostness	α	failure of the movement to the destination	
	β	cannot grasp the current place	
resolution of lostness	α'	quick fix	
	β'	check information (map,traffic-sign)	

Table 1: Code system of thinking-aloud-protocols

5 ANALYSIS OF THE CHARACTERISTICS OF SPATIAL COGNITION IN THE ARTICLE-FINDING EXPERIMENT

5.1 Goal-subgoal analysis of article-finding behavior found by

A sub-goal refers to a partial goal condition that is formed to help fulfill a goal (fulfillment of goal conditions). Fig. 3 shows a typical case of analyzing the sub-goals and two goals of a participant, and Fig. 4 shows their walking route, and the spots where they made any remarks. As a method to organize the analysis, the process from each sub-goal formation through to fulfillment is represented by one box. Remarks that could be interpreted as being made during the process of achieving the sub-goal are given on the right side of the box. For example, the sub-goal of Remark No. 7, which was set to achieve the sub-goal set in Remark No. 6, is shown on the right side of the No. 6 box.

At Remark No. 2 in Fig. 3, the participant commented on a shop where they thought the article would be sold; however, they noticed that they were unable to find that particular shop (#), which indicates that the newly added code in this research enabled us to encode pedestrian behaviors more accurately. Moreover, in all district cognition levels, one particular result was observed: the participants found a shop which they thought was likely to sell a target article, but they were unable to find the article (#).

Next, the results of the article-finding experiment and the way-finding experiment were compared. The article-finding experiment gave "plural tasks" to examine "article-finding behavior," whereas the way-finding experiment gave "a single task" to examine "way-finding behavior."

Fig. 3: Goal-subgoal analysis of article-finding behavior, a typical case
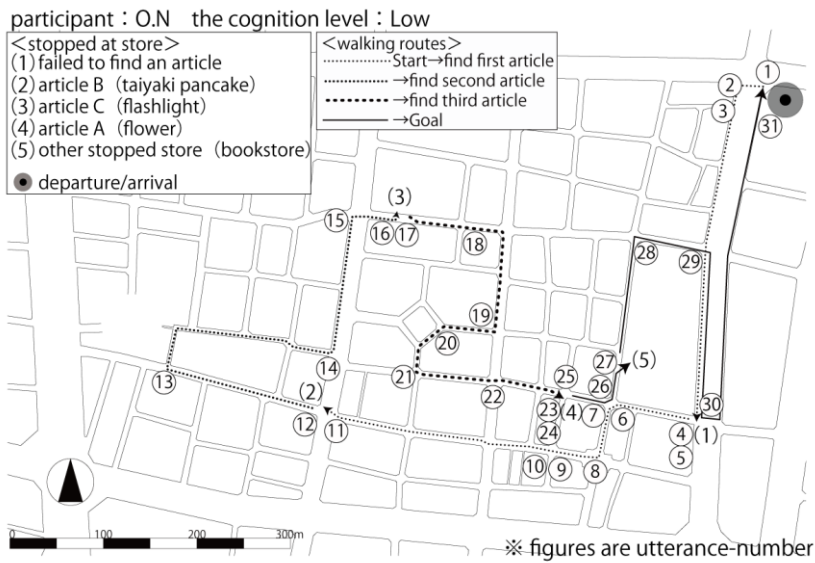
Fig. 4: Walking route and the spots where he made any remarks, example

Fig. 5 shows a distinct difference between these two approaches: in the article-finding experiment fragmentary subgoals were created and only a small amount of the stacking of subgoal layers was found; on the other hand, in the way-finding experiment, sub-goals tended to stack up in several layers. This can be attributed to the following: since the specific destination spots in the article-finding experiment were not given, participants needed to immediately decide whether to change or fix a (sub-)goal in response to the on-the-spot situation.

The second difference involved the creation of subgoals based on sign information. In the wayfinding experiment fewer and 'longer-term' sub-goals were created. In the article-finding experiment, when many tasks were still left to be fulfilled, relatively 'shorter-term' subgoals were created, and when only a few tasks remained, 'longer-term' subgoals were created. These results could be attributed to the following factors: when many tasks were left, acquisition and organization of information was complicated; however, as the number of tasks decreased, acquisition and organization of information became simpler. In addition, in the article-finding experiment sub-goal creation based on visual information was often observed. It would seem

that in response to the changing situation, participants needed to obtain visual information from their immediate surroundings.

"Free strolling" was observed for all participants after they fulfilled all their tasks. Many of the participants at that time drew up subgoals to return to the starting point more or less straightaway, but often by chance, as they found other activities that interested them, they tended to engage in alternative temporary behaviors, and subgoal creation decreased.

Goal-subgoal analysis allowed us to clarify the characteristics of spatial cognition recognized during "free strolling," "article-finding behavior," and "the fulfillment of plural tasks."
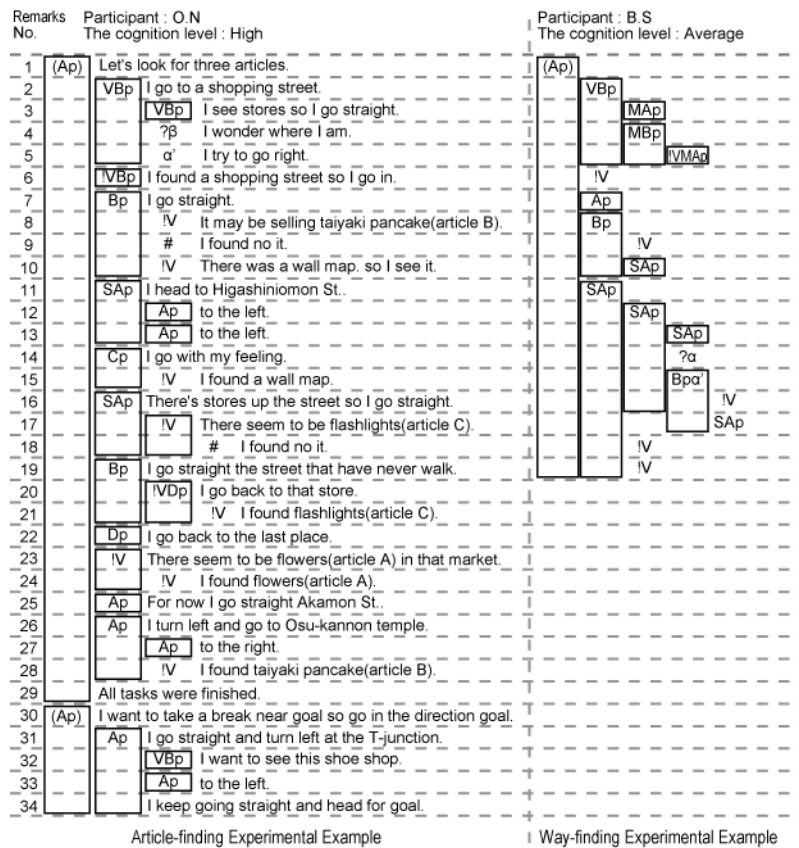
Fig. 5: Comparison between article-finding behavior and the way-finding behavior

5.2 Article-finding behavior found by mental map analysis

To analyze any change to their mental maps, each participant drew a rough sketch map of the Osu district and its environs on a sheet of white paper before and after the experiment (Table 2).

Generally speaking, pre-experiment sketch maps showed that participants with a High district cognition level did not demonstrate any error concerning the locations of shops and streets, although there were differences between individual participants. Post-experiment maps of all three participants showed high accuracy of the overall picture of Osu, and also shops other than those inolved in task fulfillment were added along with those side routes seen during the experiment, but not explored. These results could be attributed to the following factors: since the initially-held mental map was highly accurate, the amount of information to be newly obtained was less, allowing for easier organization. It can be said that the participants with a High cognition level made additions to and improved their mental maps.

Pre-experiment sketch maps of participants with an Average district cognition level showed an ambiguous positional relationship with low accuracy concerning the places that they had visited and the immediate neighborhood. In the post-experiment maps, they were able to draw the whole Osu district, and showed improved accuracy of the positional relationship among shops and streets. When compared to the participants with the High level, apart from those shops involved in task fulfillment, overall they drew fewer shops, and the streets drawn were mostly those that they had walked along during the experiment, and few side routes were shown. From these results it can be said that although they had a mental map, there were

mistakes in important parts, and therefore, they tended to correct mental-map errors by using information obtained in the course of their behaviors.

Pre-experiment, participants with a Low district cognition level were hardly able to draw a map. On the post-experiment map, they only partially depicted the task shops and the streets they had walked, and errors were found in the linkage of fragmentary information. This could be attributed to the following factors: the information obtained was all new, and they were unable to completely process it. From this finding, it can be said that the participants with a Low cognition level created a slightly better mental map.

As mentioned above, the participants were requested to draw a mental map as an actual map, and according to the different cognition levels, corresponding changes to the mental maps were observed. From the results of the experiment, it can be inferred that the accuracy of a mental map is improved through the following stages: creation > revision > addition, and in the early creation stage a larger workload is undertaken.
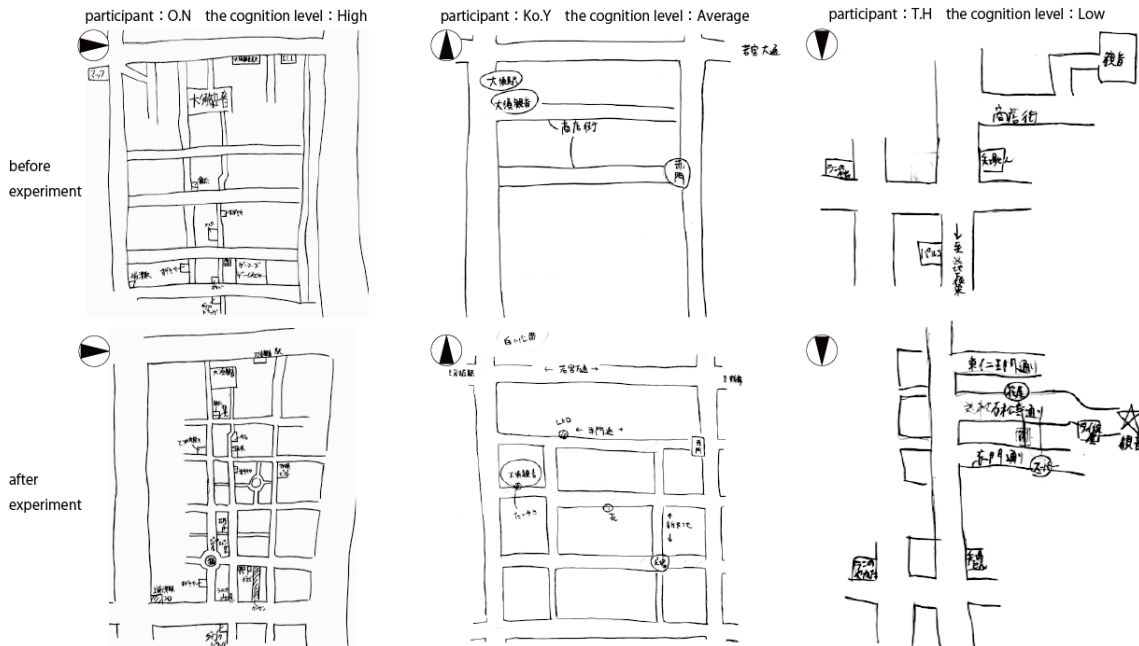
Table 2: Sketch maps before and after the experiment

6 ANALYSIS OF THE CHARACTERISTICS OF SPATIAL BEHAVIOR IN THE ARTICLE-FINDING EXPERIMENT

6.1 Article-finding behavior found by walking speed analysis

Table 3 shows the results of all participants. Their walking speeds were collected at 2-second intervals by GPS loggers to analyze the characteristics of spatial behavior in the article-finding behavior. Firstly, 343 spots, where the walking speed decreased by 1km/h or more, were extracted, and then by comparing with video images, 56 spots, where the drop in speed was caused by a positioning error of the GPS logger, were removed. Consequently 287 spots were selected as data.

The data was analyzed and the main causes for any walking speed decrease were classified into the following 4 categories: 1) Traffic, e.g. waiting for traffic lights to change or vehicles to pass; 2) Pedestrian congestion; 3) Acquisition and confirmation of visual information, e.g. checking shops; and 4) Consideration, e.g. checking a map.

The cognition level		High			Average		Low		
Participants		K.N	O.N	N.T	Ko.Y	Ku.Y	A.H	T.H	K.H
Times of retracing		0	0	1	1	3	3	2	2
Times of revisiting the intersection		0	0	0	1	2	4	3	3
Spots to stop in after article-finding		Restaurant,Temple	BookShop	Clothing Shop	none	Clothing Shop,SmokingArea,Toilet	none	ShoeShop	Shrine
Walking distances [m]	During finding	1113	1943	1338	2027	2010	2203	2040	2070
	After finding	905	875	812	1082	829	962	945	1419
	Total	2018	2818	2150	3109	2839	3165	2993	3489
Duplicated walking distance ratio [%]	During finding	0%	0%	4%	2%	14%	12%	12%	8%
	After finding	50%	20%	5%	39%	78%	83%	100%	72%
	Total	22%	6%	5%	15%	33%	33%	40%	34%
Having time to find an article [m:s]	1st	8:45	18:35	14:05	12:50	10:55	14:15	29:25	11:10
	2nd	12:25	35:25	28:10	24:05	22:40	34:30	31:55	20:20
	3rd	20:45	46:10	38:15	42:05	38:25	45:25	44:45	38:55
Times of walking speed decreas	Visual information	14	25	23	24	23	24	32	20
	Consideration	2	3	4	6	2	4	3	3
	Traffic	11	9	2	8	3	8	21	13

Table 3: Result summary of the Experiment

Next, each point of time the walking speed decreased was recorded on a walking speed graph as shown in Fig. 6. In addition, the walking speed decrease spots of the participant and their route are shown in Fig. 7. As a result, once they entered into the shopping street, the frequency of "acquisition and confirmation of visual information" increased, along with a constant decrease in the speed of walking, compared to before the entering the shopping street. This could be attributed to the following factors: the participant, upon entering a shopping street, was bombarded by a large amount of information, and they maintained a slower walking pace while constantly obtaining and organizing this new information. It was also observed that they often stopped when they tried to obtain information actively.

After the fulfillment of all tasks, there was a drop in the frequency of walking speed decrease incidents due to "acquisition and confirmation of visual information" and "consideration." It can be inferred that since the participants had fulfilled their tasks, there was no need to actively obtain or search for information. In particular, those participants with a Low cognition level did not need to obtain information because they simply retraced their steps along their route (described in Section 6.2). Moreover, when the speed decreased due to "acquisition and confirmation of visual information," in most of these cases the participants had found something of interest to them.

These results did not show clear differences according to the district cognition levels. It can be inferred that this was true even of those participants with a High cognition level, who knew the street map well, but did not know exactly the kinds of shops and their locations, and thus they too needed to constantly obtain and organize information. From this finding, it can be said that walking speeds in article-finding behavior are not affected by the level of completeness of a mental map.
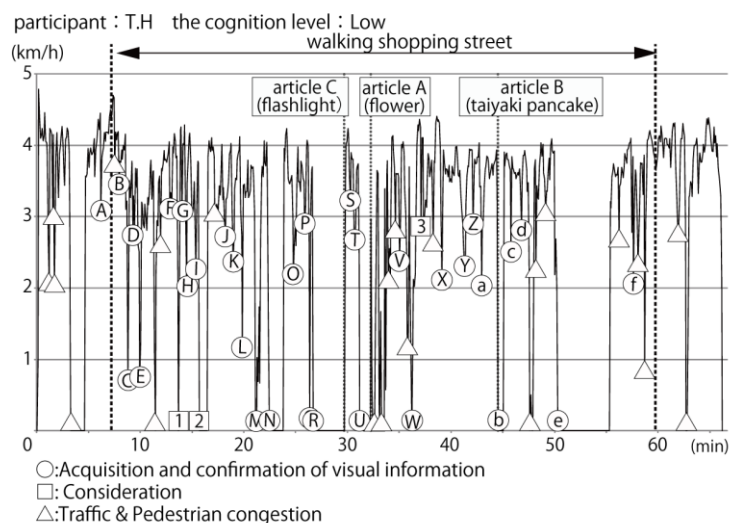
Fig. 6: Walking speed analysis on article-finding behavior, example
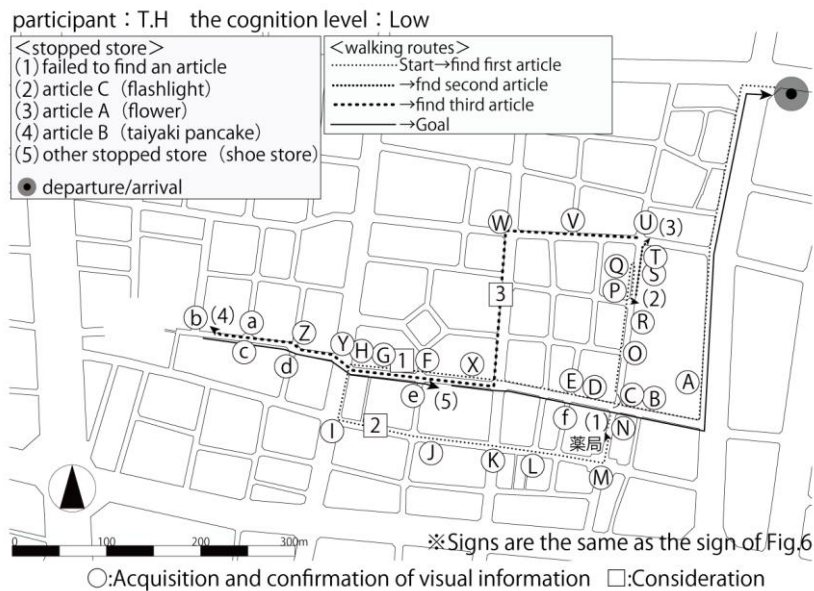
Fig. 7: Walking speed decrease spots of the participant and his route, example

6.2 Article-finding behavior found by route analysis

Table 3 shows the number of times the participants retraced their steps, which is a return behavior during article-finding, and the number of times they revisited any intersection. In both cases, the participants with a Low district cognition level tended to demonstrate higher scores. The main cause of retracing was that the shop or article was not found at a supposed location (8 out of 12 cases). The main reason for this can be considered as follows: being unable to find their target shop or article, and not knowing the way ahead, they started feeling uncertain, and turned back. Those participants with a High cognition level in the same situation were able to rely upon their mental map and move ahead, which resulted in a difference in the number of times of retracing.

Revisiting the same intersection due to retracing was observed in 7 out of 13 cases, and revisiting the same intersection from a different street was observed in the other 6 cases. It can be inferred that the participants with a Low level did not know how streets were connected, and thus retraced their steps.

Table 3 also shows analysis of walking routes and walking distances. The duplicated walking distance is the total of all the instances when participants walked along the same route, and the duplicated walking distance ratio indicates to what extent they walked the same street during searching and after searching.

On the whole the results indicate that the participants with a High cognition level showed a low value for the duplicated walking distance ratio during searching, whereas all participants with a Low cognition level showed a value around 10 %; this is caused by the retracing of the participants with a Low level. In addition, regarding the duplicated walking distance ratio after searching, the participants with a High level showed a low value, whereas the participants with a Low level showed high values with 72 % to 100 %. It can be said the participants with a Low level had a tendency to retrace their steps towards the final goal point without deviating. This could be attributed to the following factors: they held back from active strolling behavior so as to comply with the given final goal and time restriction.

7 CONCLUSION

The results obtained by this experiment are summarized as follows:

- From the goal-subgoal analysis employing the thinking-aloud-protocol method with the additional Awareness code, the cognition process that is characteristic of article-finding behavior was examined. When compared with way-finding behavior, it is characterized by a higher number of small sub-goals, and a lower number of planning layers.

- The experiment enabled the observation of the characteristics of mental maps and any changes. It can be considered that mental maps change through the stages of creation > revision > addition.

- In article-finding behavior, it is unlikely that walking speeds are affected by the level of completeness of the mental map.

- In terms of walking routes, differences among the district cognition levels were found in retracing and duplicated walking distances.

As shown by the above results, this article-finding experiment enabled the clarification of the characteristics of spatial cognition and spatial behavior in article-finding behavior.

Since the experiment was conducted under time constraints and the participants had limited time for exhibiting free strolling behavior, we were unable to conduct deeper analysis. Therefore, in the future, using several different kinds of analysis, there is a need to conduct an experiment focused on exploring the characteristics of free strolling behavior.

8 REFERENCES

ERICSSON, K. Anders & SIMON, Herbert A.: Protocol Analysis: Verbal Reports as Data. A Bradford Book, 1993.
FUNAHASHI, Kunio: Spatial Cognition and Environmental Information: Wayfinding Behavior and Spatial Cognition with Regard to Environmental Information in an Irregular Street Area: Part 1. In Transactions of AIJ. Journal of Architecture, Planning and Environmental Engineering No. 424, pp. 21-30, 1991.
FUNAHASHI, Kunio: Spatial Cognition and Environmental Information: Wayfinding Behavior and Spatial Cognition with Regard to Environmental Information in an Irregular Street Area: Part 2. In Transactions of AIJ. Journal of Architecture, Planning and Environmental Engineering No. 430, pp.55-64, 1991.
HIIRO Maho, HARA Hiroshi and MONNAI, Teruyuki: Wayfinding in Urban Space as a Problem Solving Concerning Lostness and Finding, Transactions of AIJ. In Journal of Architecture, Planning and Environmental Engineering No. 466, pp.65-74, 1994.
LYNCH, Kevin: The Image of the City. MIT Press,Cambridge Massachussettes, 1960.
MIURA, Kinsaku: Path Choice and Patterns of Wayfinding Behavior of Pedestrians Based on Different Walking Conditions: A study on eye fixation in wayfinding in the street Part 3. In Transactions of AIJ. Journal of Architecture, Planning and Environmental Engineering No. 624, pp.371-378, 2008.
MORI, Suguru & OKU, Toshinobu: Characteristics of Action in Strolling Behavior: A basic study on act-finding in urban space. In Journal of the City Planning Institute of Japan No. 37, pp.31-36, 2002.
NAKAMURA, Sho, NATSUME, Yoshinori and KANEDA, Toshiyuki: Experimental Research of Way-finding Behavior in Urban Space. In Summaries of Technical Papers of Annual Meeting, Architectural Institute of Japan (Kanto), pp. 585-586, 2011.
OIWA, Yukari, YAMADA, Tetsuya, MISAKA, Tomohiko and KANEDA, Toshiyuki: A Transition Analysis of a Shopping District from the Viewpoint of Visitors' Shop Around Behaviors. In AIJ Journal of Technology and Design No. 22, pp.469-474, 2005.
SUZUKI, Toshitomo, OKAZAKI, Shigeyuki and TOKUNAGA, Takashi: Visual Search in Way-Finding at Subway Stations. In Transactions of AIJ. Journal of Architecture, Planning and Environmental Engineering No. 543, pp.163-170, 2001.
TAKEUCHI, Masashi, YOSHIDA, Takumi and KANEDA, Toshiyuki: A Transition Analysis of a Shopping Street Complex District from the Viewpoint of Shopping-Around Behaviors – A Survey of the Osu District, Nagoya in 2008 –. In Transactions of AIJ. Journal of Architecture, Planning and Environmental Engineering No. 660, pp.361-368, 2011.

9 NOTES

To select participants, a questionnaire survey was conducted to establish the frequency of visits to the target district, and to ascertain the respondent's knowledge concerning 11 facilities in the district. Respondents chose one of five levels of answer, which ranged from: "I can give directions to this facility (1 point)" through to "I do not know the way to this facility (5 points)." In addition to the knowledge score of facilities in the district, the frequency of visits was also taken into account when the district cognition level of the respondents was classified into the following three levels: High: less than 30 points, and one or more visits per month; Average: less than 40 points, and one or more visits per year, but less than one visit per month; Low: respondents who did not qualify as High or Average.

🏆 *reviewed paper*

Application of Modeling Urban Growth with Cellular Automata in Spatial Planning

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1 ABSTRACT

The current pattern of urban development in the industrialized countries is growing of low-density, decentralized residential and commercial development. This form of development in urban and suburban areas is commonly known as "sprawl" that has caused fragmentation of the natural resource, declining water quality and traffic congestion. Urban development is a complex dynamic process which involves various factors with different patterns of behavior. Modeling urban development patterns is a prerequisite to understanding the process and lead to manage resources between communities and planning it. This research is going to introduce Cellular Automata (CA) as one kind of dynamic models to predict and simulate urban growth and also explain the necessities of using it and its parameters. In CA models space (it means place and its surrounding environment) should be represented as a grid of cells that can change state as the model iterates to simulate urban growth. Finally, Tehran simulation urban growth with cellular automata as a case study will be explained. In this case study, the applied CA model uses three historical images as the input data, and also a scenario is defined for the transition rules. After checking the precision of the simulation, the future of the urban growth in Tehran has been predicted with this scenario. At the end of simulation, finding of CA simulation was applied to planning. Such predicting will help municipalities to design the infrastructure plan, and apply a better management to handle the resources.

2 INTRODUCTION

With rapid urbanization in many countries, in addition to increasing the number of cities and their population, area of cities has expanded rapidly and this physical expansion was higher than population growth; this form of growth that is unplanned was called Urban sprawl (Bhatta, 2010). It was formed originally in developed countries, but today, urban sprawl can be seen in most countries in the world. In this type of development, land use patterns were changed and urban land capitation will be increased.While urbanization has occurred, natural resource lands, such as forest, wetlands and agriculture, have been replaced by land uses with more impervious surfaces (Javadian, 2012). Predicting future environmental consequences requires that we able to predict the spatial pattern of land use change. In recent years, spatially simulation models of urban growth patterns have emerged. The economic versions of these models estimate land use transition probabilities with using discrete choice methods based on the behavior of agents making land use decisions.

A relatively simple class of models, cellular automata (CA) has gained attention from researchers attempting to simulate and predict spatial patterns of urban development. CA models are not only conceptually elegant but also they have the potential to simulate the complex behavior of systems, such as city. CA models have been used to simulate different types of urban forms and development densities and to investigate the evolution of urban spatial structure over time.(Yang, 2003)

3 NECESSITY OF USING CA

To realize the dynamics of complex urban systems and to evaluate the impact of urban growth on the environment we require to procedures of modeling and simulation with innovative methodology and techniques. A number of analytical and static urban models have been developed that are based on different theories such as urban geometry, size relationship between cities, economic functions and social and ethnic patterns with respect to city structures. But these models were developed to explain urban expansion and to extract patterns rather than to predict future urban development. For understanding the spatial consequences of urban growth, a dynamic modeling approach is preferred (Alkheder; Batty, 1997; Fulong, 2002; Kiavarz, 2009). In recent years, dynamic modeling as a primary research field in geographical information science is rapidly gained popularity among geographers and urban planners as tools for urban and landscape

simulation. A variety of these models that are cell-based has been developed as either stand-alone packages or subcomponents that are linked with different software packages from GIS, visualization, or urban planning. They can be categorized incidentally, such as logit , Markov and cellular automata, or processes based, such as dynamic ecosystem model. These models have some common features such as the use of transition probabilities in a class transition matrix, cellular automata, and the GIS weighted overlay approach.

Among all the documented dynamic models, those based on cellular automata (CA) are the most effective in terms of their technological evolution in connection to urban applications. There are a number of reasons leading to the choice of this model for urban researches. The model is scale independent, dynamic, and future oriented, conforming to the essential requirement of urban growth simulation (Alkheder; Fulong, 2002; Kiavarz, 2009; Nuno, 2007). This may be valuable for producing reasonable growth prediction. The model can be verified through rigorous past to present calibration using historical land use/cover data and be used to simulate urban growth under different conditions by modifying some initial conditions and changing input data layers (Kiavarz, 2009; Nuno, 2007). This could be useful not only for guiding future urban planning practice but also for studying metropolitan dynamics. Last, in contrast to many existing models that were developed by different research teams with essentially no reuse, this model's design allows it to be applied to other regions with different datasets.

4 DEFINITION OF URBAN SPRAWL

The concept of sprawl-emergence of a situation of un authorized and unplanned development, normally at the fringe areas of cities especially haphazard and piecemeal construction of homesteads, commercial areas, industrial areas and other non-conforming land-uses, generally along the major lines of communications or roads adjacent to specified city limits, is observed which is often termed as the urban sprawl. (Bhatta, 2010: 7)

The area of urban sprawl is characterized by a situation where urban development adversely interferes with urban environment which is neither an acceptable urban situation nor suitable for an agricultural rural environment (Rahman et al.2008).

Much of the literature and debate on urban sprawl has been based upon experience in the United States (Galster et al., 2001; Peiser, 2001; Squires, 2002; for example). In this debate urban sprawl has been defined as:

„a pattern of land use in an urbanised area that exhibits low levels of some combination of eight distinct dimensions: density, continuity, concentration, clustering, centrality, nuclearity, mixed uses and proximity" (Galster et al., 2001, p. 685).

Or as Peiser (2001, p. 278) suggests:

„the term is used variously to mean the gluttonous use of land, uninterrupted monotonous development, leapfrog discontinuous development and inefficient use of land".

Urban sprawl has many features that can be identified by them, some of these features are occurred in the physical but others can be studied in other aspects such as social, economic and environmental realm. Part of these features that are physical aspects (because the Cellular Atumata models will predict based on physical characteristics) is proposed as fallow:

- Leapfrog Development
- Commercial Strip Development
- Low-Density Residential Areas
- Single Use Development
- larger separation of land pieces
- More useless spaces and abandoned spaces
- Loss of green space use and change to urban use (Javadian, 2012)

5 DEFINITIONS AND PARAMETERS OF CELLULAR AUTOMATA

Cellular automata are mathematical models for complex natural systems containing large numbers of simple components with local interactions; these models enable the examination of systems whose behavior at the global scale can be classified as complex, while at the local or individual level they are comprised of fundamentals simple components (Batty, 1997; Kiavarz, 2009; Nuno, 2007). CA models are cell-based that is a collection of "colored" cells on a grid of specified shape (Alkheder).

CA models are comprised of four individual components, all of which are required to be classified as a cellular automaton. Cell space, Local states, Transition rules, Neighborhood, in recent years other researchers have added an additional fifth component to CA, although it is naturally adherent to their nature Temporal space (time) (Alkheder; Batty, 1997; Nuno, 2007). Cells are Basic element of a CA and can be thought of as memory elements that store state information. All cells are updated simultaneously according to the transition rules, which are defined in more than 2 dimensions, but the 2-d form that makes them applicable to cities is the most usual (Alkheder; Nuno, 2007). Local states are the states that cells can take it in iteration process that can be change at the time to other states with transition rules such as 0, 1 in Boolean method or residential, commercial and green area in urban studies. The rules for transition from one cell state to another can be interpreted as the generators of growth or decline, such as the change from an undeveloped to a developed cell or vice versa. This change is a function of what is going on in the neighborhood of the cell (Alkheder; Batty, 1997; Nuno, 2007).

IF   something happens in the neighborhood of a cell

THEN   some-other-thing happens to the cell (Batty, 1997).

The neighbourhood usually being defined as immediately adjacent cells, or cells that "in some sense" are nearby. Urban growth and Specially in real city neighbourhoods provide excellent examples different type of neighborhoods are defined in CA that shown in Figure 1 .Von Neumann neighborhood Composed of the cells above, below, left and right and it has a radius of one. Moore neighborhood Composed of the same cells as the von Neumann neighbourhood, but also includes the diagonal cells and it has a radius of one. Extended Moore neighbourhood Composed of the same cells as the Moore neighbourhood but the radius of neighbourhood is increased and it has a radius of two (Alkheder; Batty, 1997; Kiavarz, 2009; Nuno, 2007).
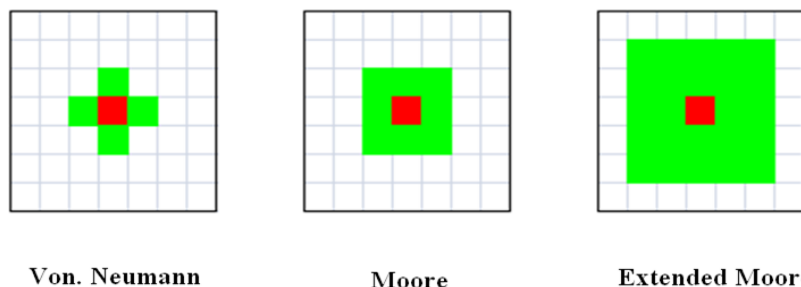
Fig 1. Different type of neighborhoods that use in CA

6 MODEL PARAMETERS IN RELATED TO URBANIZATION TYPES OF GROWTH

A number of parameters must be defined by users before the model starts to run. There are five growth control parameters to be initiated, namely, diffusion coefficient, breed coefficient, spread coefficient, slope resistance, and road gravity. The diffusion coefficient controls the overall stagnancy of growth. The breed coefficient determines how likely a newly generated, detached or road influenced settlement is to begin its own growth cycle. The spread coefficient controls the amount of outward 'organic' expansion. The slope resistance influences the likelihood of settlement extending up steeper slopes. The road gravity encourages new settlements to develop near the transportation network. These parameters must be determined with intensive model calibration in which each coefficient combination needs to be tested individually and the modeled result is compared to historical urban and land use/cover data by using statistical methods. The coefficient combinations resulting in the best overall statistical scores are selected and the final values for these coefficients are then determined.

The urbanization is the sum of the four types of growth: spontaneous, diffusive, organic, and road-influenced. Spontaneous growth, models the development of urban settlements in undeveloped areas. Diffusive growth, permits isolated cells to be locations for new urban spreading centers, but these cells must

pass random tests for the diffusion coefficient and slope suitability. Organic growth promotes the expansion of established urban cells to their surroundings. Only undeveloped cells that have at least two urban neighbors and pass the spread coefficient and slope resistance tests become a new urban location. Last, road influenced growth promotes urbanization along the transportation network because of increased accessibility.

These newly urbanized cells must pass the random tests of breed coefficient, diffusion coefficient, slope resistance, and road gravity. During the urban growth computation, a second level of growth rules, termed self-modification, is invoked if the model's growth rate is larger or smaller than a critical number. In that case, the model will modify certain parameters to emphasize trend. This component is quite important to ensure reasonable results (Clarke, 1998).

7   CA SIMULATION IN TEHRAN CITY

One of study cases about application of CA is urban growth simulation in Tehran (Kiavarz, 2009). In this simulation process of a real city these process have done: data processing, CA algorithm design and implementation and finally evaluated of simulation result.

At data processing step, the data has been used, included three historical satellite images covering period of forty years, the images are geometrically rectified and registered spatially to each other, and then the images are classified to five classes: water, road, urban, green area and non urban area.
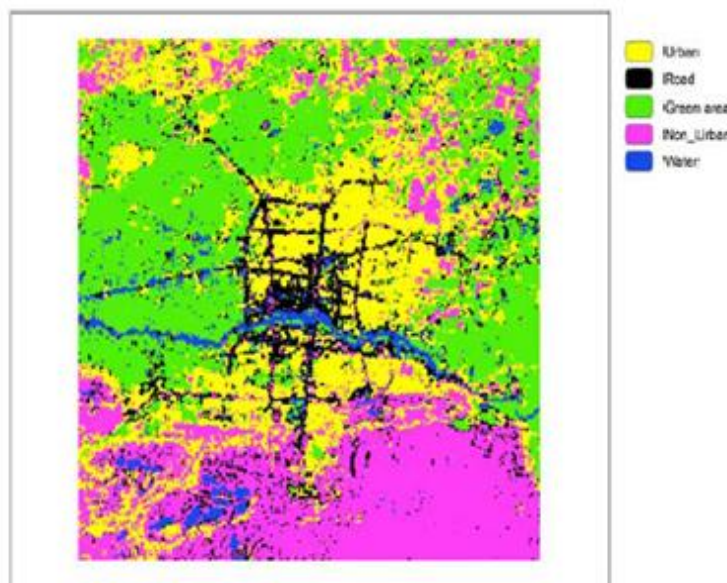
Fig 3. Tehran ground truth for 1975

In the implementation of CA algorithm, at the first, the oldest classified image 1975 was selected as an input for CA urban simulation. Ground truth images 1990 was used for training to calibrate the CA rules and growth step while ground truth images of 2001 was used for testing purposes only (because of not accessibility of newer photos). The different scenarios have been defined for CA algorithm. With these scenarios, the pixels of images were updated. Simulated images were compared with truth image 1990 and their precisions were calculated. The best precision scenario was selected for transition rules in a CA; the following scenario had the best fit with truth image of 1990.

Scenario:

1. IF tested pixel under consideration is water, THEN no growth is allowed at this pixel.

2. IF tested pixel under consideration is road, THEN no growth is allowed at this pixel.

3. IF tested pixel under consideration is residential OR commercial (Urban), THEN keep this pixel the same without any change.

4. IF center pixel under consideration is (Green Area) AND there are 3 Urban pixels in the neighborhood, THEN change center pixel to Urban

The achieved precision for CA calibration was acceptable about 88.82 %. The simulation of 2001 were calculated with following scenario, in order to test result, the simulated images for 2001 were compared with ground truth image for 2001; The achieved precision for predicted years 2001 was 85.90 % that it was reasonable.

Table 1, 2 summarizes the urban growth prediction evaluation results based on this scenario for years 1990 and 2001 and Fig. 3, 4 shows Tehran ground truth and CA simulated images based on this scenario.

Region	1990 Ground Truth (urban)	1990 simulated (urban)	error	Precision (%)
Tehran	95616	106301	24955	88.82

Region	2001 Ground Truth (urban)	2001 simulated (urban)	error	Precision (%)
Tehran	103070	117560	14490	85.90
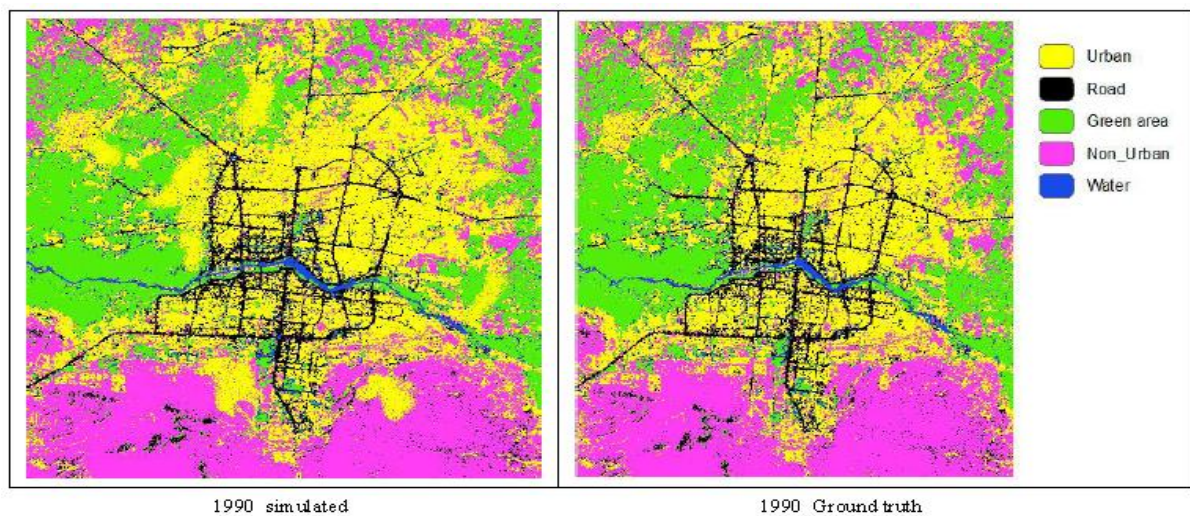
Fig 3. Tehran ground truth and CA simulated images for 1990
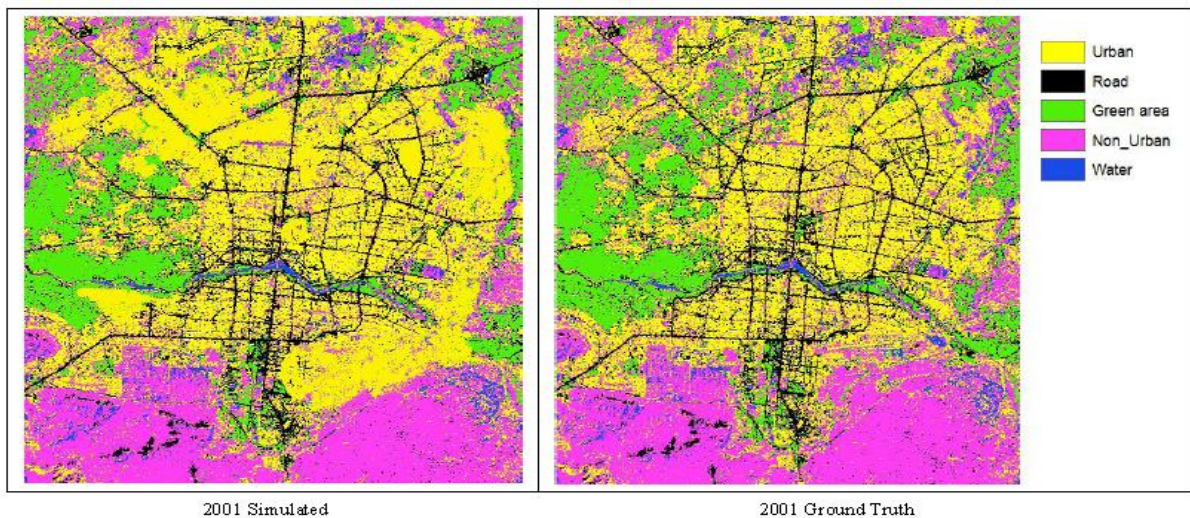
Fig 4. Tehran ground truth and CA simulated images for 2001

So based on the CA simulation strategy we used to predict 2001, future prediction of Tehran urban growth can be simulated (Kiavarz, 2009).

According to The results of simulations by using the scenarios defined during the years 1990 and 2001 which was acceptable and was matched with the fact, simulations for 2016 was done. The following result for the year 2016 is shown in Fig.5.
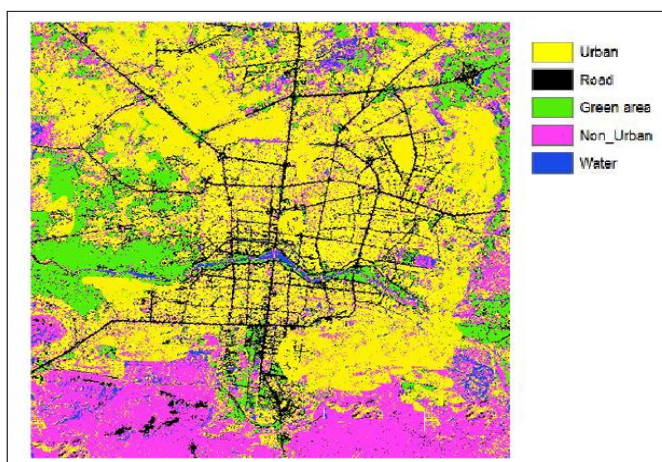
Fig 5. Tehran CA simulated image for 2016

8 ANALYSING OF CA SIMULATION

Based on the findings of the case study was seen that urban development in Tehran has dispersed and has spread to the West and Northwest, also this result shows that urban growth of Tehran lead to leapfrog discontinuous development. With this development seems to Tehran city are faced with the urban sprawl problem, this problem lead to Over-exploitation of land and the other hand, it made high potential land that is qualified for municipal services remain unused and disabled; while expanding the city limits, agricultural land and gardens are separated and thus a considerable amount of public investment is wasted and the consequence of environmental degradation is a consequence of urban sprawl. In other words, in Tehran city facilities and resources was shifted to around of the city because of lack of vacancy land and the higher cost of land in the central area of Tehran, migrating middle-income people to Tehran city who are not able to take possession of these expensive land and the occupants tendency to have larger land.

With this type of growth that simulated by CA models, urban manager in Tehran are faced to some problems in providing municipal services and facilities, and appropriate equipment to the urban sprawl areas. According to finding of these simulations and problems arising from this kind of urban development (sprawl development), urban management of Tehran ought to conduct facilities and resources to these region.

In order to treat or reduce the negative effects of urban sprawl, it seems necessary to understand to limit this phenomenon. So these strategies in physical and environmental realms offered to reduce or eliminated it (table 3).

physical	Development of public transport networks in order to increase access from urban sprawl region to other place of city and reduce their travel costs. (8th principle of Smart Growth Theory)
	Utilizing mixed land uses in order to allocate balance urban service in the city's area. (the first principle of Smart Growth Theory)
	Increasing access to urban facilities and equipment
Environmental	Preservation of agricultural land in the region to take advantage of green space. (6th principle of Smart Growth theory)
	Applying rules to increase density and control the horizontal spread of the urban and to prevent damage to the environment. (6th principle of Smart Growth theory)
	Creating green spaces for leisure use and equip existing green spaces in the area. (6th principle of Smart Growth theory)
	Prevent fragmentation or change in use of agricultural land to urban uses. (6th principle of Smart Growth theory)

Table 3: strategies in physical and environmental realms based on CA simulation result.

In addition by using simulation can be reviewed trend of development direction in Tehran that based on this can be predict utilities and infrastructure for responding occupant needs. In Tehran as it is extracted from the simulation − aspects of the development are the North and the North West region. Identifying spatial characteristics are necessary in order to plan so by using detailed plan in 2012 in Tehran, SWOT table in 7 realm such land use, Natural disaster, urban Infrastructure, transportation, environment, Social-economic-population, Housing and density These areas are provided (table 4):

Realms	SWOT	Description
Land use	S	Possibility of using appropriate arid land for constructing needed land uses Existence of land uses related to tourism in city
	W	Shortage of facilities and welfare services at resorts area
	O	Tendency to investment in the region and conducting them to tourism, Recreational and Cultural land uses according to Properties of region.
	T	construction without a license and lack of supervising on the construction in marginal zone Changing green spaces land use to residential land use.
Natural disaster	S	Existence of Open Spaces in order to disaster Relief
	W	Non-concurrence of construction with high potential Density of seismic in Tehran High housing density in the region, especially in old buildings
	T	Lack of efficient organization of disaster management in the region (and Tehran) Existence of Tehran North fault, and the threat of earthquake
Urban Infrastructure	S	Implementation of the sewer project in some areas.
	W	Vulnerability due to old water supply pipes due to decay The lack of a modern and extensive network of waste system
Transportation	S	Existence of snag in Transportation network
	W	Not applicable of the detailed plan for transportation network high sloping pathways and pavement performance problems
	O	Extension of metro networks in region
	T	Lack of streets proper servicing
Environment	S	Appropriate environmental and climatic conditions of the region
	W	Offensive to rivers domains Environmental pollution is the release of sewage in rivers and canals
	T	Destroy of gardens and rich vegetation of the area due to construction
Social-economic-population	S	Higher levels of education, profession and income of people living in the region than in Tehran Willingness to residents to participate and collaborate in urban issues
	W	Heterogeneity of social, cultural and economic sectors of the region
	O	Settlement of political, social and economic national and international leaders in the region Willingness to invest in the region because of the economic benefits
	T	High growth rates than the general population in Tehran The overflow of capital into the housing and construction sector in the region in recent years
Housing and density	S	Desired Status indicators density (family in dwelling unit and person in the room) than in Tehran
	W	Existence of high density residential area in the historic core Low-quality housing in the peripheral areas and non-regulated renovation of them high-rise building in inappropriate topography, locations and access to public services
	O	Willingness to renovation according to economic benefits The possibility of regulated revenue during demolition & Renovation of high-rise building in the area
	T	Construction of the residential units in the boundary of faults and watercourse

Table 4: Swot analyses of the new development region based on CA simulation.

By using information extracted from swot which is provided for the future development, some strategies in seven realms to improve the region capacity for dealing with development are presented in the following table (table 5):

9 CONCLUSION

The increasing urban growth through the world has effected over the degradation of our environmental and ecological health. Understanding the dynamics of complex urban systems and evaluating the impact of urban growth upon the environment involve procedures of modeling and simulation, which require robust methodology and techniques. In recent years, dynamic modeling was rapidly gaining popularity among geographers and urban planners as a tool for urban and landscape simulation. Cellular modeling as a popular dynamic modeling method has witnessed much technological advancement in the past ten years, enabling it to grow out of an earlier game-like simulator and evolve into a promising tool for the exploration of complex

urban systems. These predictions can be help to the Tehran urban management to prepare urban development plan such as detailed plan and structural plan. Hence urban planner can decide more appropriate decision based on the results of such predictions for land use planning for the future development of land in these areas.

Realms	Strategies
Land use	Suit distribution of urban land uses and their special spaces
Natural disaster	Attention To capacity of the land, especially in vulnerability and disaster issues
Urban Infrastructure	Synchronization of urban infrastructure in related to increase of the population
Transportation	Prioritize to public transportation
Environment	Maintain and enhance structural and functional sustainability through restoration and completion of the green spaces network
	Improve and develop green spaces with recreational and Renovation environmental quality
Social-economic-population	Prioritize to land uses in related to public facilities and services
	Synchronization of urban services in related to increase of the population
Housing and density	preventing illegal constructions in the area
	Controlling the construction and building density in the area

Table 5: strategies of the new development region based on CA simulation.

As in the study was shown by using CA simulation, Tehran growth was reviewed and analyzed. Based on finding of reviewing growth, was determined that Tehran growth trend is likelihood to urban sprawl; so in order to reduce or eliminate this phenomena some strategies was presented in physical and environmental in two realms . It should be noted that these strategies is according to the principles of smart growth strategies that is a one of important strategies for reduci ng or eliminating effects of urban sprawl . In addition by this simulation can be predicted development aspect s in Tehran and based on some preparation was recognized for dealing with such development in process of spatial planning in Tehran. However, it is considered urban and regional planner should not rely on these simulations and all their planning is based on them, but these models can be used as a tool to assist better decision-making, because urbanization and urban development is a multi-dimensional phenomena, thus was not considered on physical realm, and also it is necessary to attend social, economic, environmental dimensions for planning.

10 REFERENCES

Alkheder, Sharaf and Shan: Jie. Cellular Automata Urban Growth Simulation and Evaluation – A Case Study of Indianapolis.

Batty, Michael: Cellular Automata and urban form: a primer. In: APA journal-spring, 1997.

Bhatta, B: Analysis of Urban Growth and Sprawl from Remote Sensing Data. In: Springer Heidelberg Dordrecht London New York, 2010.

Clarke KC, Gaydos LJ: Loose-coupling a cellular automaton model and GIS: long-term urban growth prediction for SanFrancisco and Washington/Baltimore. In: International Journal of Geographical Infor mation Science, 1998.

Couch, Chris, and Karecha, jay: Controlling urban sprawl: Some experiences from Liverpool. In: cities journals, vol. 23, No. 5, p.253-263, published by elsevire, 2006.

Fulong Wu, David Martin: Urban expansion simulation of Southeast England using population surface modeling and cellular automata. In: Journal of Environment and Planning A 2002, volume 34, pages 1855- 1876, 2002.

Galster. J, Hanson. R, Ratcliffe. M, Wolman, Wolman. H, Coleman. S & Freihage. J: wrestling sprawl to the ground Defining Measuring Sprawl: Defining and Measuring an Elusive Concept. In: Housing Policy Debate, Vol.12, Issue.4, pp.681-717, 2001.

Javadian Namini, Marjan: Application of Spatial Strategic Planning in dealing with Urban Sprawl, Case Study: Karaj City and Pre-Urban Environment, a Thesis Submitted in Partial Fulfillment of the Requirements for the Master of Arts Degree in Urban and Regional Planning, January 2012.

Kiavarz moghaddam, Hamid and Samadzadegan, Farhad: Land use change modeling in Tehran using Geo Cellular Automata. Inn: Journal of GIS Ostrava, 2009.

Nuno Pinto, Norte and Antunes, António Pais: Cellular Automata and urban studies: A literature survey. In: Journal of ACE, Vol.1, pp. 368-399, 2007.

Peiser, R: Decomposing urban sprawl. In: Town Planning Review, Vol.72, Issue 3, pp. 275–298, 2001.

Rahman, G, Alam, D. and Islam, S: City growth with urban sprawl and problems of management. Proceedings of 44th ISOCARP Congress Dalian, China, September 19–23, International Society of City and Regional Planners and Urban Planning Society of China, 2008.

Tehran city Detailed plan, Tehran Municipality, 2012.

Yang, X, C.P.LO: Modelling urban growth and landscape changes in the Atlanta metropolitan area. In: Geographic Information science, Vol. 17, No. 5, pp.463-488, July-August 2003.

Approach to Spatial Data Infrastructure Development for Spatial Planning in Serbia

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1 ABSTRACT

Spatial data infrastructure (SDI) represents a socio-tehnical concept that aims to create a context for cooperation and exchange of data and information between a certain spatial data community's stakeholders. Thus, the aim of SDI concept development is to establish a common and spatially supported platform of organized information needed for making right decisions relevant for economic progress, good governance and sustainable development in general within a certain domain or jurisdiction. Today, the majority of launched SDI initiatives are on the national level that is by some authors identified as the crucial one for evolution of this concept in general. Additionally, recent research has proven that SDI developments have become prevailingly social phenomena since interactions between community stakeholders appeared to be critical for achieving purpose of SDI concept and vision in general.

Recent socio-economic issues in Serbia and existing practice in domain of spatial planning have proven strong need for new, systematic approach and efficient mechanisms towards sustainable development of its territory. In a narrow sense, this systematic approach should include clear responsibilities and participation among spatial planning stakeholders within spatial development monitoring and evaluation process and identification of sustainable development alternatives, where the whole process should be supported by appropriate GIS-based information platform. On the other side, this new approach along information platform should support consequently mechanisms and tools for efficient and continual sustainable development alternatives and decision-making on resources and existing capacities development in Serbia. Finally, in a broader sense, this new system should provide basis for realistic and sustainable spatial development policy definition and, along it, conditions for its optimal implementation strategy identification.

Therefore, recent activities in the Republic Agency for Spatial Planning (RASP) have been oriented towards building basic database model for projected information system that would be followed up by spatial planning SDI in future. This latter should become platform for efficient and effective communication and coordination among spatial planning SDI stakeholders in Serbia. However, it would be also expected to provide input for translation of spatial data and information into knowledge that support continuous, informed and timely sustainable decisions making and development alternatives creation and management employing planning support systems (PSS) and decision support systems (DSS) technologies.

Thus, aim of this article is to propose an appropriate approach, i.e. model for spatial planning SDI development in Serbia based on present database model and its development concept, as well as to describe recent activities on the same and discuss expectations for PSSs and DSSs.

2 INTRODUCTION

The well-known Bruntal Report's definition of sustainable development assumes development that meets present generation needs without jeopardizing capabilities of future generations to satisfy their own needs as well. This means that sustainable development encompasses sustainable management of all three main spatial systems, namely social, economic and environmental/ecological ones, as well as their relationships. Besides spatial dimension, sustainable development definition above assumes, also, dynamic dimension of those three systems. This includes need for monitoring of three systems and their relationships through time, i.e. during generations, and collecting and storage of information series on systems' statuses as well as taken management actions. (Shcherbina et al, 2010; Feeney et al, 2001)

Today sustainable development presents dominant governance approach to resources management. Thus, modern societies are build different information and communication management capacities –namely, tools, instruments, models, etc.- for spatial development status monitoring and evaluation, on one side, and for making sustainable development decisions, policies and strategies based on dynamic relationships among social, economic and environmental phenomena, on the other. (Williamson et al, 2006) Therefore, it could be claimed that data and information have critical role for management towards sustainable development goals

achievement: economic progress, good governance and environmental responsibility. (Shcherbina et al, 2010)

On the other side, data and information and their organization is main focus of the SDI paradigm, which is a part of Al Gore's (1998) Digital Earth (DE) vision of „a multi-resolution and three-dimensional presentation that…enable discovering, visualisation and true understanding of an enormous quantity of geo-referenced data and information about social phenomena and environment on our planet". (Craglia et al, 2008) After 15 years of DE vision launching, SDI concept today is developing and evolving its paradigm within different domains and levels of public sector, both in developed and developing countries, where national level is found to be of critical importance for SDI paradigm development in general. (Rajabifard et al, 2000) From the early development, SDI concept was considered as prevailingly public policy analysts' tool, needed for informing different public policies and sustainable development decision-making, and which was generally implemented by legal mechanisms. (Craglia et al, 2008) However, some recent analysis has decline SDI firstly claimed decision-making functionality (Feeney et al, 2001), and instead they positioned SDI as important facilitation tool, i.e. supporting information platform for various models and infrastructures for professional judgment, like PSSs, and policies decision-making, like DSSs.

In domain of spatial planning in Serbia today notable efforts are investing in building GIS-based tool that would a) support identification, planning and monitoring of sustainable development alternatives; and b) provide platform for making informed decisions, strategies and policies that would contribute to sustainable development scenario achievement. (Živković, 2012) Clearly, this tool in future should include implementation of PSS and DSS solutions adapted to spatial planning system and its jurisdiction's needs in Serbia. However, since both PPS and DSS functionalities and usefulness depend on available data and information quality and quantity, spatial planning SDI and its integrability and interoperability would be thus of crucial importance for future sustainable decision-making and development in Serbia in general. In other words, this implies that spatial planning SDI would have significant effects on emerging PSS and DSS infrastructures in Serbia, and that tackling of different technical and non-technical SDI implementing issues today could have direct impact on sustainable spatial development decisions and actions in future.

Therefore, this article aims to identify and propose SDI development approach or model that would be appropriate for spatial planning system establishment in Serbia. First, basic introduction to SDI paradigm and its development and evolution are going to be presented. After that, in Chapter 4, new methodological approach to sustainable spatial development in Serbia will be explained, and general description and objectives of initial model for spatial planning database (SPACE) and information platform (ISSPace) will be identified. In following Chapter 5 model for SDI development for spatial planning domain in Serbia is going to be proposed, along general assumptions on how proposed model would reflect on latter PSS and DSS technologies implementation.

3 SPATIAL DATA INRASTRUCTURE

3.1 SDI: Definition, components, structure, national SDI and development models

The SDI concept is usually defined as a set of policies, technologies and standards necessary for efficient collection, management, access, exchange and usage of geospatial data and knowledge within geospatial data communities –consisting of stakeholders, that is, users and producers- on global, regional, national and local levels. (Rajabifard et al, 2002) Therefore, SDI is usually described as a constellation of five basic components and their relations: people, access networks, policies, standards, and data. (Rajabifard et al, 2001; Mohammadi et al, 2008)

Since the first initiatives were launched, relationships between SDI components have been changing. (Craglia et al, 2008) At the beginning, the focus of SDI concept development was on creation of concrete products and/or services within single jurisdiction. Later, relationships between people, i.e. social component and data component have become critical for the SDI concept development in general. Therefore, today the focus of SDI development is on management of different stakeholders' rights, restrictions and responsibilities against data through the different cross-jurisdictional partnerships. (Feeney et al, 2001; Rajabifard and Williamson, 2002)

Thus, the originally dominant short-term product-based approach to SDI development, oriented towards content building, has been later complemented and dominanted by a process-based approach to

establishment of communication conduit that needs to secure long-term commitment of all SDI stakeholders to collaborate and exchange data between included jurisdictions. (Rajabifard and Williamson, 2002)

A) Product-based model

B) Process-based model
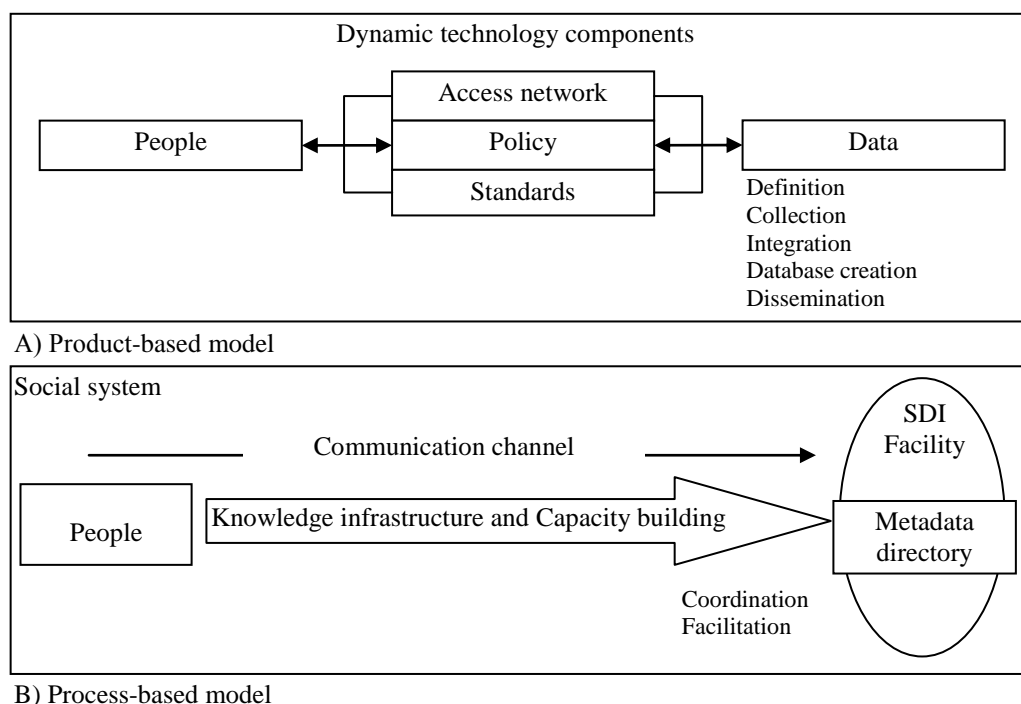
Figure 1: Approaches to SDI development. Product- and process- based models for SDI development (Rajabifard et al, 2002)

Adoption of either one of two SDI development approaches depends directly on a mandate that particular jurisdiction needs to establish. (Feeney et al, 2001) However, it is also possible to implement a composite product-process approach that secures advantages of both models, making thus development and evolution of particular jurisdiction more flexible as a whole. This is due to the initial raising of social commitment to SDI concept building, securing a common leadership and trust necessary for data sharing.
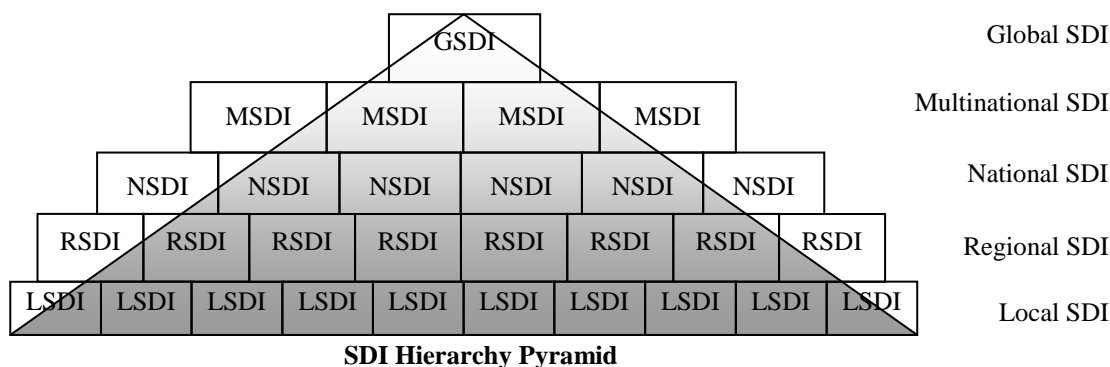
Figure 2: SDI spatial pyramid. SDI global hierarchical structure is the result of different mandates of the SDIs' jurisdictions on different levels, as well as within the same level (adapted: Rajabifard et al. 2002).

According to Rajabifard et al (2000), SDI components on national level have the greatest and direct impacts on development of the same components on the other levels in SDI spatial hierarchy, i.e. pyramid, national SDI initiatives have been identified to posses decisive role for the development of the global SDI concept in general. (Rajabifard et al. 2000) However, Carrera and Ferreira (2007), Nedović-Budić et al (2007) and Živković (2012,b) claim that future of SDI should confirmed and highlight significance of local and regional GIS-based information platforms, i.e. municipal and regional SDIs, for producing fine-grained and up-dated (re)usable spatial data and information in and for public, private and non-profite sectors. Also, these authors claim that this would be the most efficient and effective way of developing, maintaining and integrating national datasets in future.

Latest development and fast spreading of different Geo-Web services and Web applications in general, point to a vision of SDI development in future as an infrastructure or network of infrastructures build up of loosley coupled Web-GIS systems, which would be shared within a different hierarchical levels (vertically) and

areas (horizontally). (Carrera and Ferreira, 2007; Mohammadi et al, 2008) However, in order for promised advantages of information infrastructures, i.e. smooth flow and easy exchange of data via Geo-Web services through integration of distributed local/regional GIS/SDI to be achieved, number of technical and non-technical issues should be implemented today by social component of SDI. This fact confirms critical role of social component and social character of SDI paradigm development in general, which is already stressed at the beginning of this article.

Technical issues	Non-technical issues			
	Institutional issues	Policy issues	Legal issues	Social issues
– Computational heterogeneity (inconsistent standards) – Poor/no metadata – Format – Semantic heterogeneity – Data Quality – Reference system and scale	– Inconsistent collaboration models – Differences in funding models – Lack of linkage between data management units – Lack of awareness of data integration needs	– Lack of awareness of data existence – Lack of legislation – Political stability – Inconsistency in policy drivers and priorities (sustainable development)	– Rights, restrictions and responsibilities to be defined – Copyright and IPR differences – Difference in data access and privacy – Licensing	– Cultural issues – different background of stakeholders – Capacity building – weak activities – Equity

Table 1: SDI implementation issues. Technical and non-technical issues associated with spatial data integrability and interoperability (Mohammadi et al, 2008; Williamson et al, 2006)

3.2 Spatial planning infrastructure and planning and decision support systems infrastructure

Sustainable development requires continual and integrated consideration and analysis of social, environmental and economic issues, as well as their evaluation and prioritization against current and planned land uses in order for potential development conflicts among those three systems to be minimized. (Feeney et al, 2001) Therefore, planning of sustainable development alternatives and making decisions adjusted to sustainable development strategies and policies require technologies with capabilities for modelling and handling complex spatio-temporal phenomena, like PSS and DSS combined with GIS advantages. (Shcherbina et al, 2010; Boerboom, under review)

Since both PSS and DSS outputs' quality highly depend on available data and information, both Feeney et al (2001) and Boerboom (under review) have identified reliable SDIs, meaning fully integrable and interoperable, as critical for collecting and storing of needed data on environmental, economic and social rights, responsibilities and restrictions. This means that SDI in future should provide comprehensive spatial and non-spatial data sets, and thus facilitate and optimize utilisation of different planning (PSS) and decision-making (DSS) technologies.
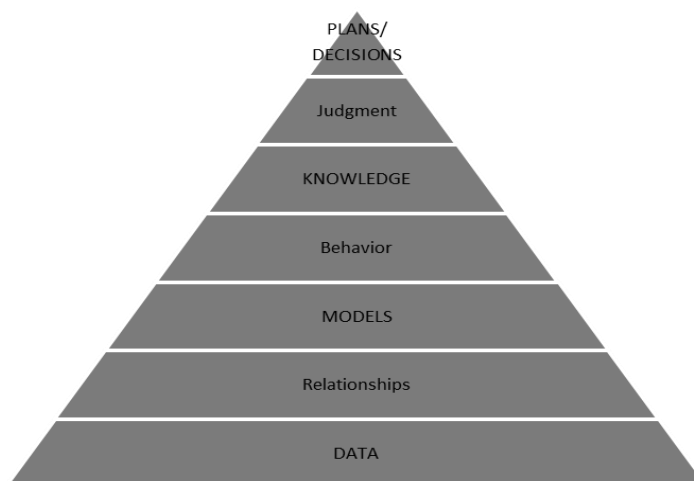
Figure 3: PSS and DSS. Value of data is increasing to judgement and decisions, where DBs and SDIs contribute with organized data on economic, social and environmental elements, their relationships and related rigths, responsibilities and restrictions (Boerboom, under review)

Finally, Boerboom (under review) goes even further claiming that in near future focus would be on development of spatial planning and decision support systems infrastructure (SPDSS-I) concept. This paradigm should emerge from loosely coupling of different PSSs and DSSs systems in infrastructures that would be relying on comprehensive and reliable spatial planning SDIs. And, unlike the spatial planning SDI general purpose to exchange data, SPDSS-I purpose would be exchange of relevant spatial planning knowledge and judgement. Thus, supporting the online creation and exchange of knowledge and judgement, SPDSS-I keeps a promise of creating conditions for transforming today spatial development planning and management procedures into continual real time process of sustainability status monitoring and evaluation in future.

4 SPATIAL PLANNING IN SERBIA

4.1 New approach to spatial planning and development implementation

Number, dynamics and complexity of prolonged transitional economy events within the territory of the Republic of Serbia require today different approach to their management, in order for sustainable character of spatial development to be preserved or (re)gained in future. Therefore, the latest Law on planning and construction (Law) (Official Gazette of the Republic of Serbia 72/09, 81/09, 64/10, 24/11), along the current Spatial Plan of the Republic of Serbia 2010-2020 (SPRS) and its Implementation programme for 2011-2015 (2011), have prescribed new approach, methodology for spatial development planning and, especially, implementation. This new methodology includes:

- Organizational model for early involvement, and continual, clear and direct responsibilities of relevant spatial development stakeholders in Serbia for identification and implementation of development alternatives, namely strategic priorities or projects (SP). These stakeholders would be also members of Serbian spatial planning SDI community in future; and

- System of social, economic and environmental spatial development indicators (DI) for territorial development status monitoring and evaluation. This system of DIs interrelated with SPs should form information platform for revision of existing and preparation of new spatial plans and other planning documents in Serbia.

Basic hypothesis behind applied methodology assumes that implementation of identified SPs should affect DIs' values, i.e. statuses, and thus generate or trigger planned development and identified sustainability goals achievement within certain territory. (Figure 5) Also, planned time framework for SPs implementation should be monitored, since the absence or presence of planned results and/or expected development progress should impose changes and/or adjustments of development alternatives both in sectoral as well as spatial plans and programmes in return. (Živković, 2012c)
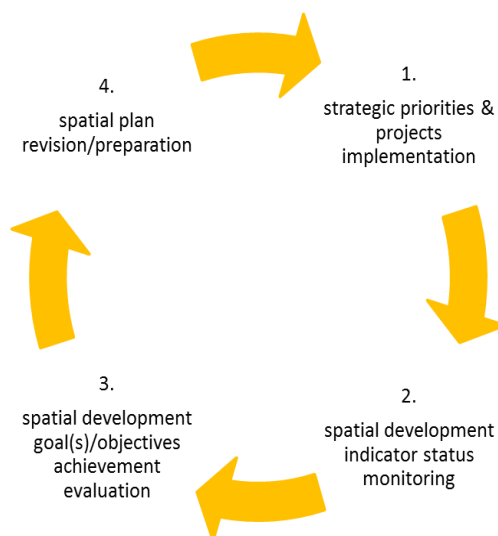
Figure 4: Territorial monitoring and evaluation concept. Integration of spatial planning cycle with territorial monitoring and evaluation elements, DIs and SPs, for spatial development implementation and planned goals achievement

4.2 Information platform for spatial planning

In accordance with the mentioned Law, within a year after SPRS was enacted, the Republic Agency for Spatial Planning (RASP) has prepared its (SPRS) first (ever) Implementation Programme for period 2011-2015. (2011) Besides porposing the action plan for monitoring and evaluation of SPRS implementation using DIs and SPs, as well as recommendations for annual report preparation, Implementation Programme has described general concept and framework for establishment of information platform for spatial planning activities in Serbia.

Thus, this first Implementation Programme has identified aim, objectives and preconditions for establishment of spatial planning information platform to be modern GIS-based tool that would simultaneously (Živković, 2012a):

- Provide monitoring functionality for spatial plans and other planning documents implementation in jurisdiction of RASP in order to support revision and preparation of new spatial plans and planning documents; and

- Support data and information collection needed to RASP to annually monitore and evaluate spatial development status in Republic, and to communicate it to the Government and public in form of report now and in future on-line via Web portal using shared Web services.

Aim	Objectives	Preconditions
Simple and efficient management of data and information needed for making timely and informed decisions and policies for balanced and sustainable development of socio-economic-environmetal resources within the Republic of Serbia territory	- Build instrument to support preparation, adjustment, monitoring, evaluation and revision of spatial plans and other planning documents; - Implement standards into domain of planned sustainable development, in respect to applied technologiess as well as content of plans and planning documents; - Create preconditions for simulation and scenario methodologies implementation, as well as for automatization of other methods and techniques needed to spatial and urban planners; - Support creation of policies for planned development and sustainable management in Serbia; and - Develop capacity of spatial planning system, that is, its institutional and organizational frameworks, and especially human resources.	**Technical framework** - standards ISO/TC 211, OGC, W3C and others; - recommendations of INSPIRE Directive and Programme, Plan4all Project; - Serbian NSDI 'GeoSrbija' recommendations; - standards of sectoral ISs in Serbia; **Organisational and institutional framework** Development of appropriate institutional and organizational framework for ISSpace by implementing internationally and nationally adopted documents and best practices, as well as by development of local solutions, which would together contirbute to more efficient operation and management of spatial planning system in Serbia **Significant financial means** **Educated and skilled human resources**

Table 2: Towards comprehensive information platform for spatial planning in Serbia. Aim, objectives and preconditions for establishment of SPACE database and ISSPace (Živković, 2012a)

4.3 Information system for sustainable spatial development, phased approach

As a first step towards spatial planning SDI establishment in Serbia, RASP has planned in the mentioned Implementation Programme to firstly establish GIS-supported information system for spatial planning, ISSPace with database SPACE.

Due to the Serbian Government aspirations to join EU, both social and technical components of ISSPace and latter SDI would be accommodated to the needs and demands of INSPIRE, as European multinational SDI initiative.

Structures and elements of SPACE and ISPPace are planned to be scalable, flexible and adjusted to future smooth data and information usage and exchange between same or similar systems and infrastructures in Serbia and Europe (following INSPIRE Directive and Plan4all recommendations), and wider (through implementation of ISO and other internationally adopted technical standards). Also, recommendations of Serbian NSDI initiative GeoSrbija would be included. (http://www.geosrbija.rs; Živković, 2012b)

Database SPACE itself is projected to record and store, in the first phase, three basic types of data and information for spatial development planning: 1) plans' and datasets' metadata, 2) spatial planning data (including DIs and SPs) and 3) sectoral data. Metadata package (blue coloured box) would support development of spatial plans and planning documents register in Serbia and, thus, their identification and fitness for use assessment using basic information, like name and type of plan or document, its scope and scale, lineage information, responsible organization, reference dates, etc. Planning data package (yellow coloured box) would provide administrative information for each type of plan and planning documents in Serbia, as well as store contents for national, regional, special purpose area as well as municipal spatial plans, with capabilities for urban plans' content to be added latter as well. Besides administrative information and planning content, this package would also provide data on MEGAs and functional urban areas (according to ESPON definition), as well as store definitions and status values for relevant DIs and SPs within monitoring and evaluation module. Finally, sectoral data packages (grey coloured boxes) needed for some SPs implementation follow-up as well as for revision and/or new spatial plans and other planning documents preparation, would be stored in 23 separate packages. And, once the relevant sectoral ISs would be established, data from these 23 packages would be gradually substitute, that is, (re)used via certain Geo-Web services that would be shared within ISSPace and, latter, spatial planning SDI environment as well. This should be seen as second phase of ISSPace development.

Finally, the same approach is assumed for the other lower-than-national planning level and their data: once regional and municipal ISs and SDIs for planning would be established, plans and planning documents data would be (re)used and exchanged between those hierarchically coupled shared GIS systems and infrastructures via different Geo-Web services.
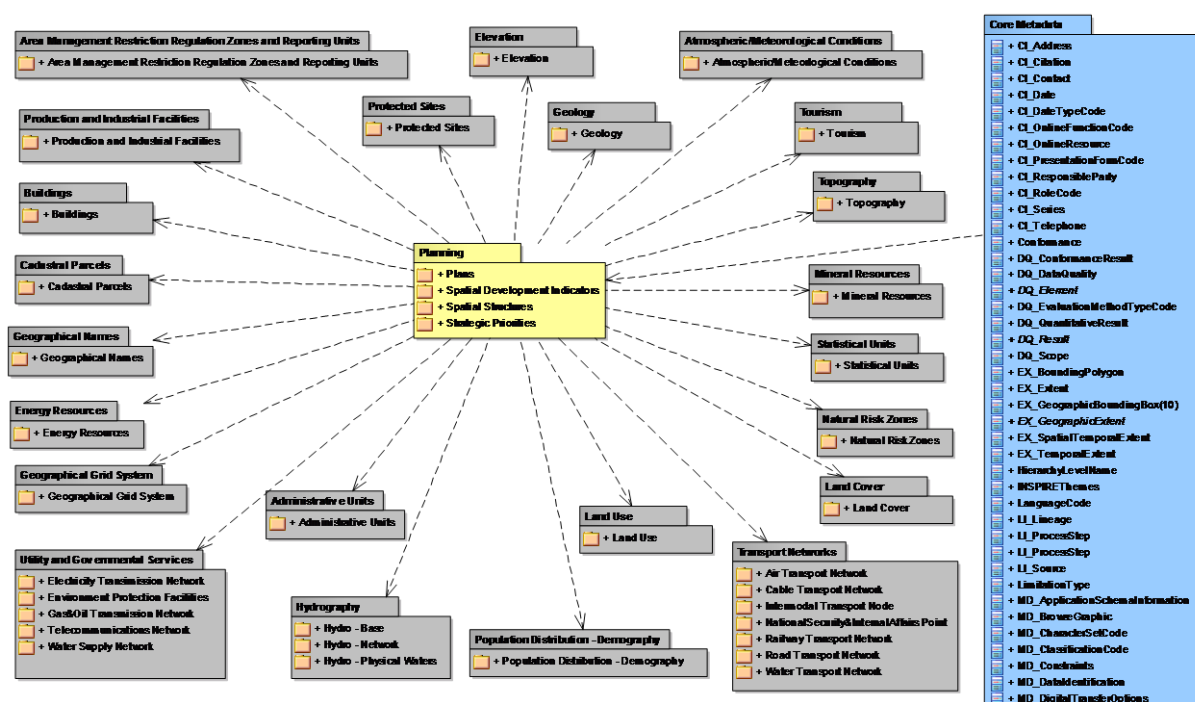
Figure 5: Basis for spatial planning SDI development. SPACE database structure (adapted: Implementation Programme of the SPRS 2011-2015)

In order for described planned technological supports and their advantages to take place in future, and for successful establishment of ISSPace and database SPACE in the first place, standardisation of the spatial plans'contents and other planning documents in Serbia has been identified as a critical initial precondition. These standards would ensure simple exchange and use of data and information stored within the other for spatial planning relevant information infrastructures, systems and databases, securing thus timely and informed approach to spatial development planning in Serbia in future. But, on the side of social component, for planned IS establishment and latter emerging SDI advantages development, improved capacity of human resources would be of key importance. (Živković, 2012a)

In addition, establishment of ISSPace and latter spatial planning SDI would support conditions for real-time continuity in monitoring and evaluation of spatial resources status and development trends in Serbia, and

thus transform set of today's discrete spatial planning procedures into process of planned and sustainable management of socio-economic and environmental capacities in the Republic.

5 APPROACH TO SPATIAL PLANNING SDI DEVELOPMENT IN SERBIA

5.1 Spatial planning SDI development model

Developing countries, like Serbia, are facing today the challenge to institute the SDI concept faster, more efficient and at lower cost. (Williamson, 2004) Therefore, spatial planning domain in Serbia should consider solutions and experiences found to be best practices in SDI establishment, and follow those lessons learnt in spatial planning SDI implementation.

Today in Serbia there is a general lack of fundamental and other datasets, and awareness and knowledge on SDI concept is generally low. (Nedović-Budić et al, 2007; Živković, 2012a, 2012b) Also, installed base and general infrastructure, both treated today as conditions for SDI paradigm establishment, are still in development in Serbia. (Nedović-Budić et al, 2007) Therefore, spatial planning domain should adopt approach that would facilitate simultaneous and coordinated development of all 5 basic SDI components (people, data, policies, standards and access networks) almost from scratch.

Therefore, spatial planning SDI initiative in Serbia should follow today favoured composite product-process development approach. This means that spatial planners in Serbia should initially focus their efforts on establishment of appropriate SDI community (people component), on one side, and establishment of communication channels needed for relevant knowledge dissemination and capacity building among stakeholders, which is prerequisite for development of other SDI components (like, data, policies, standards, access network), on the other (Figure 1.). This approach is, also, in line with and confirms today prevailing opinion on SDI paradigm as social phenomenon.

Additionally, framework for spatial planning SDI components and concept development in general in Serbia should include newly adopted systematic/methodological approach to spatial plans and other planning documents preparation and implementation; also, this framework must be outlined around expected functionalities as well as identified development aim, objectives, preconditions and content of database SPACE and ISSPace system (Table 2.). By this approach, development framework for spatial planning SDI would support both building necessary organizational and human resources' capacities for SDI, as well as solid socio-technical preconditions establishment for its consequent upgrading with DSS and PSS functionalities once SDI is established.

In other words, from proposed composite development approach perspective, spatial planning SDI community in Serbia should be initiated and evolve around those spatial development stakeholders' that are already involved within the spatial planning cycle. Consequently, relying on this initial SDI community, first communication channels for SDI development process-approach should be initiated around its database SPACE module for territorial development monitoring and evaluation (conceptualized in Figure 4.), and latter diversified following expected database SPACE and ISSPace functionalities, benefits and needed conditions and capacities acquisition (Table 2.). Finally, SDI development product-approach should be employed within different work groups that would be established around communication channels and composed of various spatial planning SDI stakeholders to produce particular product/service for mutually agreed non-technical and technical standards (Table 1.). Besides these tasks, some of those work groups would be working on establishment of preconditions for spatial planning SDI further enhancement by employment of DSS and PSS technologies for making knowledge, judgements and decisions on sustainable development alternatives and policies.

Finally, having the seeds of information society and NSDI still in the ground in Serbia (Nedović-Budić et al, 2007), and following principle of the national level SDI's components greatest impact on the other SDI levels' components within the spatial pyramid (Figure 2.), where regional and municipal spatial planning SDIs are yet expected to play significant role, RASP should take leadership role now and prepare preconditions for optimal Serbian spatial planning SDI pyramid evolution in future. Concretely, RASP should provide directions for domination of process-based development model on national –i.e. Republic-, regional and municipal levels, where product-based development model should dominate among various work-groups established within each of those levels and SDI initiatives with aim to develop particular

contents, like legal and technical standards framework, access and exchange policies preparation and maintenance, and other SDI and latter PSS/DSS -relevant conditions, products and/or services.

5.2 Approach to SDI development and its implication for spatial development decision-making and policy management in future

Previous attempts to use SDIs for making decisions or creating policies and strategies have failed. (Feeney et al, 2001; Boerboom, under review) Since SDI main role is to organize spatial and non-spatial data, making of sustainable development decisions and definition of relevant policies and strategies in Serbia would require PSS and DSS tools to be implemented. However, the question is how proposed composite product-process approach to spatial planning SDI development in Serbia would reflect on utilisation of planning and decision-making technologies, as well as ultimate concept of SPDSS-I? Even being too early for exact predictions and impacts estimation, some assumptions on this issue are proposed in next lines.

Since PSSs and DSSs outputs' quality highly depend on available data and information, that is, on underlying SDIs' capacities to store and exchange various environmental, economic and social data, which are usually coming from different sources, proposed composite approach should have at least two advantages for building decision- and policy- making capacities in Serbia in future.

The first generally assumed advantage of proposed composite model refers to its dominant process-based approach and prioritization of spatial planning SDI community and communication components building. This means opportunity to involve knowledge workers and other experts -responsible for PSS and DSS tools development- among SDI stakeholders' community for the very beginning of concept development. Using their knowledge and expertise, these SDI stakeholders could immediately impact and optimize database SPACE, ISSPace and future spatial planning SDI solutions for PSS and DSS technologies implementation, and avoid thus maybe some future expenses for platform adaption. Also, as a second generally assumed advantage of proposed composite SDI development model for spatial planning domain in Serbia, where process-based approach dominante, knowledge workers and experts could -along the other work groups that perform on product-based approach- establish their own groups that would work on upgrading of mentioned SPACE's territorial monitoring and evaluation module from the beginning. On this way, they could further enhance preconditions for creating added values of prospective sustainable development models, simulations, PSS and DSS employment towards creating knowledge for right decision-making on development alternatives as well as forming judgement for policies and strategies creation (Figure 3.).

Finally, since predicted SPDSS-I concept assumes exchange of knowledge and judgement between PSS and DSS infrastructures, proposed composite development approach for spatial planning SDI in Serbia seems for time being to be irrelevant for the same.

6 CONCLUSION WITH DISCUSSION

Sustainability has become today leading governance principle for creating judgement and decision-making on spatial development alternatives. Thus, since sustainable development concept includes all 3 major spatial systems, namely environmental, economic and social, as well as their complex and dynamic spatio-temporal relations, modern societies are investing significant efforts in building tools to understand, predict and manage them.

On one side, sustainable development principles implementation assumes collection, processing, management, usage and exchange of significant number of various spatial and related data in an organized way, what is the actually purpose of SDI paradigm. On the other side, avoidance or minimization of conflicts among environment, economic and social systems for sustainability development character preservation, requires employment of different spatio-temporal modelling, decision and knowledge creation tools, like PSSs and DSSs technologies are. These tools have advantages to support mutlicriteria spatial analysis as well as dynamics of real-time development events, both features underlying sustainable development today.

Following need to develop further living and working conditions in Serbia, spatial planning domain works on establishment of information platform that should in short-run support systematic monitoring of planned development alternatives implementation, on one side, and evaluat their effects on identified sustainable development goals, on the other side. This first GIS-oriented solution for ISSPace with database SPACE as core should provide in the long-run basis for establishment of spatial planning SDI in Serbia by using today

favoured composite product-process development approach. This approach is suitable for Serbian still developing socio-technical and data capacities, since it provides advantage of overcoming locally existing development deficiencies by building strong human resources claimed to be of critical importance for building SDI concept today.

Also, relying on flexibility of composite SDI development model, which stresses importance of communication, facilitation, coordination and capacity building, this model seems generally more appropriate for establishment of fully interoperable and integrable spatial planning SDI, as prerequisite for latter optimal employment of PSS and DSS technologies' advantages. On the other side, pure product-based or process-based approach to spatial planning SDI development in Serbia would limit in the former case its future options to employment either PSS or DSS for single development purpose, while in the latter case employment of PSS and DSS would be restricted to mere exchange of knowledge and discussion of potentials rather than having some exact applications or results.

7 REFERENCES

Boerboom, Luc (under review): Integrating Spatial Planning and Decision Support System Infrastructure and Spatial Data Infrastructure, International Journal of Spatial Data Infrastructures Research, Ispra

Carrera, F., Ferreira, J. (2007): The Future of Spatial Data Infrastructure: Capacity-building for the Emergence of Municipal SDIs, International Journal of Spatial Data Infrastructures Research, Vol. 2, pp. 49-68, Ispra

Čerba, O. (2010): Conceptual Data Models for Selected Themes, Plan4all

Craglia, M., et al (Editorial) (2008): Next-Generation Digital Earth, International Journal of Spatial Data Infrastructures Research, Vol. 3, pp. 146-167

Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE). Official Journal of the European Union, European Parliament and of the Council of the European Union L108, 50, Luxembourg

Feeney, M., Rajabifard, A., Williamson, I. (2001): Spatial Data Infrastructure Frameworks to Support Decision-Making for Sustainable Development, Cartagena

Gore, A. (1998): The Digital Earth: Understanding our planet in the 21st century. Internet: http://www.isde5.org/al_gore_speech.htm

Internet: http://www.geosrbija.rs

Kafka, S., Fiala, R. (2010): Plan4all Metadata Profile – Final Version, Plan4all

Law on Planning and Construction, Official Gazette of the Republic of Serbia 72/09, 81/09, 64/10, 24/11. Belgrade

Ministry for Environment, Mining and Spatial Planning, Republic Agency for Spatial Planning (2012): Report on the Spatial Plan of the Republic of Serbia Implementation and Spatial Development Status 2011, Belgrade

Ministry for Environment, Mining and Spatial Planning, Republic Agency for Spatial Planning (2011): Implementation Programme for the Spatial Plan of the Republic of Serbia for Period 2011-2015, Belgrade

Mohammadi, H., Rajabifard, A., Williamson, I. (2008): Spatial Data Integrability and Interoperability in the Context of SDI, The European Information Society-Taking Geoinformation Science One Step Further. Amsterdam.

Nedović-Budić, Z., Jokić, V., Dželebdžić, O., Budhathoki, N.R. (2007): Spatial Data Infrastructure and Its Initiation in Serbia. Sustainable Spatial Development of Town and Cities 1, Belgrade

Rajabifard, A., Feeney, M., Williamson, I.P. 2002: Directions for the Future SDI Development, International Journal of Applied Earth Observation and Geoinformation 4-1. Enschede.

Rajabifard, A., Williamson, I.P., Holland, P., Johnston, G. (2000): From Local to Global SDI initiatives: a pyramid of building blocks, 4th GSDI Conference Proceedings. Cape Town.

Rajabifard, A., Williamson, I.P. (2002): Spatial Data Infrastructures: An Initiative to Facilitate Data Sharing, Global Environmental DBs – Present Situation and Future Directions 2. Hong Kong.

Shcherbina, O. et al (2010): Spatial Development Making and Modelling, Sustainable Spatial Development, Scientific Journal of Riga Technical University, Vol. 1, Riga

Williamson, I. P. (2004): Building SDIs – The Challenges Ahead. 7th GSDI Conference. Bangalore.

Williamson, I., Rajabifard, A., Binns, A. (2006): Challenges and Issues for SDI Development, International Journal of Spatial Data Infrastructures Research 1. Ispra

Živković, Lj. (2012a): Conceptual and development frameworks for the spatial development information system in the Republic of Serbia, Spatial Planning in Serbia – current issues, Republic Agency for Spatial Planning, pp. 110-124, Belgrade

Živković, Lj. (2012b): Towards institutional and organisational framework for the National spatial data infrastructure development in Serbia, Acta geographica slovenica, 52-1: article 08, http://giam.zrc-sazu.si/?q=en/node/532, Ljubljana

Živković, Lj. et al. (2012c): Improving spatial planning by developing an indicator-based monitoring system in the Republic of Serbia, FIG Working Week 'Knowing to Manage the Territory, Protect the Environment, Evaluate the Cultural Heritage', Rome

Assessing Impacts of Passive Defense Policies Interventions on Spatial Logic of Tehran Metropolitan Area (TMA)

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1 ABSTRACT

Security and reduction of vulnerability of the city, as a place of conflict, disorder and terrorism have been considered by various countries since the past up to now. In this regard, the militarization of urban spaces is not always an effective option in establishing security firstly because of high costs of security establishment and then revelation of the strategic spaces. Nowadays, planners have started to think more creatively about how they can hide security behind planning and design features.

With emphasis on passive defense concept all around the world, defining new spatial logics and including related policies in urban spatial development plans have been cited in planning agenda. The importance of Tehran metropolitan area, as political and economic capital due to accumulation of power, population, activities and wealth, has made application of passive defense policies necessary. So the goal of this research is to assess impact of interventions resulting from application of principles and policies of passive defense on Tehran metropolis spatial logic and to formulate appropriate framework of spatial development policy making for vulnerability reduction.

2 PREFACE

In the present preface, necessity for dealing with research issue is elaborated and history of research in the world and Iran is explained and goal and method of research are mentioned in order to achieve the goal.

2.1 Elaborating Role of Urban Spatial Structure of City in Reduction of Vulnerability and Increase of Security

Subject of security and reduction of vulnerability of city (as place of conflict, crime, disorder and terrorism) and continuation of development in different military and nonmilitary methods have been considered by different countries in the world since the past. In this regard, militarization of urban spaces is not regarded as a suitable option for establishing security due to necessity for establishing balance between costs and benefits of security and revelation of strategic spaces. This subject led the planners to think about other unobservable methods of security establishment in covering features of planning and design. Unobservable methods male cities more beautiful and convert them to more pleasant places for spending leisure time while realizing goal of establishing security (Briggs, 2005). In this regard, importance of passive defense is regarded as the third layer of response to threat.

2.2 Elaborating History of Passive Defense Principles Application

Idea of passive defense is regarded as important element in thought of strategic planning of America and other threatened countries (Pedatzur, 2007). Passive defense is defined as set of actions which and seek to limit damages resulting from war, improve capabilities of space in order to protect life of the citizens and minimize life losses resulting from war without any need for application of military equipments and firearms and only based on planning of urban spatial structure from two perspectives of form and function (Lacina, 2006). Goal of application of passive defense is to increase continuation of vital operations and activities and to give service to vital, critical and important centers at time of threat and crisis. Now, the planners have found that the built environments and form of the city play important role in increase of urban security (Liesette, Frances & William, 2001). Elaboration of this relation has led the researchers and professionals of different disciplines to search for suitable forms of urban places of residence for establishing sustainability and urban security (Jabareen,?). This effort can be manifested in emergence of defensible Space (DS) theory[1] as well as effort to study role of counter-terrorism policies in internal form and structure of metropolises in order to achieve more sustainable urban form especially after event of 11 September

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[1] Defensible Space (DS) theory of Oscar Newman –urban architect and planner –includes thoughts about prevention of crime and establishment of security in urban districts which was extended in early 1970s and a book was written about it in 1972.

(Marcuse, 2002) not only in New York but also in most developed countries in the world. In Iran, passive defense principles have been considered in design of spatial structure of cities since the past up to now. Spatial structure of material city including a central powerful core with impenetrable strengths, construction of Persian city affected by defensive strategies of Achaemenid Empire in strategic and border points, circular structure of Parthian cities for establishing enough security in Parthian lands which are subject to internal and external insurrections, attention of the Sassanid to selection of a place for establishing city using factors or natural barrier for making access to city difficult, defensive elements of city in Islamic periods including castle, bulwark, and trench, centrality of Feudal castles and fortifications in Safavid period all are indicative of importance of defense in Ira since the past up to now(Mir Ahmadi and Yadegar Zendeh, 2011).

2.3 Explaining Goal and Method of Research

Governing conditions of global society, hostility of the western autocratic states and USA and Israeli against Iran as well as special position of the land in critical zone of Persian Gulf and Middle East made defensive preparedness necessary in all fields. In modern wars, goal of the enemy is to remove strategic centers and activities not people and in gravity center destruction strategy which is known as Five Strategic Rings of Warden,[2] the attacked country is regarded as an organic system and the most important duty in war planning is to identify gravity center of the attacked countries (Movahedi Nia, 2007). Centralization of five strategic rings in Tehran as the political and economic capital of Iran necessitates importance of this metropolitan area due to accumulation of power, population, activity and evident wealth and application of passive defense policies for reducing vulnerability. In this regard, goal of the present research is to evaluate effect of policies and principles execution interventions on spatial logic of Tehran metropolis and formulate suitable spatial development policy making framework in order to reduce its vulnerability. In order to achieve the mentioned goal, the selected process and method applied in each stage include the following steps:

- Elaborating passive defense principles and criteria by archival study and history of this field
  - Identifying and understanding effects of application of passive defense principles and criteria on urban spatial structure generally /deducing spatial representation of principles and criteria of passive defense.
  - Recognizing the status quo of Tehran metropolis based on circumstances of passive defense
- Measuring vulnerability of spatial structure of Tehran metropolis by adapting elements of urban spatial structure to spatial representation of passive defense principles and criteria
- Formulating suitable spatial development policy making framework and presenting vulnerability reduction strategies.

3 IDENTIFYING AND UNDERSTANDING EFFECTS OF PASSIVE DEFENSE PRINCIPLES AND CRITERIA APPLICATION ON URBAN SPATIAL STRUCTURE GENERALLY/ DEDUCING SPATIAL REPRESENTATION OF PRINCIPLES AND CRITERIA OF PASSIVE DEFENSE

It was mentioned before than urban spatial structure plays important role in reduction of vulnerability and increase of security and sustainability of the city against potential attacks. One of the key branches which plays major role in completion of passive defense goals is use of spatial development planning (Maleki and Brandkam, 2011). In this regard, different countries have included new spatial logics in agencies of urban spatial development agendas in order to achieve security and sustainability based on subjects of passive

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[2] In theory of Five Strategic Rings of Warden which was mentioned by an American retired colonel in 1988, gravity centers of a country were regarded as organs of a body which will be crippled in case of destruction of each part of the country and will not be able to continue working. These gravity centers can be classified as five strategic rings : the first ring –national leadership includes political leadership, main centers of political and military decision making (ministries, command post , telecommunication , Broadcasting Organization) as brain and neural system of the country , the second ring –key precuts including power plants , raw material production heavy industries and centers, military equipment production industries , water supply network etc as digestion and blood flow system , the third ring as communication infrastructures including airports , railway , roads and bridges as motor organs , the fourth ring –the public and the fifth ring –operational forces as defensive cells.

defense. Determination of special spatial logic in Iran resulting from execution of passive defense policies requires the following steps:

- Identifying passive defense principles and criteria.

- Explaining elements of urban spatial structure.

- deducing representation of passive defense principles and criteria in elements of urban spatial structure.

3.1 Identifying passive defense principles and criteria

Achieving goal of sustainability and reducing vulnerability of city from the viewpoint of passive defense subjects first require identification of passive defense principles and criteria which are related to urban spatial structure.[3] These principles are studied in some general classes including camouflage, concealment & cover, deception, separation, dispersion, multi-functionality of urban elements and access (Movahedi Nia, 2007).

Principle of camouflage

The main factors which facilitate identification of a strategic goal include form, shadow, texture &shine. Therefore, making texture and form of installations, equipments and forces equal to the surrounding environment makes identification difficult (Movahedi Nia, 2007). Concealment means utilization of equipments and methods for concealing, homogenizing, transforming and simulating, creating deceptive goals and deleting regular geometrical shape in order to prevent the detectors and sensors of enemy from discovering and identifying forces, equipments, installations and activities (Maleki and Zarifi, 2011). Methods of concealment are different in lifestyle of the system (Ghanbari, 2011) and (Movahedi Nia, 2005 and 2007):

- Surface treatments which are applied for design of new systems and along with them are a part of the performed camouflage on goal and a part of system design and are accompanied by it and there is no need for any action of military forces for applying it. The systems which are in the first stages of design have the best conditions for adopting surface treatments strategies. Geometrical forming is one of the most important methods of surface treatments which is achieved with the following criteria (table 1);

Remarks	index	Criterion
The larger the cross section the more the radiant radar energy toward the reflected signal place and the easier the identification of goal	Downsizing and reducing radar cross section	Target dimensions control
-	Low height	
Preventing application of electrically conductive surfaces such as metals and glasses with radar reflection, flat surfaces and surfaces with perpendicular sides prevent scattering of radar waves.	Radar waves scattering and deleting radiations of systems against sensor	Target form
-	Considering target less important (face transformation)	
Showing large goal as some small goals /dispersion		
It means separation or transformation of building, prevention of equal repetition of buildings and construction of uniform buildings because order is a sign of manmade objects and disorder is a sign of nature.	Creating failure and deletion of geometrical regular forms and reduction of other signs	
Homogenization is made possible by similarity to the surrounding environment.	Homogenization with environment	

Table 1: strategies of geometrical forming as one of the surface treatments methods

- Add – On Camouflage is used for the systems which have existed before. This is done by two kinds of substance:

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[3] One of the principles of passive defense in different texts is principle of hardening the vital structures which has not been mentioned in this research due to the absence of representation in urban spatial structure.

- o Natural substances of camouflage include plants and soil (plant vegetation) : green space causes to reduce vision and enemy identification and attack factors and adjust explosion wave and vulnerability (Saeedi and Iran Doost, 2011).
- o Synthetic substances of camouflage include artificial and semi-natural supplements, isogam and sound and electromagnetic insulation .

Principle of concealment

Concealment means being hidden from the vision of enemy and is a location based on passive defense of which basis is correct settlement in natural and built environments. Concealment methods include (Movahedi Nia, 2005) and (Boozari, 2009):

- Use of morphologic factor for making the target buries or semi-buried; it will be easily possible to identify installations in extensive plains and zones without geographic feature because they lack passive defense considerations (unsuitability of zones without natural reliefs for establishment of equipments, construction of installations and construction of shelters and safe places). Therefore, this will be possible by using natural valleys and earth cracks inside the internal tunnels, grooves, in shelter of highlands, natural reliefs and   hiding surfaces difference. In passive defense considerations especially in concealment or secretiveness, it is common to use fault cliffs and fault valleys because these structures prevent from targeting equipments. For example, in Korea, museums have been constructed inside the mountains in order to protect cultural monuments. In European countries, serious efforts have been made to hide infrastructural installations such as power plants.
- Creating visual barriers and concealing them in natural and built shades as factor of light reflection reduction and difficulty of tracking.

Principle of deception

Identification of strategic goal difficult. Theory of deception is based on the fact that vital part of the set should be transferred to another part or appropriated to open space (Hashemi Fesharaki and Araghi Zadeh, 2011).

 Principle of separation and prevention of vital systems interdependence

Separation of the vital systems from each other guarantees survival of city in case of failure of its part. This is possible by parallelizing and predicting the alternative systems (Movahedi Nia, 2007).

Principle of dispersion

Among principles of passive defense, dispersion is more related to urban spatial structure. Dispersion of important urban activities in this field has two main applications (Mir Ahmadi and Yadegar Zadeh, 2011):

- Reducing ability of enemy to recognize, target and penetrate into key, important and critical points at critical times; abundance and dispersion of urban centers cause to use more defensive forces.
- Guaranteeing survival of city in case of failure of its part due to dispersion of urban elements and infrastructures ; in old Iran,   of the defensive strategies for reducing vulnerability are dispersion of services by creating servicing hierarchy in district, regional and urban scale and self sufficiency of the districts.
- Multi-functionality of urban elements

Creation of dual purpose structures which can have defensive function in addition to ordinary function is one of the principles of passive defense. By making dual purpose structures, construction cost of public shelters will be saved and shelters will not be deserted (Movahedi Nia, 2007). Of the strategies used for this purpose in different countries are use of urban subway as public shelter[4] and development of green and open spaces which help conceal the region in addition to role of shelter at critical times.

Principle of access and penetrability

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[4] Shelter is the place which is more secure against different effects of weapons on ordinary buildings or open space (Movahedi Nia, 2005).

Transportation networks should be designed and reinforced such that it is possible for the public to exit and have access to relief in emergency.

3.2 Explaining elements of urban spatial structure

Organizing the urban spatial structure based on principles and strategies of passive defense in order to reduce vulnerability and increase sustainability is very important in issues of urban planning. Access to sustainable spatial structure requires identification of different elements of urban spatial structure. In this research, the studied elements of urban spatial structure were identified as follows:

- urban spatial development pattern

- spatial dispersion and layout of urban elements in the entire set (principles of strategies performances)

- juxtaposition and combination of different urban activities and performances (use of space, compatibly and proximity)

- accumulation, population density and activity at one place

- relationship between elements and performances (condition of communication network)

- space morphological subjects

- Organizing the urban spatial structure based on principles of passive defense requires identification of effects of passive defense principles and criteria on elements of urban spatial structure.

3.3 deducing spatial representation of passive defense principles and criteria in elements of urban spatial structure

Deducing spatial representation of passive defense principles and criteria is the final step in formulation of spatial logic of urban development based on defensive considerations. In this regard, effort is made to search for spatial representation of each passive defense principle in urban spatial structure which comprises of elements elaborated in the previous chapter. Result of the performed search is shown in table 2. This table is also regarded as a framework for measuring vulnerability of spatial structure of Tehran metropolis from the viewpoint of passive defense principles and criteria by giving arbitration tools.

4 MEASURING VULNERABILITY OF SPATIAL STRUCTURE OF TEHRAN METROPOLIS BASED ON CIRCUMSTANCES OF PASSIVE DEFENSE

Measuring vulnerability of spatial structure of Tehran metropolis in the first step requires identification of status quo of Tehran metropolis based on circumstances and principles of passive defense. At the end, conformity of urban spatial structure with spatial representation of passive defense principles and criteria which was explained in table 3 indicates vulnerability of spatial structure of Tehran metropolis.

4.1 Measuring Vulnerability Of Tehran metropolis based on principle of camouflage

Generally, Tehran metropolis with only 2 % of buildings with more than 9 stories and average compaction of two stories is the shortest capital in the world. However, Tehran city recently has seen construction of long building without planning and without observance of many passive defense requirements especially for vital and important governmental and public activities which has converted high rise building to an element contrary to sustainable development in urban development. Although it is cost effective to construct distinguished high buildings in globalization era and due to expensiveness of land in large cities, this case is not justifiable in the militarily threatened cities (Briggs, 2005). Generally, most of the governmental and public buildings in Tehran are relatively higher than their surrounding environment and this makes the target more important and facilitates its identification. One of the other weaknesses of Tehran metropolis is to expand large public and governmental buildings. National Iranian Library with approximate area of 9.7 hectares which has been constructed on hill in addition to its large scale is one of these examples. Another example is Tehran Mosalla complex located in southern side of Abbas Abad lands, although expansion of green space of Abbas Abad lands around these spaces is a potential for camouflaging them(figure 1).

Figure 1: a view of National Iranian Library building (derived from Google Earth software)

Use of uniform repetition of buildings (construction of uniform buildings) is one of the other subjects studied in this field. Residential and modern and future high buildings beside Evin Hotel (figure 2) and Ekbatan Residential Complex as the fourth Strategic Rings are of these class. Construction of spaces with geometrical and regular shapes facilitates identification of target from the surrounding environment.

Figure 2: a view of future buildings (derived from Google Earth software)

In morphological terms, weakness of Tehran metropolis is expansion of use of glass and aluminum view of office and governmental buildings due to easy installation and low cost price and this facilitates scattering of radar waves and identification of target. The known glass building of Ministry of Agricultural Jihad located in Keshavarz Blvd. as one of the first strategic rings and building of Bank Markazi (figure 3) have this feature.

Figure 3: a view of Bank Markazi building

Morphological subjects	Accumulation and density of population and activity in one place	Juxtaposition and combination of different activities and performances	spatial layout and scattering of performances in the complex (principles of strategic performances settlement)	Urban spatial development pattern	Index	Criterion	Principle
• Preventing expansion of vital and critical large-scale centers • Small grading of uses	• Determining optimal scale of population settlement and activity in space • Reducing the price and downsizing residential units	-	-	-	Downsizing and reducing radar cross section	Target dimensions control	Surface treatment / camouflage
-	• Preventing high rise building of vital and important installations			• Emphasis on urban sprawl	Low height		
• Preventing application of electrically conductive surfaces such as metals and glasses with radar reflection in view of strategic buildings, • Preventing application of flat surfaces or the surfaces with perpendicular sides	-	-	-	-	Radar waves scattering and deleting radiations of systems against sensor	Target form	
• equality and harmony of form of relief and environment	-	-	-	-	Considering target less important (face transformation)		
• preventing uniform repetition of buildings and construction of uniform buildings	-	-	-	-	Creating failure and deletion of geometrical regular forms and reduction of other signs		
-	-	-	-	-	Homogenization with environment		
-	-	-	• layout of critical and vital activities in green space	-	Add - On Camouflage		
• Preventing construction of symbols, signs and indexing		• Separation of vita activities from signs such as installations,main communication networks	• Preventing layout of important structures in large plains and zones without relief • Settlement of important activities in tunnels, grooves, highlands, natural reliefs	• Making structure of city uniform with the surrounding areas and making determination of urban border difficult	Concealment		
• Necessity for avoiding difference of physical organization of vital activities of the surrounding texture	• Reinforcing surrounding residential places of large cities as deception and delay barriers	-	-	• Decentralizing and accepting polycentric development	Deception		

	spatial representation of passive defense principles and criteria in urban spatial structure				assive defense principles and criteria		
	elements of urban spatial structure						
Morphological subjects	Accumulation and density of population and activity in one place	Juxtaposition and combination of different activities and performances	spatial layout and scattering of performances in the complex (principles of strategic performances settlement)	Urban spatial development pattern	Index	Criterion	Principle
-	• Reducing interdependence of different districts by establishing required services in the district (districts independence potential) • Preventing population increase and emphasis on dispersion approach	• Establishment of compatible uses in space • Relative separation of business centers from residential centers • Farness from hazardous production centers	• Creating hierarchical structure and centrality (district, local and regional centrality) of urban services	• Focus on suburban sprawl pattern; • Avoiding application of linear development pattern and disruption of relationship between different parts of the city			separation
-	• Decentralizing and transferring strategic centers to urban suburbs and appropriation of Central Business Districts to less strategically important activities • Reducing charismas of central and critical business districts for establishing residential texture and encouraging to transfer them to suburbs of cities • Necessity of uses distribution in urban structure such that it prevents centralization in gravity points of the city.	-	• Creating servicing hierarchy with emphasis on neighborhood units patterns				_Dispersion
-	• Increasing open space in the entire surface of residential sections as the factor increasing efficiency of the texture at time of accident	• Making dual -purpose public spaces for building shelters • Building common tunnel of underground installations	-				Dual purposes of space /multifunctional urban elements

	spatial representation of passive defense principles and criteria in urban spatial structure				assive defense principles and criteria		
	elements of urban spatial structure						
Morphological subjects	Accumulation and density of population and activity in one place	Juxtaposition and combination of different activities and performances	spatial layout and scattering of performances in the complex (principles of strategic performances settlement)	Urban spatial development pattern	Index	Criterion	Principle
• Increasing the barren and green lands and plant vegetation in city • City fortification	• Closeness of collective spaces to open spaces with low confinement • Urban density distribution in resistant and accessible districts	• Closeness to green and open environments, therapeutic and hospitals centers, firefighting centers and police stations for establishing security • Farness of residential centers from fuel tanks, military bases, the desired targets of enemy including management and governmental centers	• The presence of suitable and homogenous communication network by creating a network of equivalent ways relating to other districts of the city • Establishing vital activities in main communication routes • Hierarchical structure of communication network and limiting easy access to residential places	• Preventing acceptance of galaxy development pattern5 • Accepting chess development instead of organic development in design of communication network • Increasing entrances and exits of the city			Access and penetrability

Table 2: spatial representation of passive defense principles and criteria in urban spatial structure –writer

[5] Galaxy development is defined as development between expanded and centralized city in open and relatively small units and density is maximal in centers. In this kind of development, penetration into the city is easily done due to abundant open and green spaces between urban knots

In addition to these weaknesses, one of the weaknesses of spatial structure of this metropolis is development of city with average density of two stories.

4.2 Measuring Vulnerability of Tehran Metropolis based on Principle of Concealment

Attribution of bleak city to Tehran as 700-cubic km capital of Iran with all disadvantages from the viewpoint of city development management and planning has some advantages from the defensive viewpoint. Tehran is attached to Shemiranat and Rey under the best condition but a more careful look shows this urban giant geographically in touch with adjacent cities, estate and counties. Robat Karim, Eslam Shahr and Shahre Ghods have been separated from Tehran only with streets and highways which indicate a part of this borderless metropolis. Recently established Alborz Province is adjacent to Tehran only with a short road and border of Tehran metropolis is not easily distinguished from the surrounding districts.

One of the weaknesses of Tehran relating to principle of concealment is widespread tendency to indexing and construction of symbols and signs (figure 4). After attack of twin high buildings in 11 September, it seems that skyscrapers have lost their attraction in developed countries because terrorist is aware of power symbols (Briggs, 2005).

Figure 4: tendency to indexing in Tehran metropolis (derived from Google Earth software))

Layout of important and vital installations in large plains without relief is one of the other weaknesses of Tehran metropolis in this field. In this regard, one can refer to location of Milad telecommunication tower or Bagher Shahr power plant in southern plains of Tehran.

4.3 Measuring Vulnerability of Tehran Metropolis Based On Principle of Deception

Tehran as capital is highly vulnerable as industrial –administrative pole of the country due to centralization of main industries and ministries and important administrative centers. On the other hand, major economic activities of the city are located in its central zone.[5] Generally, contemporary spatial structure of Tehran can be typologically imagined in "centralistic, single centric and dispersed radial "framework (figure 5). In recent decades, centralistic trends have led to intensification of single centric system of Tehran city. This trend led to more domination of main center of Tehran which is slipping and creeping toward north (Boom Sazgan Consulting Engineers, 2006). While there is principle of being outstanding in central development pattern which facilitates recognition of strategic business centers due to the growth pole. Therefore, one should transfer the complex to another part using theory of deception or appropriate it to open space (Hashemi Fesharaki and Araghi Zadeh, 2011).

Figure 5: centralization of the most important urban settlement centers in northern-southern axis direction (Boom Sazegan Consulting Engineers, 2006, Tehran master plan)

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[5] Central zone is defined as distance between Valiasr , South Karegar Streets and Shahid Rajaei Highway from the west and Shariati , 17 Shahrivar and Shahrzad Streets from the east.

Another issue in this regard is economic, administrative and servicing weakness of the surrounding residential places around Tehran and their use as barriers makes deception and delay impossible. However, abundance of equal urban centers makes enemy's deception possible.

4.4 Measuring Vulnerability of Tehran Metropolis Based on Principle of Separation

Chaotic mixture of critical business centers in residential textures and zones is one of the weaknesses of spatial structure of Tehran metropolis. In this field, several cases are explained:

- Preventing observance of industries and residential texture proximity (industrial zone of district 21, industrial zone of eastern District 4, business centers around Khavaran Road etc).

- Proximity of political activities of the country such as Beit Rahbari and parliament to residential texture

- Proximity of Milad therapeutic center as one of the largest therapeutic centers of the country to Milad Telecommunication tower which makes its identification easier.

- Location of military region in east and its proximity to residential texture.

- Location of gas stations to residential zones.

- Location of power plants such as Bagher Shahr adjacent to residential texture.

- Others

Of the other weaknesses of Tehran metropolis are location of business-service centers on arterial axes generally and expansion of the most important business centers in national scale across main northern-southern axis because linear development doesn't cause to enjoy districts independence potential though which other parts continue functioning in case of failure of one part and efficiency of the dependent performances is reduced in case of failure of some main axis of the city. This will be aggravated by continuation of radial structure of Tehran metropolis. Other challenging issues in principle of separation in Tehran metropolis are interdependence of different districts despite history of self sufficient districts and failure to observe minimal safe distance between the residential buildings.

4.5 Measuring Vulnerability of Tehran Metropolis Based On Principle of Dispersion

Dispersion of important urban activities causes increase of security and sustainability of city despite increase of servicing costs due to reduction of enemy's ability to recognize, target and penetrate into important points, necessity of use of more defensive force due to abundance and dispersion of urban cities and guarantee of survival of city in case one part fails. Galaxy development and urban sprawl patterns are preferred over other urban physical development patterns. Centralistic spatial structure of Tehran city is vulnerable from this viewpoint.

4.6 Measuring Vulnerability of Tehran Metropolis Based On Principle of Multifunctional Urban Elements

One of the defensive strategies applied in old Iran in order to reduce vulnerability of city is the presence of multifunctional urban elements such as aqueduct which has played role of shelter as underground communication way between districts in addition to its main role at time of enemy attack. Hosseinies played role as district defense centers at any place at critical times (Mir Ahmadi and Yadgar Zadeh, 2011). In other parts of the world, Russians take action regarding creation of the required shelter as masters of passive defense and multipurpose designers of spaces redundancy when length of metro lines increases. Safe Swiss Metro with suitable depth, Pyongyang dual-purpose Metro in North Korea with depth of 90-105 m are the good examples (Maleki and Zarifi, 2011). Of the weaknesses of Tehran metropolis are insufficient coverage of metro lines and avoidance of its settlement in suitable depth for playing role of shelter (figure 6).

Figure 6-the present and future rail lined of Tehran city (Boom Sazgan Consulting Engineers, 2006).

One of the other strategies in this field is use of open and green space in the city (figure 7) which is not available in Tehran metropolis.

Figure 7: layout of large-scale green space among Moscow urban texture

4.7 Measuring Vulnerability of Tehran Metropolis Based on Principle of Access and Penetrability

Incomplete communication network and especially Tehran metropolis highway network and discontinuous performance of the network, unsuitable access in some parts of the city especially the decays as well as important business centers of the city make servicing difficult at time of threat. Of the other weaknesses of spatial structure of Tehran metropolis is layout of high buildings in low penetrable regions. Establishment of the most important business centers across main arteries facilitates access and relief despite some disadvantages. Abundance of entrances and exits of Tehran metropolis is one of the strengths which allow the population to immediately exit (figure 8).
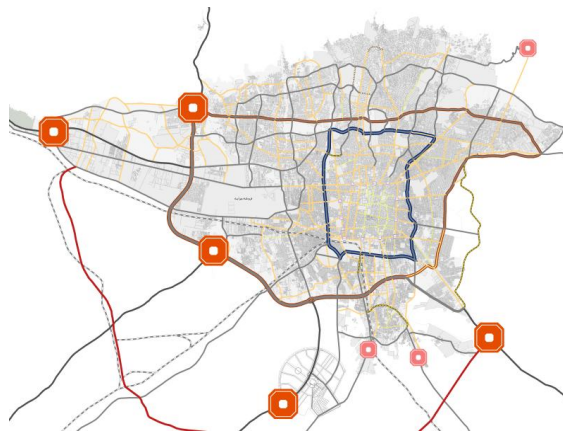
Figure 8: dispersion of exits and entrances of Tehran metropolis (Boom Sazan Consulting Engineers, 2006)

5 FORMULATING SUITABLE SPATIAL DEVELOPMENT POLICYMAKING FRAMEWORK AND PRESENTING VULNERABILITY REDUCTION WAYS

Result of the performed studies, vulnerability of spatial structure of Tehran metropolis is summarized in table 3. The hachured cells indicate vulnerability grounds and grey cells indicate sustainability grounds.

Spatial representation of defensive principles and criteria in spatial structure					Passive defense principles and criteria		
Elements of urban spatial structure							
Morphological issues	Accumulation and density of population and activity	Juxtaposition of activities and performances	Layout and distribution of performances in complex	Urban spatial development patterns	Index	Criterion	Principle
					Downsizing and reducing radar cross section	Target dimensions control	Surface treatment / camouflage
					Low height		
					Radar waves scattering and deleting radiations of systems against sensor	Target form	
					Considering target less important (face transformation)		
					Creating failure and deletion of geometrical regular forms and reduction of other signs		
					Homogenization with environment		
					Add - On Camouflage		
					Concealment		
					Deception		
					separation		
					Dispersion		
					Dual purposes of space /multifunctional urban elements		
					Access and penetrability		
Sustainable	Vulnerable	Without proof			Table guide		

Table 3: measuring vulnerability of spatial structure of Tehran metropolis based on defensive circumstances-writer

High vulnerability of Tehran metropolis to threats clarifies necessity of formulating suitable policymaking framework . In this regard, vulnerability reduction strategies have been suggested in each one of the studied axes:

- Strategies of fulfilling principle of camouflage
  - Constructing vital underground centers and installations; in Sweden, power generation, fuel reserves and necessary procurement centers have been laid out in the underground (Maleki and Zarifi, 2011).

- Strategies of fulfilling principle of concealment
  - Using river five northern –southern valleys of Tehran city in order to decentralize nonresidential performances in zone of northern –southern continuous axes and using their privacies as protective green space; in wrinkled regions , erosive performance of synclines causes formation of broad valleys or confirmed plains of which abundance facilitates dealing with principle of dispersion in passive defense(Boozari, 2009).
  - Preventing construction of symbols, signs and indexing –using few high symbols

- Strategies of fulfilling principle of deception
  - Accepting urban dispersal strategies, Tehran center refinery and promoting its functional level and quality for cultural, touristic and recreational performances; in Tehran, most of large enterprises are governmental and strategy of decentralization and transfer of important centers to suburb districts and appropriation of central spaces to the activities which are of less strategic importance (such as coffee shops and galleries) is the best strategy.
  - Reinforcing polycentric pattern and equivalent urban centers in urban spatial structure by prioritizing equipment of peri-urban centers of Tehran and new satellite towns and

transferring administrative and political centers to peri-urban centers ; concurrently with start of Tehran Regulatory Plan enacted in 1991, chaotic condition of Tehran led some authorities to think about transfer of capital and some studies started in this field resulting in long time (15 to 25 years) and heavy expenses of transfer which dissuaded the authorities to do so(Boom Sazgan Consulting Engineers, 2006). Now, policy of transferring administrative capital to Parand seems to be a suitable strategy in this regard.

o Accepting decentralizing patterns in spatial structure of Tehran metropolis; among different urban development patterns, centralistic forms due to easy identification and failure of main functions of city are the most vulnerable and on the contrary, decentralist forms are the least vulnerable due to difficult identification of business centers (Mir Ahmadi and Yadegar Zadeh, 2011).

- Strategies of fulfilling principle of separation

    o Emphasis on neighborhood units approach and independency and self sufficiency of districts

    o Relative separation of business centers from residential zones and observance of compatibility principle in layout of activities and prevention of creation of hazardous installations in public centers and transfer of these installations to outside the city

    o Observance of minimal distance between residential buildings and coverage of open space by green land use

- Strategies of fulfilling principle of dispersion

    o Emphasis on urban sprawl pattern ; less density of population reduces vulnerability and increases attack cost(Ebrahimi, Mobin Rahni, 2010), though increase of density will not be effective on vulnerability dependent on place(Saeidi and Iran Doost, 2011). Authorities of this field believe that recent terroristic attacks on urban centers of America facilitate urban scattering toward the margin such that this country will see intensive increase of life rate around the city and decentralization of business centers (Ziegler, 2005). Suitable scattering of masses by changing to polycentric, multiplex and network[6] development patterns; polycentric systems are more sustainable due to variety because there is substitute for it in case of failure of one of these centers (Marcuse, 2002).

    o Refining the present business zones and expanding fields of activity in domain of Tehran city and peri-urban development; edge cities form the future spatial development pattern due to benefits of passive defense (Ziegler, 2005). Tehran will be forced to move toward a regional multi-centered business environment in order to fulfill principle of sustainability and security. In this way, more independent vital enterprises in urban centers which have internalized large part of their external benefits move toward less dense urban fringes and the activities which are not dependent on communication media and modern transportation technologies remain in center. After 11 September, many main enterprises in New York possessed large satellite departments in urban fringes (Marcuse, 2002).

- Strategies of fulfilling principle of multifunctional urban elements

    o Increasing flexibility, variety and efficiency of urban spaces

    o Increasing length and depth of metro lines and equipping it as shelter, including shelter for a city with population of 4000 and area of 600,000 cubic meters and one can construct 150-km tunnel in underground depth which is accessible to the public. By designing safe

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[6] Typologically, this structural change can be regarded as movement toward network pattern. In this pattern, hierarchy is not only regarded as key and critical concept but also attempt is made to give any part of city identity by distributing centrality and density in large scale and by covering the metropolis resulting in its special and suitable performance without it is regarded less important or more important than other parts. Therefore, abundance of the related, complementary and distributed centers in the city level, formation of abundant functional and physical barriers, varied and balanced transportation system and finally functional and multilayer balance can be regarded as main features of network spatial structure.

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multipurpose structures such as metro, underground shops, construction cost of public shelters will be saved and shelters will not be deserted (Movahedi Nia, 2005).

- Strategies of fulfilling principle of access and penetrability

    o Observing hierarchy in structure of residential place and communication network ; in the past, observance of hierarchy of access, organic structure and narrow passageways, dense urban texture have made penetration of immigrants impossible (Mir Ahmadi and Yadegar Zadeh, 2011).

    o Reinforcing transportation network based on astral and radial patterns in order to facilitate exit of the population.

    o Layout of squares and local gathering spaces in urban texture with rapid accessibility to residents; proximity of collective spaces to open spaces with low confinement reduces resistance of space against war injuries (Saeidi and Iran Doost, 2011).

    o Fortification of city and public places: public places should be less public and their free access and use should be limited. Instead, controlled spaces such as large shops have increased their attraction in this regard (Marcuse, 2002).

    o Easy access to business centers by arranging activities as abundant and integrated centers.

    o Attention to principle of easy access in location of high buildings.

6 REFERENCES

Briggs, R., (2005), Invisible Security: The impact of counter-terrorism on the built environment

Buzari, S. (2009), Geology and its Application in Passive defense, Zamin Periodical, fourth year, No. 2, summer

Ebrahimi, F, Mobin Rahni, M, (2010), Planning and Design of Urban Open Spaces with Passive defense Approach, the first conference on Passive defense and Resistant Structures

Ghanbari, F, (2011), Studying Camouflage Operational Methods during design and construction, Passive defense Periodical, second year, No. 4

Hashemi Fesharaki, J, Araghi Zadeh, M. (2011), spatial structure from the viewpoint of Passive defense, collection of articles of the third national conferences on Passive defense

Jabareen, Yosef R., (?), Sustainable Urban Forms: Their Typologies, Models, and Concepts Journal of Planning Education and Research 26:38-52

Lacina, B, (2006): Explaining the Severity of Civil Wars, Journal of Conflict Resolution, No. 50, P.276

Liesette B., Frances E. K., William C. S., (2001), Resident Appropriation of Defensible Space in Public Housing : Implications for Safety and Community, Environment and Behavior, 33: 626

Marcuse, P., (2002), Urban Form and Globalization after September 11th: The View from New York, International Journal of Urban and Regional Research, Volume 26.3 September 2002 596–606

Maleki, S, Zarifi, K, (2011), Analyzing Passive defense, collection of articles of the third national conferences on Passive defense, May

Maleki, K, Brand Kam, F (2011), Necessity for Attention to Passive defense in Strategic Urban Land Use Planning in Reduction of Foreign Attacks Effects, the third national conferences on Passive defense, May

Mir Ahmadi, M, Yadegar Zadeh, B, (2011), Studying Vulnerability of urban form from the viewpoint of Passive defense and strategies of reducing it, construction of city, No. 14

Movahedi Nia, J, (2007), Passive defense Principles and Fundamentals, Malek Ashtar University of Technology

Movahedi Nia, J, (2005), Passive defense, deputy of Passive defense, Khatamolanbia Air Defense Post

Pedatzur, R., (2007), The Iranian Nuclear Threat and the Israeli Options, Contemporary Security Policy, Vol.28, No.3 (December), pp.513–541

Saeidi, A, Iran Doost, A (2011), Passive defense Considerations in Location of Religious Centers Using AHP Method, Passive defense Periodical, second year, No. 4

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Augmented Reality Apps for Real Estate

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1 ABSTRACT

Our research focuses on the appliance of real estate applications (RE-apps) especially on the unchartered topic of the use of augmented reality (AR) and in special cases for virtual reality (VR) in the field of real estate. Apps are small programmes on smartphones and tablets. These apps will be classified by their usage for a modern city. A sub-classification is made for the ability of AR functions.

Augmented reality means that the reality of the camera is enhanced with additional information through GPS and compass information, data from external knowledgebases, social media networks or real estate search engines. So a value for the user could be created that turns the real and the virtual objects in a multi-dimensional relationship to each another.

The paper analyses the usage und functionalities of the offered real estate applications concerning architecture, buildings, refurbishment and housing renewal. First results have been shown at the Pacific RIM Real Estate Society (PRRES) conference 2012 in Adelaide, Australia.

The work is based on extensive literature research providing a methodical comparison of applications available. Based on the results, the project covers the structural, technological and user related factors that facilitate or impede dissemination of AR-apps. As a result it is given a smart overview of the existing AR- and VR-applications and the market potential for real estate with a visionary conclusion of expected future developments.

2 INTRODUCTION

Apps are small programmes on smartphones or tablets which are characterized by simple usage and a flat training curve in usage in a short life cycle. They are often cheap products, created for consumers and distributed via virtual markets. (LANG; SITTLER 2011, p. 1) But technically seen apps are no new phaenomenon. (MAYER 2012, p. 13)

Though the worldwide sales of mobile phones to end users have reached a peak with 428 million units in the third quarter of 2012, this means a 3 percent decline from the third quarter of 2011. But the smartphone sales increased by nearly 47 percent. (GARTNER 2012a) Additionally the use of Non-Computer devices like smartphones and tablets increases rapidly. (COMSCORE 2012, p. 50) In this enviroment it is not surprising that an older whitepaper points out that mobile applications are achieving unprecedented download levels driven by the success of the Apple App Store. So the opportunities for mobile applications with AR are strongly increasing. (JUNIPER RESEARCH 2009, p. 1)

We began our research in 2010 with apps for finding property via smartphones. We early noticed that several categories of apps can be used in the field of real estate. (LANG; SITTLER 2011, p. 3) Further on we additionally classified the real estate apps by their usage of augmented reality (AR) functions. (LANG; SITTLER 2012a, p. 4). In addition to this paper some of the apps changed and many new came into range.

"Augmented reality (AR) is a term for a live direct or an indirect view of a physical, real world enviroment whose elements are augmented by computer-generated sensory input, such as sound or graphics." (KENT 2011, p. 1)

Following the definition of AZUMA (1997) an AR system has to fulfill following three requirements:

(1) Combines real and virtual

(2) Interactive in real time

(3) Registered in 3-D

According to the Milgram continuum of reality and virtuality AR is one of the possible states of mixed reality (MR), which begins with the real enviroment and is continously enhanced by additional data and external information. So as it can be seen in Fig. 1 AR is the picture of the real world enhanced eg. with data

of the Pisa tower. AR is based on the real world with a limited set of virtual objects mixed in. When only the virtual reality is enhanced with some real views it is called augmented virtuality (AV). It is pointed out that the virtuality continuum juxtaposes AR and AV (WAGNER 2007, p. 2) While AR shows the real world, AV shows a virtual reality based on a computer-generated world. The boundary between AR and AV is not strictly defined. (LANG; SITTLER 2012a, p. 2)
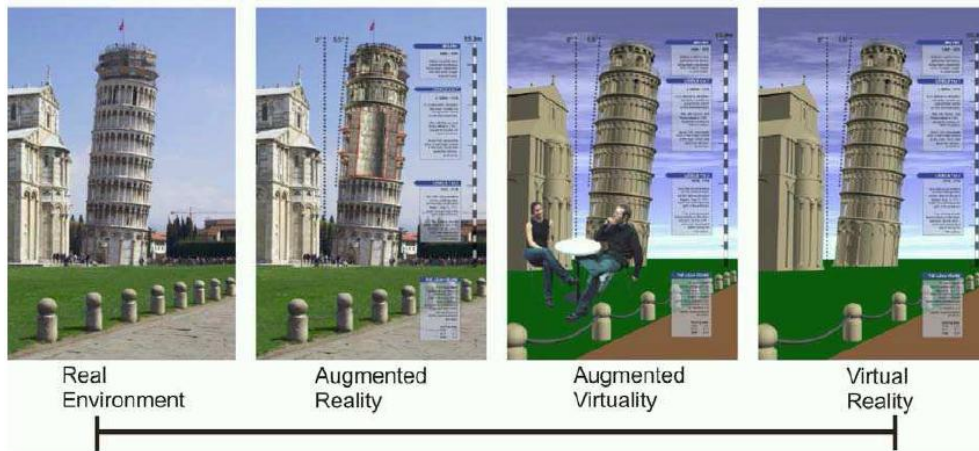
Fig. 1: Milgram continuum of reality and virtuality (SIEGLER; WIETZEL 2009, p. 90)

3 FIELDS OF AUGMENTED REALITY APPS FOR REAL ESTATE

The real estate sector even noticed that the development of apps is an important criteron of marketing for the customer. In early times AR-apps for the iPad have not been developed due to the lack of camera in the first generation. (CARMIGNIANI; FURTH 2011, p. 36) Only a few companies offer RE-apps. The number of AR-apps is even smaller. We pointed out that there is only few literature concerning AR in the field of real estate.There can be additionally mentioned (ALLBACH; MEMMEL; ZEILE; STREICH 2011), (GAWLITTA 2012), (KIPPER; RAMPOLLA 2013, p. 16) and (MEHLER-BICHER; REISS; STEIGER 2011).
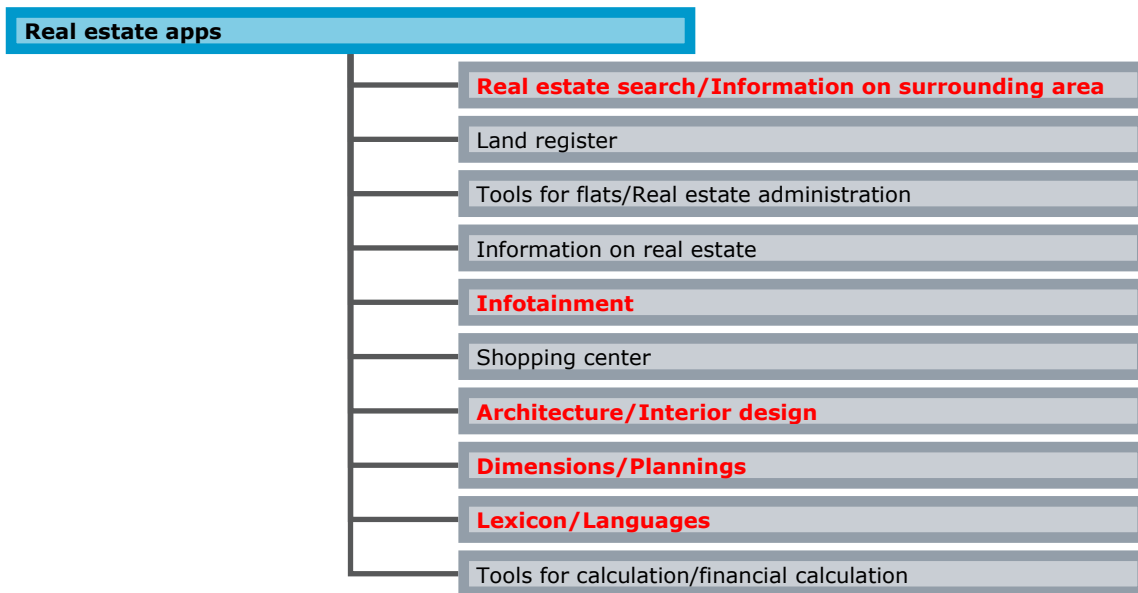
Fig. 2: Classification of the real estate apps (LANG; SITTLER 2012b, p. 5)

We made an extensive internet and literature research to find some apps in several publications, but AR applications for real estate are only partially mentioned. A whitepaper concerning several business models of AR describes the AR search of property regarding the app of the German real estate search engine Immonet. (JÁNSZKY; SCHILDHAUER 2010, p. 26) The search of property is the best known and most distributed AR application in the field of real estate. Additionally MEHLER-BICHER; REISS; STEIGER (2011) try to classify the fields of applications of AR with education, presentation/visualization, collaboration, configuration/simulation and navigation/orientation. (MEHLER-BICHER; REISS; STEIGER 2011, pp. 73

77) It is often seen that in the literature real estate applications are mixed with architecture and other fields of applications. But real estate seems to be an enormous factor for the economy, so several fields are concerned. (LANG; SITTLER 2012a, p. 3)

We made a classification with the several fields of applications that are concerned with RE-apps with a sub-classification for the ability of augmented reality (AR) functions (in bold red). (LANG; SITTLER 2012b, p. 5)

The AR applications are a subset of RE-apps. As a field of research we collected a number of RE-apps for smartphones. This applications are mostly focused on the Austrian market, but some of them are international while there are no apps concerning a digital city (JAEKEL; BRONNERT 2013, pp. 35-63). (LANG; SITTLER 2012a, p. 4)

4 AR-APPS FOR REAL ESTATE

The following individual areas of applications are shown with examples and discussed with respect to AR-apps for real estate.

4.1 Real estate search/Information on surrounding area

We made a research on the main searching-apps in the field of real estate in the German speaking region and noticed that the first application was the app of www.immobilien.net, which took back their app from the Apple iTunes store meanwhile. So only the German RE-app www.immonet.de offers an AR-search through an own RE-app. (MAYER 2012, p. 13) The main reason why immobilien.net gave up their AR strategy was that the amount of findable objects within the app was very small, while flats could only be exact positioned when full data of the object is registered by the real estate agents. This is a problem in Austria, because only 10 % of all real estate on offer are currently geo-coded. In practice (even without AR) geo-coded objects that display full address information are 40 % shorter on the market. (LANG; SITTLER 2011, pp. 5-6)

In order to show how the app was running there are some screenshots shown below in Fig. 3.
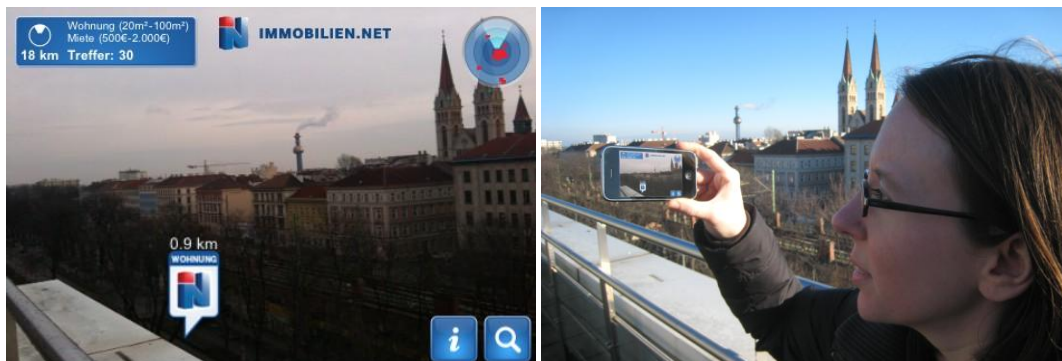
Fig. 3: Real estate search application Immobilien.net (LANG; SITTLER 2012a, p. 5)
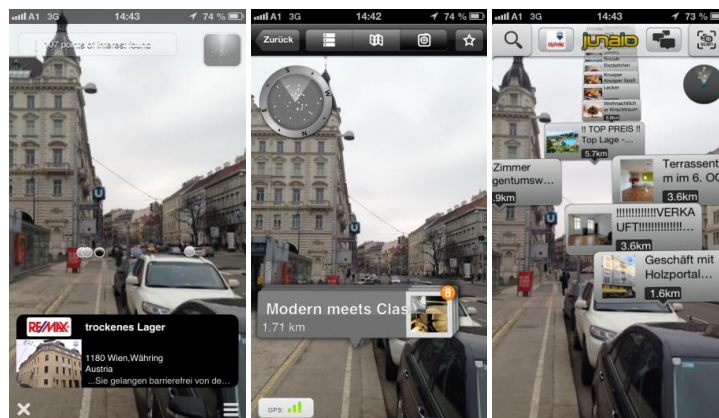
Fig. 4: RE/MAX real estate search with Layar, Wikitude and Junaio

Another field of application for AR-apps in the city is information on surrounding areas. The main apps are Layar, Wikitude and Junaio which show information on the surrounding offices, restaurants, educational infrastructure, etc. on the screen of the smartphone or tablet. The mentioned apps are partly described in AR-

literature: Layar (MADDEN 2011, pp. 36-39), Wikitude (KENT 2011, pp. 41-42), Junaio (KENT 2011, p. 37).

There are some real estate agents which use layers to show their property with an AR functionality. In Austria the company RE/MAX[1] uses the apps Layar, Wikitude and Junaio for this purpose.

4.2 Infotainment

A wide range of smartphone concerns entertainment and infotainment to prospective customers. In the field of real estate the Australian Commonwealth Bank uses AR in their app. The aim of this app was to show non technical users how to use AR functionalities for their AR-search app. With this app you use a marker to start the real estate market in the virtual city Cherryford Hill. A virtual person named Paul explains with voice guidance terms, transactions and purchase prices. (BROUGHALL 2011)

Fig. 5: CommBank 3D Reader

4.3 Architecture/Interior design

Another extensive use of RE-apps is architecture and interior design. In the last years there are aditionally several applications that use AR. Some of the first experiments were made by the company Ikea. (MEHLER-BICHER; REISS; STEIGER 2011, pp. 103-108) Today they offer their catalogue as an interactive AR featured one, but the AR functionalities are only for showing further information or videos, not for showing virtual furniture. (TRAK 2012)

In this field of interior design the Viennese company Meixner IT-Solutions[2] offers an AR-app called ViewAR that is able to place virtual interior in an real enviroment. Some other firms use their technology with white lable apps . Within this app you can place a virtual piece of furniture in your flat by using a marker. A marker is needed for showing the AR-app the position of the model.

Fig. 6: ViewAR

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[1] www.remax.at

[2] www.meixner.at

Using the orientation features of a smartphone or tablet like GPS,[3] compass, accelerometer and gyroscope it is possible to interact with the real enviroment. So a prototype application for architectural on-site visualisation could be build to simulate a bridge beetween two existing buildings (NIEDERMAIR 2012, pp. 20-21, 64).

Fig. 7: Prototype AR-app for showing a bridge (NIEDERMAIR 2012, p. 62)

What is used above as a prototype is in other projects already in use. The app 3Don ARchitecture[4] is a 3D viewer for architectural models integrating a geo-tagged ability. (NIEDERMAIR 2012, p. 17) Vienna was one of the first cities that implemented the AR technology for visualization of a development in urban areas. The construction site is in the north of the city and called "Seestadt Aspern" and will be be developed in the next years. The Austrian company Ovos[5] set up a special layer using the app Layar (compare to chapter 4.1) for prospective customers. So you can see future buildings and architecture live on the construction site. (OVOS 2011) (LANG; SITTLER 2012a, p. 8)

Fig. 8: AR app for large development area – Vienna Seestadt Aspern (OVOS 2011)

Fig. 9: Wohntraum am Olympiapark

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[3] Global Positioning System

[4] www.3don.co.uk

[5] www.ovos.at

Without using a third-part AR-app there are several projects that already use AR technologies. But these projects are located in Germany. The first app was "Wohntraum am Olympiapark" which is situated in the city of Munich. The title page of the project catalogue is used as a marker for the app. Beside additional information of the project the AR mode can be reached with the "3D view" button. So the whole project is shown on the display. The app was also programmed by the company Meixner IT-Solutions.

The second project is "AR Winterhuder Wohnkultur" which also offers additional information on the project and two ways of visualizing the site. The first way is a classical AR approach with a special logo in the prospect using a marker for getting the project shown as virtual model (using button pages 1-9). The second way is non-AR, but shows the architectural objects interactive by holding the camera around (using button pages 10-16). Knowing the position the app guides you through the 3D model. Strictly speaking this is not AR, is is virtual reality (VR) instead.

Fig. 10: Winterhuder Wohnkultur (AR view)

Fig. 11: Winterhuder Wohnkultur (3D model)

Fig. 12: BIMx (Reconstructed 3D model of synagogue 1190 Vienna, Dollinergasse)

Other apps using this method of orientating in the building or interactive showing the 3D model are BIMx and iVisit 3D. All these apps can be used as an innovative method for 3D presentation of architecture setting

new standards. In Vienna there was a project which rebuilt the destroyed synagogues in the city with virtual models. (MARTENS; PETER 2009) The Austrian company A-Null Bausoftware[6] made it possible that these buildings are in a BIMx virtual environment. In this app you can virtually move inside the objects.

With the iVisit app architects can upload their own projects. It is developed for architects and designers, to allow users to view panorama renderings. In the navigation mode you can look around in your model by moving the smartphone or tablet. The views are genrated by rendering only images. This property is not in Vienna. But again this is also Virtual Reality, even a smart way to present property.

Fig. 13: iVisit 3D

4.4 Dimensions/Plannings

As a planning tool the app SOLight from the Austrian company Anvartec[7] is used to show the sun path throughout the whole year. The app calculates the exact sun path for the current GPS position and overlays the live picture with the sun path in front of the surrounding area (houses, trees, mountains, etc.). The difference between the summer and the winter sun positions could be helpful for visiting an object and detecting several lightning problems e.g. with new or prospective condominiums. (LANG; SITTLER 2012a, p. 9)
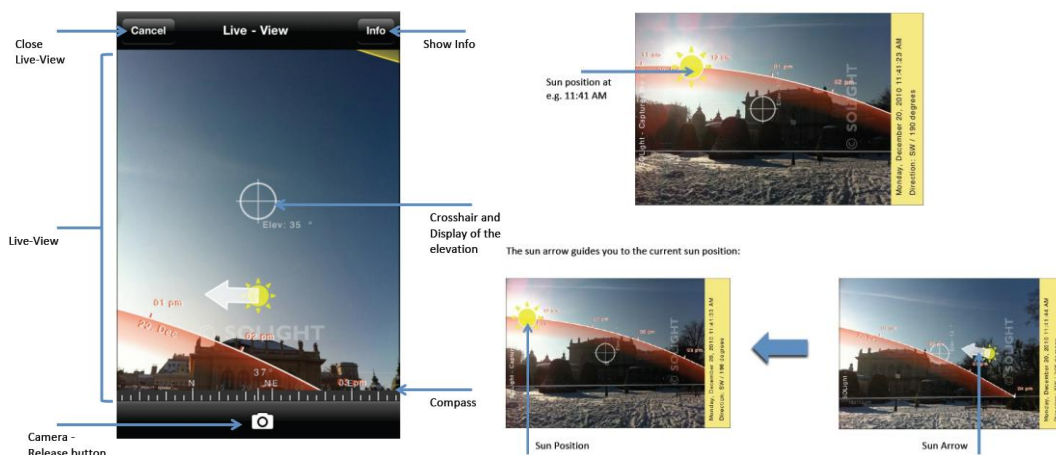
Fig. 14: SOLight (ANVARTEC 2010, p. 2, 4)

4.5 Lexicon/Languages

Tourism is one of the most wanted categories for apps, while the use of smartphone features is applicable for AR use. In this field the app Word Lens was developed. It is an entirely new tool for live translations using the camera image to immediately translate the appropriate language. The result is simultaneously displayed in the desired language. Currently the translation of Spanish, French, Italian and German into English (and vice versa) is supported. With this application every language challenge or sign reading on a construction site will be no problem any more. (LANG; SITTLER 2012a, p. 9)

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[6] www.a-null.com
[7] www.anvartec.at
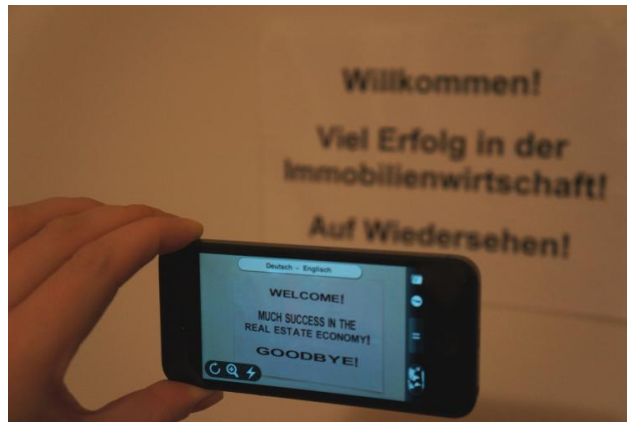
Fig. 15: Word Lens

5 CONCLUSION

"AR is still in infancy state, and as such, future possible applications are infinite" (CARMIGNIANI; FURTH 2011, p. 38)

The above mentioned classifications in the use of AR have different relevance in terms of their capabilities in use and their benefits for the user. The size of the circles indicates the estimated market share. In comparison to the results of 2012 there is a a sharp shift towards architecture and interior design at the expense of real estate search. (LANG; SITTLER 2012a, p. 10)
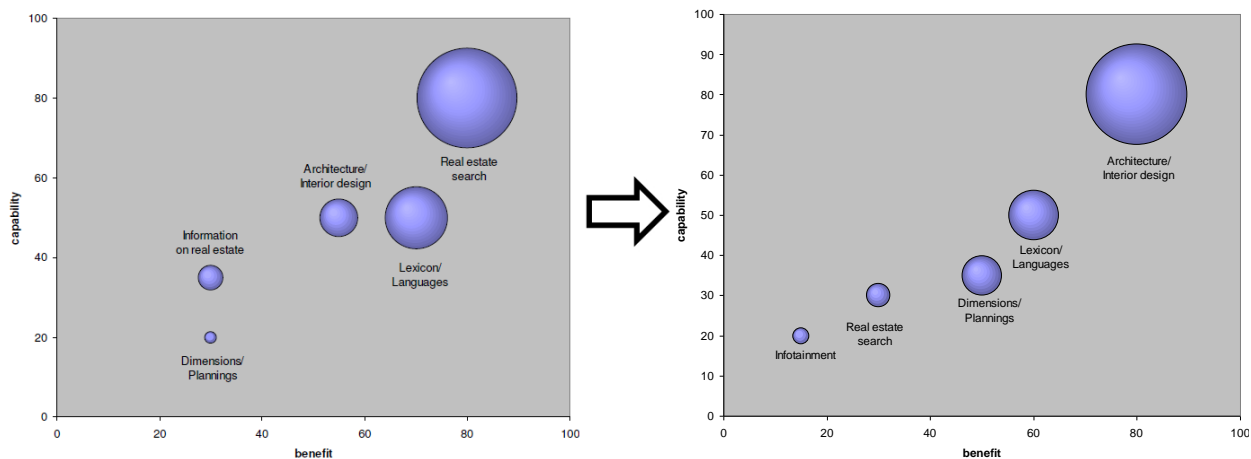
Fig. 16: Capabilities in use and benefits for the user of AR RE- apps (first graphic LANG; SITTLER 2012a, p. 10)

The focus of AR and VR is located on presentation and visualization. AR is predicted to be increasingly used in a major number of areas and it is a question of time when AR-apps will become a familiar technology. (BIESZKE 2011, p. 41-42) AR is a revolutionary technology, which is more and more used in real estate. Even the augmented view of a construction site with the virtual building is possible. The site notice board can be as anchor of the marker for the virtual sightseeing. The broker could stand in front of the desired site showing the customers house by AR animation and virtual tours before construction begins. (GAWLITTA 2012, p. 67 70) In addition VR-apps give well known visualization for prospective customers and are easier to create. With the new standard of Building Information Modeling (BIM) an intelligent model-based design process gives added value to the entire lifecycle of a building and infrastructure project. (AUTODESK 2011)

Apps enhance the perspective of customers with showing how his future home looks like. Also location based services with GPS will influence the customer use. (TÖNNIS 2010, p. 166) Especially the field of real estate should benefit from the increasing AR market. (LANG; SITTLER 2012a, p. 11)

6 SUMMARY OF USED AR-APPS

The following table (in two parts with Fig. 17 and 18) shows all mentioned app available in any of the main app stores.

Name of the App	Layar	Wikitude	Junaio	CommBank 3D Reader	ViewAR	aspern Die Seestadt Wiens
Vendor	Layar HQ	Wikitude GmbH	metaio Inc.	Commonwealth Bank of Australia	Meixner IT-Solutions GmbH	ovos media consulting gmbh ovos realtime 3D gmbh
Category	Information on surrounding area			Infotainment	Architecture/ Interior design	Architecture/ Interior design
Description		Augmented Reality browsers for live views of the surrounding information of the desired object. Hotspots, pubs, premises around the location are shown in the live view of the camera of the smartphone. Individual layers for own purposes can be viewed.		With this app (and the concerning marker) the real estate market in the virtual city Cherryford Hill can be visited. Terms as transactions and purchase prices are shown. This fun app is used for explaining AR.	App for visualizing furniture, interior design, kitchens and even whole architectural buildings. With a marker the object could be viewed in the display of the smartphone or tablet.	Using the Layar AR-browser the building site named "Seestadt Aspern" can be viewed through the camera of the smartphone. With 3D-objects the future buildings are shown schematically from special viewing points onsite. The virtual city is contributed by additional texts, pictures and videos.
Operating System	iOS, Android	iOS, Android, Blackberry, Windows Phone	iOS, Android	iOS	iOS	iOS, Android
Price	free	free	free	free	kostenlos	free
Hyperlink	www.layar.com	www.wikitude.com	www.junaio.com	www.commbank.com.au/personal/home-loans/3d-reader.aspx	www.viewar.com	www.ovos.at

This table is a personal choice of the authors and raises no claim to completeness.

Fig. 17: Summary of used AR-apps (part1)

Name of the App	Wohntraum am Olympiapark	AR Winterhuder Wohnkultur	BIMx	iVisit 3D	SOLight	WordLens
Vendor	HI Wohnbau GmbH Meixner - IT5	Wulff Hanseatische Bauträger GmbH	Graphisoft SE	Abvent R&D	Anvartec Dipl.-Ing. Bernd Rene Ruprechter	Quest Visual Inc.
Category	Architecture/ Interior design	Architecture/ Interior design	Architecture/ Interior design	Architecture/ Interior design	Dimensions/Plannings	Lexicon/Languages
Description	The app uses AR-technology to show the project "Wohntraum" in Munich (Germany) by a virtual and 3-dimensional object. The title of the project-folder is used as an anchor to see the object from several angles.	The app uses AR and 3D modeling technology to present the project "Winterhuder Wohnkultur" in Hamburg (Germany). A special logo in the project-folder is used as an anchor to see the object from several angles or navigate throug the virtual property.	Virtual reality app which shows virtual objects which can be walked through like in a jum-and-run game. Architecture is simply imported and shown to the customer.	The app is available in two versions. The Lite version is free, but only shows one panorama each day. For heavy users the Pro app with the same functions shows views of buildings and architecture, which you can move throug ba handling the smartphone or tablet.	With this AR-app you can see detailed information concerning all sun paths with highest and lowest positions of the sun. To determine the solar time of an apartment you can check the light intensity with this app.	With this app short words an sentences could be translated live within the camera view of the smartphone. Currently the translation of Spanish, French, Italian and German into English (and vice versa) is supported
Operating System	iOS	iOS	iOS, Android	iOS	iOS	iOS, Android
Price	free	free	free	free / 17,99 EUR	2,99 EUR	4,49 EUR [1]
Hyperlink	www.hi-wohnbau.de	www.winterhuder-wohnkultur.de	www.graphisoft.at/produkte/bimx	www.ivisit3d.com	www.anvartec.at	www.questvisual.com

[1] The app is free for testing. One App-in language (in both direction) costs EUR 4,49.
This table is a personal choice of the authors and raises no claim to completeness.

Fig. 18: Summary of used AR-apps (part2)

7 REFERENCES

ALLBACH, B.; MEMMEL, M.; ZEILE, P.; STREICH, B.: Mobile Augmented City – New Methods for Urban Analysis and Urban Design Processes by using Mobile Augmented Reality Services. Research Paper, REAL CORP, Essen, Germany, 2011.

ANVARTEC: SOLight Handbook, ver 1.0, http://anvartec.com/Portals/32/SOLight-Handbuch.pdf, viewed 22 Sep. 2011, 2010.

AUTODESK: Realizing the Benefits of BIM, Whitepaper, http://images.autodesk.com/emea_dach_main_germany/files/ 2011_realizing_bim_final.pdf, viewed 27 Feb. 2013, 2011.

AZUMA, R.: A Survey of Augmented Reality. In: Presence: Teleoperators and Virtual Environments 6, pp. 355-385. Malibu, 1997.

BIESZKE, E.: What is the Future of Augmented Reality Technology on Smartphones. Bachelor Thesis, Bournemouth University, 2011.

BROUGHALL, N.: Commonwealth Bank Using Augmented Reality As An Ad For Property App, http://www.gizmodo.com.au/ 2011/03/commonwealth-bank-using-augmented-reality-as-an-ad-for-property-ap, visited 20 Sept. 2011, 2011.

CARMIGNIANI, J.; FURTH, B.; Augmented Reality: An Overview. In: FURTH, B. (Ed.), Handbook of Augmented Reality, pp. 3 46. New York, 2011.

COMSCORE: European Digital Trends – Shifting Consumption Habits. Gulltagen, 2012.

GARTNER: Gartner Says Worldwide Sales of Mobile Phones Declined 3 Percent in Third Quarter of 2012; Smartphone Sales Increased 47 Percent. http://www.gartner.com/newsroom/id/2237315, viewed 27 Feb. 2013, 2012a.

GAWLITTA, T.: Digitale Immobilien Kommunikation. Wiesbaden, 2012.

JAEKEL, M.; BRONNERT, K.: Die digitale Evolution moderner Großstädte. Apps-basierte innovative Geschäftsmodelle für neue Urbanität, Wiesbaden, 2013.

JÁNSZKY, S. G.; SCHILDHAUER, T.: Vom Internet zum Outernet. Strategieempfehlungen und Geschäftsmodelle der Zukunft in einer Welt der Augmented Realities, Whitepaper, http://www.2bahead.com/fileadmin/content/janszky/pdf/

PDF_broschueren/WhitePaper_Vom_Internet_zum_Outernet.pdf, viewed 20 Sept. 2011, 2010.

JUNIPER RESEARCH: Mobile Augmented Reality. A whole new world, Whitepaper, Basingstoke, 2009.

KENT, J.: Augmented Reality. 2011.

KIPPER, G.; RAMPOLLA, J.: Augmented Reality. An Emerging Technologies Guide to AR, Waltham, 2013.

LANG, V.; SITTLER, P.: Looking for property via Smartphone. Trends, Offers and Prospects, Research Paper, 18th European Real Estate Society (ERES) Conference, Eindhoven, Netherlands, 2011.

LANG, V.; SITTLER, P.: Augmented Reality for Real Estate. Research Paper, 18th Pacific-RIM Real Estate Society (PRRES) Conference, Adelaide, Australia, 2012a.

LANG, V.; SITTLER, P.: Real Estate Applications for Smartphones. A market overview for Austria and Germany, Research Paper, 19th European Real Estate Society (ERES) Conference, Edinburgh, United Kingdom, 2012b.

MADDEN, L.: Augmented Reality Browsers for Smartphones. Chichester, 2011.

MARTENS, B.; PETER, H.: Die zerstörten Synagogen Wiens. Virtuelle Stadtspaziergänge. Vienna, 2009.

MAYER, A.: App-Economy. Milliardenmarkt Mobile Business, Munich, 2012.

MEHLER-BICHER, A.; REISS, M.; STEIGER, L.: Augmented Reality. Theorie und Praxis, Vienna, 2011.

NIEDERMAIR, S.: Augmented Reality on Mobile Devices for Architectural Visualisation. Master Thesis, TU Vienna, 2012.

OVOS: Augmented Reality App – aspern Die Seestadt Wiens. http://www.ovos.at/portfolio/87,augmented-reality-app-aspern-die-seestadt-wiens.html, viewed 22 Sept. 2011, 2011.

SIEGLER, A.; WIETZEL, I.: Die Verschmelzung von realer und virtueller Umgebung in der City 3.0, Research Paper, REAL CORP, Sitges, Spain, 2009.

TÖNNIS, M.: Augmented Reality, Einblicke in die Erweiterte Realität, Berlin, 2010.

TRAK, L.: Innovative Product Catalog Has Augmented Reality. http://augmentedblog.wordpress.com/2012/07/24/ikea-2013-catalog-has-augmented-reality, viewed 28 Feb. 2013, 2012.

WAGNER, D.: Handheld Augmented Reality. Doctoral Thesis, TU Graz, 2007.

Augmented Reality as a Communication Tool in Urban Design Processes

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1 ABSTRACT

One of the main parts in planning is the communication of planninginformation. Not only the decision maker, but also the inhabitants have to be informed on the planned actions, no matter if they are affected directly or indirectly by the planning . The classical two-dimensional visualizations do not offer the required range to present the contents of the planned changes, and lay people do not have the same base knowledge to understand the three-dimensional extent to what is shown in the plan.

3D models are one possible solution to this problem, based on the fact, that e.g. a new planned building or area can be viewed from different angles and also allow a direct judgement.The down side of these models is the creation. It is complicated and expensive to create the three-dimensional surroundings. What if the virtual model could be combined with the existing reality? Would that make things easier?

With the use of Augmented Reality various techniques are available which have to be tested.

Using these methods real-world situations can be overlayed with digital content which allows an extension of information of reality. Based on practical examples, these new methods and techniques are explained in detail.

2 INTRODUCTION

Urban planning is an extremely complex subject that is often difficult to understand for lay people. Especially if the individual is affected by the planning process, the possibility must be given to express his dismay in the participation process. But how can citizens express their opinion if their basic knowledge is not the same? What can help these people to understand the three-dimensional effect of a plan based on the classical two-dimensional visualization. How can this be made more transparent and understandable?

Regardless to the chosen (visualization) method, factors of the communication theory must also be taken into account. The general view on the continuous communication between planners and the addressee in the whole planning process, shows that the analytical categories of communication theory can be applied (Fürst & Scholles 2008:198).
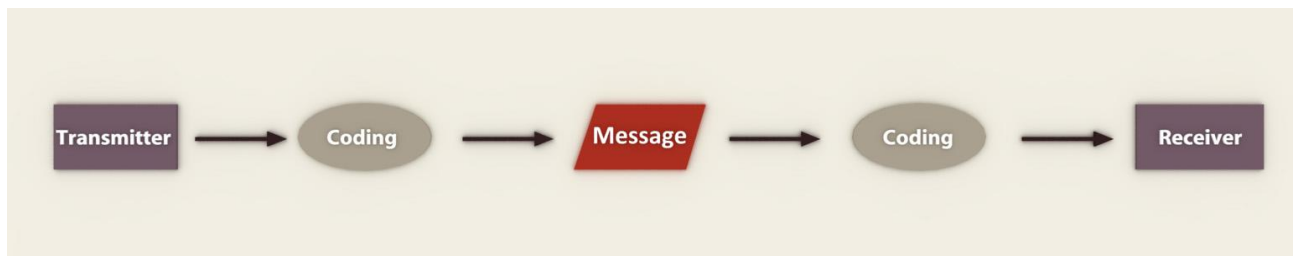
Fig. 1: Communication in planning processes, based on transmitter-receiver model (Zeile 2010, according to Fürst & Scholles 2008:198)

The vocabulary that planners use to define a problem in planning is very fixed and defined by law. They encode their core message, which then must be decoded by the receiver. This can result in transmission errors, since the receiving side remains within its own interpretation range. It attempts to translate the information to his language. Here emotions, such as a distrust of the stakeholders, or a defensive position due to personal fears, or the own idea of a "good" plan, can falsify the actual statement. (Fürst & Scholles 2008:198).

In this content Smartphones or tablets with Augmented Reality Browsers offer a possible solution for a better exchange of information as they are more understandable and transparent. Augmented Reality is conciderd to be "the extension of reality with additional content". Two different methods can be differentiated: On the one hand the use of Augmented Reality in situ, meaning that in the case of a planning project, fotos or 3D models can be blended in to the built reality. On the other hand, a printed 2D plan can be extended with additional

information or models, with the use of Augmented Reality markers. These methods can be seen as a type of translation, as it enables a lay person to understand the previously complex two-dimensional presentation.

In the follwing current methods and techniques are to be discussed.

3 STATE OF RESEARCH

3D-city models have gained more and more popularity in the last years. This is especially based on the continously simplified development. If the new design of a building or situation is integrated in a city model, it can be viewed from all perspectives and alternatives can be discussed and rated.

On the other hand it is criticized that the effort and the costs to create the surroundings is too high. Can the new design be combined with the built reality (Zeile 2012) ?

3.1 Augmented Reality

This question constitutes the approach of the technology of augmented reality. Instead of using a virtual environment to show the content, it is projected into the reality. To achieve this 4 elements are needed: a computer with the required software, which serves as rendering unit, overlaying real pictures with virtual pictures, a tracking system, which locates the position of the user, a recording device in form of a camera and also a display.

If all these requirements are fulfilled, 4 different methods of Augmendet Reality can be differentiated (Höhl 2008):

- The Projective Augmented Reality (PAR) uses a projector to show digital information on a real object.

- With the method of Video See-Through (VST) enclosed projection glasses are used.

- The Optical See-Through (OST)-method works with an optical unit to combine the signals, a semi-transparent mirror, which allows the perception of the environment.

- The Monitor Augmented Reality (MAR) displays digital contents on a Monitor. This technique is concidered the easiest solution.

A few years ago this method was only possible from a stationary computer, or the User hat to transport about 20 kilos of equipment. Today the same technical effort can be given to the User as a handheld device in form of a smartphone (Zeile 2011). The Augmented Reality technique implemented in smartphones shows a whole new form of Augmented Reality. It is basically an advanced form of the Monitor Augmented Reality, only that the User is not fixed to one spot, but can move freely in reality. This makes it possible to use the system nearly everywhere, as long as a mobile internet connection is assured and the required App (a so called Augmented Reality-Browser) is installed. The tracking system to determine the perspective is included in practically all newer smartphones in form of a GPS-module and also a compass (Allbach et al. 2011).

3.2 Geolocalisation or Marker Based Technics

With the current MAR-techniques two procedures are differentiated: On the one hand, using the integrated GPS-module, the geolocalisation techniques and on the other hand the so called marker-based techniques. In the case of the geolocalisation the content, which is to be displayed is linked to the geoposition, allowing the user to view it at the point of interest. This method is restricted though because the GPS-localisation is not always as exact. If there is a high density of buildings or trees, the GPS-signal and the deposited AR-content starts to "jump".

A new approach to solve this problem is found in the marker-based tracking systems, which do not need a GPS-signal. The setting, in which the content is supposed to be overlayed is found on a server as a marker. All that is needed is a foto of the setting. Originally set up for print media, this application can be extended to the built reality with simple tricks: disturbing elements that complicate the recognition, such as reflecting windows or weather-related changes in the sky, have to be cut out with image editing programs, e.g. Adobe Photoshop. Distinctive structural elements in the face of the building are adequate to recognise the according setting to then overlay the content (Zeile 2012). The technical restrictions to create such an Augmented Reality projection are reduced to a minimum. Years ago it was limited to people with the needed know-how

to set up such a server and deposit certain contents, whereas now there are platforms that offer a graphical user interface and drag&drop functions. Therefore Hoppala augmentations (Gadeya 2013) or the RADAR-platform of the DFKI Kaiserslautern (Memmel 2013) can be used for the accomplishment of geolocalized AR-visualizations. This development is continued by the new platform "LayAR-Creator" (Layar 2012) relating to the current AR-application LayAR. Centre of attention is the user-friendliness.

4 METHODS FOR AUGMENTED VISUALISATION OF URBAN PLANNING

In the presented projects three different methods, meaning also three different applications were used: LayAR (Layer 2009) as a representative of the location based service as well as LayAR Vision (Layar 2012) and AR Media (Inglobe Technologies 2011) as marker-based techniques. LayAR is concidered to be the most common Augmented Reality-Browser on smartphones. The georeferenced contents can be stored on a server for a later presentation when a GPS-localisation is possible and the smartphone only has to be aligned on-site to show the contents on the display. This allows an import of pictures, 3D-objects, audio- and video data in to reality.

LayAR Vision is the marker-based version of LayAR. Both versions are combined in the same App. Since the introduction of LayAR Vision the App LayAR directly starts in a "Scan"-mode. If a photo is taken in this mode the App compares this situation with all the markers filed on the server. If it finds this situation on the server it leads the user to the according info-layer within the App.

Manual navigating to the LayAR-channel, which is still necessary with geo-referring layers is not applied in this option. With LayAR Vision it is not yet possible to visualize three-dimensional contents.

A marker based AR-technique to present three-dimensional information is AR Media. This application can be used as a plugin for any current softwareprogramm for three-dimensional modelling (SketchUp, Vectorworks, 3D Max,…). The program is then extended with the AR-function. With the help of this, 3D models can be placed on such a marker, which resembles to the famous QR-codes. This marker can be printed out at home by everyone, the matching 3D-model can be downloaded as well as the free AR Media Viewer (Inglobe Technologies 2011). By adjusting the webcam to the marker an AR visualization can be generated on the monitor. For Apple's iOS systems there is the so called AR Media Viewer, a free App which enables a visualization with a smartphone or a tablet.

AR Media shows tremendous functions, such as the scaling of the 3D-model, the ability to show different versions and different angles by turning the marker or by using the common form of wiping over the touchscreen. A high level of detail can be displayed, as the model is saved locally on the device and does not have to be streamed over the internet. Therefore the only restrictions result in the hardware of the used smartphone or tablet.

5 USE CASES AUGMENTED REALITY

The presented methods were tested within cooperation projects with cities and communities, adjusted to their objectives and presented in the following.

5.1 Smartwalk Saarbrücken „Stadtmitte am Fluss"

In the summer of 2012 the research team of the department CPE worked with the mentioned visualization methods on the example of the major project "Stadtmitte am Fluss" in Saarbrücken. This major project dealt with the revaluation and creation of a better quality of ambience along the river Saar, which runs directly through the city.
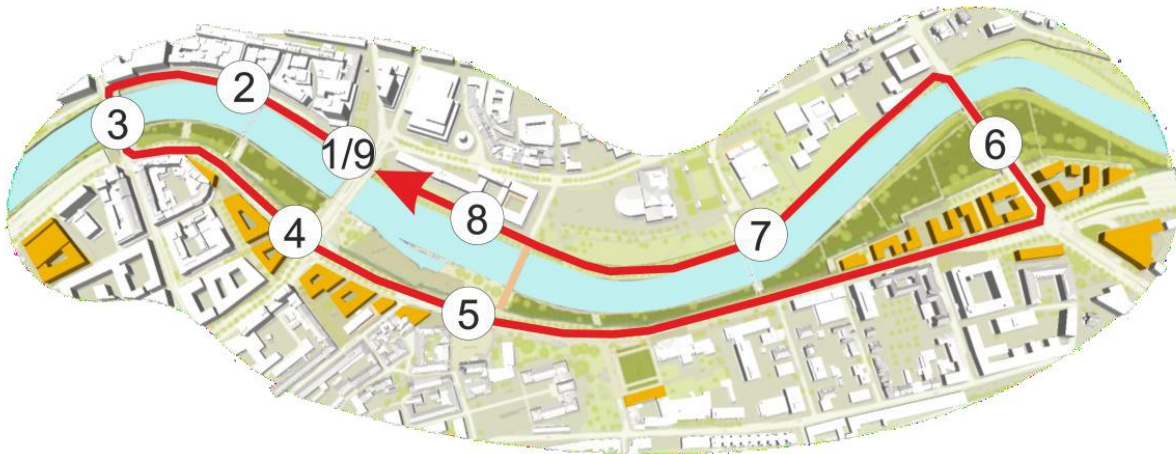
Fig. 2: Track oft he smartwalk through the area „Stadtmitte am Fluss" in Saarbrücken (Research group CPE, based on the master plan of Saarbrücken)

Especially building projects to reduce the traffic pollution, such as noise and emissions were intended. A focal point of this planning was the tunnelling of the urban motorway which runs alongside of the Saar.The emerging free space on the top of the tunnel is supposed to be used by the people as an attractive park and recreation space. Also the boulevard on opposite side of the river is to be upgraded and integrated in the urban pattern. Key aspect of the research was on the one hand to communicate with the inhabitants on the planning, on the other hand to reach and fascinate young adults with the help of innovative visualization methods. The second aspect should work by the principle of the "Homo ludens" (Streich 2011) with a "playful contact" of the subject of planning and town developments.

Fig. 3: Use of Augmented Reality to overlay the new virtual design of a pedestrian bridge over the real picture- (Research Group CPE)

The main focus was set on the development of the so called "Smartwalk", a kind of virtual tour through nine stations without a fixed order. The walk extends to the planning area of the project "Stadtmitte am Fluss" and uses various digital contents configured for smartphones or tablet pcs.

If the observer is for instance at a station where he can see an empty site the new planning can be experienced with a video fitted to the gap. At a different station the new planned pedestrian bridge is blended in as a 3D-model and at yet another station viewers can get a brief overview of the whole area with some basic textual information as well as information on the project.

At a different spot a 3D-model of the entire area including noise pollution and flooding simulations can be viewed. To offer a better understanding of the new planning the presentation was not only made for future planning but also shows a comparison to the historical development and the current situation.

The associated information of the project can be accessed at every station, either through a mobile website or in form of an available audio-stream. To reach as many people as possible a simplified version of the walk is offered based on QR-codes and mobile websites. The purpose of the Smartwalk is not only to inform, but the city of Saarbrücken is hoping to get feedback of the viewers. To allow this, every station offers the possibilty of a rating- and commenting system (Becker et al. 2012).

Fig. 4: Visualization if a new design in AR Media, (left) Visualization over Webcam and Notebook, (right) iPad (Research Group CPE)

AR Media was also used so that citizens had the opportunity to look at the new planning from home, by using the augmented 3D-models. In the end not everyone interested in the project has the chance to take a tour of the area to get more information.

5.2 Conversion area Trier Bobinet

Often the area affected by building projects is spread over such a large range that the whole extent of the project can not be taken in by the viewer straight away. The use of AR Media opens further potential since a 3D model does not have to be placed on one single marker. Shown in the example of the conversion area Trier Bobinet the 3D-model of the entire planning area was set on various markers arranged in a grid. AR Media supports a maximum spreading of 7x7 markers. This way the display of the 3D-model in the Augmented Reality view can be increased. Depending on which marker the webcam (or the camera of the iOS-device) is directed the matching section of the 3D-model is shown. The transition from one marker to another is smooth which allows a scan of the entire area (Noll 2012).
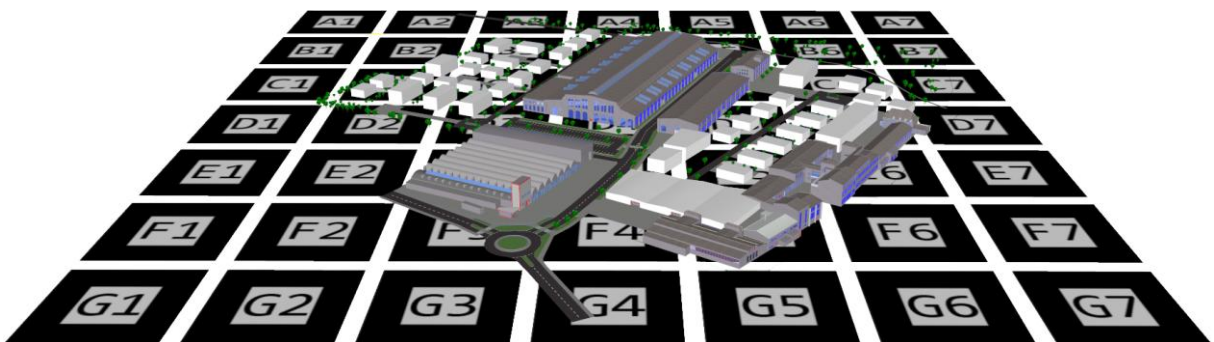
Fig. 5: Placement of a new design with the help over several markers in AR Media (Noll 2012)

5.3 Added value for urban planning

After selecting technical capabilities for the use of AR-presentations in planning, it has to be figured out if the new repertoire of methods can help a lay person to judge the planning project and form an opinion. To fathom out the question the new methods were compared in another final paper and the value for the interested citizen was determined based on a questionnaire. This was applied in the example of the Landesgartenschau in Schwäbisch Gmünd. Here Henn architects are planning a research centre and a trainee center, that is going to be a combination of 35 ship containers. By stacking containers of different sizes an abstract construction is created (Henn 2012).

Fig. 6: Evaluation at the construction site in Schwäbisch Gmünd (Dübner 2012)

To find out if the people passing by the planning area can imagine how it will look the evaluation takes place at this point, devided in different stations. The first evaluation took place after looking at the two-dimensional plan. In the following steps the various AR-methods were added, repeating the evaluation after every method. The interested people viewed the building project as a marker-based visualization in AR Media, as a two-dimensional overlay with LayAR and finally as a three-dimensional model over a LayAR-geo-channel. Regardless to their age or previous experience with smartphones and Augmented Reality every person could handle the techniques. The presented AR-methods were consistently seen positive and helped the test person to imagine the building (Dübner 2012).

5.4 Augmented Reality as a communication instrument for landuse planning

Besides the pure presentation of the planned construction of a building project, the legal regulations of a development plan also have a spatial impact. Therefore, also the classical two-dimensional plans require a translation. Can the presented mobile Augmented Reality methods enable this translation for citizens? Since not every citizen has the same spatial perception the question arises, if the complex contents of a development plan can be shown in a three-dimensional visualization, including the extent the planning will have on the area. Within another research project, the contents of the development plan were created as a three-dimensional alternative. After an existing development plan was recreated on a three-dimensional level and presented in Google Earth, the next step was to find out how Augmented Reality methods can offer a higher value for citizens. In the first possibility, the models were transformed and located on a geo-channel in LayAR. This allowed an inspection of the development plan "in situ". Particular regulations, which are in their selves complicated enough, were extended with additional textual information. This offers a combination of the visualization of the set regulations with the translation for the interested layperson. The handling of this method though, turned out to be difficult, as the restriction of the exact location was set because of an insufficient GPS-signal. In addition, the level of detail that influences the data volume of the model was limited through the quality of the mobile internet connection (Broschart 2011).
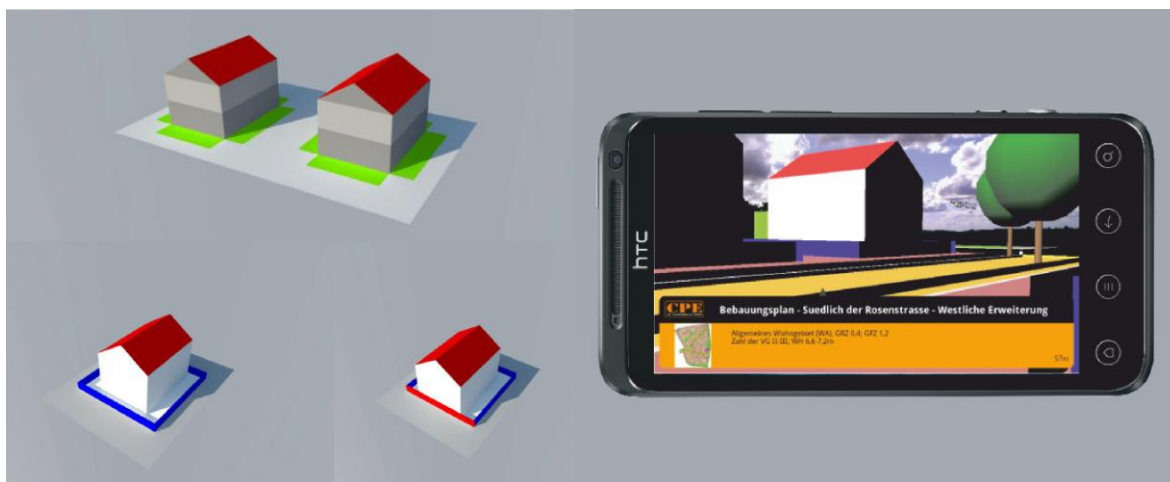
Fig. 7: Threedimensional examples of the content of building codes (above: open design; below: perimeter and fixing building limiting line) Augmented Reality Visualization of a development plan (Broschart 2011)

In the second version, the attempt was started to explain the contents of the development plan with the help of mobile Augmented Reality methods directly on the plan. Again, LayAR Vision was used for this approach. The actual development plan is then set as the marker and additional contents can be "placed" on this surface. On the other hand, LayAR Vision does not offer the presentation of three-dimensional contents, so the explanations to the single regulations are pictorial. The contents with various degrees of information are basically supposed to be decoded through the smartphone to enable the understanding of the different regulations. With this technique, the legally valid development plan can be used as the base without changing the plan. This means that the smartphone would function as an informal translation device for the formal plan, which could be used for the mandatory presentation (Zeile 2011).

Fig. 8: Marker-based AR-Visualization of a developement plan with buliding codes (Zeile 2011)

6   CONCLUSION

The presented Augmented-Reality methods can already be used in various parts of planning. The methods repertoire of a planner is being extended in its function of "translating" for lay people who are interested in planning. First evaluation results turned out positive: For inhabitants an additional benefit is assured, as they are assisted in their spatial perception, but also there is the possibility of making planning activities more attractive with the playful and interactive handling.

Currently there are certain restrictions to these techniques, such as an insufficient mobile internet connection or the vague GPS-signals which are needed for the geolocalizing AR-techniques like LayAR.

The newly provided LayAR Vision, a marker-based technique can compensate these problems, nevertheless the assistance for 3-dimensional contents is (still) missing. However it is expected to proceed in a continuous development, which will enable further possibilities for the supply of information.

Also in the area of the handling there is some potential, possibly Google's Glasses Project shows the next step to make Augmented Reality more intuitive.

The shown Augmented-Reality methods do offer an enrichment, but their use must me considered, as it should only be seen as an extention to the already existing methods of participation. Non of the forms of information processing should be used on it's own. The Augmented-Reality methods can only show their full effect if they are used as an addition to the participation process.

All in all it can be said that planning is based on the communication between all people involved and this works best in the direct conversation. "Online does not work without offline!"

7 ACKNOWLEDGEMENT

8 REFERENCES

ALLBACH, B.; MEMMEL, M.; ZEILE, P.; STREICH, B.: Mobile Augmented City – New Methods for urban analysis and urban design processes by using mobile augmented reality services, in Schrenk, M.; Popovich, V.; Zeile, P.: Proceedings of RealCORP 2011 Zeche Zollverein Essen, Wien, 2011.

BECKER, D.; FRIEDRICH, A.; HOFER, S.; JOA, T.; LE, A.-N.; NOLL, R.; PLATZ, V.; WEBER, S.: Innovative Visualisierungsmethoden am Beispiel des Großprojektes „Stadtmitte am Fluss", Bachelorprojekt am Fachgebiet CPE, Kaiserslautern, 2012.

BROSCHART, D.: Bebauungsplan 3D? – Die Möglichkeiten der Visualisierung planerischer Festsetzungen, Bachelorarbeit am Fachgebiet CPE, Kaiserslautern, 2011.

DÜBNER, S.: Mobile Augmented Reality im Planungsprozess – Anwendung am Beispiel der Landesgartenschau 2014 in Schwäbisch Gmünd, Bachelorarbeit am Fachgebiet CPE, Kaiserslautern, 2012.

FÜRST, D., SCHOLLES, F.: Planungstheorie – Wissenschaftliche- und kommunikations-theoretische Grundlagen der Planung, in Handbuch Theorien und Methoden der Raum- und Umweltplanung, Dortmunder Vertrieb für Bau- und Planungsliteratur, 2008.

GADEYA, M.: Hoppala Augmentation [Online] Available at: http://www.hoppala-agency.com/ [Accessed 2013 February 14]

HENN: Architekturbüro Henn Architekten: Planungsunterlagen für das Forschungs- und Qualifizierungszentrum, Schwäbisch Gmünd. 2012.

HÖHL, W.: Interaktive Ambiente mit Open-Source-Software: 3D-Walk-Throughs und Augmented Reality für Architekten mit Blender 2.43, DART 3.0 und ARToolKit 2.72 1. Aufl., Springer, Wien, 2008.

INGLOBE TECHNOLOGIES: ARMedia Augmented Reality Plugin 2.2 now available. 2011. [Online] Available at: http://www.inglobetechnologies.com/en/news/fullnews.php?id=33 [Accessed 2013 February 16]

LAYAR: The first mobile augmented reality browser premiers in the Netherlands. 2009. [Online] Available at: http://layar.com/blog/2009/06/ [Accessed 2013 February 17]

LAYAR: Layar Creator places the power of interactive print at everyone's fingertips. 2012. [Online] Available at: http://www.layar.com/pr/creator/ [Accessed 2013 February 14]

MEMMEL, M.: RADAR – White-Paper [Online] Available at: http://radar-project.de/RADAR_whitepaper_de.pdf. [Accessed 2013 February 14]

NOLL, R.: Der Einsatz von Augmented Reality Methoden zur Kommunikation bei Konversionsprojekten, Bachelorarbeit am Fachgebiet CPE, Kaiserslautern, 2012.

STREICH, B.: Stadtplanung in der Wissensgesellschaft, 2. Auflage, VS Verlag, Wiesbaden, 2011.

ZEILE, P.: Echtzeitplanung – Die Fortentwicklung der Simulations- und Visualisierungsmethoden für die städtebauliche Gestaltungsplanung, Kaiserslautern, 2010.

ZEILE, P.: Städtebauliche Methodenentwicklung mit GeoWeb und Mobile Computing – Untersuchung über die Fortentwicklung des städtebaulichen und raumplanerischen Methodenrepertoires angestoßen durch technologische Neuerungen im Internet. Weblog des Forschungsprojektes. TU Kaiserslautern, Fachgebiet CPE Prof. Streich. Kaiserslautern. 2011. [Online]: http://geoweb.arubi.uni-kl.de/ [Accessed 2013 February 14]

ZEILE, P.: Augmented City – erweiterte Realität in der Stadtplanung, in: Stadtbauwelt 24/2011, Berlin, 2011.

ZEILE, P.: Neue Visualisierungsmethoden in der Planung – oder: „Ich sehe was, was Du nicht siehst", in Planerin 5/2012, Berlin, 2012.

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BROWNTRANS – Focusing Brownfield Knowhow Transfer

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1 ABSTRACT

This paper reviews experiences of a partner involved for nearly a decade in promotion of Brownfields reuse, Brownfields awareness raising and Brownfields education and know-how transfer to the Central and the East European Countries. These experiences were gained from involvement in various projects such as Brownfields project for the Czech Ministery of Regional Development, Brownfields inventory projects for CzechInvest, BROWNTRANS, LEPOB, BRIBAST, CABERNET, CobraMan, CircUse and others, and they serve as a background for considering the effectiveness of various know-how transfer approaches. Different focus of individual projects, their partners´ profiles and project outputs are also reviewed. Project impacts and sustainability and transferibility of project results are examined. The effectiveness of Brownfield know-how transfer for different type of partners and stakeholders is also considered. For some projects, details of their local impact are compared and potential benefits to their participants and to local stakeholders are described. Finally, a recommendation is given for an approach to Brownfield know-how transfer to countries, which are yet to grasp the Brownfield nettle and need to integrate their Brownfields reuse into their national, regional and local systems.

2 EMERGENCE OF THE BROWNFIELD ISSUE

2.1 Introduction

Societal and production changes of the 1990's in the Central and the Eastern European states have generated large amounts of underused Brownfield land. These changes [1] required a spectrum of know-how, skills and tools, which would help them and their citizens to cope with new issues and emerging free markets. In some fields such know-how became avaliable, in other fields it was missing. An absence of know-how, skills and suitable tools particularly affected the urban development domain and actually it is affecting it until today. Here, local spatial planning was (and still is) failing to cope with the forcoming situation, turbulent market forces and the subsidiarity principles drive for community based leadership, which substituted the centraly planned and driven economy. All this was (and still is) simultaneously contributing to a worsening land use economy, Brownfields emergence and to a deregulation of large amount of Greenfield land, which is seldomly linked to any real population increases. The consequences are the increased costs of local development externalities and sharply developing differeces, between the "rising" and "failing" urban locations. Where as the "rising" locations are attracting development on Greenfield sites and exeptionally also on Brownfields land, the failing locations are experiencing ever increasing dilapidation, which is weakening local communities and deterring even further any potential investors. At the beginning of this milenium, such development dynamics were still not really fully perceived or understood by these countries politicians, academics or practitioners, nor they were clearly understood by various teams of international advisors, which in those days traveled these countries.

2.2 Problem identification and recognition

Nobody initially perceived (in policy or practice) that these sprouting dilapidated industrial, institutional or agricultural sites were "the same thing", which needed a common label! At the early days no external technical assistance was available for planning and development, but it was being available for environmental and economic issues. One of such US EPA external technical assistances has in the Czech Republic in the late 1990 labeled as Brownfields the environmentally polluted and dilapidated industrial sites and similar labeling have occurred also in another Central and Eastern European countries. The different

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[1] GAVRILIDIS A., IOJA C., SAGHIN I.:Urban Regeneration through Industrial Restructuring of Brownfields   47th ISOCARP Congress 2011

nature and origin of Brownfield sites, their varied development potential and their spatial aspects were started to be recognized in the Czech Republic after the year 2002 and the local planning system in the Czech Republic acknowledges Brownfields only since 2007. However, most of the other Central and Eastern European countries´ local planning systems have not perceived Brownfields as a land use and planning issue [2] until now. It is Brownfields multi-sector and cross-professional reach, which makes their problem recognition and solutions difficult. In the Czech Republic during the years 2002-2004, it was the external experts and the NGOs who helped the Czech Brownfields issue perception and recognition. This was achieved by estimating and sizing the magnitude of Czech Brownfields, by promoting Brownfields typologies and by identifying the need for an overall institutional responsibility for the land use. When finance was attracted into Brownfield research, the awareness of the issue among academics has improved. Increased knowledge and subject publicity have then helped lobbying Brownfields into the key national policies. In most of the other New Member States, such recognition has emerged five or more years later. For example until recently, some of Latvian, Bulgarian and Romanian, academics and practitioners still perceive Brownfields as an environmental and not as a land use and development issue [3]. For brownfield solutions to be successful, awareness and know-how improvements have to reach the national as well as the regional and the local levels. The regional and the local levels however, have serious language barriers, which prevent them from benefiting from international resources and literature, foreign experts´ produced reports and web-based information on Brownfields. Also, the local and the regional levels were not (and until today are often not) able to cope with the EU urban regeneration and management expertise transfers. This is because there are large areas of development and economic related know-how still missing in these local systems – and this effect the ability at the local level to absorb state-of-the-art urban development and Brownfield know-how. Simply, it takes time to build it up.

BOX 1 – Emerging brownfield know-how

Slovakia and the Czech Republic have similar political and development conditions and legal frameworks, but in terms of Brownfield regeneration the Czech Republic became the know-how transfer partner for Slovakia (see various papers by the authors dealing with the Czech Brownfields). In 2004, the Slovak Chamber of Charted Engineers and one of the educational institutions became a partner in the Czech initiated LEPOB project, focused on Brownfields education in local languages, targeted mainly to local practising construction and development professionals. At that time, understanding of the Brownfield issue in the Czech Republic was relatively well developed, whereas in Slovakia, the issue was so new, that it became difficult during this project to access experts, which could convert the generic Brownfields handbook into a Slovak country-specific version. Since this time, further Brownfield know-how transfers reached Slovakia from the Czech Republic. For example the Czech national investment support agency, CzechInvest, has in 2009 shared with the Slovakia´s investment agency SARIO expertise on Czech industrial Brownfield support programs and Brownfield inventory making. Meanwhile, Slovakia´s partners have also participated in other European Brownfields focused projects. By the year 2011, the awareness of Brownfields issue in Slovakia developed to such an extent that Slovakia´s stakeholders were themselves seeking means, how to improve and update their local Brownfield know-how. To fulfil these objectives they prepared the project BROWNTRANS financed from the EU Livelong Learning Programme. But the BROWNTRANS project aims not only to develop the Slovak professionals and academics Brownfield know-how, it is also reaching further East, to initiate and to open up Brownfield know-how transfer to Bulgarian and Romanian partners [4].

Whereas in the Czech Republic the national policy has responded to Brownfields since 2001, the Czech regional and the local levels, were responding later, partially from 2005, but on a larger scale after 2006, when Structural funding for urban and industrial regeneration became broadly available. In the other Central and the Eastern European states, such a policy and programme recognition of urban regeneration and Brownfield issues occurred a few years later. Hence the full impact on urban land use, which was possible in

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[2] POPESCU G., PĂTRĂŞCOIU R.: Brownfield Sites – Between Abandonment And Redevelopment – Case Study: Craiova City, Human Geographies – Journal of Studies and Research in Human Geography, 6.1 (2012) 91-97

[3] http://business-review.ro/investments/country-investment-reviews/brownfield-developments-still-waiting-for-green-light/#comment-18172 (last accessed 15.1.2013)

[4] COBÂRZAN B.: Brownfield Redevelopment in Romania, Transylvanian Review of Administrative Sciences, 21 E/2007, pp. 28-46

see section 12 and 13 of the project BROWNTRANS handbook on http://fast10.vsb.cz/browntrans/index/

the Czech Republic by the application of 2007-2013 Structural funding, is in these countries yet to come. But time moves on and also in Bulgaria and Romania various successful Brownfield projects are now springing up. They are mostly privately financed, but there are also emerging various publicly financed urban regeneration projects, some of which can be classified as projects on Brownfields [5].

BOX 2 – Brownfields in Romania and Bulgaria

There are several similarities of Brownfield perception in Romania and Bulgaria [6].

- In both countries until now Brownfields are perceived nearly exclusively as a contaminated land issue.

- In both countries there exist databanks of contaminated land but no databanks or inventories concerning dilapidated or underused urban land (Brownfields).

- In both countries, dilapidated or under-used urban land (Brownfields) is not recognised as a local urban, spatial, an economic or a social issue by the national legal framework and policies.

- Spatial planning in both countries does not "see" dilapidated or under-used urban land (Brownfields) as land use, planning and development issue.

- In both countries dilapidated or underused urban land (Brownfields) does actually represent a considerable amount of local urban fabric and because this issue is not correctly labelled, recognised or sized, Brownfields continue to be excluded from local urban policies and local urban plans, and financial resources, which could aid their remediation, are therefore not being provided.

Where the approach to Brownfields differs between the Bulgaria and the Romania is in their academic spheres. Whereas from the year 2007 there now are several scientific papers written by Romanian academics recognizing the economic, the social and the spatial context of Romanian Brownfields, there seem to be no such papers produced by the Bulgarian academia, which publishes only numerous scientific papers related to soil contamination and environmental aspects of Brownfield land.

Estimating and sizing the seriousness of the Brownfield issue was attempted for the first time in the Czech Republic by external experts in 2003 [7]. But for this now very outdated estimate, until today no other actual Czech Brownfields volumes figures exist. Brownfield data are also missing, or are incomplete and incompatible in most of the other Central and the East European states. Gathering qualitative data (achieved by an expert judgement stigmatising a property as a Brownfield) is an expensive pursuit and, if it is to be of any use, it requires a common approach to such data collection. This is still missing, even in the Czech Republic. Up to date Brownfields data are unavailable in the Czech Republic despite that since the year 2007 the Czech law enables signifying and publicizing properties as Brownfields for purposes of planning support information gathering. Because in the Czech Republic such an indication on a property usually has allowed its owners access to the Structural funding, property owners were in general not objecting to this very much. In the other Central and the Eastern European countries such a legal framework does not exist, which leads to difficulties with Brownfields surveys legitimacy and it also causes difficulties with Brownfield data publicity. Without at least estimating the amount of Brownfield land, and without analysing gathered data to understand what type of problems local Brownfields represent, it is very difficult to include Brownfields into the national/regional/local policies, channel research into them, or prepare programs and focus public finance and mainly soft intervention to Brownfields.

BOX 3 – Private sector – a leader in Brownfield reuse know-how

Despite the public sector failing in providing suitable policies or legal frameworks and despite an absence of suitable programs focused to aiding Brownfield regeneration, in the Central and Eastern Europe countries, the private sector is taking a lead on viable and well-located Brownfield sites. Such Brownfields are redeveloped by 100 % private funding for various commercial activities. Examples can be quoted not only from Czech Republic, Poland or Slovakia, but also from Romania[8] and Bulgaria.

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[5] see section 12 and 13 of the project BROWNTRANS handbook on http://fast10.vsb.cz/browntrans/index/

[6] http://www.cabernet.org.uk/resourcefs/132.pdf (last accessed 15.1.2013)

[7] EU PHARE assistance in North Bohemia and Moravia regions 2003-2004, final report

[8] http://www.europe-re.com/system/main.php?pageid=2616&articleid=20514, http://www.palasiasi.ro/en/ (last accessed 15.1.2013)

3   LEARNING THROUGH PROJECTS

3.1 History of participation on international Brownfield projects

One of the first international Brownfield projects where the Central and the Eastern European countries have participated was the CABERNET [9] network. This network was conceived and lead by the Western academia and this was why, in 2003, the Central and Eastern European countries partners invited to participate on this project, were not from the policy of professional backgrounds, but were from the academic backgrounds, often quite removed from the Brownfields issue. This has presented problems with the project results dissemination, if there was not a strong backing from another national organization, with a keen interest in promoting Brownfield issue. One of the spin-offs from the CABERNET project for the Central and the East European states was in the year 2004 the project LEPOB. The CABERNET project outputs were all in English and were presenting relatively sophisticated concepts, which were in general preceding in time the general European professional perceptions of the issue. This was why these outputs became not too easily accessible for the Central and Eastern European audience. This was partly because of language barriers, but also because of a high level of background property, economic development and other knowledge, which the CABERNET outputs presupposed from any potential reader. The LEPOB project lead by a Czech partner and its later clones, the BRIBAST and BROWNTRANS projects have adapted and interpreted the CABERNET message to the Central and the Eastern European audiences. Parallelly, there were a number of other Brownfield projects [10], where the Central and Eastern European partners have also taken part, but in these projects the Central and Eastern European partners were usually in passengers and not the drivers´ seats. This was why a full impact of such projects was usually limited to projects partners´ participation and there was a little impact reaching the national, regional or local levels. Not until the CobraMan or CircUse – Brownfield and land used focused projects, initiated from 2009 by the Central European programme (which however limits participation only to the Central European states), similar approaches were adopted. That is, the training materials and selected outputs which were focused onto local stakeholders were adapted into country specific versions and were translated into local languages.

3.2 Partners profiles and beneficiaries

The partners in the Lifelong Educational Program projects (LEPOB, BRIBAST, BROWNTRANS) were mainly experts, educational providers and dissemination bodies such as professional chambers. These projects´ main beneficiaries were practising professionals, but also academics and students benefited. As a spin-off of these projects, Brownfield courses started in several of the Central European universities. On the other hand, the partner mix in Central European Program projects (CobraMan, Urban SMS, ReNewTown, CircUse) were focused on cooperation of local or regional authorities and research or academic bodies. Their main beneficiaries here were local and regional administrations. The partners in the URBACT Program Brownfield project project BRING UP were public bodies supported by a delegated expert and beneficiaries of this project were the local authorities. Partnership in the INTERREG III C program project the B Team was a large one, consisting mainly of public bodies and institutes, where the beneficiaries here were the local and regional administrations.

3.3 Sharable projects outputs

There is a transnational value in these various Brownfield and urban land development focused projects´ outputs. Especially for countries, where the Brownfield subject is a new one or a rising issue, which is not sufficiently supported by local resources. In such cases, local language resources are usually very limited and all resources which are adapted to country-specific versions and are in local languages are of a great value. But for a non-academic newcomer to Brownfields, reaching all these international or even the local language outputs may not be easy. Various EU Programmes may harbour Brownfields and urban land development related projects, but they do not enable cross programme subjects search. Also projects web life after projects´ completion is limited. The EUKN network [11] so far posts mostly outdated information and the

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[9] CABERNET network, 5th Research Framework Program, www.cabernet.org.uk (last accessed 15.1.2013)

[10]

http://www.central2013.eu/fileadmin/user_upload/Downloads/outputlib/cobraman_tools_brownfield_regeneration.pdf (last accessed 15.1.2013)

[11] EUKN – European Urban Knowledge Network, http://www.eukn.org/ (last accessed 15.1.2013)

EURO Soil [12] portal is focused only on soil issues, not on the spatial and the urban development ones. The outputs produced in national languages are even more difficult to identify, as they may not always be on the public side of projects´ web pages and a search on the local partners´ webs may be needed. So far, the Local Contact Points of various programs do not have any duty to provide web sites for their projects outputs, which can be sourced in local languages. The other issue is, that the outputs and information in respects of Brownfields and urban land development ages quickly, but unfortunately they do not age all in the same rate. A new comer to this field may not to realise that for example, the CABERNET project findings from the year 2006 are nearly all relevant and valid until today, where as the outputs of some other or later Brownfield projects, do not age so well and may be outdated even on the day they are posted on the web.

4 THE EXPERIENCE OF HINDSIGHT

Experience shows that the structure of the project partnership is important. When the lead partner has sufficient experience and partners know each other from the past, the matters usually run much smoother. Firstly, the project is conceived on a more balanced way, where all partners contribute, and not on bases that partners are being invited to a more or less "baked cake". Secondly, individual partners can more influence outputs which would be advantageous to be produced in their national languages and have more time to approach suitable local associated partners for projects outputs dissemination. But large partnerships (above 12 partners) also limit partners direct input into the scope of a project. The aim of any partnership should be to work together to the contracted goals, share knowledge and findings and add transnational value to such cooperation. But sometimes it is difficult to balance contributions from various partners, especially, when considering partners (and also countries) levels of subject expertise, technological standards or limits of local legal frameworks, policy, institutional capacity and modes of operation. Partners which are new comers to the subject, may feel lost, whereas the expert partners, especially when participating on non-research focused programs, may feel frustrated, because in these non-research programs, the experts position offers relatively a low value to such partner own expertise expansion. It is often much better for an expert partner to enter a project with a subject, which only relates to the partner´s key expertise, because in such a case his benefits from project participation are much more substantial (this applies not only to Brownfield projects). Some motivation from programmes to encourage top expertise partners in non-research projects is needed.

5 RECOMMENDATION HOW TO START ADDRESSING THE BROWNFIELD ISSUE

In Central and the Eastern European countries, the spatial and urban context of Brownfields has to be acknowledged at all governance levels. This is in order to drive and improve Brownfields´ regeneration chances and aim for more sustainable land use practices. Channelling public funding into Brownfield research and education drives such country knowledge and helps to develop understanding for necessary changes in national policy and legal framework. Defining, identifying and mapping Brownfield sites attracts stakeholders, investors and public interest to Brownfield regeneration and allows for integrating Brownfields into the existing urban context and local spatial and development planning. Data availability also helps to understand and identify likely development potential of local Brownfields and their realistic chances for any meaningful reuse. Understanding of Brownfield sites volumes, typologies and their redevelopment potential enables governments, regions and municipalities to formulate public programme interventions (perhaps also dedicate some soft and hard funding) which can help Brownfield regeneration, or can mitigate the impact of undevelopable Brownfields. Balancing the use of Brownfields and the Greenfields, creating job opportunities, strengthening local communities and preservation of historical heritage are just few examples how Brownfields can be integrated and reflected into local or regional policy and planning regimes.

6 REFERENCES

http://www.sario.sk/ (last accessed 15.1.2013)
http://siteresources.worldbank.org/INTURBANDEVELOPMENT/Resources/brownfields.pdf?resourceurlname=brownfields.pdf (last accessed 15.1.2013)
http://www.eukn.org/Romania/ro_en/E_library/Urban_Policy/Development_and_Urban_Policy_in_Romania (last accessed 15.1.2013)
http://www.timbre-project.eu/ (last accessed 15.1.2013)

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[12] http://eusoils.jrc.ec.europa.eu/data.html (last accessed 15.1.2013)

Cadastral Feedback on Spatial Planning

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1 ABSTRACT

Spatial planning shall guarantee that the limited resource land is used efficiently. One problem connected to such a task is the control of the result's quality. In case of spatial planning the question is, whether the proposed usage and the legal framework requirements actually fit the needs of the society. A problem in such an assessment is the time frame. Planning of concrete situations, e.g., of a large bus stop, is implemented quickly and thus feedback can be collected by the people who were doing the planning. The results on strategic development plans, however, may take decades to become visible and thus it is difficult to learn from mistakes or find examples where the planning was successfully implemented.

In this paper we propose using the cadastre as a source for feedback on spatial planning. The idea is that the cadastre contains all data to show the effects of spatial planning. However, it does so in a way that is not supporting any feedback. The cadastral data must be rearranged in order to extract the effects of spatial planning. We discuss the information hidden in the cadastral data sets and show some directions for implementation issues.

2 INTRODUCION

Land is a limited resource and as such has to be used efficiently and sustainably. The goal of spatial planning is to optimize the utilization of land. This requires a balance between two contradicting goals: To guarantee the prosperity of society and to preserve the beauty of the natural environment for future generations. However, achieving this goal is not simple (compare Laistner & Laistner, 2012) and feedback is necessary to improve the planning procedures. In order to assess the quality of spatial planning, different measures can be taken. Faludi, for example, only discusses strategic plans, which he sees as coordination efforts between project plans. He argues that the quality of strategic plans can only be measured by their performance in subsequent communication processes and not by the conformity of the outcome with the intentions (Faludi, 2000). The difficulties of such an approach are visible when trying to define concepts, e.g., the notion of the "quality of life" (Ryser, 2011). Receiving feedback directly is essential and although the evaluation of Internet questionnaires can produce interesting insights (compare Pešek, Fialová, & Špačková, 2012), the process of questionnaire development is not trivial, the methodology only works if Internet access is available and will not produce an unbiased sample. Thus a different method to obtain feedback is necessary. The main idea is that the effects of spatial planning will lead to changes in the spatial structure of rights. Observation of these changes is possible if adequate land administration is in place. In the paper we discuss the use of the cadastral maps and explore the boundaries of such an approach.

The goal of spatial planning can be split into two different categories: (i) determining the spatial distribution of different processes and (ii) analyzing the spatial distribution of objects to enable such processes (compare Navratil, 2006). The result of the first category is usually a map showing the intended use of land. Depending on the planning scale, this may be an overview to identify large regions, e.g., national parks, or large-scale maps representing detailed parameters, e.g., for new buildings. The result of the second category is an implementation—or at least guidelines for an implementation—to solve a practical problem.

3 LAND MANAGEMENT AND LAND ADMINISTRATION

Since land is a limited resource, its utilization has to be organized. Resource utilization is typically a part of management, which can be defined as the "organization and coordination of the activities of a business in order to achieve defined objectives" ("management," 2013). Land management is management of the resource land. It comprises various processes including land planning, land reform, land market control, etc. and defines land-related policies and strategies. The implementation of these policies and strategies requires base data on land. These data are provided by various organizations, which together establish land administration (Williamson, Enemark, Wallace, & Rajabifard, 2010, p. 5). The organizations involved in

land administrations may vary between countries, but the types of data are similar. The data describe geometrical, physical, and legal attributes of land. The types of data necessary are mainly defined by the key tasks of a cadastre. These tasks are (Creuzer, 2002, 2007)

- the registration of all real estate,
- the maintenance of base information, and
- the provision of secure land markets and property transactions.

Modern land administration systems have to adopt a multi-functional approach to meet the demands of society. Although differences are clearly visible between different countries, e.g., between Austria and Serbia (Mansberger et al., 2011), the society needs are similar worldwide. A separation between geometrical, legal, and economic description of pieces of land (usually called "parcels") is not compulsory but often visible. In Austria, for example, the cadastre provides the geometrical description, the land register ("Grundbuch") provides the legal description, and the economic description (the value of land) is missing. The reason in Austria is the difference between private land public law and the differences in the legal processes attached to these types of law. Dealing with both types in a single organization is more difficult than to have two organizations.

One of the problems of land administration is the changing needs of society. The original task of land administration was simply the documentation of the current status of land to support land taxation and land ownership protection. Today, land administration supports a wide variety of different tasks including agro-subsidies, environmental protection, and financial services (Muggenhuber, Navratil, Twaroch, & Mansberger, 2011). This requires more data on land than the original tasks. Each new task may require additional data sets leading to extensive data collection campaigns. A simple example would be a visibility analysis for new constructions (What is the area from which a new construction can be seen?) because it requires 3D data which is usually not included in 2D cadastral systems because it is not necessary (Navratil & Hackl, 2007). However, new demands of society may always lead to new elements in the cadastre, if the demands justify the additional expenses. In Austria, for example, the need of improved boundary reliability led to the implementation of a coordinate-based boundary cadastre.

4 ELEMENTS OF A CADASTRE

As mentioned before, a cadastre maintains administrative, legal, ownership, usage, and geometric information about land. Thus in a first step, pieces of land have to be defined such that the data can be attached to these pieces. The smallest spatial unit is typically the parcel and the data are either related to one parcel or a group of parcels. The cadastre defines the spatial extent for each parcel and assigns a unique identifier to each parcel. The cadastral processes must also guarantee that the parcels do not overlap and completely cover the area of the country, i.e., they do not allow for areas that are not part of any parcel. Ownership of land and other private rights on land are registered in Austria at the land register. The rights are registered for a specific land registration item. A list of parcels is connected to each item. Thus the rights have a defined spatial extent even if the pieces are not necessarily connected.

The cadastre maintains the cadastral map, a graphical representation of the parcel boundaries and some additional information. Additional information is, for example, the area and the postal address. The graphical representation is a set of lines representing the boundaries between the parcels. Depending on the jurisdiction, the quality of these lines and their legal status may differ but mapping proved to be a simple method to avoid inconsistencies in parcel boundary definitions. The graphical representation guarantees that overlapping parcels or gaps between parcels would be easily detected. The quality of the boundaries varies since the sources range from digitization of old maps to modern surveys and different surveying methods also result in different quality. The parcel boundaries are then used to determine the parcels. A parcel is the area surrounded by boundary lines. Each parcel is assigned a unique identifier. Austria, which is a rather small country, currently consists of approx. 12 Mill. parcels (Abart, Ernst, & Twaroch, 2011, p. 105). In order to avoid huge parcel identifiers in local processes, the cadastre is organized in almost 8000 small administrative units. Each of these administrative units has a unique identifier and the identifiers of the parcels only have to be unique within the administrative unit. Additional data shown in the cadastral maps are land use and some data for orientation. Names of important roads, for example, can be placed on the map. The same is true for major water bodies. In addition, the direction in which rivers and rivulets flow can

be indicated with an arrow. However, only the information on land use is compulsory. Land use may not be unique on a parcel. A parcel may, for example, consist of a house and the adjacent garden. These are two different land uses and thus the cadastre in Austria can separate different uses of land with a specific type of line, a land use separation. These allow for, for example, identifying buildings and their geometry even if the building is not a separate parcel.

Figure 1 shows an example of an Austrian cadastral map. It shows the parcels boundaries and the parcel identifiers. It also shows symbols representing the current land use and the outlines of buildings. However, neither correctness nor completeness is guaranteed for the buildings. The buildings do not have separate parcel numbers. Thus they are not parcels themselves but areas of the parcels with a different type of use.

Fig. 1: Sample from the Austrian cadastral map (data © BEV)

Since a cadastre shall reflect the real situation, the cadastre must be constantly adapted to the real situation. The geometry of the parcel may prohibit a special use of the land. If a parcel is too small, for example, the owner of the parcel has to buy adjacent land to place a building. Since buildings are not allowed to cross parcel boundaries, the owner must adjust the boundary or merge the parcels. A parcel may be split into two or more parcels, if the owner wants to sell a part of it. Thus, frequently, parcels are split up and merged and parcels boundaries are changed. All these changes must be documented in the cadastre. The principle of private-public-partnership was introduced in Austria and many other countries to fulfil this task, i.e., private surveyors perform the surveys and the public authority inserts the changes into the cadastral map. The communication between these two groups requires survey documents specifying the change. These documents contain the old and the new situation including some administrative information, e.g., the new areas of the changed parcels.

These survey documents are used to update the cadastral map whenever a change occurs. However, various errors may occur in the whole process of map update: Misplaced lines in the old or new situation of the survey document, misinterpretation of the land owner's intention by the surveyor, misinterpretation of the survey document by the cadastral authority, etc. Additionally, manual revisions of the cadastral maps were necessary when the maps were maintained in analog form because the carrier (paper or transparencies) were worn out by use. This created additional problems and resulted in a mismatch between the original measures taken in the field and the distances observed in the cadastral maps (compare Navratil, Hafner, & Jilin, 2010).

Thus it is essential to keep a register of all survey documents to be able to correct these errors. The survey documents are time stamped. These time stamps can be used to filter changes that occurred in a specific region since an arbitrary date. Assuming that all changes are documented and implemented correctly, this allows restoring the geometry of the cadastral map for any point in time since the first survey. A cadastral database that supports this type of query could be called a temporal cadastre.

Some data in the cadastre are easily observable, e.g., the outline of a building. Other data are difficult to observe. Land use is an example for this. Land use is a process but only a status is easy to be observed, e.g., the extent of a lake, the area where trees exist, or the position of a fence protecting grassland. However, this is only land cover and the boundaries between different types of land cover. Although there is a high correlation between specific types of land cover and land use (Ippoliti, Clementini, & Natali, 2012), difficulties will arise on a number of occasions. Grassland protected by a fence may be used as a garden, as a playground of a kindergarten, as a sports field (e.g., a golf course) or as a military training area. In order to determine the exact use, these processes have to be observed. This may be difficult because the processes will not take place constantly. Some evidence may be visible, though. Shape and extent of areas used as gardens are usually different from that of a golf course and military training areas are usually connected to a complex owned by the military. Thus in combination with land cover information, shape, size, and context can provide evidence for land use.

5 DETERMINATION OF LAND USE FROM THE SHAPE OF PARCELS

Changes in cadastral data are interrelated with spatial planning inasmuch changing the planned land use for a set of parcels can affect parcel boundaries: For example, areas fit for agricultural use have a different size than areas for industrial or residential use. A parcel with an area of 500m2 can be sufficiently large for residential areas because it allows the creation of a small building and still leaves some room for a garden. 500m2, however, are much too small for modern agricultural use because the advantages of modern machinery cannot be utilized. Changes in the spatial planning, thus, must have an effect on the cadastral geometry. However, spatial planning is an authoritative process initiated by the local administration whereas the change of cadastral boundaries is a privately organized process managed by the respective land owners. The land owners will react promptly to any change in spatial planning, if the change is in their advantage. Farmers, for example, can sell land profitably if

- the land lies in areas intended for residential use,
- their loss in productivity is small, and
- there are sufficient potential buyers to spike the prices.

This will become visible in the cadastral maps because a number of small parcels will be created. However, the farmers will not sell, if above conditions are not met and thus the geometry in shown in the cadastral map remains unchanged. Thus, the effect of spatial planning on the cadastral geometry reflects the concord between concepts developed by the administration and needs of land owners and the local society. The delay between change of spatial planning and changes in the cadastre can serve as a measure for concord.
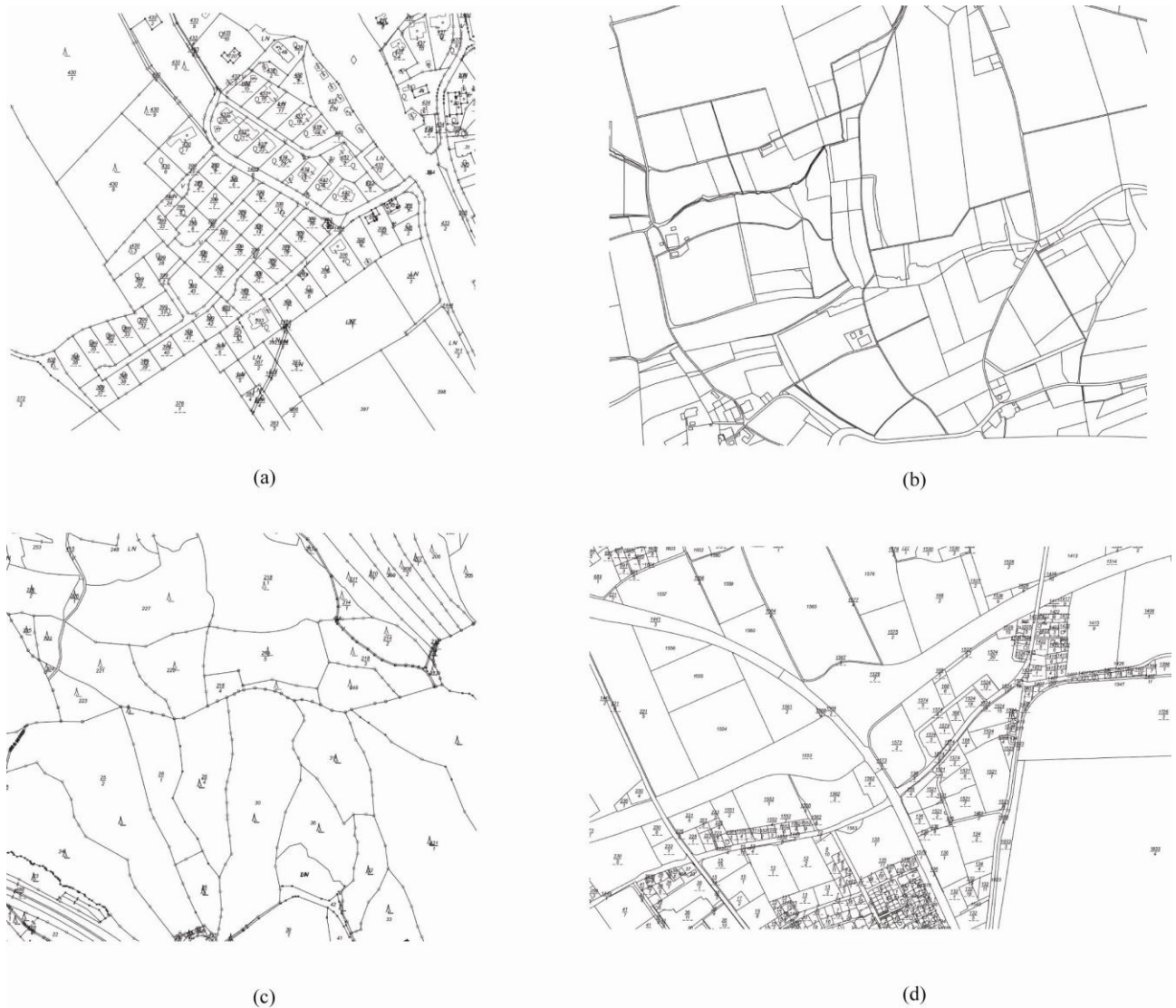
Fig. 2: Parcel patterns of four different types of land use: (a) residential area (b) agricultural area (c) forest (d) intersection between highway on-ramp (examples from DORIS, the Upper Austrian land information system)

Figure 2 shows different types of land use and how the land use affects the shape of the parcels. Residential areas (Figure 2a) are composed of small, parcels of similar size. Rectangular shape simplifies the construction of buildings and thus rectangular parcels are predominant. In city centers, the pattern may vary because high buildings require larger area and old road networks are rarely orthogonal. However, the land use in old city centers typically does not change much. Since all parcels must have access to the public road network, there is a dense network of roads in residential areas. Most of these roads will be quite narrow to restrict through traffic. Typical parcel width for these roads is in Austria 8m. Agricultural areas (Figure 2b) have a similar pattern than residential areas. However, the parcels are typically much larger and there are often rectangles with a large difference between length and width. In addition, the access to the agricultural areas is granted by narrow paths with a width between 3 and 4m in Austria. Therefore, the ratio between productive area and roads is different from that in residential areas. Forests (Figure 2c) may have parcels of similar size than agricultural areas. However, forests parcels have to consider topographical elements like ridges more than agricultural areas. The last example is constituted by traffic areas (Figure 2d), which consist of long, narrow parcels.

The development of a temporal cadastre to provide feedback for spatial planning requires different steps. The first step is providing the technical basis for such a system. This requires digitizing all survey documents, storing them in a computer system, and connecting them such that all necessary evaluations become possible. In a second step, it is necessary to be able to detect patterns related to spatial planning. It must be possible to automatically detect, for example, agricultural areas based on the geometrical characteristics. This step is more complicated than the first one because the characteristics will vary between countries and probably

even regions of the same country. There may also be a temporal component. Agricultural areas, for example, became much larger with the development of efficient machines because one farmer could handle much larger areas if they were arranged in pieces of suitable size. The third step is then to identify the lag between a change in the spatial planning documentation and its effect on the cadastral geometry. How long, for example, does it take for a new residential area to be used for living? The answer may vary for different areas and research can then concentrate on areas where concepts of spatial planning were implemented slower than average.

6 DATABASE ISSUES

In this section we present an overview of database issues that have to be addressed in order to enable the type of cadastral feedback for spatial planning we discussed above. More specifically, main challenges raised by the suggested approach are made explicit and an overall analysis of today's technologies that are better suited to tackle such challenges is carried out.

Any kind of spatial information system, including cadastre and spatial planning applications, typically relies on spatial database management systems (DBMS) in order to optimize data storage and retrieval. Any DBMS, in turn, implements one of a variety of theoretical data models, as well as a series of data access methods. Each data model is better suited for the treatment of a certain type of information (e.g., scalar, multi-dimensional, hierarchical) whereas requires cumbersome adaptations for the treatment of other types. Thus, it would be reasonable to think that, according to the type of information to treat, each application relies on the most appropriate data model. Unfortunately, because of historical reasons, this is not the case. Conversely, only one data model is predominantly used today: the relational data model (Codd, 1970). That is, the majority of cadastres and spatial planning applications relies on relational DBMS.

According to our previous analysis, two central features required to exploit cadastral feedback are: document storage and temporal support. Relational databases are not very well suited to implement these features. The documents that have to be treated can possibly be in either a paper-based or an electronic format. Moreover, since they come from different sources or authorities (or even from different time periods), they do not posses, in general, a common structure. This raises the following two issues: (i) as a first step, paper-based documents have to be digitized. But according to which structure? (ii) The second issue is related to the inefficiency of the relational data model to treat structureless data: relational databases usually store structureless data in a raw format as a so-called binary large object (BLOB). This is greatly inefficient in terms of both, storage space and retrieval time. Indeed, it is very hard to find and eliminate redundancies within this kind of data (storage inefficiency). Moreover, it is not possible to index (retrieval inefficiency) BLOBs in a meaningful way (i.e., according to the pieces of information they contain) because of the unpredictability of their content.

Temporal support is also not provided natively by relational DBMS. A possibility in this case would be to resort to data warehousing: a design technique for relational databases that allows for designing the schema of the database in such a way that historical data can be maintained and analyzed efficiently.

An interesting alternative to the relational model is provided by document-oriented databases (Strauch, Sites, & Kriha, 2011, Chap. 5): non-relational databases whose functionalities are developed around an abstract definition of document. Such kind of database natively supports the management of unstructured or semi-structured data, allowing for optimality in data storage and retrieval. Two representative document-oriented databases are CouchDB (http://couchdb.apache.org/) and MongoDB (http://www.mongodb.org/). They both natively provides the requested temporal support: every time a document insertion, update, or deletion occurs, the database system does not change its state; rather a new state is created according to the issued action while the previous one is marked as obsolete (but not deleted). Because of their features, CouchDB and MongoDB are excellent candidates to keep trace of and analyze temporal changes.

7 CONCLUSIONS

It will not be possible to use this kind of feedback for all kinds of spatial planning activities. Nature protection areas, for example, will not show on cadastral maps because nature protection prohibits a wide range of activities. Most of the allowed activities do not produce much revenue for the land owner. This restricts the resources put into the development of land and optimizing the parcel shape is one of the development activities. Of course, this should not come as a surprise because it is the basic idea of nature

protection to restrict development activities. On the other hand, parcel boundaries may adapt to the shape of the nature protection zone and the zone itself may become visible.

An automatic system to detect land use can present areas where the changed land use is not implemented. This provides one source of feedback that spatial planners can use to optimize the utilization of land. It can also provide feedback in the opposite direction. Sometimes the assumptions under which spatial planning was working are not adequate. The economic and social situation of the regions next to Czechoslovakia, for example, changes significantly with the opening of the borders in 1989. Concepts of spatial planning had to be adapted to these changes and old concepts were maybe not optimal in the new context. However, if some of these outdated concepts were already implemented, how long does it take to correct these problems? A temporal cadastre could help addressing questions like that.

An automatic system can also be used as the bases for even more advanced analysis. Changes in spatial planning typically have an effect on land market. The classification of land as residential land, agricultural land etc. has a dramatic impact on the value of land. Thus, the land owners in some areas will benefit from the change, the owners in other areas will not. This leads to new questions, e.g., about compensation payments. However, a different question could also be who the persons are that profit most from a change in spatial planning. In general we can assume that from a statistical view all land owners will benefit equally from spatial planning. However, what happens if always a specific class of land owners profits? Such statistics can be produced automatically if sufficient data is available and the historic development can be modeled. The effect would be a more transparent system of spatial planning where (at least some) hidden agendas could become visible.

8   REFERENCES

Abart, G., Ernst, J., & Twaroch, C. (2011). Der Grenzkataster (p. 239). Graz, Austria: neuer wissenschaftlicher Verlag.

Codd, E. F. (1970). A Relational Model of Data for Large Shared Data Banks. Communicattions of the ACM, 13(6), 377–387. Retrieved from http://www.seas.upenn.edu/~zives/03f/cis550/codd.pdf

Creuzer, P. (2002). Co-ordination Initiatives for the Creation and the Updating of the Cadastre. 1st Cadastre Congress in the EU. Granada: eurocadastre. Retrieved from http://www.eurocadastre.org/pdf/creuzer.pdf

Creuzer, P. (2007). The UNECE Working Party on Land Administration – A Support to Good Governance. International Workshop on Good Land Administration – It's Role in the Economic Development. Ulaanbaatar, Mongolia: Administration of Land Affairs, Geodesy & Cartography.

Faludi, A. (2000). The Performance of Spatial Planning. Planning Practice and Research, 15(4), 299–318. doi:10.1080/713691907

Ippoliti, E., Clementini, E., & Natali, S. (2012). Automatic generation of land use maps from land cover maps. Proceedings of the AGILE'2012 International Conference on Geographic Information Science. Avignon, France.

Laistner, A., & Laistner, H. (2012). Sustainable Urban Development in Germany in the 1990s – a Situation Report after 20 Years. In M. Schrenk, V. V. Popovich, P. Zeile, & P. Elisei (Eds.), Proceedings REAL CORP 2012 (pp. 1397–1409). Schwechat, Austria: CORP. Retrieved from http://www.corp.at/archive/CORP2012_35.pdf

management. (2013).BusinessDictionary.com. Retrieved February 18, 2013, from http://www.businessdictionary.com/definition/management.html

Mansberger, R., Aleksic, I., Muggenhuber, G., Navratil, G., Tesla, N., & Twaroch, C. (2011). Land Administration Systems in Austria and Serbia: Current Tasks and Potentials. In D. Joksic (Ed.), 1st Serbian Geodetic Congress (pp. 122–129). Belgrade, Serbia: Republic Geodetic AUthority.

Muggenhuber, G., Navratil, G., Twaroch, C., & Mansberger, R. (2011). Development and Potentials for Improvements of the Austrian Land Administration System. FIG Working Week 2011 (p. 15). Marrakech, Morocco: FIG. Retrieved from http://www.fig.net/pub/fig2011/papers/ts07a/ts07a_muggenhuber_navratil_et_al_5112.pdf

Navratil, G. (2006). Data Quality for Spatial Planning-An Ontological View. In M. Schrenk (Ed.), CORP 2006 & Geomultimedia06 (pp. 99–105). Vienna, Austria: CORP. Retrieved from http://www.corp.at/archive/CORP2006_NAVRATIL.pdf

Navratil, G., & Hackl, M. (2007). 3D-Kataster. In M. Schrenk, V. V. Popovich, & J. Benedikt (Eds.), CORP 2007 & Geomultimedia07 (pp. 621–628). Vienna, Austria: CORP.

Navratil, G., Hafner, J., & Jilin, D. (2010). ACCURACY DETERMINATION FOR THE AUSTRIAN DIGITAL CADASTRAL MAP (DKM). In D. Medak, B. Pribicevic, & J. Delak (Eds.), Fourth Croatian Congress on Cadastre (pp. 171–181). Zagreb, Croatia: Croatian Geodetic Society.

Pešek, D., Fialová, B., & Špačková, E. (2012). Feedback for Urban Planning and Solutions. In M. Schrenk, V. V. Popovich, P. Zeile, & P. Elisei (Eds.), Proceedings REAL CORP 2012 (pp. 1201–1206). Schwechat, Austria: CORP. Retrieved from http://www.corp.at/archive/CORP2012_174.pdf

Ryser, J. (2011). Whose Quality of Life? In What Kind of City? In M. Schrenk, V. V. Popovich, & P. Zeile (Eds.), Proceedings REAL CORP 2011 (pp. 1163–1168). Essen, Germany: CORP. Retrieved from http://www.corp.at/archive/CORP2011_22.pdf

Strauch, C., Sites, U. L. S., & Kriha, W. (2011). NoSQL databases. Stuttgart, Germany.

Williamson, I., Enemark, S., Wallace, J., & Rajabifard, A. (2010). Land Administration for Sustainable Development (p. 487). Redlands, CA: ESRI Press.

Cellular Automata Approach for Medium Sized Cities

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1 ABSTRACT

We show how small to medium sized cities can make use of the Cellular Automata (CA) approach to integrate land use data and other GIS based data with inter-active long-term scenario evaluation. Our CA model illustrates the interdependency between transport infrastructure supply and population density. It can be used to generate maps of future land use patterns for potential future scenarios. It provides a fast and economical way to compare alternative strategic plans and development rules for a small to medium sized city. For our sample town, Austria's second largest city Graz, we develop three different long-term scenarios (fast population growth, slow population growth, and urban sprawl scenario in which population growth is concentrated in the suburban areas). The model output for each scenario can then be used as input for infrastructure planning procedures. We illustrate some examples: the graphic representation of the spatially differentiated structure of the population, ex-ante public transport infrastructure evaluation, evaluation of existing zoning rules, and the evaluation of infrastructure capacities by combining the model outcomes with capacity calculations for the public sewage system.

2 INTRODUCTION

The starting point of our Cellular Automata model is the Corine Land Cover (CLC) Project (2006) which is used to represent the current situation of land use within the city limits of Graz and also provides us with the cells of the dimension 100m x 100m that serve as the individual building blocks of our Cellular Automata model. Using this structure we develop a Cellular Automata model that illustrates settlement activity within the city limits of Graz for each year until 2050. This is done for three different scenarios which illustrate a broad spectrum of possible future developments of the city until 2050. We feed each of these alternative scenarios into the model, combine it with future population predictions, and let it run for 44 periods, where each period represents one year. The model output then illustrates settlement activity within the city limits of Graz until 2050 in the case this particular scenario occurred.

We choose a broad variety of different scenarios to illustrate the scope of our model's possibilities. The first two of these scenarios are based on extrapolations of current trends of population growth (one illustrating a fast growth scenario and the other one a slow growth scenario). The third scenario deals with the issue of urban sprawl.

The model output for each scenario can then be combined with a variety of infrastructure applications to estimate likely future needs and to check in which way capacities of the current (public) infrastructure would need to be expanded. For example we look at where new public transport routes would be necessary, we check whether the current sewage pipe system would be adequate for the city of Graz under each of the three scenarios. By comparing the model output with actual zoning rules we can pinpoint areas that experience too much population pressure as well as those areas that have free capacities for densification. By highlighting areas with potential for further improvement the model can help city planners to locate areas that would benefit from an improvement in public infrastructure (which in turn would increase their attractiveness for development in the model and in reality). The model could also be used to find the optimal future locations for kindergartens, schools, shopping facilities and other infrastructure needs.

In this paper we show how our CA model can be used by city planners to better understand the structure and dynamics of their city as well as its infrastructure limitations. This should be helpful for long term planning of zoning regulations, public infrastructure such as public transport services, the dimensions of sewage systems to name but a few.

3 MODEL

3.1 Model Structure

The basic structure of our model consists of four parts: the cells, their states, their neighbourhoods, and the transition rules that regulate how cells can change their state through influence of their neighbourhood.

We choose the model's cell structure to coincide with the grid structure of the Corine Land Cover Plan 2006 (European Environment Agency, 2010). This provides us with a two dimensional representation of Graz that consists of 12,762 grid cells with dimension 100 by 100 meters. The possible states of the model were defined by us and are based on the Corine land use classes which were combined with population data. The Corine Land Cover Project allocates to each cell one of potentially 42 different land cover classifications. 12 of these land cover types are represented within the city limits of Graz. The actual population data for Graz is available at census district level ("Zählsprengel") of which there are 259 within the city limits of Graz. We define the neighbourhood of a cell as the 8 cells surrounding the cell itself. The transition rules are more complicated as they depend on more than one factor. We concentrate on the transition of unpopulated cells into populated ones. For an agriculturally classified cell to be converted into building land it has to be surrounded by at least 4 populated cells. The likelihood with which a cell attracts population is then dependent on two factors: one is the proximity to the city centre, the other is the distance to public transport stops.

The distance to the city centre is important as Graz is a traditional city that is structured in a way similar to the monocentric city model (Alonso (1960, 1964), Mills (1967) and Muth (1969)). Most jobs are located in the central part of Graz and there is a central transit place in the city center ("Jakominiplatz") where all public transport routes of the city meet. To illustrate this situation we divide the city into three distinct areas by introducing two concentric circles around city centre (with a 1500m and 3000m radius). For the cells in these areas we assume different possibilities of development (transition probabilities). The levels of these relative probabilities are found by solving a linear optimization problem. A graphic illustration is given in Figure 1.
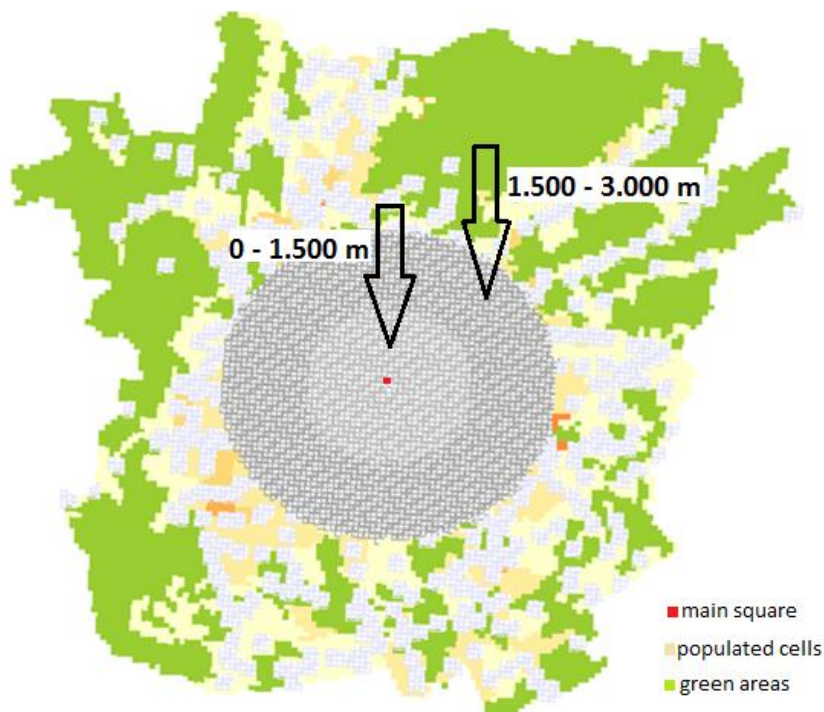
Fig. 1: Graz divided into three main areas.

3.2 Data

The following data inputs have been used in this model:

- Public transport stops (busses and trams) with GIS representation

- Coordinates of River Mur

- Distance of all cells to city centre (main square)

- All major roads out of the city centre with GIS representation

- Population density data comes from the 259 political "Zählsprengel" of the city of Graz 2006 – 2011 (Magristrat Graz, 2012). Apart from the number of people living in each census district this data set also contains age, citizenship, and whether the residency is used as a main or secondary residency ("Haupt/Nebenwohnsitz"). These population numbers are then divided up between all cells that lie within CLC classes 1 or 2 (urban fabric and discontinuous urban fabric respectively) within that "Zählsprengel" (census district). CLC class 1 (continuous urban fabric) receives four times as many people as CLC class 2 (discontinuous urban fabric).

- Corine Land Cover data from 2006 (version 13: 02/2010) with GIS representation

These data are presented in grid cells of 100m x 100m. We cut out the boundaries of the city of Graz from this data set. 12 of the 42 land cover types used in the Corine Land Cover data set occur within the city limits of Graz. Corine Land Cover class 1 and 2 are "town", which are defined as continuous urban fabric and discontinuous urban fabric respectively. In our Graz data set we have 573 cells with CLC class 1 and 6,241 cells with CLC class 2. The total city area consists of 12,762 cells. Thus, according to the Corine Land Cover data 53 % of the area of the city is covered by populated "built-up" area.

3.3 Scenarios

One of the greatest advantages of modelling urban development with a CA model is the relative ease and economic efficiency with which different scenarios can be "played through". To develop the individual scenarios we have focused on existing trends that are discussed in the local media as well as future infrastructure decisions that are currently discussed by the local municipality. These scenarios are sample inputs – we can easily combine the model with other statistics or incorporate other scenarios that city planners are interested in. We will illustrate three different scenarios here. Each scenario has its own probabilities of change associated with it. These probabilities were obtained by solving a linear optimization problem. Wherever possible we included past population trends in this optimization process.

The following scenarios have been considered so far:

Scenario 1	Fast population growth
Scenario 2	Slow population growth
Scenario 3	Population growth focused on suburban areas

Table 1: Characterisation of the three scenarios.

Scenario 1 assumes an extreme increase in population until 2050. In this scenario we take the predicted population numbers for "Greater Graz" area (Landesstatistik Steiermark, 2010) and allocate them all into the city area. The point of this excersise is to see how the city's infrastructure would cope under this extreme scenario.

Scenario 2 is the most realistic scenario. It is based on a demographic study by ÖROK (2004) for the individual districts of Graz until the year 2031. For the period 2032 – 2050 we use our own extrapolations of these numbers.

Scenario 3 shares the population numbers with scenario 2 – but now we assume that because of socio-economic preference changes additional population is mainly locating in the outer areas of the city.

Figure 2 illustrates the starting situation of land use classes and cell level population density in 2006. Figure 3 shows the outputs of scenarios "fast growth" and "urban sprawl" for 2050 (after 44 model sequences).
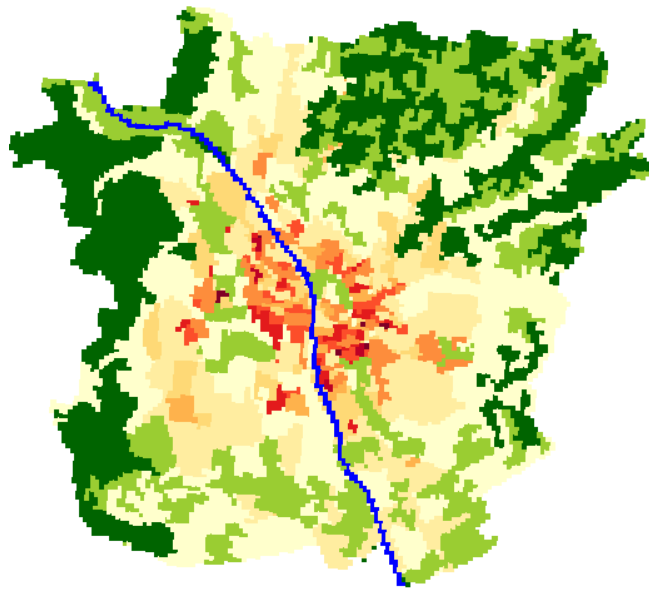
Fig. 2: Land use and population density at cell level in 2006.
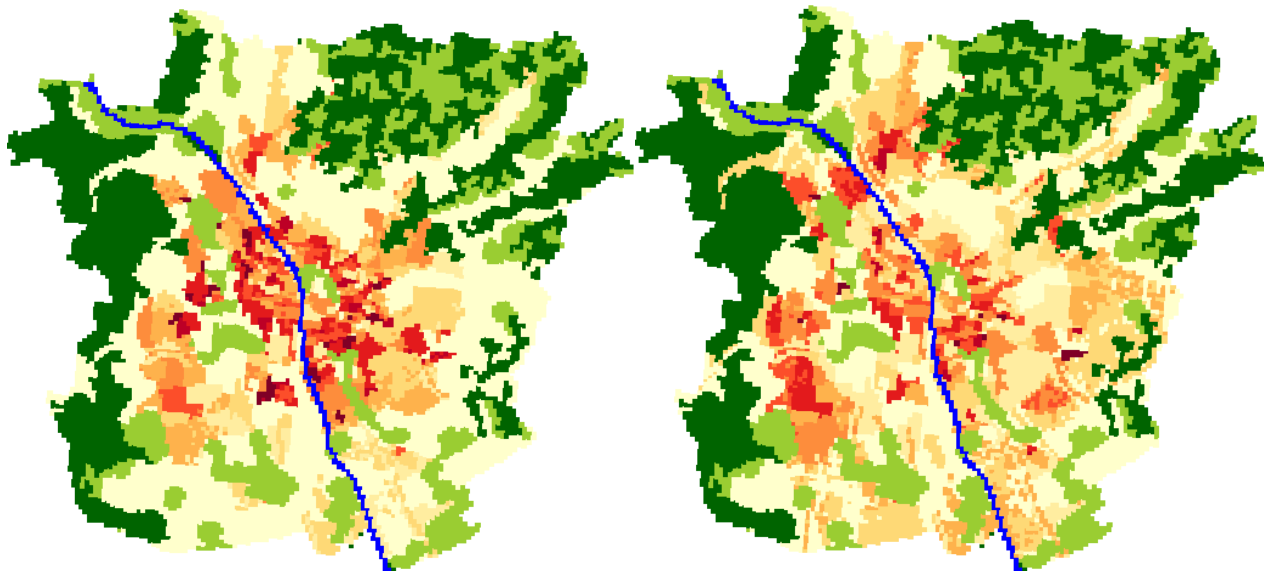
Fig. 3: Land use and population for the year 2050 for scenario "fast growth" (left) and scenario "urban sprawl" (right).

4 APPLICATIONS

4.1 Ex-post building density evaluation

The zoning plan is the main instrument with which the city's future shape and structure are influenced. The city of Graz has set maximum as well as minimum building densities per square meter building block via their zoning plan (see 3.0 Flächenwidmungsplan Graz, 2002). The official building densities differ quite substantially within the city of Graz. While the inner city area has building densities of up to 2.5 the outer areas generally have maximum building densities around 0.3 or 0.4 and a minimum building density of 0.2 (compare 3.0 Flächenwidmungsplan Graz, 2002). For example, a maximum building density of 0.4 implies that on a 1,000 square meter plot a building can have a maximum living space of 400 square meters. If a minimum building density of 0.2 applies to this plot, then the building needs to have at least 200 square meters of living space. Thus, the legal building densities are given as proportions to the actual land area. These legal requirements expressed in the zoning plan of the city of Graz is available in GIS format and can be incorporated into our model.

Ex-post we can compare how the various scenario predictions of the CA model correspond with these politically set boundaries for building density. The CA model can thus highlight "pressure point" areas where the model predicts a higher building density than the city currently allows. On the other hand it can

also highlight those areas where the model predictions do not reach the minimum density levels. These areas are areas with potential for "densification".

There are no legal restrictions on the population density per square meter. However, we know that the average living space per person in Austria is 42 m² (Lugger, 2002). We use this number to calculate the maximum average population density for each cell (per rata). If a cell consists of two or more zoning classes with different upper and lower building density limits we calculate the proportional average building density rules and use those.

With this information we calculate an average statistical "upper population boundary" per cell which can then be compared with the results of the various simulations of the CA model. This gives us an indication of whether there are population pressures in certain areas. However, the excess population of a cell does not per se mean that the building requirements are violated – as mentioned before a larger than the average number of people can live in one place. But it is an indication that more people want to live in that area than foreseen by the zoning plan.

In this situation city planners have two fundamental choices: They can keep the existing zoning regulations. In this case a cell once "full" will not take on any more buildings or population and the population that feels attracted by this cell will choose a cell with similar attributes. This movement of course illustrates the issue of "urban sprawl". Another possible action plan of city planners in this situation is to loosen the building density restrictions. This will lead to more densely populated cells and a lower degree of urban sprawl as before. This situation illustrates how city planners can influence the future shape of a city through the design of the zoning rules. Both cases can easily be incorporated into our CA model and thus illustrate the long-term consequences of zoning regulations.

The red cells in Figure 4 mark the areas which would require an increase in building densities. On the other hand, the yellow cells in the graph below show those cells that do not reach the minimum building density if each person allocated to those cells uses 42 square meters of living space. Orange cells indicate those areas where the statistically average living space of the allocated people lie within the range set by the present zoning plan.
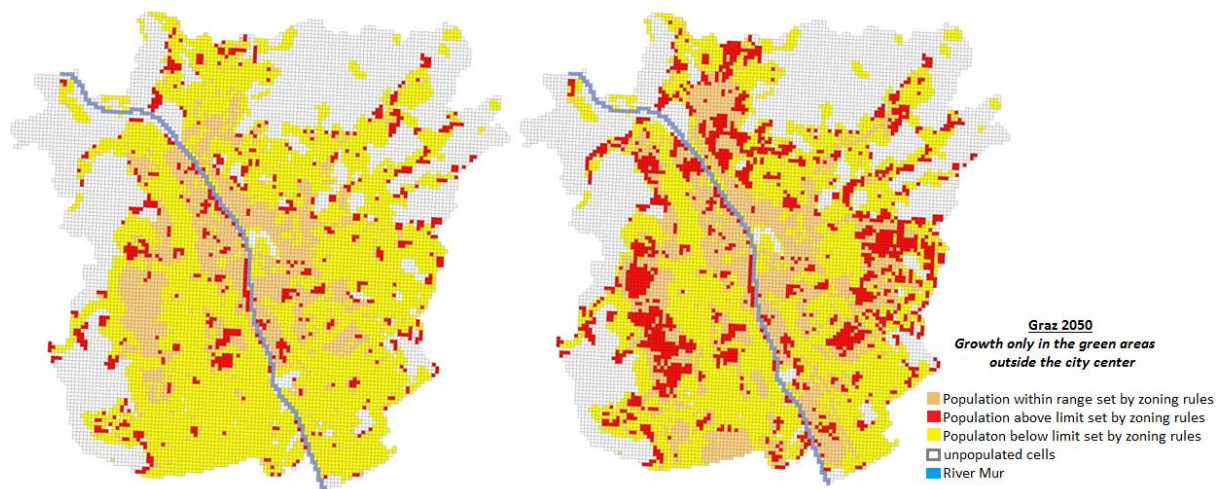
Fig. 4: Density and zoning rules 2006 (left) and 2050 – scenario "urban sprawl" (right).

We see that in 2006 there still is a lot of potential for densification in the outer areas of the city according to our calculations. If we contrast this picture with the figure of the sprawling scenario for 2050 we see that a large proportion of this potential has been used up by then.

4.2 Dynamic transport stops

An inherent question in urban economics is whether people move into an area because of good public infrastructure, or whether good infrastructure is provided wherever there is population that demands it. While our CA model cannot be used to address the causality issue per se, we can use the model to illustrate influences both ways.

If sufficient population grow exists in a particular area we can for example set new public transport stops. In the example below we stopped the model in certain time intervals and checked for the "need" of new transport stops. We followed the rule that a new public transport stop was created if considerable population growth existed within the area and the distance to the next public transport stop was larger than 375 meters. The arrows in Figure 5 indicate the new public transport stops that would be necessary to provide adequate access for the growing population. In this example the number of new stops was quite low however, because of the already very dense public transport net of the city of Graz. Of course, the additional transport stops will improve the attractiveness of the cells within this area, which will then change the probability of additional population being attracted into this area. Thus the model output for the year 2050 will be different to the original situation.

Because of the already very dense public transport system within the city limits, the population results do not differ very substantially from the original model. This example does however provide an illustration of how new public transport opportunities will attract new settlements. In a similar way entire new transit routes could be incorporated into the model to illustrate how these would influence future urban development.
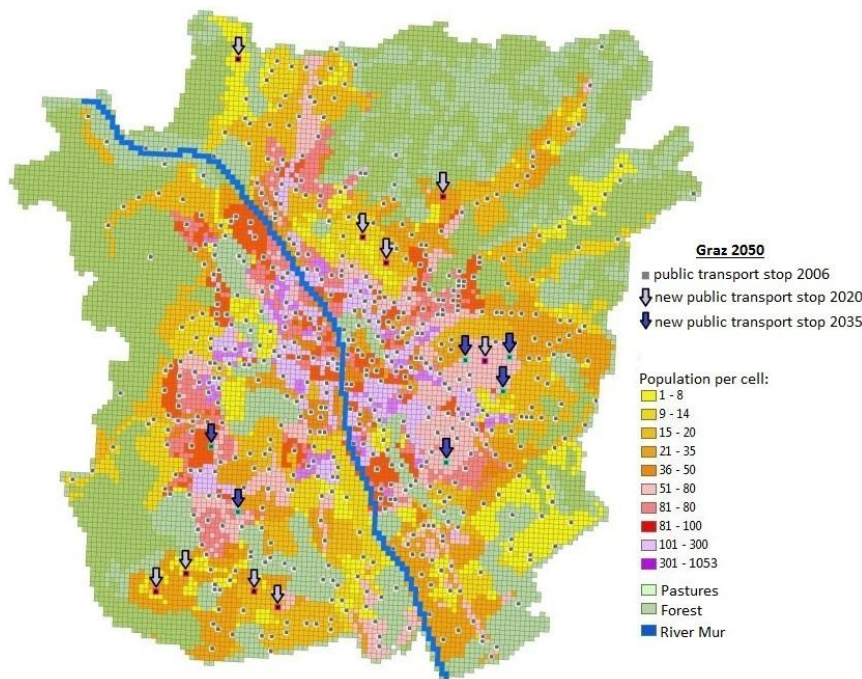
Fig. 5: Dynamically set transport stops 2050 – scenario "fast growth".

4.3 Sewage system checks

Figure 6 is an illustration how the scenario model output can be combined with the existing sewage system of a city. Again we illustrate how our model can be used as a tool to evaluate future needs. The intuitive graphic representation helps in the visualisation of potential problem areas. The GIS based output can also be incorporated into existing infrastructure systems.

For strategic points of interest for each of the three scenario outputs we can calculate whether the capacities of the sewage system are sufficient to meet potential future demands. These calculations can be useful to illustrate bottle-necks in the sewage system, to highlight needs for pipe expansion, or to illustrate the need to restrict future settlement by limiting additional population growth in certain areas via zoning rules.

For two reasons we concentrate on pipe diameters of more than 800mm. First, the bigger pipes illustrate the overall capacities of the sewage system which cannot be altered as easily as the more regional smaller pipes. Another reason is that the CA grid size of 100m x 100m is too coarse to allocate smaller pipes accurately. To illustrate our method we consider the scenario of "fast growth" and check how the existing pipes would handle the scenario needs for the year 2050.
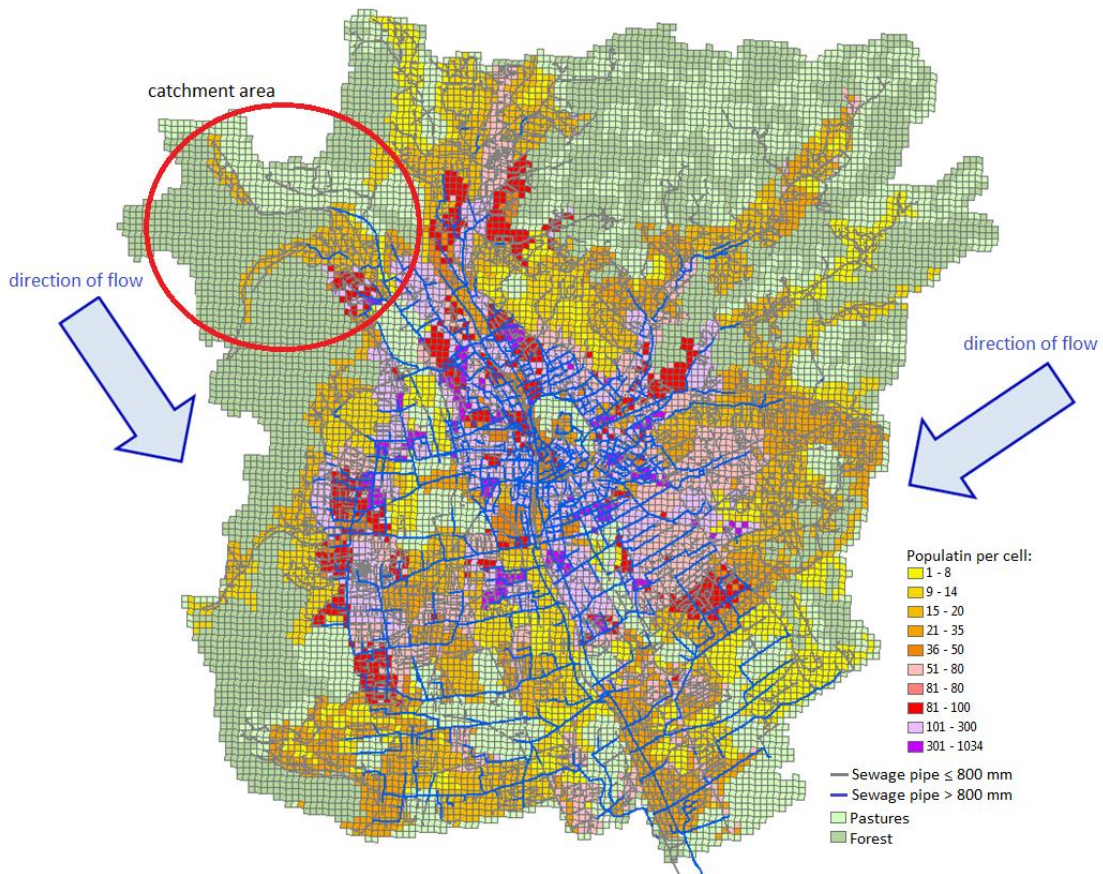
Fig. 6: Sewage system 2050 – scenario "fast growth".
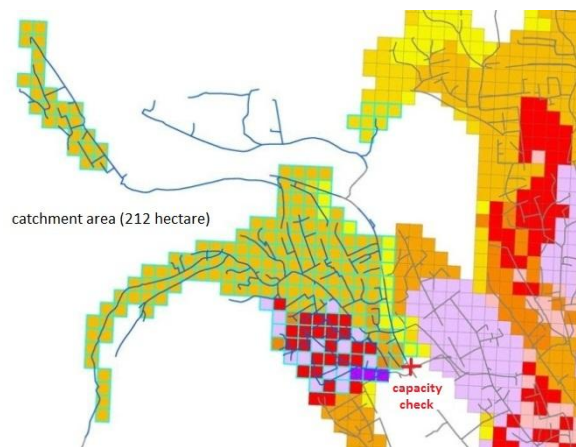
Fig. 7: North-West segment of sewage system 2050 – scenario "fast growth".

We calculate the sewage output of the catchment area by multiplying the simulated population numbers of the cells in the catchment area with the per capita sewage assessment values for the city of Graz (details can be found at the webpage of Holding Graz, 2013). We calculate maximum pipe capacities with the help of the Hazen-Williams formula, which is often used for the design of pipe systems with larger diameters (Bobardelli und Garcia, 2003), the "90 % rule", and the average European conversion factor (which lies at 0.849). For this specific area we find that the pipe diameters are large enough to handle all three of the scenario situations.

5 CONCLUSION

The last decade has seen a surge of GIS data sources becoming available to city planners. Because of its two dimensional model representation via grid cells, Cellular Automata models provide a natural framework within which GIS data can be represented. The CA model we develop in this paper is useful for city planners because it provides an intuitive, fast, and economical representation of alternative scenarios.

By comparing the outcome of the model with the zoning rules of the city of Graz we can highlight areas with potential for densification as well as areas with intense population pressure.

We have shown three different potentially possible scenarios for the future expansion and population structure of the city of Graz. Each of these scenarios is associated with different infrastructure needs. These infrastructure needs can then be assessed by integrating additional layers into the model or by exporting the model scenarios and assessing them with traditional methods.

There is a long list of potential extensions for the model. We have already made some progress in the inclusion of sewage systems and we will tackle the optimal allocation of elementary schools in a next step. The strategic setting of new commercial infrastructure locations (e.g. super market locations) is a further potential extension.

6 REFERENCES

ALONSO, W: "A theory of the urban land market", Papers and Proceedings of the Regional Science Association, Vol. 6, 149-158, 1960.

ALONSO, W: "Location and land use", Cambridge, Mass.: Harvard University Press, 1964.

BOMBARDELLI, Fabian A.; GARCIA, Marcelo, H.: "Hydraulic Design of Large-Diameter Pipes", Journal of Hydraulic Engeneering © ASCE, pp. 839-846, 2003.

European Environment Agency: Corine Land Cover Project 2006, Version 13, http://www.eea.europa.eu/data-and-maps/data/corine-land-cover-2006-raster, 2010.

Flächenwidmungsplan 3.0: http://gis.graz.at/cms/ziel/1138240/DE/ , Graz, 2002.

Graz Holding: http://www.holding-graz.at/wasserwirtschaft/wissenswertes/wasserverbrauch.html , accessed 24.01.2013.

Landesstatistik Steiermark: "Regionale Bevölkerungsprognose Steiermark 2009/2010 – Bundesland, Bezirke, Gemeinden", Heft 13/2010, 2010.

LUGGER, K.: "Österreichisches Wohnhandbuch 2010", Studienverlag Innsbruck, Wien, Bozen, 2010.

Magistrat Graz: "Bevölkerungsprognose für die Landeshauptstadt Graz, 2012-2031", Präsidialabteilung Magistrat Graz, Referat für Statistik, http://www.graz.at/statistik, 2012.

MÜLLER, Daniela, KÖNIG, Reinhard. "Simulation der Siedlungsentwicklung der Stadt Wien von 1888 -2001". Forschungsprojekt gefördert durch die Hochschuljubiläumsstiftung der Stadt Wien, MA 8, 2008.

MILLS, E.: "An aggregative model of resource allocation in a metropolitan area", American Economic Review, Vol. 57, pp.197-210, 1967.

MUTH, R.: "Cities and Housing", Chicago, University of Chicago Press, 1969.

ÖROK: "ÖROK-Prognosen 2001-2031: Bevölkerung und Arbeitskräfte nach Regionen und Bezirken Österreichs", ÖROK Schriftenreihe Nr. 166/I, Österreichische Raumordnungskonferenz, Wien, 2004.

Regelblätter des Österreichischen Wasser- und Abfallwirtschaftsverbandes: "Richtlinien für die abwassertechniche Berechnung und Dimensionierung von Abwasserkanälen", ÖWAV-Regelblatt 11 2., vollständig überarbeiteter Entwurf (Stand 02.06.2008), Vertrieb: ON Österreichisches Normungsinstitut, A-1020 Wien, Heinestrasse 38, 2008.

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CG Mixed Reality Architectural Workspace

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Fig. 1: Entwurf und Simulation in einer Realtime-3D-Anwendung mit „Natural Interface"

1 ABSTRACT

Gestalten Sie ihr Einfamilienhaus in Echtzeit-3D! Diese Forschungsarbeit beschäftigt sich mit der Umsetzung eines computergestützten Mixed Reality Präsentationssystems für die Firma Haslerhaus GmbH. & Co KG. Realisiert wurde dieses System mit Unity in einem Kommerz MRI Framework. Das System besitzt zur Zeit zwei wesentliche Komponenten: (A) einen virtuellen Baukasten zur Bemusterung und (B) eine Echtzeit-Simulationsoberfläche mit virtuellem 3D-Walk-Through und einer integrierten Sonnenstandssimulation. Vergleichbare Entwicklungen von Collaborative Virtual Environments (CVE) nennen Ponto, Doerr, Wypych, Kooker und Kuester (2011), Künz, Dontschewa und Weber (2007), Tizani (2011), Peña-Mora, Golparvar-Fard, Aziz und Roh (2011), Yabuki (2011), Yi-Luen Do (2011) und nicht zuletzt Ren und Tang (2011). Im Mittelpunkt dieser Arbeit steht die Fragestellung, in wie weit der herkömmliche Entwurfsprozess durch interaktive computergestützte Werkzeuge verbessert werden kann. Der hier präsentierte CG Mixed Reality Architectural Workspace vereinfacht den Entwurfsprozess durch eine evolutionäre, iterative Vorgehensweise, kombiniert mit einem benutzerfreundlichen, intuitiven Interface.

Der traditionelle Entwurf entsteht in einer Reihe von Iterationsschritten in verschiedenen Medien (Gespräch, Skizze, CAD-Planung und manuelle Korrekturen). Das hier vorliegende Modell (Realtime 3D-Anwendung mit „Natural Interface") bildet eine gemeinsame digitale Plattform, kann ohne spezielle CAD-Kenntnisse bedient werden, reduziert die Medienvielfalt, vereinfacht die Benutzerinteraktion und macht den Entwurf unmittelbar erlebbar. Mehrere iterative Entwurfsschritte können so in kürzerer Zeit erfolgen. Umgesetzt wurde dieses Projekt mit der 3D-Echtzeit-Engine Unity, integriert in ein Mixed-Reality-Interface. Momentan existiert das System als Mixed-Reality-Installation mit optischem Tracking. Die MRI Plattform erlaubt aber auch, unterschiedlichste Hard- und Software gemeinsam einzubinden. Interessant erscheinen dabei Kombinationen eines 3D-Walkthrough über optische Marker und die simultane Sonnenstandssimulation über einen Tablet-PC. Vorteilhaft gegenüber anderen Entwicklungen ist die einfache Verständlichkeit auch für ungeübte Benutzer und die intuitive Bedienbarkeit über optische Marker. Im Endergebnis generiert das System auch einen personalisierten Prospekt mit selbst entworfenen Hausvarianten. Zukünftig denkbar wäre die Erweiterung des virtuellen Baukastens und des Simulationstools zu einem umfassenden Werkzeug für den interaktiven Echtzeit-Entwurf. Dieses Paket würde in dieser erweiterten Form die Entwicklung des Raumprogramms unterstützen, aber auch die Möblierung, Beleuchtung, die gesamte Innenraumgestaltung und die nachfolgende Simulation.

2 VIRTUAL ENVIRONMENTS – RAUM, ZEIT UND ORGANISATION

2.1 Genereller Aufbau von Collaborative Virtual Environments (CVE)

Ausführlich beschreibt Maher [2011] die Einbettung virtueller Werkzeuge in den Gestaltungsprozess und die daran beteiligten Elemente. Als grundlegendes Charakteristikum virtueller Ambiente sieht sie den Kommunikationsprozess im Mittelpunkt, der nun oft non-lokal, über digitale Medien abgewickelt und gesteuert wird. Maher legt den Schwerpunkt der Bewertung eines CVE auf kommunikative und koordinierende Aufgaben und entwickelt sechs Anforderungen:

- Managing collaborative design processes
- What you see is what I see (WYSIWIS)
- Chance meetings
- Peripheral awareness
- Non-verbal communications
- Designing for two worlds (digital and physical)

Sie nennt vor allem die Gleichwertigkeit der gezeigten Information auf beiden Seiten (WYSIWIS), die Möglichkeit informeller virtueller Treffen (Chance meetings), die Transparenz der Aktivitäten der jeweils anderen Partner (Peripheral awareness), non-verbale Dinge transportieren zu können und die Ausgewogenheit von digitaler und physischer Welt. Sie beschreibt aber auch die wesentlichen Elemente eines CVE. Von diesen Annahmen ausgehend, wird hier folgendes grundlegendes Schema eines CVE entwickelt:
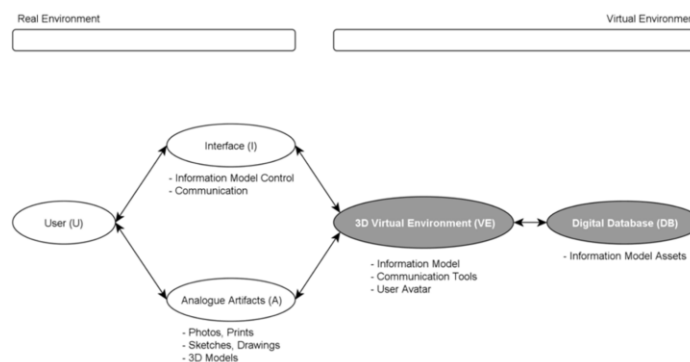
Fig. 2: Genereller Aufbau eines Collaborative Virtual Environments (CVE)

Im Zentrum des CVE steht ein digitales Informationsmodell, oft auch als dreidimensionales Virtual Environment (VE), das den eigentlichen Arbeitsraum bietet und den Gegenstand der Gestaltung abbildet. Das CVE sollte aber auch über Kommunikationswerkzeuge verfügen, oft existieren dort auch Avatare, als eine digitale Repräsentation der Nutzer. Eine digitale Datenbank (DB) lagert alle Assets zur Gestaltung des Informationsmodells. Der oder die Nutzer (U) verfügen über den Zugriff zu einem digitalen Interface (I), das die Steuerung des Informationsmodells ermöglicht, aber auch Kommunikationswerkzeuge anbietet. Parallel dazu hat der Nutzer Zugriff auf analoge Arbeitsmaterialien und Artefakte (A). Vereinfacht erhalten wir daher folgendes Schema:
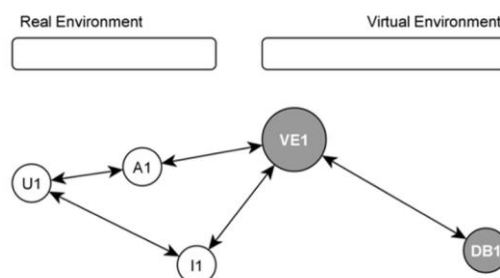
Fig. 3: Collaborative Virtual Environment (CVE) | Vereinfachte Struktur . Single-User Workspace

2.2 Raum, Zeit und Organisation

Dave [2011] beschreibt den Zusammenhang zwischen Raum, Zeit und Organisation im Gebrauch von Virtual Environments. In gestalterischen Berufen finden sich am Arbeitsplatz neben PC´s auch oft analoge Artefakte, wie Skizzen, Zeichnungen, Fotos, Drucke, Pläne oder 3D-Modelle. Der Zugriff auf diese beiden Mittel und die Kommunikation über diese beiden Möglichkeiten (digitale Schnittstellen und analoge Artefakte) beschreibt er als essentiell bei der Bearbeitung gestalterischer Aufgaben. In der Gestaltung der Arbeitsplätze unterscheidet er zwischen physischem und digitalem Raum, Single-User und Group Workspaces.
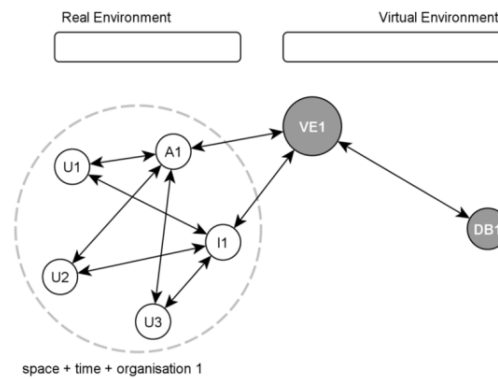
Fig. 4: Collaborative Virtual Environment (CVE) | Synchroner und lokaler Group Workspace

Demnach zeichnet sich der Gruppenarbeitsplatz mit mehreren Nutzern durch gleichzeitigen Zugriff auf dieselben Interfaces und analogen Artefakte am selben Ort aus. Alle Nutzer befinden sich in der selben Organisationsform, das heisst, sie arbeiten nach den selben Standards und nutzen den selben Workflow im Gestaltungsprozess.
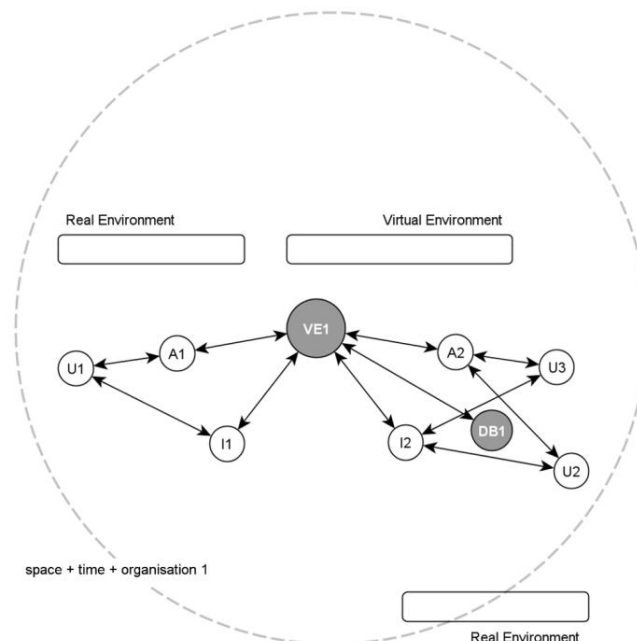
Fig. 5: Collaborative Virtual Environment (CVE) | Synchroner und lokaler Group Workspace

Möglich wäre aber auch folgende Konfiguration: hier sind es mehrere Nutzer im selben Raum, zur selben Zeit, in der gleichen Organisationsform, aber an unterschiedlichen Interfaces und analogen Artefakten.

Denkbar wären hier auch Variationen, wie zum Beispiel eine asynchrone Tätigkeit, aber auch eine non-lokale und asynchrone Kooperation in unterschiedlichen Organisationformen wie in der nächsten Grafik dargestellt:
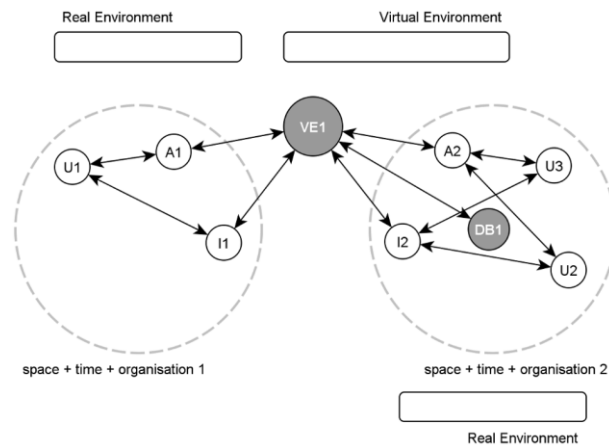
Fig. 6: Collaborative Virtual Environment (CVE) | Asynchroner und non-lokaler Group Workspace

Weitere Variationen sind denkbar, einerseits die Erweiterung um weitere Datenbanken und andererseits die Vernetzung mit anderen CVE zu komplexen Mixed Reality Environments.
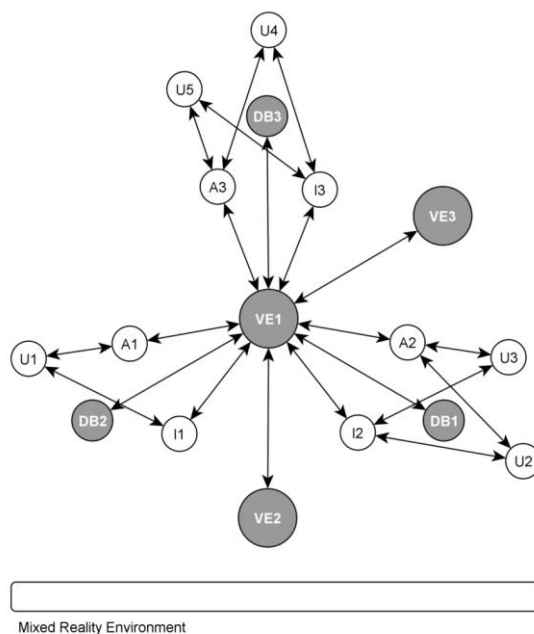
Fig. 7: Collaborative Virtual Environment (CVE) | Multi-Database und Vernetzung mit anderen CVE

Diese Analyse eröffnet uns nun Möglichkeiten, das eigene nachfolgende Projekt kritisch zu betrachten und weitere, mögliche Perspektiven zu entwickeln. Dazu mehr im abschließenden Kapitel „6 CONCLUSION".

3 ANWENDUNGSBEREICHE UND BEWERTUNGSKRITERIEN FÜR CVE

3.1 Anwendungsbereiche

Zur Zeit kennen wir folgende Hauptanwendungsbereiche von Mixed-Reality-Echtzeitsystemen:

- Archäologie, Rekonstruktion und Städtebau
- Architektur und Baukonstruktion
- Erziehung und Bildung
- Wartung, Inspektion und Instandhaltung von Anlagen
- Chirurgie und militärische Anwendungen

Beschränken wir uns nun auf das Gebiet der Architektur, gibt es schon einige bemerkenswerte Forschungsarbeiten. Billinghurst und Henrysson nennen folgende generelle Anwendungsbereiche von Echtzeitsystemen: On-Site-Visualisierungen von Gebäuden, speziell auch in der Archäologie und die

Unterstützung des gesamten Gestaltungs- und Konstruktionsprozesses, also auch kollaborative Methoden (Vgl. BILLINGHURST 2009). Speziell in der Architektur scheinen also folgende Anwendungen heute schon umsetzbar und interessant:

- Indoor/Outdoor Visualization
- Architekturentwurf, Gestaltungs- und Konstruktionsprozess
- Energieoptimierter Entwurf
- Design Collaboration, Shared Display und Delokale Visualisierung
- Anwendungen für Weiterbildung und Lehre

Wir kennen fünf wichtige Phasen im Ablauf eines Bauvorhabens: 1. Entwurf und Genehmigungsplanung, 2. Ausführungsplanung und Bauausführung, 3. Bauüberwachung (Qualitätsmanagement), 4. Wartung und Service (Facility Management) und 5. Baudokumentation. Heute sind für alle diese genannten Phasen Echtzeitanwendungen in Entwicklung.

3.2 Bewertungskriterien für Echtzeitsysteme

Allgemein anerkannt sind heute folgende fünf Bewertungskriterien für Echtzeitsysteme in der Architekturvisualisierung und -simulation: Flexibilität, Mobilität, Wirtschaftlichkeit, Leistungsfähigkeit, (Performance) und Integrationsfähigkeit. Die Hardware sollte modular, flexibel und leicht zu transportieren sein. Dadurch werden auch On-Site-Visualisierungen möglich. Flexible und modulare Bestandteile erleichtern die Kombination und Rekombination verschiedener Geräte. Echtzeitanwendungen sollten möglichst wirtschaftlich sein, in Anschaffung und Betrieb, sollten eine gute Performance aufzeigen und sollten sich gut in Standardsoftwarepakete integrieren lassen. Gute Performance, speziell das Laufzeitverhalten und die Integrationsfähigkeit sind wichtige Indikatoren für die Akzeptanz einer Echtzeitanwendung beim Nutzer (Vgl. HÖHL 2009a, S. 24 – 25).

4   RELATED WORK

Es gibt bereits eine Menge an verschiedenen Echtzeitsystemen für alle fünf oben genannte Bereiche, in unterschiedlichen Entwicklungsstufen, vom Prototypen bis hin zu sehr praktikablen Lösungen. Tizani [2011] beschreibt ein virtuelles Environment zur Bauplanung in der Konzeptionsphase. Er orientiert sich dabei am herkömmlichen Workflow des Architekturentwurfs und der Gebäudeplanung und arbeitet mit einer gemeinsamen Datenbank, entwickelt in C++ und OpenGL. Peña-Mora et.al. [2011] beschäftigen sich mit der Design Coordination und dem Monitoring des Gestaltungsprozesses in der Ausführungsplanung. Die soziale Akzeptanz und die Integration von CVE in den Planungsprozess erforscht Yabuki (2011). Yi-Luen Do (2011) beschäftigt sich mit der Integration von 2D-Echtzeitskizzen in die 3D-Grafik von virtuellen Environments. Die Echtzeitmodellierung von Gebäuden mit einfachen Würfeln ist das Forschungsthema von Chen (2011). Er integriert dabei einfache Modellierungsfunktionen in Echtzeitoberflächen. Eine umfassende, integrierte GIS/CAD/VR-Anwendung auf VRML/XML-Basis und angelagerten CAD-Standardprogrammen entwickeln Ren und Tang (2011). Künz, Dontschewa und Weber (2007) zeigen wichtige Möglichkeiten zur Integration von existierenden Game-Engines in Echtzeitoberflächen zur Architektursimulation.

5   CG MIXED REALITY ARCHITECTURAL WORKSPACE

In diesem Projekt wird der Einsatz von Echtzeit-3D-Darstellung und deren Steuerung durch ein innovatives Mixed Reality-Präsentationssystem (MRI der Firma Kommerz) im Rahmen von Kundengesprächen der Firma Haslerhaus untersucht. Das Ziel der Untersuchung ist, durch den Einsatz innovativer und immersiver Technologien das Produkt Fertigteilhaus optimal darstellen und vermitteln zu können. Durch interaktive Echtzeit-Technologie soll im Gespräch unmittelbar auf Kundenwünsche reagiert werden können und das Ergebnis von Änderungen und Planungs-Varianten sofort erlebbar werden. Die dadurch vermittelte, intensivere Einbindung sollte zu einer höheren Kundenzufriedenheit und -bindung führen. In Vorgesprächen zwischen der FH JOANNEUM und der Firma Haslerhaus wurden konkrete Forschungsbereiche eruiert:

- Mögliche Visualisierungs- und Interaktionskonzepte bestimmen und testen.
- Entwicklung eines Präsentationssystems, das es erlaubt, sich in Echtzeit durch einen Entwurf eines Fertigteilhauses zu bewegen

- Veränderung von Faktoren in Echtzeit: Entwicklung eines Systems, das es erlaubt in Echtzeit Faktoren wie Sonnenstand zu verschiedenen Tages- und Jahreszeiten zu verändern

- Entwicklung eines Bemusterungssystems: hier kann der Kunde sein eigenes Haus am Computer mit den zuvor ausgewählten Details (Fenster, Aussenputz, Dachstein, etc.) in Echtzeit bemustern und zur Beurteilung virtuell begehen.

- Unmittelbar abrufbare, weiterführende visuelle Informationen zu Gebäudedetails, die es erlauben dem Kunden die Sinnhaftigkeit gewisser Lösungen eindrücklich zu erklären

Fig. 8: Integrierte Sonnenstandssimulation

Das Projekt wurden in folgenden Schritten umgesetzt:

Präsentation und Auswahl des MRI-Systems der Firma Kommerz – Gemeinsamer Besuch bei der Firma Kommerz, wo zwei Varianten des MRI-Präsentationssystems, eine stationäre Untertisch- und eine mobile Auftisch-Variante, demonstriert wurden.Aufgrund der Anforderung bei Kundenbesuchen mobil sein zu können sein fiel die Entscheidung schließlich auf die mobile Variante. Weiters wurden anhand von bereits umgesetzen Projekten der Firma Kommerz die Möglichkeiten dieses Systems bzw. der Software für Bau- und Architekturanwendungen demonstriert.

Ermittlung einer optimalen Pipeline für 3D-Daten – Es wurden Test durchgeführt wie die bei der Fa. Haslerhaus vorhandenen 3D-Daten am besten von der von ihnen verwendeten BIM-Software Nemetschek Allplan in die für die 3D-Präsentation verwendete Realtime-3D-Middleware Unity 3D überführt werden können. Dabei ging es darum den Aufwand für notwendige Nachbearbeitungsschritte so gering wie möglich zu halten. Neben den 3D-Daten sollten auch UV- und Texturdaten optimal übertragen werden. Eine nahezu optimale Lösung ergab sich mit dem Export der Daten von Nemetschek Allplan in das 3D-Animationsprogramm Maxon Cinema 4D und von dort nach Unity 3D. Dabei spielt sicher eine Rolle, dass diese beiden Programme der gleichen Firma gehören. Der Grund dafür, soviel Energie in das Pipeline-Thema zu investieren ist, dass die Firma Haslerhaus in einer zukünftigen Ausbaustufe des Projekts ihre 3D-Daten möglichst ohne externe Fachleute in das Framework bringen und präsentieren kann.

Aufbereitung von 3D-Daten eines Musterhauses – Die Daten eines konkreten Musterhauses wurden aufbereitet und in die Realtime-3D Software überführt.

Implementierung von Interaktivität in das MRI-System – Dem Musterhaus-Modell wurden in der Realtime-3D-Umgebung einige interaktive Elemente angebunden

- die Möglichkeit Teile des Hauses und den Außenbereich in der 3D-Umgebung und in Echtzeit mit einer „First-Person-Kamera" zu begehen

- die Belichtungssituation durch Sonne kann über den Tagesverlauf dargestellt werden und zwar für Winter und Sommer

- es wurden Beispiele für die Bemusterung implementiert, die Wand- und Bodenoberfläche kann interaktiv ausgetauscht werden

- es wurde ein "Hotspot" eingbaut der eine animierte Darstellung eines Details erlaubt

Eine entscheidende Rolle spielte die Haptik und die Interaktion. Die Steuerung dieser interaktiven Elemente wurden an entsprechend gefertigte reale und haptische Interaktionselemente des MRI gebunden. So wurde z. B. der Sonnenstand zeitlich im Tagesverlauf durch die Drehung eines Sonnenstand-Modells geregelt. Zwei verschiedene Sonnenstand-Modelle repräsentierten jeweils den Sonnenverlauf für Winter und Sommer. Oberflächen wurden bemustert, indem ein (vorbereitetes) reales Muster z. B. eines gewissen Bodenbelags auf den Tisch gelegt wurde.
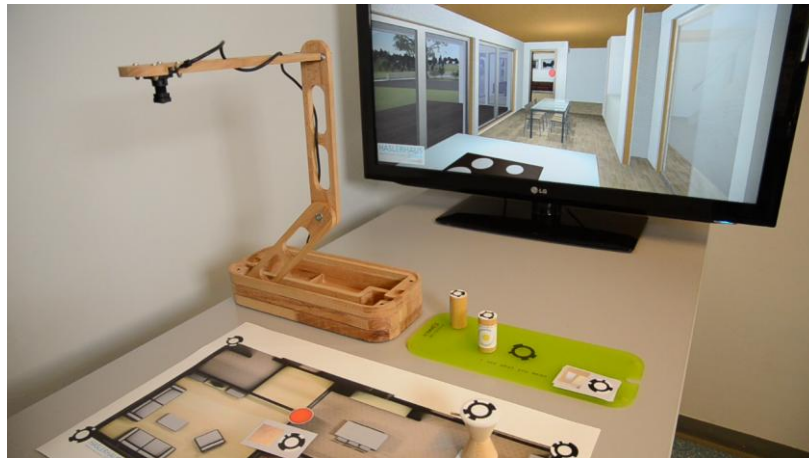
Fig. 9: Virtueller Baukasten zur Bemusterung

Leihgabe eines MRI-Systems – Das gesamte System aus Soft- und Hardware wurde der Firma Haslerhaus für intensive Tests für einen Zeitraum von 14 Tagen zur Verfügung gestellt.

Abnahme, Feedback, Austausch der Erfahrungen und Überlegungen für eine Fortführung – all die oben genannten Dinge basieren darauf, dass die 3D-Daten und ein abgestimmter Grob-Entwurf eines Hauses bereits vorhanden sind. Für gewisse Aspekte, wie die Bemusterung, können stattdessen natürlich auch generische Musterhäuser herangezogen werden. Der logische nächste Schritt wäre jetzt mit dem System zeitlich noch einen Schritt früher anzusetzen und auf das Erstgespräch mit dem Kunden abzuzielen. Trotz Echtzeit und Interaktivität muss bis jetzt der Erst-Entwurf noch immer konventionell abgewickelt werden. Im Erstgespräche können Ergebnisse des Prozesses nur in der relativ vagen Form von Hand-Skizzen festgehalten und präsentiert werden. Für eine genauere Beurteilung muss ein zweiter Termin angesetzt werden, damit inzwischen ein CAD-Operator die Ergebnisse visualisieren kann. Gerade bei einem Fertigteilhaus-System mit seinen systembedingten Einschränkungen der Elemente würde sich daher ein virtuelle Baukasten anbieten, mit dem man nach dem Lego-Prinzip das Haus zusammen mit dem Kunden erstellen, dann aber gleich auch in Echtzeit aus der Benutzerperspektive betrachten und beurteilen kann. Man kann unmittelbar nach dem Erstellen durchgehen, Beleuchtungssituationen verschiedener Tages- und Jahreszeiten erleben und die Wirkung von Material-Varianten beurteilen.

6 CONCLUSION

Das Gesamtsystem läuft auf einem handelsüblichen Spielecomputer in einer unteren Preisklasse, einem herkömmlichen Bildschirm (HD 1920/1080, Diagonale 46 Zoll) mit einem optischen, markerbasierten Trackingsystem der Firma KOMMERZ. Das KOMMERZ Mixed Realtity Interface (MRI) ist ein Tangible User Interface, das in unterschiedlichen Designs am Markt verfügbar ist. Vom DIY-Kit bis zum hier verwendeten MRI-TableTop. Es basiert auf einer Bilderkennung runder Marker, die unter gestalterischen Gesichtspunkten entwickelt wurden. Das Besondere ist die automatische Plankalibrierung im richtigen Maßstab mit Hilfe einer speziellen Steuerfigur, die auch dem Benutzer die Orientierung erleichtert. Verwendet wird eine USB-Kamera der Firma IDS mit einem 3 mm Weitwinkel-Objektiv. Das 3D-File wird aus Nemetschek Allplan in Cinema 4D importiert, dort vorbereitet und texturiert. Dann kann die Datei in Unity importiert werden. Die Steuerfiguren im MRI liefern Position und Drehung via einer Plug-In-Echtzeit-3D-Software. Das Unity-File kann von einem Mediendesigner erstellt werden, ohne spezielle Programmierkenntnisse. Ermöglicht wird das über das KOMMERZ Unity Framework, eine Scriptsammlung, die unterschiedlichste Funktionen in Unity bereitstellt, um interaktive 3D-Applikationen zu erstellen. Das Betriebssystem ist Windows OS.

Wie in den vorangegangenen Abschnitten beschrieben, entspricht das existierende Setup unseres CG Mixed-Reality Architectural Workspace momentan dem Typ eines „Synchronen und lokalen Group Workspace".
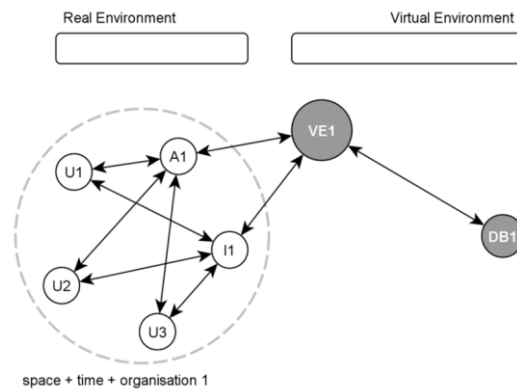
Fig. 10: Synchroner und lokaler Group Workspace

Das VE1 entspricht dem 3D-Walkthrough mit integrierter Sonnenstandsanalyse, die DB1 entspricht dem virtuellen Baukasten zur Bemusterung, A1 und I1 bilden das Mixed-Reality-Interface für mehrere, lokale Nutzer, gleichzeitig und in der selben Organisationsform. Aus dieser Typologie lassen sich weitere Entwicklungsmöglichkeiten ableiten. Problemlos lassen sich bereits heute weitere Interfaces für weitere Nutzer und Funktionen in unser System integrieren, wie Tangible User Interfaces, Multitouch-Tables oder ein IPad für die Sonnenstandssimulation. Zu testen wäre, in wie weit zukünftig auch Umgebungsfaktoren wie Schall, Wind und Verkehr in die Simulation eingebunden werden könnten. Die existierenden Anwendungsbereiche könnten damit geeignet erweitert werden und der computergestützte Gebäudeentwurf könnte dahingehend optimiert werden. Als Anwendungsbereiche bieten sich auch folgende Szenarien an:

- Architektur-Wettbewerbe: Austausch von Beiträgen in Echtzeit, vergleichende Beurteilung, Echtzeit-Begehung, Jury-Arbeit

- Beurteilung der Gestaltung im öffentlich Bereich – Bürgerbeteiligung

- Visuelle Leitsysteme: „schnelles Austesten" verschiedener Varianten in der Gebäude- und Verkehrsplanung

- Präsentation von Planungen mit der Möglichkeit interaktiv zu reagieren – (politische) Gremien

- Urban Code und "Big Data": Vernetzung ortsbezogener Datensätze der Stadt für Planungen – Gemeinbedarfsanlagen (z. B.: Kioske, Apotheken, Bibliotheken, Energieverbrauch, Wetter, Schadstoffemission, Verkehr, Mobilität, etc.), Nutzung von Datenbankinformation auch für Laien
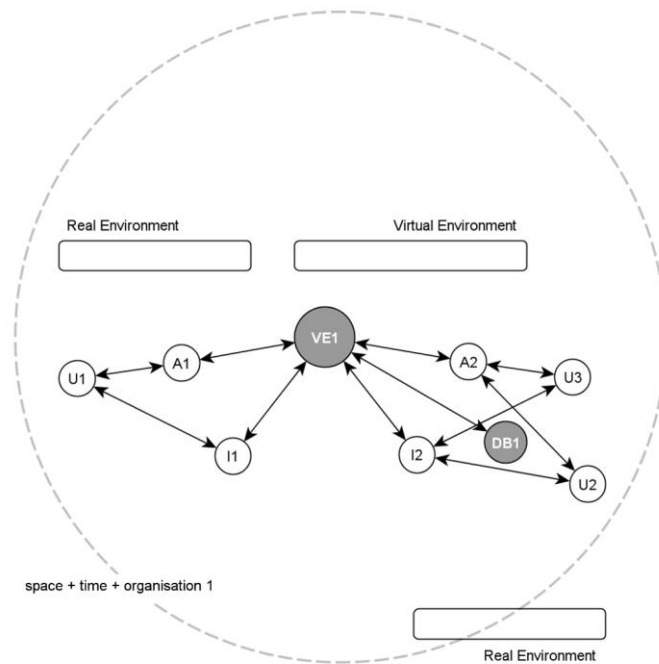
Fig. 11: Integration von weiteren Nutzern und Interfaces (z.B: Tangible User Interfaces, Multitouch-Tables oder IPads)

Eine Chance zum besseren Modellieren im Entwurf und zur Integration in den Echtzeit-Planungsprozess sehen wir in verschiedenen Detail- und Interaktionsebenen. Mittels globaler und lokaler physischer Selektions- und Interaktionselemente können interaktiv einzelne Informationselemente selektiert und manipuliert werden. Zugehörige Detailinfo erscheint in verschiedenen Ansichtsmodi der 3D-Ansicht. Denkbar wäre aber auch eine Erweiterung um weitere Datenbanken für einen „Virtuellen Baukasten" oder eine Anbinduung an ein geeignetes Building Information Modeling (BIM). Mit einem weiteren Ausbau der Kommunikationstools entwickelt sich auch die Möglichkeit zu einer weiteren Vernetzung mit non-lokalen Nutzern, Datenbanken und anderen Virtuellen Environments zu einem neuen, asynchronen und multilokalen kollaborativen Environment.
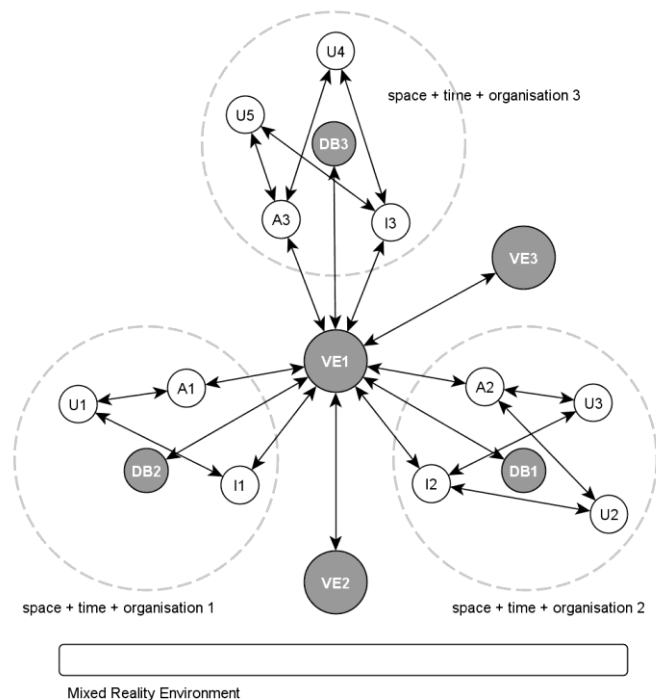
Fig. 12: Asynchrones und multilokales Collaborative Virtual Environment (CVE)

7 REFERENCES

BILLINGHURST, M. and HENRYSSON, Anders: (2009): Mobile Architectural Augmented Reality, in: WANG, X. and SCHNABEL, M.A. (2009): Mixed Reality in Architecture, Design and Construction, Springer Science + Business Media, University of Sydney, p. 93 – 104

CHEN, Jian (2011): A Hybrid Direct Visual Editing Method for Architectural Massing Study in Virtual Environments, in: WANG, X. and TSAI, J.J.-H.(2011): Collaborative Design in Virtual Environments, Springer Science + Business Media B.V., S. 131 – 140.

DAVE, Bharat (2011): Spaces of Design Collaboration, in: WANG, X. and TSAI, J.J.-H.(2011): Collaborative Design in Virtual Environments, Springer Science + Business Media B.V., S. 143 – 151.

HÖHL, Wolfgang (2012): Netzwerktheorie und Prozeßoptimierung, in: Business + Innovation 02/2012, Steinbeis Executive Magazine, Springer Gabler Verlag, Wiesbaden, S. 24 – 32

HÖHL, Wolfgang und ZEILE, Peter (2009): Die ‚Innere Logik' der Form – Neues vom Design Modelling Symposium 2009, in: db – deutsche bauzeitung 12/2009, Leinfelden-Echterdingen, S. 76 – 78

HÖHL, Wolfgang (2009): Generative Solar Design – Lichträume, Schattenkörper und Sonnenstandssimulation, in: Computer Spezial 2/2009, Bauverlag BV GmbH., Gütersloh 2009, S. 13 – 19 und in: FORUM PLANEN 11 / Juni 09, Österreichischer Wirtschaftsverlag, Wien, S. 9 – 11

HÖHL, Wolfgang (2009a): Interaktive Ambiente mit Open-Source-Software, 3D-Walk-Throughs und Augmented Reality für Architekten mit Blender 2.43, DART 3.0 und ARToolKit 2.72, SpringerWienNewYork

KÜNZ, Andreas, DONTSCHEWA, Miglena und WEBER, H. (2007): Low-Cost-Interaktivität für 3D-Computeranimation mit Computerspiel-Engines. In G. Kempter & M. Dontschewa (Hrsg.). Informieren mit Computeranimation, 134-138. Lengerich: Pabst

MAHER, Mary Lou (2011): Designers and Collaborative Virtual Environments, in: WANG, X. and TSAI, J.J.-H.(2011): Collaborative Design in Virtual Environments, Springer Science + Business Media B.V., S. 3 – 15.

PEÑA-MORA, Feniosky, GOLPARVAR-FARD, Mani, AZIZ, Zeeshan, ROH, Seungjun (2011): Design Coordination and Progress Monitoring during the Construction Phase, in: WANG, X. and TSAI, J.J.-H.(2011): Collaborative Design in Virtual Environments, Springer Science + Business Media B.V., S. 89 – 99.

PONTO, Kevin, DOERR, Kai, WYPYCH, Tom, KOOKER, John, KUESTER, Falko (2011): CGLXTouch: A multi-user multi-touch approach for ultra-high-resolution collaborative workspaces, Graphics, Visualization and Virtual Reality Lab (GRAVITY), University of California, San Diego, La Jolla, CA 92093-0436, USA

REN, Aizhu and TANG, Fangqin (2011): Modeling of Buildings for Collaborative Design in a Virtual Environment, in: WANG, X. and TSAI, J.J.-H.(2011): Collaborative Design in Virtual Environments, Springer Science + Business Media B.V., S. 153 – 165.

TIZANI, Walid (2011): Collaborative Design in Virtual Environments at Conceptual Stage, in: WANG, X. and TSAI, J.J.-H.(2011): Collaborative Design in Virtual Environments, Springer Science + Business Media B.V., S. 67 – 76.

YABUKI, Nobuyoshi (2011): Impact of Collaborative Virtual Environments on Design Process, in: WANG, X. and TSAI, J.J.-H.(2011): Collaborative Design in Virtual Environments, Springer Science + Business Media B.V., S. 103 – 110.

YI-LUEN DO, Ellen (2011): Sketch that Scene for me and meet me in Cyberspace, in: WANG, X. and TSAI, J.J.-H.(2011): Collaborative Design in Virtual Environments, Springer Science + Business Media B.V., S. 121 – 130.

City Building and Urban Failure: Why Urban Development in Serbia Does Not Achieve Planned Results

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1 ABSTRACT[1]

Societies in which cities are diminishing are no longer developing and getting wealthier. They decay (Jacobs 2007, 248). Jacobs believes that the cities, not the state, are the engines of economic development. The traditional approach (top-down) is characterized by centralized decision-making and interventionism, management from the center, the sectoral approach to development, the development of large industrial projects as stimulation mechanisms of other economic aspects and financial support, incentives as instruments of economic activity. Due to the fact that this has been proved as negative and unproductive for many reasons, the bottom-up approach is today more favoured. It involves local economic development, which includes the promotion of the development of all community sections, decentralization of vertical cooperation with different establishment levels and horizontal cooperation with economy, territorial approach to development, maximizing the development potential of each region and adjusting the local system to changes in the economic environment, and the creation of conditions for economic activity, ie. improving the local environment. Generally, it should correspond with the environmentally responsible economic, socially-fair and spatially balanced regional development / growth.

Having in mind that Serbia is still a highly centralized state, with only initial forms of decentralization in development management, it is necessary to establish modalities for its inclusion into current trends. Starting from the fact that the general development regulations in the EU reserves the supranational and national levels, and that most of the development documents are adapted at the regional, metropolitan and local level, such an approach should be necessarily applied in Serbia too. Those adjustments would be accompanied by changes in the policy of regional development in the EU, where is, among other things, insisted on an integral approach to policy development, integral territorial management and establishing a sustainable business.

The research focus has been placed on determining the possibilities of applying the concept of "smart cities", "smart regions" or "smart clusters" as a planning tool, which proved to be suitable for the new developmental ideas and initiatives. The starting point is that all areas should better use their own territorial capital/potential, especially activating all stakeholders, as well as available natural, technical and human resources, etc. However, simple downloading of the model is not possible, because of the general and specific conditions that characterize the territory. In order to recognize the code for better functioning and offer guidance for the future, it is necessary to consider the specifics of planning policies and urban development in the period prior to and after 2000.

2 PRECONDITION OF SERBIAN MODERN PLANNING

The Eastern Mediterranean and South-East Europe are burdened by the historical deficit of urban development. Their cities have entered the era of the industrial revolution as conglomerates of immediate rural origin and character, devoid of professional, scientific and technological resources needed for investment in new economic, cultural and social values. In the long era of Muslim domination and Islamization on the sidelines of the great pre-modern civilizations, the periphery of the peripheries, the Balkans have remained isolated from the influence of the Renaissance, the Reformation, the Enlightenment

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and rationalism. Impacts on the European periphery, nationalism and colonial imperialism of the nineteenth century were also hinder the emancipation of urban culture.

The beginnings of democratization, when there were any, also relied on the prevailing political will of the archaic agrarian society and dominant layers of power. This mentality has contributed to the survival of the patriarchal, paternalistic and authoritarian political model that generated the autarchic economy. Islam and Eastern Orthodoxy rejected individualism, capitalism, and work ethic. The first national writers of Balkan literary realism and naturalism were exposing the local urban civilization in gloomy colors of deplorable and neglected communities, emphasizing the darkest features of the human soul, and the historical spell of ignorance and poverty. At the periphery of the Habsburg Empire Balkan long endured relics of feudalism and clericalism. European peripheral countries in the early twentieth century still had around one half or more of their population dependent on agriculture and with incomes per capita of less than 50 per cent of those of the advanced nations of Western Europe. As being predominantly rural, their demographic potentials have remained weak and badly structured. Post feudal, rural cultures and mentalities have undermined the power of the already thin layers of urban civilization. Cities were identified with the enemies of the nation and the church.

In comparison to already poor Southern Europe, comparing to the West, with 45–50 per cent of rural population, in the Balkans 70–81 per cent were living in the villages at the beginnings of the twentieth century, with very low productivity levels and high illiteracy rate.

A very specific problem related to the urban structure and the place of the cities stemmed from the circumstances in which they were often a national, religious and cultural minorities habitat, or even a refuge. Minority nationality problems were one of the most acute causes of tension in South-east Europe, confronting the cities and their potentially tolerant, pluralistic environment, with the huge rural hinterland and its traditional notions and influences.

The low urbanization level was also connected to a poor industrial development. Mostly basic trade orientated, the Western Balkans remained, through a century, weak and vulnerable economy, closely related to the state and privileged groups, instead to a business-orientated urban society. Low living standards encouraged the survival of traditional strata of economic and social power and the nomenclature. Domestic economic structure dictated the state of economic culture, as the primary commodities, and, in the second half of the twentieth century, low rated industrial products tended to dominate the export trade. Generally, all external parameters of urban development remained extremely unfavorable, as public and commodity transport, communications, housing supply, health care, and educational and cultural service.

Citizenship has never been able to gain a historical reputation and political prestige. Traditional rural society and a violent elite consisted the basic social mass, further filled with the soldiers, clergy and highly obedient bureaucrats, lacking the substantial middling bourgeoisie as the driving force in mercantile and industrial pursuits. The key roles in trade, industry and finance were historically due to the foreigners, to Germans, Jews, etc., and the social mobility was limited as much as its foundations that could be provided in successful urban development. The interwar, "first" Yugoslavia was the state with the smallest percentage of Jews in Europe, and it was one of the symptoms of the modest urban development, rather than some general bad feeling.

3 AFTERWAR SERBIAN MODERN(IST) 'PLANNING TIMES'

From today's perspective, the idea of long-term city planning in Serbia appeared after the WWII, as a part of the general ideological orientation. Namely, the Urban Institute of Serbia was founded in 1945, followed by the first concept of renewal of war-devastated country. Further development path is characterized by a number of modifications as a reflection of general societal changes, impacts from other environments or adjacent disciplines. By the end of the 1960s, the paradigm was established, which remained almost unchanged to this day. With regard to long-term, city planning represented the only institutionalized mode of action. Monitoring of its development is actually monitoring the development of one model. In other words, the process of establishment and implementation of the general planning can be presented as development of single paradigm. Therefore, general planning in Serbia has undergone the whole process of a paradigm change but with very specific dynamic, where some phases last an unusually long, while others very short (Brkovic Bajic, 2002).

Planning in Socialist Yugoslavia was the dominant type of regulation and control of modern society, economy and urban space. It is related to the fundamental processes of domination and social culture, as well as with the growth of modernity. According to Escobar (2001), the concept of planning reflects the belief that social change can be planned, managed and produced at will. Finally, in all its variants, rationalist model of planning is practiced as an 'eminently modernist project' (Vujosevic, 2004).

This model can be recognized in all cities in Serbia. Spatial planning was subordinated to economic, as economic growth is identified with the development. City development was considered through opportunities and the power of a country that has had a leading role in decision-making. Thus, all decisions were taken in the political centre. One of the examples was New Belgrade, built after the WWII on the empty land between two historical cores of Belgrade and Zemun. The initiative for the construction of Belgrade on the left bank of the river Sava came from the leadership of the Communist Party of Yugoslavia and its head Tito. The whole period of conceiving and realization was under the strong influence of political ideology, namely that the city of New Belgrade serves as the capital of a modern and progressive Yugoslavia and its multicultural society. The main actors were professionals working on a plans, politicians and government bodies at various levels. From the very beginning, all the results of the experts have been subject to permanent supervision of the state leadership that gave opinions and suggestions for further work and development. After all, all plans were eventually at the hands of Tito for proofing.

4 'THE CRISIS OF NON-CONCEPT': POST-MODERN TURN AND POST-SOCIALIST TRANSITION

In Yugoslavia, socialism was more open and liberal than in other Central and Eastern European countries. Economic organizations had the opportunity for more liberal market performance, cultural freedoms were recognizable, the citizens were free to leave the country. After Tito's death in 1980, the level of political differentiation increased. Almost a decade later, the fall of the Berlin Wall symbolized the end of the socialist system. At this time, Serbia's position was much better, because in 1990 (as the initial year of transitional processes) most of the republics of the former Yugoslavia was ahead of the socialist countries of Central and Eastern Europe by the level of economic development. However, the price of transition, interrupted by disintegration of the state and war, increased several times, while the time of completion shifted for nearly two decades. As a result, these countries found themselves at the bottom of the list for accession into the European Union.

The way in which Yugoslavia disintegrated determined the transformational path of Serbia during most of the 1990s. As there were certain specifics that were associated with Yugoslavia, the transition process which Serbia entered (as part of the former Yugoslavia) had some different characteristics from Poland, Hungary, the Czech Republic, etc. Taking into account the collapse of Yugoslavia, civil war, UN sanctions, hyperinflation and economic collapse, these processes were difficult for Serbian society. The transition has not appeared in a peaceful way, because the wars strongly influenced newly formed states. These circumstances have created a situation of external as well as internal isolation, under the rule of Milosevic's authoritarian regime. Most distinctive was the case of Serbia under the full UN sanctions since 1992 to 1995. In this situation, the question of 'collective identity' of citizens became confusing, given that Milosevic's structures promoted and had a monopoly on all media, with aim to achieve the new 'national identity'.

In the field of urban planning and design, these processes were most reflected in a changed interpretation of the relationship between interests and values. Interests were based on the needs, which are "individual and collective organic substrate from which they spring" (Vujosevic, 2004). According to Vujosevic, "They may come from kind of value orientation (such as normative criteria, or general ideas about desirable etc.), which is not necessarily about material interests, but also others". In urban planning, the last decade of the century was marked with the trend of 'deplannification', which is legitimized on the basis of decisions made in the political centre, but is achieved primarily through the decentralized decisions of many actors. In terms of the emergence of 'wild capitalism', unregulated privatization and uncontrolled private accumulation, the importance of the public good in planning and social, environmental and spatial implication of these processes has been pushed into the background" (Vujosevic, 2004).

Social enterprises changed their status into the private, and an additional incentive for success is guaranteed by already built political and business connections. In such constellation, the state becomes the user, not the regulator, while more authority is transferred to the municipalities. Urban planning lost its centralized

character causing a hyper production of detailed plans by different offices, without the influence of the Town Planning Institute. New architectural and planning paradigms were embraced by the professionals inclined to post-modern flows, while modernist models lost their importance in a changed socio-economic context (Vujošević, 2004). Consequently, this situation created a fertile ground for different malversations, while urban planning represented an uncoordinated set of fragmented interventions, 'justified' by the lack of funds, regulations, tools for implementation and, above all, well-defined, comprehensive development concepts.

After the 5th October 2000, the great pro-democratic energy went on stronger economic action, partly (and associated with it) in the mass consumerism. In regard of values, this situation "threatens the level of (social) solidarity and blurs the contours of common goals and the constituted community around them in Serbia" (Cvejic, 2010). By strengthening the decentralization, local governments were given greater powers and possibilities for influence in the local economic development. Cvejić also claims that the current developmental crossroad is in the cultural sphere. It can be said as well that the new cultural patterns are most importantly of value. However, the action potential of civil society is reduced by consumerism and its primar orientation on economic goals and activity.

5   REVIEW OF THE CURRENT DEVELOPMENT AND PLANNING SITUATION IN SERBIA

Report on the development of Serbia in 2009 states that the main characteristic of regional development of Serbia is a distinct territorial disparity. This kind of imbalance is manifested through several levels: undeveloped territory, developed centre and insufficiently developed periphery. The same source indicates that uneven development and regional differences are caused by numerous economic, demographic and social factors with the special emphasis on multi-decadal marginalization of the process of regional development strategic management. The consequence is the regional disproportion which is manifested in a high level of unemployment, reducing the scope of a total economic activity and a constant decline in population especially in undeveloped area (Republički zavod za razvoj, 2009). According to the researches of the Republic institute, the regional polarization of Serbia is multi-layered and is evinced in interregional differences manifested in demographic movements in Serbia, regional educational structure of the population, interregional economic differences, infrastructural gap and poverty. Regional disproportions of the level of development in Serbia are the biggest in Europe and in time they grow even bigger.

The most illustrative review of this situation is the trend of evolution of demographic situation, a sort of logic response to the social-economic situation in the country. The migration[2] of population towards economically active centres is noted, all in order to ensure their own existence. This trend would lead to the forming of only one demographically vital territory, the one that would connect present regions of Belgrade and Novi Sad. Centralization is manifested in all levels, the state, the province as well as the level of municipality.[3] Considering negative trend of regional development of Serbia but also strategic orientation to join the European Union, regionalization and more even development are set as a primary goal for solving this situation. Its purpose lies in setting the equalities, not literally but in the form of various opportunities and chances. Edvard Jakopin (2009) determines five reasons for which the regionalization is necessary: (1) Regionalization as the basic instrument of state in terms of economic, social and demographic development, (2) Development of each part of the state with geo-strategic character, (3) Economic and social homogeneity, (4) Dialog and tolerance and (5) Political relaxation. However, the current orientation to regionalization and equal development entails three crucial problems: deficiency of laws regulating restitution, denationalization, laws of public or municipality property, and deficiency of systematic decentralization as an expression of political will and the political appropriation of the system of regionalization (Stojkov, 2009).

In the period of time from 2003, after ratifying the Law of planning and construction, series of activities have been initiated and series of legal acts have been adapted which have as their goal to contribute to more equal regional development of Serbia. Among them stands out the Spatial development strategy, which is based on

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[2] The facts of the migration without return from urban municipality centers to three large cities in Serbia: Belgrade, Novi Sad and Niš (Kovačević 2009)

[3] If you consider only the examples of the positive example such as the autonomous region of Vojvodina or the city of Belgrade, you will notice the enormous differences in development of the municipalities in Vojvodina between south and north Backa and, for example, municipalities on the east and southeast of Vojvodina, as well as in the city of Belgrade between Belgrade and Barajevo, Sopot etc. Therefore, the relationship between center and periphery appears dramatically on all levels (Stojkov, 2009).

the fact that the cities (urban system and urban net) are in every way a pillar and regional catalyst of the economic development.[4] Zekovic (2009) states that the cause of recession in our cities is rapid decline in industry which led to the most powerful regional deindustrialization in Europe.

After analysing the results of the 2012 Census and forming the Report on establishing the Spatial Plan of the Republic of Serbia and state of spatial development (RAPP, 2012) the following indicators were observed: (1) balanced regional development and social cohesion level, (2) regional competitiveness and accessibility, (3) indicators of sustainable use of natural resources and state of the environment, (4) protection and sustainability of use of natural and cultural heritage and district and (5) indicators of spatial and functional integrity in the surrounding. For the purpose of this paper results which can be observed from the Smart City concept were singled out.

Key performance indicators are represented Serbia in the Report which was published in March 2012and they are presented below. The population density (Fig. 1a) indicator in the capital city area is largely disproportionate to the rest of districts in the country. It is observed that in four border districts the population density is below 50 inhabitants per km2, six districts (all in the zone of influence of Pan-European corridors) have over 100 per km2, while only the Belgrade District has over 200. The average population density is around 85 inhabitants per km2, but if observed from the perspective of districts they range from 40 to 500. As for migration rate level, migratory movement in Serbia is largely directed towards the capital city and to a large extent lower to South Backa, Nisavska and Raska districts, while in the rest of districts the negative migration level is observed, which indicates emigration, or continuation of emigration from those regions. By comparative analysis of the three basic age categories of population it is recorded that the concentration of inhabitants older then 65 is the highest in Eastern Serbia, where at the same time the lowest concentration of young and middle aged population is recorded, which is the bearer of economic development in the observed moment in comparison to the rest of districts in Serbia.

The share of highly educated population (Fig 1b), which is the direct factor of economic and social progress of certain territory is unfavourable, both on the level of certain district and when observed on the national level. The highest share of highly educated population is measured in the Belgrade District (13.76 %), the lowest in Branicevski District (below 5 %). Additionally, except for the Belgrade, South Banat and Nisavska districts, the percentage of highly-educated inhabitants among the population older then 15 is always lower than 5 % which polarizes the development and inequality in terms of living conditions in Serbia. On the national level, the share of the highly educated employed population in the total number of those who are employed accounts to only 14.6 %. In the Belgrade District the share of the highly educated employed population is the highest (26.5 %). This estimate is expected, if considered that the highest number of highly educated inhabitants can be found in the Serbian capital and the labour market and economy are most vibrant. In other three districts, the share of highly educated in the total share of the employed population is similar and it ranges from 10.9 % in the Vojvodina Region, 10.8 % in the Sumadija and Western Serbia regions, while the lowest is recorded in Southern and Eastern Serbia and it accounts for 10.6 %. In all 25 districts for which there are data, the share of dependents and those with personal income, in comparison to active persons with interest is higher, and this difference is the highest in the Toplicka District (28 %) and the lowest in Kolubarska District (7 %). In other words, the highest share of dependents and those with personal income is in Toplicka District (58.97 %) and in Kolubarska District in the total population (48.94 %). On the other side, the share of active persons with interest in the total population in the total population is the highest in Kolubarska (42.16 %) and the lowest in Pcinjska District (31.06 %). Finally, such low number of active persons who are engaged in comparison to dependants and those with personal income generates and it is to generate a series of socio-economic problems, which require the creation of new and/or implementation of existing measure for employment of working-age population, and creation of circumstances for positive development trends and higher level of social inclusion of population in all districts, i.e. regions of the Republic of Serbia.

Average travel time from the centre of district to one of the three centres with over 100.000 inhabitants ranges between 60 to 155 minutes. The inhabitants of the Belgrade, Pomoravska, Sumadijska and South Backa districts take the least time to travel to a regional centre, which can be explained by geographical

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[4] Over 90 %, and somewhere even over 95 % of the total economic development happens in cities.

location and position along the Corridor X, while the least accessible are border districts, which can be explained by both distance and level of development of traffic infrastructure.
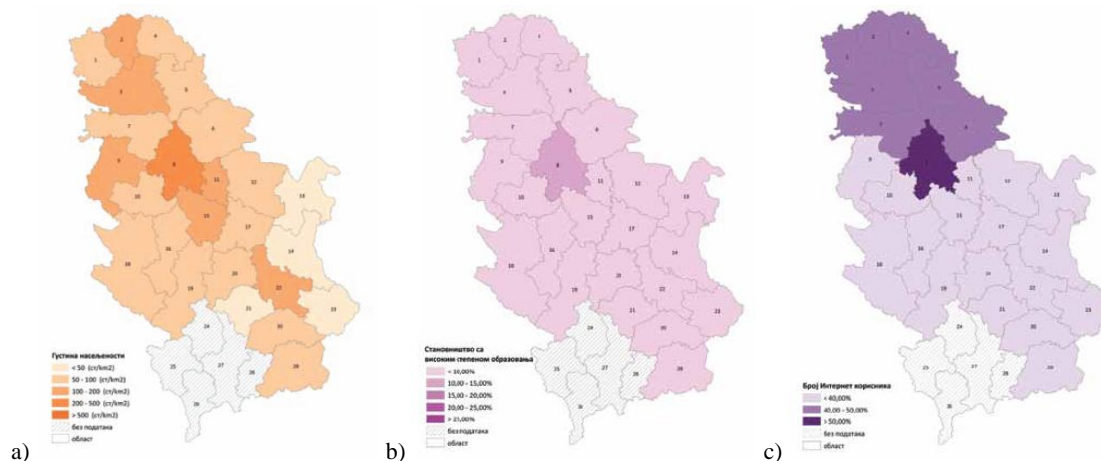
Fig. 1: a) Population density; b) Highly educated population and c) Internet users in Serbia. (RAPP, 2012)

As for the adapted planning documents in the year or 2011, there were four regional spatial plans and 14 plans on the level of local self-government. In 2009 and 2010 there were 10 plans adapted. The work on other regional spatial plans and spatial plans of local self-governments is in different phase of development (5 regional and 82 local) or harmonization (44 local) with the current legislature. By analysing the date from the municipal yearbook it is evident that tertiary sector of economy prevails, while based on the 2002 Census the results are more heterogeneous and it portraits the predominance of tertiary sector in all areas of big cities such as Belgrade, Novi Sad and Nis, while the primary sector is most present in the Macvanska, Kolubarska and Branicevska districts. The highest number of immovable cultural property is located in the Sremska and Beogradska districts, the high number of protected goods is also in South Banat and South Backa districts and also in Nisavska district. In other districts there is a lower number of protected goods, especially in South Serbia. The participation to international cooperation projects is most evident in the North parts of Serbia, especially in Backa and Banat. Lower number of projects in the central parts of the country is caused by high number of cross-border cooperation projects, which are concentrated in the border areas of the country. Also, in the last report of Republic geodetic authority it can be seen of the total number of cadastral municipalities (4527) 45 % drafted digital cadastral plans and placed in official use, 13 % of the work in progress. Other cadastral plans are in analogue format (RGZ, 2013).

The stated indicators and general long-year experience with implementation of planning documents in Serbia, as well as the actual situation on the global level, demonstrate the need for new approach which is implemented in development strategies of populated areas.

6 SMART CITY PLANNING TOOL

The current period is characterized by a situation in which a large number of cities, regardless of their size, formulate their development strategies on the basis of knowledge city and creative city concepts. These concepts arise as a consequence of rapid economic and social change. In these cities knowledge, creativity and innovation of citizens are considered to be crucial holders of creating prosperity and quality of life. The hybrid concept of smart city is formed by overlapping these concepts: knowledge city and creative city (Vukmirovic/Milakovic, 2012). This conception is also known as intelligent or digital city. Depending on the phrase used the primary focus varies: ICT, highly educated population, creative class etc. Although the smart city concept is already present in development visions of cities, some blueprints begin and end with a vision dominated by the physical design, resulting in a jumbled mess of engineering and architectural ideas supported by various technologies. Such visions are utopian and impossible to implement. However, the key characteristic of this concept is movement from vision to action (OVUM, 2011).

urban production factors in a common framework and, in particular, to highlight the importance of Information and Communication Technologies (ICTs) in the last 20 years for enhancing the competitive profile of a city. We believe a city to be smart when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high

quality of life, with a wise management of natural resources, through participatory governance (Caragliu et al. 2009). A Smart City is a city well performing in 6 characteristics, built on the 'smart' combination of endowments and activities of self-decisive, independent and aware citizens. These characteristics encompass: smart economy, smart mobility, smart environment, smart people, smart living and smart governance (European smart city project, 2013). All of those can be measured by using the determined indicators: smart economy, smart mobility, smart environment, smart people, smart living and smart governance (Fig. 2). These indicators also serve as separate fields in which a city is to make an improvement.
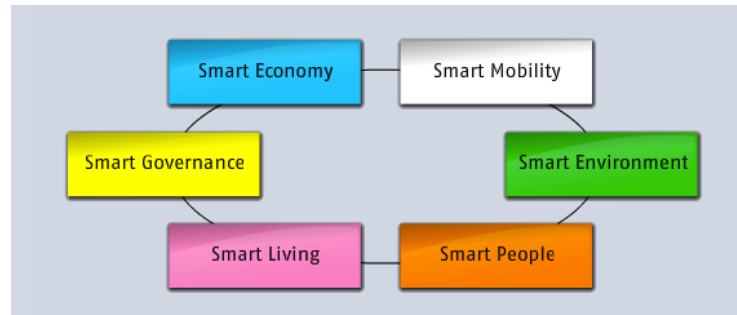
Fig. 2: Smart city indicators. Source: http://www.smart-cities.eu

The concept of the 'smart city' has recently been introduced as a strategic device to encompass modern Advantage of this conception is reflected in the possibility of implementation on cities of various sizes (from a metropolis to a small size city). Also, this principle favourise bottom-up planning approach. In this way, the size of intervention which is to initiate urban development varies from those of smaller scale to those on the regional level. Having this in mind, implemented strategies can be ranked as smart point, smart network, smart cluster, smart city and smart region. Specifics of the smart city approach are seen in several important elements (OVUM, 2011):

- The paradigm for a top-down approach is a tightly managed enterprise resource planning system for the entire city, including its distributed physical assets. The paradigm for a bottom-up model is an open source platform that supports instead of prescribes the creation of modular and diverse applications and extensions by third parties.

- Projects in Europe and North America tend to be focused on "retro-fitting", which is the use of ICT as an overlay for existing infrastructure. In these regions, it is more challenging to deploy an integrated approach as existing cities already have systems in place to discharge their functions. In addition, most cities have grown on a piecemeal basis as a result of individual initiatives and projects.

- Opportunities for complete retro-fits are also limited. While in the 1850s and 1860s, Haussmann could drive great boulevards through Paris's inner-city districts to fix the city's perceived circulation and political security problems, there are unlikely to be many "digital Haussmanns" as it is simply not possible to replace existing urban systems because too much relies on them. Therefore, urban projects increasingly make use of a "living laboratory" methodology. This methodology explicitly recognizes that new systems must be deployed in a real life context, with the experimental subjects drawn from the population of future service users.

In this way an advantage is given to ICT sector, which is seen as quick to develop and complementary to the existing infrastructure, which is underdeveloped in Serbia. The stated approach is implemented in the proposal for development of Trstenik. The development concept of this small size city is observed from three levels: (1) at the State level and its connections with other centres in the region, (2) at the regional level and (3) at the level of municipality.

- At the State level, Trstenik is recognized as the local centre in which agriculture has the potential to become the dominant sector of the economy. This would be achieved by specializing in specific production sectors of agriculture such as production of coils, fruits and vegetables. Furthermore, specialization would be reflected in the application of modern technologies and knowledge. This would aim to improve the yield, but also the retention of natural (organic) quality that is highly

desired and valued in developed countries. The creative agriculture is seen as a concept, which seeks the city development on the basis of the activity recognized to have great potential.

- At the regional level and the level of local centres network, position of Trstenik could be seen as a specialized centre – a smart town, which would aim to complete the offer.

- As the centre of the municipality and the network of rural settlements, Trstenik should direct its actions towards the development of these settlements, primarily for the purpose of promoting various forms of rural tourism, which is becoming increasingly attractive to both domestic and foreign population (Vukmirovic/Milakovic, 2012).

The stated idea is presented at the competition Small Towns of Serbia organized by the Agency for Spatial Planning of the Republic of Serbia in 2011. The jury composed of six spatial planning experts evaluated the proposal as good in a visionary sense, but requiring several massive factors which are to initiate it during the development process of a city. However, the jury considered that the way this idea communicates can be improved in the qualified professional circles, but it is at the same time harder to achieve in the general public.

7 CONCLUSION

Hitherto urban planning experience in Serbia and current development indicators demonstrate a rather complex situation. Still, planning tools have managed, to a certain extent at some periods, to produce good results, which indicates their necessity. The inconsistency of expert opinions with those of the public is seen as a main problem for implementing planning documents, which leads towards something which can be named "spontaneous occurrence".

The contemporary approach to planning is primarily based on sustainable development and it implies education and inclusion of citizens in the process of decision-making and creation of planning documents. Although this trend is in the development phase, certain positive results can be observed. However, the specific mentality/identity of this region and its inhabitants is observed as a second important factor, which is clearly seen from the historical analysis. For this reason, it is necessary adapt best practices which are "imported" to areas where they are implemented, so as to avoid misbalance and unexpected results – spontaneous occurrences. Accordingly, the contemporary concepts such as smart city should be implemented in the "local way", which implies their adaption to the local area and mentality.

8 REFERENCES

BAJIC BRKOVIC, Milica: Urbanističko planiranje u Jugoslaviji u 20-tom veku: primer Beograda/City Planning in Yugoslavia in the 20th Century: The Case Study of Belgrade. In: Arhitektura i urbanizam, Issue 9, pp. 19-31. Belgrade, 2002.
CARAGLIU, Andrea; DEL BO, Chiara and NIJKAMP, Peter: Smart cities in Europe. In Serie Research Menoranda. No. 0048. Amsterdam, 2009
CVEJIĆ, Slobodan (ed.): Suživot sa reformama: građani Srbije pred izazovima „tranzicijskog" nasleđa". Beograd, 2010.
EUROPEAN smart cities project. http://www.smart-cities.eu [Cited 2013, january]
FALCONER, Gordon. MITCHELL, Shane: Smart City Framework. A Systematic Process for Enabling Smart+Connected Communities. Amsterdam, 2012
JACOBS, Jane. Gradovi i bogardstvo naroda. Zagreb, 2007
JAKOPIN Edvard. Regionalizacija – Uslov ravnomenrnog razvoja. [Internet]. 2009 [cited 2011 Jun 15]. Available from: http://www.politickiforum.org
OVUM: Digital Urban Renewal. Retro-fitting existing cities with smart solutions is the urban challenge of the 21st century. London, 2011
РАПП Републичка агенција за просторно планирање: Извештај о остваривању Просторног плана Републике Србије и стању просторног развоја 2011. Београд, 2012
RGZ Republicki geodetski zavod: Izvestaj za januar 2013. [Internet]. 2013. http://www.rgz.gov.rs [Cited 2013, februar 16]
RZZR Republički zavod za razvoj. Regionalni razvoj Srbije 2009. Regionalne neravnomernosti Srbije. [Internet]. 2009 [cited 2011 jun 15]. Available at: http://www.razvoj.gov.rs
STOJKOV Borislav. Demokratski politički forum. [Internet]. 2009 [cited 2011 Jun 15]. Available at: http://www.politickiforum.org
VUJOŠEVIĆ, Miodrag: Racionalnost, legitimitet i implementacija planskih odluka. Novije teorijske interpretacije i pouke za planiranje u tranziciji. Beograd, 2004.
VUKMIROVIC, Milena; MILAKOVIC, Mira: Testing an intelligent city approach as development principle of small towns in Serbia. In: 7th International Forum on Knowledge Asset Dynamics & 5th Knowledge Cities World Summit. IFKAD-KCWS 2012. Matera, 2012.
ZEKOVIĆ, Slavka. Regionalizacija – uslov ravnomernog razvoja: U proces regionalizacije treba uključiti i strategiju prostornog razvoja Srbije. [Internet]. 2009 [cited 2011 Jun 15]. Available at: http://www.politickiforum.org

City Works: A New Model for Management of Public Landuu

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1 OBJECTIVES

The main goals of City Works are the following:

(1) Improve the quality and duration of roads;

(2) Reduce the impact of the work on the mobility of citizens, eliminating traffic jams;

(3) Retrieve economic resources by controlling of the territory;

(4) Provide a service to the economic operators, reducing the time of investigation.

1.1 How to activate

Agencies that have joined this new management model have enabled a virtual one-stop-shop online that is accessible from any computer connected to the internet.

You can submit requests for digging permits, encroaching, scaffolding, exhibitions and more, in general any type of use of public soil.

In addition to textual information, it is mandatory to trace on map the geometry connected to the request, showing what will be the impact on the territory.

The system shows what are the possible overlaps and interference with other encroaches, allowing to have a true co-ordination in real time.
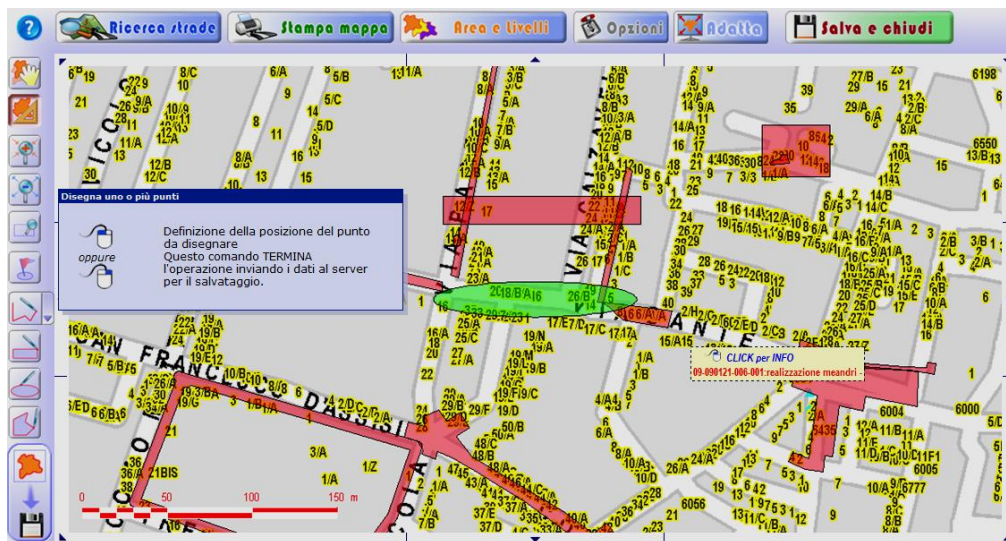
Figure 1: Sample of new geometry tracing: when the user terminates the geometry (green oval) the system displays the possible overlaps (red polygons).

1.1.1 The situation before City Works

The amount of daily activities on the territory are increasing year by year and it is becoming more and more difficult to control all the encroachments insisting on the territory. Sometime it is possible to authorize public events and at the same time excavations on the same or on adjacent areas. This can cause damage to City Council's image and sometime to people, if an emergency service could not reach the target. With City Works we wanted to include all the possible encroachments, including also all the public works opened for broken pipes.

1.1.2 What is the technical coordination of the territory

In some Municipalities it has been decided to activate a dedicated department for the coordination of these requests, and the department is transversely, checks all the events both activated by the infrastructure companies and by the other departments of the town (public works, mobility, traffic, land planning, building

permits, sports, culture, etc.). The task of the coordination is preventing overlaps and avoiding discomfort to citizenship (i.e. traffic jams).

1.1.3 City Council Departments

Each department has the ability to enter all their own planning, and check in real time what is already set by the other departments. In addition, the City Council can see the encroachments inserted by the infrastructure companies (i.e. water, gas, telephone companies). The main objective is to aggregate all the street works, therefore optimizing the economic resources of the City Council and of the infrastructure companies (digging and resurfacing one time for several public works).
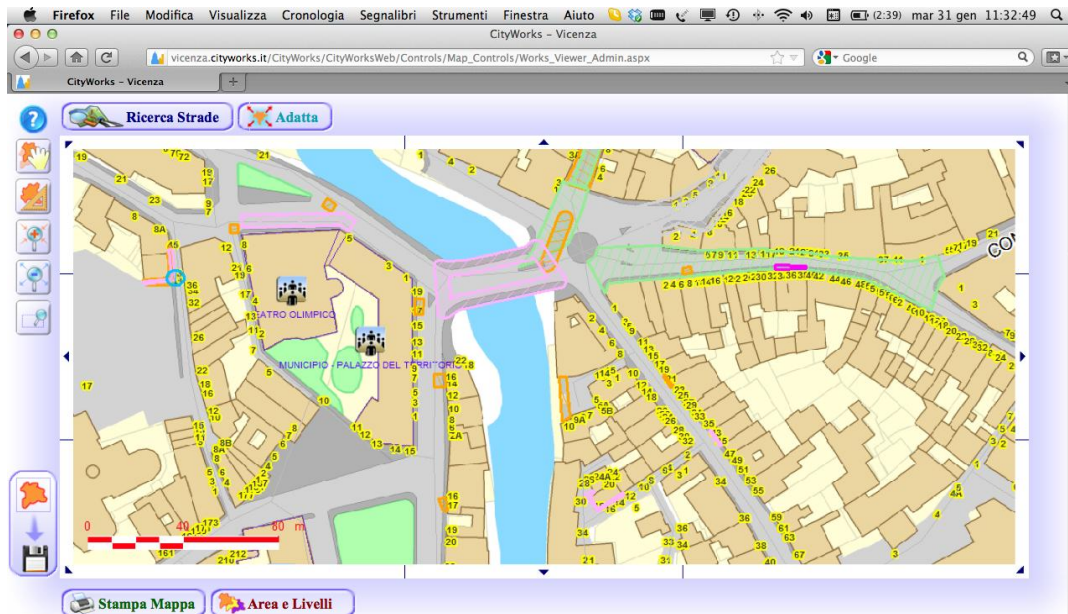
Figure 2: Sample of Vicenza City Works: Pink polygons are planned street works, Purple in progress, Orange temporary completed.

1.1.4 Quality of the roads

The streets of the towns contain potholes, cracks, and damage of various kinds. These problems are normally determined by works on infrastructures. Very often the streets are not well restored and the City Council is forced to resurface the road in shorter times than those already scheduled.

1.1.5 Requests for compensation and insurance

In recent years, we have a considerable increase of citizens claims caused by bad streets maintenance. Some Italian City Councils will not even be insured anymore, thus creating a considerable damage to the budgets of the Municipalities. Therefore, it is necessary to have a better control of street works, reducing potholes and cracks, having a better restoration process of roads.

1.1.6 Improvement of technical analysis

We wanted also to improve the quality of the documentation, having all the necessary information (Project Tracks, Sections, Pictures etc.) to properly analyse each request.

1.1.7 Integration with the taxation department

In order to send a new request, the user will also be prompted to enter all the information which is normally managed by the Tax Department. The system automatically calculates taxes required. The incomes are automatically verified by the system, and this allows to not having to proceed with the recovery of fees not paid by the applicant.

1.1.8 Integration digging permits and traffic ordinances

City Works has, moreover, allowed to unify encroachments and traffic ordinances. The two permits are completely hooked and one should not exist without the other. We wanted to create a system that integrates activities usually handled by separate departments, but that, when they are not synchronised, procuring several issues to the territory.

1.1.9 One-stop-shop: paperless workflow with the use of digital signature

In the municipalities that have adopted the City Works system, it is possible to submit requests for digging and encroachment directly from the office without having to bring the „piece of paper" to the City Council. It is possible to query in any moment the status of the request.

The entire process of analysis of requests is shared among all the City Council's departments, to avoid overlaps and interferences.

1.1.10 Result of the complete process

The City Council has a true dashboard of what is happening in the city, what has already done and what is already scheduled. This makes possible to control the contractors, see immediately what operations have been completed and which are to verify. This new process must also prevent a road just resurfaced to be broken after a few months for scheduled replacement of an infrastructure.

1.1.11 Certified Cartography

All the information produced are recorded in a WebGIS application. The end users are generating the information and this is certified by the City Council.

1.1.12 A true emerging system already used most common in cities with following sizes: from 30,000 inhabitants on

City Works is a true emerging system: each user, even with non-computer skills, inserts information in the system. This data is immediately available to all the other. It is like a "public land social network", to improve the economic management of government companies and reduce the discomfort to the citizens. A new way of managing the public body since is possible to understand the transformations of the territory and what activities are handled by the City Council day to day.

2 THE CONTROL OF THE INTERVENTIONS: AS LENGTHEN LIFE IN THE STREETS, ELIMINATE THE ABUSIVE ACTIONS AND REDUCE THE REQUIREMENTS FOR COMPENSATION

The City of Florence has activated with the City Works a new model for control and verification of the territory: having knowledge of the planned street works, twelve inspectors come out every day to check each yard or construction site, they verify the used filling, the quality of the concrete and asphalt.

2.1 New developments to improve the model

We have already planned to develop new Apps which will allow the contractors to insert the emergencies (broken pipes) directly from the territory: the app will collect GPS coordinates, Photos, technical data, and all of these information will be immediately sent to City Works.

Another App will be developed to collect possible issues of the territory (potholes, cracks, dangerous cross roads etc.).

To improve the control management system, we will create another application for the City's inspectors to collect all the street works information using a tablet device. This application will be connected also with the City's Police to have an integrated process for the control of the territory (street works safety, mobility and traffic etc.).

All of these software modules will be developed to have a better organisation of human resources, since it will be possible to plan from the office the routes of verification for planned and emergency street works.

2.2 Effects in using the system

Twelve Italian City Councils already acquired City Works, having very positive results with the use of this new management model. In particular, Florence, Brescia, Prato and Livorno, City Councils allow sending of requests for digging and ordinances directly online. Also Municipalities like Vicenza, Pordenone and Castelfranco Veneto have a one-stop-shop to manage digging permits directly by the Internet.

2.3 Average results achieved with the use of this new operational model

After 8 years of operation, we can collect an average of results obtained in City Works City Councils:

Description	Income/Savings
Increased number of authorizations	From +15 % to +26 %
Occupation taxes	From +18 % to +42 %
Paper warehouse	From -93 % to -100 %
Potholes	From -30 % to 57 %
"Useless" street resurfacings	From -22 % to -35 %
Fines for irregular application of authorization	+ 200 %
Time dedicated to front office activities	-93 %
Time dedicated to assistance	-88 %
Data entry activity	-96 %
Quality of territorial control	+ 400 %

Table 1: tangible and intangible results using City Works (average results of 8 City Councils).

3 CONCLUSION

City Works has proven itself as a model of efficient management and particularly efficient because it allows to recover economic resources, and have a better spending avoiding useless street works. This new management model improves the quality of the roads and reduces the number of claims asked by citizens for bad road maintenance. In this case, the technologies are helping the control of the territory, and the City Councils are providing a better service to businesses, professionals and citizens, having the transformations of the territory under control.

Climate Data Analysis on IGIS

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1 ABSTRACT

The paper deals with a system of algorithms used in the intelligent GIS for solving problem of environment monitoring based on integrated data from various data sources, statistical and operative data on meteorology and oceanography in the first place. The described set of algorithms is developed for solving tasks that arise at three main stages of data analyses: data verification, regularization and recognition. Derivative parameters calculation algorithms that allow to compute relevant parameters of the environment in case of limited computational power without computationally complex models solving recognition and forecasting problems play discrete role. Example of the software implementation of the system is considered for the problems of climate monitoring in the Arctic.

2 INTRODUCTION

Exponential increase of the information content in all spheres of human activity at the end of the twentieth and in the beginning of the twenty first centuries called for principally new approaches in information treating and apprehending. Critical breakthrough in informational technology (IT) related to geo-referenced information was achieved due to the development of high-tech intelligent geographical information systems (IGIS) [19]. Although the existing systems provide wide opportunities to be adapted to specific objectives and/or geographical areas they are not sufficiently effective to meet the scope of challenges constantly arising as a result of changing climate conditions. The research overall goal is to develop an algorithm set to empower IGIS-based decision making support system that will synthesize ocean/ice/atmosphere observation-based and model-based products for the purpose of fast access to the available information about the given region.

3 GENERAL STRUCTURE OF DATA PROCESSING

The developed system is expected to handle large volumes of heterogeneous information, at that, taking into account the constraints imposed on available computing resources. To overcome the difficulties encountered in these problems solving three areas of scientific and technological research are formed: data harmonization, integration and fusion [10].

(1) Harmonization in the broadest sense can be interpreted as the standardization of data. Its distinguishing feature is an orientation to a great number of consumers.

(2) Integration, whose hallmark is the orientation to solving some particular class of problems, is supposed to have a specific data model.

(3) Fusion is aimed at obtaining information of higher quality, the exact definition of "quality" depends on the application. Data fusion is accompanied by a decrease in data content.

In view of the described paradigm the data processing within the developed system can be divided into the following stages:

(1) Pre-processing stage (verification).

(2) Regularization stage.

(3) Analysis stage including recognition and forecasting.

3.1 Verification stage

Main purpose of data verification stage is to structure storage, analysis and processing of received data meant for preparing them to meet the challenge of building a regular data grid.

The main requirements to verified data are:

(1) data should not contain duplicating values;

(2) data must be converted to a common format for data submitting and integrated into a single data storage;

(3) metadata should be described in terms of subject domain;

(4) data, if possible, should not contain noise or outliers;

(5) data, if possible, should not contain gaps;

(6) should be formed statistical evaluation of data quality, including:

(6a) techniques of processing and analysis for each type of data received from each source;

(6b) results of statistical processing and analysis of data;

(6c) comparison of results of statistical processing with statistical background.

The considered requirements are provided by:

(1) developing a single model of subject domain and single model of measurements and results of their processing representation;

(2) using expanded set of methods and models of measurements processing and analysis;

(3) using unified analysis methods of measurements;

(4) using a set of self-trained algorithms that provide a choice of adaptive processing parameters;

(5) fuzzy measures application intended for compliance of processing results with the admission values limits and with statistical background.

The stage of data verification received from various sources assumes the consecutive solution of the following key tasks:

(1) development of algorithms for the harmonization of data generated at different times by different data sources;

(2) development of algorithms for data integration, including search for and elimination of duplicating values, usage of specialized techniques for processing data from each data source, statistical data processing;

(3) development of algorithms for data fusion, including algorithms for data interpolation, creation of data formalized description, creation of statistical data models for different regions.

3.2 Regularization stage

The main objective of the regularization is development of a regular grid using gathered measurements and estimation of data accuracy in knots of the regular grid.

The main requirements to the formed regular grid are as follows:

(1) high efficiency of new data assimilation;

(2) application to development of regular grids' methods and models should be universal, and specifics of the area on which data are processed should be considered;

(3) the highest possible resolution of regular grids should be used;

(4) flexibility of a regular grid provided by changing resolution in time, height/depth and coordinates depending on data volume;

(5) ensuring absence of data accuracy loss in presence of large data volume at the expense of low grid resolution;

(6) providing accompanying data on reliability of provided data;

(7) possibility of rebuilding grids locally for an area the new data are received for.

Providing the considered requirements is possible with an allowance for:

(1) applications of multiresolution approach to grids' creating;

(2) use of statistical data models as bases for grids' development;

(3) use of the data processing complex method based on currently existing methods.

The stage of data regularization assumes the consecutive solution of the following key tasks:

(1) development of a general statistical model based on all collected measurements;

(2) development of a regular grid based on collected data and using statistical model;

(3) recalculation of a regular grid through the reanalyze procedures, grid specification when acquiring new data.

3.3 Analysis. Forecast and recognition tasks

Two important problems solved at the stage of analysis is the task of forecasting the given variable (or set of variables) values and the problem of recognizing objects of a given class. Here and below, by pattern is meant an n-dimensional column vector $X = [x_1, ..., x_n]^T$, where $x_1, ..., x_n$ are non-negative numbers, and "T" is the symbol of matrix transposition. Under the data recognition is meant a mapping of arbitrary pattern X, where integers 1, ..., c represent the class. The feature i is an element of the vector X with the index i. The set of classified patterns is denoted as U.

The problem of pattern recognition is formulated as follows. Given:

(1) The number of classes c ;

(2) A set of m training patterns: $X_1, ..., X_m$;

(3) Class of any training pattern: $f(X_1) = c_1, ..., f(X_m) = c_m$;

(4) Arbitrary n – dimensional vector u from U.

(5) A set of weights for classes $\beta_i \in [0; 1]$, i=1,…,c.

(6) A set of weights for features $\gamma_j \in [0; 1]$, j=1,…,n.

(7) On the set of vectors U is set a metric $\rho(u_1, u_2)$, where $u_1, u_2 \in U$.

(8) The distance d is set – the value of the metric, that determines the size of the neighborhood to be considered for classification.

Search for:

The class of vector u: f(u)=?

The prediction problem can be formulated as follows. In a given area in some way are chosen points p(φ, λ, h) with the coordinates φ, λ and h, where φ and λ are geographic coordinates of a point (latitude and longitude), and h is the depth / height. For these points are known the measured values of various parameters (temperature, pressure, humidity, etc.) for a sufficiently long period of time T, obtained with a discrete time ΔT. The values of these parameters x_i at each point p(φ,λ,h) at time t, t = 0, ...,ΔT forms a row-vector X(φ,λ,h,t)=[x1,...,xn], where n is the total number of investigated parameters, xi=xi(φ,λ,h,t). It is necessary to determine the value of vector X at all points p(φ, λ, h) in a given time T + mΔ, where m – is a constant. The parameters of the forecast are:

The forecast depth. History of the variables' values at a given point taken into account when calculating the future value.

The forecast horizon. Time when the forecast is carried out; it is set by the value of the constant m.

3.3.1 SVD Classification Method

As a unified approach to recognition and forecasting algorithms we use SVD-classification algorithm [21] as fast, reliable and simple method of data orthogonalization and dimension reduction. The method is also can be used as pattern recognition technique for forecasting purposes.

3.3.2 SVD Classification Algorithm

The idea of SVD classification has been previously discussed in several papers like [3, 20] published by the authors. Let us outline only basic concepts of the proposed idea. Two main stages of SVD classifichion are being studied: training phase; and – recognition one. The training phase is reduced to forming a new space of smaller dimension properties and displaying the training sample elements in it. Recognition consists of

classified vector display in the received space and search for the next nearest element out of the training sample.

3.3.3   Training Phase

Brief description of the algorithm training phase is given below:

For each property $j=1,...,n$ find and store maximal value from all elements of training set - E_j .

Normalize each property (element X_i) to $[0;1]$ via dividing it by E_j .

Multiply every element of every training vector X by its weight γ_j .

Create training matrix $A=[X_1 ... X_m]^T$ with dimension $m \times n$.

Calculate maximal singular value s , as well as left and right singular vectors L and R jf training matrix (can be done using different algorithms).

Set s = s(k) , L = L(k) , R = R(k) . Store singular value s and right singular vector R.

For each $i=1,...,m$ store component l_i of the left singular vector L and class c_i that corresponds to training element X_i .

3.3.4   Recognition Phase

(1) Normalize each element u to $[0;1]$ via dividing it by E_j .

(2) Multiply each element u by its weight γ_j .

(3) Calculate direct image of u in new feature space:

$$w=\frac{u^T R}{s} \qquad (1)$$

(4) Find max value from $l_i, i=1...m$:
$$M=max\{l_{1,}...l_m\} \qquad (2)$$

(5) Calculate P_i :

$$P_i=\frac{|w-l_i|}{M} \qquad (3)$$

(6) Calculate values t_i for each $i=1...m$ and find minimal value; where t_i are calculated as:

$$t_i = P_i \blacktriangleleft -\beta_i \qquad (4)$$

(7) Set the class c_i as a calculated class for u .

The properties weights and classes are entered for the contribution accounting, at that, for separate properties into recognition results and change of errors' ratio of the first and second kind. For classification an accuracy increase, the proximity of classified objects in space and/or in time is also considered [20].

3.4 The derivative parameters calculation task

Derivative parameters (DPs) are oceanic/atmospheric/ice parameters; they are not directly measured in the field or can be received remotely. Calculation of the most of these parameters generally requires an application of high-resolution 3D modeling systems. Technically these modeling systems are too complicated and computationally too costly. Another approach is to estimate DPs with reasonable accuracy by theoretical/empirical algorithms (models). Models take measured parameters as the input data and produce DP at the output. For the developed prototype (see below) list of the used DPs is given below.

3.4.1 Calculation of water density

Water density (WD) is an important parameter of the sea water primarily determined by thermohaline properties (water temperature and salinity) and hydrostatic pressure. Two types of WD are used for oceanographic applications: (i) potential WD that only depends on thermohaline properties and (ii) in situ WD that additionally depends on hydrostatic pressure and geographical latitude. Importance of WD for oceanographic conditions is dictated by the fact that WD determines distribution of mass around the ocean and therefore controls density (geostrophic) currents [4].

3.4.2 Calculation of sound speed in the water

The sound speed (SS) is the distance traveled in unit of time by a sound wave propagating through an elastic medium. SS in the seawater depends on hydrostatic pressure, temperature, and salinity, and empirical equations have been derived to accurately calculate the sound speed variables. For calculation of the sound speed Wilson's empirical formula proposed in 1960 is commonly used. Wilson's formula is accepted by the National Oceanographic Data Centre (NODC), USA for computer processing of hydrological information.

3.4.3 Geostrophic current

Dynamics of horizontal flows (synoptic and large scale ocean currents) on the rotating Earth is substantially determined by the balance between the horizontal pressure gradient and Coriolis force [4]. This balance in oceanography is known as the geostrophic balance, which determines geostrophic currents (GC). Far from the boundaries (ocean surface, bottom and coasts) the GC provide rather precise approximation of real currents, if the latter are averaged over time scale of the order of few days or more.

3.4.4 Wind current

Dynamics of the upper layer in the sea (down to about 20-30 m) is mainly controlled by the wind. In accordance with Kamenkovich's theory [6] the wind forcing is transfered to the water column through the wind stress at the ocean-air interface. Wind stress initiates motion of water, affected by the Coriolis force. These two forcing equilibrate in about pendulum day. As a result the WC distribution arrives to a steady state.

3.4.5 Wave height

Wave height (WH) is one of the most important parameters which determines the navigational conditions in the sea. Therefore reliable information about WH is highly practical for planning the optimal navigation routes, selection of the locations for running scientific and industrial operations in the sea and providing for safety and economic efficiency of such operations. Currently sophisticated models are used in prognostic centers around the world for WH operational forecasting. However, these models often may not be used because of time-consuming computations. This is why the empirical models based on statistically obtained relationship and providing reasonable accuracy are applied.

3.4.6 Ice drift

Ice drift (ID) is important navigational parameter in the ice-covered seas and in seas with seasonal ice cover, like the Barents Sea. The major forcing, affecting ID is the surface wind. The direction of ID in the low concentrated ice massive coincides with the direction of geostrophic wind (along sea level pressure contours). Simple empirical relationship between the surface wind speed and ID speed was suggested by Shuleikin [13]. In consolidated ice zones this relationship is more complicated and depends on other factors, including total ice concentration, ice thickness, rafting etc. [2]. At present for practical purposes ID could be estimated from sequential satellite images with high resolution.

3.4.7 Ice thickness

Ice thickness (IT) is an important climatological parameter and together with ice extent it allows for estimating the total ice volume and its variability. This parameter is also crucial for navigation and planning of various operations in the ice covered seas. So far IT could be accurately measured only by ice drilling, or by remote sensing measurements from ships (submarines) or aircrafts. It is expected that new satellite-based sensors, like CryoSat [17], will be able to provide the detailed information on IT over entire Arctic in the nearest future. Indirect method of estimating the ice thickness is based on the concept that ice of different

type (nilas, grey ice etc.) and different age (fast ice, one year old or over one year old) has different thickness [2]. Empirical relationship between ice type, age and thickness are generally known.

3.4.8 Heat flux at the water-air interface

Turbulent heat flux (HF) at the water-air interface is the major factor that governs energy exchange between the ocean and the atmosphere in high latitudes. HF determines the heat content of the upper ocean layer and through it controls ice freeze/thaw processes. Due to large horizontal inhomogeneity, precise calculation of HF can only be done via direct measurements in the field [11]. The latter can only be executed under the aegis of special targeted experiments from board of research vessels, or at ice camps. Well established empirical method of approximate HF calculation is widely used in oceanography and meteorology. This method is based on Monin-Obukhov theory of atmospheric boundary layer, which allows for linking HF with temperature difference between water and air and surface wind speed through the so-called bulk-formula (see [1]).

4 ROLE OF THE ARTIFICIAL INTELLIGENCE BASED SCENARIO APPROACH

The peculiarity of IGIS project is the need to integrate the existing heterogeneous software into a single system of scientific computations, as well as rapid development and embedding into the system of a set of new software for the emerging research in the additional computational tasks.

An adequate development environment software for the design of complex research system would be environment, allowing for visual, in the form of block diagrams, representation of complex data processing algorithms, that include existing as well as newly developed computation blocs, automatic execution of these algorithms, their easy modification and correction in the process of execution. Such an environment exists. This is a visual environment for scenario simulation DroolsTab [18].
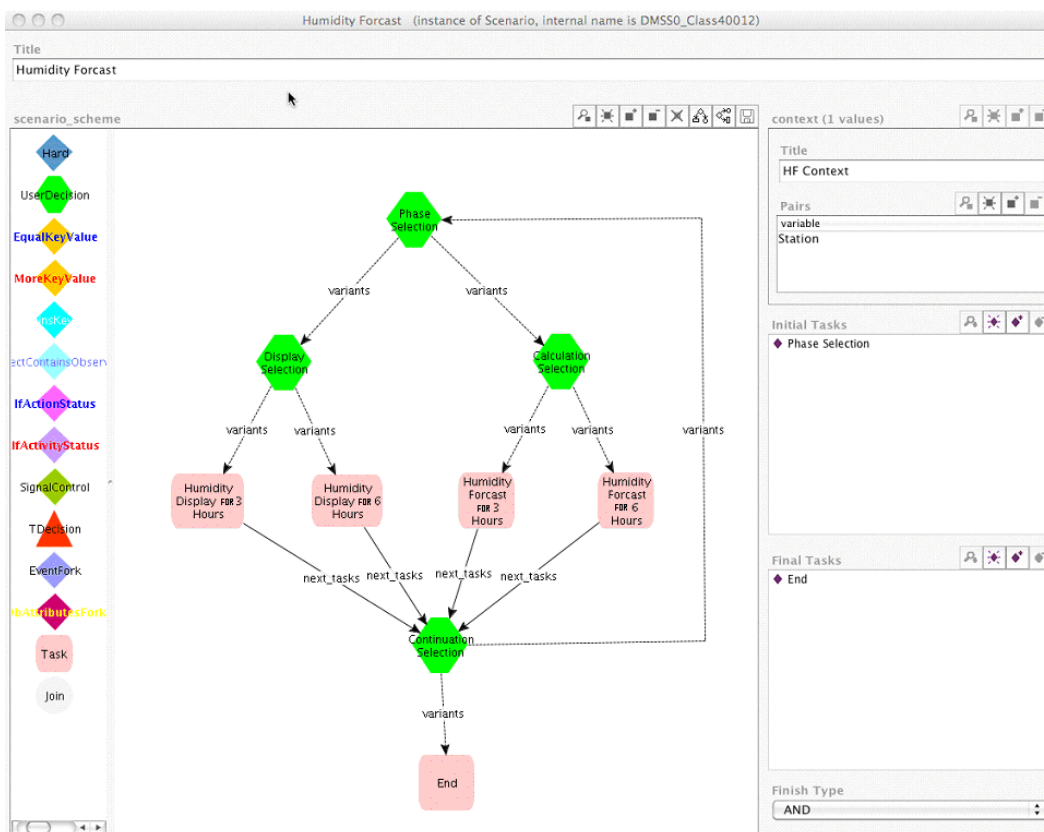
Fig. 1. Scenario development Window

The expert system is used to design, visualize and execute scenarios (algorithms) of data processing. Herewith during the execution of scenarios are automatically invoked existing data processing algorithms and also executed newly developed computational blocks, embedded in the scenarios. The scenarios also contain blocks of decision-making in which data processing branches depending on various conditions.

5 CASE STUDY

Computer prototype of the system was developed by OOGIS research lab.[1] Technically the system will consist of two major components: IGIS-engine, i.e. the program package capable of storage, manipulation and visualization of various types of geo-referenced data, and the data[2] itself. The novel feature of the proposed system, compared with the existing analogues (e.g., Ocean Data Viewer (ODV), http://odv.awi.de/) is its multidisciplinary character.

Here are some screenshots of working system.
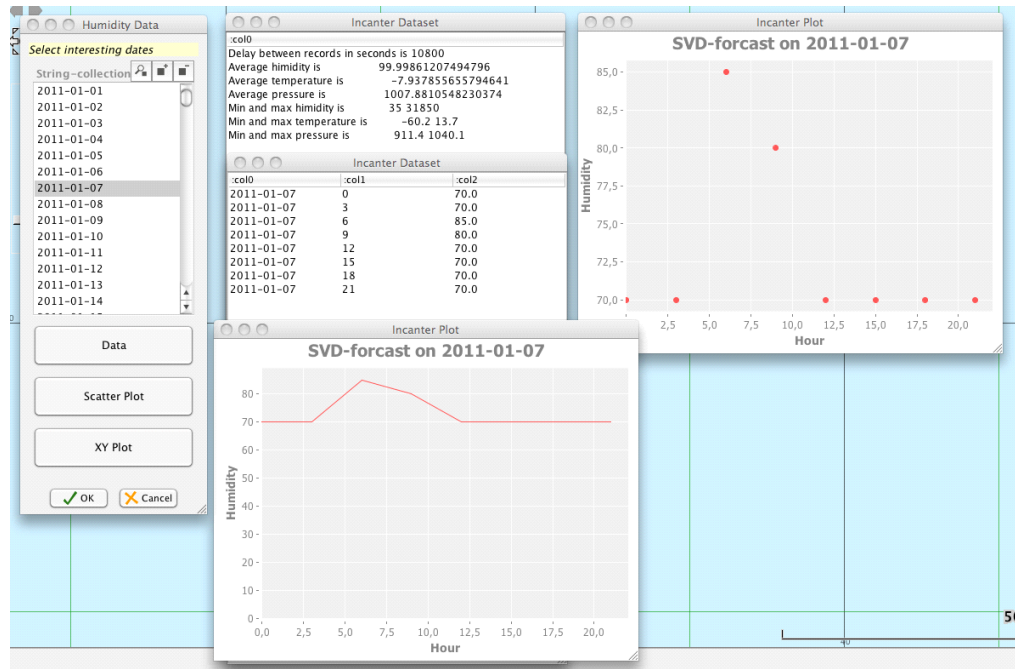
Fig. 2. Windows show the results of calculations at scenario execution

In Fig. 3 the examples of regularization of basic data for temperature are presented.
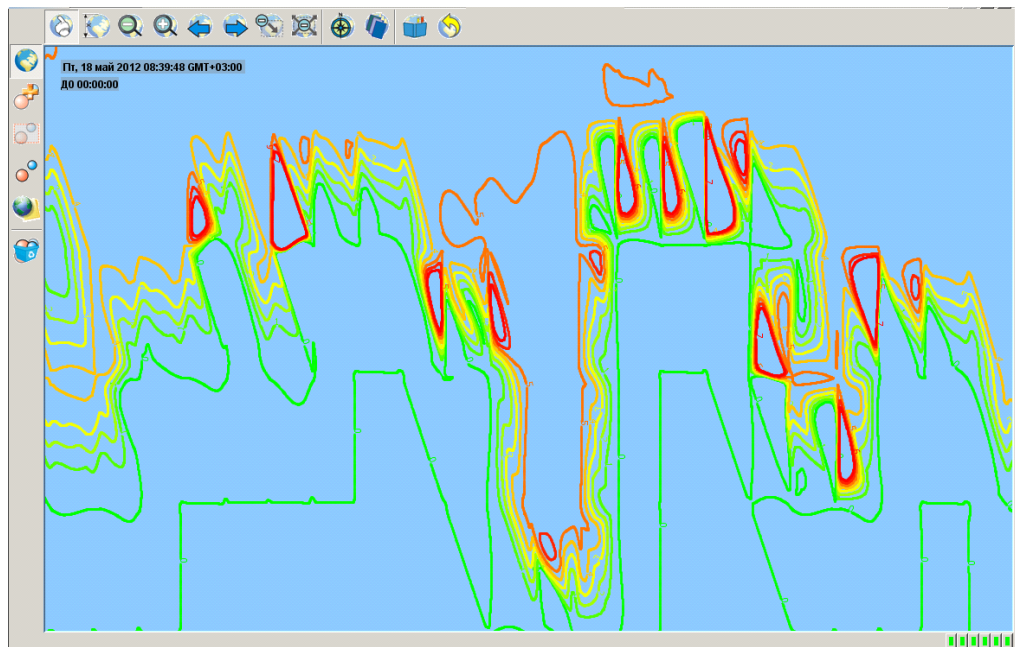
Fig.3. Examples of regularization of temperature values. Color represents temperature value.

5.1 Ice recognition example

The example of ice situation assessment according to MODIS satellite for the Barents Sea region is given in Fig. 4.
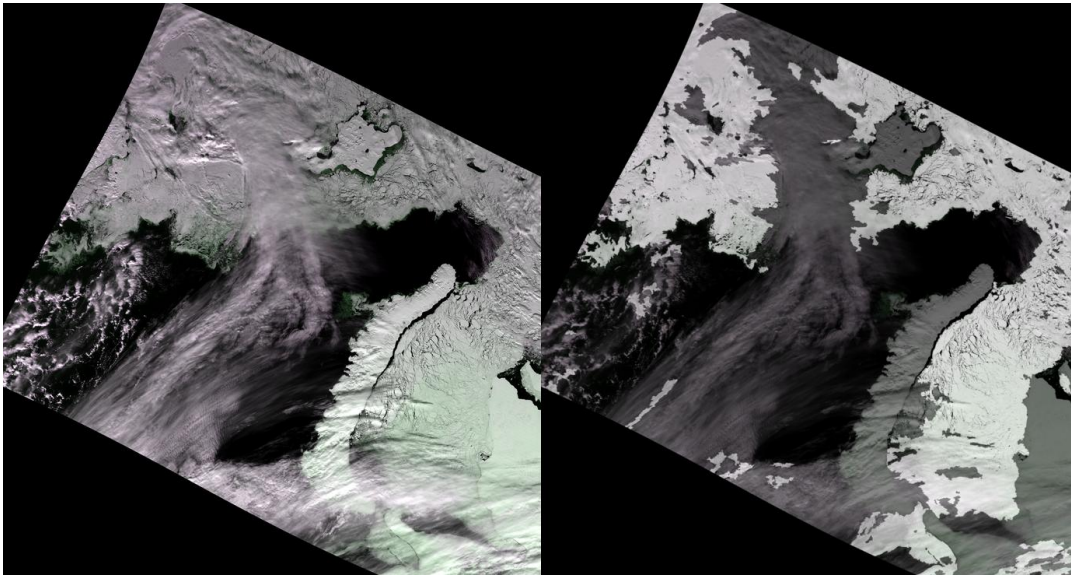
Fig. 4. Example of ice situation assessment according to remote sensing. Input data – at the left, result of ice distribution – to the right. Areas of recognized ice are marked by white color.

5.2 Forecast example

In the system SVD method is applied to the atmosphere parameters forecasting. In the presented example forecasting of temperature, pressure and humidity is executed based on the data received within the previous stages of the project. For comparison the method of the next nearest neighbor is chosen.
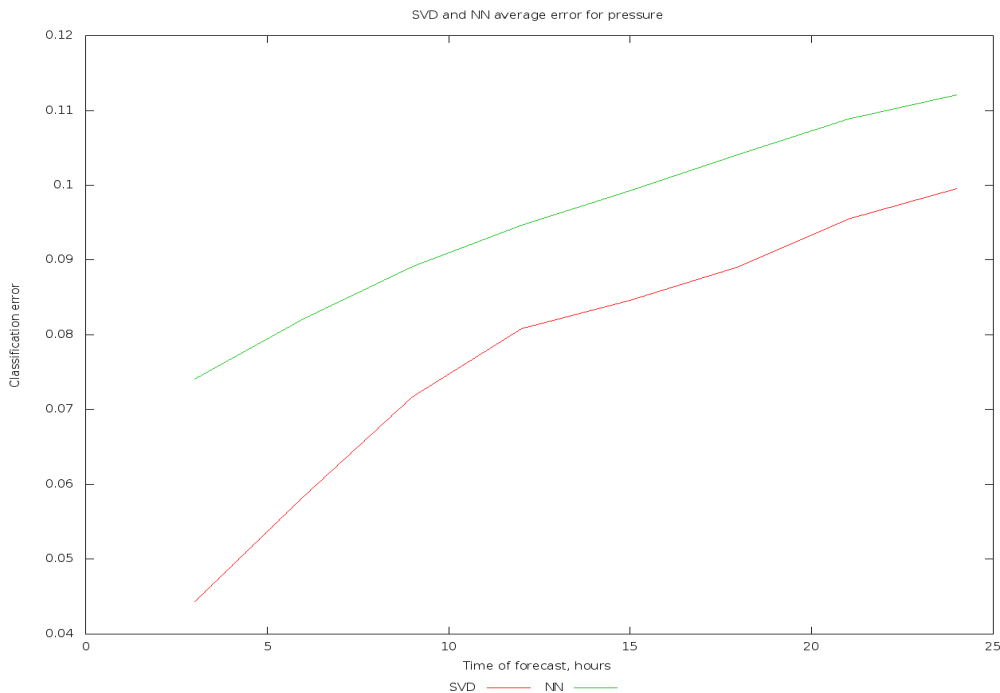
Fig. 5. Comparison of SVD classification and a method of the next nearest neighbor for the pressure values forecast.

At a forecast by the next nearest neighbor method for this station the row site (stories of values), being characterized, the maximum proximity to the current values is chosen. Results of comparison of SVD classification with a method of the next nearest neighbor in forecast accuracy on the basis of over 50000 values of atmospheric parameters (humidity, pressure, temperature) for forecasting for the period from 3 to 24 hours in atmospheric surface layer are presented in Fig.5.

The dependency diagram presents an average dependence between accuracy (Y – axis) and the forecast horizon (X – axis) for all WMO stations. As follows from the diagram SVD-classifier (the red line) shows a steady increase in the forecast accuracy over the next nearest neighbor method (the green line) in the whole range of values. The highest increase of SVD accuracy (approximately 3 %) is observed for short term forecast (under 10 hours).

6 CONCLUSION

Presented basic technology allows to cover the entire range of tasks confronting the system for data processing and storing, as well as visualization of the results and system adaptation for particular current task. Using a scenario approach and unified ontology allows to configure the system according to the peculiarities of the problem. Unified approach to the problems of classification and prediction, based on SVD-classification allows to optimize the detection accuracy or running time. Together with the use of algorithms for calculating the derivative properties that allows to solve the full range of data analysis problems with limited computational resources. Further development of the proposed system can be used (1) to increase the set of avianle algorithms and (2) to develop a system of evaluation criteria for data input to automate the selection of algorithms optimal for the problem solving.

7 REFERENCES

1. Andreas E.L., R.E. Jordan, and A.P. Makshtas, Parameterizing turbulent exchange over sea ice: The ice station Weddell results, Boundary Layer Meteorol., 114, 439-460, 2005.

2. Doronin and Heisin, Sea ice, Hydrometeoizdat, 319 p., Leningrad, 1975 (in Russian).

3. Galliano F.R. Earth surface sites classification Algorithm based on singular valley decomposition method, «Information Technologies». №12, pp. 35-37, 2010 (in Russian).

4. Gill, A.E., Atmospheric-Ocean Dynamics, Academic Press, 662 p, NewYork, 1982.

5. Hall E.L. Computer image processing and recognition.-NY.:Academic Press, 1979.

6. Kamenkovich, V.M., Basics of large-scale ocean circulation theory, In: Oceanology, Nauka, V.2, P.359-400, Moscow, 1978 (in Russian).

7. Persson P.O.G., Fairall C.W., Andreas E.L., Guest P.S., Perovich D.K. Measurement near the Atmospheric Surface Flux Group tower at SHEBA: near surface conditions and surface energy budget. J. Geophys. Res., 107 (C10), DOI: 10.1029/2000JC000705 Moscow, 2002.

8. Popovich, V., Ermolaev, V., Hovanov, N., Chirov, D., Konuhovsky, P., Vanurin. S., Acoustics Field's Calculation Optimization on the Combined Approach Basis.//ECUA 2010, July 25-29, Istanbul, Turkey, 2010.

9. Popovich, V., Vanurin, S., Kokh, S., & Kuzyonny,V., Intellectual Geographic Information System for Navigation Safety // IEEE Aerospace and Electronic Systems Magazine, Volume Twenty Five (Number Eight), NY, 2011.

10. Popovich, V., Voronin, M. Data Harmonization, Integration and Fusion: three sources and three major components of Geoinformation Technologies.//Proceedings of IF&GIS, September 25-27, St. Petersburg, 2005.

11. Repina I.A., Smirnov A.S., Heat and momentum exchange between the atmosphere and ice from the observational data obtained in the region of Franz Josef land, Atmospheric and Oceanic Physics., 36, 5, 618-626, 2000.

12. Sarkisyan,A.S., Numerical analysis and forecast of ocean currents, Hydrometeoizdat, 182 p., 1977 (in Russian).

13. Shuleikin, V.V., Physics of the sea, Nauka, 1083 p, Moscow, 1968. (in Russian)

14. UNESCO: The practical salinity scale 1978 and the international equation of sea water 1980. Tenth report of the joint panel on oceanographic tables and standards. UNESCO technical papers in Marine Sciences, Paris, N36, 1981.

15. Zaslavsky, M,M. and A.S. Monin, Wind waves, In: Oceanology, Nauka, V.2, P.146-179, Moscow, 1978. (in Russian)

16. http://www.aari.ru/news/text/2012/ %D0 %92 %D0 %90 %D0 %AD1605.pdf

17. http://esamultimedia.esa.int/docs/Cryosat/Mission_and_Data_Descrip.pdf

18. http://oogis.ru/component/option,com_remository/Itemid,34/func,fileinfo/id,15/lang,en/

19. Popovich, V.V. Concept of Geoinformatic Systems for Information Fusion// Proceedings of 1st International Workshop on Information Fusion and Geographic Information System. St. Petersburg, September 17-20, 2003.

20. Galliano F.R. Earth surface parts classification algorithm based on singular value decomposition method. «Information Technologies». №12, pp. 35-37, 2010 (in Russian).

21. Gene H. Golub, Charles F. Van Loan. Matrix Computations (3rd ed.) Baltimore: Johns Hopkins University Press, 1996.

Collaboration in the Brownfield Regeneration Process – Legally Binding or Informal Approach?

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1 ABSTRACT

The research subject is the analysis of the possible ways to achieve stakeholder compliance in the brownfield regeneration process. The aim of the paper is to show urban planning mechanisms that are used for the establishment of cooperation between different stakeholders involved in brownfield regeneration. It is important to explain the possible ways of collaboration between different institutions, but also between different sectors (public, private and civil society). In the very beginning of the paper, the current trends in the brownfield regeneration are shown, both in developed and post-socialist countries. However, the rest of the text relates to the topic of brownfield regeneration in Central European states. Precisely, the overview of the institutional aspect of brownfield regeneration within the planning system in the Czech Republic and Hungary is indicated. The determination of the responsible institutions for the brownfield regeneration process is of particular importance. Also, it is significant to examine if the collaboration is prescribed by the main laws in the field of spatial planning or not. However, the focus of research concerns the collaborative procedures to achieve the successful regeneration of brownfields. Those results stem from the analysis of the brownfield sites examples. Namely, the first example relates to the regeneration of military complex in the Czech town of Uherske Hradiste, while the second case indicates the regeneration of unhygienic settlement in Budapest. The final section of the paper systemizes the experiences from the developing countries in terms of collaborative procedures in brownfield regeneration process. This provides insight into the possible general model of brownfield regeneration.

2 INTRODUCTION

Brownfield redevelopment is defined as a redevelopment of „any land or premises which has previously been used or developed and is not currently fully in use, although it may be partially occupied or utilized, (…) and which may also be vacant, derelict or contaminated" (Alker et al., 2000: 49). Also, brownfield regeneration can be described as one of the mechanisms for sustainable development (Dorsey, 2003; Grimski & Ferber, 2001), which is specific due to its complexity. Namely, brownfield regeneration involves different instruments – planning, social, economic, political, environmental, etc. Thus the main challenge in such a process is to achieve successful collaboration between different sectors (private, public and civil society), on the one side, as well as between various institutions (within public sector), on the other.

Since the 1980s brownfield regeneration has become a central topic in the most important international documents (RESCUE, 2004; CABERNET, 2009; Stanilov, 2007). This especially relates to urban practice in North America (U.S. and Canada) as well as Western Europe. However, the new millennium trend of sustainable regeneration has also spread to the so-called transition countries. Nevertheless, the mentioned countries tend to integrate European models of urban transformation. Since they established market economies, these countries have become open to global influences and foreign direct investment. According to the views of certain authors, cities have fallen under the simultaneous influence of the local system of social transformation as well as global processes, which created a specific ‚post-socialist' context of urban restructuring (Stanilov, 2007). This is particularly done by the creation and adoption of many local planning documents, which were prepared on the base of western experience.

The issue of the collaboration among various actors in the brownfield regeneration process is considered to be complex, because it is often very difficult to examine and define the interests of different stakeholders. This problem is present even in the developed countries as evidenced by the studies where brownfield regeneration is seen as a specific urban process due to a large number of participants (Dixon & Doak, 2005; Dixon et al., 2008). Communication, understanding and trust among stakeholders are the key goals in brownfield regeneration process. According to the research studies in developing countries, there are two main obstacles to brownfield regeneration. The first one concerns the land ownership, while the second one

relates to the interest compliance and coordination of participants in such a process (Garb & Jackson, 2006: 276; Stanilov, 2007; Zeković, 2007).

The main research hypothesis is that brownfield regeneration process should be placed within the collaborative planning paradigm, i.e. within the context of multiple stakeholders and their often contradictory interests, where the final aim of such collaboration is a consensus building and solution achievement. The aim of the research is to assess the nature and the extent of collaboration in the brownfield regeneration process within the selected cases.

3 REGULATIVE FRAMEWORK OF BROWNFIELD REGENERATION

In the following part of the paper the main institutions – their roles and responsibilities, on different government levels (national, regional and local) will be shown. Also, it is interesting to notice the level of mutual collaboration in order to formulate brownfield regeneration policies. Beside this, the main legislative documents in regard with the brownfield regeneration will be mentioned. In fact, it is important to notice if the collaboration in such complex planning processes is prescribed by the law or not.

3.1 The Czech Republic

As the most important actors in the process of brownfield regeneration in the Czech Republic, the following institutions under the jurisdiction of public administration can be distinguished: the Ministry of Regional Development, National Property Fund – a state agency responsible for the privatization process which after the year 2005 was transformed into the Ministry of Finance, the Ministry of Environment, CzechInvest – a government agency to promote investment in brownfield regeneration projects and the Ministry of Finance (Garb & Jackson, 2010). The review is given in the Table 1 below.

Institution	Functions and Responsibilities
Ministry of Regional Development	• Its role is to provide support to cities and regions in better understanding of the problem as well as the greater cooperation with the stakeholders involved in the process of brownfield regeneration. • Although this ministry does not have all the necessary information regarding the mentioned problem, it can choose outside consultants, with the possible including of foreign experts as well. • It is closely linked with the local government in terms of technical training and preparation for participation in the brownfield regeneration process. • It has the important role in formulating and adopting the Planning and Construction Law.
National Property Fund	• It was founded for the necessity of introducing the guarantees to potential private investors during the regeneration of brownfields that carry not only financial but also environmental risk. • Its role is to provide financial cover for brownfield clean-up costs that were found to be contaminated during the regeneration process. • The key to the success of this organization lies in the accurate re-allocation of money, as well as the exploitation of financial resources only for the brownfield regeneration and not for other state projects.
Ministry of Finance	• It is a key stakeholder in the brownfield regeneration. Firstly, the budget for the process initiation must be approved by this Ministry. Secondly, many aspects of brownfield programs, as well as the legislative reforms directly fall under its jurisdiction. • It has the ability to strategically act on the long-term costs of deferred problems.
Ministry of Environment	• It acts as a technical consultant and supervisor for the National Property Fund. • As the orientation of the Ministry of Environment is primarily focused on meeting environmental demands, the lack of economic pragmatism can make the rigorous standards for environmental protection counter-productive.
CzechInvest	• The success of this agency is primarily based on technical assistance from the European Union in terms of cooperation with European development agencies, and financial support as well.1 • During the years CzechInvest was on the way to become national brownfield support agency, due to its skills and awareness regarding brownfields. • Its main task is not only to make an inventory of the brownfields of industrial origin, but to rethink their use in broader urban context, i.e. offer back brownfields to the market.
Regional Development Agency	• Its function is the regional information system coordination. • Urban planners here have a role in preparing the register of brownfield sites and its update. • The experts represent the key stakeholders who participate in a timely providing of information about all data related to brownfields and to all stakeholders in the brownfield regeneration process. • Also, regional authorities are in charge of preparing development strategies, compiling planning documents and policies, and, finally, using the brownfield priorities in structural funding.
Local government	• The power of this government is guaranteed by the law. • The national Czech government has an active role in providing mechanisms for direct communication between local governments and citizens.

Table 1 – Institutional framework for brownfields in the Czech Republic. (Source: Prepared by author according to Garb & Jackson 2010, 2006, 2001)

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1 CzechInvest has been awarded with 3 million euro for the three brownfield regeneration projects in the Czech Republic (Garb & Jackson, 2001).

Collaboration and joint decision-making on spatial development guidelines is stipulated by the Planning and Construction Law (183/2006Sb). Specifically, planning on the basis of an agreement between the parties (primarily public and private sector) implies in particular at the local planning level. According to the same law, institutional collaboration is needed between the local and regional level planning (PLUREL, 2010). Therefore, it is considered that an appropriate institutional framework exists, but the cooperation of different sectors is required. This would contribute to the effective brownfield regeneration.

3.2 Hungary

When it comes to the topic of brownfield regeneration, several important institutions on the different levels can be outlined (Table 2). Although some experts agree that there is no guiding strategy for the mentioned urban problem at the national level (Foldi, 2006; Kauko, 2010), the activities of some institutions will be mentioned here.

Institution	Functions and Responsibilities
Hungarian National Development Agency	• It is the state agency responsible for the supervision of the „New Hungarian Development Plan" (NHDP) implementation. • Its main role is to collaborate with the representatives of national government, regional development agencies and expert institutions (Hungarian Academy of Sciences and numerous scientific institutes).
National Development Council	• Its main role is to coordinate all the sectors in the field of spatial planning at the national level • It has the important role in monitoring and evaluation of development policies implementation.
Ministry of Interior – Department for Regional Development and Construction	• It has the important role in formulating and adopting the Act on the Formation and Protection of the Built Environment. • It is responsible for the preparation of the Law on Spatial Planning.
Regional Development Council	• Its role is to monitor calls for application for the action period of NHDP and then to evaluate the follow-up applications. • The crucial significance of this authority lies in its function of a mediator. On the one hand, RDA forward information to the Hungarian National Development Agency and, on the other, it is the institution with decision-making competences toward local government.
Metropolitan Government of Budapest	• All the urban regeneration programmes are under the jurisdiction of the chief architect's department within the mayor's office of the municipality of Budapest.

Table 2 – Institutional framework for brownfields in Hungary. (Source: Prepared by author according to Grisel & van de Waart, 2011; Ricz & Salamin; 2010)

Collaboration of institutions that are responsible for the physical development of Hungary is regulated by the Act on the Formation and Protection of the Built Environment only for different sectors at the local level. According to the same document, the local government is responsible for the involvement of local stakeholders in the formulation of urban development policies (Pallai, 2008). Also, one of the priorities in the document „Medium-Term Urban Development Programme of Budapest – The Podmaniczky Programme 2005-2013" is the cooperation of private and public sector at the local level (The Municipality of Budapest, 2005).

4 COLLABORATIVE PROCEDURES FOR SUCCESSFUL BROWNFIELD REGENERATION

The collaborative procedures for successful brownfield regeneration are going to be presented and examined on the two selected case studies. The methodology used for the determination of the nature of collaboration and its extent within the cases is based on the semi-structured interviews (Bičan, 2012; Molnár, 2012; Alföldi, 2012) conducted among the selected actors who were directly in charge of the preparation (planning) phase of brownfield regeneration process. The structure of the interview as well as the section of the article that follows consists of several parts:

- Major stakeholders who have contributed to the project initiation;
- Planning experts in this project – their actions, organization and project management;
- Negotiation process and decision-making procedures in the specific project;
- Identifying the ways to conflict resolution.

4.1 The Czech case – Ex-military complex, Uherske Hradiste

Czech case study for the analysis of the nature of collaboration during brownfield regeneration process is ex-military complex located 500 m east of the historic centre of the city Uherske Hradiste.[2] Location of the former military complex occupies an area of about 17 hectares, which is, on the one side, bounded with the river Morava, and, on the other, with industrial zone. So, this site is a buffer zone between the old town and the industrial area (Bergatt Jackson, 2012).

Initiation of brownfield regeneration process. Although the idea of the regeneration of a given military complex appeared earlier, formal conditions for it have been created during the year 2000 due to the army transformation. In 2001 the official decision of the Ministry of Defense was made according to which the military complex location was no longer needed by the army, and, therefore, could be transformed with a different purpose. The location is then assigned to the city government. At the beginning this was seen as gift of the Czech army, but over a longer period of time the responsibility of local government for the military complex increased. The interviewee emphasized the advantage of the period in which the planning process started, since the beginning of the millennium was marked by „economic growth, the possibility of co-financing by EU funds, cooperation with the scientific community – the newly established state and private universities, as well as the interest of the private sector to new, mostly commercial, zones" (Bičan, 2012). Therefore, the role of planning experts within the local government from the very beginning was not only related to urban development, but also to the strategic planning of the site.

The organization and management of the planning process. In 2003 city administration department for spatial development prepared the first urban location study for the military complex („Land-use study of former military district in Uherske Hradiste"). It served as a basis for future discussions and amendments in accordance with the demands and needs of different stakeholders. In fact, this study was a joint effort by local experts and external consultants – represented by the experts from the planning sector of regional government. This was the typical „form of vertical collaboration, necessary for the regeneration of large brownfield sites in the city central core" (Bičan, 2012). After the public debate within the local government, the study was approved by the City Council. As the local government had to conform to the demands of future financiers (private investors, EU funds, state budget, Zlin region), it was necessary to monitor the planning process and the compliance of future proposals with the existing urban concept. Specifically, in order to control the progressive transformation of former military complex, the city government has established the so-called Management Commission. At the head of the four-member group was mayor, while the rest were directors of different departments of local administration. The mentioned urban concept was first updated in 2004 after the adoption of a tender for a strategic partner in a commercial zone. The decision on financial support for the construction of educational zones from EU funds and budget of the Czech Republic was made next year. Therefore in 2005 original concept underwent additional changes (especially to the educational zones for compliance with the requirements of the EU as a funder). This document was then presented to the public in the form of exhibitions organized by local government, where they could hear the comments of the local community. The final version of the document entitled „Study of the conversion of a military complex in Uherske Hradiste – 3 Update" was adopted in 2007.

Negotiation process and decision-making procedures. Although the Management Commission was responsible for planning process organization, it should be noted that a strategic approach was applied in order to effectively promote brownfield regeneration in the local market. Specifically, all the decisions were made by the Mayor, but on the basis of expert knowledge (local and external experts) in the field of spatial development as well as economy, given that the concept should attract public donations and European regional development fund. In addition to this, from the very beginning direct negotiations were conducted with interested investors. The interviewee particularly stressed the importance of their early involvement in the planning process. In fact „the harmonization of the interests of the public and private sector was the basis not only for the subsequent planning phases, but the financial support of investors in the very beginning accelerated the regeneration process, i.e. the implementation of the concept" (Bičan, 2012). It is also important to note that, due to the successiveness of planning and construction phases for specific zones

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[2] The city of Uherske Hradiste is located in the Zlin region, i.e. in the vicinity of the eastern state border. It has quite good position to two European capitals – Vienna and Bratislava, but the major infrastructure corridors are underused.

across the entire site, the Management Commission throughout the period „was open to new suggestions and solutions" (Bičan, 2012).

Conflict resolution. Among the mentioned stakeholders in the planning process, most conflicts have emerged between local government, which, on the one hand, was weighing the preservation of public interest „without radical modification of the given complex" and, on the other side, private investors whose goal was to "build as much as possible" (Bičan, 2012). However, due to the „pragmatic approach" of the mayor during the negotiation with investors, the so-called 'win-win' solution was achieved. Also, it should be stressed that local governments and private investors were not the only participants in a given process. In fact, applying for European funds implied certain ways of organizing processes (in terms of time limits), but also in terms of conditioning and limiting the domination of only one stakeholder. Therefore it can be concluded that „well-planned and prepared approach to regeneration has created clear and less risky conditions for the arrival of new investors and their activities and investments" (Bičan, 2012).

4.2 The Hungarian case – Ex-unhygienic settlement, Budapest

The selected case study from Hungary is the area of the former unhygienic (Roma) settlement called Corvin (Corvin-Szigony). The site is located within the wider centre of Budapest city, and belongs to VIII district named Jozefvaros (Józsefváros). Corwin covers a territory of 22 hectares and has an excellent strategic position. In fact, the location is well connected to the central city core, it is close to two subway-stations, and also belongs to the corridor route that leads to the airport. On the site there were a total of 1100 social housing units in extremely poor building condition, 800 of which were unacceptable for living.

Initiation of brownfield regeneration process. The regeneration of Corvin site was initiated by the district authority. The reasons for this were numerous, such as ghettoization, dilapidated infrastructure networks, poor building stock, etc. However, having in mind the advantage of this location (its central position in Budapest), district administration decided to initiate the brownfield regeneration process whose "goal was not just to improve the building stock, but also economic, social, and cultural benefit" (Alföldi, 2012). Therefore investors should be included in the process, but also it was important to keep most of the original population (if not at the site, then in the VIII or surrounding districts). However, the initial status of the site was unenviable. A third of the Corvin population was members of the Roma community. In addition to this, at the beginning of regeneration process, private sector representatives were not reliable partners for collaboration. In fact, none of the investors has been able to financially support regeneration in accordance with the original decision of the district to keep the majority of the local population on the site. Only in 2004 the company called Futureal, the largest residential construction contractor in Hungary, managed to buy the site. This emphasizes that from the very beginning, "the most important roles in the planning stages of brownfield regeneration were awarded to public sector" (Molnár, 2012).

The organization and management of the planning process. In 1997 district authority founded Rév8, the Agency for Rehabilitation and Urban Development, which had the role of "expert branch" of local government in the process of Corvin location regeneration (Molnár, 2012). It should be emphasized that the importance of this agency was not only reflected in the technical expertise (the formulation of strategies and policies in urban development, management planning process, development of a plan), but also in an intense mediating the communication between other stakeholders, particularly investors, as well as the local community. The agency was comprised of an interdisciplinary team of highly educated experts (sociologists, geographers, spatial planners, architects). Their task took place on two levels. In addition to the detailed analysis of the social structure of population and the identification of their needs, the detailed analysis of the current building stock state was conducted. The main disadvantage of such an approach related to the long time required for the analysis of about 2500 households, but the advantage of this approach was invaluable. In fact, in this way the interests of those social groups with very low power compared to other stakeholders were protected. Practically, with some benefits from district authority, local people were able to obtain housing unit at the same location (Corvin) or to choose another apartment in the same or neighbouring districts without any financial compensation. Bearing in mind that the original construction stock was of very poor quality, this move of district authority was considered "socially acceptable compromise" (Alföldi, 2012). In the later stages of the planning process, the significant role of the agency Rév8 was reflected in the inclusion of external expertise – representatives of Hungarian and foreign universities. Also, at the request of

investors, the planning process involved both domestic as well as international experts from different fields (architects, experts in real estate, tourism and communications).

Negotiation process and decision-making procedures. Rév8 agency had a key expert position and, what is more important for the complex developmental processes, its representatives were the epitome of mediation and facilitation skills among different stakeholders. However, the decision-making was not within the jurisdiction of the agency, but within the district office called Corvin office. The main role of this office was the control of the agency Rév8, and the control of limits for each phase of the site regeneration. Specifically, at each stage of a complex process, proposals and measures formulated by Rév8 were forwarded to district administration through this office. Although originally Rév8 agency was formed jointly by the district administration, and the administration of the city of Budapest, in the later stages of regeneration process, communication with the metropolitan administration was not intensive. The reason for the lack of vertical collaboration is reflected in the fact that "the mayor did not understand the need for the regeneration of a given location" (Molnár, 2012). However, in addition to negotiating with the local community, the most important role of the agency Rév8 was the mediation between district administration and the private sector – company Futureal. According to the original regulatory district plan from 2002 only residential purposes were prescribed. But in 2005, due to the demands of investors, the plan changed with the aim of increasing mixed-use areas. Local authority of VIII district also showed good negotiation skills with private investor. Although part of the original plan had to be revised due to the requirements of investors, this was actually a reward for a very risky investment, not only financially, but also in political terms. In addition, the investor agreed to the achievement of social benefits (construction of schools and health centres in relation to the planned population, employment of local people in the process of demolition and construction of the building stock, planning of public open space). In addition to expert input, significant negotiations were held with local residents who had been constantly kept informed about new proposals for developing the plan. This form of negotiation was conducted within the agency Rév8 office, within the territory Corvin location, which "is very informal form of communication during the planning process for Hungarian standards" (Alföldi, 2012).

Conflict resolution. The major conflicts during the planning process appeared between district government and the metropolitan administration of Budapest, which resulted in changes to previously established developmental priorities. Namely, the original concept of brownfield regeneration was conceived as a public-private partnership which, with the same investment fund, should involve private sector, local government, as well as the administration of Budapest. Disregarding this rule led to the need for increasing the housing stock on the site. The administration of Budapest donated only 15 percent of the total investment, as opposed to the originally intended one third. District government was not able to fund the remaining 15 percent, so this shortcoming was compensated by increasing the number of housing units compared to originally planned number. However, as the agency Rév8 sought sustainable solution in economic and in social terms, the quality of public space was certainly a priority. Therefore, the realization of the necessary capacity was provided by adding another floor, and not, for example by construction of new facilities (Molnár, 2012). One of the conflicts that arose during the planning phase of brownfield regeneration was the resistance of a number of local people to being moved the site. However, the interviewees submitted that this resignation was the result of political manipulation, because it was inspired by print media, but did not reflect the true attitude of the local population (Molnár, 2012).

5 CONCLUSION

The previous analysis both on macro-level, i.e. regulative framework (institutions and documents regarding brownfield regeneration) and on micro-level, i.e. case study (collaboration in the concrete process of brownfield regeneration) is the sound base for formulating the general conclusions about the nature of stakeholder collaboration in the mentioned process. To be more precise, it is interesting to observe if the collaboration was legally binding or it was a kind of a more informal approach.

When it comes to the Czech Republic, active participation of the city government in the process of brownfield regeneration caused the necessity of finding new approaches to the management process, as well as new methods of obtaining investment (from various sectors). This had the overall impact on the unconventional way of planning and outcome of the planning process. However, as the collaboration in the planning process was required by the law (Planning and Construction Law), we have to stress that the final

document was not the result of only informal forms of cooperation (Bičan, 2012). Namely, the urban study was made in accordance with the mandatory documents at higher levels of planning – "Spatial development policies" (national level) and "Spatial Development Principles of Zlin region". Besides, the formulation urban study was in accordance with the requirements of several different sectors at the national level (which operated in the form of external consultants). In addition to this vertical collaboration, there was also intensive collaboration on a horizontal level between experts in various fields. Interviewee estimated this as a "necessary and very inspiring" (Bičan, 2012).

However, something that makes the regeneration process of a given military complex different to other examples of brownfield regeneration was a way of formulating planning instruments and their character. In fact, it was a "constant process of brainstorming between local government and stakeholders" (Bičan, 2012). So, the process was not accompanied by workshops, roundtables and other forms of collaboration at a steady pace, but the ability to opt for new ideas lasted throughout the whole process of regeneration, thanks to its parallel organization of the different phases (planning and implementation). The result of this planning process was the formulation of urban studies as a final document, i.e. the base for later construction. Although according to the law these studies are not binding, in a given planning process they turned out to be the best solution, for several reasons:

- The study, as opposed to planning documents, is not approved by the administrative body;
- The study does not require a long period of time or a large cash outlay required for its development;
- The study is not "rigid" document and, if necessary, it can be simply changed, which is especially suited private sector.

From the Hungarian case study, we can draw several conclusions. Even though public-private partnerships are prescribed on the local planning level (especially within the "Integrated Urban Development Strategy") as the preferred mechanism for collaboration within the complex developmental process, in planning practice there are very few examples where the mentioned guidelines take effect. However, a public-private partnership in the process of Corvin location regeneration is one of the "most successful examples of long-term cooperation between the public and private sectors, and as such it is recognized at European level" (Molnár, 2012).

Firstly, something that makes the public-private partnership in the Corvin case different to other similar examples is the fact that the key role of the planning process was entrusted to an independent expert agency Rév8 who mediated between both sectors (public and private). This kind of planning process organization was for the first time in Hungarian urban planning practice implemented at the site Corvin, and since then it has been used in other similar cases (Alföldi, 2012). The special value of this approach is seen in the fact that "urban planning is understood as a management process, and not a rigid adherence to the planning basis" (Alföldi, 2012). The specificity of stakeholder collaboration is their common pursuit of sustainable vision of site development (in economic, social, and cultural terms), as well as of including a number of other stakeholders, which are important for different aspects of the planning process. Thus, graduate students from Harvard University participated in the formulation of the planning concept in accordance with determined vision and development objectives formulated at the beginning of the planning phase on the basis of consensus among relevant stakeholders. Local community was not active in the creative sense, but they had economic benefits. Namely, one of the conditions of district authority was the creation of new jobs while promoting employment of the original inhabitants of the Corvin location.

Also, what makes this case specific in terms of collaboration is the cooperation with civil society. The role of this sector in formulating brownfield regeneration policies is often limited, and decisions are made without public debate (Keresztély & Scott, 2012). However, the case of Corvin regeneration was different. Namely, the investor interests were not achieved at the expense of the interests of the local community. The local population succeeded to preserve local values through an organization called Grund. Namely, a former gathering place of local people was recognized as a local cultural value and, with the involvement of local community and agency Rév8, it was accepted by investors as a carrier of identity of Corvin site.

6   REFERENCES

ALFÖLDI, G. (Personal communication). 24 July 2012.

ALKER, S., ROBERTS, J., SMITH, P. The definition of brownfield. In: Journal of Environmental Planning and Management, Vol. 43, Issue 1, pp. 49-69. 2000.

BERGATT JACKSON, J. (2012). Example of Brownfield Regeneration – Best practice in barracks redevelopment – Uherske Hradiste, Czech Republic (unpublished paper).

BIČAN, J. (Personal communication). 9 July 2012.

CABERNET (Concerted Action on Brownfield and Economic Regeneration Network). Sustainable Brownfield Regeneration. 2009. Available at: http://www.cabernet.org.uk (cit. 10.12.2009).

DIXON, T. & DOAK, J. Actors and drivres: Who and what makes the brownfield regeneration process go round? SUBR:IM Conference. Sheffield, 2005. Available at: http://www.subrim.org.uk/publications/subrim1stconference/1030_1100actorspaper.doc (cit. 25.11.2008).

DIXON, T., RACO, M., CATNEY, P. & LERNER, D. N. Sustainable Brownfield Regeneration: Liveable Places from Problem Spaces. Chichester, 2008.

DORSEY, J. W. Brownfields and Greenfields: The Intersection of Sustainable Development and Environmental Stewardship. In: Environmental Practice, Vol. 5, Issue 1, pp. 69-76. 2003.

FOLDI, ZS. Neighbourhood Dynamics in Inner-Budapest. A realist approach. In: Netherlands Geographical Studies, No. 350. Utrecht, 2006.

GARB, Y., JACKSON, J. The search for brownfield leadership in Central European Cities: Overview and case study of the Czech Republic. Paper presented at the ITDP brownfield seminar – Recycling Urban Land. Prague, 2001. Available at: http://www.brownfields.cz/wp-content/uploads/2008/04/brownfield-leadership-in-ceec-2001.pdf (cit. 5.12.2008).

GARB, Y., JACKSON, J. Central Europe's Brownfields: Catalysing a Planning Response in the Czech Republic. In: Altrock, U. et al. (Eds.): Spatial Planning and Urban Development in the New EU Member States – From Adjustment to Reinvention, pp. 271-286. Hampshire, 2006.

GARB, Y., JACKSON, J. Brownfields in the Czech Republic 1989-2009: The long path to integrated land management. In: Journal of Urban Regeneration and Renewal, Vol. 3, Issue 3, pp. 263-276. 2010.

GRIMSKI, D., FERBER, U. Urban Brownfields in Europe. In: Land Contamination & Reclamation, Vol. 9, Issue 1, pp. 143-148. 2001.

GRISEL, M., VAN DE WAART, F. (Eds.) Multilevel Urban Governance or the Art of Working together – Methods, Instruments and Practices. The Hague, 2011.

KAUKO, T. Where have all the planners gone? The Law of the Wolf in an Era of Ignorance. Paper presented at the Regional Studies Association Conference. Pecs, Hungary, 2010. Available at: http://www.regional-studies-assoc.ac.uk/events/2010/may-pecs/papers/kauko.pdf (cit. 10.5.2011).

KERESZTÉLY, K., SCOTT, J.W. Urban Regeneration in the Post-Socialist Context: Budapest and the Search for a Social Dimension. In: European Planning Studies, Vol. 20, Issue 7, pp. 1111-1134. 2012.

MOLNÁR, G. (Personal communication). 24 July 2012.

PALLAI, K. Hungary. In: Ryser, J. & Franchini, T. (Eds.): International Manual of Planning Practice (IMPP), pp. 156-166. The Hague, 2008.

PLUREL (Peri-Urban Land Use Relationships – Strategies and Sustainability Assessment Tools for Urban-Rural Linkages). National spatial planning policies and governance typology. (Deliverable Report 2.2.1). 2010. Available at: http://www.plurel.net (cit. 25.5.2011).

RESCUE (Regeneration of European Sites in Cities and Urban Environments). Guidance on Sustainable Land Use and Urban Design on Brownfield Sites. (Work Package 4, Deliverable 4.1). 2004. Available at: http://www.rescue–europe.com (cit. 5.12.2008).

RICZ, J., SALAMIN, G. (Eds.) Handbook for the National Implementation of the Territorial Agenda of the European Union – The Case of Hungary. Budapest, 2010.

STANILOV, K. (Ed.) The Post-Socialist City: Urban Form and Space Transformations in Central and Eastern Europe after Socialism. Dordrecht, 2007.

THE MUNICIPALITY OF BUDAPEST. The Podmaniczky Programme 2005-2013: Medium-Term Urban Development Programme of Budapest, Summary. Budapest, 2005.

ZEKOVIĆ, S. Prostorno-planska politika i industrijski braunfildi u gradovima Srbije. In: Danilović, K. et al. (Eds.): Oživljavanje braunfilda u Srbiji, pp. 61-70. Belgrade, 2007.

Conceptual Assessments on Epistemological Differences in Tactical and Strategic Spatial Planning

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1 ABSTRACT

Purpose: In spatial processes, the terms strategy and tactic have frequently appeared without any clear distinguishing. Strategic knowledge have tries to defining visions of urban space through answering "What" and "Why" questions and its knowledge is the abstract knowledge, while tactical knowledge is the experiential knowledge via answering "How" question. Strategy and tactics are both terms from a military context where strategy has referred to long-term war planning and worked from the power position to force its components to accept the prevailed condition in contra to tactic as short-term flexible battle planning. The strategic conventional ideologies empty of tactical policies have therefore destroyed built spaces memories to organize urban society according to elite's tendencies. The Equivalent of strategy in urban planning is Master plan.

Tactics have not operated such dictated forces since They are bottom-up spatial practices. Bottom-up dynamics causing to flexibilities of the prevailed ideologies of the upper policies, Hayden calls those short-small actions (Tactics) "power of places" to challenge homogenous urban planning to keep planning far from a frozen platform of time.

Findings: Thereby, strategic spatial planning without tactics has justly characterized as an abstract phenomenon. The tactics developed by ordinary people are at root attempts to negotiate power relationships, discourses and representations of identity. To develop the empowered spatial planning, the synergic relations amid localities tactics and strategies have implemented for tackling with the stochastic world.

Results: The paper has aimed to solve the problem of misunderstandings in tactics and strategies definitions and applications in urban planning. Additionally through explanations of strategies and tactics differences in spatial planning, the project has tries to argue that strategy of locality cannot be duplicated like spatial tactics imitating all over the world. Localities got used to dismantling other localities strategies and tactics to enhance their situation in the competition platform of neo-liberalism. However, a strategy is hard to duplicating such tactics. Strategies and practices (Tactics) have shaped the everyday life of inhabitants. And urban planning should make balance in utilizing both. Additionally locality should not imitate spatial tactics and strategies of other localities. Otherwise, it has reified spatial tactics and strategies. Every locality has own priorities to consider in urban planning.

Originality: In planning literature, implementing spatial strategies have not been the recent phenomena. The differences have reverted to the deficiency of synergic relations amid tactics and strategy. The conventional regulated spatial planning has generally formulated without spatial tactics to reach spatial goals while to tackle the real world future, the reciprocal connections of tactics and strategy have gotten priorities. In other words, planning has to move on toward an experimental science of planning.

With considering the novel re-configuring urban planning, the paper has tries to shed light based on simulating urban planning via "Artificial Intelligence" achievements. This will support arguments on systematic planning definitions to control the uncertain world. In moving form toy-world domains that characterized early conventional planning, we are looking at a wide range of issues, including reasoning in uncertain worlds, interacting with processes and events beyond the agent's direct control and controlling systems in real non-linear time. The disciplinary background of the paper is philosophical-epistemological. The enquiry is conceptual.

2 INTRODUCTION-DYNAMIC AND UNCERTAIN DOMAINS; PLANNING WITH STOCHASTIC ACTIONS

One of the main concerns of socio-spatial policy makers all over the world is to improve their ability to anticipate and control the future. Designing human futurity, whether long or short-term is not a simple matter. The sophistication involved in dealing with ongoing fundamental changes in modern societies challenges the ability to control human futurity and to sustain continuity. Here our concerns in the following exploration are time perception and time management in public policy. Public policy literature is generally farmed in terms of long term and short term policies where this study suggests juxtaposing "tactical policy

time" and "strategic policy time". Tactical policy time- short time- is defined as "taking a specific time-related plan or action aimed at achieving a defined policy result". Strategic policy time has defined as "taking a specific time-related plan or action with the aim of coping better with uncertainty in the future". These arguments have invited attentions on time-related planning or action aiming to achieve a defined policy result or cope better with uncertainty in the future". The mapping of time management in public policy generally indicates two main trends: 1- a pragmatic trend-short-term policy has based on the response-oriented policy (Tactic) and 2- a normative trend-long-term policy inspired by "the voice of the future" to avoid uncertainty" (Strategy).

In other words, "Why do we plan?" Planning is to respond necessities of real world. To control real world, there are two focus points: coping with uncertainties and real time planning. The planning knowledge is incomplete process. The process definition of planning has gotten back to non-predicted events in the world by which control and pre-determination of domains have not been done completely. The planning has to discovery new approaches of intervention in the world such reactive planning, tactical planning and conditional planning.

The arguments have supported that the planning process has not only defined due to theoretical discussions but also that has included the practical exercises. The planning process requires mutual connections of theory and practice. Tactical, reactive and conditional planning has justly supported the incremental practical planning. Controlling the world with stochastic actions where linear and universal plans have not functioned any more, incremental and conventional spatial practices combinations have insistently emphasized.

Therefore, planning in realistic domains has forced us to confront two main issues: uncertainty and urgency. Uncertainty arises since the planner is neither omnipotent, omniscient one nor alone in the world to control stochastic actions. The paper aims to consider spatial planning as the automatic planning by which planning has prepared to any stochastic actions of the world in which has witnessed the social, economic, environmental and politic upheavals. That does not mean, refuting result rationality of conventional planning in which its rationality measures how efficiently the plan achieves its specified objectives. Planner should re-construct planning with making balance between result rationality of conventional planning and process rationality of tactical planning.

The lost and disregarded part of planning in dynamic and uncertain world has characterized via tactical planning. Planning has been a process changing its long term focus point toward short term planning. Nilsson has proposed the concepts of actions networks for reactive planning/tactical planning. Actions networks differ from universal plans in that they allow the formation of action hierarchies (Hanks, 1990). This supports argument that we view planning as the process and planning has been converted from long term prospects into short term tasks and That does not equal to throw out the strategic planning and justly focused on tactical planning since the planning process must consider both the strategic and tactical aspects of planning to achieve empowered spatial plans.
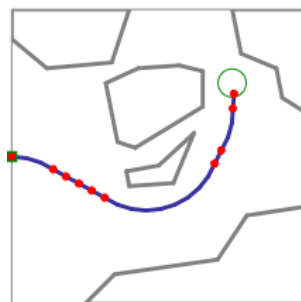
Fig.1: from an initial configuration (solid square) to a goal (open circle) – Source: (Alterovitz, 2007)

Tactical or incremental planning has emphasized on tasks/ actions which achieve short term goals. Purely strategic planning cannot immediately react to a changing world while tactical planning can answer changes quickly. The traditional planning logic is Boolean logic where the values of variable are the truth values, truth and false, usually denoted 1 and 0. However planning is the process and it has formulated in between 1 and 0. The deductive knowledge of Boolean planning has distrusted on urban society with stochastic actions. The figure 1 has simulated spatial planning with intervention of Artificial Intelligence (AI) in the sphere of urban planning to emphasize on importance of tactics in controlling the stochastic world. There is a

Robotic motion planning that explicitly considers actions (Tactics) to control probable uncertainties, avoid collisions and successfully reaching a goal. To reduce system failures, Markov decision process formulates dynamic planning to optimize Robotic motion in the selected path to achieve its goals.

The remainder of paper is organized as follows; section 2 explanation on non-linear world and the world of cause and effect to declare necessity of dynamic planning, section 3 discussion on planning re-cognition names "empowered planning", "synergic phenomena" and "strategic and tactic imitation", section 4 discusses result and future work.

3 PLANNING AS TEMPORAL REASONING; NECESSITY OF DYNAMIC PLANNING

We have invited attentions on modeling dynamic planning rather static traditional planning due to realities of the non-linear real world. Traditional conventional planning has been a model of planning with certain goals whereas in a-changing world, witnessing planning with certain goals has not been the possible phenomenon. The linear world and the perception of cause and effect is simply a trick of the mind to create the illusion of predictability and control. Thereby, tactical spatial planning which has characterized as a short range planning emphasizing on the current operations of various parts of the spatial complex and non-linear system has not been ignorable anymore. Short range has defined as a period of time extending about one year or less in the future. Figure 2 has discussed on the time non-linearity amid events in spatial system. Inhabitants often claim that it is easy to see how the events unfolded with hindsight in linear time. However, it is often possible to understand events reasons with foresight. Additionally events can happen simultaneously instead of the linear pre-determined perspectives and the spatial layouts have been witnessed hidden and complex non-linear causes and effects.
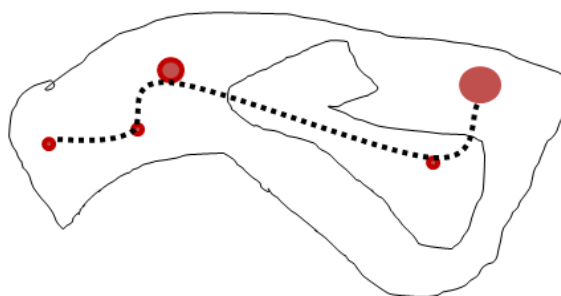
Fig.2: dashed line: linear time, filled points: events in spatial layout – Source: by Author

In the real-world framework, there is not any linear reality. The complex spatial system has embedded with pluralities of actions by which the urban system has directed to complexities of causes and effects. The spatial temporal actions have taken place on self-emergencies and planned bottom-up activities. Figure 3 has explained realities of real world where actions have made influences upon each-others and created complex non-linear systems.
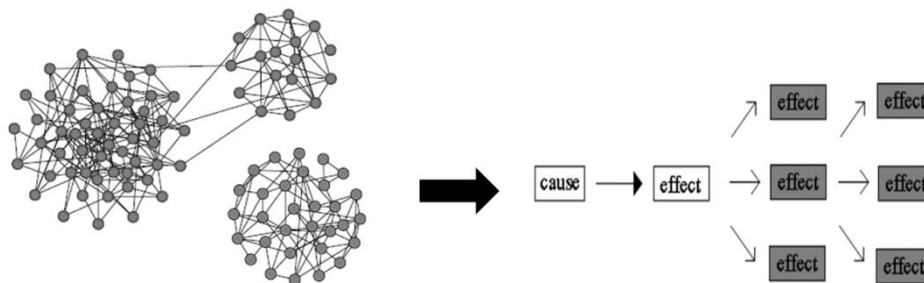
Fig. 3: Cause and effects dynamics of bottom-up spatial activities – Source: by Author

The bottom-up planned actions are spatial tactics/reactions by which time and space proximity is achieveable to control urban society's upheavals, in figure 4, the incremental tempo-spatial changes have been manifested. The emphasizing on relationship between space and time has been formulated in the most diverse planning theories.

The next section of the paper has discussed on re-formulating planning named "empowered planning" through integrate tactical spatial practices in conventional classical planning to configure planning system.
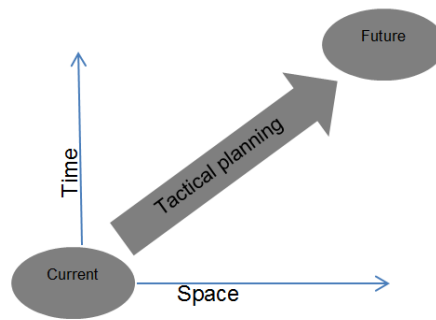
Fig.4: co-existence of time and space in tactical planning; 1- the efficiency: is the operational level of planning via asking" how can we best deploy and control resources?" 2- the effectiveness: is the tactical level of planning via asking" how can we best organize ourselves to reach success?" 3- the competitiveness: is the strategic level of planning via asking" what are our aims and what are marketable to do global competitiveness?" – Source: by Author

4   PLAN RECOGNITION; EMPOWERED PLANNING

Strategic planning has emphasized on the analyzing future and tactical planning has functioned on controlling everyday life, despite their differences, tactical and strategic planning is internally related. System without strategy only based on tactics leads to shooting in dark. Sun Tzu innovation on "The Art of War" has taught the strategy such the timeless lesson as humans' nature. Strategy and tactics have depended on each other. Goldratt has defined "Strategy" as, simply, the answer to the question: "What for?" (The answer is the objective of a proposed change). "Tactic" has been defined as, simply, the answer to the question "How to?" (The answer is the details of the proposed change). From these definitions, it is clear that every Strategy (What for?) should have an associated Tactic (How to?) and therefore Strategy and Tactic must always exist in "pairs" and must exist at every level of the organization (Figure 5).
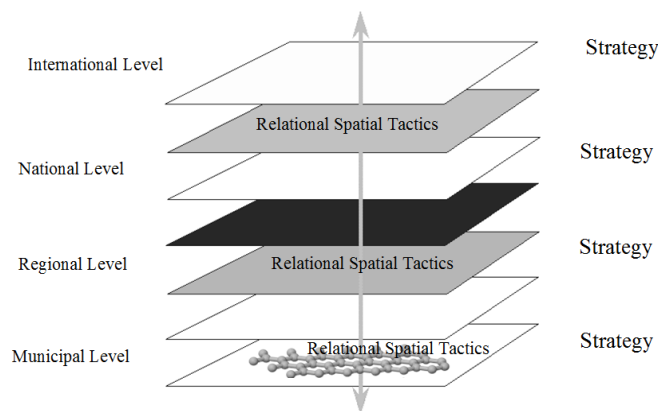
Fig. 5: every level of organization such Municipal level has composed of strategic vision and relational spatial tactics which has connections with the upper plans such regional levels orderly – Source: by Author

Tactical planning should focus on what to do in short term to contribute the spatial organization achieving the long term objectives determined by strategic planning. The short term tactical policies are more common in the political competitive sphere where citizens involvement in public sphere management. In the area of planning, there has been considerable debate about whether top-down or bottom-up planning is best spatial practice. However the empowered planning model has combined and made balance between long term and short term planning. Foucault's (1991) notion of 'governmentality' has also composed of active tactics and strategies by governments and agents. Strategy without tactics is the slowest route to victory. Tactics without strategy is the noise before defeat.

The conventional instrumental planning has modeled relied on the rational calculation is also the strategic challenge apart from tactical policies. However, great upheavals in uncertain world have led to the lack of trust on rational calculation empty of spatial tactics to control the stochastic actions. To support the argument, Friedman (1987) said that municipal level of the spatial development cannot justly answer local

spatial dynamics via upper policies strategies, but it has to consider the local bottom-up knowledge and plan spatial tactics to reach strategic goals of the locality. In planning literature, it is time to integrate tactical spatial practices in conventional strategic planning. In this sense, the planning organization has simulated the novel "process policy" on spatial planning which Habermas (1995) has put forward that on "communicative action theory". Generally, "strategy" is really at the highest level of spatial systems by which the directions of all activities are dictated and "tactics" are lower down in spatial systems and define the activities that are needed to implement the Strategy, then where does "Strategy" end in which do "Tactics" begin.

The figure 6 has represented differences on strategic and tactic perspectives in detail by which the paper next argument has clarified via declaring difficulties on imitating spatial strategies rather socio-spatial tactics.

Strategy	Tactic
Future (Longer Term)	Now (in the moment)
Preparing and Planning	Doing activities
A journey	A trip
Broad perspective	Narrow perspective
A purpose	A task
Anticipation	Reaction
Risk	Caution
Important	urgent
Difficult to copy	Easy to copy
Large scale	Small scale

Fig.6: strategic and tactics differences-source: by Author

4.1 Strategic and tactical imitations

Imitation strategy is the strategy that mimics the strategy of other territories where have performed this kind of the imitation strategy to attract global capitals. This strategy is an illegal and unethical activity on condition that territories inner dynamics have refuted (Figure 7).
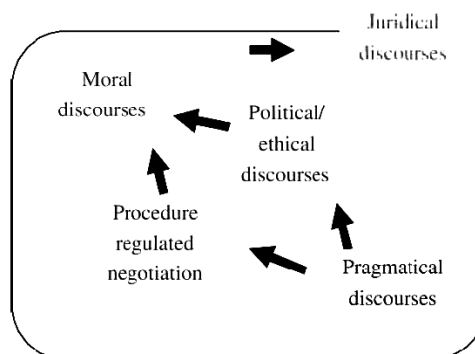
Fig.7: the bottom-up ethical process- Source: (Nielsen, 1994)

Duplicating spatial tactics without paying attention on territories authenticities and dynamic bottom-up knowledge should keep away. In reality, tactics vary with circumstances and, especially, technology. Alan Emrich says, "If I were to teach you how to be a soldier during the American Revolution, you would learn how to form and maneuver in lines, perform the 27 steps in loading and firing a musket, and how to ride and tend to a horse. Naturally, yesterday's tactics won't win today's wars – but yesterday's strategies still win today's wars… and will win them tomorrow and into the future. Therefore, strategy and tactics require a different focus." After debating on necessity of strategic and tactical planning authenticity to dismantle empowered spatial planning, it will be more interesting to concentrate on in what manner spatial tactics have integrated in urban planning through "synergic planning".

4.2 Synergic Planning

Synergy comes from the Greek word synergia, meaning joint work and cooperative action. Synergy is when the result is greater than the sum of the parts. Synergy has been created when things work in concert together to create an outcome that is in some way of more value than the total of what the individual inputs is. The synergic phenomena have supported "What to change, but more importantly, what not to change and especially How to implement the changes and Why." Empower planning has ethically planned socio-physical-spatial changes owing to making synergy amid different spatial localities of urban systems such

synergy in between two localities strategies and tactics towards planning overlapping to reach mega goals of a territory (Figure 8).
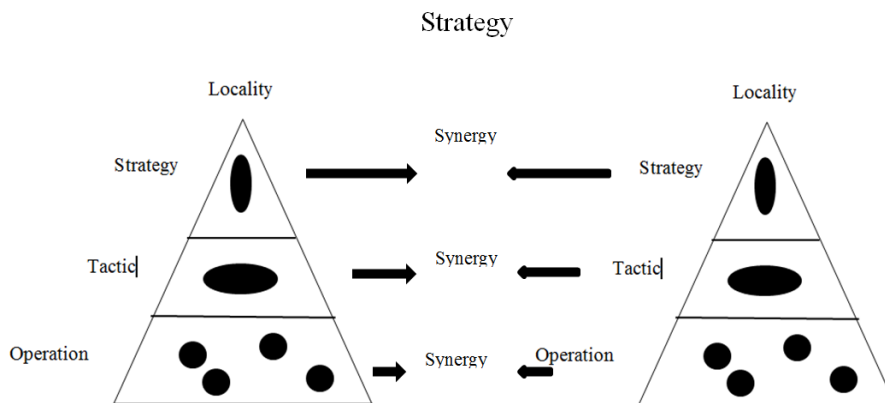
Fig.8) synergy in between two localities strategies, tactics and operations – Source: by Author

5   CONCLUSION

The conceptual discussed arguments have attracted attentions on empowered planning not to avoid uncertainties, but to control uncertainties. This supports arguments that inclusion two planning epistemologies ; tactical and strategic policies have led to easily deal with stochastic world. And planner and geographers have attracted on "real time planning" where the long term planning and short term planning have combined and utilized in balance. This research has tries to introduce a new mode of intervention in planning since the empowered planning is the sub-ordinate to system theories. System theories focus on complexity and system inter-dependencies. The system theory followers in the field of sociology also give light to what is happening in the socio-spatial context. Among them, Nikolas Luhmann argues the significance of the continuity of social processes and inter-activities among parts in such processes.

6   REFERENCES

Alterovitz, R., Siméon, T., and Goldberg,K. (2007) "The Stochastic Motion Roadmap: A Sampling Framework for Planning with Markov Motion Uncertainty," Proc. Robotics: Science and Systems.

Amdam, R. (1997) Empowerment planning in local communities, International Planning Studies, 2(3), pp. 329-345.

Amin, A. & Thrift, N. (1995) Globalization, institutional "thickness" and the local economy, in: P. Healey et al.(Eds) Managing Cities: The Urban Context, pp. 91–108 (London: John Wiley).

Christiensen, A.D., Goldberg, K.Y. (1990), Robotic manipulation planning with stochastic actions, proceedings of the workshop on innovative approaches to planning, scheduling, and control, San Diego, CA: Morgan Kaufman,pp.3-5.

De Certeau, M. (1984) the practice of everyday life, University of California press, pp. 29-60

Emrich, A., Principles of Game Design- Available online:

<http://www.alanemrich.com/PGD/PGD_Strategy.htm>

Foucault, M., (1991) Governmentality in Burchell G, Gordon C and Miller P eds The Foucault effect: studies in governmentality University of Chicago Press, Chicago IL, pp. 87–104

Friedmann, J. (1987) Planning in the Public Domain, From Knowledge to Action (Princeton, NJ: Princeton University Press).

Habermas, J. (1995) Between Facts and Norms: Contributions to a Discourse Theory of Law and Democracy (Cambridge: Polity Press).

Hanks, S., Firby, R.J., (1990), Issues and Architectures for planning and execution, proceedings of the workshop on innovative approaches to planning, scheduling, and control, San Diego, CA: Morgan Kaufman, pp. 377-381.

Herting,S., Stein,L. (2007) The evolution of Luhmann systems theory with focus on the constructivist influence, International Journal of General systems, Vol. 36, No. 1, pp.1-17.

Hyung Hur, M (2006) Empowerment in terms of theoretical perspectives: Exploring a typology of the process and components across disciplines, Journal of Community Psychology, 34(5), pp. 523–540.

Kristian Mork, A., & Abrahamsson, S., (2012), Empiricist Interventions: Strategy and Tactics on the onto political Battlefield, Science studies, Vol.25, No.1, pp.52-70

Langley, P., Drummond, M., (1990) toward an experimental science of planning, proceedings of the workshop on innovative approaches to planning, scheduling, and control, San Diego, CA: Morgan Kaufman, pp.109-114.

Leydesdorff, L., (2010) the Communication of Meaning and the Structuration of Expectations: Giddens' "Structuration Theory" and Luhmann "Self-Organization", Journal of The American society for information science and technology, Vol.61, No.10, pp. 2138-2150.

Moshe, M., (2010) it is about time: policy time, policy studies, Vol.31, No.3, pp.319-330.

Nielsen,K. (1994), How to proceed in philosophy: remarks after Habermas, Theoria, Vol.60., Issue 2, p.2007.

Sacerdoti, E.D., (1974) planning in a hierarchy of abstraction spaces, Artificial Intelligence, Vol.4, pp.115-135.

Creating Collective Memories in Urban Spaces of Iran

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1 ABSTRACT

The aim of all kind of arts such as painting, theater, music, and cinema is impressing on their users and we can find it in architecture and urban designing as well.

In the other words urban designers like other artists want to make a permanent impression on their users who generally are citizens and tourists.

In this matter a designer faces with two major categories to make a memorable urban space:

(1) Spaces where a historical – social event have happened on them. So this space has become special and memorable and designer should try to amplify and emphasize on this space and its memory both.

(2) Designing some spaces that could create a pleasure and eternal memory in mind and make a suitable container for social interaction and civic vitality. Hence citizens and tourists encourage using this spaces continually.

In Iran the factor of being memorable has been ignored in most of our urban spaces so we have some ugly, messy, and unvalued urban spaces in our cities.

However the greatest responsibility of an urban designer is making some spaces that make all the visitors to appreciate and remember it and even advise other people to see and use that space ,but unfortunately today there is a very few attempt to make such memorable spaces which make the identity of our cities.

In Iran we also use some kind of art working in our urban spaces such as fresco, sculpture, tile working and so on, but here again we see that most of these objects couldn't impress the people perfectly and nobody pay attention or remember them. So these designs and spaces become unsuccessful in spite of the fact that Iran has a very rich and considerable history in art and architecture and urban designing.

The propose of this article is discussing about making memorable "urban spaces" and "collective spaces" in Iran and how we can amplify and reinforce the factor of memory in them and what strategies could be suggested about it .

2 COLLECTIVE SPACES

Collective space is the place of social living of people and creates the spirit of the city. In recent cities most of these spaces have been disappeared or are being destroyed.

These spaces are often completely open but in some cases they can be covered partly or completely.

Collective memories are not only some negative spaces which merely relate buildings to each other and unify them but they identify the special function by locating entrances and buildings in a collective space.

Two kind of collective spaces : (right) Iran – (left) Vienna

2.1 Collective memory

Collective memory is a common image from the space which is created in visitor's minds because of an important historical event or a beautiful and exclusive view and forms a common sense in them.

2.2 Locations and places to form a collective space

We can categorize the collective spaces as follows:

- Squares ,main streets and major urban complexes

- Parks and urban green spaces

- Passages , open spaces, and green spaces in regional and district scale

- Elements of the services of city such as : the courtyard of large mosques, "Hosyniye"[1] , common passages of Bazar

Mir Chaghmagh Urban complex-Iran, courtyard of mosque- Iran

Traditional Bazar –Iran, pedestrian passage – Iran

2.3 The effective elements and spaces to create collective memory in users

Furniture is necessary to complete the decoration of cities. There are like some decorative elements such as flowers on walls or on the dining table in a house. All of them intend to give pleasure to users. Function is the main role of various urban facilities. Columns, clock tower and fountains all have function even they are some simple natural elements such as plants.

2.3.1   Urban furniture

Furniture has an important role in making a space memorable. If furniture create the possibility of attendance and stop of visitors and make a memorable image in minds, we can say that this collective space is successful in making memorable. Here we just discuss about two major elements of urban furniture, benches and kiosks:

Benches:

Benches in urban spaces could be a simple cubic form which is suitable for a short rest.

The other kind of bench is a more comfortable bench supports the body properly, distributing weight evenly over the surface of the seat.

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[1] some spaces in Iran which religious activities hold in them

The location of bench is important. It should be placed at a natural resting point on a path or in a square, but located with its back protected, in a shelter position from which it is possible to see interesting views and observe the activities of others while still feeling secure.

A cubic bech – netherland

Kiosks:

This word drives from a Turkish word "Koshk". The Parisian kiosk used for advertisements and newsstand is a best method to present the news and if plaster over walls takes on the appearance of graffiti. There are many types and uses of kiosks such as the telephone box. Probably the most interesting and potentially the most decorative kiosk is the bandstand. They can be found in many European cities, often taking from of a light circular or octagonal structure with raised platform and pyramid roof. They are usually placed in a space surrounded by benches. If kiosks correctly judged, the form, location and surrounding space can create a vital, lively and decorative place in a city scene.

A bandstand- England

3 URBAN SPACE AND INFORMATION FIELD

Urban spaces should have a rich information field and it is proved that increasing of the information in an urban space create a beautiful, exiting and memorable scene and it is the reason of why there are a lot of visitors for historical cities such as Venice , London , Paris and Esfahan and not for modern urban spaces.

Here two elements are essential:

- Context
- accessibility

Context is the information that exist on a screen (like a message on a paper)

Accessibility is affording to receive the information (like the simplicity in reading a message).

3.1 Being fractal

Being fractal in spaces allows getting new details by zooming in several stages. These fractal elements present the whole of themselves but modern urban spaces don't have this property so they are not attractive. Details of traditional urban space and buildings which are clear and coherent have fractal property and it cause that the visitor be impressed. Permeability is another property of fractal. In historical cities colonnades, arcades and facades of buildings have a great permeability which makes the exchanging of information

easier, like a roundabout river that has a complicated route which prevents from simplicity and monotonous of the scene of river.

The main problem is imposing the fractal property in human scale. For example a colonade could be fractal when the distances between its columns are 1 to 3 meters because these measures are compatible with human percept.
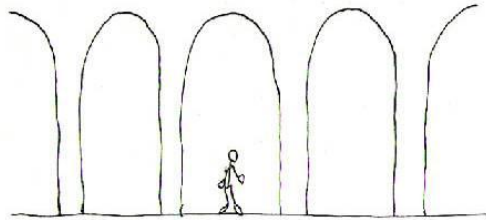
A colonnade with 1-3 meters between their columns is fractal in human scale
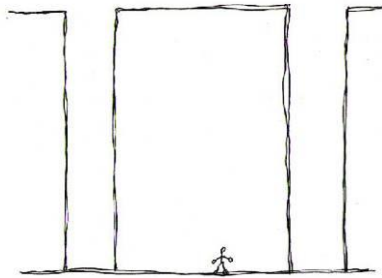
Not respecting of human scale prevent the perception of fractal structure

Old cities are interesting, visitable and memorable because of being fractal in human scale but contemporary urban spaces because of following the modern style which suggest purity and avoiding ornaments and complicating are spaces that don't have influence of their visitors.

Actually a tree has a lot of points to touch and see than a modern glass cube which modern architecture recommend it. Today our cities have become some places that are inhuman and decayed for people especially for children. So we can conclude that a collective urban space couldn't be a successful and memorable space without having fractal property in human scale.

Being fractal makes the collective space more visitable and attractive – Iran

3.2 Three principles of a successful urban space

Regarding to above information to create a successful urban space we should respect three major principles:

- Urban space should be surrounded by some surfaces which present clear information
- The network of pedestrian and vehicle should be neat and identified
- The core of urban space should be allocated to pedestrian to be preserved from non-pedestrian traffic

3.3 The influence of the style of civic art on common perception

Surveying shows that using realistic style in urban spaces causes more perception and user can remember these spaces more clearly and in contrast using abstract styles will cause less memory from these spaces.

Civic arts with realistic style are always more attractive and memorable than artworks in abstract style – Iran

3.4 Categorizing collective spaces in various scales

After considering the criteria of urban spaces we can categorize these spaces in various scales such as "urban", "regional" and "sectional" scale.

Squares are major type of these kinds and in urban scale it has a large role in civic life. These squares could be used by citizens as a pleasant and functional place and in this way some special places with individual feature will be appeared.

The centers of historic district of Iran in old fabric all reflected the social – cultural features because of some nodes and some distinct elements such as mosque, "Hosyniye", stores or even an old tree. In these places meeting and social interaction occurred and in the other word civic vitality was enforced in these spaces.

A collective space in sectional scale –Iran

3.5 Definition of users of urban spaces

The activity of people can be divided in two groups: essential activities and optional activities. All of these activities have different features so they need different physical environment.

Essential activities are mandatory such as going to school or work, shopping, and standing in the line of bus, these activities is affected from the physical environment very few because they should be done every day and anywhere.

The optional activities will be occurred when people intend to do it and time and place help them to do that such as walking in fresh air, standing and watching the people and so on.

These activities are occurred when the circumstances of outdoor places are pleasant and the weather is fine. The relation of this kind of activities with designing of common spaces is more than other activities, because most of recreational activities are being done outdoor.

If outdoor places have low quality people will just do necessary activities but if outdoor environment creates a beautiful and favorite atmosphere people prefer to attend in streets and squares much more and even they would rather walk than pass through with vehicles. Architects and urban designer can improve social interaction in a city.

Like an architect who can provide an invitatory space by using suitable material, forms and colors, urban designers can produce pleasant and unpleasant spaces as well. They can provide a vivid city or apathetic one.

Improving urban spaces can effect on social interaction and daily activities. This effect can be seen in passages and common spaces. Scattered houses will diminish social event and also remove the relation between people. In many old cities people gathered in the squares and encouraged to walk and attend in open spaces.

3.6 Imposing some codes for designing urban spaces to enforce collective memory

The quality of vitality in a city is measured by its social relations and attendance of people in its space. If the citizens of a city don't want to use the urban spaces, it doesn't have a good quality. An urban designer with respecting all aspects could create a city with better civic vitality and here we mention some factors and guidelines in doing that:

(a) Enforcing social relations

People needs social interaction, increasing social relations causes the vitality of cities. We can use these guidelines to enforce social interaction:

- Holding ceremonies and rituals which create social interaction and made people to be familiar with each other
- Respecting hierarchy in the sections of city and locating distinct elements (kindergarten, educational centers, mosques, clinics) in the middle of districts
- Supporting NGOs , organizations and association in the way that this associations could attract all ages and groups of people
- participating of citizens in governing the city

These are some guidelines that we can use them to enforce social interaction and relationship of residences to enforce "the neighborhood" concept as much as possible which have very good side effects.

Holding "Ashoora" ritual ceremony as an important social event – Iran

Holding some festivals – Iran

(b) pedestrian accessibility

Strolling in city and its urban spaces means that this city should have pedestrian accessibility.

Experience in a city without walking in city is impossible and events couldn't be found without strolling in city. A pedestrian network makes different images and pictures from the city in minds.

By this pedestrian network scattered parcels in contemporary cities could be jointed to each other and create a coherent image in minds. This network can create a collective memory as well.
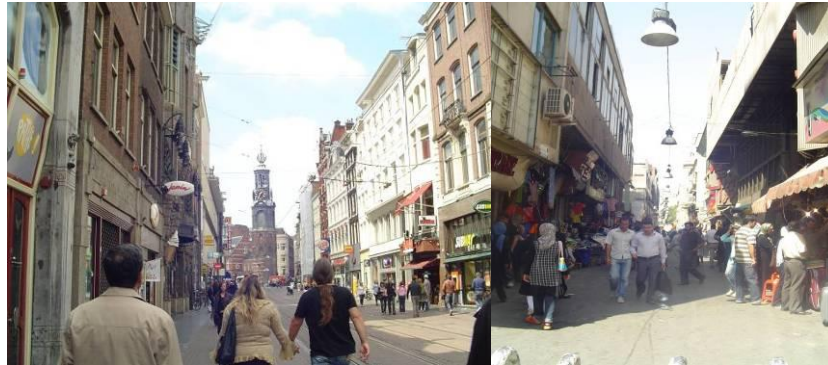
Pedestrian streets :(left) Netherlands-(right) Iran

(c) Thresholds

A threshold is a joint between different spatial, social, cultural or political territories. Passing through threshold means arriving to another territory and exiting from pervious territories.

Threshold is a place that strollers, passengers and residences stop there and perceive the urban space with their five senses.

Creating threshold or joint spaces can be used for reorganizing the spaces. In these spaces, conscious and unconscious memories, individual and collective memories will form.

The threshold of a "mosque" between street and the mosque- Iran

A threshold of a commercial complex

(d) Mixed land use

Zoning in cities leads to forming lost and indefensible spaces. Single land use works in limited hours in a say and in the rest of day these spaces will be completely indefensible. Making mixed land use spaces in a city will create new common areas. The multipurpose spaces which usually located near pedestrian routs will lead to a busy and memorable space.

A street with mixed land use-Turkey

(e) Recreating the concept of neighborhood

Recreating the concept of the center of neighborhood, lane, and alley and so on can produce a new concept in neighborhood. A neighborhood which doesn't has passing through and fast traffic in the fabric. This kind of neighborhood has a defined population and services and it can response to emotional, social and recreational requirements of the community.

4 CONCLUSION

It is more than two centuries that a traditional artist couldn't respond to the problems of cities. Cities become more crowded and technological and the attendance of human in urban spaces was reduced. The result was some polluted, strange, unnatural and ugly environment.

Human being is social and he needs some spaces for having sound interaction and relation with other people and he searches something around himself to remember them as a pleasure and identified memory as well.

In spite of that a traditional artist couldn't be able to respond to all aspects of urban planning, the requirement for beauty and proportion and coherent is always necessary in cities.

Of course it should be mentioned that imitation from some historical spaces in recent designing will not be enough! A contemporary artist should design spaces with considering the values and criteria that enrich an urban space, some factors which were exists in historical architecture and now they are often ignored.

Without this factor the high quality in the environment of people won't be created, and it is the main aim of urban planners: "improving the quality of life".

Two traditional collective spaces – Iran

A contemporary collective space in a commercial complex- Iran

5 REFERENCES

Cliff moughtin, taner Oc and Steven Tiesdell/Urban design: ornament & decoration/Architectural press/1999
Iranmanesh Nasim/ Civic vitality & urban space/40th IsoCarp conference/Geneva/2004
Iranmanesh Nasim/ surveying the public perception from absract arts in urban spaces in Iran/ ARUP2006/ Egypt , Cairo
S.Hossein Bahrainy/The analysis of urban space/ Tehran university publications/ 2006
S.Hossein Bahrainy/ Urban design process/ Tehran university publications/ 2006
Nikos A. Salingaros/ت رجمه د س یم ن شان م دار ای/urban saces and information field/مجله مسکن و قلاب ان/ شماره/1383 160
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Kevin lynch/ت رجمه م نوچهر م زیمن ی/The image of city/ ت شارات داند شداند گاه ته ران ت /1374
Shirvani Hamid/The urban design process/van nostrand reinhold company/1985
newman oskar/Defensible space/http:// www.defensible space. com

Creativity and Innovation in a Mid-Urban Size Learning Infrastructure – Designing Spaces for Thriving Innovation Communities

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1 ABSTRACT

This paper presents the design of an urban structure for about 1000-2000 persons originating primarily from the so-called creative class, a creative settlement. This settlement provides a smart working environment for innovation (driven companies) and start-ups, an area for high quality living as well as for leading edge education. Both, the theoretical concepts, their background, and the research-driven design process having lead to this creative settlement are presented. The methods applied in this approach include ethnographic methods, qualitative interviews, quantitative surveys as well as approaches from design thinking.

This paper represents a case study applying and explaining theoretical concepts form the Enabling Spaces approach. A balanced and sustainable research-based ecosystem integrating the poles of innovation/creativity, qualitative living, and high quality educational concepts and facilities is presented. This paper presents the basic concepts of a master plan for the creative settlement that is planned to be realized in Russia.

2 INTRODUCTION: AN ECOLOGY OF INNOVATION ARTIFACTS

The case study presented in this paper is based on an architectural and innovation project for a small urban settlement of about 20-40 hectares (1.000–2.000 inhabitants), which will be realized approximately 20 kilometers outside of major Russian cities. The goal is to develop a "creative settlement" as a resilient and self-sustaining innovation eco-system which is based on sound scientific research results. It represents an eco-system that is sustainable as it regenerates itself through its social design (people working and living there), as well as its knowledge and innovation processes (education, working/business). It provides an ecology of innovation artifacts (cf. Krippendorff 2006, 2011) with self-regulating the in-, through-, and out-flows of knowledge, people, innovations, discourses, etc.

At first, the client's brief was to create a role model for a well-balanced integration of living, education, and work. However, during the research and design process, the "creative settlement" emerged as a place fostering responsibility through people with an entrepreneurial and innovation-driven spirit—a place for people who inherently want to move things forward—with focus on the Russian context.

This project is the result of a cooperation in an transdisciplinary team of (both academic and business) innovation experts, architects, urban planners, cognitive scientists, a sociologist and psychologist, as well as an entrepreneur. As it was the goal to develop a radically new design, the project team itself approached the whole development as an innovation process, which is based on the concept of so called "Enabling-Spaces" (Peschl and Fundneider 2012, 2013)—this approach will be discussed in detail in the following sections.

The first part of this paper discusses the theoretical foundations of the Enabling Space approach and gives an introduction to the design process leading to such multidimensional spaces.

3 DESIGNING ENABLING SPACES

3.1 Enabling Spaces

Enabling spaces are spaces that are designed in such a way that they enable and support processes of collaborative knowledge creation and innovation. Enabling spaces try to give an answer to the question: How do we have to design environments that enable processes of bringing forth fundamental innovations and thriving social systems?

It will be shown that we have to apply a rather broad notion of space going far beyond architectural/physical space: several dimensions have to be considered including the social, cognitive, emotional, technological, epistemological, and organizational dimensions and aspects. Hence, in Enabling Spaces these dimensions have to be orchestrated and integrated in a highly interdisciplinary manner in order to support knowledge (creation) processes (see Peschl and Fundneider 2012, 2013 for details).

Space is understood as a container providing a set of (active and passive) constraints that are offering an enabling structure that is integrated with enabling process dynamics; they are allowing knowledge processes to flow and to develop their own dynamics in such a way that (radically) new knowledge may break forth. The challenge is to develop a stable design process integrating these dimensions into a holistic framework or ensemble, which functions as a coherent Enabling Space.

Fig. 1:. The Enabling Space design process

3.2 The Enabling Space design process

The project design of the "creative settlement" follows the Enabling Space design process/approach (see Figure 1): its goal is to devise and develop architectural design concepts for spaces cultivating and supporting processes of knowledge creation and innovation. The integration and orchestration of various space-dimensions having been mentioned above is one of the most challenging problems, yet powerful features of the Enabling Space approach. One has to follow a design process for achieving this integration. The design process being proposed in this section is the result of five years of the authors' interdisciplinary research (in the fields of cognitive science, theory of innovation, epistemology, and innovation spaces) and of a large number of applied projects that have been realized in different industrial and cultural contexts (for examples see Peschl and Fundneider (2012, 2013) and http://www.theLivingCore.com).

This whole design process is based on a profound understanding of the social system under investigation and its systemic environment. Starting with an extensive research phase ("Observation"), the core knowledge and innovation processes of the social system as well as its cultural, organizational, and structural parameters are identified. This is achieved by applying a wide variety of participatory and ethnographic (qualitative and quantitative) observation methods. The experiences and perspectives of a wide variety of stakeholders are studied through qualitative, generative in-depth interviews. Furthermore, the behaviors and desires of potential users are identified by using a comprehensive quantitative online questionnaire. The observation/research phase is completed by ethnographic studies, as well as by observing and studying artifacts, processes, relationships, etc. that can be found in the organization or system.

In the next step, the "sense-making phase", this systemic multi-perspective and multi-stakeholder view is transformed into a so-called "core-process model" illustrating the research findings in a highly condensed manner. In this phase, the observation results are analyzed, described and reflected by identifying patterns, (hidden) assumptions, polarities, discrepancies, and potentials in a complex qualitative inductive process so

that a coherent overall profile being based on a profound understanding of the social system can be developed. In this highly challenging inductive process it is necessary to work on big tables and literally/physically move items around, (re-)group and relate them (many methods that are relevant here are part of the design thinking approach [e.g., Brown 2008, 2009;]). These core processes represent the essence of the social system and act as a solid theoretical and conceptual foundation for all subsequent design as well as for decision-making processes.

This abstract model is then transformed into design patterns (Alexander et al. 1977) describing and explicating design qualities: Their aim is to provide the foundation for translating and transforming these abstract core knowledge processes into concepts for concrete (materialized) structures, activities and processes. They are a necessary prerequisite for understanding and realizing the various (architectural, technological, organizational, etc.) dimensions of the Enabling Space. On the basis of these design patterns, a holistic urban design concept is developed in transdisciplinary workshops bringing together experts from different fields, such as architecture, urban design, information and communication technology, landscape planning, etc. The resulting design concept goes far beyond architectural aspects and—in many cases—brings about changes in the social structures, processes, and culture. Architecture transforms social systems and vice versa.

Whenever crucial decisions are to be taken in this process, the client and a steering team are involved in the transparent planning of further steps, thus assuring continuous feedback between decision-makers, the teams of architects, researchers and experts, and possible users.

4 CREATIVE SETTLEMENT — RESEARCH PHASE AND OVERVIEW OVER INSIGHTS AND RESULTS

In the first phase ("Observe"), more than 30 extensive qualitative interviews (generative/appreciative interviews; e.g. Cooperrider, Sorensen, Whitney et al., 2000; Scharmer 2007) with a wide spectrum of relevant stakeholders (entrepreneurs, digital natives, investors, business angels, property developers, etc.) were conducted. An interview lasted for about two hours and aimed at establishing deeper insights into topics of the original client's briefing (education, creativity/innovation, working, living) in order to develop a profound understanding of possible core processes for the "creative settlement". Since this project aims at generating a radically new—at that point in time unknown—innovation eco-system, we could not speak with potential "users" as—at that stage—the project was not yet defined. Hence, most of the interviewees could not yet imagine what this settlement would be about; nevertheless, the interviews were conducted in such a way that we tried to listen to the hidden desires and needs of the stakeholders so that we could derive new perspectives from questioning and reflecting their assumptions (partly in a process of co-creation).

On top of these interviews, the authors visited the site several times and conducted ethnographical studies observing and investigating the context, urban setting, cultural issues, etc. (e.g. Kawulich 2005; Laurel 2003; Spradley 1979). Finally, extensive desktop research was carried out: on the Russian context, relevant Russian value systems/terms (e.g., personal power, family, stability, security, etc.), Russian culture and mentality, Russian economy, the political and demographic situation, on specific functions of the settlement (e.g., interactive science museums, alternative education/pedagogical approaches, learning spaces), etc. The interviews plus all of the remaining research has brought about a huge collection of data, information, first insights and ideas, as well as contradictory issues and polarity fields.

Phase 2 of the research process, the phase of "Sense-making", tried to make sense out of these vast amounts of information from the field. This step aims at identifying patterns, finding implicit orders, achieving an understanding of background/hidden assumptions, etc. within this information in order to come up with the most important and essential processes or activities ("core processes") defining the "creative settlement". The result is a highly condensed model of the core processes depicted in Figure 2; it has turned out that children surrounded by family, living and education, as well as an enabling, inspiring, and vibrant working environment were the key processes for this settlement.

Up to this point, one could follow several well known scenarios that address these core processes quite well, for instance, in the form of a special business park, satellite town, or a science city (having some tradition in Russia); however, these solutions are not really innovative and—furthermore—were not in line with the expectations of the client.

5 GUIDING PRINCIPLES AND DESIGN PATTERNS FOR A SUSTAINABLE INNOVATIVE CREATIVE SETTLEMENT

Instead of falling back into or just adapting already existing solutions of urban settlements or business parks the design team developed distinct guiding principles/design patterns that are applied throughout this project. These guiding principles have been developed from so-called "polarities" (apparently contradicting issues that are excellent starting points for new ideas), from the design patterns, from insights from the research phase; they emerged out of the above-mentioned inductive processes and out of rigorously questioning and reflecting on the assumptions that stand behind the interviewees' statements:
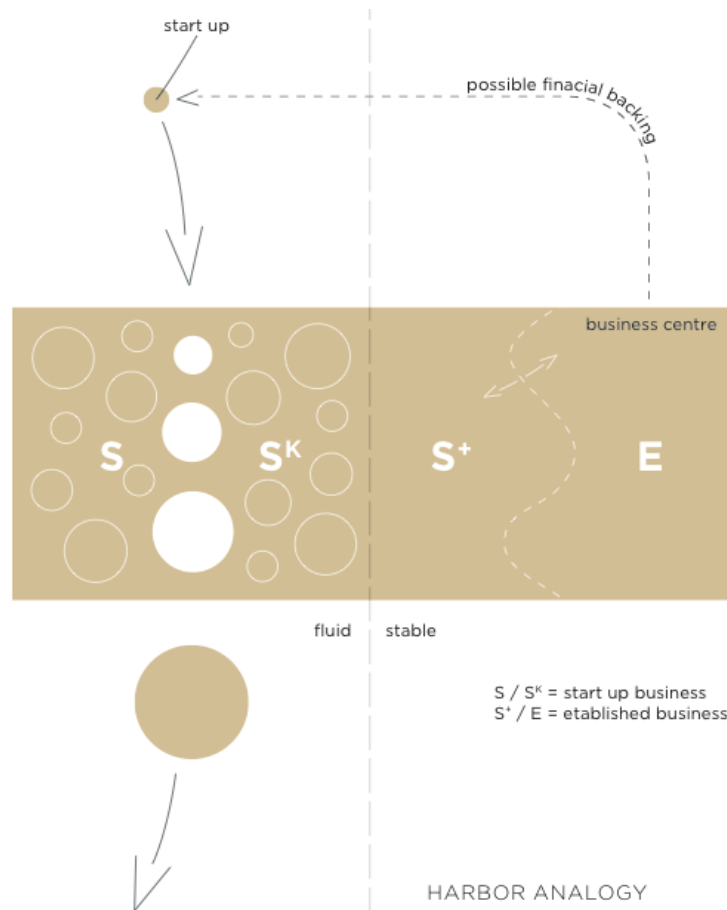
Fig. 2: The Harbour-Analogy illustrating the steady in-, through-, and outflow of new knowledge and people. Start-up businesses (S and SK) dynamically move through the creative settlement in order to bring in fresh and new perspectives. The established business people (S+ and E) are cultivating the stable pole.

(a) Role of creativity, innovation, and entrepreneurship: creativity and innovation are at the core of the creative settlement; they are embedded into entrepreneurial dynamics creating buzz and aiming for a thriving social, knowledge-, and innovation-dynamics.

(b) Openness: is present on various levels and in several domains: knowledge, open-minded people, socially open, open to the public vs. security issues

(c) Balancing the in-, through, and out-flow of new knowledge and people: start-up companies and a so-called established user group (people in strategic positions of bigger companies) are settling and working together in a mutually synergetic cooperation. Figure 2 illustrates the process of renewal (e.g., start-up companies have to leave the creative settlement, once a certain size and economical stability is reached and new start-ups move in).

(d) We are following here a well-known principle from biology, cybernetics, cognitive science, and systems science, namely the principle of autopoiesis: This concept was originally developed by the biologists H.Maturana and F.Varela (1975) for describing the dynamics of living systems: according to the concept of autopoiesis living systems have to be understood as self-sustaining and self-regulating systems, (re-)creating themselves and their borders in a continuous process of transient stabilities (a homeostatic equilibrium) by interacting with, reacting to, and actively acting on their environment. We are applying this principle here to

describe the knowledge dynamics and the social dynamics of the "creative settlement". The goal is to maintain this tension, this "stable instability", this state of homeostasis of inflow of new knowledge and people, assimilating this knowledge, developing it further, getting inspired, creating new knowledge, using and exploiting this new knowledge and, by that, creating new realities, innovations, as well as social structures. The whole system aims at producing a thriving ecosystem of new knowledge, creativity, prospering individuals and a stable social dynamics in accordance with the surrounding environment.

(e) Primacy of incubation: the creative settlement offers protection and at the same time it stays open for new ideas, knowledge, innovations, technologies, etc. (compare also the issue of exploration vs. exploitation (on the scale of a small-sized urban knowledge ecology (e.g., Corso et al. 2009)).

(f) Providing leading-edge education: from créche to academia, education is organically embedded within living and working; furthermore, these educational places are open for people living outside the "creative settlement", such as from surrounding cities and existing villages.
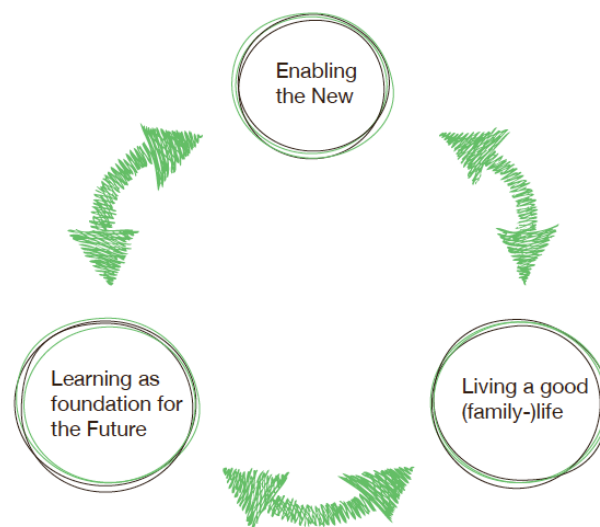
Fig. 3: The core-processes of the creative settlement.

Above these guiding principles various issues had to be solved and integrated in an interdisciplinary manner in the form of an overall process design. Figure 3 shows these core processes that are interacting and mutually causing each other:

(i) "Enabling the New": innovation, spirit of entrepreneurship, start-up dynamics

(ii) "Learning as a foundation for the Future": highest quality and leading edge education on all levels ((pre-)kindergarten, school, entrepreneurial academy, science museum)

(iii) "Living a good (family-)life": good balance between life, family, and work; high quality living environment; providing a safe harbor for living.

All these considerations led to the identification of the user-groups by relating the desired knowledge and innovation processes to potential users, their skills, their business contexts, as well as their needs for living (e.g., family live, good quality houses, education). Examples for such user groups are the start-up founders, people working at the start-ups, established business men (investing in the start-ups), young families living in this creative buzz, etc.

Furthermore, scenarios have been developed that offer quantitative measures concerning balancing of number of users per user groups and balancing the different functions (school, smart working, different residential areas, sport facilities, entertainment, science museum etc.).

6 REALIZATION OF THE CREATIVE SETTLEMENT

Departing from the above-developed guiding principles and design patterns the architects as well as the social designers started to transform these rather abstract concepts into concrete architectural and social forms (see also Figures 4 and 5); here are the most important realizations:

(a) Communication plaza: this element is a meeting & communication space around a central plaza for residents, business people, as well as the general public. A gradient from public (entrance, restaurants, science museum, etc.) to private areas (living, school, etc.) allows for different levels of privacy and openness. Inside, the plaza reveals the functions of the adjacent elements by opening up the architectural skin, thus becoming public experiences. The communication plaza is defined by the surrounding elements/functions, such as smart working spaces, a science park, an entertainment center, sport facilities, and a school. Thus, the communication plaza acts as a connecting interface, creating a buzz and a vibrant atmosphere just by being there at the intersection of these units and functions.

(b) Open and public educational spaces: open to the public and offering courses, activities, events, etc. on a regular basis. The concept is to provide a high quality educational offer, which goes far beyond classical school offerings or curricula. The authors suggest to view these educational infrastructures in a plug-and-play manner: i.e., to combine a set of the following modules according to the affordances, needs, preferences, etc. of the specific context and the environment of the "creative settlement": (i) science and technology: newest insights and results from various fields of the natural sciences and technology are presented and collectively experienced, explored, and further developed. The goal is to involve the visitors in the process of doing science and research. One can think also of a science park of jointly creating new knowledge and insights in various settings (workshops, labs, fab-labs, simulations, etc.); (ii) arts and humanities: these modules comprise a wide variety of offerings as well as zones for different fields of arts: painting, sculpture, performing arts, dance, etc. There will be need of specific spaces for these fields of art (ateliers, stages, etc.); (iii) entrepreneurial thinking and innovation: provides state-of-the art approaches in different fields of entrepreneurship and innovation. Both theoretical and practical aspects will be taught. The work being done in these courses and workshops might result in innovations, prototypes, and or co-operations with start-ups in the creative settlement (e.g., internships, etc.); (iv) thinking styles, interdisciplinary thinking, reflection, and personality development: Teaching in this module provides generic skills that are necessary for any kind of knowledge and innovation work and education. This is a unique offer, as these things are normally not taken care of in classical educational systems and curricula.

(c) Focus on balancing user groups and functionalities: in order to establish a fruitful symbiosis (entrepreneurial activities) between the various target groups it is important to keep the ratio of start-up people and established people (individuals in strategic positions of larger companies) well-balanced. Either group dominating would result in a shift of the character of the proposed "creative settlement"—especially a shift towards loosing the creative buzz. Consequently, the design of the "creative settlement" is focusing on the links and relationships between functions, rather than on single functions. Hence, it is not possible to just remove or add certain elements or functionalities of the "creative settlement", as this could imply a destructive pertubation of the autopoietic dynamics of the creative settlement.

7 CONCLUDING REMARKS

It is important to understand that this settlement does not primarily address a romantic view of living and working in the countryside or a kind of "wellness" program for a good work-live balance. Rather, by focussing on the core processes—in this case, knowledge and innovation processes—it is a well-balanced eco-system continuously bringing forth new knowledge, innovations, as well as educated and cultivated individuals and social structures. One has to know that there exists a long tradition of research settlements or science cities in Russia, e.g. Naukograd or Zelenograd—they have a rather positive reputation.

From this perspective, the "creative settlement" is located in a positive distance (accessible but remote) from a major city, this supports the above discussed creative processes and innovation dynamics in a highly efficient manner. Historically, cities emerged around (road) junctions, water routes, etc., since most products and processes were—and still are—based on material structures. In our age, this material foundation of products gets relativized: knowledge processes and knowledge creation are inherently immaterial, they are not bound to roads, but require new epistemological, social, as well as technological eco-systems in which they can thrive: Enabling Spaces.

This leads to a second important issue: the "creative settlement" is both open and closed: closed, because (radically) new knowledge is highly fragile and needs some kind of a "safe" container, where this knowledge can be incubated, explored, tested, etc. On the other hand, there has to be a steady stream of new people, knowledge, technology, etc. moving in and out in order to enable the creative settlement to regenerate itself,

re-create itself, re-define its borders, etc. (compare the analogy with an autopoietic system). In an analogy the settlement can be thought of as a harbor (see also Figure 2). Ships of young (start-up) entrepreneurs are entering the harbor (inflow of new knowledge, ideas, etc.) and after a period of protection (regarding their fragile ideas), incubation, and exchange (with other entrepreneurs and experienced business people) and when their business models have proven successful or at least promising, they are ready to leave the protected place and sail out across the ocean (entering the business environment). In this sense, the harbor (respectively, the "creative settlement") is a place to anchor, a place for incubation (protection). However, it is of utmost importance that the ships are not becoming permanent residents of the harbor, since then the flows from the external world will be inhibited.

The project team has translated the concept into concrete architecture and process structures; that process has been finished by the end of June 2012. First visualizations are shown in Figure 4 and can be found under http://www.thelivingcore.com/realized-projects/ and http://sferiqtown.com/. Negotiations with potential investors and political stakeholders in Russia are underway.

Fig. 4: Overview over the creative settlement.

8 REFERENCES

Brown, T. (2008). Design Thinking. Harvard Business Review 86(6), 84–93.

Brown, T. (2009). Change by design. How design thinking transforms organizations and inspires innovation. New York, NY: Harper Collins.

Cooperrider, D.L. and D. Whitney (2000). A positive revolution in change: appreciative inquiry. In D. Cooperrider, P.F. Sorensen, D. Whitney, and T.F. Yaeger (Eds.), Appreciative inquiry. Rethinking human organization toward a positive theory of change, pp. 3–27. Champaign, Illinois: Stipes Publishing.

Corso, M., A. Martini, and L. Pellegrini (2009). Innovation at the intersection between exploration, exploitation and discontinuity. Int. J. Learning and Intellectual Capital 6(4), 324–340.

Kawulich, B.B. (2005). Participant observation as a data collection method. Forum: Qualitative Social Research 6(2), Art. 43.

Krippendorff, K. (2006). The semantic turn. A new foundation for design. Boca Raton, FL: Taylor and Francis CRC Press.

Krippendorff, K. (2011). Principles of design and a trajectory of artificiality. Journal of Product Innovation Management 28, 411–418.

Laurel, B. (Ed.) (2003). Design research. Methods and perspectives. Cambridge, MA: MIT Press.

Maturana, H.R. and F.J. Varela (1975). Autopoiesis: the organization of the living. In H.R. Maturana and F.J. Varela (Eds.), Autopoiesis and cognition: the realization of the living, pp. 63–134. Dordrecht, Boston: Reidel Pub.

Peschl, M.F. and T. Fundneider (2012). Spaces enabling game-changing and sustaining innovations: Why space matters for knowledge creation and innovation. Journal of Organisational Transformation and Social Change (OTSC) 9(1), 41–61.

Peschl, M.F. and T. Fundneider (2013, in press). Designing (and) enabling interfaces for collaborative knowledge creation and innovation. From managing to enabling innovation as socio-epistemological technology. Computers and Human Behavior 2013.

Scharmer, C.O. (2007). Theory U. Leading from the future as it emerges. The social technology of presencing. Cambridge, MA: Society for Organizational Learning.

Spradley, J.P. (1979). The ethnographic interview. Fort Worth, Philadelphia: Harcourt Brace College Publishers.

Crime Mapping for Urban Planning – a Useful Tool for New Planning Times?

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1 ABSTRACT

Every new period of planning evolves its own gadgets and tools. Whereas the relation between crime and urban space has been part of research for almost 200 years, new techniques like geographic information systems and mobile communication devices could have huge effects for this topic. Data analysis and visualisation could be brought to a new level and furthermore, the data could be distributed immidiatly to citizens. In this context interactive Crime Mapping Systems emerged during the past decades. These online platforms visualize criminal events freely available on maps and become more and more popular for normal citizens looking to evaluate their area of town. Based on the historical development of this topic, data gathering and distribution are showing the impact of crime on urban areas and their population. Hence, such platforms will gain importance in planner's life and a critical evaluation about chances and risks from the point of spatial and urban planning is needed, which will be done in this paper. For this purpose different examples from the U.S. and Europe will be examined and compared. These systems will be analyzed in detail on the basis of the following three characteristics: data set, functionality and type of visualization. It is the aim of this paper to consider the feared and hoped effects of these platforms on urban areas, their population, local players and in particular urban planners. This includes the correlation between systems with public access and unpredictable effects for urban areas. Nevertheless, the paper will give some insights about the possible positive effects of crime mapping systems. The intention is to provide an approach, for the possible use of such platforms for urban planning while avoiding the described risks like as data data protection or the evocation of a generation of fear.

2 INTRODUCTION

The combination of crime data and urban areas is as old as traditional urban planning. This paper will give some insights about the relationship of crime in urban areas and how the circumstances have changed in the last decade and which are reasons for this new field of research. One of the key factors for the quality of life in urban areas is the subjective well-being of its inhabitants. Many circumstances influence this subjective impression (social and ecological issues for instance), but feelings about their sense of security are often considered as very dominant (Floeting & Seidel Schulze 2012, p.1). Due to the fact, that crime is mostly taking place in public areas, and the fear of crime is an important factor for the quality of life, there has to be a scientific debate for urban planners about crime mapping platforms in order to improve the urban environment, because an increased use of such platforms by public authorities could be observed. In the light of these developments, this examination aims to provide a critical analysis for its effects for cities and planners. From an urban planning perspective, some questions about the use of such system are obvious and should be handled in this paper:

(1) What is crime, which are the effects for citizens?

(2) What are interactive crime mapping systems and how will data be gathered?

(3) What are the chances for the use of such platforms from an urban planning perspective?

(4) What are the risks for the use of such platforms from an urban planning perspective?

(5) Considering chances and risks, under what conditions could such an approach be promising for urban planning?

2.1 Crime in urban areas

Already in 1829, Balbi and Guerry mapped different kinds of property crimes in France in correspondence to their educational level (Boba Santos 2009, pp.7-12) and drew their conclusion of possible connections. Nearly 100 years later, Park from the Chicago School did some research about "Social Ecology" and crime locations (Vogt 2001, pp. 11-12). Hence, monitoring crime in urban areas was and still is an essential issue for urban planning, because it's an important influencing factor for citizens well-being. Nevertheless, research was done particularly from urban sociology. Accordingly, the topic was only accessible for experts

for 180 years, (planners, city councils, scientists or the police). However, during the last 180 years, this was a topic which only experts (planners, city councils, scientists or the police) were able to access to relevant database.

As before, crime or especially the impression of urban crime is strongly connected with subjective impressions, which is part of urban research (Vogt 2001, pp. 11-12). From a terminological point of view, the explanation of crime is considered to be very complicated. Simplified, it is described as "something, which deviates from legal regulations" (Belina 2011, p.12). This deviance depends on the current political and social circumstances. This means, that an action (e.g. drinking alcohol in public) could be considered as crime in one specific place at a specific time, whereas the same act isn't necessarily seen as a crime in other countries with other circumstances. Besides the fact, that due to the mentioned problems, the statistical crime data gathering by the police is not able to entirely illustrate crime in urban areas realistically, many other problems have to be revealed: Unreported issues, reporting behavior, suspects- and offender statistics, and contradictory interpretations. These issues make a complex analysis of crime mapping systems for urban planning necessary.

2.2 State of research and planning methods

As previously mentioned, Balbi and Guerry have done some research almost 200 years ago (Boba Santos 2009, pp.7-12). The topic came back in the scientific focus about 100 years later, as the Chicago School did the research about "Social Ecology" and crime locations (Vogt 2001, pp. 11-12). Some investigations about this were also done for example in the context of the combination with mental maps (Matei et al., 2001). The research focus to crime mapping platforms is intensifying, because there has been an immense growth in numbers of such platforms, especially in Anglo-American countries. First of all, this was possible because of the new capabilities of GI-systems, which were able to analyze crime data very detailed and get useful data out of it. Even more important is the fact, that this data could be published through the web, which makes all of it accessible. This was despite of the uncertain complex interactions with the urban environment. Alone in the USA, there are more than 125 crime mapping systems. Great Britain for example empowers the public platform "police.uk", where various kinds of crime mapping data for the United Kingdom can be accessed. Furthermore, these services are getting more and more available through mobile devices. From a planning perspective, there are plenty of potentials for implementation. These embrace different spatial and urban planning issues as well as the urban sociology perception. As well important is the fact, that this data could be published through the web, which makes all of this data accessible for every citizen and other laypeople. Furthermore, mobile phones are making this data accessible everywhere, allowing users to contribute own crime data by User-Generated-Content (UGC). These mentioned topics are barely integrated in planning processes or researches yet. Hence, aim of this paper is a comparative analysis of the existing crime mapping systems and approaches and to assess the potential positive and negative effects of these platforms for urban areas as well as for planners.

2.3 Methodology

The paper examines the theme on the basis of the earlier mentioned research questions. In this regard, it first analyzes theoretical questions, such as the definition of criminality and its distinction to other forms of deviancy, its connection to the planning field, the challenges of the data collection and finally, the history of crime mapping. Secondly, the technical basis of the interactive crime mapping platforms is studied. Because of the diversity of different systems, three main categories were developed, in order to comprehensively illustrate all functions, types of visualizations and base data. In the next step the paper discusses the possible positive (hoped) and negative (feared) effects of such systems, based on these theoretical and technical facts. In both cases, effects for urban areas, their inhabitants, stakeholders and city planners will be illustrated. Although the paper was composed from a planner's point of view, especially the hoped positive effects will include and discuss numerous aspects, which derive from the perspective of the police. Finally the paper summarizes the assets and drawbacks in order to picture the proportion of chances and risks which come with the use of such plattforms in urban areas. Considering these results, a few recommendations will be outlined and possible future developments will be discussed.

3 EMPIRICAL STUDY CASES

The various forms of crime mapping platforms are almost as complex as the phenomenon of crime itself. Therefore the technical basis was analyzed detailed in three separated categories in order to ensure an essential comprehensibility:

- Data set
- Functionality
- Type of visualization

These three categories will be illustrated in the following on the basis of exemplary study cases.

3.1 Example A

The first category, respectively the first group of study cases is defined by the type of the underlying data set. It can be illustrated, that most of the platforms are based on police data, whereas only a few platforms use user generated content (UGC) for their visualizations. This general segmentation of base data in two groups is quite oversimplified. In fact, the data set relies profoundly on platform operators and their aims. In this context four types of data sets can be revealed, that are substantially affecting the platforms. As pointed out in the illustration below these four groups are: Systems operated by the police, systems operated on behalf of the police, independent systems using police data and independent systems generating own datasets.
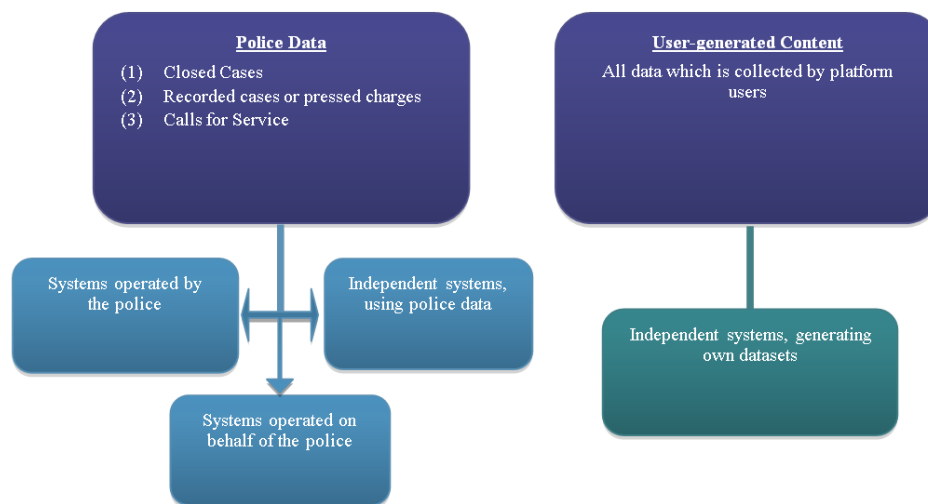
Figure 1: Types of base data

3.2 Example B

The second category examines the functionalities of crime mapping systems. Superficially, all platforms can be described as interactive, allowing users to investigate all designated areas in a freely scalable map-interface like Google Maps or Microsoft Bing. Furthermore all platforms offer a few tools to analyze the visualized crimes. In nearly all cases this includes the sampling of different kinds of crime, times of offences or areas of crime scenes.

However, some platforms provide much deeper analysis tools. The following example of the platform raidsonline.com, allows users to put further data layers such as population density or underemployment rate underneath the crime incidents. This gives the user to chance, to make multi-level analysis with results, which can be very valuable from an urban planning point of perspective. On the other hand it has to be mentioned, that correlations between additional information and crime incidents have to be checked carefully, in order to prevent misinterpretations.
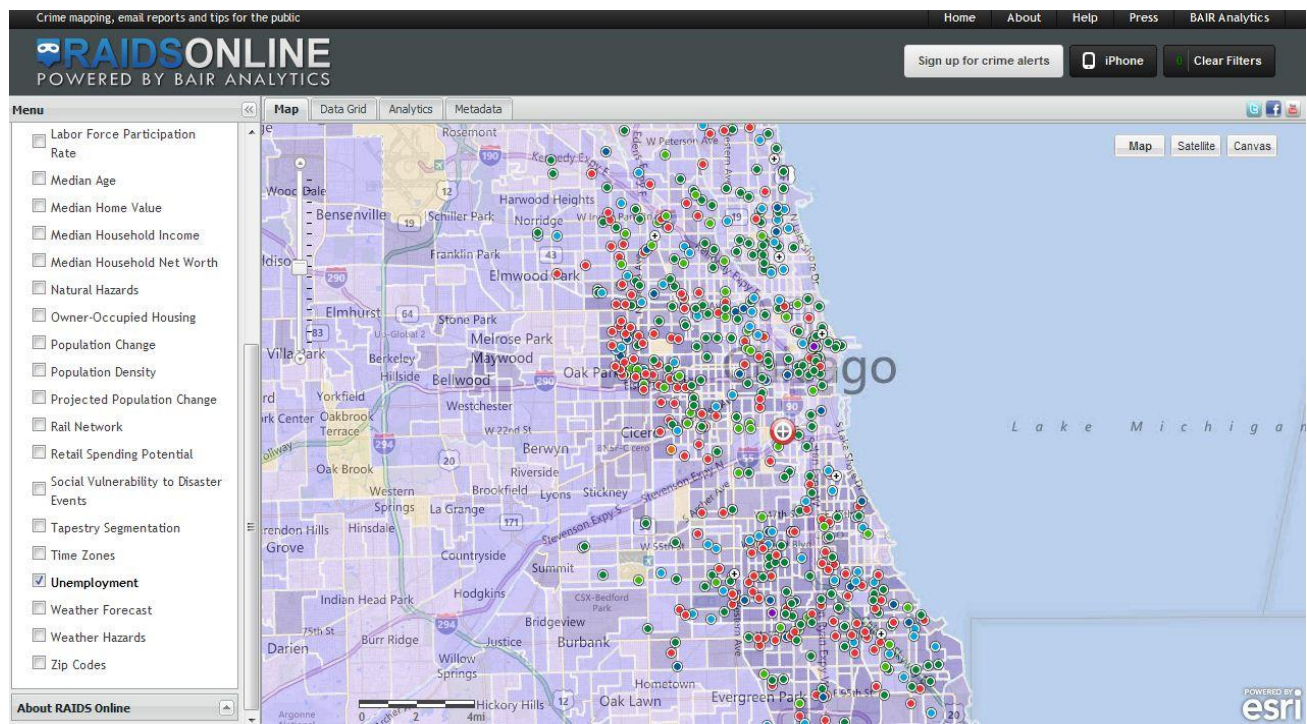
Figure 2: Combination of registered Crimes and further data layers

Other platforms also offer solutions for mobile phones. It has to be mentioned, that these solutions are not as detailed as the platforms for real computers, but usually they provide maps and functions that include the actual position of the user, allowing him to search for possible threats in the surrounding area. Very often the solutions for mobile devices are quite specific, which is on the one hand a limitation, but on the other hand a chance. The example aside shows an application (FindAPad for Windows Mobile) that displays free houses near by the location of the user and offers him information about crime incidents in

Figure 3: Example of the mobile phone app FindAPad

These two examples clarify the range of functions interactive crime mapping platforms are offering. However, there is an advancing number of mobile applications available for mobile devices. For the United States, there are already lots of iPhone applications like "Crimemapping.com Mobile for iPhone", "Crime Reports for iPhone", or "RAIDS Online for iPhone". These applications are also available in Asia ("CrimeMap for iPhone"). Some of them use data by public authorities like the police, but there are more and more applications, which enable the user to contribute data with their mobile devices.

3.3 Example C

The last case group examines the different types of visualizations of crime mapping systems. There are various kinds of visualizations, but here the focus is put on the three most common groups. Generally the visualization of the platforms can be divided into 3 classes, which implicate different pros and cons:

- Symbol Maps illustrate all crimes with an own symbol. Accordingly, these maps are easy to understand, but in the case of big map extracts it can get overloaded. This can be seen especially, when various kinds of different crimes have to be visualized.

- Graduated- Symbol- Maps add up all crimes of a certain area, generating a symbol for that area according to the amount of events. These types of maps are much easier to read, but in case of missing knowledge harder to understand.

- In contrast to the maps described above, the heat map does not visualize crime scenes punctual, but it illustrates the density of committed crimes. This approach leads to maps, which are easily to read, but also harder to understand. In programs to generate heat maps there are possibilities to modify the visualizations, which is good for customized solutions, but vulnerable for manipulation. This manipulation does not necessarily mean falsification, it can simply mean the specific configuration in terms of colours or radiuses.

The following illustration displays all three kinds of visualization types.
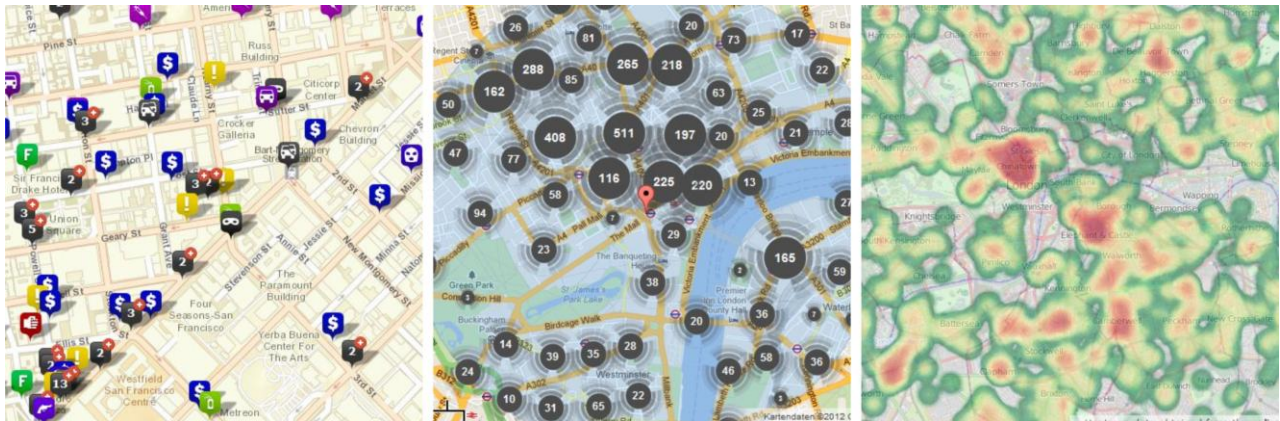
Figure 4: Visualization Types of interactive Crime Mapping Systems (Symbol Map, Graduated Symbol Map and Heat Map)

Furthermore, there is also the possibility to combine geospatial analysis and 3D-mapping (Wolf & Asche, 2009). However, it has to be stated, that visualizing 3D-content is very "eye-catching", but it can be very complicated for laypeople to understand and not to misinterpret the given data. Though there is no intense use of 3D-Heat Maps through crime mapping systems worldwide, which is the reason why there is no deeper analysis in this paper.

4 POTENTIALS FOR URBAN PLANNING

As previously mentioned, crime mapping tools offers a wide range for analysis approaches. Though, the use of such systems and the provision of this informations can be a two-edged sword. Hence, the described platforms will generate positive as well as negative effects for urban areas, their inhabitants, local stakeholders and also planners. In this context, the paper examines in two steps first the hoped positive effects and secondly the feared negative effects for cities and the named groups.

4.1 Chances

The positive effects can be seen from two different angles, first of all from the view of the police, secondly from the view of a planner. On the one hand, the aims of police departments should be considered, because they were the primary reason for the implementation of the platforms. Nevertheless, these hoped effects concern particularly urban areas and their inhabitants:

(1) Better information for citizens, reducing the fear of crime and the workload of the police

(2) Increased transparency of police work and more confidence of citizens

(3) The bond between citizens and local police departments will be strengthened, enhancing their cooperation

(4) Inhabitants will be empowered to independently avoid dangerous situations and to adopt prevention measures

On the other hand, further effects can be identified from a planner's point of view. Besides the urban areas and inhabitants, these effects additionally concern local actors and planners. However, they have to be reconsidered in their relation to the earlier mentioned aims of the police:

(5) Assistance in processes of urban and regional planning, e.g. in the preparation of development plans

(6) Benefits for other urban actors like the detection of trends and the identification of emerging problems

(7) The public could use the platforms as pressurizing medium

(8) Image promotion for slightly affected areas

(9) Crime Monitoring serves all stakeholders for early trend detection and it can be used, to test the effects of measures for crime reduction

A possible realization of such a tool for visualizing crime can be seen in the subsequent figure. The following map of the Stamen Design Group illustrates the desired results exemplarily for the city of San Francisco (Stamen Design, 2012). The example map visualizes crimes, which took place during the nightlife in a specific part of the city. This map can be used by several of the defined groups, fulfilling different of the hoped effects. In particular, citizens could avoid the highlighted crime hot spots during the nighttime which could lead into an improved cooperation between citizens and police, as it is described in point (3). Furthermore planners should include this information in their work and use them for more precise geo-localisation of urban problems as it is described in point (6). This could leads for example to reconsidering the concepts of illumination and visibility during nighttime in order to improve the subjective well-being of the citizens.
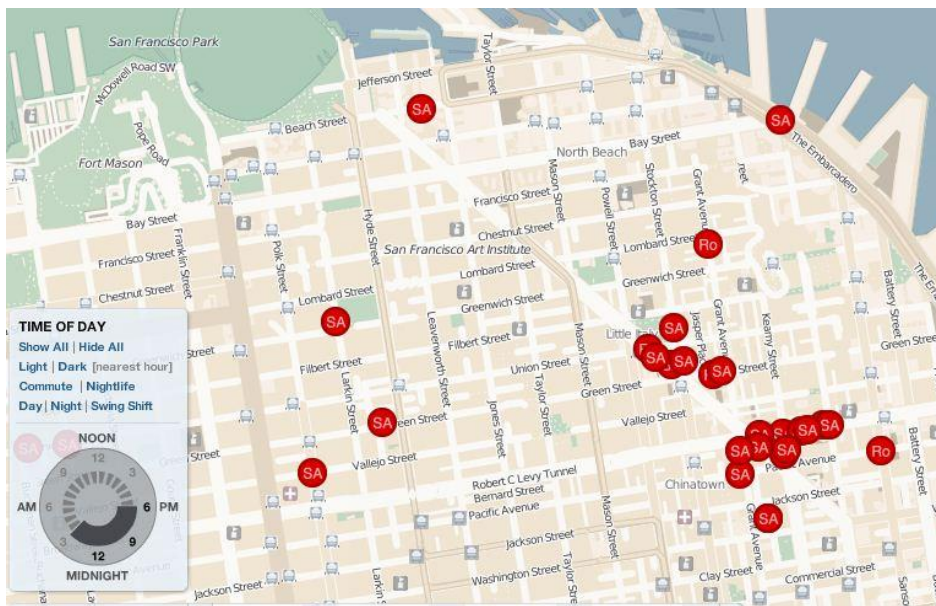
Figure 5: Registered crimes during nightlife

4.2 Risks

In addition to the discussed hoped effects, the paper considers possible negative effects. The feared consequences are also strongly correlated, alongside with the different positive effects. In this context misinterpretations are particularly relevant for the other outcomes, causing or intensifying many of them. This embraces the problem of stoking of fear (d) in the affected areas or the possibility to manipulate the user perception (b). Following problems could occur:

(a) Misinterpretations by users, due to a lack of expertise, a lack of information about the published data and visualizations that provoke misinterpretations

(b) Manipulations of the platforms by outsiders and operators, especially in the case of user-generated content. This will be even more relevant through the massive use of mobile communication devices, which enables their users to tag crimes in urban areas at every time at every place. Furthermore, through the easy use of geo-mash-ups, it is very easy to develop own crime mapping applications, which aren't under any kind of public or scientific surveillance

(c) Commercial use of the platforms, including severe consequences for the population (Example: Redlining of insurance companies or credit institutes)

(d) Crime- Mapping- Systems are stoking the fear of crime, like all other mass media

(e) Crime- Mapping- Systems are supporting the stigmatization of areas and their inhabitants.

(f) Criminals can use the platforms like all other people. They could use the published information to find possible victims and identify less controlled areas

(g) The platforms are not able to reduce crime, its just a displacement of the crime locations

(h) The platforms violate the individual right to decide which personal information should be published and which not, because of the effort to ensure absolute public safety

Especially the last point will be reflected in detail. It is impossible to publish geographically referenced crime data and to protect the victims of crimes at the same time. If a crime is referred to a specific location and is published in a crime mapping system, this means that it can be seen from the general public. Although there are some regulations about data privacy, if there is a specific place marked with a crime (or even more as area with a general high rate of criminality), it could be directly referred to this specific location and the people who are living there. This could lead to a negative image in terms of criminality and all its corresponding consequences. This stigmatization would have consequences for the whole neighborhood and could lead into affecting real estate prices for example. Whereas there is some legal regulation from services offered by public authorities, this won't be the case for data distributed by private companies and especially for UGC-crime data. How strongly privacy rights of single persons could be affected can be seen on the subsequent figure. "Homicide watch D.C." publishes personal data of murder victims like home addresses, personal photographies and the exact crime spot in order to "remember" them (Homicide Watch, 2012). According to this, the platform doesn't even have the aim to prevent any possible future crimes, but it violates the privacy of family members.
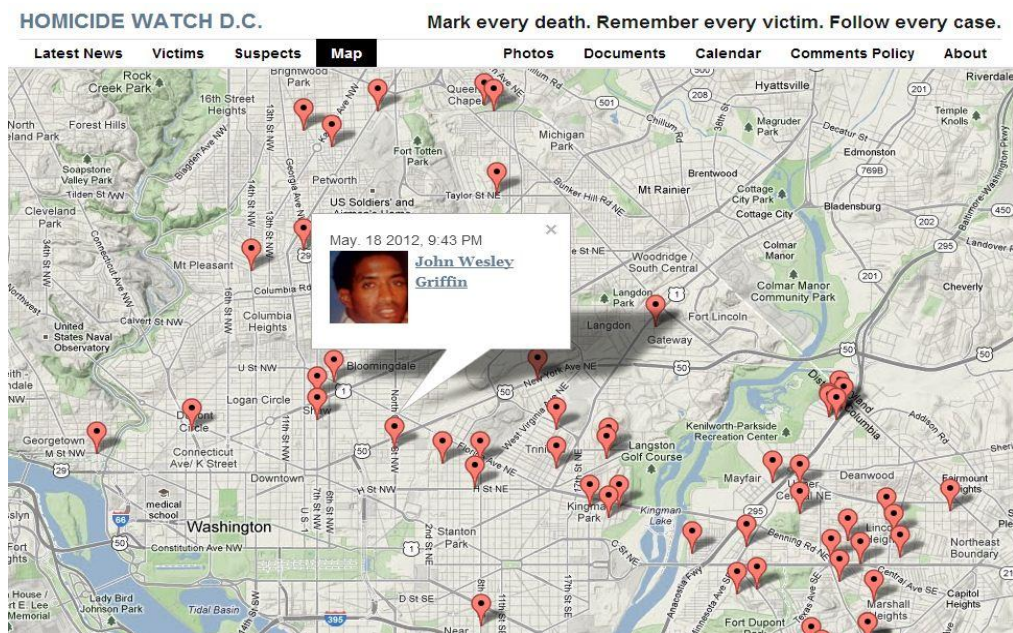
Figure 6: Visualization of homicide victims

Another example is given in the second illustration, which is visible below. All four maps visualize crimes for the same area in the city of London (Police UK, 2013). Actually, the last three maps show the same type of crime for the same time period. This example demonstrates how easy the offered maps can be misinterpreted or manipulated. This problem is very relevant, because there will be a communication between technical specialists (planners, employees of the city council) and laypeople. Hence, this could lead to massive misinterpretation on the citizens' side. Finally, the number of possible negative effects raises the question, what kind of institutions should decide about the handling of such sensitive data. The paper discusses this question, offering possible solutions to protect the privacy of victims, while taking advantage of the information the platforms provide.
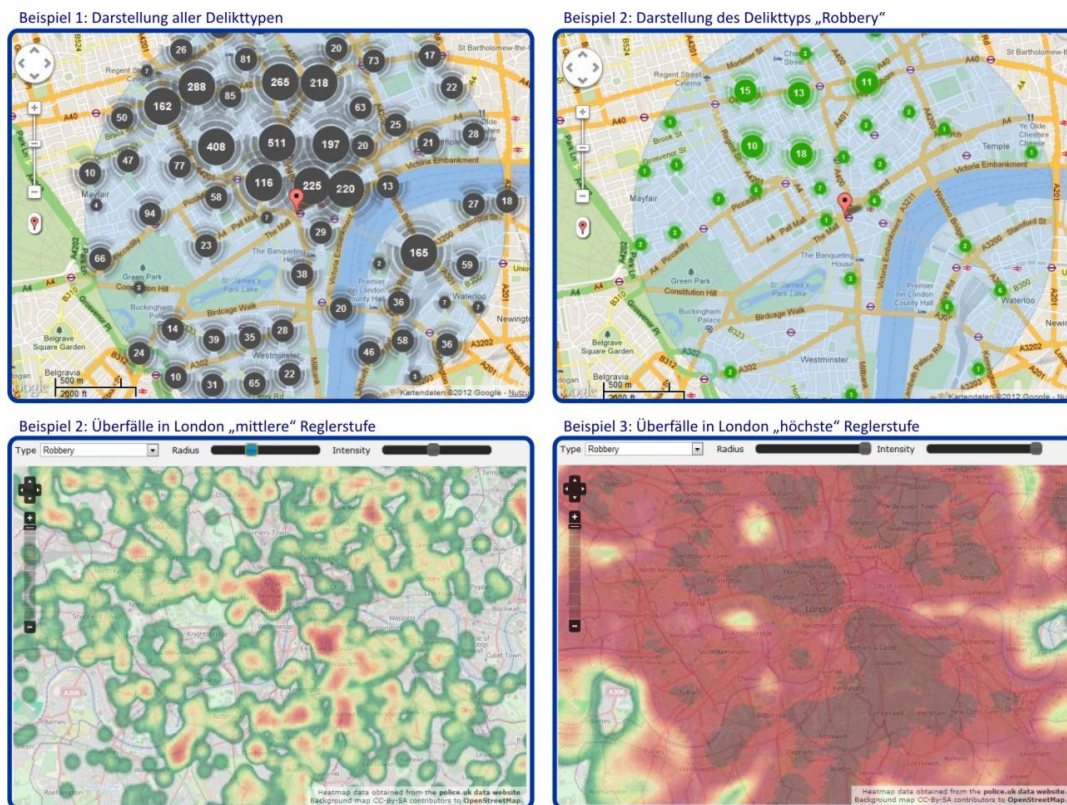
Figure 7: Examples for data misinterpretation and manipulation

5 CONCLUSION, RECOMMENDATIONS & FUTURE RESEARCH

In view of the dynamic developments in the crime mapping sector in the last years, the increasing prevalence of these tools and methods will continue. This is mostly due to the fact of the technological development for data processing and the possibility for accessing and contributing data via mobile phones. And of course, there will be a high demand for such service on side of the citizens. Due to that, there will be a relevant momentum in the development of such approaches in developing countries as well. This is where crime mapping systems meet urban areas with relatively high crime rates and a society that could rely on big promises of such systems. Hence, the mentioned feared negative effects of such platforms can be expected as much worse than in these countries.

From a planning perspective, these crime mapping tools provide a wide range of analysis possibilities though it has to be stated, that after evaluating the potentials and risks of crime mapping systems, it is very problematic to find a compromise in use of such systems by free availability for the public society. Furthermore, it is quite impossible to estimate all direct and indirect consequences, if crime related geodata will be made public for all citizens. As mentioned, monitoring urban crime is very complex and there has to be some contextual knowledge to deal with it. Usually this is not the case for all citizens. This problem is even more relevant due to the fact, that through data publishing via Internet, all of this data is theoretically accessible for all citizens – at every time and in every place. Furthermore, it is also possible for them to create their own "crime geodata" with their mobile phones, which could be seen by other citizens. If there is an open and unrestricted access to crime mapping data and systems, negative impacts like misunderstanding of visualizations, exaggerated fear of crime as well as data manipulation could occur. This is mainly because of the lack of knowledge in terms of crime research or geodata visualization. Though, there is a potential of crime mapping methods for urban planning, in the case of a restricted access for urban actors or tailored for citizens with the contextual knowledge. If there is a political will to embed these systems in public services of a city, the dependence on legal (data privacy regulations), social-cultural, political regulations has to be discussed. The use of such systems has to be considered wisely, particularly from an ethical point, in order to achieve a benefit for the society. Besides these official approaches, crime relevant data created by User-Generated-Content with mobile phones will also be more important in the future and there has to be a broad scientific debate how to deal with it in an urban context. Furthermore, crime mapping platforms driven by private companies should be seen very critically. Unrestricted publications of crime data through crime

mapping platforms could raise negative effects for the urban environment. Through stigmatization or other effects, self-amplifying effects could occur and lead for example to misled development in these quarters. There is also the possibility for planned manipulation of real estate prices for example. Such negative effects should be avoided by urban planning approaches if possible. Urban planners have to be aware of these topics and have to consider potentials and risks of crime mapping systems for public authorities, police and especially the citizens before an implementation of crime-mapping tools in the daily working routine. Although there is a potential for future planning approaches in order to detect new urban patterns and to prevent crime in urban areas, there will be also an ethical question to discuss, what kind of data is suitable for the public society and which should be better handled by experts. Hence, there has to be more research on these crime mapping systems as well as on its effects on urban areas.

6 ACKNOWLEDGEMENT

7 REFERENCES

BELINA, B.: Raum, Überwachung, Kontrolle – Vom staatlichen Zugriff auf städtische Bevölkerung, Westfälisches Dampfboot. Münster, 2011.
BOBA SANTOS, R.: Crime analysis with crime mapping. Sage. Los Angeles, 2009.
FLOETING, H.; SEIDEL-SCHULZE, A.: Urbane Sicherheit – Eine Gemeinschaftsaufgabe vieler Akteure. In: Schrenk M., Popovich V., Zeile P., Elisei, P. (Eds.). In Proceedings REAL CORP 2012. Vienna, 2012.
HOMICIDE WATCH: Homicode Watch D.C. Online available: http://homicidewatch.org/homicides/map. Washington, 2012
MATEI, S.; BALL-ROKEACH, S. J.; LINCHUAN Qiu, J.: Fear and misperception of Los Angeles Urban Space – A Spatial-Statistical Study of Communication-Shaped Mental Maps. In: Communication Research Vol. 28-4 2001. Thousand Oaks, 2001.
POLICE UK: Maps. Online available: http://police.uk. London, 2013.
STAMEN DESIGN: San Francisco Crime Spotting. Online available: http://stamen.com/projects/crimespotting. San Francisco, 2012.
VOGT, S.: Crime Mapping: Voraussetzungen und Anwendungsbeispiele am Beispiel US- amerikanischer Entwicklungen. Wiesbaden, 2001.
WOLF, M.; ASCHE, H.: Exploring Crime Hotspots: Geospatial Analysis and 3D Mapping. In: Schrenk M., Popovich V., Engelke D., Elisei, P. (Eds.): Proceedings REAL CORP 2009. Vienna, 2009.

Cross-Border Transport Modelling in the Region of Aache

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1 ABSTRACT

For transport planning, as well as for other planning jobs, it is necessary to have information about the general conditions. To estimate traffic volumes and to identify the need for measures, knowledge about the future transport demand is necessary. The development of transport demand depends on many factors as well as on the general situation, so an estimation is quite complex. Therefore transport models are often used as a basis for the decision-making- and planning-process. At the moment different stakeholders usually use different models with different data and their own focus – even in the same city. In many transport planning processes different stakeholders (e.g. from the city council, transport association) are involved, so collected data and results have to be discussed many times and difficulties in the coordination and decision-making-process can occur. Aachen is located on the border to the Netherlands and Belgium, so there is a tight interaction between the municipalities (e.g. cross border business park, cross border public transport), which are located close to the border. Data and information which is needed for the planning process are kept and used in wide differentiation and with a variety of definitions and considered areas by the different institutions and stakeholders (e.g. city council, road administration, transport association) in Germany, Belgium and the Netherlands. Therefore, the plausibility and consistency is not always given in the regional context. Essential for future projects as well as for coordinated planning across the borders is a reliable and coordinated basis between the different institutions.

The StädteRegion Aachen (association of municipalities), Straßen.NRW (road administration) and the AVV (Aachen Transport Authority) are responsible for different spatial and traffic planning tasks. Therefore they have awarded the development of a cross-border and georeferenced data platform combined with a macroscopic cross-border transport model to create and keep a high quality and consistent basis for regional planning in the region of Aachen. The aim is to build up a standardized and continuing database, which provides necessary basis data for different types of planning for every stakeholder in the region. This is a challenging process in which most regional stakeholders of the three countries should participate to guarantee reconciled data. During the development of the data platform and the transport model due to the data a lot of inconsistencies can occure which are required to be solved. Just two of them are the use of coordinate systems and commuter statistics. In the process of building up the model available data and information about the over 60 municipalities in three countries are used. Therefore it was necessary to combine map bases (e.g. private traffic network, zonal structure) of different suppliers. It has to be taken in consideration that all countries of the planning area, are using different coordinate systems. In Germany mainly Gauss-Krüger is used, whereas in the Netherlands Rijksdriehoekstelsel and in Belgium Belge Lambert 2008 System is common. A transformation of coordinates can lead to distortions. So it is necessary to check different key factors of the model (e.g. distances) and correct them. There is always a problem with merging maps form different suppliers. Inaccuracies on border crossings can occur even in areas of the same country. The trip generation is based on commuter and structural data. When comparing the correspondent balances (e.g. gainfully employed persons – jobs compared to commuter balance) there are great differences especially in the cross-border balance. Therefore it is necessary to rework and to adjust the data, but the reliability of the chosen approach has to be taken into account. The national statistic of people who commute to work depicts the interconnections very detailed. NRW and the province of Limburg for example are collecting commuter data on municipality level. Looking at the cross-border commuter data it is obvious that this data was collected on a more aggregated level. And due to different methodologies the data cannot be combined easily so it is necessary to develop an approach and reconcile it with all stakeholders. This preparation work has to be communicated well to all regional stakeholders, so that they understand and support the data adjustments. The participation of all regional stakeholders in the process of setting up the data platform and the transport model is crucial so that in the end all stakeholders trust the data and use this model as base for planning actions. Therefore the process of participation consists of a broad involvement of the stakeholders in data collection, data adjustments and information about the model calibration.

2 INTRODUCTION AND BACKGROUND

For transport planning, as well as for other planning jobs, it is necessary to have information about the general conditions. To estimate traffic volumes and to identify the need for measures, knowledge about the future transport demand is necessary. The development of transport demand depends on many factors as well as on the general situation, so an estimation is quite complex. Therefore transport models are often used as a basis for the decision-making- and planning-process. At the moment different stakeholders usually use different models with different data and their own focus – even in the same city. In many transport planning processes different stakeholders (e.g. from the city council, transport association) are involved, so collected data and results have to be discussed many times and difficulties in the coordination and decision-making-process can occur.

Aachen is located on the border to the Netherlands and Belgium and is a part of the Meuse–Rhine Euregion. In this region there are a lot of cross-border trips concerning different areas of life such as studies, work, shopping or leisure . Therefore a tight interaction between the municipalities located close to the border exists. Examples for this cooperation are the cross-border German-Dutch business park (AVANTIS), the successful concept of the regional train called "eureogiobahn", which operates in Germany and the Netherlands or the platform especially for the problems concerning the cross-border public transport (such as tariff regulations or improvement of international connection). Data and information, which is needed for the planning process are kept and used in wide differentiation and with a variety of definitions and considered areas by the different institutions and stakeholders (e.g. city council, road administration, transport association) in Germany, Belgium and the Netherlands. Therefore, the plausibility and consistency is not always given in the regional context. For future projects as well as for coordinated planning across the borders a reliable and coordinated basis between the different institutions is essential. Therefore the StädteRegion Aachen (association of municipalities), Straßen.NRW (road administration) and the AVV (Aachen Transport Authority) have awarded the development of standardized and continuing database combined with a macroscopic cross-border transport model, which provides necessary basis data for different types of planning for every stakeholder in the region. This is a challenging process in which most regional stakeholders of the three countries should participate to guarantee reconciled data. Therefore the process of participation consists of a broad involvement of the stakeholders in data collection, data adjustments and information about the model calibration. Representatives of the regions and cities are informed and participate in regular meetings about the structure and calibration of the model. Furthermore they provide data and are involved in the development of data adjustment methods.
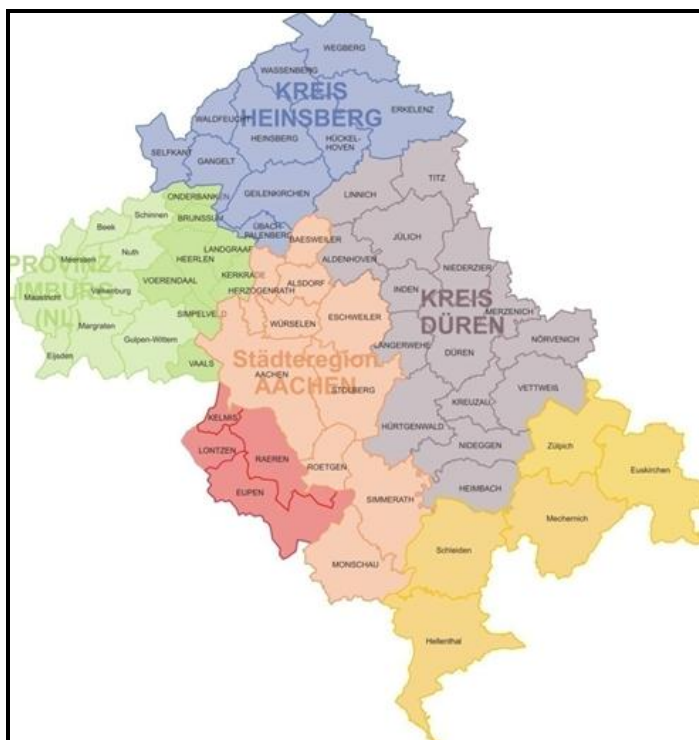
Fig. 1: study area

3 STUDY AREA AND MODEL STRUCTURE OF THE TRANSPORT MODEL

The aim is to build up a standardized and continuing database, which provides necessary basis data for different types of planning for every stakeholder in the region. The cross-border traffic model is based on the four-step approach. In this trip-based model trip generation, distribution, mode choice and route choice are calculated sequentially although there is a feedback between the different stages. To forecast the travel demand for the study area (area where expected policy impact should be analysed) it is necessary to take into account the interaction areas outside the study area, where trips into the study area are generated or out of the study area are destinated (external stations ES). Therefore all municipalities with relevant commuting traffic are included in the model but on a more aggregate level.

The study area consists of the four German regions StädteRegion Aachen, district Heinsberg, district Düren and a part of the district Euskirchen with 40 municipalities, the region of Südlimburg in the Netherlands with 17 municipalities and the four German speaking municipalities of Belgium (see fig. 1).

These municipalities are divided into 1226 traffic analysis zones (TAZs) taking into account data availibility, main traffic borders and an possible aggregation on district and minicipality level.

4 CHALLENGES BUILDING UP A CROSS-BORDER TRANSPORT MODEL

Data availability and the comparability and/ or compatibility of this data is always a challenge developing transport models. Due to the different methodologies and data aggregations the data cannot be combined easily. These difficulties increase in cross border planning processes even more.. Therefore building cross border transport models it is necessary to develop an approach and reconcile it with all stakeholders (see also other cross border transport models e.g. VKM AT-CZ-SK-HU 2009). This preparation work has to be communicated well to all regional stakeholders, so that they understand and support the data adjustments. The following examples should explain the related problems and resulting consequences in the process of developing a cross-border transport model.

4.1 Compatibility of map bases

In the process of building up the model available data and information about the over 60 municipalities in three countries are used. Therefore it was necessary to combine map bases (e.g. private traffic network, zonal structure) of different suppliers. It has to be taken in consideration that all countries of the planning area, are using different coordinate systems. In Germany mainly Gauss-Krüger is used, whereas in the Netherlands Rijksdriehoekstelsel and in Belgium Belge Lambert 2008 System is common. A transformation of coordinates can lead to distortions (see fig. 2). So it is necessary to check different key factors of the model (e.g. distances) and correct them. There is always a problem with merging maps form different suppliers. Inaccuracies on border crossings can occur even in areas of the same country. Therefore the adjustment of maps, before generating data through intersection between different maps, is unaviodable although it is an time-consuming work.
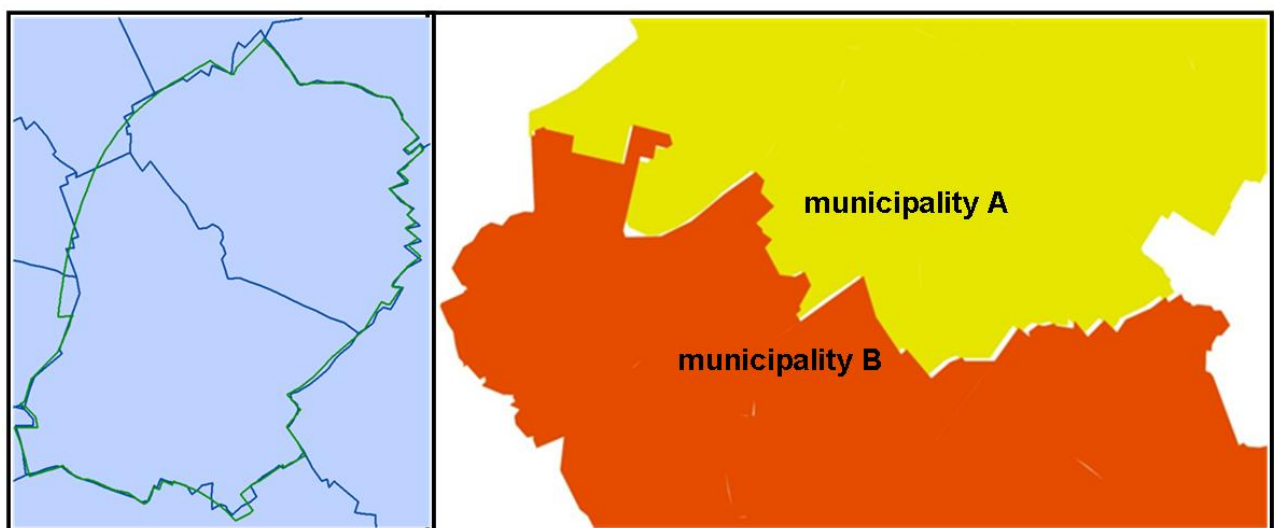
Fig. 2: Inaccuracies due to merging different maps

4.2 Commuter and structural data of land-use and travel behaviour

The calculation of the trip generation is based on commuter and structural data of land-use and travel behaviour.When comparing the correspondent balances (e.g. gainfully employed persons – jobs compared to commuter balance) there are great differences especially in the cross-border balance. Therefore it is necessary to rework and to adjust the data, but the reliability of the chosen approach has to be taken into account.
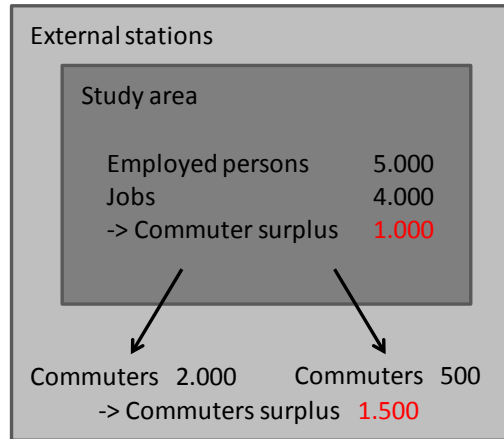
Fig. 3: imbalance of commuter and structural data (hypothetical example)

The national statistic of people, who commute to work, depicts the interconnections very detailed. In the German region of North Rhine-Westphalia and the province of Limburg in the Netherlands for example commuter data is collected on municipality level in national statistics. Looking at the cross-border commuter data it is obvious that this data was collected on a more aggregated level. Cross border commuter data does not show the originating or destinating municipality for foreign countries but only the country (e.g. the Netherlands or Belgium) the people commute to or from. The commuter data from the Netherlands for example just shows the number of people, who commute to Germany. There is no differentiation in German regions or even municipalities. Same for German statistics, they supply the number of commuters from the Netherlands to Germany but not the district or municipality of origin in the Netherlands (see fig. 4). Due to this fact it is necessary to disaggregate this data to obtain an origin-destination matrix on municipality or
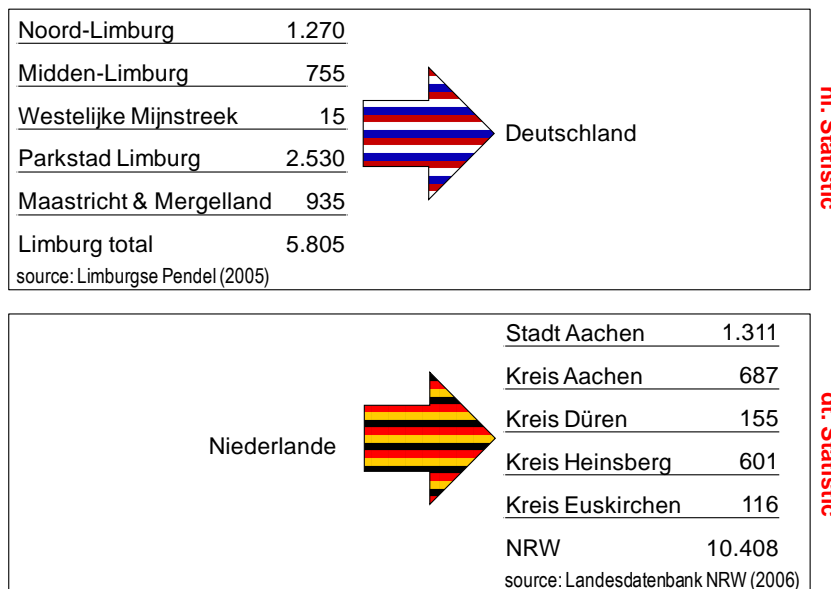
Fig. 4: Commuters from Limburg to the region of Aachen in German and Dutch commuter statistic

There is not only the problem with the spatial aggregation but also with the availability of cross-border data in general. The Dutch commuter statistic for example shows the commuters to and from Germany, whereas the German statistic only supplies the number of commuters from the Netherlands to Germany but not the other way around (see fig. 5). The reason for that is a differentiation in the methodology. In Germany the

number of jobs liable for social insurance contribution is recorded, whereas foreign employers do not send any information about German employees to German agencies . Due to that fact the employment statistic does not show how many German employees work in foreign countries. In The Netherlands everyone who works abroad is recorded by his health insurance. Every employee living in the Netherlands and with a certain maximum income has to have a Dutch health insurance. Therefore in comparison to Germany the Dutch department for statistics (CBS) is able to record every Dutchman and Dutchwomen living in the Netherlands and working abroad.

Noord-Limburg	2.234
Midden-Limburg	631
Westelijke Mijnstreek	683
Parkstad Limburg	757
Maastricht & Mergelland	708
Limburg total	5.014

source: Limburgse Pendel 2005

nl. Statistic

Stadt Aachen	???
Kreis Aachen	???
Kreis Düren	???
Kreis Heinsberg	???
Kreis Euskirchen	???
NRW	???

source: Landesdatenbank NRW (2006)
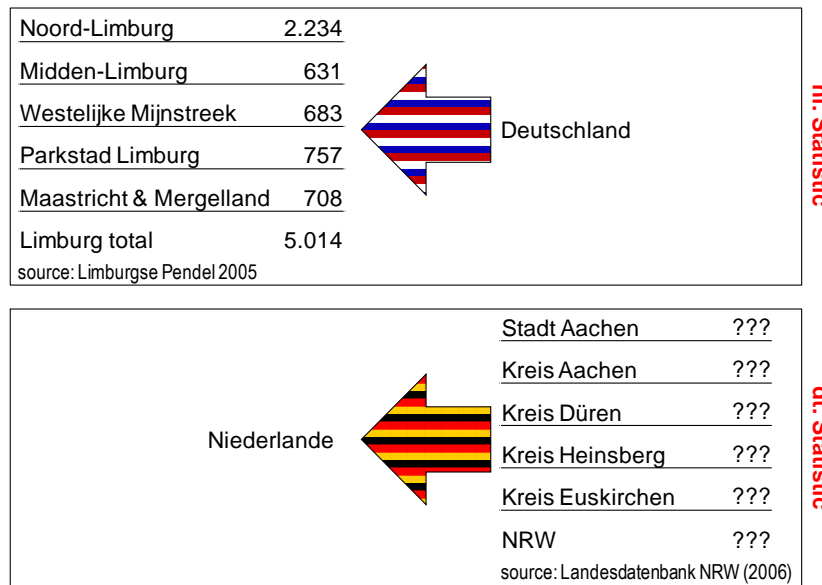
dt. Statistic

Fig. 5: Commuters from the region of Aachen to Limburg in German and Dutch commuter statistic

Niederlande → Deutschland

8.845

source: CBS Statline (2005)

nl. Statistic

Niederlande → NRW

11.160

source: Bundesagentur für Arbeit (2005)
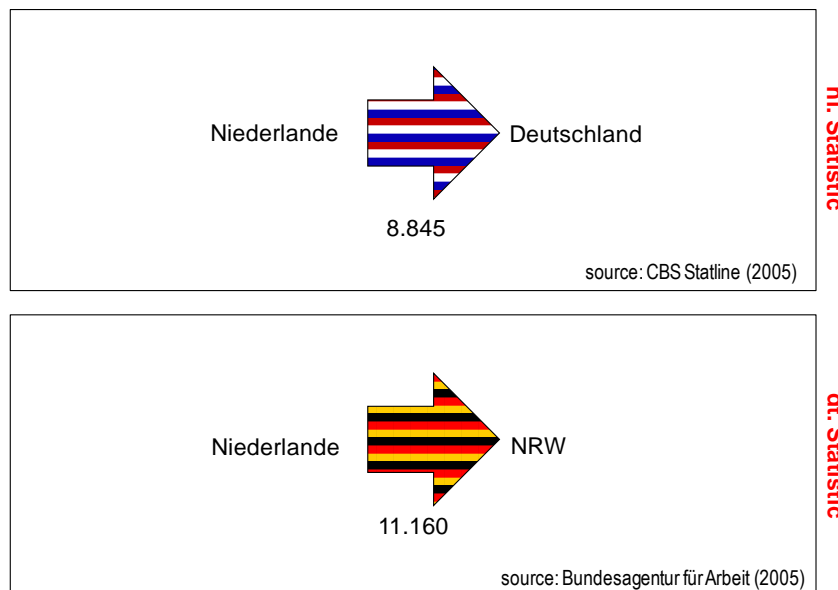
dt. Statistic

Fig. 6: Commuters from Netherland to the Germany in German and Dutch commuter statistic

Due to the differentiation in the methodologies recording the commuters and the definition about what commuters are, the data about the commuting transport differs between Germany and the Netherlands. A closer look to the statistics verifies this fact clearly. Due to the German statistic North Rhine-Westphalia has 11.000 commuters from the Netherlands whereas the Dutch statistic has recorded only 9.000 commuters from the Netherlands to whole Germany (see fig. 6). One reason is that the responsibility for Dutchman/ Dutchwomen, who are living in the Netherlands and working abroad, to have a Dutch health insurance is related to their income. If they have a certain income, they do not need a Dutch health insurance anymore. That means that a certain amount of cross-border commuters is not recorded in the Netherlands. The Dutch research office E,til estimates that the actual amount of commuters is 10 % higher than the CBS records (E,til 2011, page 22). Additionally the CBS does not record any cross-border commuters, who work less than

twelve month in a foreign country. But these two reasons just explain some part of the difference in the commuter statistic, so there have to be more explanations. To analyse this discrepancy enquiries to identify the differentiation of the recording methodologies. The research work is complicated by the accessibility of data and communication problems. Another challenge lies in the development of a useful approach how to handle the noticed differentiation and reconcile it with all stakeholders.

To develop an approach this data was first verified by the methodologys of the used statistics and compared with the number of jobs and employed persons in the region. In the next step this data was verified by known cross border traffic (counting stations) and the percentage of work trips.

4.3 Travel behaviour

To forecast travel demand information about travel behaviour is necessary. The calculation of trip generation requires knowledge about how many trips are made and for which purpose are they made by different groups of people (e.g. elderly, students, employees). To model the distribution of trips and the mode choice data about trip length and mode choice of people differntiated by trip purpose are used. The travel behaviour varies due to the group of people and region because of different activities and land-use. Since the land-use is heterogeneous in the study area (urban and rural districts) and the variety of travel behaviour between regions is even stronger between different countries a region-specific survey would be the optimal database for data about travel behaviour. But such a survey is very expensive and takes a lot of time, so existing surveys have to be used. For Germany there is the MiD (Mobilität in Deutschland) and for the Netherlands the MON (Mobiliteitsonderzoek Nederland). Both surveys are carried out in the whole country to analyse the mobility behavior of the inhabitants. Belgium has a comparable survey for Flanders but not for the Walloon region, where the Belgium study area is located. Moreover there is a local mobility survey carried out in the StädteRegion Aachen. A comparison of mode choice in the Netherlands and Germany shows the necessity of a cross-border traffic model that depicts the travel behaviour differentiated by the countries. In the Netherlands for example the bicycle (as a mode) is more important than in Germany, whereas in Germany the public transport plays a bigger role in commuting traffic (see fig. 7).
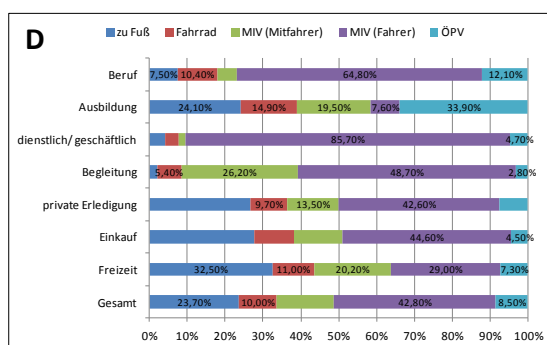
Source: MiT 2008
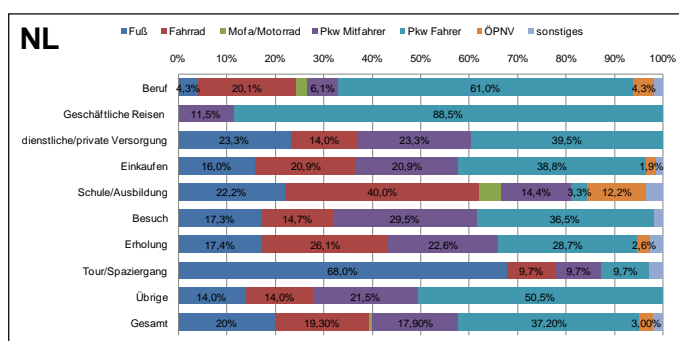
Quelle: MON 2007

Fig. 7: Mode choice in German and Dutch surveys

Besides the country-specific travel behaviour, the location of regions close to the border influences the destination choice. There are existing impediments and incentives (e.g. language skills, difference in price, fare or a differentiation in the job markets), which have an influence on the modal and destination choice of a person. Due to that fact it can be assumed that the travel behaviour in the inland is different to the travel

behaviour in the border areas. To verify this, according to AHRENS/SCHÖNE (2008, page 87), the following information is needed:

- Frequency of border crossing/journey to the neighbouring country
- Motive/purpose for border crossing
- Modal choice for border crossing
- Activities in the neighbouring country

Since there is no such empirical survey for the region of Aachen, which takes the characteristics of the border area adequately in consideration, available surveys and data have to be used. The frequency of border crossings by car are counted at some streets and the activities in the neighbouring country can be taken from regional and municipal statistics. To estimate mobility indicators for the different regions different surveys have to be used. The differentiation of the German MiD would take the entire region North Rhine-Westphalia into consideration, with this the characteristics of the examined planning area cannot be emphasized totally. But for some parts of the German study area there has been carried out a local survey, which can be used additionally. The use of the Dutch MON for the Netherlands seems to be suitable because the data refers to the province level and the Dutch planning area is the province of South Limburg. When using both mobility surveys (MON and MiD) there is a problem with the compatibility. Due to the different survey methods and definitions a classification is not simple. Whereas the MiD has seven trip purposes the MON has nine (see fig. 8). The Dutch trip purposes "Visit", "relaxation" and "tour/walk" could be combined by the German trip purpose "leisure". A classification of the private and on business purchase is much more complicated. To find an exact equivalence it is necessary to have a closer look on the survey methods of MiD and MON, which is again complicated by the language barrier and the availability of the relevant data.

Mobiliteitsonderzoek Nederland 2007 (MON)		Mobilität in Deutschland 2008 (MiD)	
Work (Van en naar het werk)	16,4	Work (Arbeit)	15,7
Business trip (Zakelijk bezoek in werksfeer)	2,6	Official purchase (Dienstliche Erledigungen)	1,3
Official/ private supply (Diensten/persoonlijke verzorging)	3,6	Private purchase (Private Erledigungen)	13,1
Shopping (Winkelen, boodschappen doen)	20,7	Shopping (Einkaufen)	20,8
School/ apprenticeship (Onderwijs/cursus volgen)	8,9	Education (Ausbildung)	6,7
Visit (Visite/logeren)	16,7	Leisure (Freizeit)	33,4
Relaxation (Sociaal recreatief overig)	13,8	Company (Begleitung)	9,1
Tour/ Walk (Toeren/wandelen)	9,5		
Others (Overige)	8,2		

Fig. 8: trip purposes in German and Dutch surveys (source: MON 2007, MiT 2008)

The data and information of MON, MiD and the local survey have been compared and comparable trip purposes have been built by aggregating or disaggregating the data of the surveys.

4.4 Traffic counts and traffic volumes

To check the plausibility of traffic assignment results counter values from the traffic census are used. In the study area continuous counts and manual counting data are available. The results of counting stations which are located close to the border of the neighbouring country should be used if available. For many border crossings between Germany and the Netherlands there are counter values available on both sides. Comparing the border crossing-point A4 (GER) or rather A76 (NL) near Vetschau shows a difference of 2 % in the average weekday daily traffic in 2008. There are no slip roads or exits between these two continuous census points. Still there is a difference in the counter values. On a border crossing-point further north, A57 (GER) or rather A77 (NL) is even a difference of 8 % (see fig. 9). Without an adjustment and a plausibility of the counter values difficulties in the calibration of the traffic assignment can occur because two alongside census points indicate different counter values. For a practical adjustment or rather a selection of counter values it is helpful to analyse possible reasons for the differences noticed. Reasons could be for example the counter- and processing methodology, the number of valid days and possible term definitions. To clarify this, a close

and intensive exchange with the Dutch colleagues is very important. Based on this information adjustments and the selection of counter values can be made.
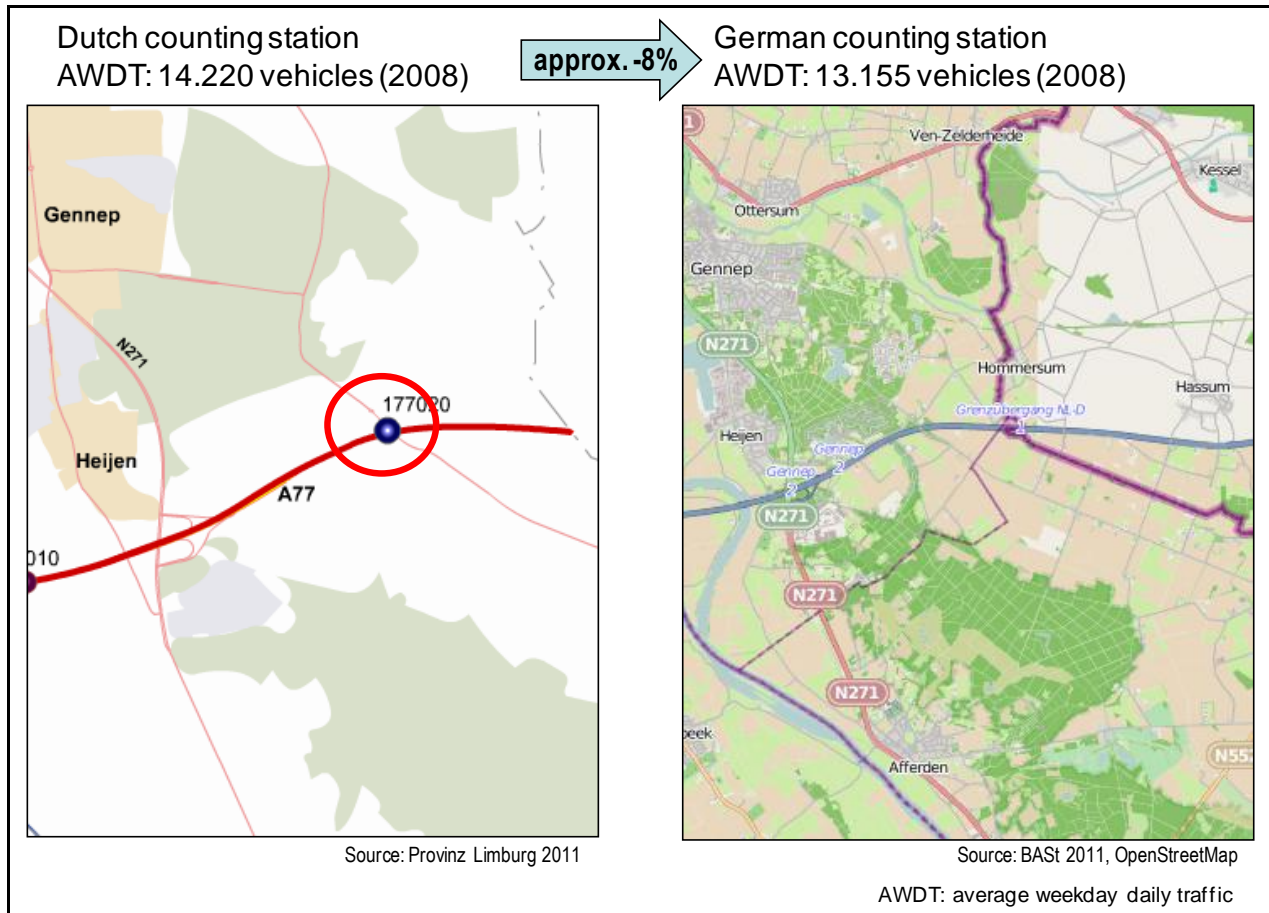
Fig. 9: Comparison of Dutch and German counting stations

5 CONCLUSION AND PERSPECTIVE

For transport planning, as well as for other planning jobs, it is necessary to have information about the general conditions. Therefore transport models are often used as a basis for the decision-making- and transport planning-process. In these processes many different stakeholders are involved and data and information which are needed for the planning process are kept and used in wide differentiation and with a variety of definitions and considered areas by the different institutions and stakeholders (e.g. city council, road administration, transport association).So collected data and results have to be discussed many times and difficulties in the coordination and decision-making-process can occur. These difficulties increase in cross border planning processes even more.

Therefore the development of a cross-border data platform combined with a macroscopic cross-border transport model in the region of Aachen is an important step to create and keep a high quality and coordinated and consistent basis for regional planning data. The process of the development is challenging since many stakeholders have to be involved and the difficulties due to data inconsistencies based on different methodologies and definitions have to be solved. The developed approaches for data adjustments have to be discussed and reconciled with all stakeholders and these discussions have to be prepared well like most stakeholders aren´t used to think about data variation and the effects different methodologies might have on results. So these topics need to be communicated well to all regional stakeholders, so that they understand the reasons and support the choosen aproaches for data adjustments. Therefore the process of participation accompanying the development of the data platform and transport model consists of a broad involvement of the stakeholders of the three countries in data collection, data adjustments and information about the model calibration. This has been done by an accompanying advisory broad and a broad interaction with each municipality and region of the planning area. All basis data (e.g. inhabitants, employees) and the apraoches of data adjustments due to regional consitency have been discussed with each municipality.

Commuter data, mobility behavioral, data from counting stations and for the calibration of the model were discussed in regular meetings of the advisory board. The next step is the discussion of the model (calibration, results) with all participants (advisory board and each municipality/ region).

6 REFERENCES

Ahrens, G.-A.; Schöne, M.: Kooperative Ansätze bei integrierter, grenzüberschreitender Verkehrsplanung auf regionaler Ebene. Dresden, 2008

Bundesagentur für Arbeit: Statistik-Service West; Pendler in Nordrhein-Westfalen 2007, Düsseldorf, 2008.

Bundesanstalt für Straßenwesen, BASt: Automatische Zählstellen 2008. Abrufbar unter: https://www.bast.de, 2011

CBS: Methoden, Dataverzameling, Grensarbeid. Abrufbar unter: http://www.cbs.nl, 2011

CBS Statline: Grensarbeid 2005. Abrufbar unter: http://www.cbs.nl, 2005

E,til: Limburgse Pendel 2005. Maastricht, 2006

E,til: Limburgse Pendel 2010. Maastricht, 2011

Landesdatenbank NRW: Pendlerrechnung in Nordrhein-Westfalen 2006. Abrufbar unter: https://www.landesdatenbank.nrw.de, 2011

Mobilität in Deutschland (MiD) 2008

Mobilität in Tabellen (MiT) 2008. Abrufbar unter: http://www.mobilitaet-in-deutschland.de; 2008.

Mobiliteitsonderzoek Nederland (MON) 2007

Provinz Limburg: Mobiliteitsmonitor Limburg. Abrufbar unter: http://mobiliteitsmonitor.limburg.nl, 2011

VKM AT-CZ-SK-HU 2009. Verkehrsmodell AT-CZ-SK-HU; Protokoll der 1. Fachbeiratssitzung vom 09.12.2009; Wien. Abrufbar unter: http://www.ivv.tuwien.ac.at/forschung/projekte/international-projects/vkm-de.html

Data Analysis Methods for Urban Planning – Problem-Oriented Stakeholders Maps Building

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1 ABSTRACT

A stakeholder is that which can affect or be affected by the actions of the business or interests area as a whole. The stakeholder concept was first used in a 1963 internal memorandum at the Stanford Research Institute. It defined stakeholders as "those groups without whose support the organization would cease to exist." [1]. The theory was later developed and championed by Edward Freeman in the 1980s. Stakeholders mapping is a creation a map of stakeholders in simple for usage format. This paper treats automatically creation problem-oriented stakeholders maps for urban planning purposes. Proposed method includes decision data mining, clustering, creation a stakeholders map in the mind map format.

2 INTRODUCTION

Today the urban economy is a complicated heterogeneous system, which includes a big number of different elements. Each concrete problem can affect or affected by the various organizations, social groups, officials and simple citizens. In a modern world resolving most complicated urban problems is impossible without data analysis, finding, who may be interested in the current state, who need or can to help to change it and which groups should be affected.

Stakeholders theory was created for business problems resolution, initially for competitor analysis, but nowadays it is a part of the decisions making in a different areas.

We propose to analyze on-line media, including social media (websites and social networks), official electronic directories and official web sites for automatically analysis and stakeholders maps creation. In additional we offer processing an official statistics and documents, where it is accessible.

As a result of analysis we builds a kind of knowledge base, and another task is a presenting this map in usable format for decision makers.

Classical systems for operations with knowledge base are not simple for use by businessman or officials. For example, well known Protege system [2], created by Stanford University, could be used only by knowledge engineers or advanced users. Modern management should have an instrument, which can be simple to integrate into the business processes, inserting into reports and presentations, and which could be extremely simple to use in any technical environment – desktops, web and mobile.

We propose to use a Mind Maps format. There are some commercial applications, like a MindJet by the JetBrains (http://www.jetbrains.com/), but we propose to use open format mind maps by the open source project FreeMind [3]. User can export FreeMind xml files into the html and flash for integration to the websites or presentations.

In this article we propose to use a 4-levels maps.

- Problem name (Topic). Examples: medicine, education, road planning, migration politics. In some cases it should be more precision problems like: "traffic jam in the center of the city", "criminal situation in the specific area"

- Objects, affected by actions in this problem or to be affected.

- It could be names of officials, organizations/businesses, businessman/competitors names, some social media authors, bloggers, etc. For further implementations we can include into this level affected small social groups.

This level includes 2 types of items:

- Affiliate objects.

Example: organization, where author works, relatives, and so on.

- Affected problems. In general, it is a set of links to another problems in the 1st level.

3 INFORMATION RETRIEVAL

System should be designed for working in semi-automatic or full automatic mode. It should gather information from the on-line media for real-time mind maps rebuilding. This option should make a possibility always to work with actual information.

It means that critically important part of the system should be a web crawler and pages parser. We designed a crawler, which can solve a different types of technical problems.

For example:

- article text extraction from the different web pages formats with knowledge extraction using Kuriashkin and Kazekin pages processor [4]
- render a page and execute a javascript on the server side for retrieving information from the ajax requests

Another problem is that we can not trust to anything from the Internet, and it means, that we should build a fraud-safe system.

In some cases, on-line authors could add some personalities into the discussions about criminal situation (black PR).

Fraud safety in our case is a dividing information sources into the trust-level groups and extraction author names for evaluation an authors confidence level.

Data sources are divided into the following groups:

- Official organizations (government, business) and directories
- Serious media
- "Yellow" press
- Blogs and social networks

Current system should skip article comments in the on-line media.

As a social networking data source we use a livejournal.com, which is very popular in Russian Internet segment. We could not propose to use another sources as a social right now, except it, because of a big number of spam messages and copy-pastes between all social on-line media sites.

4 BUILDING A VECTOR SPACE

For data analysis texts should be converted into the vector space. Classical approach in building vector space from the text includes: stemming, n-grams extraction, n-grams tf-idf calculation, selection for the vector space building only significant n-grams. By making decision about what n-grams are significant it is possible to increase a quality of the space for the concrete problem. Usually vector space builders skips n-grams with too high tf-idf value, because it could be syntax errors or very specific terms, and a "long tail" with low tf-idf values – non-significant terms.

For our task, building a vector space, besides the classical approach should include directory records analyzing.

In addition, for Russian language extremely important to process: prefixes and word endings, which could be extracted in a separate dictionary and could be used as a separate vectors elements.

Thus, we have 3 groups of the vector elements: directory components, syntactic components and n-grams analysis components. For each space types components we calculated a separate kind of tf-idf measure, which it is possible to use in the distances measure. Weights could be selected for tuning our algorithm, but we suggested to use:

w=2 for directory

w=1 for syntactic

w=0.5 for texts from the official sources and 0.3 for blogs and social networks.

All weights should be corrected for the concrete problem investigation.

5   TEXTS DISTANCE MEASURE

We have a 3 type of vectors components, so, we should use a weighted distance measure. In our case it is possible to use a weighted Euclidean distance or weighted Manhattan distance. In case of Manhattan measure [5], we have reduce an importance of the outlets, so, this approach is more usable for our case.c

We propose to use following distance measure:

$$D = \sum w_i * (A_i - B_i) ,$$

where w is a weight, selected for the components category.

6   PROBLEMS EXTRACTING AND MIND MAP TREE BUILDING

We propose two problems extraction methods:

- "Learning without teacher" approach
- Using a classification and learning dataset for the problem specification.

First method should be useful for the timely response to the emergence of the problem. We propose to use a Fuzzy C-means (Soft K-means) clustering algorithm [6].

The FCM algorithm attempts to partition a finite collection of n elements

$$X = [x_1, x_2, \ldots x_n]$$

into a collection of c fuzzy clusters with respect to some given criterion. Given a finite set of data, the algorithm returns a list of c cluster centers

$$C = [c_1, c_{2\ldots} c_c]$$

and a partition matrix

$$W = w_{ij} \in [0,1]$$

where each element w_{ij} tells the degree to which element x_i belongs to the cluster c_j

We propose to use a standart objective function for minimization:

$$w_k(x) = \frac{1}{\sum \left(\frac{d(center_k, x)}{d(center_j, x)} \right)^{\frac{2}{m-1}}}$$

The fuzzyfier m is a level of clustering fuzziness. In the common cases m=2, and we use this value of the fuzziness for our case.

For the real analyzing process we suggest to use a different number of initial clusters for receiving adequate results.

In our project we used an Apache Mahout library [7] for clustering process, which can use a calculations in the distributed or Cloud computation environment in case if we need to analyze a big amount of data or need to receive result in a critically short time or even in real time.

We can suggest to use such computation in the Amazon Cloud, because significant computing power we need only in process of data analyzing, which could not be a permanent process.

The result of the clustering is a set of clusters, which can be processed by operator for selection a names for each cluster, which can be used as a name of the problem.

System could select a set of directory objects, which could be used as an objects, could be affected or affect by the selected problem. It could be a person, government or business organization.

Next step is an association of this object with another objects through common problems/clusters.

Example of the part of the map could be the follows:
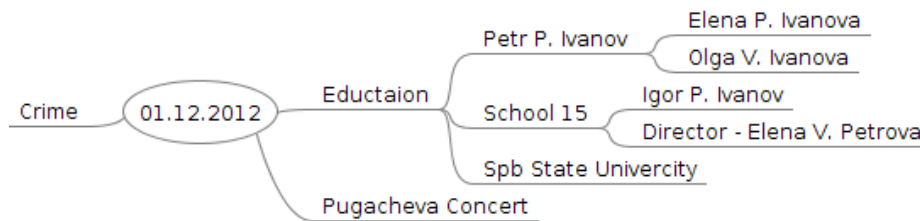
Where is possible to add a data sources.

Second approach, which is called "Supervised learning" implies a classification and test dataset using. We suggest to use a Wikipedia articles categories for the root of classification.

Work flow algorithm should contains following steps:

- Getting an articles tree from the Wiki. It could be not a full tree, but just a part, which is interesting for the customer.

- Crawling each category and subcategory for the wiki pages, extracting texts from the each page.

- Crawling on-line data sources and extracting texts, same as in the first approach.

- Use a Naive Bayes algorithm for finding the best category (problem, in our terms) for each predefined category.

$$p\left(C \mid F_{1,} F_{2,} \ldots F_n\right) = \frac{p\left(C\right) * p\left(F_{1,} F_{2,} \ldots F_n \mid C\right)}{p\left(F_{1,} F_{2,} \ldots F_n\right)}$$

In our case we should calculates a comparison of probabilities, denominator is a constant for the selected data set, so, we can decrease a computations to the numerator calculation and comparison.

We proposed to use a NaiveBayes [8] (MAHOUT-9) algorithm, implemented in the Apache Mahout library.

- Extracting directory objects from the selected texts and place it into the second level of the mind map tree.

- Selection an objects from the another problems, where each of the selected object has found and creation next level of the tree.

We proposed to use a Naive Bayes classifier, because it gives satisfactory results, but it is not correct in the strict sense, because it works in case if components in the vector space is independent from each other. In our case, n-gram analysis could contains terms, includes in the directory term set. This algorithm is not use a weights, selected in the vector space, and could takes not precision enough results, but it could works correctly for the case of small number of categories or in case of searching for the events in the news flow for the selected categories and problems.

Certainly, for the problems classification could be used not only Wikipedia, but any another data source. Better approach is an official data sets usage. In this case it is possible to use only objects finding in the texts from the Internet.

7 HELPFULNESS OF THE SYSTEM

System, which is based on the proposed approach, could be used for on-line monitoring a social media and building an easy to use mind maps. It could be used by government organizations for finding an affected stakeholders of the selected problems (in case of predefined problems classification) and making investigations of the media environment for some important problems for the urban planning. Business organizations can use approach for finding a competitors in the specific area of activity, customers and suppliers.

Proposed approach can be used for both long-term analysis and short-term problems monitoring.

8 PROBLEMS AND SOLUTIONS

Systems is depends on the sufficiently large directory of the personalities, organizations and government structures. Partially it could be found in the Internet using external services. We can suggest to use Open Calais API (Reuters inc) [9], which was used for some project for the Forbes Media. Problem is that it have

not Russian texts, accessible for the on-line API. For some cases it is possible to translate texts to English language, extraction personalities and organization names (Reuters has this base for Russia) and translate it back. It could be a source of some mistakes, but useful for some non-critical investigations.

Proposed algorithms could be tuneup with the following coefficients:

- m – fuzziness – for the clustering. Default value is 2

- n – n-gram length.

- Google [42] uses n<=5, but in our case we proposed to use a 3,4,5-grams, filtered by tf-idf measure

- tf-idf borders for the vector space building.

We can not build a space for all texts elements, and propose to make a filtering and reducing a vector space in process of crawling and texts processing to reduce a number or calculations and memory efficiency. This approach could save memory, but it could be follows to the loose of the some data, which is means, that it is unusable for algorithm tuning for the selected use-case.

9 REFERENCES

(1) Freeman, R. Edward (1984). Strategic Management: A stakeholder approach. Boston: Pitman. ISBN 0-273-01913-9.

(2) http://protege.stanford.edu/

(3) Asmaa Hamdy, Mohamed H. ElHoseiny, Radwa Elsahn, Eslam Kamal, Mind Map Automation (MMA) System. SWWS, Las Vegas, Nevada, USA , 2009

(4) Kuriashkin V, Kazekin M, smart data extraction from the raw web pages https://github.com/vk4arm/dartanianparser

(5) Elena Deza & Michel Marie Deza (2009) Encyclopedia of Distances, page 94, Springer.

(6) Nock, R. and Nielsen, F. (2006) "On Weighting Clustering", IEEE Trans. on Pattern Analysis and Machine Intelligence, 28 (8), 1–13

(7) http://mahout.apache.org/

(8) https://cwiki.apache.org/confluence/display/MAHOUT/NaiveBayes

(9) http://www.opencalais.com/

Decision Support Systems and Tools as Collaborative Web Platform for Sustainable Development of Landscapes

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1 ABSTRACT

Landscape development is increasingly characterized by collaborative processes involving multiple stakeholders of heterogeneous groups. An essential prerequisite for effective collaboration and sound decision-making in landscape development is the understanding of participating stakeholders of required landscape information and the interrelationships between factors influencing landscape development. The tools for representing, processing, analyzing and combining spatial data have evolved and diversified enormously in the last 30 years. This has influenced also the set of media that is applied in participatory planning workshops. Current technology offers great opportunities to allow broad access and to support deeper understanding of landscape processes by implementing web-based platforms. These comprise 3D landscape visualizations and spatial analysis functions. However, an analysis on how to prepare these platforms, their technical structure, their user interface, and the spatial data is missing.

In this paper we present a technical framework of a collaborative web-based platform that takes into account basic user demands for understanding and evaluating landscape processes. Further, we show an initial prototype of a user interface and its information content that was tested with stakeholders. The evaluation results show that the complexity and amount of information offered by the user interface should be customizable for different user groups. New approaches have to be developed to integrate realistic real-time visualizations into the system. Overall, for securing the final tool's effectiveness, it is essential that the technical development of the system is tight to its implementation in collaborative planning situations. These results provide helpful advice for targeted development of the collaborative web-platform system's components.

2 INTRODUCTION

The style of collaborative workshops in land use planning has undergone big changes during the last three decades. These are also related to the development of new communication techniques (Arciniegas & Janssen 2012). Workshop techniques 30 years ago based on large hard copies of maps combined with sheets of tracing paper maps for presenting characteristics of proposed plans or planning areas. With the implementation of Geographic Information Systems (GIS), a new communication tool was offered that allowed to present various map layers on a computer screen and could partially replace hard copies of (tracing) maps for examination (Longley et al. 1999). A next step, which is still under development, takes into account functions and services or the related policy configurations and connects them with related land use patterns. To reveal these relationships can facilitate a better integration of participating stakeholders e.g. in a planning process (Grêt-Regamey et al. 2013).

The workshop style also changed over the years from an emphasis on one-way communication to participation with active stakeholder involvement (Sieber 2006). Today, the major focus is on collaboration: stakeholders shall actively work together to identify a landscape development strategy that is sustainable and acceptable for the majority of the stakeholders (Arciniegas & Janssen 2012). But how can we use the existing technologies to support these collaborative processes? How can we prepare and provide spatial data that is accessible, understandable and useful for all participating stakeholders?

GIS-based 3D landscape visualizations have shown great potential as valuable communication tool in planning processes (Wissen Hayek 2011). Linking quantitative, spatially explicit indicators and realistic 3D visualizations of landscape change scenarios can facilitate the communication of relationships of factors that lead to certain landscape change. This allows to bring in different opinions on a topic and to create public

interests (Wissen Hayek et al. 2012b). Furthermore, experiences show that interactive and participative tools help to understand coherence between prioritization of different indicators and possible land use change. For example, in Figure 1 participants of a workshop on wind farm planning choose the priority of economic viability, landscape aesthetics, nature protection, and noise emission. Depending on the indicators' priority, the amount of wind turbines differs. The interactive tool allows users to understand trade-offs between indicator values as well as between different demands of the landscape and landscape aesthetics (Grêt-Regamey et al. 2013).

Figure 1 – Real-time modeling and visualizing approach with slider control of selected indicators' priority

The variety of planning processes and the diversity of workshop settings and goals complicate the development of an all-purpose decision support platform. The effectiveness of such a platform depends on two major factors. First, it has to provide useful participatory GIS functions, comprising interactive elements of GIS-analyses producing indicators as well as of GIS-modeling producing scenarios of landscape change. Second, it needs to be suitable for participatory settings. With regard to the application, e.g. workshop or self-exploration, the content load and detail of information have to meet the users' demand. Particularly, if the user should understand the relationships between different indicators, overloading the interface is a problem, which can lead to lack of time for appropriate implementation of the tool and even deterrence (Salter et al. 2009). The problem of overloading the interface might be overcome by providing layman and expert modes with a customized offer of spatial information with a useful level of detail. However, there is a general conflict of required detail of information and suitable time investment in collaboration sessions. On the one hand, the need of detailed information on indicators is required to communicate what they state and how they are related to each other. On the other hand, these details need time to be understood. A multi-user-group interface might provide a solution for reducing the complexity of available information. However, with this interface type addressing more specific demands of different user groups might become more difficult.

In this paper we present a technical framework of a collaborative web-platform system that takes into account basic user demands for understanding and evaluating landscape processes. Further, we demonstrate a first prototype of implementing parts of this system, which was tested in a workshop and at an exhibition with different stakeholders. The prototype was designed to addresses basic user demands by implementing participative GIS functionality. This included a user interface design with certain interactive functions as well as preparing visual information content according to a defined level of detail and complexity. The evaluation results were analyzed in order to further specify user demands and to discover expected functions of the platform. They provide advice for enhancing the prototype of the collaborative web-platform.

3 THEORETICAL FRAMEWORK

In the early stages, GIS was used mainly for providing spatial information, but with increasingly active stakeholder involvement and the failure of tracing map paper sheets, a demand of interactive GIS was given. Participatory GIS is designed for improving stakeholder participation within group spatial decision-making (Carver 2003, Janowski 2009). Two function types of Participatory GIS must be distinguish: (1) Public

Participation GIS (PPGIS) focuses on an enhancement of public access to geospatial data and maps, providing possibilities for participatory learning and analysis by the general public, community groups and marginalized groups in planning and decision-making for their communities (Craig et al. 2002). In contrast, (2) Group Spatial Decision Support Systems (GSDSS) focus on supporting the identification of trade-offs, conflicts and compromises between stakeholder groups (Boroushaki & Malczewski 2010).

Our hypothesis is that to create an applicable and full-efficient decision support platform, both participatory GIS types (PPGIS & GSDSS) must be combined. Furthermore, the following functions should be available: general information on the planning topic and use of the platform, spatial analysis and evaluation functions, and interactive indicator-based decision support. In the following chapters these three functions are further explained.

3.1 General Information Content

For understanding complex topics and being capable of evaluation and decision-making tasks, first of all background information must be available and provided in a useful manner. In addition to texts, tables and graphs, maps are the basis for providing relevant information for spatial decision-making. Often stakeholders preferred maps as source of information for spatial decision-making, although they are not easy to understand and use (Janssen & Uran 2003).

Maps can show various and complex information in a spatially explicit way. They can present alternative solutions, scope for decision-making options or spatial patterns (Kraak & Ormeling 2003). Further, they can be used for developing scenarios and alternatives, e.g. by drawing in or modifying it (Carton & Thissen 2009), as well as to handle conflicts among stakeholders. In this way, they can support feedback loops in the planning process (Arciniegas & Janssen 2012; Andrienko et al. 2007). Another function of maps is that they provide base-layers (e.g. thematic and topographic maps) for the before mentioned functions (Arciniegas & Janssen 2012). In addition, map information can provide the input for GIS-based 3D visualization of alternative scenarios, which provide a common communication basis and support mutual concept development (Hehl-Lange & Lange 2005; Wissen Hayek 2011; Grêt-Regamey & Wissen Hayek 2013).

3.2 Spatial Analysis and Evaluation

GIS-based analysis is key for gaining information on the current landscape state or alternative development scenarios. Multi-Criteria Decision Analysis (MCDA) is an effective method to perceive the necessary trade-offs of different demands of the landscape. By weighting different criteria addressing economic viability, ecological or social quality of the landscape, and possible scenarios of landscape change are calculated. Integrating a MCDA in the workflow provides a method to evaluate, compare, rank, map and present the performance of decision alternatives on the basis of several criteria and/or objectives (Malczewski 2006, Grêt-Regamey & Wissen Hayek 2013).

Ideally, stakeholders with different backgrounds should choose criteria and indicators as well as their weighting themselves. In order to avoid mismatches and misunderstandings between the stakeholders' decision-making problem and the answers produced by the system, it is necessary that constraints are set with regard to the interactive modification of criteria and indicators in the user-interface (Uran & Janssen 2003). This might influence the required user-interface complexity.

3.3 Interactive Decision Support

Depending on the functions of an interactive decision support tool aimed at, a selection and combination of various interactive methods is possible. User-friendly interfaces are necessary to allow multiple users to provide input and generate real-time output for supporting to form an opinion and decision-making (Arciniegas & Janssen 2012). Interactive exploration and interactive allocation of map content is required to secure credibility and provide information for specific areas of interests. Furthermore, real-time output of analyses and landscape change models is important for dynamically exploring the spatial outcomes. Iteratively testing different input parameter settings and exploring results can facilitate the comprehension of spatial environmental effects. In this context, linking the quantitative, abstract modeling results to more qualitative 3D visualizations interactively is seen as a promising way (Grêt-Regamey et al. 2013, Wissen Hayek et al. 2012a).

4   METHODS

The goal is to develop a collaborative web-platform that integrates both types of participatory GIS (GSDSS and PPGIS). We elaborated a general technical framework for such a platform and tested parts of it in order to start its implementation. First, the technical framework is described. Then, the prototype of an interactive tool called "Landscape Impact Assessment Controller" is presented. Finally, the evaluation method of the effectiveness of the prototype is explained.

4.1 General technical framework

The various demands of different user groups call for a dynamic user-interface in order to provide a useful decision-support tool. We developed a technical framework that combines modeling and visualization functions essential for interactive landscape impact assessment by different user groups.

Resulting from the literature review (see chapter 3) essential functions are:

(1) The selection of indicators/parameters and their characteristics can be controlled interactively and the related landscape changes can be presented as spatial information. For example, the amount of economic incentives for farmers can be modified and as result the agricultural area that might be managed or abandoned are shown as abstract and realistic 3D visualizations at the area of interest. Thus, the user can identify trade-offs, limitations and restrictions with regard to the choice of the parameters' characteristics. Implementing this functionality requires a real-time user control of the GIS-model.

(2) The GIS-model scripts have to be standardized to make them accessible to different software and thus allows for linking different GIS-models. This standardization of indicator values and labeling, attribute labels, input/output data types, coordinate system, projection, etc. is also necessary for further processing of modeling results, e.g. in visualization workflows.

Figure 2 shows the schematic framework of a decision-support system. The system consists of five different servers and three workshop decision-support tools that are the front-end decision support platform interface and peripheral devices and software, such as mobile decision support apps.
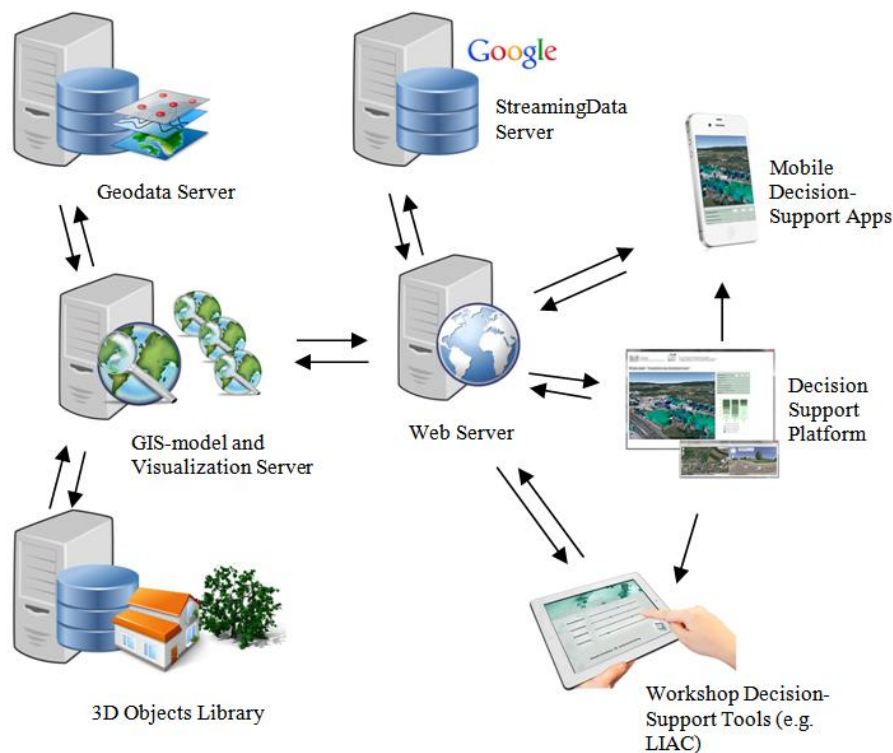
Figure 2 – Schematic framework of a Collaborative Web-Platform Decision-Support System for landscape planning

The web server is the core of the platform and serves as hub for all applications. All requests and replies pass the technical interface of the web server and are linked to spatial data and mapping information streams like GoogleEarth from the streaming data server. The users interact only through the web platform. Platform inputs, e.g. information requests are forwarded to the GIS-model server. This server runs the requested

models and analysis modules (e.g. ArcGIS Server, R-Scripts), queries necessary data from the geodata server and sends the results back to the web server. Produced model outputs are also interpreted and linked to 3D objects and textures for 3D visualization. The resulting 3D visualizations are sent to the web server and displayed on the platform. This workflow is similar to existing ones (e.g. Pettit et al. 2013) with the difference, that we try to integrate a full controllability of models by adapted user-interface design.

3D landscape visualization of high detail requires the use of 3D objects for built and natural landscape structures and elements. The standardization of the input and output data of the spatial modeling processes allow for accessing the 3D objects automatically. However, in a library the 3D objects have to be structured in a meaningful way so that their access is secured. For example, a land use pattern of forest is defined by the forest type (e.g. deciduous, coniferous, or oak-hornbeam forest (Carpinion betuli)). This information should ideally already be available in the output of the GIS-model. The forest type defines the plant types of the trees, e.g. for an oak-hornbeam forest there are oak (Quercus robur) and hornbeam (Carpinus betulus), and further plants of the shrub and ground vegetation layer such as anemone (Anemone nemorosa), that are selected by data base queries. Finally, a realistic distribution of the individual plants of the forest type is necessary (Röhricht & Clasen 2006; Paar et al. 2008).

One major bottleneck is the time required for the real-time modeling processes. Saving produced model outputs to an archive on the GIS-model server allows for showing the results immediately on request. This archive option would allow users to share their evaluated scenarios among each other and discuss them for example in group rooms using the platform. The users feed the archive by using the platform and optimize the processing time by enlarging the amount of already processed model outputs. Of course, this procedure makes only sense for time-consuming models and analyses. A further option for achieving a real-time modeling approach is to implement interactive selection methods. Models and associated visualization workflows might then only be run for preferred perimeters. Perimeter selection could be carried out by a list of regional boundaries (e.g. administrative districts) or by designating a user specified perimeter by drawing a polygon on a map.

4.2 Prototype of the Landscape Impact Assessment Tool (LIAC)

In order to overcome the problem of different user capabilities and interface design complexity, we developed a first prototype of a decision support tool. A user-evaluation of the prototype should provide us with information on the users' demands and on useful designs of the user interface. Figure 3 shows the multilayer structure of the prototype of the "Landscape Impact Assessment Tool (LIAC)", which was designed to show the relation between indicators and the impacts of defining certain indicator values on land use. The tool is applied in a workshop setting. The target group for our web-platform are experts in land use and landscape development. The survey in the workshop revealed that participants were more heterogeneous than expected. To facilitate a "hands-on" experience for the participants, the thematic direction was leaned at a workshop series conducted in another study area in central Switzerland.

As indicated in Fig. 3, the main screen shows sliders with different optional value settings (low to high) for five indicators, which indicate different states of GIS-model parameters. The change of the indicator values is a direct input to a land use change model. A further option on the main screen is changing the view style to an "abstract view" in the second and third screen. In these screens the land use is shown either as a draped raster map on a digital elevation model or as realistic 3D visualization. Screen 2 presents a large view frame of the 3D visualization (realistic and abstract view mode), while screen 3 shows two close-up views of specified areas and an additional graph for information on land use values.

Considering the large amount of possible combinations of the indicators' values and resulting scenarios, visualization approaches that require many manual steps are not advisable. Furthermore, with a rising number of indicators the number of scenarios is increasing exponentially. A direct GIS-model link to the user-interface is one solution to produce scenarios in real-time with full controllability of the output. This was not implemented in the prototype yet. Instead, scenario outputs of a GIS-based land use model were prepared as visualizations and graphs, which were linked to the respective indicator value settings that were input to the respective scenario output. Criteria for the land use modeling of the rural, alpine case study area Andermatt in Switzerland were the degree of liberalization of the agricultural market, agricultural incentives for the farmers, farming income, provision of residential area and the degree of implementing a regulation

for second homes in Switzerland. All these criteria have an effect on landscape development and interact with each other.

Figure 3 – Schematic screenplay of LIAC (Landscape Impact Assessment Controller), which presents land use scenarios that are defined through the interactive setting of indicator values in the controller interface

Figure 4 – Questionnaire of the survey carried out at an exhibition stand providing an overview on indicator characteristics and animating visitors to apply LIAC

4.3 Evaluation of the prototype

We applied the prototype in the case study area Andermatt in two different settings, at an exhibition stand and in a workshop situation, and evaluated it applying empirical methods. Visitors of the exhibition were animated to use LIAC by a small survey that also gave an introduction to indicators and their characteristics

(Fig. 4). About 30 participants explored the tool at the exhibition. The participants were a heterogeneous group including local inhabitants and representatives of Swiss and international governmental and non-governmental organizations from different departments. In open interviews we asked these users about their impression of the tool.

The about 20 participants of the workshop were international experts of land use management, spatial planning and nature protection from governmental and non-governmental organizations, private enterprises, and academic institutions. They were briefed on the prepared planning topic and the GIS models. In addition, the workshop moderator used LIAC to introduce the participants to the information content as well as the functionality and handling of the tool. The decision tool was controlled by a tablet PC that was synchronized to a projector screen presenting the chosen value settings of the indicators. The idea of this setup was to hand over the tablet to workshop participants for supporting their argumentation or explanations implementing the tool interactively. In a group discussion we received the users' feedback on the potential application of the tool and the quality of the user interface. Furthermore, we observed the users in both settings to record their reactions and if the controlling of the user-interface was easy to handle.

5 RESULTS

During a short personal and individual introduction of the available information, the participants at the exhibition "played" with the indicator settings of the LIAC tool to find out how the virtual landscape changes (Figure 5-A, -C, -D). Teenager used the tool more explorative than adults. However, all participants understood that the future land use patterns depend on the five indicators' value settings. The users recognized by themselves, how the indicators influence each other. Furthermore, they recognized on which scale the indicators can influence future landscape aesthetics. For example, less agricultural incentives for farmers effect an abandonment of fields and leads to an increase in forest in certain areas.

In the workshop the participants were rather interested in detailed explanations of the correlation between indicators than in a self-exploration of the tool (Figure 5-B). In conclusion of the group discussion the participants appraised the tool as innovative and useful as discussion basis in a workshop. However, participants stated that the interface offered too much information on the three screens. Furthermore, they asked for more user control on the models to verify effects and impacts of priority settings. Additionally, the participants mentioned that an interactive navigation through the 3D visualizations would have been desirable to see changes in detail, to have a better overview of the site, and better impressions of the view of the landscape.

Figure 5 – Application of iPad controlled LIAC in self-exploration situations and a workshop situation (Photos by T.M. Klein)

6 DISCUSSION & CONCLUSION

The fast developing technical possibilities of providing spatial data in various types of forms and in different types of accessibility offer sophisticated means for supporting public participation in spatial planning.

However, combining the available tools to a coherent and powerful system that can facilitate collaboration of heterogeneous stakeholder groups effectively is a major challenge. We focused in this paper on how to prepare a collaborative web-platform and presented a possible technical structure. Stakeholder feedback on a prototype of a user interface and spatial data presentation provided helpful insight for further development of the system.

Generally the stakeholders were interested in the new means. The users stated that a tool with interactive control of input parameters for generating scenarios of landscape change could help to understand complex landscape issues and offer a new basis for discussion in workshop situations. Even with rather general scenario information the prototype enabled participants to identify relationships of the five indicators controlling the land use change model. But we received also information on missing functions of the tool, which should be available to meet the users' demands.

Obviously younger participants (aged < 20 years) had less fear of contact with the interactive application than older ones. A reason might be that these young people are so called "digital natives" that grew up with the digital technologies (Lange 2011). Through interacting with digital technology from an early age (e.g. mobile devices, smart phones), they should have a good concept of these tools. The higher reservation of older participants might, however, be ascribed to a more critical examination of the technical means due to larger expert and case knowledge. Their requests for more information on the GIS models indicate that their focus was clearly on the meaning of the tool to provide reliable and thus useful information.

The first feedback of the users of LIAC shows that there is a need for a customized user-interface design depending on the user group. In particular the knowledge and capability of the users is crucial for defining a useful complexity of the user-interface design. Overstraining users might be avoided by a customized restriction of interactive parameter control and offer of information for the specific groups. Increasing the accessibility of GIS models seems necessary for a satisfying use of decision support tools by experts. This option might also support an even improved understanding of correlations between indicators and between prioritization of certain demands and resulting landscape changes.

The necessary investment of time for the users to understand and to control the tool as well as for processing the provided information turned out to be problematic. The required time might even increase with rising complexity of the interface and of the offered information content. The available time in the workshop was not sufficient to give the individual user the time he required. This experience reveals that the design of applications has to be developed in parallel with the tool to secure its meaningful implementation. Probably trade-offs must be taken into account due to a reduced complexity of the user-interface depending on the respective application situation (workshop vs. self-exploration).

Beyond user-related requirements we also discovered technical problems that have to be solved. Manual workflows for visualization are not feasible anymore if the amount of landscape change scenarios increases exponentially and if these scenarios can be defined interactively by the users. Furthermore, the degree of realism of the visualizations has to match the landscape development topic, e.g. vegetation types might have to be recognizable if the focus is on the ecological effects of agricultural management or landscape aesthetics. Hence, visualization workflows have to be redesigned to create sophisticated – and from the users expected – visualizations with a sufficient visual quality and appropriate level of detail in an automated way. In order to allow for analyses and visualization of output for any location on demand a generic, automated approach is necessary. This would ensure that the decision support platform is highly flexible and spatially independent.

Overall, it is hard to cover all aspects and demands and develop a useful user interface according to the ideas of different user groups. Particularly, it is challenging to satisfy all users. Generating a user interface that allows for adapting the amount of information, and thus its complexity, might be a constructive approach to meet the users' needs. Of great importance is an iterative approach for the development and testing of web-based platform system. Hence we aim at progressing by stages and with a particular focus on the interfaces to meaningful information provision in planning situations.

7 REFERENCES

Andrienko, G., Andrienko, N., Jankowski, P., Keim, D., Kraak, M. J., Maceachren, A. M., et al.: Geovisual analytics for spatial decision support: Setting the research agenda. International Journal of Geographical Information Science, 21(8), 839–857. 2007.

Arciniegas, G.; Janssen, R.: Spatial decision support for collaborative land use planning workshops. In: Landscape and Urban Planning, Vol. 107, pp.332-342. 2012.

Boroushaki, S., & Malczewski, J.: Measuring consensus for collaborative decision-making: A GIS-based approach. Computers, Environment and Urban Systems, 34(4), 322–332. 2010.

Carton, L. J., & Thissen, W. A. H.: Emerging conflict in collaborative mapping: Towards a deeper understanding? Journal of Environmental Management, 90(6), 1991–2001. 2009.

Carver, S.: The future of participatory approaches using geographic information: Developing a research agenda for the 21st century. Urban and Regional Information Systems Association (URISA), 15(APA I), 61–72. 2003.

Craig, W. J., Harris, T. M., & Weiner, D. (Eds.): Community participation and geographic information systems. Taylor & Francis. London, 2002.

Grêt-Regamey, A., Celio, E., Klein, T. M., Wissen Hayek, U.: Understanding ecosystem services trade-offs with interactive procedural modeling for sustainable urban planning. In: Landscape and Urban Planning, Vol. 109, pp.107-116. 2013.

Grêt-Regamey, A. & Wissen Hayek, U.: Multi-criteria decision analysis for planning and design of sustainable energy landscapes. In: van den Dobbelsteen, A., Stremke, S. (Eds.), Sustainable Energy Landscapes: Designing, Planning and Development. CRC/Taylor & Francis, 111-131. 2013.

Hehl-Lange, S. & Lange, E.: Ein partizipativer Planungsansatz für ein Windenergieprojekt mit Hilfe eines virtuellen Landschaftsmodells. In: Natur und Landschaft 80/4, pp.148-153. 2005.

Jankowski, P.: Towards participatory geographic information systems for community-based environmental decision making. Journal of Environmental Management, 90(6), 1966–1971. 2009.

Janssen, R., & Uran, O.: Presentation of information for spatial decision support. A survey on the use of maps by participants in quantitative water management in the IJsselmeer region, The Netherlands. Physics and Chemistry of the Earth, Parts A/B/C, 28(14–15), 611–620. 2003.

Kraak, M. J., & Ormeling, F.: Cartography at work: Maps as decision tools. In: Cartography. Visualization of geospatial data (pp. 180–197). Harlow: Pearson Education Limited. 2003.

Lange, E.: 99 volumes later: We can visualize. Now what? Landscape and Urban Planning, 100 (4), 403-406. 2011.

Longley, P. A., Goodchild, M. T., Maguire, D. J., & Rhind, D. W.: GIS: Principles and technical issues New York: John Wiley & Sons Inc. 1999.

Malczewski, J.: GIS-based multicriteria decision analysis: A survey of the literature. International Journal of Geographical Information Science, 20(7), 703–726. 2006.

Neuenschwander, N., Wissen Hayek, U., Grêt-Regamey, A. (2012): Integrated Multi-Criteria Modeling and 3D Visualization for Informed Trade-Off Decision Making on Urban Development Options. eCAADe 30, Prague: pp. 203-211. 2012.

Röhricht, W., Clasen, M.: Multum, non multi − Hierarchische Bit Trees bei der Pflanzenverteilung mit oik. In: Simulation in Umwelt- und Geowissenschaften. Workshop Dresden 2005, J. Wittmann, N. X. Thinh (eds.), Shaker, Aachen, 2005.

Paar, P., Röhricht, W., Schuler, J.: Towards a planning support system for environmental management and agri-environmental measures – The Colofields study. In: Journal of Environmental Management, Vol. 89, pp.234-244. 2008.

Pettit, C.; Williams, S.; Bishop, I.; Aurambout, J.-P.; Russel A.B.M.; Michael, A.; Sharma, S.; Hunter, D.; Choung Chan, P.; Enticott, C.; Borda, A.; Abramson, D.: Building an ecoinformatics platform to support climate change adaptation in Victoria. In: Future Generation Computer Systems, Vol. 29(2), 624-640. 2013.

Salter, J. D., Campbell, C., Journeay, M., & Sheppard, S. R. J.: The digital workshop: Exploring the use of interactive and immersive visualisation tools in participatory planning. Journal of Environmental Management, 90(6), 2090–2101. 2009.

Sieber, R.: Public participation geographic information systems: A literature review and framework. Annals of the Association of American Geographers, 96(3), 491–507. 2006.

Uran, O., & Janssen, R.: Why are spatial decision support systems not used? Some experiences from the Netherlands. Computers, Environment and Urban Systems, 27(5), 511–526. 2003.

Wissen Hayek, U., Neuenschwander, N., Grêt-Regamey, A.: Facilitating well-informed trade-off decision making on land use change: Integrating rules and indicators of ecosystem service provision into procedural 3D visualization. In: R. Seppelt, A.A. Voinov, S. Lange, D. Bankamp (Eds.), International Environmental Modelling and Software Society (iEMSs) 2012 International Congress on Environmental Modelling and Software Managing Resources of a Limited Planet: Pathways and Visions under Uncertainty, Sixth Biennial Meeting, Leipzig, Germany, pp. 2235-2242. 2012a.

Wissen Hayek, U., Glaus, M., Klein, T. M., Grêt-Regamey, A.: 3D Szenarien zum Dialog über präferierte Landschaftsentwicklungen in der Gesamtmelioration Blauen. GEOSummit Conference 2012, Berne, Switzerland. 2012b.

Wissen Hayek, U.: Which is the appropriate 3D visualization type for participatory landscape planning workshops? A portfolio of their effectiveness. In: Environment and Planning B 38, pp.921-939. 2011.

Density Exercises in Projects of Oriol Bohigas. Density as a Tool for Suburbs Regeneration

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1 ABSTRACT

The starting point of this research is the assumption that nowadays to regenerate – rather than to build from scratch – is a necessity. Regeneration is fundamental to avoid further land consumption, curb urban sprawl and reduce resources consumption.

In the context of urban regeneration, residential periphery deserves special attention.

Residential peripheries are nowadays marginal, because they are awfully connected, undifferentiated, mono-functional and lacking in basic services. They are unable to respond to changed housing requirements, and inadequate from morphological, typological and energetic perspectives.

At the same time, these neighborhoods are a significant resource, because of their size and transformation potentialities.

The chosen approach considers density as the main criterion to guide and check the projects of reconstruction of residential periphery.

Density, as an urban variable, is a quantitative parameter that affects both architecture and life quality, i.e., the quality of life of the inhabitants of the architecture. In this research the concept of density is extended to a three-fold meaning: density of buildings (with particular attention to density interpretation in terms of surface: FAR – floor area ratio), density of encounter (whose values are randomness and closeness), and density of uses (differentiation of activities and functions).

The choice to focus on Oriol Bohigas, architect that works in Barcelona since 1951, is justified by his vision of planning and also by his determination to promote city reconstruction rather than city expansion. Indeed, he is in favor of a compact city, with a high density of people and activities. The work of Bohigas takes place in the space between plan and project: the plan tends to the project and the vision of the process is always recognizable.

From this perspective, the local dimension gains a relevant value and the transformation strategy for the city is improved through punctual actions for services development and reconstruction of public spaces. The elements involved in regeneration are housing, city block and urban space, whose hierarchies and forms are pivotal points for planning. Following this recipe, the urban project becomes a strategy for high impact changes.

To compare with criteria and solutions in plans and projects of Oriol Bohigas, a selection of representative projects will be analyzed, through the reading key of density, with focus on residential themes and actions in the consolidated city.

The outcomes of this research will include an evaluation of the relevance of cognitive contents that relate the work of Bohigas with the concept of density. Also included will be the extrapolation by deduction of a possible "Bohigas Method", an intervention method, defined by project and process strategies, for the regeneration of urban periphery. These strategies are based on concepts like: functional differentiation, strong relation between plan and project, local dimension, city block as regulation element and urban space differentiation, through hierarchies and forms.

2 URBAN REGENERATION AND SUSTAINABILITY

Urban regeneration, a central issue in current urban planning, is a strategy for the sustainable development of cities.

The term urban regeneration has taken partially the place of more traditional terms like renewal, redevelopment, renovation, and restoration. The term refers to something "organic", embodying the changing and unpredictable transformation of the contemporary city.

Cities are among the main culprits and victims of ecosystem destruction. The first step towards limiting the damage caused by cities to the ecosystem is overcoming the linear metabolism model, which consumes

energy and produces huge amounts of waste. The alternative approach is the circular metabolism model (Rogers and Gumuchdjian, 1997), that reduces resources consumption and increases recycling, thereby reducing the production of waste, in a circular system of use and reuse.

The aim of urban regeneration is therefore the construction of a sustainable built environment, in which the word sustainability applies to welfare, safety and environmental care. Urban regeneration aims at improving the quality of life in the city, in a constant comparison between the potential of existing buildings and user's changing needs.

3   BUILDING ON BUILT

The starting point of this research is the assumption that, today, regenerating rather than building from scratch, is a necessity. Regeneration is fundamental to prevent further land consumption, limit urban sprawl and reduce resource consumption.

The compact city is the best model to reduce consumption. It focuses on the density of compact urban fabric as opposed to uncontrolled urban growth. This defines a new paradigm: building on built.

Nowadays choosing regeneration over substitution is an ethical imperative that becomes an aesthetic choice, which has been named duration aesthetic (Magnago Lampugnani, 1999).

The regeneration process has an added value: temporal continuity. The radical break accomplished through demolition and reconstruction is replaced by a continuity in urban development: it's the renewal, achieved through building the city layer by layer. It's a mechanism that allows a gradual and seamless urban development, like the process of a river's bed sedimentation (Van Schagen Architekten et al. 2009).

The history of the place is a value, the traces of the past can be found in the ground, in buildings, in the countryside, in the views, but also in space, obstacles, borders, links, intentions, successes and the failures.

There is a need to understand and exploit the opportunities offered by the existing buildings, trying to awaken their potential, rather than destroy them.

The renewal of existing assets is today both a requirement of sustainability and an opportunity. The existing assets is not only a problem to be solved, but also a great resource.

4   RESIDENTIAL SUBURBS: PROBLEM AND RESOURCE

Suburban districts merit a special attention in the context of urban regeneration. Suburban districts are today marginalized places, because they are badly connected, undifferentiated, monofunctional, lacking the most basic services, and gravitating around overcrowded urban centers. Furthermore, this housing stock is incapable of responding to changing housing needs and inadequate with regard to morpho-typological and energy requirements.

At the same time, these neighborhoods are a substantial resource, because of their size and potential for transformation.

Periphery is often defined by negation: as the place of lack or the place of loss [1]. The suburbs lack quality, meaning, and identity. Space organization, consistency, shape, boundaries are all lost.

The term periphery derives from the greek "peri" ("around") and "pherein" ("carry") and indicates areas of a city outside the historic center, in a vision antithetical between center and periphery.

Today it is more evident than ever that the geographical dichotomy center-periphery is passed. It is common to come across suburban areas that are part of the urban development. The definition of these areas is no longer based on geographical location but depends on the their characteristics. One can speak of a new peripheral condition [2] which includes space, society and culture.

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[1] Concept defined by Paola Di Biagi in her article "La periferia pubblica: da problema a risorsa per la città contemporanea" (2006).

[2] Giovanni Caudo in his article "Periferia di cosa?" (2009) says that there is a way to be peripheral even before being grounded in a peripheral location in a interstitial city, where the casualization of the statutes draws unexpected geographies that out alongside forms of so-called exclusion with normal integration. Original text: "Emerge un modo di essere periferici prima ancora di radicarsi in localizzazioni periferiche descrizione di una città interstiziale nella quale la

Today two main features identify the peripheral areas: provisionality and incompleteness, especially in the use of the open space and community facilities. Often these areas are incomplete with respect to the original project. Planned services are missing or there is no design of public space.

These characteristics of impermanence and non-finiteness reveal the potential for transforming the suburbs. The suburbs are indeed able to regenerate themselves and become an active resource.

The provisional character is accompanied by a number of problematic aspects that define the peripheral areas. The existing buildings are increasingly lacking and defective, they do not meet changed and changing needs of users, and do not meet minimum requirements for energy efficiency. Buildings built before the 70s did not include any device for energy saving and need today a strong action in this regard. Moreover, we are witnessing an increasing diversification of housing demand: increasing number of families, progressive reduction of the nuclear family, aging population, growing presence of foreign families, young people living in the household. This diversification compels to act on the existing offer of undifferentiated accommodation in residential complexes.

Other problematic aspects of the suburbs are size and proportion. Size is often too large, distances are too wide, open spaces are empty and huge. The large scale discourages people to stay and do activities.

This leads to a lack of recognition and identification and to an almost total disuse of those spaces that should contain the core of urban life in these neighborhoods, at the expense of those relationships that could and should occur in those open areas. "Great distances between people, events, and functions characterize the new city areas. Transportation systems, based on the automobile, further contributed to reducing outdoor activities. In addition, the mechanical and insensitive spatial design of individual building projects has had a dramatic effect on outdoor activities" (Gehl, 1987).

Furthermore, the post-war planning has changed the way of life between the buildings. Urban life was taken outside of the housing complexes, forcing them to depend from the nearest urban centers. This has discouraged pedestrian circulation in favor of motor traffic.

Fig. 1: Examples of peripheral areas where regeneration is completed or in progress. 1) Park Hill, Sheffield. The housing complex was built in '60s and partially renovated. 2) Bijlmermeer, Amsterdam. Housing complex built in '70s and completely renovated. 3) San Cristobal de los Angeles, Madrid. Neighborhood built in '60s and partially renovated.

precarizzazione degli statuti disegna geografie impreviste che rendono contigue forme di cosiddetta esclusione con situazioni di normale integrazione basterebbe a testimoniare di una simile evoluzione".

An interesting term to define this type of urban planning is desert-planning [3]; peripheral areas take the form of no man's land, lifeless places, deserts.

The negative characteristics mentioned above are at the same time considerable potentials for transformation. One example are the great outdoors, today among the largest green and open spaces, that creep in urban areas and are very useful elements for action.

The redevelopment of peripheral housing is a key element to restore urban quality of life in large degraded urban areas.

5 DENSITY AS REGENERATION TOOL

In the proposed approach density is the main criterion for guiding and controlling the redevelopment of residential suburbs. As an urban variable, density is a quantitative parameter, that has implications for the quality of both the architecture and the life of those who live there.

In this research the concept of density has a triple meaning: density of built, density of encounter and density of uses.

The first aspect, built density, reads the density in terms of quantity measured in numbers. Density is a ratio, a tool of analysis, interpretation, planning and control of urban development.

In this analytical approach, density is defined as the "relationship between architectural consistence and anthropized surface"[4] (Reale, 2011). It has a great value in measurement and control of urban space, indeed "to study urban density means going back to measure the space"[5] (Reale, 2011).

There are three main types of density measurement from the point of view of urban planning: lodging per hectare; inhabitants per hectare; surface per hectare.

The last type of measurement highlights a value equivalent to the ratio between all floor area and the settlement area, and it's called FAR: floor area ratio. This type of measurement does not give functional information but volumetric consistency information. It's useful to represent the relation between the density and shape of built. Thus it refers to morphological and volumetric features of urban system, rather than to population's demographics.

Different densities define different qualities of space. It may be interesting to do an analysis of this type applied to Rome, comparing center and periphery. Comparing the density values of some peripheral areas of Rome with the values of some areas of the center is possible to have an immediate feedback on the relationship between density number and the quality of life in the considered areas. The density in the central districts of the city settles something over 2 [6]: 2.71 in Prati district, 2.91 around Bologna Square, Balduina district is 2.56, and nearby Re di Roma square the ratio is 2.38. In remote areas density drops significantly: 1.01 in San Basilio district, 1.34 in Laurentino, 0.69 in Val Melaina, 0.64 in Spinaceto.

These data by themselves speak of how density can be a powerful key for reading urban quality.

In this research we want to emphasize density understood in qualitative terms, i.e. urban intensity. The idea is to go beyond quantitative measurement of urban environment's density to measure qualitative density, i.e. the features of built environment. These features affect relationships between people by realizing, hindering or facilitating them.

The degree, extent and nature of outdoor activities are influenced by the physical design of space "through planning decisions to influence patterns of activities, to create better or worse conditions for outdoor events, and to create lively or lifeless cities" (Gehl, 1987).

Accordingly, it is possible to speak of encounter density. Proxemics is the discipline dealing with personal and social space and the way in which man perceives it. In addition, proxemics considers distances between

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[3] The term desert-planning was introduced by Gordon Cullen in his text "Townscape" published for the first time in 1961.

[4] Translation by the author. Original text: "il rapporto tra consistenza architettonica e superfice antropizzata"

[5] Translation by the author. Original text: "Studiare la densità urbana significa tornare a misurare lo spazio"

[6] All values are calculated as F.A.R. floor area ratio. Values are defined by Luca Reale in his text "Densità, Città, Residenza" (2011).

people, which vary according to culture and history. In our culture, proximity is a value and a necessary element of the definition of the city. Together with random personal interaction and neighborly relations.

The density of meeting refers to frequency, character, and controllability of random encounters. It defines the quality of urban life, in contrast with loneliness and dispersion of the suburbs: " This density of encounter is the substrate of sociability and the material basis of democracy"(Sorkin, 2003)

A neighborhood where you can live well is also represented by another type of density: density of uses. The quality of urban density refers to the quantity and diversity of functions, necessary elements for promoting the variety of everyday experience: " Cities are public reservoirs for the production of private experience" (Sorkin, 2003)

Hence to act on urban density "is not simply to densify or infill but establishing new relationships, building close relationships"[7] (Caudo, 2009). The goal is to grow what has been called the third city [8], which is not city's expansion nor conservation, but is the city of regeneration, of redevelopment, transformation of what was built, in relation to ability to create a human scale city. In such a city the boundary is not a site of separation but a meeting place between differences.

6 ORIOL BOHIGAS: A REFLECTION ABOUT THE CITY

The choice to focus on Oriol Bohigas, architect active in the city of Barcelona from 1951, is based on his work's appraisal. Since the '80s, Oriol Bohigas was an advocate of city reconstruction versus city expansion. He promoted returning to a compact city, with a high density of people and activities. He has actively contributed in the '80s and '90s, to transform the city of Barcelona, participating both as a designer and as technician of the municipality city-plan office, moved by the idea to give urban value to architecture. Bohigas planned expansion and opening of the city towards the sea, through the transformation of the Barceloneta neighborhood.

He has a vision with a planning flavor. His work is at the junction between plan and project: the plan tends to the project and the relationship between them is always recognizable.

Oriol Bohigas sees the city not as an unicum but as a juxtaposition of parts. He defines the neighborhood as the main urban planning unit. In this view, the local dimension acquires great value. The strategy of city transformation is implemented through precise actions for services development and reconsideration of public spaces.

He has contributed greatly through ad hoc actions to urban transformation through interventions in the consolidated city, that is inside the Eixample district, created by the Cerdà plan [9], focusing on the theme of the city block.

Oriol Bohigas, as designer, has in fact worked a lot on housing, mainly focusing on urban space design and community services. Indeed, he considers urban design a strategy for high impact changes. City regeneration begins from building community space. Hierarchies and forms of urban space are key points for planning. Streets and squares are pivotal points for designing public space. The street is important on a small scale, corresponding to the dimension of urban life. The square is also important on a small scale, because it expresses place's spatial culture. It is necessary to understand and interact with the site to build quality public spaces.

The elements involved in regeneration are: housing, city block, and urban space. The latter with its hierarchies and forms. Actions should be taken to regenerate attraction capabilities and recovering formal dignity, that helps improving the sense of community (Bohigas, 1986).

Bohigas, in his reflections on the transformation of the city, attaches great matter to density. He believes in the necessity to rebalance city's density and uses. A qualitative and quantitative homogenization of the city is, for Bohigas, necessary. You have to rebalance meanings and uses, and restore or provide urban quality of

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[7] Translated by the Author. Original text: "Non è semplicemente densificare o riempire (infill) ma stabilire nuovi rapporti, costruire relazioni di prossimità"

[8] The term Third city is defined by Giovanni Caudo in his article "L'abitare e la città al tempo della crisi" (2009). Third city is densification, is building the city into the city (...) therefore is not a merely quantitative operation". Original text: "La terza città è densificazione, è costruire la città nella città (…) quindi non è operazione meramente quantitativa"

[9] Urban plan for the expansion of the city of Barcelona, created by Ildefons Cerdà and approved in 1860.

life in the spaces of suburbs. Indeed, he focuses on the density of use. An effective method for regeneration is to reconsider the intended use of a neighborhood in a sort of Plan of Uses. The combination of work, housing and leisure activities allows to define the city.

It is important to include the work of Bohigas in the regulatory environment in which he operates, and then study what he achieved in relation to city laws. The reference urban plan in Barcelona is the PGM-76, which is the achronym for Plan General Metropolitano de Ordenación Urbana, drawn up in 1976. This plan defines rules for soil use, density limits and standards.

The regulation of soil regime is very interesting for this research. Urban development areas are defined according to the intensity of use. Areas with specific physical features and urban classification are assigned a definite intensity of use [10].

The plan does not give a detailed order, but clearly defines the proportions between volume and empy space. The plan defines first the minimum standards to be met, and then gives an index of buildability based on the different density of use attributed to the various areas.

Reflections on urban density and intensity are strongly considered in the urban plan that includes Bohigas's projects.

Fig. 2: Some case studies: projects of Oriol Bohigas. 1) La Maquinista Block, Barcelona, 1983. 2) La Salut Block, in Sant Feliu de Llobregat (Barcelona), 1973. 3) Housing block in Mollet (Barcelona), 1983.

7 RESEARCH METHOD: AN EMPIRICAL COGNITIVE PROCESS

To evaluate the criteria and solutions in the plans and projects of Oriol Bohigas, a sample of representative projects will be analyzed. The key to select the projects is density, with a focus on residential themes and actions in the consolidated city.

Case studies will be selected that meet the following criteria: must be a predominantly residential complex, must be actions on a whole city block. The latter criterion permits to understand clearly the practices applied.

The research is based on an empirical cognitive process. The analysis is based on detailed and thorough study of physical features and use of space, as defined in the projects.

A table of assessment indicators will be defined for case studies analysis. Indicators aim to provide an assessment as objective as possible of building complexes rated by qualitative density. That goal is to gather information about those design procedures that modify space and the way in which it is lived, and that determine ultimately whether or not there is a good quality of life in urban areas.

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[10] Normes urbanístiques del Pla General Metropolità. Títol II, Règim urbanístic del sòl.

Indicators for analyzing projects will be divided into two main types: indicators describing physical space and indicators showing interaction between space and users. Indicators of the first type refer to build space in function of its physical, dimensional, aesthetic properties.

Indicators that describe physical space will respond to the following questions: How are inner and outer space connected? Are boundaries defined or fluid? Is there a gradual transition between the public and private space? What is the relationship between built and empty space? How much outdoor space is green? How much open space is walkable and how much is private? How is the ground floor organized? What is the relationship between building height and open space width? Are there any services for residents? Is there a differentiation in colors? How is the system of routes configured? Distances are long or short? Walkways are covered or not? Are there are spaces to rest, to walk, to sit? What kind of paving is used?

Indicators which describe the interaction between space and users respond to questions such as: In outdoor space are there optional activities besides the basic ones [18] ? What is the frequency of interactions between people? Are there passive, chance encounters? What is the traveling speed outdoors? What activities will be carried outdoors and for how long? Is a sense of safety perceived? Is there a protection against noise, weather, traffic, hazards?

The method of analysis is to be based on perceptions of space. Carrying out such an analysis requires a prolonged stay in the building complex being analyzed, in order to understand how the space is used at different times of day. Indicators are therefore analytical tools necessary to give objectivity to observations.

The next step, after case studies description, is comparison between cases. By comparing data obtained through the indicators it is possible to deduce the constant features which determine the good quality of urban spaces.

8 CONCLUSIONS

These constant features can become design guidelines for the reconstruction of city character in peripheral urban areas. Those areas where this character has been lost or city qualities have never existed. The goal is to extrapolate by deduction design strategies to be applied extensively. The outcome of this research prefigures the definition of a possible method based on intervention design strategies, extrapolated from the comparative analysis. Such strategies are based on architectural devices, able to provide urban quality of life in spaces of suburbs.

This method can be an answer to the regeneration requirement of peripheral areas. This method can provide information about the elements on which to act and the methods of intervention, modifying urban density and intensity. The final goal is to provide or restore urban quality of life in degraded urban areas and thus allowing a wide-ranging regeneration.

The research will add an innovative contribution to the issue of regeneration of suburbs, using urban density as means of regeneration, using the example of Bohigas's work.

A possible development of this research is a feasibility test of this method applied through a simulation. The simulation could be applied for a suburban area in Rome metropolis, with the involvement of city government and inhabitants.

9 REFERENCES

BAUMAN, Zygmunt: Trust and fear in the Cities. It.tr. Milan, 2005.
BOHIGAS, Oriol: Reconstrucción de Barcelona. Madrid, 1986.
CAUDO, Giovanni: Periferia di cosa?, in Macramè, 3. Florence, 2009.
CAUDO, Giovanni: L'abitare e la città al tempo della crisi, in Ambiente Italia 2011. Il consumo di suolo in Italia. Annual report Legambiente, Edizioni Ambiente. Milan, 2011.
CULLEN, Gordon: Townscape. London, 1961.
DI BIAGI, Paola: Città pubbliche: linee guida per la riqualificazione urbana. Milan, 2009.
DI BIAGI, Paola: La periferia pubblica: da problema a risorsa per la città contemporanea, in: Oltre la città: Pensare la periferia. Naples, 2006
FRAMPTON, Kenneth: Bohigas, Martorell, Mackay. Milan, 1990.
GEHL, Jan: Life between buildings: Using Public Space. New York, 1987.
GELSOMINO, Luisella; MARINONI, Ottorino : Territori europei dell'abitare 1990-2010. Bologna, 2009.
HERZBERGER, Herman: Space and the architect. Rotterdam, 2000.
MAGNAGO LAMPUGNANI, Vittorio: Modernità e durata. Proposte per una teoria del progetto. Milano,1999.
MARTORELL, Josep; BOHIGAS, Oriol; MACKAY, David: MBM: fiaschi. Florence, 2001.

MBM Arquitectes: Obras y proyectos 1993-2006. Barcelona, 2006.

NANNERINI Giuseppe; MANDOLESI Domizia: Lo studio MBM: O. Bohigas, J. Martorell, D. Mackay, A. Puigdomenech: progetti e opere. Rome, 1996.

REALE, Luca: Densità Città Residenza. Rome, 2011.

ROGERS, Richard; GUMUCHDJIAN, Philip: Cities for a small planet. London, 1997.

SORKIN, Edward: Pensieri sulla Densità, in Lotus, 117. Milan, 2003.

VAN SCHAGEN ARCHITEKTEN; MOSCOVITER, Herman; MEURS, Paul: De Bestaande stad asl uitdaging. De Methode Van Shagen. Amsterdam, 2009.

🏆 *reviewed paper*

Deprived Neighbourhoods in Neo-Liberal Times – the Role of Public Funding in Education

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1 ABSTRACT

In the light of what has been called "actually existing neo-liberalism" the issue of spatial segregation and exclusion of deprived peripheral neighbourhoods is analysed by challenging the pseudo-concept of the so-called "mixed communities", whose ultimate goal seems rather to be encouraging home ownership through a mix of tenures. Preliminary findings on a still ongoing on-field research are presented.

2 NEO-LIBERAL GUIDELINES FOR URBAN POLICIES, PLANNING AND DESIGN

Within what Brenner and Theodore (2002) have called «actually existing neo-liberalism», being different from pure neo-liberal ideology, Peck and Tickell (2002) further distinguish a «roll-back» and a «roll-out» model, or «laissez-faire» («let-do») and «aides-faire» («help-do») neo-liberalism (Purcell, 2009; see also: Raco, 2005). While the former is associated to Margareth Thatcher's and Ronald Reagan's policies in the context of the 80s, when market logics and the reduction of the State to a minimum were proposed as an effective approach for facing the economic recession, the latter, based on a more active role of the State in facilitating the accumulation of capital, is explicitly associated (see e.g.: Allmendinger, 2011; Peck & Tickell, 2002) to the New Labour's centre-left government in the UK (see also: Levitas, 1998; Newman, 2001; Cochrane, 2003; Raco & Imrie, 2003; Hills & Stewart, 2005; Holden & Iveson, 2003).

Brenner and Theodore (2002) also suggest «recognising the extraordinary variations that arises as neoliberal reform initiatives are imposed within contextually specific institutional landscapes», and the need to more overall analyses on such «variegated neo-liberalism» (Huw, 2009; see also: Peck & Theodore, 2007; Birch & Mykhnenko, 2009; Brenner et al., 2010a) is highlighted (e.g.: Brenner & Theodore, 2002; Peck & Tickell, 2002; Peck, 2004; Peck et al., 2009b).

But, despite «the path-dependent character of neo-liberal reform projects» (Brenner and Theodore, 2002) and the different ways in which «established institutional arrangements significantly constrain the scope and the trajectory of reform», as Scoppetta (2012) has noted in the case of regeneration of industrial port-cities (see also: Scoppetta, 2011a; 2011b), a general well-established neo-liberal planning recipe exists and can be easily individuated: «finding a derelict industrial or port area (in the latter case, delocalising port activities in a deepwater zone); adding a lot of public/private partnership, a pinch of trendy "creative class" according to Landry's (2000) and Florida's (2003) theories, a quantity of entertainment and leisure, a spoonful of (luxury) housing, offices, malls and public spaces, and a handful of tourism. Seasoning with IT facilities; then mixing with an international Olympic or cultural event and with a slowly and carefully cooked strategic planning tool. Finally flavouring with a tasty slogan – such as "young city" or similar – and with an "inclusive" and "shared" participatory process».

Such neo-liberal planning recipes can be seen as «knowledge apparatus» (Sum, 2009), based on competitiveness as a «hegemonic "knowledge brand"» (ibid.), «persuasive, widely accepted and powerful simplifications of the world» (McCann, 2004), such as the so-called "best practices", that effectively functions in spreading neo-liberal discourses and approaches, by forming a sort of disciplinary power over different countries and rooted planning traditions, so that they are often used by various actors to support arguments and to express the need for certain projects (see: Peck, 2010), which, in turn, refer to a specific (and often imagined) «urban neoliberal subjectivity» (Beaten, 2011) mirroring particular ideas about work, free time, and (above all) pattern of consumption (see: Atkinson, 2003b; Zukin, 1995; 1998).

In fact, as MacLeod and Ward (2002) and Lees (2003) underline, this happens especially as concerns public open spaces (on which urban regeneration schemes are particularly focused) by promoting an idea of "quality" that precisely mirrors a specific, «selective and systematically discriminating» (in: MacLeod, 2002) aesthetic model, which, in turn, both emerges from and promotes specific social groups, i.e.: young single or childless urban professionals with high income, and high social, educational and cultural capital. And, as Jensen and Richardson (2007) argue, «when particular subjects are imagined in particular ways, this will play a more or less visible part in the formation of policies and plans».

Such «technology of representation», which is incorporated within a «technology of renewal» based on detailed design guidelines, tends to reproduce «guidelines for a favoured kind of urban citizenry, figuratively embracing them in a landscape informed by a bohemian aesthetic while other residents are rhetorically and materially recast as outsiders» (in: Hoskins & Tallon, 2004) through the use «interdictory architecture of the new built environment» (MacLeod, 2002) implying expectations of specific behaviours, often supported by surveillance systems (Atkinson, 2003b).

3 DEPRIVED NEIGHBOURHOOD IN THE CONTEXT OF NEO-LIBERALISM

3.1 Neo-liberal spatial exclusion

The French sociologist Jacques Donzelot (2008) claims that, while the twentieth century was the age of confrontation, ours is one of polarization and spatial segregation. In fact, being the epicentre of the neo-liberal «geographically uneven, socially regressive, and politically volatile trajectories of institutional/spatial change» (Brenner & Theodore, 2002), cities are at the heart of processes of exclusion/inclusion, as the transformations linked to the process of both economic restructuring and globalisation have led to a polarisation of the labour market due to the growth of the demand for high-skilled labour on one side, and low-skilled labour on the other (see: Sassen, 1991; Mollenkopf & Castells, 1991; Hamnet, 1996; 2004; and many others).

While the polarisation thesis by Sassen and by Mollenkopf and Castells tends to highlight how specific processes of economic restructuring and labour market changes affect the social and spatial structures of cities, Hamnett's contribution (1996; 2004) has been pivotal in addressing the importance of welfare regimes in shaping the social outcomes of economic restructuring. In the European context, the debate was taken forward, with many authors insisting on the significance of welfare regimes without disputing the spatial inequalities affected by economic restructuring (see: Maloutas 2004, Musterd & Ostendorf 1998). Therefore, the phenomenon of spatial polarisation can be seen as an additional outcome of that characterising both the labour market and population (Maloutas, 2004).

As a consequence, the issue (or the rhetoric) of the included and the excluded who are (also) spatially segregated permeates the recent European literature and policies. The broader "spatial turn" in policy discourses has led to widely acknowledge space as a crucial dimension in the structuring process of exclusion. In fact, many scholars (Murie and Musterd, 2004; Musterd et al., 2006; Andersen, 2003; Forrest & Kearns, 1999; Atkinson & Kintrea, 2001) particularly emphasise the spatial dimension and the role of place in social exclusion, especially in the case of run-down inner city areas or peripheral public housing estates, so that the emphasis on social issues has shifted from notions of social class to notions of place: Therefore, both mainstream literature and political discourse in many European countries focus on the dimension of the neighbourhood, especially if dangerous, deprived and involved in a downward spiral that contributes to the further concentration of low-income households.

"Downward spiral" involving people, buildings, the environment and the image of the place, stigmatisation, "post-code discrimination", predominance of negative role-models, spreading of anti-social behaviours, concentration of disadvantaged low-income inhabitants, and the escape of householders as a result (see e.g.: Taylor, 1995; Power, 1996): these are the interpretative categories– coming from the US context, with a higher and more rooted level of segregation due to racial issues – generally used for explaining the «neighbourhood effect» (Bolt et al. 2010; see also: Musterd & Ostendorf, 2005; Ostendorf et al., 2001). The latter is not without implications in policy terms, as it linked with the idea of introducing a"de-concentrative" social mix (see: Musterd, 2002; Musterd & Andersson, 2005; Ostendorf et al., 2001; Musterd, 2003).

Lindsey (2007), however, underlines how the exclusion is «manifested both physically (within the actual space of the city) as well as discursively (within the space the city occupies in the imaginary)». In other words, this means that the exclusion is not only spatial, but it also is an exclusion from city's narratives. This allows assuming the existence of dialectical relationships between the (essential) economic motives and the (not irrelevant) ideological connotations of neo-liberal globalised and market-led urban renewal initiatives. As Scoppetta (2012) notes, «this relationship clearly reveals how not only the end result of rent-seeking urban policies, but also the socio-spatial transformation process are determined by (and are able to reproduce) hegemonic relationships».

3.2 A "pseudo-concept" is roving Europe!

On the background of the abovementioned spreading of neo-liberal pre-established recipes, guidelines and (presumed) "best practices", a «pseudo-concept» – as Bourdieu (2004) would say – is roving Europe (sic!): the assumption that more balanced communities can be achieved by encouraging the social mix through the differentiation of housing tenures. Well-designed open public spaces for imagined citizens (consumers) to be attracted in regenerated neighbourhood constitute the obvious corollary of the basic assumption.

Jacques Donzelot (2006) – an urban sociologist from a country where concerns about self-segregation are strong in the political debate, as the main objective is to assimilate minorities into mainstream society – has critically analysed such trend towards social mix by deconstructing, in order to reveal its ambiguities, the use of the concept of "mixitè social" as a key-tool to achieve social cohesion in French urban policies over the past twenty years. He nderlines how this concept has been translated in two type of policies: imposing minimum quotas of social housing to local authorities, and encouraging "middle class residents" back into deprived neighbourhoods (mostly post-war housing estates) through selective demolition and housing differentiation measures. According to Donzelot, this means that the ultimate goal is to increase the variety of housing typologies in order to encourage home ownership, rather than assuming as primary objective the mix of population groups with different incomes. In fact, such projects are often aimed at enticing middle-class residents into deprived neighbourhoods, rather than deprived households into richer areas.

Donzelot's analysis offers useful insights into a better understanding of both rhetoric and hidden reasons staying behind public discourses on social mix, which seem to be mainly led by the need of attracting middle classes residents and private investments in the (no longer public) restructuring of the existing public city. We can also interpret in this sense the shift towards ownership of housing policies in Berlin (Bernt & Holm, 2004), which used to be a tenant city: while subsidisation of condo conversion is expanded, funding for social housing has been drastically curtailed, and rent control has been reduced. In addition, each year 30,000 housing units are "freed" from being reserved for low-income groups, and the public housing associations are being sold. The goals of social programs for "problematic neighbourhoods"– such as "Social Stadt" – are not desegregation or redistribution (since such goals are no longer seen as feasible), but rather an attempt to mitigate the worst effects of the restructuring.

It is not a coincidence, however, that the concept of social mix – exclusively applied in social housing estates (Darcy, 2010) and not, as in case of the Home Ownership and Opportunities for People Everywhere VI or Moving to Opportunity programmes in the USA, where vouchers to rent private dwelling in richer neighbourhoods are given to low-income households – as an engine of cohesion and sustainable communities constituted one of the main principles underpinning the vision of New Labour's so-called "urban renaissance" (that involves, in the reality, just a part of the "urban"), and it was strictly linked to that of "sustainable community". In this sense, many scholars have highlighted the coexistence of two contradictory New Labour's agendas (Cochrane, 2003, 2007; Holden & Iveson, 2003; Levitas, 1998; MacLeod & Ward, 2002; Ward, 2003; Jones & Ward, 2004; Amin et al., 2000). In fact, while the term "social mix" was already present in the first period, "sustainable community" appeared for the first time in 2003 and progressively substituted the term "urban renaissance" – the major slogan of the New Labour's agenda immediately after the coming into power in 1997 (Rogers & Coaffee, 2005; see also Gordon, 2004) – in public discourses.

In key policy documents, the «new sustainable urban realm» to be achieved through the "urban renaissance" was explicitly intended as an instrument aimed at «attracting the suburban knowledge and service industrial demographic back to the city» (Cochrane, 2003, 2007), i.e.: to stop the "escaping" of the middle-class towards the suburbs (the process of sub-urbanization started in the '80s) and to enhance the (global) competitiveness of the city in the new knowledge economy. In other words, the vision of the New Labour's "urban renaissance" was based on the assumption that the return of the middle classes to the inner city could be the key-way of reducing concentrated poverty and its long-terms effects (DETR, 2000). Therefore, being the concept of "social mix" framed within these basic ambiguities and contradictions, it clearly shows its rhetoric nature.

In this sense, it is not a coincidence that what is to be "mixed" remains highly unclear in key policy documents such as the Urban White Paper (DETR, 2000; see also: Lees, 2003), where the term "mix" refers to uses and functions («mixed development») as well as to social issues («mixed communities») or, as

Rowlands et al. (2006) note, it is presented as a (prodigious!) tool for delivering both income and social mix as well as social interaction, broader social cohesion, "sustainable communities", cultural and ethnic diversity (OPDM, 2006) (surprisingly, happiness, richness and eternal youth are not mentioned!). Further (supposed) positive effects of mixed tenure are individuated by the Williams's and Daly's de-constructive analysis (2006): dilution of disadvantage, improved sustainability (of services), change in resident behaviour and change in non-residents perceptions. But, anyway, they conclude that empirical evidence shows that while tenure mix surely is a necessary precondition for social mix, it is not sufficient to achieve it.

In the reality, indeed, «tenures are spatially separated as a result of the land assembly methods» and «this not necessarily being conducive to social integration» (Williams & Daly, 2006). Many other scholars (Kleinhans, 2004; Galster, 2007; Cheshire, 2007, 2009; Chesire et al., 2008; Lupton & Tunstall, 2008) agree on the fact that there is little or no evidence neither of the increasing of social interactions between social housing rental residents and the owners of newly built housing units, nor of the leading to better life chances and opportunities. On the contrary, beyond the obvious loss of social housing and public assets, regeneration policies based on a mixed-tenure approach rather tend to lead to a transformation of local services and retail (Rowlands et al., 2006) for the benefit of higher income groups. Furthermore, while seeing in mixed-tenure strategies a form of gentrification (Cameron & Coaffee, 2006; Johnstone & MacLeod, 2006; Lees, 2008; Aktinson, 2003; Davidson & Lees, 2005; Watt, 2009; see also: Urban Studies, 2008), British scholars underline that the tenure mix rather tends to produce «utopian and dystopian spaces», «physically proximate but institutionally estranged» (MacLeod & Ward, 2002) leading to daily micro-conflicts over the use of green or social spaces (Richards, 2005; Taylor, 2005). Richard Rogers himself – one could say: the "father" of the Urban White Paper – highlights the risk of segregation «with ''haves'' occupying their trendy new apartments and the ''have nots'' living not far away in substandard housing» (Hetherington, 2002).

By underlining that the New Labour's idea of "urban renaissance" is focused on a «civilized middle class» (Atkinson, 2003a), other scholars (Jupp, 1999; Atkinson & Kintrea, 2000) highlight a further paternalistic assumption of a (supposed) "civilizing" influence of tenure mix, based on the idea that contacts and interactions with "role model" from a different socio-economic background could "motivate" the deprived groups or individuals, even though there is «no specific evidence of role-model effects or increased social capital» (JRF, 2006).

Anyway, it is worth noting that in the UK the increasing of negative perceptions of Muslim residents, due to the bombing of 11th September 2001 in the US and 7th July in London as well as the riots in Northern English cities in 2001 led to growing debate in the British media and political sphere on the spatial segregation/clustering of immigrants and on its potentially dangerous consequences as well as to the re-emerging of assimilationists discourses (Philipps & Harrison, 2010) within which residential segregation of ethnic groups was seen as undesirable (Bolt, 2009; Musterd, 2003). A clear ideological affinity with such kind of discourses can be found in the highly controversial declaration by Prime Minister David Cameron (Helm et al., 2011), elected in the spring of 2010, and by the new Conservative-Liberal Democrat coalition government's reaction to the urban riots of the summer of 2011.

4 CONSTRUCTING CITIZENSHIP AND URBANITY.

4.1 Lessons from a (too easily) forgotten work.

Although it has become a sort of «professional orthodoxy» (Bailey, 2005), given the scarce evidence about its positive effects for low-income or marginalised residents, together with so many abovementioned British scholars that livened up a passionate debate on the issue at least since the 1996 (a review in: Inch & Marshall, 2009; Marshall, 2009; see also: Inch & Marshall, 2007) we can affirm that the mixed-tenure approach is an uneffective or at least insufficient tool «for delivering social mix and long term sustainability» (Rowlands et al., 2006) for low income or marginalised urban residents.

Such approach, in fact, tends to treat the symptoms of urban deprivation and inequality rather than tackling its causes (Cheshire, 2007; 2009; Cheshire et al., 2008), by shifting the focus of public intervention away from the fundamental question of structural inequalities, with a useless and uneffective use of public resources (Musterd et al., 2006; Beaumont, 2006; Arbaci, 2008; Cheshire, 2009), as it seeks to solve larger-scale problems – such as labour market and structural economic transformations, the changing role of the welfare state, the dynamics of the national housing market, or ethnic discrimination in various spheres –

which are rooted outside the borders of the neighbourhood. An example of the uneffectiveness of the mixed-tenure approach is given by the fact that, despite the emphasis (and the rhetoric) on the so-called "sustainable mixed communities", social interaction in mixed neighbourhoods is not self-evident, as social worlds, places of consumption or education of children from low and middle/high-income families remain highly separated. In fact, even though tenure mix may imply a (relative) physical proximity between social groups having different incomes, it does not automatically mean a real mix in public spaces, schools, public services and shops.

Therefore, a broader consideration of non-residential forms of marginalisation is to be suggested, and this raises questions on what other spaces focusing on to construct a shared concept of contemporary urbanity. Amin (2002), for example, suggests the spaces of daily negotiation of differences, such as workplaces or schools. In particular, as regards schools, it has been noted (Burgess et al., 2005) that, even in the less criticised cases of UK neighbourhood regeneration, new middle class residents tend to perform exit strategies by sending their children to private schools or to public schools outside the (clearly still stigmatised) neighbourhood, so that the degree of class or ethnic segregation in schools within the regenerated areas remains higher with respect to that of the surrounding neighbourhoods.

Therefore, schools and, more generally, the access to welfare services (such as education, training and employment opportunities) (see: Musterd & Andersson, 2005) – i.e. the integration of area-based and people-based policies – seem to be a more crucial factor for the construction of "sustainable communities", even for avoiding the «potentially detrimental gentrifying effects» that only mixed-tenure regeneration processes «may inflict on the communities they intend to help» (Lees, 2008).

In 1961, at the beginning of both the so-called Italian "economic boom" and the uncontrollable sprawling growth of the city of Rome, Vittoria Calzolari and Mario Ghio wrote together an unfortunately too easily forgotten book – "Verde per la città" ("Green for the city") – based on a detailed comparison (showing a gap which appeared as really hard to bridge) of educational provisions (in terms of school buildings and related green and sport areas as well as of educational systems) between Italian (and, particularly, Rome) and highly welfarist Northern European cities (Copenhagen, Amsterdam, Zurich, Ulm).

This is a work that should be considered a possible new starting point for the integration of place-based and people-based approaches as well as for the spatial rethinking of the welfare system. Italian planning scholars use to connect this work to the concept of "standard" (in quantitative terms) of public services, but this is a reductive misunderstanding. In fact, even if such word was not fashionable at that time, this is a book that clearly talks about what we today use to call "urbanity", since it stresses the role of public schools (to be connected to both playing fields and public libraries) within urban neighbourhoods, by addressing their design in terms of both spaces to be devoted to young citizens and inter-relationships between these spaces and the neighbourhood as a whole. During the tumultuosus highly rent-guided growth of the city of Rome in the 60s, highlighting the existence of children and the need to consider public spaces, structures and contexts within young people operated meant linking together the issues of education and citizenship.
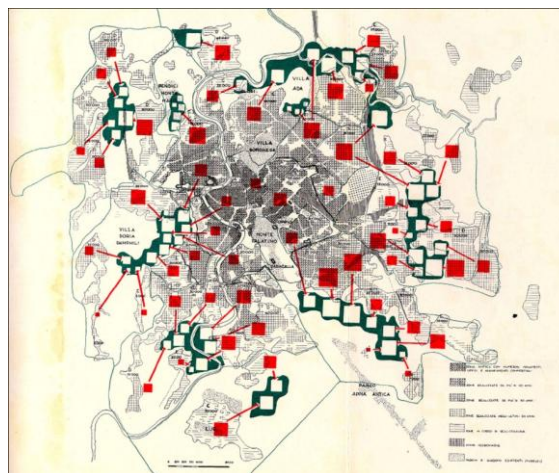
Fig. 1: Primary and secondary schools and related inter-connected green areas with sport equipments (based on density of children population). Source: Calzolari & Ghio (1961).

4.2 Preliminary findings from a still ongoing interdisciplinary on-field research.

The current sprawled and fragmented urban morphology of the periphery of the city of Rome is the result of a rent-seeking (Natoli, 1953; Cederna, 1956; 1965; 1991; Insolera, 1962; Della Seta & Della Seta, 1988; Tocci, 2009) urban regime occurred since the post-World War II, that led to the emerging of three different cities: the "private city", i.e.: the result of what Parlato (1970) has identified as «the ideology of privately owned house»; the «spontaneous metropolis» (Clementi & Perego, 1983; see also: Berdini, 2010), i.e. illegal unplanned settlements (28 % of the urbanised areas within the municipality of Rome in 1981) in what between the eighteenth and nineteenth century had been called "Roman Campagna"; and, finally, the "public city", i.e. the answer to the emerging, during the 70s, of the periphery as a new active social subject due to both innovative approaches in sociological research (e.g.: Ferrarotti, 1970; 1974) and Pasolini's literary works (1955; 1959), and to the consequent urban struggles for social housing.

The result is the current «fragmented morphology formed by "islands" which are defined by visible (e.g.: architectural shapes) and invisible borders (sometimes implying a still rooted sense of belonging of settled communities)», and which «tell us about different ideas of both city and society», so that «architectural objects, separate powers, public, private and illegal projects, images and cultural constructions, differences and conflicts are currently casually spread» (Scoppetta, 2009). What joins the different islands is a metropolitan condition in which distance (from city centre, from working places) due to a severe lack of public transport (and a consequent strong car-dependent mobility) «constistutes the unit for measuring exclusion» (ibid.). Neo-liberal policies developed since the 90s, by shifting from the periphery (i.e.: from the city as a whole) have privileged a «rhetorical narrative of urban renaissance» (in: Scandurra et al., 2007), focusing on the role of culture in re-positioning the city within the global arena of the new "cultural economy" (a review on the issue in: Scoppetta, 2013) through both the valorisation of the historical centre, mainly focusing on tourism and consumption, and culture-led policies, based on the (outsorced) promotion of spectacular events as well as of contemporary architecture (e.g.: the Renzo Piano's Auditorium Music Park) (see: Scandurra et al., 2007; Berdini, 2008).

The neighbourhood of San Basilio, in the north-eastern periphery of Rome, originally was one of the "borgate" (Insolera, 1962; Berlinguer & Della Seta, 1976; Martinelli, 1990), which were established in 1929 by the fascist regime in the "Roman Campagna" far from the already urbanised areas, as a displacement tool for freeing the central areas of the city in order to give room for the magniloquent representation of the fascist "empire" on the background of archaeological remains. After the World War II, the borgata was partally demolished and reconstructed with a low-density typology. Furthermore, thanks to the funds coming from the Marshall plan, a further nucleus of public social housing was added, and illegal settlements arose. A further settlement of social and affordable housing was then added, but it still remains separated from the others. In 1974, the neighbourhood of San Basilio emerged (with many political consequences at the national level) as a sort of symbol of urban struggles for housing: in fact, due to the problems of overcrowding and lack of transparency in establishing allotment lists, the existing nucleus of social housing was occupied, and this resulted in an armed conflict that ended tragically in the death of a young demostrator and dozen injured among both police and occupants. The initial ruralisation of the displaced originally urban craftmen and, then, the riots that involved the neighbourhood as a whole (not only the occupants) produced a shared and persistent strong sense of belonging that, in a certain sense, seems to be favoured by the architectural shapes, provided by common spaces and connected courtyards.

Due both to the presence of the still occupied blocks and to the spreading of illegal activities, such as the direct selling of hard drugs especially within the original nucleus – an enclave which is easy to control by pushers thanks to its architectural shape – San Basilio is currently considered as a neighbourhood at risk. At the same time, an "official" controlled gypsy settlement has been established (after its dispacement from an inner urban area) close to the neighbourhood immediately after the coming into power of the new right-wing government of the municipality in 2008. Thus, even if drug-market activities are confined only in certain areas, and although, given the distance from the city centre, flats' prices are more affordable than in other neighbourhoods so that new inhabitants are immigrant workers but also young families from the middle class under the pressure of the economic crisis, San Basilio is currently involved in a "neighbourhhod effect".

Within such a context, exclusion and segregation clearly appear in the neighbourhood's secondary school, with the increasing emerging of racist behaviour: middle against lower classes (mirroring the different parts of the neighbourhood), Italian against immigrants, Italian and immigrants against Roma pupils. In fact, even

if they share the same living environment, these are separate worlds with profound differences in knowledge, language, behaviours, lifestyles, interests, and expectations. School compositions, for example, clearly highlight a different use of free-time as well as the fact that the most advantaged tend to use the neighbourhood as a dormitory, as they do not use (and, therefore, do not know) the neighbourhood's public spaces. The latter are also differently perceived: on the one hand, they are intended as dangerous places to be avoided, since the living environment is inside home and movements are always by the parents' car. On the other hand, public places in the neighbourhood are perceived as a familiar networked space which tells about a shared "antagonist" collective memory, and in which it is difficult to clearly distinguish from legal and illegal behaviours because of daily interaction of street-life.

Anyway, the school is the unique welfare space for gathering, socialising and for culture, and it could really be a relevant resource, as it could act as a mean of contact and dialogue between parallel networks that otherwise risk to never cross. Exploiting the existing school's creativity and opening it to the territory could mean considering it as a social centre not only for pupils and parents, but for the whole neighbourhood, hosting in its spaces cross-section initiatives (e.g.: courses of Italian language for immigrants, cinema, library, and so on) that address different categories of inhabitants. But, surprisingly, even if many projects have been developed in the neighbourhood in order to face the "neighbourhood effect", no one of them involves the school: both the forecast path network aimed at reconnecting the different parts and the improvement of public spaces paradoxically does not consider the school, and only two of the 120 students analysed know the existence of the new built social space (resulting from a "participative" process!).

More generally, despite the rhetoric of the so-called "knowledge society", in the current phase of restructuring of the welfare system, education in Italy seems to be the privileged sector of public dis-investment. In fact, between 2008 and 2011 "cuts" in funding have amounted to 8,5 billions €, and between 2012 and 2014 further 13,683 billions are foreseen. As underlined by the OCSE report 2012 "Education at glance", Italian investment in public education (9 %) is lower than the European average (13 %), so that Italy is at 31th place among 32 EU members. Spending for public schools has been dramatically decreasing in the last 10 years: in 1990 Italy spent for school 10,3 %, while in 2008 the percentage was reduced, by subtracting about 80 billions €. In addition, in 2008 Law no.133 by the Berlusconi's government led to further cuts of around 7,8 billions for the period 2009-2012 concerning teachers employed: from 824,178 in 2001 to 795,342 in 2010 and 744,260 in 2012. When considering all different (and necessary!) figures employed in public schools: 1,137,619 in 2007, 1,043,284 in 2010, 950,000 in 2012. All this means the disappearing from classrooms of over 1,000,000 teachers in the last five years. This also means that public education is considered as one of the main resources to be used for improving the national budget. At the same time, public funding (223 millions € in 2013) to private (mainly Catholic and often elite) schools remain uncut, even though in such schools a (often very expensive) fee is required. In fact, although according to the art. 33, par. 2, of the Italian Constitution «private entities have the right to establish schools and educational institution at no cost to the State», the Law no. 62/2000 (by the D'Alema's progressist government) equaled private to public schools, so that they are considered as part of the national educational system, and since 2000 public funding to private schools is tripled (from 179 to 545 millions in 2007) – not to mention further funds from local authorities.

In the secondary school of the neighbourhood of San Basilio – where the most disadvantaged students can, however, easily earn 50 euros per day as useful non-punishable under-age pushers – such neo-liberal devolution results in less laboratories and equipments, less time devoted to lessons, impossibility in opening the school during the afternoon, increase of student per classes, less adjunctive teachers for non-Italian speaking or problematic children (currently from 5 to 9 in each class), elimination of social and psycological support. All this finally unavoidably leads to an "exit strategy" of the most advantaged students towards the schools in the surrounding neighbourhoods, while the most deprived remain excluded since the beginning.

On the contrary, beyond constituting a possible physical focus for the requalification of the surrounding network urban open and/or green spaces, the school could really play a role within a broader rethinking of the concepts of urbanity and citizenship in order to make them suitable for children, and not only for the thirty-years-old high-income single gentrifier, typical of the London's "urban renaissance". This obviously means usefully concentrating public investments (reduced because of the economic crisis) on both material and immaterial components of educational system rather than looking for "zero-cost" and "zero-tolerance" solutions to face social problems due to the still ongoing economic restructuring.

5 REFERENCES

ALLMENDINGER, P.: New Labour and Planning: From New Right to New Left. Routledge, Abingdon, 2011.

AMIN, A., MASSEY, D., THRIFT, N.: Cities for the Many Not for the Few. Policy Press, Bristol, 2000.

AMIN, A.: Ethnicity and the multicultural city: living with diversity. In: Environment and Planning A, Vol. 34, pp. 959-980, 2002

ANDERSEN, H.S.: Urban Sores: On the Interaction between Segregation, Urban Decay and Deprived Neighborhoods. Ashgate Urban and Regional Planning and Development, Aldershot (UK), 2003.

ARBACI, S.: (Re)Viewing Ethnic Residential Segregation in Southern European Cities: Housing and Urban Regimes as Mechanisms of Marginalisation. In: Housing Studies, Vol. 23, Issue 4, pp. 589-613, 2008.

ATKINSON, R.: Misunderstood saviour or vengeful wrecker? The many meanings and problems of gentrification. In: Urban Studies, Vol.40, Issue 12, pp.2343-2350, 2003a.

ATKINSON, A.: Domestication by cappuccino or a revenge on urban space?. In: Urban Studies, Vol.40, Issue 9, pp. 1829-1843, 2003b.

ATKINSON, R., KINTREA, K.: Owner occupation, social mix and neighbourhood impacts. In: Policy and Politics, Vol.28, Issue 1, pp.93-108, 2000.

ATKINSON, R., KINTREA, K.: Disentangling area effects: evidence from deprived and non-deprived neighbourhoods. In: Urban Studies, Vol.38, pp.2277-2298, 2001.

BAILEY, N.: The Continuing Search for Mixed Communities: Identifying the Objectives and Evidence Base for Mixed Tenure Developments. Paper presented at the AESOP Conference, Vienna, July 2005.

BAETEN, G.: Neoliberal Planning: Does It Really Exist?. In: TASAN-KOK, T., BAETEN, G. (eds.): Contradictions of Neoliberal Planning: Policies, Politics and Cities. Springer, Dordrecht, 2011.

BEAUMONT, J.R.: London: deprivation, social isolation and regeneration. In: MUSTERD, S., MURIE, A., KESTELOOT, C.: Neighbourhoods of poverty: urban social exclusion and integration in Europe. Basingstoke, Palgrave, 2006.

BERDINI, P.: La città in vendita. Donzelli, Roma, 2008.

BERDINI, P.: Breve storia dell'abuso edilizio in Italia, dal ventennio fascista al prossimo futuro. Donzelli, Roma, 2010.

BERNT, M., HOLM, A.: Gentrification of a particular type: the case of Prenzlauer Berg. In: ATKINSON, R., BRIDGE, G. (eds.): The New Urban Colonialism. Gentrification in a Global Context. Blackwell, London, 2004.

BIRCH, K., MYKHNENKO, V.: Varieties of neoliberalism? Restructuring in large industrially dependent regions across Western and Eastern Europe. In: Journal of Economic Geography, Vol.9, Issue 3, p.355, 2009.

BOLT, G., ÖZÜEKREN, A.S., PHILLIPS, D.: Linking Integration and Residential Segregation. In: Journal of Ethnic and Migration Studies, Vol.36, 2, pp.169-186, 2010.

BOURDIEU, P.: Firing back – against the tyranny of the Market 2. The New Press, New York, 2004.

BRENNER, N., PECK, J., THEODORE, N.: Variegated neoliberalisation: geographies, modalities, pathways. In: Global Networks, Vol.10, Issue 2, pp.182-222, 2010a.

BRENNER, N., THEODORE, N.: Cities and the Geographies of 'Actually Existing Neoliberalism'. In: BRENNER, N.,

THEODORE, N. (eds.): Spaces of Neoliberalism: Urban restructuring in North America and Western Europe. pp.2-32, Blackwell, Oxford, 2002.

BURGESS, S., WILSON, D., LUPTON, R.: Parallel lives? Ethnic segregation in schools and neighbourhoods. In: Urban Studies, Vol.42, Issue 7, pp.1027-1056, 2005.

CALZOLARI V., GHIO M.: Verde per la città. De Luca, Roma, 1961.

CAMERON, S., COAFFEE, J.: Housing Market Renewal as Urban Revanchism?. Paper presented at the Revenge and Renewal Conference, University of Newcastle, 10-11 August 2006.

CEDERNA, A.: I vandali in casa. Laterza, Bari, 1956.

CEDERNA, A.: Mirabilia Urbis. Einaudi, Torino, 1965.

CEDERNA, A.: Brandelli d'Italia. Newton Compton, Roma, 1991.

CHESHIRE, P.: A new phase of urban development in Western Europe? Evidence for the 1980s. In: Urban Studies, Vol.32, Issue 7, pp.1045-1063, 1995.

CHESHIRE, P.: Are mixed communities the answer to segregation and poverty?. Joseph Rowntree Foundation York, 2007.

CHESHIRE, P.: Policies for mixed communities: faith-based displacement activity?. In: International Regional Science Review, Vol.32, Issue 3, pp.343-375, 2009.

CHESHIRE, P., GIBBONS, S., GORDON, I.: Policies for 'mixed communities': a critical evaluation. UK Spatial Economics Research Centre, London, 2008.

CLEMENTI, A., PEREGO, F.: La metropoli "spontanea". Il caso di Roma. Di Donato, Bari, 1983.

COCHRANE, A.: A. The new urban policy: Towards empowerment or incorporation? The practice of urban policy. In: Imrie, R., Raco, M.(eds.): Urban Renaissance? New Labour, Community and Urban Policy. Policy Press, pp. 223-234, Bristol 2003.

COCHRANE, A.: Understanding Urban Policy: A Critical Approach. Blackwell, Oxford, 2007.

DARCY, M.: De-concentration of disadvantage and mixed income housing: a critical discourse approach. In: Housing, Theory and Society, Vol.27, Issue 1, pp.1-22, 2010.

DAVIDSON, M., LEES, L.: New-build „gentrification" and London's riverside renaissance. In: Environment and Planning A, Vol.37, Issue 7, pp.1165-1190, 2005.

DELLA SETA, P., DELLA SETA, R.: I suoli di Roma: uso e abuso del territorio nei cento anni della capitale. Editori Riuniti, Roma, 1988.

DETR (Dept. of the Environment, Transport and The Regions: Our Towns and Cities: The Future. Delivering an Urban Renaissance. White Paper presented to Parliament by the Deputy Prime Minister and Secretary of State for the Environment, Transport and the Regions by Command of Her Majesty. HMSO, London, 2000.

DONZELOT, J.: Quand la ville se dé´fait: Quelle politique face à` la crise des banlieues?. Seuil, Paris, 2006.

DONZELOT, J. (ed.): Villes, violence et dépendance sociale. Les politiques de cohésion en Europe. La documentation Française, Paris, 2008.

FERRAROTTI, F.: Roma da capitale a periferia. Laterza, Roma-Bari, 1970.

FERRAROTTI, F.: Vite da baraccati. Contributo alla sociologia della marginalità. Liguori, Napoli, 1974.

FLORIDA, R. The Rise of the Creative Class. And How It's Transforming Work, Leisure and Everyday Life. Basic Books, Cambridge (MA), 2002.

FORREST, R., KEARNS, A.: Joined up Places? Social Cohesion and Neighbourhood Regeneration. Joseph Rowntree Foundation, York (UK), 1999.

GALSTER, G.: Should policy makers strive for neighborhood social mix? An analysis of the Western European evidence base. In: Housing Studies, Vol.22, Issue 4, pp.523-545, 2007.

GORDON, I.: The resurgent city: what, where, how, and for when?. In: Planning, Theory and Practice, Vol.5, 3, pp.371-379, 2004.

HAMNET, C.: Social Polarisation, Economic Restructuring and the Welfare State Regimes. In: Urban Studies, Vol.33, pp.1407-1430, 1996.

HAMNET, C.: Economic and Social Change and Inequality in Global Cities: the Case of London. In: The Greek Review of Social Research, Vol.113 (A), pp.63-80, 2004.

HEFFERNAN, R.: New Labour and Thatcherism: Political Change in Britain. Palgrave, Basingstoke, 2001.

HELM, T. TAYLOR, M., DAVIS, R.: David Cameron sparks fury from critics who say attack on multiculturalism has boosted English Defence League. In: The Guardian, 5 Feb. 2011.

HETHERINGTON, P.: Rogers laments failing vision. In: The Guardian (Society), 26 Jan. 2002.

HILLS, J., STEWART, K. (eds.): A More Equal Society? New Labour, Poverty, Inequality and Exclusion. Policy Press, Bristol, 2005.

HOLDEN, A., IVESON, K.: Designs on the urban: New Labour's urban renaissance and the spaces of citizenship. In: City, Vol.7, Issue 1, pp.57-72, 2003.

HUW, M.: Variegated neo-liberalism: transnationally oriented fractions of capital in EU financial market integration. In: Review of international studies, Vol.35, Issue 02, p.451, 2009.

INCH, A., MARSHALL, T.: A review of recent critical studies of UK planning. In: International Planning Studies, Vol.12, Issue 1, pp.77-86, 2007.

INCH, A., MARSHALL, T.: Planning and New Labour in the UK. Planning practice and Research, Special Issue, Vol.24, Issue 1, pp.1-144, 2009.

INSOLERA, I.: Roma moderna. Un secolo di storia urbanistica, 1870-1970. Einaudi, Torino, 1962.

JENSEN, A., RICHARDSON, T.: New Region, New Story: Imagining Mobile Subjects in Transnational Space. In: Space and Polity, Vol.11, Issue 2, pp.137-150, 2007.

JOHNSTONE, C., MACLEOD, G.: From Urban Renaissance to Sustainable Communities: Soft-focusing Revanchism in England's Towns and Cities?. Paper presented at the Revenge and Renewal Conference, University of Newcastle, 10-11 August 2006.

JONES, M., WARD, K.: Neo-liberalism, crisis and the city: The political economy of New Labour's urban policy. In: JOHNSTONE, C., WHITEHEAD, M. (eds.): New Horizons in British Urban Policy: Perspectives on New Labour's Urban Renaissance. Ashgate, Aldershot, 2004.

JRF-Joseph Rowntree Foundation/Chartered Institute of Housing (2005–2006): Research programme on 'Mixed Income Communities', final report. Available at: http://www.jrf.org.uk/bookshop/publications.asp (accessed 13 Nov. 2012).

JUPP, B.: Living Together: Community Life on Mixed Tenure Estates. Demos, London, 1999.

KLEINHANS, R.: Social implications of housing diversification in urban renewal: a review of recent literature. In: Journal of Housing and the Built Environment, Vol.19, Issue 4, pp.367-390 , 2004.

LANDRY Ch.: The creative city. A toolkit for urban innovators. Earthscan, London, 2000.

LEES, L.: Visions of urban renaissance: The Urban Task Force Report and the Urban White Paper. In: IMRIE, R., RACO, M. (eds.): Urban Renaissance? New Labour, Community and Urban Policy, Policy Press, Bristol, 2003.

LEES, L.: Gentrification and social mixing: towards an inclusive urban renaissance?. In: Urban Studies, Vol.45, Issue 12, pp.2449-2270, 2008.

LEVITAS, P.: The Inclusive Society? Social Exclusion and New Labour. Macmillan, Basingstoke, 1998.

LINDSEY, D.: Controlling the Spectacular World City: A Discursive Analysis of Inclusion and Exclusion in the making of Giuliani's New York. Boston College, Chestnut Hill (MA), 2007.

LUPTON, R., TUNSTALL, R.: Neighbourhood regeneration through mixed communities: a "social justice" dilemma?. In: Journal of Education Policy, Vol.23, Issue 2, pp.105-117, 2008.

MACLEOD, G.: From urban entrepreneurialism to a 'Revanchist city'? On the spatial injustices of Glasgow's renaissance. In: Antipode, Vol.34, Issue 3, pp.602-624, 2002.

MACLEOD, G., WARD, K.: Spaces of Utopia and Dystopia: Landscaping the contemporary city. In: Geografiska Annaler, Vol.84B, Issue 3-4, pp.153-170, 2002.

MALOUTAS, T.: Editorial: Urban Segregation and the European Context. In: The Greek Review of Social Research, Vol.113, pp-3-24, 2004.

MARSHALL, T.: Planning and New Labour in the UK. In: Planning Practice and Research, Vol.24, Issue 1, pp.1-9, 2009.

MARTINELLI, F.: Roma Nuova. Borgate Spontanee e insediamenti pubblici., Franco Angeli, Milano, 1990.

MCCANN, E.: 'Best Places': Interurban Competition, Quality of Life and Popular Media Discourse. In: Urban Studies, Vol.41, Issue 10, pp.1909-1929, 2004.

MOLLENKOPF, J., CASTELLS, M.: Dual City: Restructuring New York. Russel Sage Foundation, New York, 1991.

MURIE, A., MUSTERD, S.: Social Exclusion and Opportunity Structures in European Cities and Neighbourhoods. In: Urban Studies, Vol.41, Issue 8, pp.1441-1459, 2004.

MUSTERD, S.: Response: mixed housing policy: a European (Dutch) perspective. In: Housing Studies, Vol.17, Issue 1, pp. 139-143, 2002.

MUSTERD, S.: Segregation and integration: A contested relationship. In: Journal of Ethnic and Migration Studies, Vol.29, Issue 4, pp.623-641, 2003.

MUSTERD, S., ANDERSSON, R.: Housing mix, social mix, and social opportunities. In: Urban Affairs Review, Vol.40, Issue 6, pp.761-790, 2005.

MUSTERD, S., MURIE, A., KESTELOOT, C.: Neighbourhoods of poverty: urban social exclusion and integration in Europe. Basingstoke, Palgrave, 2006.

MUSTERD, S., OSTERDORF, W.: Urban segregation and the welfare state: inequality and exclusion in Western Cities. Routledge, London 1998.

MUSTERD, S., OSTENDORF, W.: Social exclusion, segregation and neighbourhood effects. In: KAZEPOV, Y. (ed.): Cities of Europe. Blackwell, Oxford, 2005.

NATOLI, A.: La speculazione fondiaria nella Roma dei clericali. In: Rinascita, p.665, dicembre 1953.

NEWMAN, J.: Modernising Governance: New Labour, Policy and Society. Sage, London, 2001.

ODPM (Office of the Deputy Prime Minister): What is a Sustainable Community?. HMSO, London, 2006.

OSTENDORF, W. MUSTERD, S., DE VOS, S. Social mix and the neighbourhood effect. Policy ambitions and empirical evidence. In: Housing Studies, Vol.16, Issue 3, pp. 371-380, 2001.

PARLATO, V.: Il blocco edilizio. In: Il Manifesto, Vol.3-4, 1970.

PASOLINI, P.: Ragazzi di vita. Garzanti, Milano, 1955.

PASOLINI, P.: Una vita violenta. Garzanti, Milano, 1959.

PECK, J.: Neoliberalizing states: thin policies/hard outcomes. In: Progress in Human Geography, Vol.25, pp.445-455, 2001.

PECK, J.: Geography and public policy: constructions of neoliberalism. In: Progress in HumanGeography, Vol.28: 392-405, 2004.

PECK, J.: Constructions of Neoliberal Reason. OUP, Oxford, 2010.

PECK, J., THEODORE, N.: Variegated capitalism. In: Progress in Human Geography, Vol.31, pp.731-772, 2007.

PECK, J., THEODORE, N., BRENNER, N.: Postneoliberalism and its malcontents.In: Antipode, Vol.41, Issue 1, pp.94-116, 2009a.

PECK, J., THEODORE, N., BRENNER, N.: Neoliberal urbanism: Models, moments, mutations. In: SAIS Review, Vol.XXIX, Issue 1, pp.49-66, 2009b.

PECK J., TICKELL, A.: Jungle law breaks out: Neoliberalism and global-local disorder. In: Area, Vol.26, pp.317-326, 1994.

PECK, J., TICKELL, A.: Neoliberalizing space. In: Antipode, Vol.34, pp.380-404, 2002.

PHILLIPS, D., HARRISON, M.: Constructing an integrated society: historical lessons for tackling Black and Minority Ethnic housing segregation in Britain. In: Housing Studies, Vol.25, Issue 2, pp.221-235, 2010.

POWER, A.: Area based poverty and resident empowerment. In: Urban Studies, Vol.33, Issue 9, pp.1535-1564, 1996.

PURCELL, M.: Resisting neoliberalization: communicative planning or counterhegemonic movements?. In: Planning Theory, Vol.8, Issue 2, pp.140-165, 2009.

RACO, M.: Sustainable development, rolled-out neoliberalism and sustainable communities. In: Antipode, Vol.37, Issue 2, pp.324-347, 2005.

RACO, M., IMRIE, R.: Towards an Urban Renaissance? Sustainable Communities, New Labour and Urban Policy. Paper presented at the "Regional Studies Association Conference Reinventing the Regions", Pisa, 12-15 April, 2003.

RICHARDS, M.: Gentrification: How was it for you?. In: The Guardian, 20 Apr. 2005

ROGERS, P., COAFFEE, J.: Moral panics and urban renaissance: Policy, tactics and youth in public space. In: City, Vol.9, Issue 3, pp.321-340, 2005.

ROWLANDS, R., MURIE, A., TICE, A.: More Than Tenure Mix: Developer and Purchaser Attitudes to New Housing Estates. Joseph Rowntree Foundation/Chartered Institute of Housing, York/Coventry, 2006.

SASSEN, S.: The Mobility of Labor and Capital: A Study in International Investment and Labor Flow., Cambridge University Press, Cambridge 1988.

SASSEN, S.: The Global City: New York, London, Tokyo. Princeton University Press, Princeton, 1991.

SASSEN, S.: Deconstructing Labor Demand in Today's Advanced Economies: Implications for Low-Wage Employment. In: MUNGER, F. (ed.): Laboring Below the Line: The New Ethnography of Poverty, Low-Wage Work, And Survival in the Global Economy. Russell Sage, New York, 2002.

SCANDURRA, E., AMOROSO, B., BERDINI, P., CASTAGNOLA, A., CASTRONOVI, A., CAUDO, G., CELLAMARE, C., RICOVERI, G. ROSSI-DORIA, B., SARTOGO, V., TROISI, R.: Modello Roma. L'ambigua modernità. Odradek, Roma, 2007.

SCOPPETTA, C.: Territori della frammentazione. Appunti per un progetto possibile. Edizioni Nuova Cultura, Roma, 2009.

SCOPPETTA C.: The Polish seaport-city of Gdansk. A gateway for the Baltic Sea EU macro Region. In: Portus Plus, vol. 2, 2011a.

SCOPPETTA, C.: Waterfronts e immagini urbane tra globale e locale. Il caso di Istanbul. In: Portus Plus, vol. 1, 2011b.

SCOPPETTA, C: Selling port-cities. The case of Istanbul. In: BDC (Bollettino del Dipartimento di Conservazione dei Beni Architettonici ed Ambientali dell'Università degli Studi di Napoli), vol.12, Proceedings of the Meeting "Port Cities as Hotspots of Creative and Sustainable Local Development" (Naples, 1-2 September 2012), p.1247-1255, Officine Grafiche Francesco Giannini e Figli S.p.A., Napoli, 2012.

SCOPPETTA, C.: Broadening the public sphere through shadow planning. In: ACE-Architecture, City, and Environment/Arquitectura, Ciudad y Entorno, Vol.7, Issue.21, pp.67-96, 2013.

SUM, N.L.: The production of hegemonic policy discourses: 'competitiveness' as a knowledge brand and its (re-)contextualizations. In: Critical Policy Studies, Vol.3, Issue 2, pp.184-203, 2009.

TAYLOR, M.: Unleashing the Potential. Joseph Rowntree Foundation, York, 1995.

TAYLOR, R.: Fashion victims. In: The Guardian, 7 Sept. 2005.

TOCCI, W.: L"insostenibile ascesa della rendita urbana. In: Democrazia e Diritto, Vol.1, 2009.

URBAN STUDIES: Special Issue on Gentrification and Public Policy. Vol.45, Issue 12, 2008.

WARD, K.: Entrepreneurial urbanism, state restructuring and civilizing 'New' East Manchester. In: Area, Vol.35, Issue 2, pp.116-127, 2003.

WATT, P.: Housing stock transfers, regeneration and state-led gentrification in London. In: Urban Policy and Research, Vol.27, Issue 3, pp.229-242, 2009.

WILLIAMS, G., DALY, P.: Mixed Communities as Outcomes of Regeneration Strategies? Lessons from Hulme City Challenge for the Housing Market Renewal Agenda. Paper presented at the National Planning Research's Global Spaces, Local Spaces Conference, University College London, 5-7 Apr. 2006.

ZUKIN, S.: The Cultures of Cities. Blackwell, Oxford, 1995.

ZUKIN, S.: Urban lifestyles: Diversity and standardisation in space of consumption. In: Urban Studies, Vol.35, pp.825-839, 1998.

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Drive Towards Circular Land Use Management

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1 ABSTRACT

Soil is one of the worldwide most important resources. Some scientists are afraid that due to the expected massive urbanization in next two decades, a "soil peak" can be reached because of e.g. urban sprawl and the massive construction of traffic areas. It means that the amount of soil which is in use for agriculture or for natural purposes decreases more and more. One problem is that traditional regulative approaches of spatial planning are failing to deliver a sustainable land use. Urban sprawl supports unsustainable land use with negative economical and ecological effects, like loss of the resource soil, increase of traffic, etc. New integrated land management approaches and policy mixes are needed, to address the stakeholders varied interests in land more comprehensively. The project Circular Flow Land Use Management (CircUse) fosters sustainable land use in Central Europe by promoting the principle "avoid – recycle – compensate".

12 partners from 6 countries are for 3.5 years implementing the project CircUse Circular Land Use Management principles and concepts. In 6 participating countries these partners promote an integrative policy and governance approaches in respect of the urbanised land utilization.

For the first the CircUse strategy has been developed to illustrate what is necessary to implement the approach of a circular land use management. According to these requirements further steps have been taken by the project partners. The project CircUse has firstly unified the urban land use typologies and then prepared a pragmatic inventory tool, focused on the local/regional land use management. This tool can assist municipalities to become aware, what is the size of their development potential within their urbanised area. On working with such a data management tool further, analyses of the actual accessibility of this urban development potential can be made and mainly measures can be proposed to improve the inner urban development potential accessibility.

Data gathering can usually help to size up an issue and monitor the situation. But the solution of a more effective land use can be only achieved through a coordinated action, which aims to deliver the good intentions, identified in various policies. As a tool which could achieve this, was by the project CircUse chosen the action plan, focused on improving land use effectiveness. Six action plans based on a common template were produced, one per each project CircUse partners´ country. A scale of these action plans varied from a site specific (Piekary) to a city based (Asti, Freiberg) to a peripheral regions based ones (Trnava, Voitsberg) to a NUTS 3 based plan (Ústí Region). In the last three plans the multilevel governance approaches and the stakeholders´ participation were tested. To help municipalities to implement a sustainable land management a guideline for the preparation of a CircUse training course was produced. The guideline consists of 6 learning modules which are: 1. Land consumption – the problem analysis, 2. Principle of CircUse, 3. Land potentials and scenarios, 4. Stakeholders, 5. Instruments and 6. Action plans. Also education materials for secondary school children have been produced and translated into 6 languages as well as the pilot training has been conducted.

A concept of institutional solutions serving the management of circular land use is another important output of the CircUse project. Here two different approaches were employed: one was based on an existing institution, to which additional or specific tasks and competencies have been transferred. This was the case of the Industrial Park – EkoPark in Piekary. Another approach was presented by establishing a new land management agency which was founded in Austria, specifically focused onto the management of circular land use. Both solutions of institutional set ups acting as local operators for management of circular land use can serve as a good practice example for other European towns and regions.

This paper would share various experiences, which partners gained, while implementing the CircUse project common approach of the Circular Flow Land Use Management in their countries.

2 INTRODUCTION

The key urban issues such as land consumption, urban sprawl and brownfields are experienced not only in Central European regions. Majority of the urbanised areas increases are not based on population growth, but they are based on increases of urbanised land per head of population. This puts higher demands on energy consumption and increases the cost of development externalities, which then reduce competitiveness of the cities. An excessive consumption of land for urbanisation also diminishes the soil environmental services capacity and contributes to global climate problems.

The existing tools, policies and forms of governance so far failed to prevent ever increasing consumption of land for urbanization. Also the traditional regulative approaches of spatial planning are failing to deliver the land use sustainability.

Therefore new integrated land management approaches and policy mixes are needed to address the stakeholders varied interests in land more comprehensively. Also new governance approaches are needed, which can reach above the local authorities´ jurisdiction and can protect specific public interest in land from a broader regional level. In the past 5-7 years, a search for an optimum solutions resulted in preparation of new national/regional policies, targets and programs, which were supported by collective efforts of many consultants and research teams.[1] But the actual outcome of these new policies and programs in the Central Europe so far, has not yet delivered the desired goals and targets.

Project CircUse – the full title „Circular Flow Land Use Management" is aiming at working out a transnational model of circular land use management. The approach is consistent with sustainable development requirements therefore stakeholders´ involvement is an important element in the model implementation. Within the project 6 pilot sites in 6 countries are developed. The main objective is to provide a transnational applicable solution which would enhance counteracting urban sprawl and creation of dispersed land use patterns. Partners of CircUse are developing and implementing a climate friendly land use concepts in coherence with new instruments and pilot actions. The project targets will be reached by a strategic approach to urban and peri-urban development based on the principle of Circular Land Use Management.

The main results of the project are:

- overall strategy towards circular land use management including policy and action plans,
- tools and instruments of circular land use management: transnational land use data base produced for each pilot case
- manual on tools and instruments,
- education materials,
- CircUse compendium,
- pilot projects.

The project consortium consists of 12 partners from 6 countries: Austria, Czech Republic, Germany, Italy, Poland, Slovakia (see. www.circuse.eu)

3 CIRCUSE STRATEGY

One of the most significant project outputs was the circular land use management strategy. The strategy is presenting characteristics of the approach of circular land use management by 9 theses which constitute features and conditions of successful implementation of this methodology.

Thesis 1: Common problems and diversity of national and regional frameworks could be faced by a common strategy of circular flow land use management

Thesis 2: The setting of quantified and qualified targets is a necessary requirement for successful implementation of a management strategy according to circular flow land use management.

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[1] See for an example the German programme "Research for the Reduction of Land Consumption and for Sustainable Land Management (REFINA)" funded by the Federal Ministry of Education and Research (BMBF) (www.refina-info.de)

Thesis 3: Circular flow land use management needs a comprehensive definition of land types (incl. greenfield and brownfield areas)

Thesis 4: The development and application of information instruments and data management for registration and monitoring of space oriented potentials is one of the key activities towards a circular flow land use management.

Thesis 5: Circular land use management in urban regions cannot be driven by the actions of a single primary stakeholder but can only be achieved through the coordinated efforts of the various public and private stakeholders who, as planners, property owners and land developers, influence or govern how land is used.

Thesis 6: The implementation of circular flow land use management needs an integrated course of action which encompasses the wider spectrum of policies and activities providing a package of instruments (policy mix). In this instance current and potential new instruments should be pooled according to regional differences in framework conditions.

Thesis 7: The implementation of action plans need the selection of an applicable policy mix, stakeholder institutions, financing sources that meet the regional demands.

Thesis 8: In general new forms of organization need to be implemented by the stakeholders of a circular flow land use management. There are wide opportunities for institutional solutions in the EU.

Thesis 9: Permanent knowledge acquisition and awareness of circular land use management are crucial preconditions for a successful implementation of a strategy for reducing land take and strengthening inner development.

4 ACTION PLANS

Action plans present examples of implementation of the project approach to circular land use management with all required features. They also integrate instruments, activities and materials developed as other project outputs. The universal unified contents concerning action plans for each of six cases has been proposed by partners and according to it, the documents of action plans have been worked out. These documents include the elements constituting the realization of the concept.

These are:

- description of the area with areas of impact, constraints definition of areas of impact
- vision mission and process of creating the AP,
- management structure with stakeholders, education activities, division of responsibilities,
- action plan itself with budget, time schedule, monitoring and outcomes for local and regional beneficiaries.

For each case the proposed structure was followed and it was a basis for general conclusion on practical steps which have to be made to develop an instrument supporting sustainable land management in the region or municipality.

4.1 Action Plan for Asti

The Municipality of Asti has to face the management of many abandoned areas, with very different locations and characteristics. The restoration of former Way-Assauto area, one of the biggest and most problematic ones, has been included in the Development Plan of the Municipality of Asti: this is a strategic plan that involves all brownfields areas and abandoned buildings. The aim is the integration of multi-task actions to reuse derelict areas in the city with the participation of various stakeholders.

With reference to the current need to provide decision-making support for those problems concerning the development, transformation and management of the urban and territorial system by means of a sustainable approach, a key role is played by the Spatial Decision Support Systems (SDSS) developed by the second Italian partners withing the project CircUse. The SDSS are tools for the analysis of complex systems in the field of spatial semi-structured decision problems. The public decision support system on land use planning would benefit from the application of a SDSS, as it could reduce the decision time and increase the accuracy and consciousness of individual decision-makers (analysis of variance, the study of solidity and sensitivity variables, application of multi-criteria analysis).

The former Way-Assauto area is an interesting pilot case, as in the past years it has been contaminated by a chemical shedding that reached the underground water level. A chemical reclamation plan for the site is in existence and reclamation is on going as a remediation of a brownfield site implies the removal of all known contaminants to levels considered safe for human health. Redevelopment can only take place after all environmental health risks have been assessed and removed. Remediation can be expensive and complex, and this needs to be seriously considered before purchasing brownfield land. Not all sites are deemed suitable for remediation, particularly if the costs exceed the value of the land after development. In the last few years several new remediation technologies started to emerge. These are proving to be relatively low-cost compared to traditional processes, with the benefit of protecting and preserving the environment. With the CircUse project, the Municipality of Asti is interested in an update of this plan by the participation of the University of Turin.

4.2 Action Plan for Saxony

The development plan 2012 of Saxony indicates "Efficient land use and reducing of land consumption". The significance of land consumption and the need of land management are increasing. Since 2008 the Free State of Saxony is working on the goal on the reduction of land consumption. In 2009 the government noticed this action programme and defined the target for Saxony to reduce the daily land consumption under 2 ha until 2020. To reach this goal an "inter ministerial working group (IMAG)" has been established. The region of Saxony and the city of Freiberg, as one of the leading cities of innovative environmental actions and research, supports the principle of Circular Land Use Management and will be a model city for the regional development targets of Saxony. Support to the inter-ministerial working group is provided by the introduction of circular flow land use management as a tool for sustainable city development, climate and soil protection in the context of the management of demographic change. The implementation of the CircUse land management system is planned in the City of Freiberg. Based on a pooled inventory usage scenarios will be developed of the pilot site – former porcelain factory in Freiberg – and a development plan will be submitted as part of CircUse.

4.3 Action Plan for Trnava

The Municipality of Trnava has had to face the problems of a very dynamic development of its economic basis bringing thousands of new working places into the city and at the same time a critical situation with exhausted capacities of social infrastructure, housing and leisure-time activities as well as internal sources of available land for their further development. This led to strong flow of population towards the sub-urban areas looking for price-friendly housing possibilities and using the infrastructure of the city, causing extraordinary load on transport and other urban services. On the other side, the city and surrounding municipalities have to deal with many abandoned areas of very diverse characteristics, looking for their new functional use and structural refurbishment. This determined the idea to cope with this very complex problem by development and implementation of a joint strategy of Trnava and surrounding suburban micro-region municipalities. By using the possibilities of joint know-how and experience exchange various actions were implemented in the frame of EU funded project CircUse.

The common agreed vision is the development of functioning, efficient and flexible cooperation structure and interlinks between different aspects of micro-regional development, different actors and interests in one interlinked strategy as a reaction to existing problems with brownfields, abandoned buildings and growing requirements concerning new capacities of public services and land for private investments. The aim is to integrate multi-task actions to re-use derelict areas in the city and municipalities and involving various stakeholders into the planning, decision making. Implementation of the joint strategy as gives a new chance to improve the quality of life in Trnava and other municipalities in the micro-region. This new approach of the joint strategy and actions is the core philosophy of the Trnava action plan and at the same time of the development towards participative governance as the new quality in municipal politics.

By optimizing the development localization from the micro-regional perspective it will both maximize use of existing potential of individual communities. It would as well minimize the take of un-built territory reflecting thus the limiting factor for extensive development throughout the region of high quality agricultural land and environmental protection. Optimising the location of functions on micro-regional level would also make the movement of population within the Trnava micro-region more efficient. It would also

help with effectivnes of operational services, with particular emphasis on services provided by public sector. Therefore it would contribute to saving municipal finances. Given the considerable similarity of the range of problems perceived by the local population (lack of green spaces, low services by public transport, incomplete services, long-term unemployment) it opens a possibility for using the cooperation within the Trnava micro-region also for the associated projects financed from structural funds, respectively from social EU funds.

4.4 Action plan for Usti Region

The Ústi Region (UR) Action Plan (AP) preparation preceded a concentrated action of both Czech partners of CircUse project to increase regional stakeholders´ know-how on matters of circular land use management principles. For the ÚR stakeholders´ use the CircUse strategy, the CircUse education materials and the land use typologies were translated into Czech.The course materials were also adapted for ÚR use by inclusion of regional particulars. Parallel to this action, extensive analyses were performed on the regional and national policies and legal frameworks, which addressed the regional land use. These material were introduced to the ÚR stakeholders and were followed by a seminar, encouraging stakeholders to share experiences, opinions and barriers, they have encountered in their attempts to steer land use effectiveness. The goals and priorities of the AP were discussed, main activities outlined, commitments to AP were pledged and means how the AP could be financed and implemented were addressed and considered.

The action plan activities can be divided into 3 main groups. The first group supported local communities with gathering urban land qualitative data and evaluation of the accessibility level of the local urbanised land inner development potential. The second group supported mitigation measures (regional demolition program, proposals for amendments to national legal framework, etc.). The third group have focused on increasing public awareness of the issue. As the key source for financing the AP initial activities the INTERREG A Cross Boarder Program Saxony – Czech Republic was identified. Preparation of this new project is now taking place.

4.5 Action Plan for Voitsberg

The region of Voitsberg is a traditional former coal mining area and is facing the structural transition since the 1990ies. Therefore numerous unused brownfields are available for revitalization in the region. The principle of Circular Land Use Management shall be implemented in the region via a land management Agency. In spite of a wide range areal spatial reserves because of former mining or industrial activities there is a wide land take of agricultural greenland for areas zoned for economic activities and housing. To reduce the land consumption in the future the principle of Circular Land Use Management shall be implemented in the region via a land management agency.

The overall task of the agency is to support a sustainable and ecological compatible development of brownfields (former industrial, commercial and coal mining areas) in the pilot region „Kernraum Voitsberg" (consisting of five municipalities: Koeflach, Voitsberg, Baernbach, Rosental und Maria Lankowitz) according to the concept of Circular Land Use Management (this is an integrative strategic approach which primarily and systematically seeks to exploit the development of existing building sites and reuse derelicted land).

To achieve the goals of the agency the development of an action plan (masterplan) for the next years for the pilot region Voitsberg (Kernraum) by the Telepark Bärnbach is necessary. To get a significant feedback by the target groups of the region, several meetings were organized and a questionnaire (online) was developed and distributed to the specific target groups.The outcome of the definition of the areas of impact differs when considering recycling of brownfields and new sustainable land use. The definition of the points of contacts, the formulation of the principles (political, economic) and the identification of dependencies is described in the new agency framework requirements.The management structure includes also the description of roles and responsibilities.The developed Action Plan considers activities in two phases a) until the end of the project CircUse and b) in the first phase after CircUse is finished.

The Action Plan List covers the following:

Action 0: Joint actions – deliverables of CircUse as basic tools for the local implementation.

Action A: Establishment of the agency: the establishment of the agency is part of the CircUse project.

Action B: Day by day activities of the agency: Building up of database and website as well as the production of PR-material is still part of the project. All other activities are started during the project and continued by the agency.

Action C: Analysis and actualization of existing concepts: The analysis and actualization of the projects has been started in summer 2012, after the end of the project these activities will part of the agency tasks.

Action D: Project development: Project development as a long term measure has been started in autumn 2012 and after the end of the CircUse project the activities will be continued according to the business plan of the agency.

4.6 Action plan for Piekary

The Action Plan prepared for the selected location is an example of implementing the circular land use management in areas of a typical district of Silesian municipality, a district, where the environmental, social and economic problems have succeeded previous intensive industrial activities (with all their negative consequences). The aim of the Brzeziny Śląskie district Action Plan was to restore the natural value of degraded areas, followed by regional economic development, ensured by provision of favourable conditions enhancing the commencement of the new projects as well as assistance in their implementation. Therefore within the Action Plan of Brzeziny Śląskie district the following categories of activities were included:

- feasibility studies (analyses, examination of the ground contamination, detailed stock-takings of the ground),
- analyses and concept (analyses and concepts of the possible land use management),
- project activity (technical projects relating to communication and territorial development),
- marketing operations (the preparation of offers for potential investors),
- support of investors' activities (advisory),
- investment activities (implementation of the „incubator for the enterprise" project, realization of the pilot project regarding greenfield development),
- activities focusing on social issues and communication.

The action plan was followed up by the pilot investment project. The CircUse Polish pilot project is placed on a highly exposed brownfield site in the Brzeziny district of the Piekary Śląskie Municipality. The size of the pilot area is approximately 14 ha and this Polish investment was planned in the framework of the CircUse project.

Picture 1: Ilustration of preparation work for planting at the Brzeziny district pilot project, photo by authors

The Brzeziny district pilot project has focused on a systematic "re-greening" of a part of the post- industrial site and on upgrading of an overall image of the local landscape. The pilot project was set up to demonstrate the innovative example of a possible remediation action, which as an added value has a sustainable financial support for its future maintenance.This is an example that can be easily transferred to other regions, in other countries. The strategy of the land use management within which the investment was implemented also demonstrates an innovative long term thinking of the circular land use, which is the key idea promoted by the CircUse project. This pilot investment is consisting of planting trees and shrubs on the site located in-between an industrial area and a residential area. But two separate functions are being realized by this one action on the pilot area. On one side an insulation zone is being created, shading the neighbouring housing from the industrial site and on the other side a tree belt of public space is being created – a kind of park – which could serve for leisure and recreation activities of the neighbourhood. On the picture 1 above the results of work already done are presented.

5 CONCLUSION

The work on action plans following the framework discussed and adapted by all the project partners has shown the reality of a concept implementation with participation of various groups of stakeholders. It has been the most difficult step but at the same time the most satisfying when the agrrement was achieved. This experience is very special, since the CircUse project has given the opportunity and the platform for meeting and discussion betweend various parties on the necessity for firther common stpes and common actions serving for common needs. It has evidenced and convinced that it is worth (simply economically) to act together in land use management which could be more efficient and sustainable. And it is may be the most important unmeasurable value of the CircUse project.

6 REFERENCES

PREUSS, T. and FERBER, U.: Circular land use management in cities and urban regions – a policy mix utilizing existing and newly conceived instruments to implement an innovative strategic and policy approach, German Institute of Urban Affairs (Difu), Difu-Paper, Berlin, 2008.
CircUse Strategy: http://www.circuse.eu/images/NaszePliki/Downloads/review_2.4.3_CircUse_Strategy_final.pdf
CircUse Action Plans: http://www.circuse.eu/index.php?option=com_showdown&typeid=12&Itemid=49
CircUse Teaching Materials: http://www.circuse.eu/index.php?option=com_showdown&typeid=9&Itemid=46
CircUse Pilot Projects: http://www.circuse.eu/index.php?option=com_content&view=category&layout=blog&id=25&Itemid=31
REFFINA research program: http://refina-info.de/en/refina-veroeffentlichungen/bruessel_2.phtml
CircUse film http://youtu.be/oW1rrj62EUY

Einkaufsstättenwahl, Einzelhandelscluster und räumliche Versorgungsdisparitäten – Modellierung von Marktgebieten im Einzelhandel unter Berücksichtigung von Agglomerationseffekten

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1 KURZFASSUNG

Die Bildung von Agglomerationen branchengleicher und -ungleicher Einzelhandelsanbieter zum Zweck der Ermöglichung von Kopplungs- und Vergleichskäufen für die Kunden ist ein allseits zu beobachtendes Phänomen, das auch in den einschlägigen Standorttheorien behandelt wird. Gleichzeitig wird Einzelhandelsangebot in nicht oder weniger agglomerierten Lagen abgebaut, was zu steigenden räumlichen Disparitäten der Versorgungssituation führt. Dem tatsächlichen Einfluss der Clusterbildung auf das Konsumentenverhalten wurde bisher jedoch nur wenig Beachtung geschenkt. In dieser Untersuchung wurde geprüft, ob die räumliche Konzentration von Anbietern (Lebensmittel-, Bau- und Elektrofachmärkte) einen positiven Effekt auf ihre Marktgebiete hat. Auf der Basis einer Haushaltsbefragung in sieben Gemeinden wurde mittels eines MCI (Multiplicative Competitive Interaction)-Modells der Einfluss räumlicher Nähe von branchengleichen (d.h. konkurrierenden) und -ungleichen Einzelhandelsanbietern auf die Einkaufsstättenwahl empirisch-ökonometrisch getestet; als Messgröße für die räumliche Ballung fungierten hierbei verschiedene Konzentrationsindices. Es konnte nachgewiesen werden, dass sowohl die Nähe zu Konkurrenten als auch zu anderen Anbietern in den meisten Fällen die Einkaufsstättenwahl und somit den Kundenzufluss aus dem Marktgebiet positiv beeinflussen. Neben dem empirischen Beleg für diesen Effekt ist es ferner möglich gewesen, durch die Nutzung der geographisch gewichteten Regression als Schätzmethode räumlich differenzierte Modellparameter zu ermitteln. Da das empirisch parametrisierte MCI-Modell in das häufig genutzte Marktgebietsmodell von Huff überführbar ist, konnte so ein Ansatz zur Simulation von Kunden- bzw. Kaufkraftströmen unter Berücksichtigung von Agglomerationseffekten entwickelt werden, der z.B. als Planungstool in Einzelhandelsgutachten zum Einsatz kommen kann.

2 HINTERGRUND

2.1 Theoretischer Zusammenhang

Das Prinzip der (positiven und negativen) *Agglomerationseffekte* ist auf einige Theorien der neoklassischen Ökonomie zurück zu führen, in deren Fokus die Standortwahl von Industriebetrieben stand. Insbesondere werden hier zu den positiven Agglomerationseffekten *steigende Skalenerträge* (Reduktion der Stückkosten durch Ausweitung der Produktion) als *interne Effekte* und *Lokalisationseffekte* (Räumliche Konzentration gleichartiger Betriebe z.B. aufgrund von *Labor pooling*) bzw. *Urbanisationseffekte* (Räumliche Konzentration verschiedenartiger Betriebe z.B. aufgrund einer diversifizierten Infrastrukturausstattung) als *externe Effekte* gezählt. Der betriebswirtschaftliche Nutzen einer räumlichen Ballung (*Clusterbildung*) von Einzelhandelsbetrieben ist hingegen maßgeblich dadurch bedingt, dass solche Standortkonfigurationen den Konsumenten *Kopplungs- und Vergleichskäufe* ermöglichen und somit deren *Einkaufsstättenwahl* vorteilhaft beeinflussen. Diese *Agglomerationsvorteile* im Einzelhandel sind in verschiedenen Raumwirtschafts- und Standorttheorien behandelt worden (Parr, 2002; Mulligan et al., 2012).

Demnach bevorzugen Konsumenten Standorte mit mehreren gleichartigen und verschiedenartigen Anbietern gegenüber Einzelstandorten, um einerseits mehrere Besorgungen miteinander zu koppeln (zwecks Zeit- und Transportkostenersparnis) und andererseits Preis- und Qualitätsvergleiche zwischen den Anbietern durchführen zu können. Hierfür sind sie durchaus bereit, weitere Wege als bis zum nächstgelegenen Angebotsstandort auf sich zu nehmen, da die Möglichkeit der Kopplungs- und Vergleichskäufe diesen Mehraufwand ausgleicht (Popkowski Leszczyc et al., 2004; Kulke, 2005). Sowohl für verschiedenartige als auch für konkurrierende Betriebe besteht deshalb ein Anreiz zur Bildung von Agglomerationen, da sich die Nähe zu anderen Anbietern gegenüber nicht-agglomerierten Betrieben positiv auf den Kundenzufluss und die Umsätze auswirkt. Einzelhandelsanbieter ballen sich daher in *gewachsenen* (Innerstädtische Geschäftsbereiche, dezentrale Agglomerationen mit guter PKW-Erreichbarkeit) oder *künstlich geschaffenen* Einzelhandelsagglomerationen (Shopping-Center), deren Branchenmix und Außenauftritt zentral gesteuert werden (Teller, 2008; Mulligan et al., 2012).

Die ersten Überlegungen zu Einzelhandelsagglomerationen stammen aus der Mikroökonomie. Hotelling (1929) leitete aus dem von ihm formulierten *Prinzip der minimalen Unterscheidung* ab, dass für zwei branchengleiche Anbieter ein Standort unmittelbar neben dem Konkurrenten die optimale Lage im Hinblick auf die Kundenabschöpfung darstellt und nicht, wie es das traditionelle Marktmodell nahelegt, die maximale Konkurrenzmeidung. Auch Chamberlin (1933) erklärt in seiner *Theorie des monopolistischen Wettbewerbs* die räumliche Ballung von Einzelhändlern aus der Überlegung von Kopplungs- und Vergleichskäufen.

Das Grundmodell der *Theorie der zentralen Orte* von Christaller (1933) geht vereinfachend davon aus, dass Konsumenten immer nur *ein* Gut auf einer Einkaufsfahrt erwerben und den nächstgelegenen Standort aufsuchen (*Nearest-Center-Bindung*). Die dynamische Weiterführung der Theorie berücksichtigt hingegen Kopplungskäufe, deren Effekt die räumliche Ballung unterschiedlicher Anbieter ist, während kleinere Angebotsstandorte an Zentralität verlieren. Diese Überlegung wird von Lange (1973) in seiner *Wachstumstheorie zentralörtlicher Systeme* weiter verfolgt, mit der er die parallel stattfindenden Wachstums-, Stagnations- und Schrumpfungsprozesse in einem System unterschiedlich ausgebauter Angebotsstandorte erklärt. Ausgehend von wachsenden Einkommen, höherer Mobilität und steigenden Konsumentenansprüchen bei gleichzeitig geringer werdendem Zeitbudget folgert er eine zunehmende Notwendigkeit der Kopplung von Besorgungen. Konsumenten würden demnach Angebotsstandorte mit vielen Kopplungsmöglichkeiten bevorzugen, was sich in Kombination mit darauf abgestimmtem Anbieterverhalten, ähnlich wie bei Christaller, in einer Angebotskonzentration und räumlichen Versorgungsdisparitäten niederschlägt. Auch einige andere Weiterentwicklungen der Zentrale-Orte-Theorie stellen Kopplungskäufe in den Mittelpunkt der Ausführungen (z.B. Ghosh, 1986).

Nelson (1958) formulierte basierend auf empirischen Studien mehrere Gesetzmäßigkeiten zur positiven Agglomerationswirkung im Einzelhandel; demnach setzt sich der betriebswirtschaftliche Erfolg eines Einzelhandelsanbieters aus seiner eigenen Anziehungskraft (*Generative business*), der Anziehungskraft benachbarter Anbieter am Standort (*Shared business*) und der Nähe zu externen Frequenzbringern (*Suscipient business*) zusammen. In Bezug auf den „Shared business" betont Nelson die *Komplementarität* zwischen bestimmten Sortimentsbereichen, die bevorzugt miteinander gekoppelt werden (*Kompatibilitätsvorteile*), und die *Konkurrenzanziehung* mehrerer branchengleicher Anbieter in einer Agglomeration (*Kumulationsvorteile*), die aufgrund der Möglichkeit von Vergleichskäufen insbesondere bei Gütern des langfristigen Bedarfs mit einem hohen Kundenanspruch hinsichtlich der Auswahl auftritt. Nelson erarbeitete hierzu eine Formel zur Schätzung der Umsatzsteigerung zweier benachbarter Anbieter aufgrund des Kundenaustauschs (*Rule of retail compatibility*) sowie umfangreiche Kompatibilitätsmatrizen.

Durch das Aufkommen der *New Economic Geography (NEG)* sind Fragen der Agglomeration von Unternehmen und der damit zusammenhängenden (möglichen) Zunahme räumlicher Disparitäten wieder in den Fokus gerückt; in der Folge werden auch „alte" Raumwirtschaftstheorien (z.B. Christaller) wieder mehr diskutiert (Fujita, 2010; Mulligan et al., 2012). Einige NEG-Modelle beziehen sich explizit auf den tertiären Sektor (Fujita/Thisse, 2002) oder lassen sich darauf übertragen, wenngleich hierbei keine Zusammenhänge aufgearbeitet werden, die nicht bereits in den Zentralitätstheorien integriert waren (Güßefeldt, 2003).

2.2 Modellierung von Marktgebieten im Einzelhandel

Im Rahmen der betrieblichen Standortplanung sowie der Analyse möglicher Auswirkungen von Einzelhandelsansiedlungen existiert eine große Fülle von Methoden zur Modellierung und Prognose von Marktgebieten und Umsatzflüssen (Müller-Hagedorn/Natter, 2011). Eine besonders prominente Methode zur Simulation von Kunden- bzw. Kaufkraftströmen ist das Marktgebietsmodell von Huff (1962; 1963; 1964), das zur Familie der gravitationstheoretischen Interaktionsmodelle zählt.

Das Grundmodell basiert auf einer multiplikativen Nutzenfunktion (U_{ij}) mit zwei Einflussgrößen (Formel 1), wobei die erste die Eigenattraktivität eines Angebotsstandortes (A_j) darstellt und die zweite, als interaktionshemmende Kraft, die räumliche Distanz zwischen Nachfragern und Anbietern (d_{ij}). Als Attraktivitätsindikator fungiert die Verkaufsfläche des Angebotsstandortes, was damit begründet wird, dass die Verbraucher ihre Einkaufsstättenwahl unter Unsicherheit treffen, da sie nie genau wissen, ob sie die gewünschten Güter am Standort auch wirklich bekommen; je größer das Angebot (also die Verkaufsfläche), desto höher die Wahrscheinlichkeit, dass die Bedürfnisse am Angebotsstandort befriedigt werden. Die Verkaufsfläche repräsentiert demnach die Auswahl bzw. die internen Kopplungsmöglichkeiten. Die Distanz wirkt überlinear negativ (λ ist betragsmäßig größer eins), da angenommen wurde, dass die Konsumenten

Entfernungen überproportional wahrnehmen. Das im Huff-Modell unterstellte Konsumentenverhalten ist also *nutzenmaximierend* unter der Bedingung *unvollständiger Information* (Huff, 1962; 1963).

Für die Analyse mittels Huff-Modell wird das gesamte Marktgebiet in einzelne Nachfragestandorte aufgeteilt. Die Attraktivitäts- und Distanzwerte für alle Kombinationen von Angebots- und Nachfragestandorten werden in einer *Interaktionsmatrix* abgetragen. Zielgröße des Modells ist die *Wahrscheinlichkeit*, dass die Kunden aus den einzelnen Gebieten den jeweiligen Angebotsstandort anlaufen (p_{ij}). Sie errechnet sich aus dem Nutzen der Alternative *j* für die Kunden am Nachfragestandort *i*, dividiert durch den Nutzen aller Standorte (Formel 2); diese Wahrscheinlichkeiten können als *Marktanteile* interpretiert und mit dem lokalen Kunden-/Kaufkraftpotenzial (C_{ij}) verrechnet werden (Formel 3). Im Ergebnis werden die Kunden- bzw. Kaufkraftzuflüsse aus den Teilgebieten ($E(C_{ij})$) zu einem gesamten Kunden- bzw. Umsatzpotenzial summiert.

(1) $\quad U_{ij} = A_j \, d_{ij}^{-\lambda}$

(2) $\quad p_{ij} = U_{ij} / \sum U_{ij}$

(3) $\quad E(C_{ij}) = p_{ij} C_i$

Das Huff-Modell wird im Rahmen der Expansion von Einzelhandelsunternehmen für die Standortplanung eingesetzt (Clarke, 1999); eine weitaus größere Relevanz hat es aber in raumordnerischen Wirkungsprognosen, die in Einzelhandelsgutachten zum Zweck der Abschätzung von Umsatzumlenkungen bei Einzelhandelsneuansiedlungen bzw. der Erweiterung bestehender Anbieter durchgeführt werden. Diese Untersuchungen, deren Notwendigkeit aus der vermuteten negativen raumordnerischen und städtebaulichen Auswirkung von (großflächigen) Ansiedlungen (BauNVO § 11) abgeleitet wird, stehen aufgrund ihrer Intransparenz und inhaltlicher Ungenauigkeiten immer wieder in der Kritik (Wolf, 2012).

Huffs Ansatz ist Gegenstand unzähliger Weiterentwicklungen gewesen (Müller-Hagedorn/Natter, 2011). Als maßgebliche Erweiterung im Hinblick auf die Analyse des Konsumentenverhaltens ist das *Multiplicative Competitive Interaction (MCI)-Modell* von Nakanishi/Cooper (1974) zu nennen, dessen Prinzip es ist, das Huff-Modell durch eine Linearisierung in ein ökonometrisches Modell zu transferieren und hierbei noch weitere Erklärungsvariablen zu berücksichtigen. Auf dem selben Prinzip basiert die Modellierung von Einkaufsentscheidungen mittels *Multinomialer Logitmodelle (MNL)*; hierbei wird durch logistische Regression die Wahl einer Alternative in Form einer qualitativen Variable auf individueller Ebene modelliert (Sullivan/Adcock, 2002; Lademann, 2007). Recht neu ist die Modellierung des räumlichen Einkaufsverhaltens unter Nutzung von *Multiagentensystemen*, denen umfangreiche empirische Daten zum individuellen Einkaufsverhalten zugrunde gelegt werden (Rauh et al., 2012).

2.3 Berücksichtigung und empirischer Nachweis von Agglomerationseffekten

Dass Einkaufsfahrten häufig Mehrzweckfahrten sind und am Point of sale mehrere Geschäfte besucht bzw. Besorgungen miteinander verbunden werden, ist umfangreich empirisch nachgewiesen. Tendenziell wird auch eine Steigerung der Relevanz dieses Einkaufsverhaltens diagnostiziert, hervorgehend aus höheren Kundenansprüchen einerseits und einem geringer werdenden Zeitbudget andererseits (Heinritz/Theis, 1997; Popkowski Leszczyc et al., 2004; Arentze et al., 2005; Kulke, 2005; Brooks et al., 2008).

Die Ballung gleich- und ungleichartiger Einzelhändler lässt sich am deutlichsten in Shopping-Centern aufzeigen, deren Prinzip ein strategisch optimierter Angebotsmix zum Zweck einer kumulierten Anziehungskraft ist. Agglomerationsvorteile werden hier sowohl von Geschäftstreibenden als auch von Kunden deutlich erkannt und durch ein zentrales Management bewusst gesteuert (Hesse/Schmid, 2007; Teller, 2008; Schnedlitz/Teller, 2008). Mitunter lassen sich auch für Standorte in der Umgebung von Shopping-Centern positive Wirkungen dieser räumlichen Nähe feststellen (Hardin et al., 2002; Lademann, 2011). Die Bildung von Angebotsclustern ist aber auch abseits geplanter Agglomerationen zu beobachten; einige Einzelhandelsunternehmen suchen im Rahmen ihrer Expansion sogar explizit nach Standorten in unmittelbarer Nähe zu Konkurrenten (Wieland, 2011; Jürgens, 2012; Krider/Putler, 2013).

Der Ballung von Angebot steht ein deutlich erkennbarer Abbau von Betrieben in nicht oder weniger agglomerierten Lagen gegenüber, wie sich zum Beispiel anhand der räumlichen Verteilung von leerstehenden Geschäftsflächen zeigt (Popien, 1989). Abseits der vorwiegend in Bezug auf Innenstädte

diskutierten Leerstandsproblematik sind Disparitäten der Angebotsausstattung vor allem für die flächendeckende Nahversorgung ein großes Problem (Baumgarten/Zehner, 2007; Wieland, 2011).

Bisher wenig berücksichtigt wurde allerdings der tatsächliche Einfluss räumlicher Ballung auf die Einkaufsstättenwahl von Konsumenten und die Integration dieses Effektes in gängige Marktgebietsmodelle; auch das ursprüngliche Huff-Modell geht implizit von einer Einzweckeinkaufsfahrt aus (Huff/Batsell, 1975). Einzig das *Competing Destinations Model* von Fotheringham (1985) berücksichtigt die räumliche Konzentration eines Anbieters als Größe in einem erweiterten Huff-Modell; ein diesbezüglicher Effekt auf das Konsumentenverhalten wird allerdings nicht empirisch erwiesen, sondern als Teil des mathematischen Modells formuliert. Hingegen sind in verschiedenen empirischen Studien mit MNL-Modellen bereits Kopplungseffekte bzw. Agglomerationsvorteile untersucht worden (Popkowski Leczcycz et al., 2004; Arentze et al., 2005; Gijsbrechts et al., 2008), ebenso in Multiagentensimulationen zur Einkaufsstättenwahl (Rauh et al., 2012) oder zum Kopplungsverhalten in Shopping-Centern (Hesse/Schmid, 2007).

3 UNTERSUCHUNGSGEGENSTAND UND METHODIK

3.1 Fragestellungen und Hypothesen

Theorie und Empirie legen nahe, dass Agglomerationsvorteile im Einzelhandel eine sehr große Rolle bei der Standortwahl von Betrieben und der Einkaufsstättenwahl von Konsumenten spielen. Es galt nun, einerseits den tatsächlichen Effekt dieser räumlichen Konzentration auf die Einkaufsorientierung empirisch nachzuweisen und andererseits diese Einflussgrößen in ein Huff-basiertes Modell zu integrieren, das beispielsweise als Planungstool in Einzelhandelsgutachten zur Geltung kommen kann.

Da sowohl für die räumliche Nähe zu andersartigen als auch zu gleichartigen, also konkurrierenden, Anbietern ein positiver Effekt unterstellt wird, musste beides separat geprüft werden. Die erste Hypothese lautet demnach, dass Einzelhandelsanbieter generell von der räumlichen Nähe zu anderen Anbietern im Hinblick auf ihren Kundenzufluss profitieren, da hierdurch Kopplungskäufe ermöglicht werden. Die zweite Hypothese bezieht sich auf die Konkurrenzanziehung: Demnach profitieren Einzelhändler auch von der räumlichen Nähe zu ihren Konkurrenten, da auf diese Weise den Konsumenten die Möglichkeit einer größeren Auswahl bzw. zu Preis- und Qualitätsvergleichen gegeben wird. Es ist also in beiden Fällen von einem positiven Einfluss auf die Einkaufsstättenwahl auszugehen.

Im ursprünglichen Huff-Modell sind die Eigenanziehungskraft der Anbieter sowie die Distanz zwischen Kundenwohnort und Angebotsstandort als Erklärungsgrößen herangezogen worden; bei einer empirischen Analyse der Marktgebiete müssen sie dementsprechend berücksichtigt werden bzw. als Kontrollvariablen fungieren. Ausgehend von früheren theoretischen und empirischen Arbeiten (Huff, 1962; Lademann, 2007; Kubis/Hartmann, 2007) ist bei der Verkaufsfläche von einer unterlinear positiven, bei der Distanz von einer überlinear negativen Wirkung auszugehen.

3.2 Untersuchungsgebiet und Analysemethodik

Das Untersuchungsgebiet liegt im Grenzbereich von Nordrhein-Westfalen und Niedersachsen (Deutschland) und besteht aus den drei mittelzentralen Gemeinden Höxter (29.941 Einwohner, 13 Ortsteile), Beverungen (13.811 EW, 12 Ortsteile) und Holzminden (19.835 EW, 4 Ortsteile) sowie der Samtgemeinde Boffzen (6.947 EW) mit vier Gemeinden, davon zwei mit dem Rang eines Grundzentrums. Zum Zweck der Erfassung der Ausgangssituation im Untersuchungsgebiet sind zunächst Expertengespräche (Verwaltung, Einzelhandel, Stadtmarketing) geführt worden. Im Anschluss erfolgte eine GPS-gestützte Erhebung (Kartierung) des gesamten Einzelhandelsbestandes im Untersuchungsgebiet (Finaler Stand: März 2012).

Kern der Untersuchung ist eine telefonische Haushaltsbefragung im Januar/Februar 2012 zur räumlichen Einkaufsorientierung der Befragten bei Lebensmittelmärkten, Elektrofachmärkten, Baumärkten und Möbelmärkten. Das Ziel der Haushaltsbefragung ist vor allem die Erfassung von lokalen Marktanteilen der relevanten Anbieter auf der Ebene der Ortsteile bzw. der daraus aggregierten 19 Teilgebiete gewesen. Die empirisch ermittelten Marktgebiete waren die Grundlage für eine ökonometrische Analyse mit Hilfe des Multiplicative Competitive Interaction-Modells (MCI) nach Nakanishi/Cooper (1974).

Diese lineare Transformation des Huff-Modells ermöglicht die regressionsanalytische Prüfung des Einflusses verschiedener Größen auf empirische Marktanteile bzw. die Schätzung von Gewichtungsparametern und

deren Überführung ins Huff-Modell; es handelt sich beim MCI-Modell also nicht nur um eine Generalisierung des Huff-Modells im Sinne einer Erweiterung der multiplikativen Nutzenfunktion (Formel 1) auf eine Vielzahl von Variablen, sondern vor allem um die Umwandlung einer theoretischen mathematischen Gleichung in ein ökonometrisches Modell, das sich mittels üblicher multipler linearer Regressionsanalyse parametrisieren lässt. Die Schätzung setzt eine Standardisierung mittels geometrischer Mittelwerte und eine Logarithmierung aller Variablen voraus (Formel 4). Eine Rückübertragung der geschätzten Parameter ins Huff-Modell ist entweder über die konventionelle Huff-Formel (Formel 2) oder über eine Exponentialfunktion möglich (Kubis/Hartmann, 2007; Huff/McCallum, 2008).

$$(4) \quad \log(p_{ij}/\tilde{p}_i) = \sum_{h=1}^{H} \gamma_h \log(A_{h_j}/\tilde{A}_{h_j}) + \lambda \log(d_{ij}/\tilde{d}_i)$$

Da es zu überprüfen galt, ob die räumliche Ballung von Anbietern einen positiven Einfluss auf ihre Marktgebiete hat, war es notwendig, diese zu operationalisieren. Hierzu gibt es verschiedene Möglichkeiten der Bildung von Konzentrations- bzw. Zentralitätsindices (Orpana/Lampinen, 2003). In diesem Fall wurden Konzentrationsindices für die Ballung mit konkurrierenden Anbietern (Formel 5) und für die räumliche Nähe zu allen Anbietern (Formel 6) gebildet, um in beiden Fällen den positiven Effekt separat prüfen zu können. Sie errechnen sich, in Anlehnung an Fotheringham (1985), aus der Summe der Attraktivitätswerte (Verkaufsflächen) der anderen Anbieter (A_k bzw. A_a) und der (gewichteten) Distanz zu diesen (d_{jk} bzw. d_{ja}).

$$(5) \quad K_{K_j} = \sum A_k / d_{jk}^{\lambda}$$

$$(6) \quad K_{A_j} = \sum A_a / d_{ja}^{\lambda}$$

Die erhobenen lokalen Marktanteile (p_{ij}) dienen im MCI-Modell als abhängige (d.h. zu erklärende) Variable. Als Prädiktoren (erklärende Variablen) fungieren im vorliegenden Modell die beiden genannten Konzentrationsindices (K_{A_j}, K_{K_j}) sowie die Verkaufsfläche des Anbieters als Attraktivitätsmaß (A_j) und die PKW-Fahrtzeit zwischen Konsumentenwohnort und Angebotsstandort (d_{ij}). Die für die Berechnung benötigten Distanzwerte sind mit Hilfe eines geometrischen Netzwerks im GIS auf der Basis eines realen Straßennetzes und Durchschnittsgeschwindigkeiten berechnet worden. Die Standorte, Verkaufsflächen und Branchen sämtlicher Einzelhandelsbetriebe wurden im Zuge der Kartierung erhoben.

Das MCI-Modell wurde zunächst mittels konventioneller linearer Regression parametrisiert; in Anlehnung an Huff/McCallum (2008) wurde hierbei das Verfahren der *schrittweisen Regression* benutzt. Danach erfolgte eine Analyse mit Hilfe der *geographisch gewichteten Regression* (*Geographically weighted regression, GWR*). Diese Methode beruht auf der Annahme, dass empirisch messbare Zusammenhänge nicht räumlich konstant wirken, sondern Unterschiede im Hinblick auf die Stärke ihrer Beziehung aufweisen; demnach werden räumliche Objekte, die nah beieinander liegen, stärker gewichtet als weiter entfernte. Im Ergebnis werden für jedes Geoobjekt (hier: Nachfragestandorte) separat Parameter geschätzt und Modellgütestatistiken ausgewiesen (Fotheringham et al., 2002). Dieses Vorgehen ermöglicht eine belastbare Prüfung des Einflusses der Prädiktoren sowie die Ermittlung räumlich differenzierter Modellparameter.

4 ERGEBNISSE

4.1 Untersuchungsrelevanter Einzelhandel und räumliche Einkaufsorientierung

Für die Analyse der räumlichen Einkaufsorientierung sind 27 Lebensmittelmärkte (insg. 31.086 qm Verkaufsfläche), fünf Elektrofachmärkte (6.900 qm), vier Baumärkte (20.735 qm) sowie zehn Möbelmärkte (16.575 qm) relevant. Alle drei Angebotsformen sind vorwiegend in großen Fachmarktagglomerationen in den Mittelzentren lokalisiert, die Lebensmittelmärkte finden sich aber teilweise auch in kleineren Standortgemeinschaften (z.B. Verbrauchermarkt und Discounter) und vereinzelt in Solitärlagen.

Abgesehen davon zeigt die Auswertung der Einzelhandelskartierung bereits eine, je nach Branche unterschiedlich starke, räumliche Angebotskonzentration auf; auch der Vergleich mit früheren Angeboterhebungen belegt, dass im Zeitverlauf bereits viele Einzelhandelsbetriebe an nicht oder weniger

agglomerierten Standorten weggebrochen sind (z.B. nahversorgungsrelevante Anbieter in Dorfzentren), während einzelne Agglomerationen (insb. in dezentralen Gewerbegebieten) deutlich angewachsen sind.

Im Rahmen der Haushaltsbefragung wurden 412 Personen interviewt und insgesamt 4.026 Einkaufsfahrten erfasst (Lebensmittelmärkte: 1.235, Baumärkte: 1.011, Elektrofachmärkte: 1.059, Möbelmärkte: 721). Abgesehen von den Möbeleinkäufen beschränken sich die erfassten Einkaufsfahrten fast ausschließlich auf die relevanten Anbieter im Untersuchungsgebiet, weswegen die Möbeleinkäufe auch von der weiteren Analyse ausgenommen wurden.

Abb. 1 zeigt beispielhaft die lokalen Marktanteile der Elektrofachmärkte auf der Ebene der Ortsteile bzw. der daraus aggregierten Gebiete (z.B. „Beverungen-Südost"). Deutlich zu erkennen ist vor allem eine starke Orientierung der Nachfrager im gesamten Gebiet auf zwei in einem Gewerbegebiet benachbarte Anbieter im nördlich gelegenen Mittelzentrum Holzminden („Expert", „Media Markt").
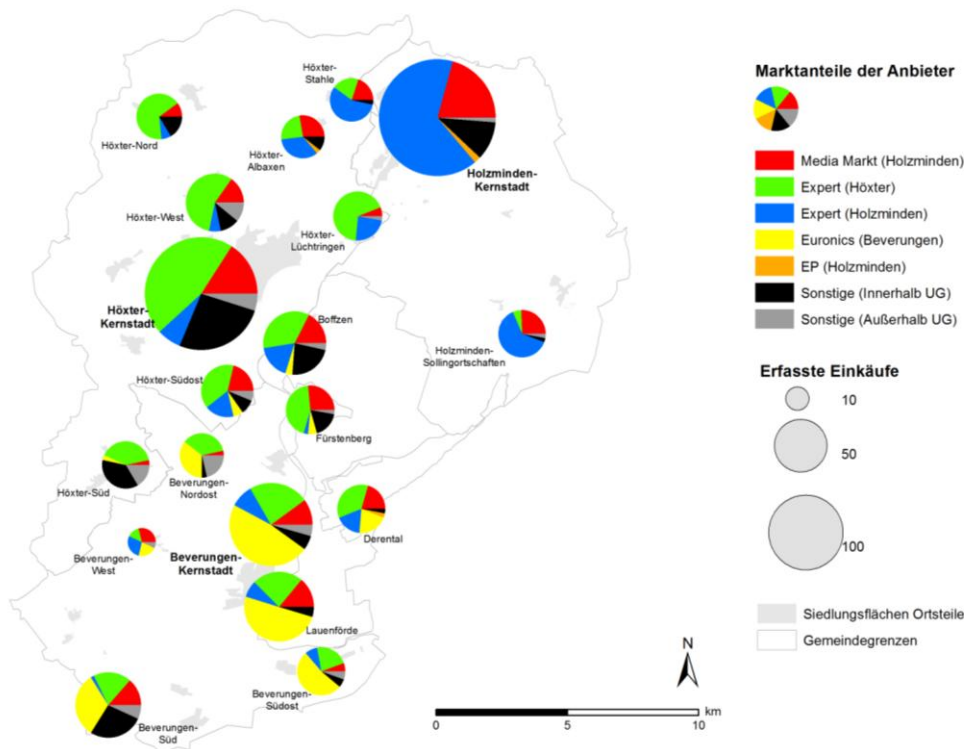
Abb. 1: Marktanteile der Elektrofachmärkte nach Teilgebieten
(Quelle: Eigene Darstellung, Datengrundlagen: OpenStreetMap, Eigene Erhebungen und Berechnungen)

4.2 MCI-Modellergebnisse

Das linearisierte MCI-Modell (Formel 4) ist ein konventionelles multiples lineares Regressionsmodell und lässt sich dementsprechend mit Hilfe der Methode der kleinsten Quadrate schätzen und auf dieser Grundlage interpretieren; aus inhaltlichen Gründen enthält das MCI-Modell jedoch keine Konstante. Die Prädiktoren sind in vorliegendem Fall die Fahrtzeit zwischen Konsumentenwohnort und Anbieterstandort in Minuten (d_{ij}), die Verkaufsfläche der Anbieter (A_j), der allgemeine Konzentrationsindex für die räumliche Ballung mit allen anderen Einzelhandelsanbietern (K_{Aj}) sowie der Konzentrationsindex für die räumliche Nähe zu konkurrierenden Anbietern (K_{Kj}). Die abhängige Variable ist der lokale Marktanteil des jeweiligen Anbieters (p_{ij}). Alle Variablen sind gemäß der Vorgaben des MCI-Modells durch den geometrischen Mittelwert normiert und logarithmiert (Formel 7).

$$(7) \quad \log(p_{ij} / \tilde{p}_i) = b_1 \log(d_{ij} / \tilde{d}_i) + b_2 \log(A_j / \tilde{A}_j) + b_3(K_{A_j} / \tilde{K}_{A_j}) + b_4 \log(K_{K_j} / \tilde{K}_{K_j})$$

In Tabelle 1 sind für die drei Marktgebietsmodelle (Lebensmittelmärkte, Baumärkte, Elektrofachmärkte) jeweils die unstandardisierten Koeffizienten (*b*), die standardisierten Koeffizienten (*β*), das Signifikanzniveau und die Bestimmtheitsmaße (R^2, Korrigiertes R^2) als Modellgütekriterien angegeben. Bei den Modellen handelt es sich immer um den letzten (d.h. vierten) Schritt der schrittweisen Regression.

Modell	(1) Lebensmittelmärkte			(2) Baumärkte			(3) Elektrofachmärkte		
Prädiktoren	b	β	Sig.	b	β	Sig.	b	β	Sig.
Log $(d_{ij}/GM\ d_i)$	-1,747	-0,781	***	-2,100	-0,620	***	-1,632	-0,603	***
Log $(A_j/GM\ A_j)$	0,658	0,330	***	1,368	0,659	***	0,951	0,720	***
Log $(K_{Aj}/GM\ K_{Aj})$	-0,090	-0,104	**	0,259	0,188	***	0,336	0,275	***
Log $(K_{Kj}/GM\ K_{Kj})$	0,083	0,176	***	-0,173	-0,156	**	0,101	0,211	***
R^2	0,596			0,800			0,770		
Korr. R^2	0,590			0,789			0,760		

Abhängige Variable: Log $(p_{ij}/GM\ p_i)$ 　　　　　　　　　　GM = Geometrischer Mittelwert

*** = 99 %-Signifikanzniveau, ** = 95 %-Signifikanzniveau

Tabelle 1: Modellschätzer und Modellgüte der MCI-Modelle (Quelle: Eigene Erhebungen und Berechnungen)

In allen drei Modellen beeinflussen die vier Prädiktoren die zu erklärende Variable in statistisch signifikanter Weise; in den meisten Fällen wird ein Signifikanzniveau von 99 % erreicht, ansonsten das 95 %-Niveau. Die Bestimmtheitsmaße zur Messung der Modellgüte (R^2, Korrigiertes R^2) sind zumindest im zweiten (Baumärkte) und dritten Modell (Elektrofachmärkte) außerordentlich hoch, wohingegen die Varianzaufklärung im ersten Modell (Lebensmittelmärkte) noch ausbaufähig ist.

Die Distanz wirkt in allen Fällen weit überlinear negativ, wie die unstandardisierten Regressionskoeffizienten (*b*) zeigen; am stärksten ausgeprägt ist die interaktionshemmende Distanzwirkung bei den Baumärkten, am schwächsten wirkt sie bei den Elektrofachmärkten. Die standardisierten Koeffizienten (*β*) belegen, dass die Distanz im Fall der Lebensmittelmärkte die mit Abstand einflussreichste Größe darstellt, im Fall der Bau- und Elektrofachmärkte die zweitgrößte. Die Eigenattraktivität (Verkaufsfläche) hat bei den Lebensmittelmärkten einen vergleichsweise schwachen, weit unterlinearen Effekt, wohingegen sie bei den Fachmärkten eine größere Rolle einnimmt; im Fall der Baumärkte wirkt sie überlinear, bei den Elektrofachmärkten leicht unterlinear positiv.

Die Konzentrationsindices wirken sich in den meisten Fällen positiv aus: Im Modell für die Marktgebiete der Elektrofachmärkte haben sowohl die räumliche Ballung mit konkurrierenden als auch mit anderen Betrieben einen positiven Einfluss auf den Marktanteil. Im Fall der Baumärkte ist der Parameter für die Konkurrenznähe negativ, der für die Nähe zu branchenungleichen Anbietern aber positiv. Bei den Lebensmittelmärkten ist das Gegenteil der Fall: hier wirkt die Konkurrenznähe positiv, die Nähe zu anderen Anbietern hingegen noch knapp auf dem 95 %-Signifikanzniveau negativ.

In allen drei Modellen hat die schrittweise durchgeführte Regression aufgezeigt, dass signifikante Modellverbesserungen durch die Hinzunahme der Konzentrationsvariablen erreicht wurden. Die statistisch gemessenen Effekte dieser Erklärungsgrößen sind jedoch deutlich geringer als die der Distanz und der Eigenanziehungskraft.

4.3 GWR-Modellergebnisse für die Marktgebiete der Elektrofachmärkte

Exemplarisch für die Modellierung mit Hilfe der geographisch gewichteten Regression werden die Modellergebnisse für die Elektrofachmärkte dargestellt. Es zeigt sich hierbei, dass alle vier Parameter zwischen den einzelnen Teilgebieten deutlich variieren (siehe Abb. 2). Beispielsweise schwankt der positive Gewichtungsparameter der Verkaufsfläche zwischen 0,89 im südlichen Marktgebiet und 0,99 im nördlichen Teil; die negative Wirkung der Distanz variiert zwischen -1,65 und -1,52. Vergleichbar verhält es sich mit den Konzentrationsindices, die zwischen 0,30 und 0,36 bzw. 0,07 und 0,11 schwanken. Vor dem Hintergrund der Tatsache, dass diese ermittelten Parameter in den Modellen vom Huff-Typ als Exponenten eingehen, ist dieser Unterschied sehr gravierend.

Es fällt hierbei ein Zusammenhang zwischen der Größe der Modellparameter und der Lage der Anbieterstandorte auf: Alle Parameter haben ihre stärksten Ausprägungen im nördlichen Teil des Untersuchungsgebietes. Sowohl die Attraktivität und die Distanz als auch die Konzentrationseffekte wirken hier, im Umfeld der Kernstädte von Höxter und Holzminden, in denen vier der fünf relevanten Anbieter angesiedelt sind, am stärksten. Die jeweils geringsten Werte sind in den eher abgelegenen Ortsteilen im südlichen Teil Höxters und Beverungens zu finden.
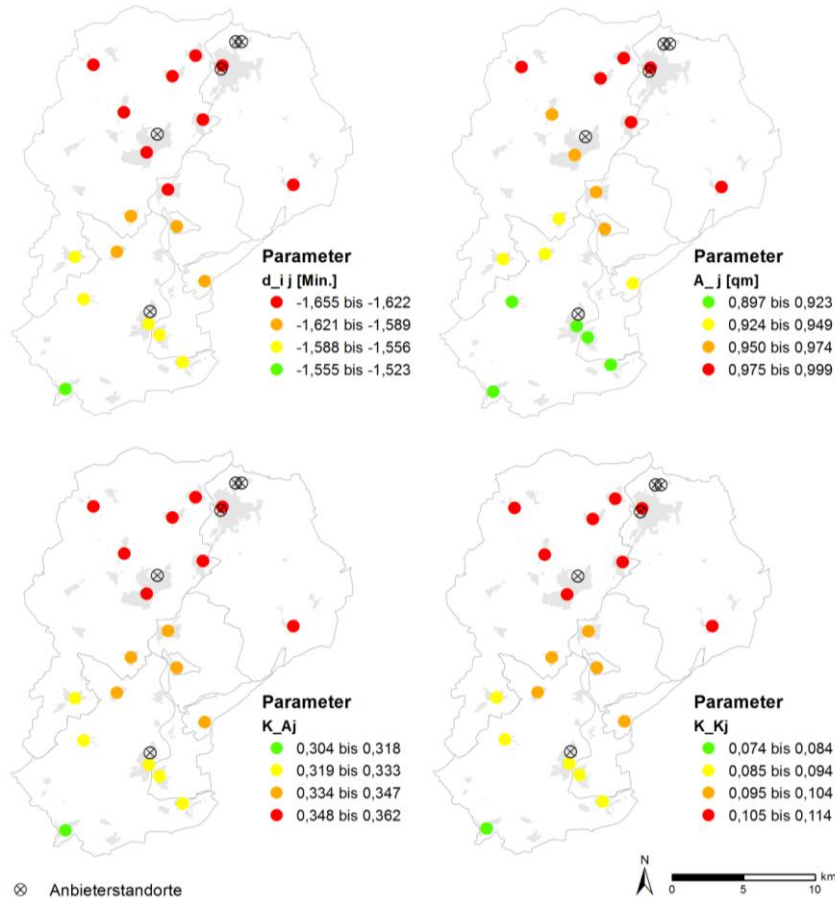
Abb. 2: Räumliche Variation der Modellparameter im GWR-Modell für die Elektrofachmärkte, klassifiziert in gleichen Abständen (Quelle: Eigene Darstellung, Datengrundlagen: OpenStreetMap, Eigene Erhebungen und Berechnungen)

5 DISKUSSION

Die MCI-Modellergebnisse zeigen auf, dass in allen Fällen (Lebensmittel-, Bau-, Elektrofachmärkte) die Berücksichtigung räumlicher Angebotskonzentration zu einem höheren Erklärungsgehalt der Modelle führt. Daraus folgt, dass diese Größen mit an Sicherheit grenzender Wahrscheinlichkeit einen Einfluss auf die konsumentenseitige Einkaufsstättenwahl ausüben; da dieser Einfluss meistens, wenn auch nicht immer, positiv ist, sind die theoretisch hergeleiteten Hypothesen weitgehend zu bestätigen.

Im Fall der Elektrofachmärkte wirken sich sowohl die räumliche Nähe von konkurrierenden als auch von andersartigen bzw. komplementären Anbietern positiv auf den Kundenzufluss aus. Das Prinzip der Konkurrenzanziehung aufgrund der Ermöglichung von Preis- und Qualitätsvergleichen für die Kunden ist hier also nachweisbar. Da es sich bei den dort vorgehaltenen Produkten überwiegend um Güter des längerfristigen Bedarfs handelt, deren Anschaffung mitunter kostspielig ist, ist es nachvollziehbar, dass hier die Möglichkeit von Vergleichen und eine breite Auswahl für die Konsumenten eine große Rolle spielen.

Der positive Effekt von Konkurrenznähe lässt sich ebenso für die Lebensmittelmärkte belegen; diese sind häufig (bewusst) in Standortgemeinschaften lokalisiert und ermöglichen auf diese Weise den Kunden, ihren persönlichen Warenkorb des täglichen Bedarfs je nach individuellen Präferenzen bei beiden Anbietern nacheinander zusammen zu stellen. Die vielfach anzutreffende Kombination aus zwei Betriebsformen (i.d.R. Verbrauchermarkt und Discounter) eröffnet nicht nur den preis- *oder* qualitätsbewussten Kunden ein großes Angebot, sondern auch der wachsenden Zahl von Konsumenten, die preis- *und* qualitätsorientiert einkaufen. Dass kein positiver Effekt für sonstige Kopplungsmöglichkeiten nachgewiesen werden konnte, lässt sich möglicherweise damit interpretieren, dass kleinere Standortgemeinschaften eine schnellere Besorgung ermöglichen und weiteres Angebot (z.B. Bekleidung, Möbel) ohnehin nicht für eine Kopplung beim Lebensmitteleinkauf in Frage kommt. Ergänzendes Angebot durch z.B. Anbieter des Lebensmittelhandwerks (Bäcker, Metzger) ist hingegen im Umfeld von jedem der untersuchten Lebensmittelmärkte verfügbar.

Die Modellergebnisse für die Prädiktoren Verkaufsfläche und Distanz sind höchst plausibel und entsprechen den in der Literatur diskutierten Richtgrößen, wonach die Distanz überlinear negativ, die Verkaufsfläche unterlinear positiv wirkt. Einzig im Fall der Baumärkte wirkt die Verkaufsfläche überlinear positiv, was sich damit erklären lassen könnte, dass in dieser Branche der Wettbewerb um die Kunden tatsächlich maßgeblich über die Angebotstiefe bestimmt wird. Möglicherweise wird dies noch dadurch forciert, dass im Untersuchungsgebiet ein hoch frequentierter „OBI"-Markt präsent ist, der nahezu dreimal so groß ist wie der nächstgrößere Baumarkt. Auch finden sich im Gegensatz zu den anderen Angebotsformen keine branchengleichen Anbieter in unmittelbarer Nachbarschaft, was den negativen Konkurrenzeffekt bei den Baumärkten erklären könnte: Es befinden sich zwar Märkte in der selben Standortgemeinde, jedoch sind sie für eine kumulierte Anziehungskraft zu weit voneinander entfernt.

Allgemein ist die Wirkung der räumlichen Nähe im Vergleich mit der Verkaufsfläche und der Distanz deutlich geringer; dies ist damit zu erklären, dass es sich bei den untersuchten Anbietern fast ausnahmslos selbst um großflächige, filialisierte Betriebe handelt, die ihrerseits als „Magnetbetriebe" anzusehen sind, also eine hohe Eigenanziehungskraft bzw. einen hohen Anteil an „Generative business" besitzen. Eine Ausweitung der Untersuchung auf kleinere Anbieter, die stärker von externer Anziehungskraft abhängig sind („Shared business"), müsste demnach weit höhere positive Effekte der räumlichen Ballung (insb. im Hinblick auf komplementäre Anbieter) erzielen.

Aufschlussreich ist ferner die Schätzung räumlich variierender Modellparameter gewesen. Die Kritik, dass in Marktgebietsmodellen vom Huff-Typ die Nutzenfunktion entgegen plausibler Annahmen überall identisch ist, kann somit konstruktiv beantwortet werden. Interessant ist hierbei, wie die räumlichen Unterschiede diesbezüglich verlaufen, was hier am Beispiel der Elektrofachmärkte illustriert wurde. Dass die Regressionskoeffizienten im Umfeld der größten Angebotsstandorte am höchsten sind, lässt sich damit interpretieren, dass in diesen Teilräumen das konsumentenseitige Anspruchsniveau und somit der Wettbewerbsdruck aufgrund der geringen Entfernung zu mehreren Anbietern besonders hoch ist.

6 FAZIT

Die Untersuchung zeigt einen deutlichen Einfluss der Clusterbildung auf das räumliche Einkaufsverhalten auf. In den meisten Fällen wurde nachgewiesen, dass stark agglomerierte Einzelhandelsanbieter – alle anderen Bedingungen konstant gehalten – tendenziell höhere Kundenzuflüsse generieren können als isolierte oder weniger agglomerierte; dies gilt zumeist sowohl für die räumliche Ballung mit andersartigen als auch mit konkurrierenden Anbietern. Während die Filialisten des Einzelhandels diesen Umstand offensichtlich größtenteils erkannt und für sich nutzbar gemacht haben (was sich teilweise explizit an ihren Standortanforderungen ablesen lässt), berücksichtigen z.B. Verträglichkeitsanalysen in Einzelhandelsgutachten diesen Effekt zumeist nicht. Die vorliegenden Ergebnisse zeigen aber auf, dass Agglomerationseffekte in jedem Fall einkalkuliert werden sollten, wenn es darum geht, negative raumordnerische und städtebauliche Auswirkungen von Einzelhandelsansiedlungen und -erweiterungen (im Sinne einer disparitären Angebotsentwicklung) zu prüfen. Das vorgestellte Marktgebietsmodell, das Agglomerationseffekte und räumlich differenzierte Nutzenfunktionen berücksichtigt, bietet hierfür eine mögliche methodische Grundlage, da es direkt in das häufig genutzte Huff-Modell überführbar ist.

7 LITERATURVERZEICHNIS

ARENTZE, Theo A./OPPEWAL, Harmen/TIMMERMANS, Harry J. P.: A Multipurpose Shopping Trip Model to Assess Retail Agglomeration Effects. In: Journal of Marketing Research, Jg. 42, H. 1, S. 109-115. 2005.
BAUMGARTEN, Marcus/ZEHNER, Klaus: Standortverlagerungen des Lebensmitteleinzelhandels und ihre Folgen für die Nahversorgung. Eine GIS-gestützte Identifizierung unterversorgter Wohngebiete am Beispiel von Köln-Merheim. In: Raumforschung und Raumordnung, Jg. 65, H. 3, S. 225-230. 2007.
BROOKS, Charles M./KAUFMANN, Patrick J./LICHTENSTEIN, Donald R.: Trip chaining behavior in multi-destination shopping trips: A field experiment and laboratory replication. In: Journal of Retailing, Jg. 84, H. 1, S. 29-38. 2008.
CHAMBERLIN, Edward: The theory of monopolistic competition. Cambridge, 1933.
CHRISTALLER, Walter: Die zentralen Orte in Süddeutschland. Eine ökonomisch-geographische Untersuchung über die Gesetzmäßigkeit der Verbreitung und Entwicklung der Siedlungen mit städtischen Funktionen. Jena, 1933.
CLARKE, Graham P.: Methoden der Standortplanung im Wandel. In: HEINRITZ, Günter (Hrsg.): Die Analyse von Standorten und Einzugsbereichen. Methodische Grundfragen der geographischen Handelsforschung. Geographische Handelsforschung, 2, S. 9-32. Passau, 1999.
FOTHERINGHAM, Alexander Stewart/BRUNSDON, Chris/CHARLTON, Martin: Geographically Weighted Regression. The analysis of spatially varying relationships. Chichester, 2002.

FOTHERINGHAM, Alexander Stewart: Spatial competition and agglomeration in urban modelling. In: Environment and Planning A, Jg. 17, S. 213-230. 1985.

FUJITA, Masahisa/THISSE, Jacques-Francois: Economics of agglomeration. Cities, industrial location and regional growth. Cambridge, 2002.

FUJITA, Masahisa: The Evolution of Spatial Economics. From Thünen to the New Economic Geography. In: The Japanese Economic Review, Jg. 61, H. 1, S. 1-32. 2010.

GHOSH, Avijit: The Value of a Mall and Other Insights from a Revised Central Place Model. In: Journal of Retailing, Jg. 62, H. 1, S. 79-97. 1986.

GIJSBRECHTS, Els/CAMPO, Katia/NISOL, Patricia: Beyond promotion-based store switching: antecedents and patterns of systematic multiple-store shopping. In: International Journal of Research in Marketing, Jg. 25, S. 5-21. 2008.

GÜSSEFELDT, Jörg: Empirische Aspekte einiger Modelle der „New Economic Geography" im Kontext jüngerer Entwicklungen des Einzelhandels. In: Die Erde, Jg. 134, H. 1, S. 81-110. 2003.

HARDIN, William G./WOLVERTON, Marvin L./CARR, Jon: An Empirical Analysis of Community Center Rents. In: Journal of Real Estate Research, Jg. 23, H. 1/2, S. 163-178. 2002.

HEINRITZ, Günter/THEIS, Christiane: The Relevance of Coupling Potential in Retailing. In: Die Erde, Jg. 128, S. 219-234. 1997.

HESSE, Roland/SCHMID, Alex: Kundenverhalten und Angebotsplanung – die Entwicklung eines Simulationstools für die räumliche Optimierung von Einkaufszentren und anderen Handelsumgebungen. In: KLEIN, Ralf/RAUH, Jürgen (Hrsg.): Analysemethodik und Modellierung in der geographischen Handelsforschung. Geographische Handelsforschung, 13, S. 111-126. Passau, 2007.

HOTELLING, Harold: Stability in Competition. In: The Economic Journal, Jg. 39, S. 41-57. 1929.

HUFF, David/BATSELL, Richard: Conceptual and operational problems with market share models of consumer spatial behaviour. In: Advances in Consumer Research, Jg. 2, H. 1, S. 165-172. 1975.

HUFF, David/McCALLUM, Bradley M.: Calibrating the Huff Model Using ArcGIS Business Analyst. ESRI White Paper, 2008.

HUFF, David: A Probabilistic Analysis of Shopping Center Trade Areas. In: Land Economics, Jg. 39, H. 1, S. 81-90. 1963.

HUFF, David: Defining and Estimating a Trading Area. In: Journal of Marketing, Jg. 28, H. 3, S. 34-38. 1964.

HUFF, David: Determination of Intra-Urban Retail Trade Areas. Los Angeles, 1962.

JÜRGENS, Ulrich: Standortmuster von Lebensmitteldiscountern – eine systematische Betrachtung am Beispiel Schleswig-Holsteins. In: Berichte des Arbeitskreises Geographische Handelsforschung, Nr. 31, S. 35-41. 2012.

KRIDER, Robert E./PUTLER, Daniel S.: Which Birds of a Feather Flock Together? Clustering and Avoidance Patterns of Similar Retail Outlets. In: Geographical Analysis. 2013 (Im Erscheinen).

KUBIS, Alexander/HARTMANN, Maria: Analysis of Location of Large-Area Shopping Centres. A Probabilistic Gravity Model for the Halle-Leipzig Area. In: Jahrbuch für Regionalwissenschaft, Jg. 27, S. 43-57. 2007.

KULKE, Elmar: Räumliche Konsumentenverhaltensweisen. In: KULKE, Elmar (Hrsg.): Dem Konsumenten auf der Spur. Neue Angebotsstrategien und Nachfragemuster. Geographische Handelsforschung, 11, S. 9-26. Passau, 2005.

LADEMANN, Rainer P.: Innerstädtische Einkaufszentren. Eine absatzwirtschaftliche Wirkungsanalyse. Göttinger Handelswissenschaftliche Schriften, 77. Göttingen, 2011.

LADEMANN, Rainer P.: Zum Einfluss von Verkaufsfläche und Standort auf die Einkaufswahrscheinlichkeit. In: SCHUCKEL, Marcus/TOPOROWSKI, Waldemar (Hrsg.): Theoretische Fundierung und praktische Relevanz der Handelsforschung. S. 143-162. Wiesbaden, 2007.

LANGE, Siegfried: Wachstumstheorie zentralörtlicher Systeme. Eine Analyse der räumlichen Verteilung von Geschäftszentren. Beiträge zum Siedlungs- und Wohnungswesen und zur Raumplanung, Bd. 5. Münster, 1973.

MÜLLER-HAGEDORN, Lothar/NATTER, Martin: Handelsmarketing. 5. Aufl., Stuttgart, 2011.

MULLIGAN, Gordon F./PARTRIDGE, Mark D./CARRUTHERS, John I.: Central place theory and its reemergence in regional science. In: The Annals of Regional Science, Jg. 48, H. 2, S. 405-431. 2012.

NAKANISHI, Masao/COOPER, Lee G.: Parameter Estimation for a Multiplicative Competitive Interaction Model – Least Squares Approach. In: Journal of Marketing Research, Jg. 11, S. 303-311. 1974.

NELSON, Richard L.: The selection of retail locations. New York, 1958.

ORPANA, Tommi/LAMPINEN, Jouko: Building spatial choice models from aggregate data. In: Journal of Regional Science, Jg. 43, H. 2, S. 319-347. 2003.

PARR, John B.: Missing Elements in the Analysis of Agglomeration Economies. In: International Regional Science Review, Jg. 25, H. 2, S. 151-168. 2002.

POPIEN, Ralf: Die Bedeutung von Kopplungsmöglichkeiten für den Einzelhandel. In: HEINRITZ, Günter (Hrsg.): Geographische Untersuchungen zum Strukturwandel im Einzelhandel. Münchener Geographische Hefte, 63, S. 129-157. Kallmünz; Regensburg, 1989.

POPKOWSKI LESZCZYC, Peter T.L./SINHA, Ashish/SAHGAL, Anna: The effect of multi-purpose shopping on pricing and location strategy fro grocery stores. In: Journal of Retailing, Jg. 80, H. 2, S. 85-99. 2004.

RAUH, Jürgen/SCHENK, Tilman A./SCHRÖDL, Daniel: The simulated consumer – an agent-based approach to shopping behaviour. In: Erdkunde, Jg. 66, H. 1, S. 13-25. 2012.

SCHNEDLITZ, Peter/TELLER, Christoph: Das Einkaufszentrum als Agglomerationsklasse – begriffliche Diskussion und empirische Evaluierung von Agglomerationseffekten. In: GRUBER, Michael (Hrsg.): Agglomerationseffekte und Bestandsverhältnisse in Einkaufszentren. S. 1-52. Wien, 2008.

SULLIVAN, Malcom/ADCOCK, Dennis: Retail marketing. London, 2002.

TELLER, Christoph: Shopping streets versus shopping malls – determinants of agglomeration format attractiveness from the consumers' point of view. In: The International Review of Retail, Distribution and Consumer Research, Jg. 18, H. 4, S. 381-403. 2008.

WIELAND, Thomas: Modellierung von Marktgebieten im Einzelhandel unter Berücksichtigung von Agglomerationseffekten (Arbeitstitel). Dissertation am Geographischen Institut der Universität Göttingen, in Bearbeitung.

WIELAND, Thomas: Nahversorgung mit Lebensmitteln in Göttingen 2011. Göttinger Statistik Aktuell, H. 35. Göttingen, 2011.

WOLF, Michael: Anforderungen an Einzelhandelsgutachten. In: KONZE, Heinz/WOLF, Michael (Hrsg.): Einzelhandel in Nordrhein-Westfalen planvoll steuern! Arbeitsberichte der ARL, 2, S. 114-134. Hannover, 2012.

Endangerments on Schools

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1 ABSTRACT

The project "Endangerments on schools" maintained by the Department of Physical Geography within the Faculty of Regional and Environmental Planning at the University of Kaiserslautern, Germany, analyzed the air quality of elementary school sites primarily not to be viewed as air hygiene loaded places. However, surveys of the traffic situation of the nearby vicinity of diverse schools in the city of Kaiserslautern indicated that these must be regarded as potentially polluted. In many cases, the combination of local emission sources and the locally limited exchange rate of the urban canopy layer proves to be a little-noticed negative factor. Pursuing this fact at the beginning of the project several elementary schools were selected within the city of Kaiserslautern, which could be classified as an urban, suburban or rural location due to its location and to the adjacent building structure. At all school sites meteorological as well as air quality parameters were measured simultaneously to allow a direct comparison of the assessed data. Initial results have shown that some analyzed school sites not only have short-term air pollution exposure, following the concentration peaks of the morning and mid-day traffic of the children. In dependence of the reduced near surface atmospheric exchange, due to the current weather situation and diverse environmental aspects the air quality limits, e.g. for particulate matters (PM10), were exceeded over longer periods. These could verifiably accumulate within the nearby vicinity of the school and even worse, within the schoolyard, respectively.

2 SCIENTIFIC BACKGROUND

2.1 Urban Geometry

What we need is to understand microclimatological modifications within urban areas so that we may affect the spaces to create a better environment from the biometeorological sight. At the same time, understanding and especially being able to predict these microclimates may also help to improve aspects of the performance of the adjacent buildings. If the environmental quality of the outside spaces is enhanced, there will be more opportunity for the people to stay outdoors, with beneficial effects on health (Erell et al. 2011).

Due to the heterogeneity of every urban structure it is useful to describe the fabric of buildings, open and green spaces respectively. Though, it is possible to give a statement that expresses e.g. the density or other physical properties influencing the micro-scale climate. One of the most used models for making such a description is the urban street canyon. This refers to a linear space bounded on both sides by vertical elements (walls of adjacent buildings). All in all the geometry of an urban street canyon could be described by three principal descriptors:

- the aspect ratio (height-width-ration),
- the canyon axis orientation and
- the Sky View Factor (SVF).

- Fig. 1: Upward-looking fish-eye lens photograph for the estimation of the Sky View Factor limited by the urban geometry (left) and making only the apparent sky visible (right).

The Sky View Factor is closely related to the aspect ratio. It is the proportion of the sky dome that is "seen" from a surface, either from a particular point on the surface or integrated over its entire area (s. Fig. 1). The calculation of the SVF is focused to determine the street`s geometry for the analysis of this project. These geometric descriptors of an urban street canyon are correlating in a useful way with a number of climatic effects. Both the aspect ratio and the SVF indicate a direct relationship with the urban heat island effect. One of these influences can be shown by different wind regimes or general patterns of air-flow over the urban surface (Souza et al., 2003; Gal et al., 2007, Erell et al., 2011).

Different numerical models as well as scale-model simulations could show that the skimming flow is always present and that the aspect ratio of the urban street canyon determines the number and strength of the vortices formed within the street. So a single vortex could be formed, with its centre a little downwind within the urban canyon. Another theory suggests that deeper urban street canyons will be able to exhibit two counter-rotating vortices. And this second one definitely could have an influence on the urban air quality near the ground because of less potency in comparison to the upper vortex (s. Fig. 2) (Erell et al., 2011).
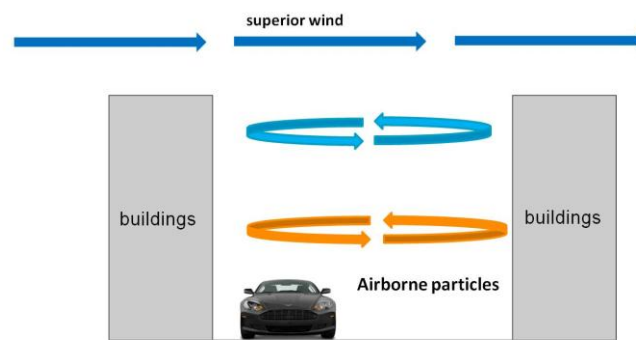
Fig. 2: Scheme of an idealized representation of two counter-rotating vortices formed in a deep street canyon by above-roof wind blowing perpendicular to the canyon axis.

Most urban aerosols are anthropogenic in origin. A large proportion of these result from combustion processes (e.g. domestic fuel, industries, traffic), which are typically the main source of particulate matters within urban streets and the urban canopy layer respectively. Several studies show that the particle number concentration at street level is linearly correlated with traffic volume as well as being inversely correlated with wind speed (Henninger, 2011; Errel et al., 2011). So the dispersion of aerosols and pollutants is directed on wind and in particular on turbulence. Depending on the atmospheric stability and the roof geometry clean air may be entrained at roof height and directed downwards into the canyon near the windward wall. At ground level the flow is directed opposite the above-roof wind. Ideally, traffic emissions from the middle of the street are carried to the base of the leeward wall and then sucked upwards by the vortex flow. But if there is the above mentioned second vortex this dispersion is prevented (s. Fig. 2) (Hotchkiss & Harlow, 1973; Yamaritino & Wiegand, 1986; Erell et al., 2011).
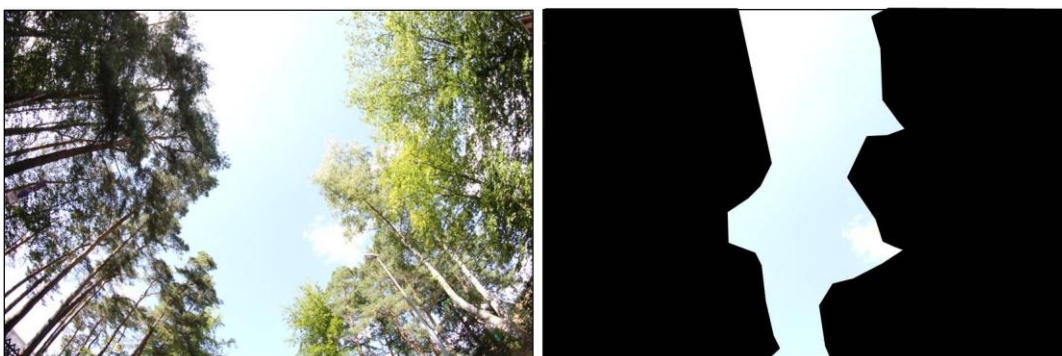
Fig. 3: Upward-looking fish-eye lens photograph for the estimation of the Sky View Factor limited by the tree geometry in summer (left) and making only the apparent sky visible (right).

2.2 Permeability of trees

The Sky View Factor could also be estimated for other types of space, whose geometry differs from a linear-type of an urban street canyon (s. Fig. 3). Trees are often employed as shading devices for buildings as well as for pedestrian spaces (Brown & Gillespie, 1995). However, this idealized behavior could not always be

observed in practice for several reasons. One of these is that the branches may still create a substantial obstruction to the sunrays and the tree crown is able to close up broad parts of a street, like it is known by the urban street canyon bounded by the walls of the surrounding buildings (comp. Fig. 1) (Canton et. al, 1994; Erell et al., 2011). Thus, trees have the capacity to filter the air by absorbing a variety of undesirable pollutants. But however, the effect of the trees on air quality within urban streets is not absolutely beneficial (Taha et al., 1997; Erell et al., 2011; Henninger, 2012).

Different wind tunnel studies could confirm results of computer simulations showing that a row of trees planted along city pavements interferes with the formation of the lee vortex. They are responsible for the removal of traffic induced pollutants originating within the street. This results in less dispersion of pollutants and consequently poorer air quality. Again, as it is known for the aspect ratio of street canyons these could be simulated for adjacent trees at street level and lead to the above mentioned second vortex near the ground (s. Fig. 4). It is worth noting that even very porous tree crowns have a big effect on pollutant concentration. Tree crowns should not occupy large street canyon volumes in order not to suppress the ventilating canyon vortex system and the trees height should not exceed the roof level. Otherwise, air exchange is hindered and the concentration of pollutants at street level may rise (Gromke & Rush, 2009; Erell et al., 2011).
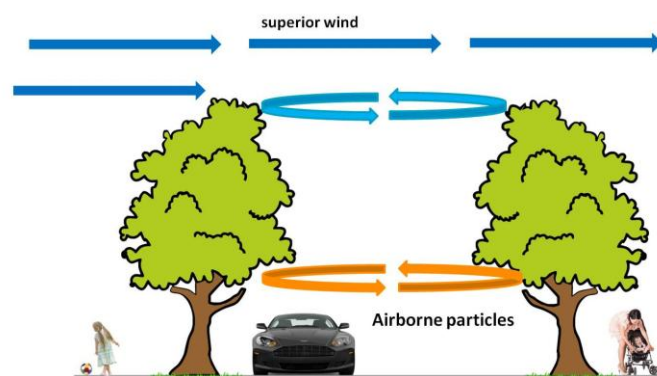
Fig. 4: Scheme of an idealized representation of two counter-rotating vortices formed by the densely tree geometry by above-roof wind blowing perpendicular to the street axis.
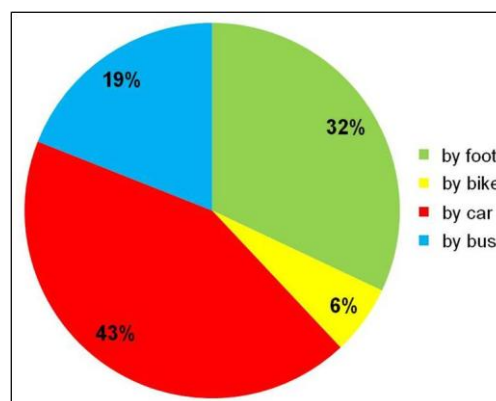
Fig. 5: How pupils of the investigated school reach the schoolyard; results of an evaluation (n = 291).

3 AIM & METHOD

The research primarily concentrated on the analysis of airborne particles, how they were modified by different times of the day in dependence of the current traffic and how these were influenced by the surrounding buildings and tree geometry. Therefore, exemplarily one investigation area was chosen, which is conspicuous particularly with regard to its temporal traffic density. The so-called area of "Pfaffenberg" is situated in the south-western part of the city of Kaiserslautern, Germany and could be considered as a typical suburban terrain with small single-family houses, blocks of flats and a heterogeneous structure of sealed-up areas in connection with urban green spaces and adjacent forest areas. The measurements were done within and in the nearby vicinity of the elementary school called "Pestalozzi-School". Evaluations of the traffic situation along this street offered that most parents transport their children by car, less pupils are going by bike or schoolbus (s. Fig. 5). So first of all, in consideration of the street system, it is obvious that there is not

enough parking area along the street which leads to "wild parking" and a permanent fight for the best places, resulting in criss-cross parking. This indicates that a high volume of traffic is a directly physical danger to the pupils.

Also visible or smellable respectively was the fact, that most parents did not stop the engine while parking. This resulted in an accumulation of different air pollutants in the exhaust plume. Considering figure 3 and 4 the situation along the street is reflected very well. Especially for the time of spring and summer the densely planted trees cover most parts of the street. A green street canyon arises (s. Fig. 4), which is, depending on the SVF, comparable to an urban street canyon. So furthermore we decided to analyze the local linear emission sources along the "Pfaffenbergstraße". Therefore, air quality measurements as well as the climatological ones were taken by three stations. This methodology made it possible to measure air quality as well as meteorology at three different locations; the first one was directly located on the pavement of the street, the second one in the transition area to the schoolyard and the third one right in the middle of the schoolyard. The aim of this measuring methodology was to determine the temporal course of different air pollutant concentration in relation to the meteorological conditions within the urban green area. Thus it should be possible to prove the daily air quality and how it was influenced respectively dependent of different external influencing factors. Especially from the mentioned second and third measuring device we expected to get an impression of the air quality situation of the schoolyard, offside of the street. Beside the particulate matters (PM10, PM2,5, PM1), carbon monoxide and carbon dioxide additionally air temperature, air humidity, solar radiation, wind speed and direction were measured in 2 m above ground level. The air quality indicators were determined by a suction device even at 2 m a. g. l. First of all, using a 3-D sonic anemometer permitted an accurate reading, especially of the expected thermally caused wind field changes. Of course it was also possible to display the results as a time line or in dependence of wind speed, but it is more favorable in dependence of the wind direction. This enables an exact temporal allocation to the potential sources of emission of the specific air pollutants within and outside the investigation area, e.g. by calculating a trace gas wind rose (Henninger, 2012).
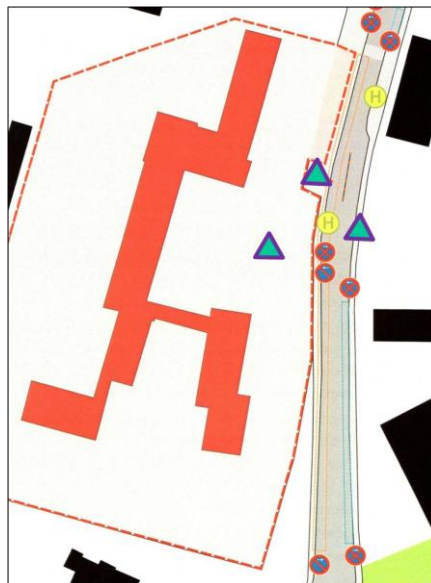
Fig. 6: Location of the investigation area (red line) and the „Pestalozzi School" (buildings marked in red), the traffic system (grey line), the non-parking areas and the three air quality/ meteorological measuring stations (purple-green triangles).

4 AIR QUALITY AND MICROCLIMATOLOGICAL MODIFICATIONS

4.1 In-situ air quality measurements

Getting a first impression and a better comparison depending on the problem of the traffic induced air pollution figure 7 offers the temporal course for the concentration of PM10 from 7.30 a.m. till 9 a.m. regarded as representative for the air quality situation on weekends and holidays. In respect on the German Federal Immission Protection Ordinance (BImSchV) the particulate matter of PM10 should examplarily be used for the quantification of the air quality situation within the investigations area. It is obvious that the suburban character of the investigation area provides a smooth course of the determined concentration by

ΔPM10 = 28.1 µg m-3. This equated course of the particulate matters reflects the solitude of the location sometimes interrupted by shortly increasing concentration due to the routinely consorting bus and some individual traffic as well.
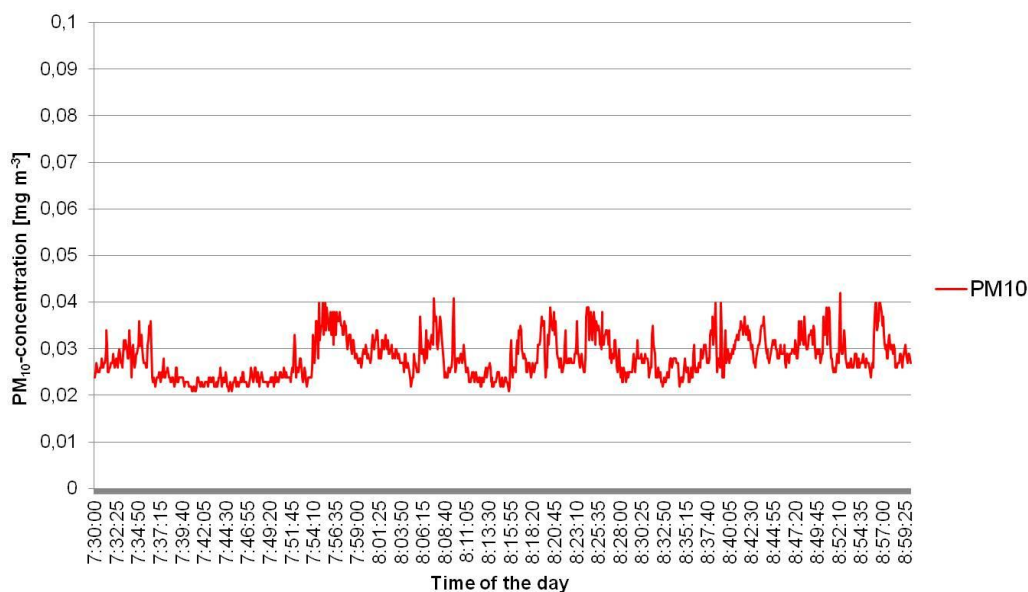
Fig. 7: Temporal course of PM10-concentration [mg m-3] for the street level of the investigation area on a representative holiday between 7.30 a.m. and 9 a.m.
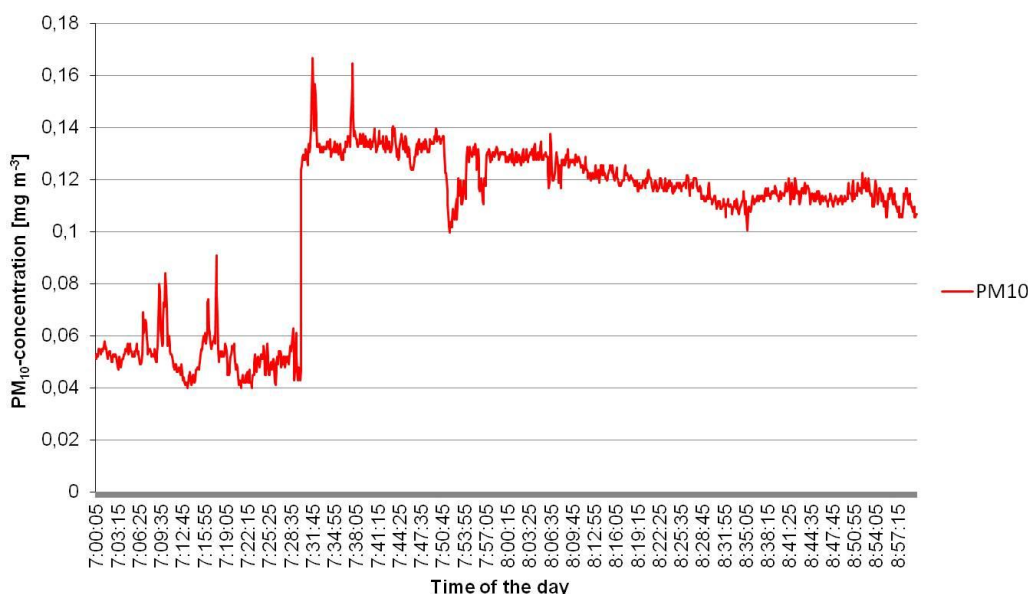
Fig. 8: Temporal course of PM10-concentration [mg m-3] for the street level of the investigation area on a representative schoolday between 7.00 a.m. and 9 a.m.

A completely different air quality situation is offered for weekdays. First and foremost it is obvious that the mean PM10-concentration for the time before school starts (7.00 a.m. till 7.30 a.m.) is by ΔPM10 = 52.2 µg m-3 higher than figured out in the above mentioned course anyhow (comp. Figs. 7 & 8). This could easily be explained by the matter of fact that there are more cars using this street in consequence of the weekdays commuter traffic. Around 7.30 a.m. the mapped air quality situation changes completely. Due to the so-called "open-beginning" of the schools first lesson the "struggle" for ample parking spaces in front of the school buildings starts at this time and the traffic situation is getting worse in this area. This "traffic jam" is replicable in the abruptly increasing PM10-concentration up to 170 µg m-3 (s. Fig. 8).

The mentioned "traffic jam" continues about ten minutes. Now, everyone would expect, that after the traffic has reassured air quality will normalize by distinct decreasing concentration. Unfortunately, the above explained problem of the street/ tree geometry becomes important. Because of the more or less closed tree

crowns the dispersion of PM10 is extremely reduced and it lingers on a high level (ΔPM10 = 121.9 µg m-3) for a longer time.

By 8.00 a.m. a trend of slightly decreasing concentration becomes visible. In consequence of the reduced exchange rate of the air masses within the canopy layer this slow decrease could be explained by the low dispersion rate in the surrounding areas. But comparing the results of figure 8 with the findings of figure 9 introduced a completely new interpretation. A slight time-display to the development provoked by the traffic situation on the street is visible and nearly the same image arises by considering the results of the measuring station within the schoolyard (s. Fig. 9).

Until 8.30 a.m. a smooth course of PM10 is visible by ΔPM10 = 36.2 µg m-3. But afterwards an almost mirror-imaged abrupt increase of the PM10-concentration appears and an equally immediately decrease in air quality within the canopy layer of the schoolyard. Of course this did not reach the high level of the street in front of the school, but by ΔPM10 = 74.4 µg m-3 and a time period of more than two hours before the concentration was decreasing again, but the situation not suitable from the humanbiometeorological point of view. Most notably not considering, that during this time period the pupils were using the schoolyard for the breaks between the lessons.

Now, it must be expected that the air quality development has to be regarded in the context with the situation on the street by the accumulation of the airborne particles. So the question was, how could these particles move so fast from one point to an other? Trying to explain this development a numerical simulation was done.
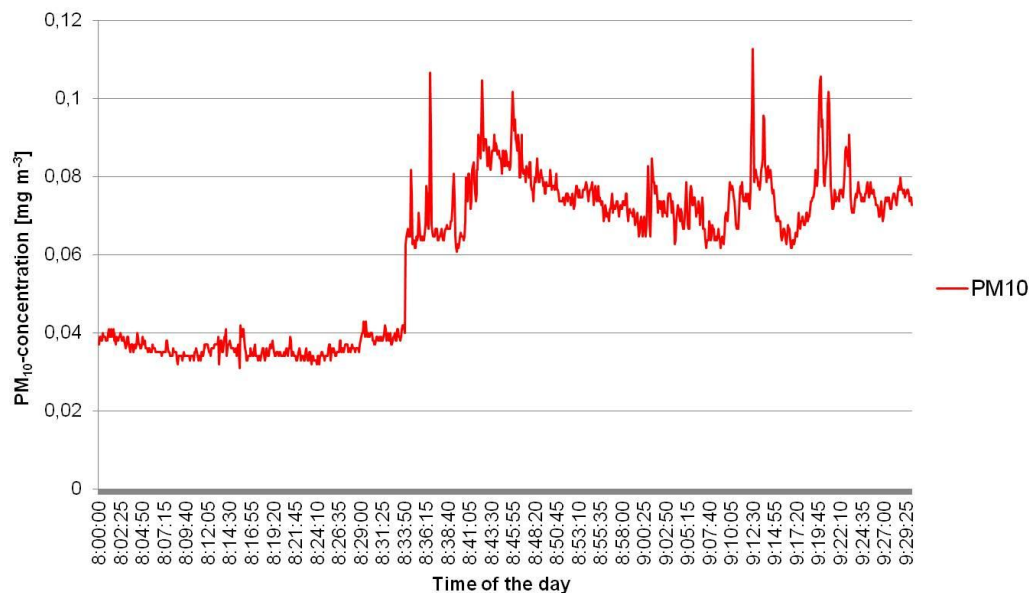
Fig. 9: Temporal course of PM10-concentration [mg m-3] for the schoolyard of the investigation area on a representative schoolday between 8.00 a.m. and 9.30 a.m.

4.2 Modeling the urban microclimate

Trying to find an answer for the dispersion of the aerosols the investigation area was analyzed due to its microclimatic situation by the simulation model ENVI-met 3.2, because analyzing the meteorological parameters showed, that there is a temperature difference between the street outside the schoolyard and the schoolyard itself.

ENVI-met is a CFD application (computational fluid dynamics) comprising a three-dimensional mathematical computer model designed for the specific purpose of analyzing micro-scale interactions between urban design and the microclimate. The model combines the calculation of fluid dynamics parameters (wind flow, turbulences) with thermodynamic processes taking place at the ground surface, like walls and roofs or plants. Using a resolution between 0.5 m and 10 m this enables the model simulating even complicated geometric forms such as terraces, balconies or complex quarters. The model includes the simulation of flow around and between buildings, exchange processes of heat and vapor at the ground surface and the walls, turbulences, exchange on vegetation and vegetation parameters, bioclimatology and particle dispersion (Bruse & Fleer, 1998; s. a. www.envi-met.com).
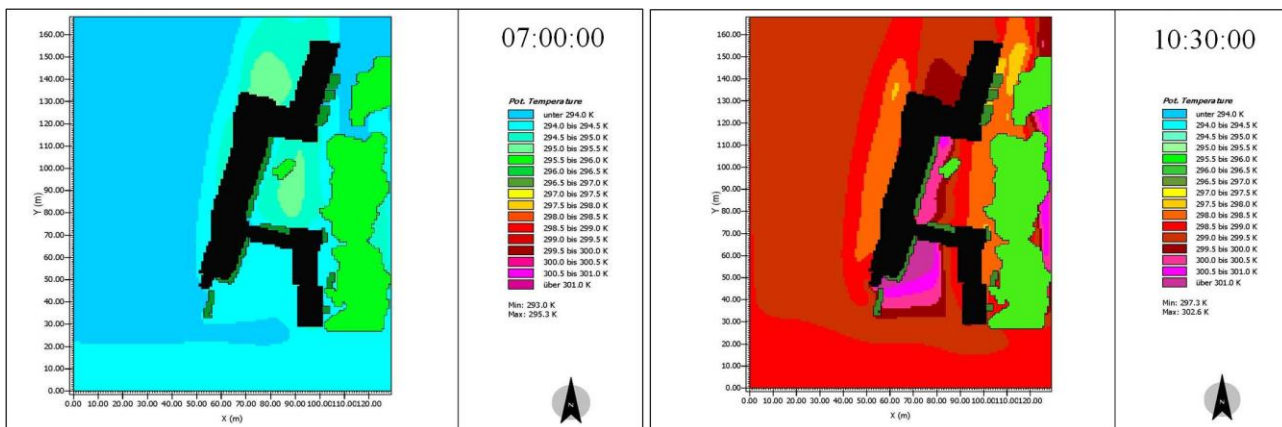
Fig. 10: ENVI-met simulation of the investigation area shortly before the sunrays directly reach the schoolyard (left) and when the schoolyard is heated up after the direct exposure to the sun (right).

Exemplarily, the results of the microclimatological simulation are shown in figure 10. These confirmed the in-situ measurements. It is obvious that in the course of the day the schoolyard (most parts are sealed by asphalt) could heat up by the direct exposure to the morning sun. This resulted in a "thermal hot spot" where a local convective air flow seemed to occur.

Regarding the near surface temperature and the wind direction, predominantly by the data of the measuring device located in the transition area of the schoolyard, the analysis offers a distinct local wind circulation between the cooler tree street canyon and the "hot spot" of the schoolyard. Evidently, the convective air flow above the schoolyard creates a local thermal area of low pressure, which will be set off by an area of higher pressure outside along the street (s. Fig. 11). This results in a measurable movement of the local air masses within the urban canopy layer.
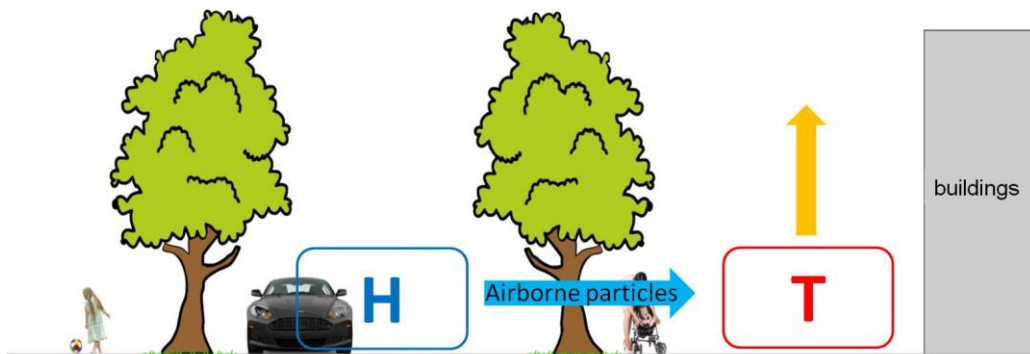
Fig. 11: Scheme of the determined local micro-scale wind circulation within the investigation area.
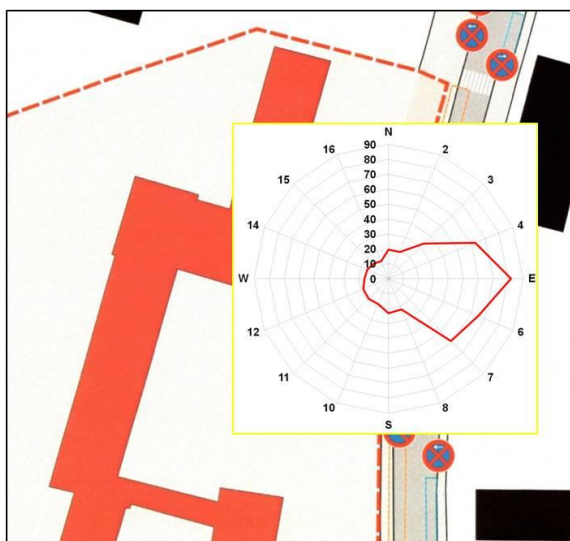
Fig. 12: Trace gas wind rose showing the flow of the PM10 [μg m-3] in dependence of the concentration and the direction of their source.

The development of this local microscale wind circulation explain the above mentioned decreasing concentration of PM10 within the investgated area of the street and also the increasing PM10-concentration within the schoolyard (s. 2.2). The determined compensation flow of this microscale air flow transports the airborne particles from the linear emission source into the schoolyard where the pupils are playing during their breaks between classes. This assumption could be proven by calculating a trace gas wind rose. Such a wind rose uses the arithmetic mean of a trace gas concentration for each wind direction sector, a trace gas wind rose can be calculated. Based on this it is possible to display an elevated trace gas concentration for an individual wind direction and it could be mapped to a potential emission sources (Henninger, 2005).

As it is displayed in figure 12 the wind rose indicates an air flow coming from the street, shifting in a small corridor of wind direction between east and south-east respectively, transporting a load of up to 80 µg m-3 of PM10, passing the entrance of the school and reaching the schoolyard later.

5 CONCLUSION

Among others, a steadily increasing individual traffic load by the parents of elementary school pupils could be made responsible for a local degradation of urban air quality within the urban canopy layer. The daily "battle" for the best parking space in front of the school often leads to obvious dangerous situations. However, it could be shown that the traffic peaks of a school day around the school ground in the morning and early afternoon hours did not only pose a physical danger to the pupils, but also present a hidden and therefore not noticed air pollution problem caused by the emission of the vehicles. With the aid of the project "Endangerments on schools" it was possible to show, using the example of the elementary school location of the "Pestalozzi School" in the south-west of the urban area of Kaiserslautern, Germany, that a high volume of traffic is not only directly, but also indirectly able to affect children. Ultimately, the project results should be used to sensitize the population to ensure that for each elementary school in the city of Kaiserslautern an individually created route-to-school-plan exists, which allows the pupils a safe and fast way to school and reaching it, of course, without a vehicle as well.

6 REFERENCES

BROWN, R., GILLESPIE, T.: Mircoclimatic Landscape Design: Creating Thermal Comfort and Energy Efficiency, New York, 1995.
BRUSE, M., FLEER, H.: Simulating surface-plant-air interactions inside urban environments with a three dimensional numerical model. In: Environmental Modelling and Software, Vol. 13. No. 3-4, pp. 373-384, 1998.
CANTON, M.A., CORTEGOSO, J.L., ROSA, C.: Solar permeability of urban trees in cities of western Argentina. In: Energy and Buildings, Vol. 20, No. 3, pp. 219-230, 1994.
ERELL, E., PEARLMUTTER, D., WILLIAMSON, T.: Urban Microclimate – Designing the spaces between buildings. London, 2011.
GAL, T., RZEPA, M., GROMEK, B., UNGER, J.: Comparison between Sky View Factor values computed by two different methods in an urban environment. In: Acta Climatologica et Chronologica, Vol. 40-41, pp. 17-26, Szeged, 2007.
GROMKE, C., RUCK, B.: On the impact of trees on dispersion processes of traffic emissions in street canyons. In: Boundary Layer Meteorology, Vol. 131, No. 1, pp. 19-34, 2009.
HENNINGER, S.: Analyse der atmosphärischen CO2-Konzentrationen am Beispiel der Stadt Essen, Hohenwarsleben, 2005.
HENNINGER, S.: A mobile measuring methodology to determine near surface carbon dioxide within urban areas. In: Air Quality – Models and Applications, pp. 173-194, 2011.
HENNINGER, S.: Biogenic Isoprene and Its Impacts on Human Health in Dependence on Meteorological Conditions. In: Journal of Environmental Protection, Vol. 3, pp. 1206-1212, 2012.
HOTCHKISS, R., HARLOW, F.: Air pollution Transport in Street Conayons. In: EPA-R4-73-029, Washington, 1973.
SOUZA, L.C.L., RODRIGUES, D.S., MENDES, J.F.G.: Sky view factors estimation using a 3 D-GIS extension. In: Proceedings of the Eight International IBPSA Conference, 11.-14. August, Eindhoven, Netherlands, 2003.
TAHA, H., DOUGLAS, S., HANEY, J.: Mesoscale meteorological and air quality impacts of increased urban albedo and vegetation. In: Energy and Buildings, Vol. 25, No. 2, pp. 169-177, 1997
YAMARITINO, R.J., WIEGAND, G.: Development and evaluation of simple models for the flow, turbulence and pollutant concentration fields within an urban street canyon. In: Atmospheric Environment, Vol. 20, No. 11, pp. 2137-2156, 1986.
www.envi-met.com (access: 27.02.2012)

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Environmental Management in the Coastal Urban Area of Alimos

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1 ABSTRACT

The degradation of the quality of the urban environment has a direct impact on the quality of life.This, has led many Member States of the European Union to develop policies for the conservation of natural resources in order to ensure a healthy environment for residents.

The research is referring to the environmental management problems that Alimos faces. Specifically, the research focuses on land use, on the degradation of natural resources and on businesses. Taking into account the EU directives and policies that have been implemented, it attempts an assessment of the current situation.

To conduct the research, a research in situ and a method of personal interviews with the local authorities took place. At the same time, legislations, land uses plans, which have been implemented until now for the regulations of land use and addressing problems, are used.

The research showed that Alimos presents many environmental problems that have degraded the quality of life of its residents. On the other hand, it has the natural resources that are necessary for the economic development and the revitalization of the area. This requires new policies and actions not only on the part of local authorities but also from on behalf of local residents.

2 INTRODUCTION

The twilight of the 21st century finds the majority of human population residing in urban environment. In an environment that has suffered radical and unusual changes and degradation, which necessitates the research that can solve the multiple problems that are resulting. Some of these include poor living conditions as a consequence of unregulated and without schedule building, traffic, pollution, poor and degraded natural areas and other.

The last few years a series of initiatives and actions aiming at solving these issues have been undertaken. The member countries of the European Union such as Greece (EU) were supported in this direction and have made many projects towards the protection of the urban environment.

The present essay is referring to the environmental management problems that the urban municipality of Alimos is facing. It focuses on land use in the building, the degradation of the natural resources and businesses. Taking into account the EU directives and policies so far implemented, it evaluates the current situation in Alimos.

3 CASE STUDIES

3.1 Municipality of Alimos

Alimos is a municipality in the conurbation of the Attica region in Greece. It is located in the southern part of the Attica region and is surrounded by Poseidon Avenue, to the east by Vouliagmeni Avenue. To the north it borders with Paleo Faliro, southwest is limited by Mount Hymettus and to the west is surrounded by the Saronic Gulf (Fig. 1). Alimos covers an area of 7.5 Km.2

According to archaeological findings, the area of Alimos is inhabited since the 23rd century BC and is considered to be the birthplace of the historian Thucydides. Its name comes from the plant alimos (armyrithra) which grew in the area.

The area was recognized as community Kalamakion in 1927 and in 1968 as Municipality Alimos. Initially Alimos was full of pasture land and later, especially the period 40-70, it turned into a residential area. At first cottages were built and later the first businesses along the roads were developed.

The last decades in the area of Alimos there has been a significant residential development. The reasons that led to this were the search for better quality of life in suburban areas, outside from Athens. Alimos possessed proper quality of life due to the short distance from the city centre, easy road access, extensive waterfront

and recreational facilities. This increase of the population has created the need for more services, leading the area to further development.

Fig.1: Municipality of Alimos

Nowadays, the commercial movement of Alimos concentrates particularly in the major Avenues of Poseidon and Vouliagmeni and all the other major roads running through and in many cases diverse it. In the area there are major lighting shops, furniture shops and of other products, thus, residents of other neighbouring municipalities of Attica come in daily for their purchases (MUNICIPALITY ALIMOS, 2011).

3.2 Economic elements

According to the last officially published element by the Hellenic Statical Authority of Greece, during the period 1971-2001 the employment in Alimos has as follows:

- In the primary sector it presents very low percentages of about 2.32 % – 0.29 %.
- The employment in the secondary sector presented progressive reduction from 34.63 % 1971 reaching 16.06 % the year 2001.
- On the contrary, the employment in the tertiary sector, presented small increase. From 59.57 % 1971 it reached 72.31 % the year 2001.

In the area of Alimos business dexterity is developed, big commercial shops and lots of companies do exist. During the last decades, there was an increase in the number of firms (from 1991 – 2010), in contrast to 2011 where there is a steady number of companies due to the economic crisis experienced by Greece (HSAG, 2011).
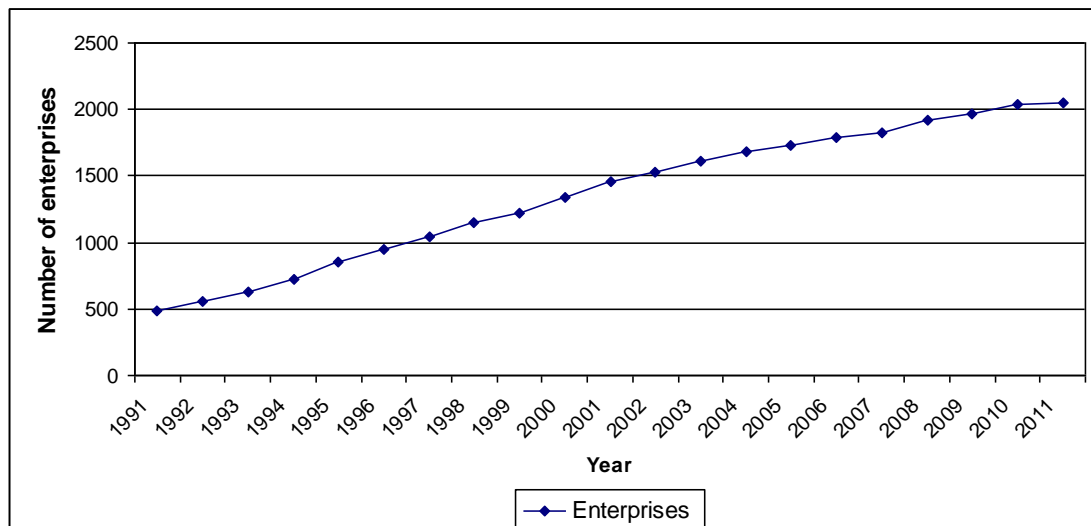
Fig.2: Number of enterprises in the area of Alimos (ICG, 2012).

The largest number of firms mentions in the wholesale and retail trade. Industry commercial agents and representatives follow in vehicles, motorcycles and auto maintenance and vehicle parts trade. The remaining companies, grocery stores, pharmacies, activities associated with agriculture, and other have low rates (INDUSTRIAL CHAMBER OF GREECE, 2012).

3.3 Redevelopment works

In the area of Alimos there have been a significant number of technical interventions so as to upgrade the area most of whom funded by the EU (www.kps.gr). Particularly, in the Theomitoros street, in Hero Matsi and in Panagouli square. In the Ypsilanti street, there has been a reduction of paving, widening of pavements, manufacturing benches with pergolas, placement photovoltaic and creation of green areas and recreation areas as well.

Also, the Armatolon Hill in the small church of St. Nikolaou was reconstructed with areas of recreation and walk, side walks and playground. Other projects that were conducted in the area are:

- Operation of the first kindergarten station at Old Alimos.
- Operation of the third Centre for Elderly Citizens in Alimos.
- Renovation of the Municipal Theatrical Scene "Karolos Koun".
- Manufacture of flood-preventing projects in the intersection Thoykididou and Megistis as well as in other areas of the city.
- Revision of the General Urban Drawing.
- Paving on the garden of Myrtidiotissas church.
- Manufacture of side walk in the Bath area, in the playground of Kotzia street, in the Nicosia road and in the Z. Romigy road at Pani.

3.4 Road works

The road structures that were made in the past few year in Alimos include asphalting the roads Kilkis, Evia, Cypriote Fighters, Stymfalias, Marathonomachon, Dilippoy, Char. Trikoupi. Also in the new program of the Municipality also other asphalting roads are included, which will totally cost 400000 Euros (MUNICIPALITY ALIMOS, 2011).

As far as transport is concerned, the area of Alimos is served by a network of urban buses that includes 28 lines and 107 stations. Also, Alimos is being serviced by two lines of Tram (Syntagma – Boula, and New Faliron – Boula).

3.5 School infrastructures

The area allocates 28 school units (9 nursery schools, 7 primary schools , 11 high schools and 1 Technical professional High School).

3.6 Sporting facilities

As far as athletic infrastructures are concerned, Alimos has two football fields, basketball and volleyball courts, swimming pool and indoor gym. Also, in the limits of the Municipality athletic associations, as Athletic Club of Sports fans Alimos, Union Trachonon Alimos for the basketball, the Athletic Association Gaia (TAEKBONTO), the Naval Group Kalamakiou and the team Trachonon are activated (Football).

3.7 Other services

In Alimos there are department stores such as LIDL, Carrefour, Jambo, banks, consultancy firms, recreation centres mainly on the coastal front, Greek Post Office, Social Insurance Institution, cultural centre, library, cultural clubs, marina, yacht club, shopping centre and other.

3.8 Open spaces

The more important green areas in the area are the Pani hill and the Kythirion hill. Also, the Municipality claims the space of former Greek Airport for the creation of green areas.

3.9 Tourism

In the area of Alimos hotel units of 2 and 4 stars exist. The tourist movement is strengthened from the existence of beaches, the Marina of Alimos and seawater sport.

Municipality of Alimos			
Category	2**	4****	Total
Hotel units	7	1	8
Rooms	257	29	286
Beds	469	54	523

Table 1: Hotel Potential in the area of Alimos (HSAG, 2010)

According to the statistical data at the time period 2005 – 2009, the area shows an increase of number of overnight stays from 2005 up to 2008, this is followed by a small reduction (Fig. 3).
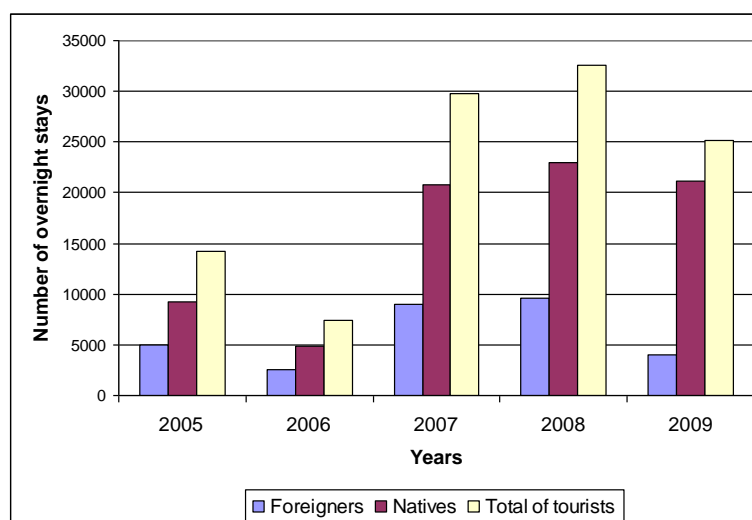
Fig. 3: Number of overnight stays in the area of Alimos from 2005 to 2009 (HSAG, 2010).

3.10 Land Uses

The area of Alimos is an urban area, which is crossed by big road arteries for the service of its residents and big commercial shops which is hosting.

Based on the extent of land uses, the bigger extent is occupied by the building (building square) with percentage 65.56 %, followed by roads on 18.57 %, green area on 8.59 %, the open area-parking on 4.17 %, sport facilities on 1.21 %, cemetery on 0.83 %, beaches on 0.52 %, Tram on 0.39 %, and finally the waters (stream) on 0.06 %.

Municipality of Alimos		
Land uses	Area (square meters.)	%
Building Square	3796481.002	65.56
Green area	497334.05	8.59
Stream	3698.90	0.06
Sport facilities	69797.30	1.21
Open area – parking	241666.66	4.17
Cemetery	47977.50	0.83
Tram	22632.60	0.39
Beaches	30245.78	0.52
Roads	1075129.81	18.57
Total	5790954.00	100.00

Table 2: Land uses in the area of Alimos (Our data processing is based on data from the Geographical Information Systems)

Fig.4: Land uses in the area of Alimos

The total coastal extend is 240 km2. The 170 Km2 belong in the Greek Tourism Organization, 150 km2 cover the installations of the marina and 20 km2 cover the installations of organised beach. The remaining

70km2 belong in the Municipality for public use facilities, sport facilities, green area and recreation areas and other.

3.11 Building activity in the area of Alimos

According to the statistical data of the Hellenic Statistical Authority of Greece, the area presents an increase of the building activity, mainly after 1945 up to 1960. In the following decades a progressive reduction of the building activity is observed. The residential growth as mentioned above was strengthened by the quest of the residents for a better quality of life and access to the sea when the centre of Athens has been burdened.
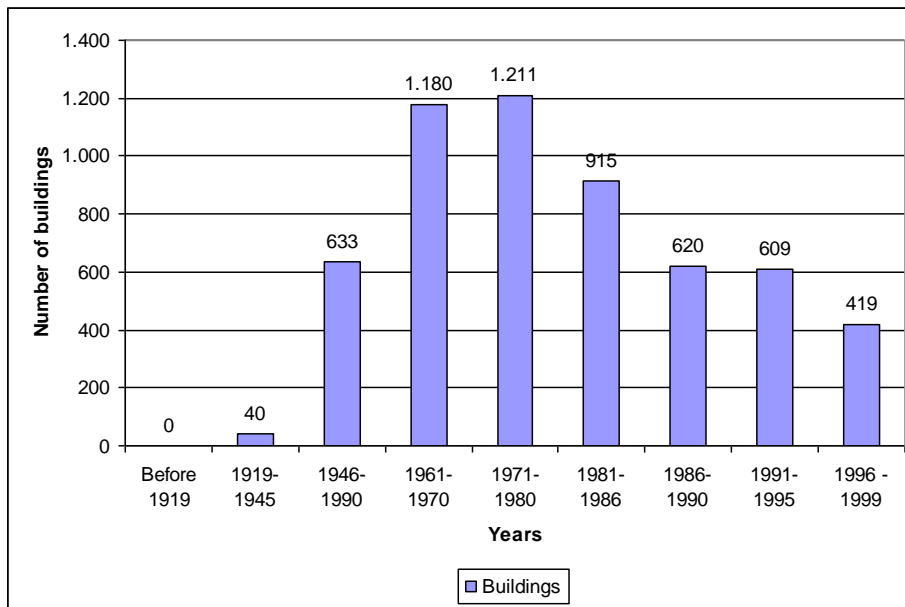
Fig. 5: Building area of Alimos from 1920 to 2000 (HSAG, 2001).
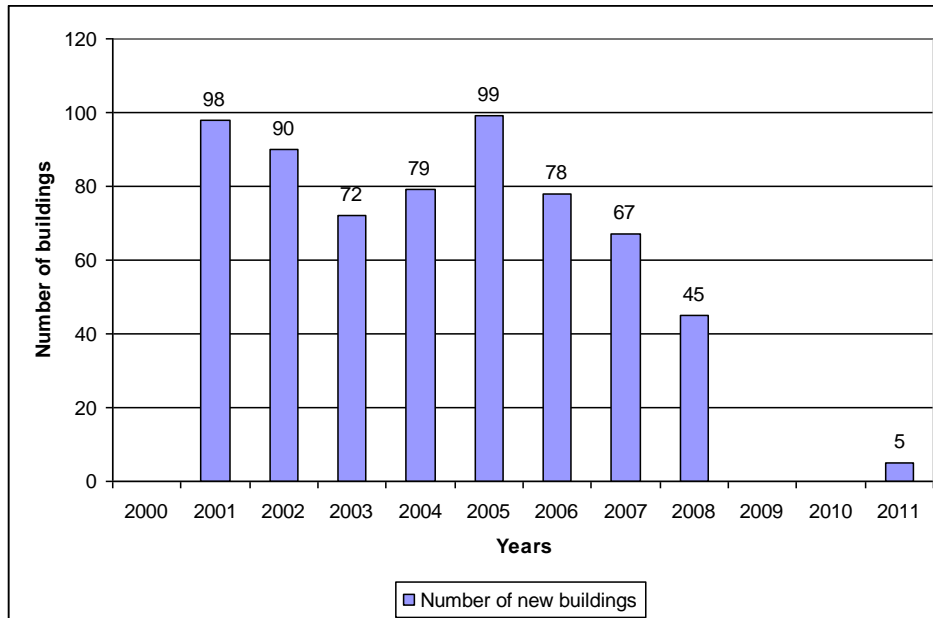
Fig. 6: Number of new buildings in the area of Alimos from 2000 to 2008 (HSAG, 2011).

According to the approval of the General Urban Drawing (GUD) the Municipality of Alimos, the urban organisation plan of the area was made for a population of up to 32000 residents for year 1991 (OJHR, 1987) The extension of the planning of city refers to the areas Trachonon Loutro and in the area of at both sides Alimos in Pani, as well as in the creation of 6 additional urban units.

According to the GUD of Alimos, in all his extent as general use is forecasted the residency and in each urban unit it is foreseen the essential social equipment in communal and beneficial operations for the public.

Also, GUP proposes for the area Trachones, the creation of communal spaces round the monuments and its configuration in archaeological park, area of recreation and sidewalk upon special research.

In 1992 a modification was made from the General Urban Drawing for an extension of its limits (OJHR, 1992)

A/A Neighborhood	Mixed density res/HA (1991)	Medium factor of building
1	70	1.40
2	53	1.10
3	55	1.10
4	118	1.40
5	49	1.10
6	17	0.80

Table 3: Neighborhoods, densities and factor of building in the area of Alimos

The extensions are reported in the increase of general residency, free areas and urban green area. It also sets out the land use and the conditions limiting the building outside town plan area of the Municipality of Alimos.

- Specifically, for the urban planning section 1, the average density altered to 50 per / ha and the average rate of building in 1.2.

- In the 6th urban planning section the use of Industrial Park (BIPA) is included – Craft-based Park (BIOPA) to be purified.

- Use of free urban green areas in the property "Geroulanou" with outdoors installations of recreation, where only the elementary manufactures of configuration to serve the public will be allowed.

4 ENVIRONMENTAL PROBLEMS

The survey is based on a series of personal interviews with officers of the municipality and on a survey in situ in order to identify the promblems.The results showed that the area of Alimos presents various problems. Specifically:

- Alimos is intersected by three major expressway avenues. (Poseidon Avenue, Kalamaki Avenue, Eleftherias Avenue). These roads split the city into 4 sections.

- Increased noise pollution do exist in the area mainly in a small distance from the big road arteries.

- Pollution of the atmosphere is presented from the major car circulation. The fact of the existence of many electric beacons at length of the avenues, increases the emissions of the cars in the atmosphere.

- The operation of the TRAM has not provided solutions in the circulatory problem of the area.

- Alimos faces problems with the rainwater pipes which are not sufficient enough for the collection of rainwater, thereby resulting into flooding phenomena in the coastal part of the area. While in the transmission of wastewater problems are being experienced related to the construction and maintenance of the network.

- The area presents problems when rain waters with the domestic sewages are mixed together.

- The coasts of the area of Alimos apart from B´ alipedo belong in Greek Tourist Real Estates, thus resulting that the Municipality does not have the management of the beach.

- A cemetery does not exist in Alimos, therefore as a result the needs of the Municipality are covered by the neighbouring municipalities.

In the area recycling is up to 20 %. 110 tons/day of litter approximately is being recycled, which are being transported in the central station of the municipality and afterwards in the station of recycling. The non recyclable litter is transported in the space of sanitary burial of litter. The recyclable litter are transported on the vehicles of the company of recycling. Thus, the cost of litter transport is reported in fuel of the vehicles and the cost of workers for the collection of litter. It is marked that economic profit for the municipality from the recycling of litter do not exist.

5 MEASURES TO DEAL WITH THE PROBLEMS

In order to deal with the problems mentioned above, there was a suggestion to make some parts of the coastal avenue underground. This demand has been rejected, on the basic argument that there would be a problem with the collection of rain waters that are responsible for the creation of flooding phenomena. The flooding and water management problems has not been tackled more vigorously due to the high cost of construction projects.

According to the opinion of the Director of Technical Services of the municipality, the management of the coastal department of the area of Alimos, should belong in the Municipality. This however requires fights and claims, because it has to reverse a long lasting situation. As far as the southern department of Alimos is concerned, which belongs to the former Greek National Airport, acooperation with the Kallikratic Municipality of Argyroupoli – Helliniko is needed, so as to make a decision regarding its utilization.

The current programs of the municipality are (Municipality Alimos, 2011a):

- The continuation of the asphalting project, the increase of green areas, the renovation of Karaiskaki Stadium's square at Ano Klamaki,

- The Restoration of the old space"Fantasia"by creating green areas, spaces of recreation and promenades.

- The exploitation of ground water horizon for the irrigation of all the green areas.

- Planting of trees on central traffic islands.

- Completion of circulatory study.

- Restoration of streams (Pikrodafni, St. Nikolaos, St. Dimitrios and Lagkadion).

- Study for the creation of a digital museum in the municipality.

- Integration of the Property Trachones in the General Urban Drawing (GUD) for the protection of its natural environment and archaeological areas that it includes (centre of ancient Municipality of Euonymou). Also, the insertion of the area Troumpari in the GUD so as to increase its contribution in areas is important.

5.1 Advantages

In the advantages of Alimos the application of President Decree 254/2004 (OJHR, 2004) is included, that determines the land uses. Positive is also the fact that in the area arbitrary building does not exist, apart from the overshootings with the semi building spaces. At the same time abandoned open spaces and buildings does not also exist.

5.2 Investments

In the area of Alimos the biggest investments do concern in the projects of sewerage – processing of sewages – flood-preventing, and the projects of road construction are following and then the projects that concern the support of human potential.

Approved Projects	Euro
Works of road construction	3492000
Works of sewerage – treatment of sewages – flood – preventing	4189000
Advisory – Information – Support	100000
Structures of support of human potential	1302978
Infrastructures of society of information in the education	127643
Energies of briefing – Enegies of sensitization	38000
Infrastructures of society of infomation in the public administration	225160
Total	9474781

Table 4: Included work in Alimos, per category (www.kps.gr, up to 5/2/2009).

6 CONCLUTIONS

The area of Alimos has developed due to its good climatic conditions that allocate the small distance from the centre of the capital of Greece, Athens. The construction was rapid in the area, however it still continues

on a smaller intensity at the duration of the last decades. In the area there is small hotel capacity for the hospitality of tourists during the summer months.

Features of the area of Alimos are, the beaches which gather a large number of tourists during the summer months and large commercial shopping malls. Thus, the biggest percentage of employment belongs to the tertiary sector of production.

Negative element of Alimos is that it is being diverted by big road arteries that are running through it (Poseidon Avenue, Kalamaki Avenue and Eleftherias Avenue).

The area faces problems of pollution as:

- Air pollution and noise pollution from road traffic
- Lacking in management of liquid waste and rain waters.
- Problems of land use such as, management of the coastal section, the southern section that belongs in the area of the airport and the lacking of proper space for a cemetery.

Also, Alimos faces problems of connection between the coastal forehead and the remainder urban web and secure access of its residents in the beaches of Alimos.

As far as the green areas are concerned, it has sufficient spaces of green as the Pani hill and Kythirion hill, which however are threatened by the building.

The above recorded current situation and problems faced by Alimos, led us to the formulation of proposals for the improvement of the area.

- The area is in need of projects to deal with the problems caused by heavy traffic, and sewerage and rainwater collection.
- The area needs to increase the revenues of the Municipality from the management of the beach, which belongs to the Greek Tourist Real Estate.
- An awareness of the citizens of Alimos is needed so as to participate more actively in the recycling program aiming to increase the revenues of the municipality and its contribution to the environmental protection.
- Despite the building, Alimos has enough green areas, which can be increased by the appropriate utilization of the open spaces.

Finally, we should emphasize that actions are required for the financial support of the Municipality of Alimos, so as to be able to finance the construction of new works to upgrade and ensure a better quality of life.

7 REFERENCES

HSAG (HELLENIC STATISTICAL AUTHORITY OF GREECE), HSAG (Hellenic Statistical Authority of Greece). Statistical data: Building in the area of Alimos. 2001
HSAG (HELLENIC STATISTICAL AUTHORITY OF GREECE), HSAG (Hellenic Statistical Authority of Greece). Statistical data: tourist movement in Greece.
HSAG (HELLENIC STATISTICAL AUTHORITY OF GREECE), HSAG (Hellenic Statistical Authority of Greece), Statistical data: Building in the area of Alimos. 2011
ICG (INDUSTRIAL CHAMBER OF GREECE) , ICG (Industrial Chamber of Greece), Statistical data for employment in the area of Alimos, 2012.
MUNICIPALITY OF ALIMOS, Municipality of Alimos. The History of Municipality Alimos. Alimos. 2011.
MUNICIPALITY OF ALIMOS, Municipality of Alimos. Program of Municipality 2011-2014, pp. 1-15, Alimos, 2011a.
http://www.alimos.gov.gr/el %2Dgr/Default.aspx
OJHR (OFFICIAL JOURNAL OF THE HELLENIC REPUBLIC), OJHR (OFFICIAL JOURNAL OF THE HELLENIC REPUBLIC) 36/D/28.01.1987) pp. 365-404. Available at: http://www.et.gr/index.php (accessed 31.1.2013).
OJHR (OFFICIAL JOURNAL OF THE HELLENIC REPUBLIC), OJHR (Official Journal of the Hellenic Rebublic), 945/D/21.09.1992. pp. 9773-9780. Available at: http://www.et.gr/index.php (accessed 31.1.2013).
OJHR (OFFICIAL JOURNAL OF THE HELLENIC REPUBLIC), OJHR (Official Journal of the Hellenic Republic). 285/D/5.3.2004, pp. 3303-3357. Available at: http://www.et.gr/index.php (accessed 31.1.2013).
WWW.KPS.GR ,www.kps.gr

Environmental Monitoring and Planning: Joining Forces for Facing Changes

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1 ABSTRACT

Planning is a continuous and dynamic process, which needs to be considered as a part of the whole decision making activity. Although law and regulation fixed procedures, its undetermined duration and the spread in time of its effects make it difficult to manage territorial transformations, in time and space. Moreover, during the implementation process, socioeconomic and environmental changes occur to the context and ask for plan adaptation.

To deal with time-effectivenes, the article focusses on the importance of monitoring since early stages of plannig. To drive the process and modify contents when necessary, monitoring should effectively join planning. Environmental monitoring in particular seems to properly pose the bases for facing this challenge, following 42/01 Directive concerning the environmental effects of certain plans and programmes (Strategic Environmental Assessment Directive).

Changes enacted or simply unwillingly produced by plans or programmes must be kept under control within a common territorial framework. Beyond 42/01 Directive, the article argues integrated monitoring as a frame for testing the sustainability of overall changes induced by decision making at territorial level. It requires the definition of a governance scheme, describing subjects involved, roles and tasks for the implementation phase. The monitoring of a single plan should be considered as a part of the integrated system.

To make integrated monitoring effective, a common knowledge framework is to be defined, at proper territorial level, by public administrations. It must put in common certified data from different sources (context indicators), useful for environmental and territorial descriptions. It must also make metadata available for continuous updating.

Monitoring is a complex process involving planning and environmental authorities, stakeholders and the public. Assuming that participation should follow the whole planning process including the implementation phase, the article explores the potential breakthrough impact of monitoring in empowering participation processes.

Within this theoretical account, the article highlights the potential of integrated monitoring in supporting planning along time and within space(s), in accordance to recent Italian case studies coming from research activity by Poliedra-Politecnico di Milano – in collaboration with the Italian Ministry of Environment, Land and Sea and the Italian Institute for Environmental Protection and Research.

2 RESEARCH BACKGROUND

Poliedra – Politecnico di Milano since 2008 supports the the Italian Institute for Environmental Protection and Research (ISPRA) in a research activity on monitoring in Strategic Environmental Asessment (SEA) funded by the Italian Ministry of Environment Land and Sea. The activities are to be intended as a part of the whole themes covered by the State-Regions-Autonomous Provinces Meeting Table on SEA.

In a first phase, until 2009, a core set of indicators for SEA and a methodology for monitoring plans and programmes have been provided.

In a second phase, from 2010 to 2012, a testing activity of proposed methodology has been put in place in Italian Convergence Regions, through a careful selection of case studies.[1] It led to the definition of "Operational and methodological elements for SEA monitoring".[2]

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[1] Following plans have been selected for testing:
•   Apulia Regional Coastal Plan (safeguard of Apulian coasts. All local plans will have to comply with its contents for a territorial strip of around 300 metres from the coastline)
•   Urban Municipality Plan of Monopoli (Apulia Region)
•   Territorial Province Plan of Caserta (Campania Region)
•   Urban Municipality Plan of Mercato San Severino (Campania Region)

At the same time, the Environment Agencies Network[3] continued working on the updating of the core set of indicators for SEA.

This paper represents a critical overview of research outputs, reflecting in particular on the role of monitoring for strengthening the inter-linkages between planning and environmental assessment.

3 DYNAMICS IN DECISION MAKING: GOVERNING COMPLEXITY

Decision making process can be described as composed by a multiplicity of plans and programmes characterized by procedural autonomy. They show own peculiarities relating to several aspects, which can be summarized as follows:

- Territorial scale and reference sector: every plan involves a certain territory. The same territory can be concerned by several sectorial and territorial planning instruments, such as regional, county and local plans, although through different roles, duties and scales;

- Implementation rules and tools: planning implementation can be direct – through tenders, public announcements, etc – or it can imply subsequent planning levels with specific implementation plans or programmes;

- Times: every plan has its own timeline. Furthermore, its influence and foreseen implementation tools can overpass expected deadlines and delay for an unpredictable time;

- Actors: plans concerning the same territory partially involve common actors and stakeholders, depending on the reference sector of the plan and on its territorial dimension. For this reason, participation activities should be properly structured, and should follow the whole decision making process chain.

To face real time planning and to deal with uncertainty, planning and evaluation activity are to be considered within their comprehensive container, the decision making process. It is dynamic by nature and links plans, policies, programmes and related implementation tools into a territory–tied system. The decision making as a whole deploys effects, both planned and unforeseen, on the territory it relates to.

This assertion partially shifts the attention from the long time often needed by planning and decision making process to become effective. Rather, it leads to concentrate on the territory planning refers to and on its relationship with the governing instruments. In this view external elements affecting concerned territory are to be considered for reaching further decisions.

In such a dynamic interaction, the assessment of territorial effects produced by a single plan or policy seems to be puzzling and particularly demanding.[4] The 42/01 directive introduces the obligation for plans and programmes to monitor the likely significant effects induced on the environment in areas affected by their implementation, even those unwillingly produced.

This sentence, simple and unquestionable in theory, implies several difficulties in practice.

An environmental context is part of a dynamic system. It undergoes continues transformations. It is really difficult to understand which part of such transformations can be ascribed to the implementation of a single plan addressing a certain territory. It is quite demanding even for projects subject to Environmental Impact Assessment, but in this case, depending on the type of works to assess, there can be observed effects or impacts directly produced by their development.

Reflecting on the planning process, this challenge requires even more efforts to be adequately engaged. The research activity carried on in this field underpinned at least three elements to be taken into proper consideration.

- Urban Municipality Plan of Lamezia Terme (Calabria Region)

[2] http://www.va.minambiente.it/monitoraggio/monitoraggiovas/costruzionedelsistemadimonitoraggiovas.aspx
http://www.isprambiente.gov.it/files/via-vas/indicazioni_per_il_monitoraggio_nella_vas_def.pdf

[3] The Italian Institute for Environmental Protection and Research works at National level constantly relating to Regional Agencies for the Environmental Protection within the so-called "Network of Environmental Agencies". They created in 2011 a specific working group on SEA monitoring.

[4] In the article, the word plan will stand for both plans and programmes

The first one looks at the relationship among decision making, planning process and the territory they relate to. Once defined the scale of planning, the whole planning and policy instruments involving that territory should be taken into consideration for monitoring the environmental cumulative effects induced. In this vision, concerned territory is the focus upon which changes shall be continuously monitored and described through proper shared data and indicators.

The second element deals with planning processes involving a certain territory and their assessment. By law, environmental assessment procedures must be referred to a single plan, programme or project. But to proper pose the basis for adequate monitoring of their effects common provisions should be put in place and shared at territorial level.

The third one reflects on the need of defining environmental frames. They should be lens through which look at territorial changes and establish sustainability goals. The research in this sense underpinned the crucial role of sustainability strategies for driving planning and assessment processes. To be effective, they should be participated and shared at proper territorial level.

Synthesizing, territorial and environmental dynamics should be interpreted per sè, delegating to the single planning component the demonstration of its contribution to changes underway. This step could bring to the full application of the strategic spirit of the SEA, unburdening the single planning and assessment process from context based analysis.

Focussing on plan or programme contents, plan contribution to the occurring transformations is to be continously monitored and assessed. Assessment outputs could allow enlightening feasible adjustments during the implementation for reaching territorial and environmental goals.

Environmental assessment, even further when strategic, should become in this frame a picklock through which integrate and critically review the implementation by monitoring its real effects.

3.1 Sustainability in planning: giving substance to evaluation

An integrated approach for framing all decision making elements is required to move towards sustainability. Italian law, by legislative decree 152/2006 and further amendments (framework law on environment), betokens sustainability strategies as common frameworks for environmental assessments at all level.[5]

By fixing their role, the legislator took the trouble to coordinate problems at different institutional levels.

Also, it challenged the formal approach to environmental assessment, overwhelmed by procedure, which is spreading among public entities in charge of the assessment. Furthermore, it represents an attempt of shifting questions arising from the issue of value from the single assessment instrument to a more comprehensive territorial level. In this sense, environmental assessment has a ground for learning by planning theory, where universal paradigms and approaches has been in time put under discussion.

The development of planning theory has not been about the adoption of a central paradigm, but about the gradual emergence of a more contested territory, where overarching theories have failed to convince the academic community that they are as universally relevant as they might claim. (Richardson 2005, 343)

Following this argument, the disappearance of universal approaches should lead to a more context-based inspiration for environmental assessment and planning. Also, it has to engage with competing multiple rationalities and with conflicts arising from the different values they represent and bring into the policy making arena. A tentative and collective ongoing process, led by the so-called adaptive management (Holling 1978). Intended in a wide sense, it allows establishing an iterative territorial learning process enriching knowledge and delivering short term outputs for management.

Therefore, a sustainability strategy shall be territorial, or rather concerning a proper territorial level, to be defined case by case. Its drafting process shall involve formal actors, stakeholders and the public to share a common vision on how to govern that territory and its complexity. The sharing does not exclude conflict. As

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[5] Art. 34, legislative decree 152/2006 and further amendments: "Sustainability strategies are intended to frame environmental assessments foreseen in this decree. Such strategies, coherently defined at different territorial levels, ensure the dissociation between economic growth and its environmental impact. They have to be carried on through citizens' and third sector participation as representatives of different requests. They also guarantee the respect of conditions of ecological stability, biodiversity safeguard and the satisfaction of social needs linked to the development of individuals' potentials as demanding premises for competitiveness and job growth."

an arena where different values are put in place and represented, even though differently explicited, the strategy should negotiate some common goals. As sustainability general objectives have been defined at least at European level, the negotiation process should select the general aim fitting with the local context concerned. In other words, aims matching local issues, seen as both context strength and weaknesses, should be defined (fig. 1).
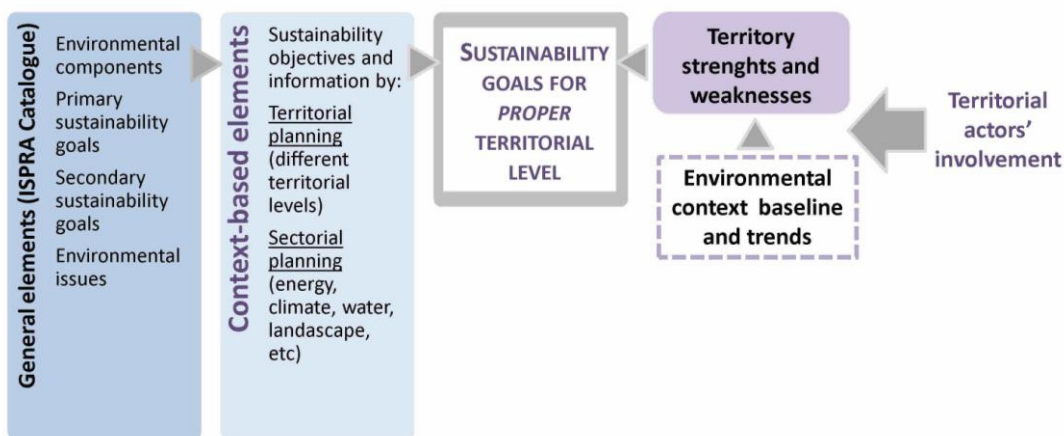
Fig. 1: definition of sustainability goals at territorial level

Once sustainability objectives have been selected, proper data and information shall be provided for monitoring their achievement. This means, at once, monitoring context changes through defining a baseline and the performance of decision makers towards sustainability. This also means thinking about enivronmental assessment as a tool for improving the chance of achievement fixed goals. This latter sentence implies a common challenge for planning and environmental assessment, which would delegate to sustainability strategy the background activity, common to all decision making instruments at territorial level.

Sustainability strategies are in this view the room where defining, coordinating and testing decision making implementation process (through plans, programmes, projects and related environmental assessments). They should make objectives available, as well as indicators and data (historical series, where possible), credible targets, information and communication protocols to be shared by all instruments.

The updating of the baseline, through monitoring of context changes and plans effects, creates a territorial-based knowledge continuously fostered by monitoring activity (fig.2).
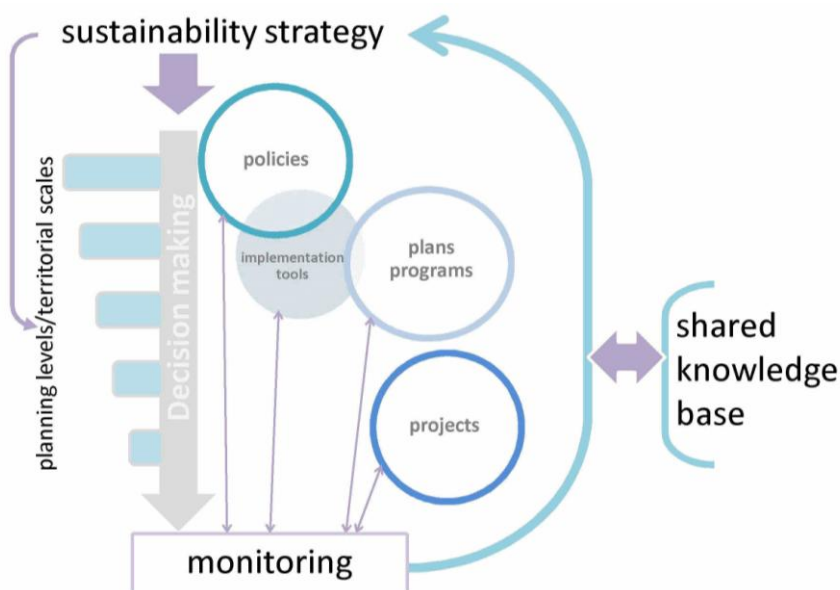
Fig. 2: Sustainability strategies, monitoring and shared knowledge: framing decision making process

The shared knowledge basis aims at supporting planning and environmental assessments, providing a reliable framework upon which starting reasoning about the contribution of the single instrument to common

goals and occurring changes. It also gives the floor for properly assess cumulative effects and to re-orient the strategy on real time. If the territorial vision is put under discussion, then the overall strategy should be revised. Consequently, and in a second phase, the single instrument should acknowledge revisions..

It seems to be describable as a matter of scale of governance: the strategy orients decision making process as a whole on a limited territory, interiorizing some values and conflicts by its participative process, as well as giving priorities and adequate tools for describing and fulfilling them. Disclosing in advance these crucial elements, the single plan or project and their assessment could "limit" to frame their contents under the shared vision, describing how, in qualitative and quantitative meaning, they contribute to its accomplishment.

Even though in Italy the general approach is fixed and shared by legislation, the role of sustainability strategies in practice is very narrow or fragmented.

It seems anyway a fruitful path towards a non-formal integration between planning and assessment. Sharing the background at the root could allow focussing within the planning process on integrating tools and approaches and making them dialogue at the proper territorial scale.

It is a step forward Therivel's decision makers "thinking SEA" (Therivel 2012, 263), as it applies to the sustainability of decision making process as a whole and does not infers the uselessness of environmental assessment procedures. Rather, it implies the role of the territorial arena, to which the sustainability strategy refers to, in marking the opportunity for constructing environmental (and social) subjectivities and qualifying related planning and assessment system.

3.2 Monitoring and knowledge

The knowledge basis set by sustainability strategies is fed by monitoring. Its effectiveness is crucial firstly by the self-reference point of view, as effective monitoring of environmental effects induced on a territory. Furthermore, it is essential for drawing reliable scenarios for forthcoming decision making.

Monitoring and research programs must be designed not just to advance general understanding, but for their relevance to informing potential future decisions. (Parson 2001, 348)

According to Parson, policies (and therefore plans) should be informative. They should, among other goals, design decisions supposed to perturb environmental systems to generate a signal and be sustained for long enough to observe a response. Such observation implies and requires the definition of a monitoring system, intended to support and increase the informativeness of policies.

To follow this argument, institutions need to show the ability of sharing their own, often locked, knowledge, assimilating new knowledges deriving from different actors, both institutional and non-institutional. They also should demonstrate flexibility to respond to such new fragments or forms of knowledge. Finally, they need to assemble contributions coming from all actors into a common knowledge framework. These steps and abilities could allow policies acted by institutions to become informative, as Parson suggests.

To make the system work, the definition of rules and mechanisms for exchanging knowledge can't be underestimated. They should mostly be selected through participative process accompanying the definition of the sustainability strategy.

The knowledge basis deriving from this approach – defined within the research shared knowledge basis – aims at supporting planning and environmental assessment processes. It works for increasing the quality level of assessments and planning, ensuring homogeneity and comparability. At the same time it aims at supporting public institutions in their demanding role of governing complexity on their territory. Far from being the solution, it must be intended as a tool for enriching and giving depth to analyses and evaluations.

The shared knowledge basis is a framework which can guarantee coherence to planning and assessments at different scales, avoiding duplications and waste of public economic resources.

In this view, strategic environmental assessments and related plans can share within the basis context analysis, coherence evaluation, environmental objectives and indicators, etc. Their duty is to adapt such common elements to their own contents and to transmit them to subsequent levels of project and assessment (Environmental Impact Assessment and Appropriate Assessment). The monitoring results coming out from every step of this structure should be able to feed the shared basis, in a process of territorial learning which main aim is to contribute to the spreading and sharing of produced knowledge.

Aware of the demanding challenge proposed, the research experience described in the following pages represents a first step conducted in Italy in this direction, oriented towards a problematic institutional integration attempt, involving national, regional and municipal level.

3.2.1   Framing environmental assessment: the ISPRA Catalogue

Italian framework law on environment establishes a direct involvement of Environment Agencies in monitoring activities.[6] Within the institutional framework set by the Ministry for the Environment, Land and Sea, the Italian Institute for Environmental Protection and Research, supported by Poliedra – Politecnico di Milano, started thinking about the definition of a core set of indicators for SEA.

After a two-year work, a so-called catalogue has been produced.[7] It aims not only at fulfilling the basic institutional request. Indeed it has been shaped for framing environmental assessement in a wider sense, waiting for the approval of national and regional sustainability strategies (Fiorletti 2012).

To define priority objectives, the European Strategy for Sustainable development (European Council 2006) has been analysed in order to extract strategic themes (climate change and clean energy, conservation and management of natural resources, sustainable production and consumption, sustainable transports, public health, cultural resources and landscape).

Following Eurostat scheme, strategic themes have been linked to primary sustainability goals, defined by the integration of EU sustainable strategy with the Italian Action Strategy for Sustainable Development (Ministero dell'Ambiente e della Tutela del Territorio 2002) and other strategic documents.[8]

According to sectorial European documents (Directives or Communications) and to national legislation, the secondary objectives have been defined, directly related to the priority ones, focussing on environmental issues, intended as specific environmental concerns to be properly reported at different territorial levels.

Every environmental issue is described by at least one context indicator. Every indicator is accompanied by a meta-information form, providing a description and details on the availability of data for population and updating among other characteristics.

Criteria have been defined for selecting appropriate indicators. Particularly relevant has been the data availability at national and regional level. Further implementation has been provided at municipal level through the testing activity on the Convergence Regions. The indicator significance towards the related environmental issue has also been ranked, as well as its level of updatability, the availability of historical series, the "scalability" of data. This latter criterion is particularly relevant and demanding at institutional level. It infers the willingness of all institutional actors involved in planning and environmental data production to make their knowledge available for guaranteeing the data covering at different territorial levels.

This still ongoing process led to the definition of 72 context indicators, describing 52 environmental issues. 53 meta-information forms are at the moment available. The updating and enrichment of the Catalogue, both for objectives and indicators, have been introduced into the formal duties of the Environment Agencies Network.

The Catalogue contents are supposed to be adjusted case by case for being used at territorial level, guaranteeing a common frame for comparing trends and situations. It undoubtely is a long and complicated track, but the layout has been traced.

Several Regions participating to the the State, Regions and Autonomous Provinces Meeting Table on SEA did share and acknowledge Catalogue approach and contents. Campania, Apulia, Emilia Romagna, Piemonte and Marche, among the others, did start the construction of their own regional catalogue for environmental

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[6] Art. 18 legislative decree 152/2006 and further amendments:"monitoring is to be carried out by the "Autorità Procedente" (authority in charge of planning activity, A/N) in collaboration with the "Autorità Competente" (environmental authority A/N), involving the Environment Agencies system and the Italian Institute for Environmental Protection and Research". (Every Region in Italy has its own Environment Agency referring to a common institutional network led by the Italian Institute for Environmental Protection and Research, A/N).

[7] Available at http://www.isprambiente.gov.it/site/it-IT/Temi/Valutazione_Ambientale_Strategica_(VAS)/ (no English translation is provided).

[8] the Sixth Environment Action Programme (European Commission 2001), the European Landscape Convention, the European Strategy on Biodiversity (Biodiversity 2020) and the Italian National Strategy on Biodiversity

assessments. In some cases, the definition of such catalogues has been encompassed within european structural funding activities (Cossu e Kohan, 2012).

4 INTEGRATED MONITORING FOR PLANNING

The proposed approach conceives the monitoring of a single plan as part of a comprehensive activity – an integrated monitoring system – falling within the decision process and the sustainability strategy defined at territorial level.

Every plan must be part of an integrated monitoring system aimed at estimating the achievement of sustainability goals, by demonstrating its contribution, both positive or negative.

In other words, monitoring activity of a single plan should enlighten through performance indicators its influence on changes underway, described by the movement of context indicators. Monitoring must accompany the plan all along the implementation process.

The integrated system is also a tool for the plan and for its SEA for framing subsequent monitoring of projects foreseen by EIA and Appropriate Assessment. It simplifies monitoring activities, making available reference objectives, indicators and data, and allowing a resource efficiency review.

From a methodological point of view, the whole monitoring process can be described as a three phases process (Laniado, Cossu, e Vaghi 2009), to be carried out during the plan implementation, whose results are described in monitoring periodical reports (fig.3):

- Analysis: acquiring information, calculating indicators and comparing them to the foreseen trends of environmental sustainability indicators and objectives, in order to verify any existing gap;

- Diagnosis: describing the reasons of the gaps identified (either due to unexpected changes in the external scenario or to problems in the implementation of the plan);

- Therapy: developing proposals for the re-orientation of the plan (concerning objectives, actions, conditions for implementation, timelines, …) in order to make it consistent with sustainability objectives.

To allow monitoring to fully play the proposed role, some basic conditions are required. It must be designed to be a decision support system to be structured and managed through a careful definition of actors, roles, rules and instruments for their involvement (monitoring governance). Moreover, it must follow the plan enactment all along its life cycle, verifying at the same time the effects induced on the territory and the achievement of sustainability goals. Finally, adequate information on monitoring activities shall be provided, in terms of modalities, results and call for remediate actions when necessary.

The design of an integrated monitoring system is based on the definition of two main elements. The first one, highly technical, relates to the definition of indicators. They should not be defined per sè and should not lead to infinite lists of good indicators. Rather, they should be limited in number but accompanied by all information needed for their continuous updating and for the data exchange among different insitutions and territorial levels. Both context indicators and plan indicators should be defined, estimating the direct effects of plan enactment on territory. Context indicators are directly related to those made available from sustainability strategy for concerned territory.

A second element is necessary for monitoring effectiveness and deals with relational sphere. The monitoring governance has to be defined, establishing duties and roles of all actors involved, in addition to mechanisms and rules relating to timelines, resources, reporting, exchange information protocols, participation instruments.

From the technical point of view, the definition of an integrated monitoring system can be developed through some generalizable phases.

In a first step, given the background information by the sustainability frame (objectives and context indicators), the linkage between the execution structure of the plan, its actions and selected sustainability goals is to be drawn. The analysis has to be carried on through the estimation of effects produced on every objective. Every effect should be described to allow recognizing the ones to be kept under observation and to lead to the definition of one or more indicators – process or contribution indicators – to this purpose.

The research underpinned the potential of graphs in supporting the explicitation of different kind of nexus between actions, effects and objectives. It also aided in the translation of such relationship into indicators by representing entity and tipology of the effects to be monitored and by evidencing mutual relations.

It allowed visual returning of complex causal relationships and representation of cumulative effects, both direct and indirect, of more than one action on the same goal (fig. 3).
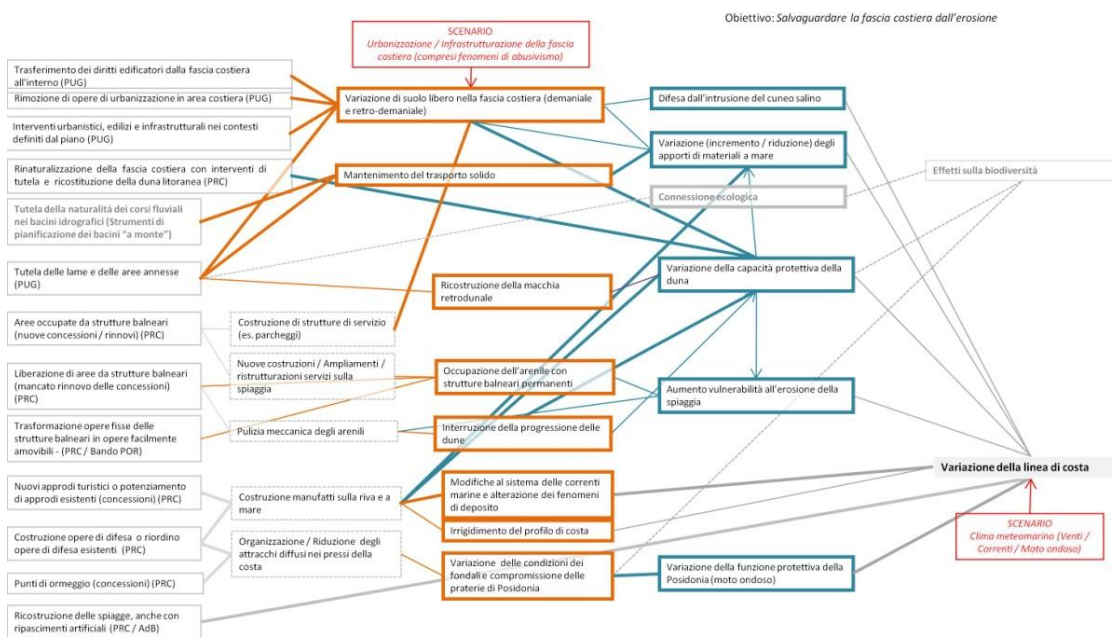
fig.3: graph for to defining performance indicators (process and contribution) in the integrated monitoring system proposed for the Apulia Regional Coastal plan

Similarly to the exposition on environmental effects, graphs have been used for defining indicators. To every action one or more process or contribution indicators have been linked. The linkage between performance indicators and context ones is also explicited.

Scenario elements, such as informal settlements, must be been taken into account for properly assess the potential responsability of all decision making elements in occurring territorial changes.

4.1 Time and space. Exploring and keeping plan implementation under observation

An integrated monitoring system must embody all aspects concerning the effects induced by decision making elements active on a certain territory (spatial dimension) all along the decision making life cycle (temporal dimension). This requirement translates into the need of defining on one hand the territorial dimension of the plan to be monitored to find out all the plans, programmes and projects in force on the same area. On the other hand, it requires the punctual description of phases and implementation tools to properly define expected monitoring outputs by any of them.

The spatial dimension is crucial when working on an integrated system. It selects the elements of decision making process which will enter the system, defining their role and contribution, directly depending on their territorial dimension.

Within the temporal dimension nature and potential of indicators are to be considered. Both process and contribution indicators follow the enactment of the plan. The difference between them relates to the availability of reliable data during the implementation process. Information will usually become more useful and precise with the full accomplishment of the plan. Otherwise, to properly detect unwanted effects it is necessary to identify at an early stage potential negative impacts. For this reason, indicators change during the life cycle of the plan, aknowledging the progressively more detailed available data.

In a first phase, if necessary, process indicators can be used for estimating potential effects by first information available. They often can not be directly linked to the environmental objectives in terms of induced effects, but can act as a proxy. As information gets more reliable, contribution indicators can be defined, describing qualitatively or quantitatively the role of the plan in achieving sustainability goals.

This dynamism in monitoring structure implies the necessity of continuous adjustment of its contents. While defining clear mechanisms since the designing phase, peculiarities in enactment process must be taken into proper account (fig. 4).
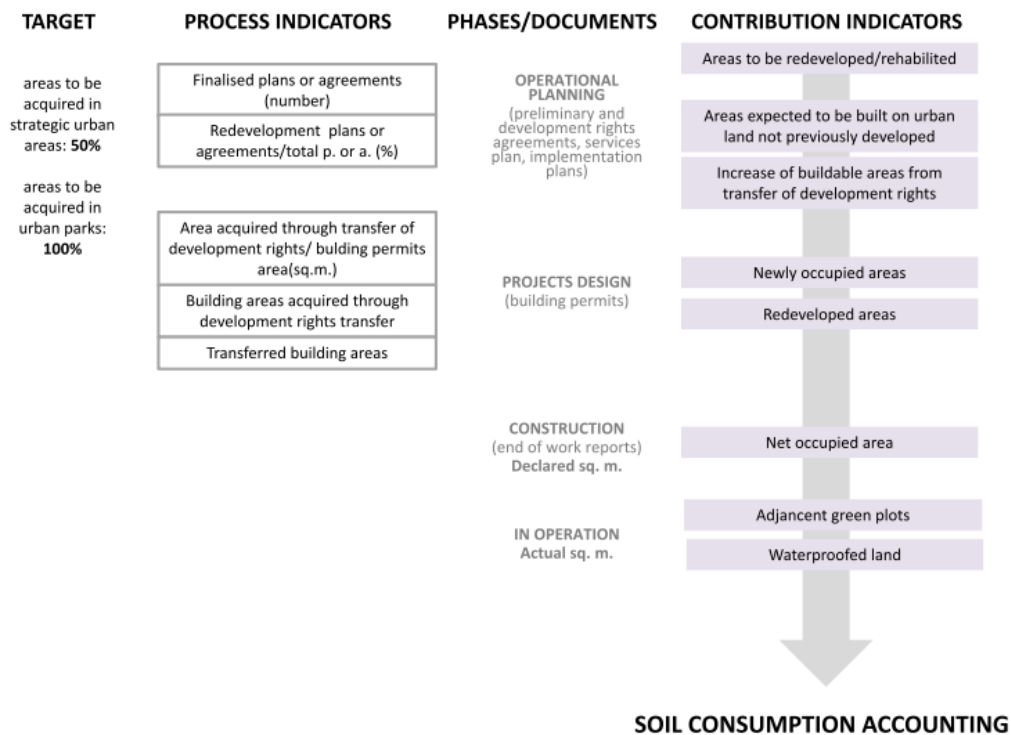
fig.4: integrated monitoring system for the Structural Municipal Plan of Lamezia Terme

4.2 Actors, rules and conditions for monitoring effectiveness: "the governance"

Monitoring should allow institutional and non-institutional actors to express their own opinions and positions about the implementation through guaranteeing adequate environmental information. Active forms of reporting are all to invent in this sense, and crucial.

The belief is that, by implementing such principles of " good governance", SEA may provide a useful meeting point between top-down and bottom-up approaches to sustainable development (Scott 2011, 69)

Technical structure alone can't guarantee monitoring effectiveness. Relational dimension needs to be properly considered to support the encountering of top and bottom and to deploy the whole potential of monitoring in intercepting and properly responding to fast changes.

The management of such a complex system demands the early definition, since the planning phase, of the actors involved and their respective roles; of rules and mechanisms necessary for performing such roles; of human and economic resources available and needed; of phases and timetables of the implementation process with specific time frames for reporting activities; of feasible tools for supporting participation of the public, environmental authorities and stakeholders, foreseeing appropriate paths when viable. Finally, it must enounce the way in which remedial actions should be undertaken when necessary.

This collection of information and decisions gives the opportunity to the technical structure of the system to stand and to avoid its transformation into an elegant proof of concept. Every governance element shall be defined and adjusted case by case.

Research activities showed the problematic nature of the relational dimension. The reluctance of public administrations involved did not allow defining a real governance system. Only few suggestions where sketched out and put before their attention, particularly focussing on potential actors to be involved and on their role. Only in one case, the sensitiveness of planning authorities towards monitoring and environmental issues did allow going beyond formal acceptance. Where awareness of problems, good disposition and consciousness of monitoring potential are provided, ground-breaking spaces open up. The work forward has to unavoidably deal with this dimension.

5   CONCLUSION

To deploy its potential, monitoring requires the clear definition of its governance. It seems to be a wider issue, overpassing planning and assessment borders, while entailing institutional and administrative layouts. In the near future, this seems to be the prior sphere for working, aiming at diffusing a real monitoring culture, as a prodrome of real – time responding planning.

Adaptive management is needed to make it possible. The monitoring culture should teach how to learn by mistakes and inscribe into territorial descriptions performances of plans and programmes. That means recognizing responsibilities and diffusing related information.

It also implies a completely different relationship with the public, transforming the actual approach to participation, seen as an plan-related tool, strictly limited in time and space. The role of sustainability strategies is crucial in this challenge, nor is doubtable the potential role of environmental assessment in supporting transparency and participation to the decisions.

Nevertheless, a forgotten peculiarity still waits for proper consideration. The updating of plans due to their real effects is a clear role ascribed by law to SEA. It opens the path to an overturning of separated logics actually underlying planning and assessment activity.

6   REFERENCES

Cossu M., Kohan B. 2012. «Il Monitoraggio VAS nella Programmazione 2007/2013 (SEA monitoring in EU 2007/2013 programmes)». Annuario 2012 della Rete Ambientale. Roma

European Commission. 2001. «Environment 2010: Our future, Our choice» – The Sixth Environment Action Programme.

European Council. 2006. Review of the EU Sustainable Development Strategy (EU SDS) − Renewed Strategy.

Fiorletti, Patrizia. 2012. «Indicazioni metodologiche e operative per il monitoraggio nella VAS». In , 9–15. Roma: Ministero dell'Ambiente e della Tutela del Territorio e del Mare.

Holling, Crawford Stanley. 1978. Adaptive Environmental Assessment and Management. London: John Wiley & Sons.

Laniado, Eliot, Mara Cossu, e Silvia Vaghi. 2009. «Environmental monitoring of plans and programmes in Strategic Environmental Assessment (SEA): a methodological proposal». In Prague: Eman.

Ministry for Environment, Land and Sea. 2002. «Strategia d'azione ambientale per lo Sviluppo Sostenibile in Italia (Environmental Action Strategy for sustainable development in Italy».

Ministry for Environment, Land and Sea, 2012 «Elementi metodologici e operativi per il monitoraggio VAS (Methodological and operational elements for SEA monitoring)».

Parson, Edward A. 2001. Governing the Environment: Persistent Challenges, Uncertain Innovations. University of Toronto Press.

Richardson, Tim. 2005. «Environmental assessment and planning theory: four short stories about power, multiple rationality, and ethics». Environmental Impact Assessment Review 25 (4): 341−365.

Scott, Caroline. 2011. «Governmentality And Strategic Environmental Assessment: Challenging The Sea/Good Governance Nexus». Journal of Environmental Assessment Policy and Management 13 (01) (Marzo): 67−100. doi:10.1142/S1464333211003791.

Therivel, Riki. 2012. Strategic Environmental Assessment in Action. Routledge.

Evaluation of City Development Strategy as a New Planning Framework with Emphasis on Good Governance in Qazvin City

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1 ABSTRACT

Given this competitive and uncertain environment, developing cities need to be disciplined in achieving targets, utilizing limited financial and human resources in the most effective ways. At the same time, capital available to any given city is highly elastic, flowing to cities that show potential, and have well thought out urban futures. Since decision making and planning processes take relatively long time before becoming effective, CDS (City Development Strategy) is an action plan for when decisions need to be immediate, and it is a plan for equitable growth in cities, developed and sustained through participation, to improve the quality of life for all citizens. An effective CDS process can both attract capital and discipline its use. The CDS activity is both a process and a product which, taken as a comprehensive program, identifies ways of enhancing a city`s competitiveness, livability, management, and financial solvency. It includes a process to engage a wide coalition of local leaders to help strengthen the city`s strategies and plans, reviewing its challenges and opportunities. Since one of the requirements for the preparation and implementation of the CDS program is a desirable urban management system that it lead to achieve CDS goals, this research is going to investigate the CDS program was prepared for Qazvin city, in order to assess the deference of the Qazvin management system with good governance approach- as a basis to develop and implement CDS programs- So by using questionnaires, interviews and reviews of documents, urban management system of Qazvin city will be evaluated in terms of having good governance criteria. The one hand this essay describes the process, characterize and outline of the CDS and the other hands evaluate urban management systems of Qazvin city with requirements of CDS.

2 INTRODUCTION

City Development Strategies (CDS) are an approach to city-based strategic planning. City Development Strategies (CDS) have become part of the lexicon of urban development used by cities, donors, and international agencies since the late 1990s. What is being referred to be not a tightly defined planning methodology but rather an approach to strategic planning at the city (or in some cases regional) level which manifests certain general attributes (ECON Analysis and Centre for Local Government, 2005). "A City Development Strategy…focuses on the city as the unit of analysis with the understanding that cities contribute to national welfare, are an integral and often major part of the national economy, and with assistance in reforms, adjustments and investments, can be made to increase both local and national output" (World Bank Memo).

As a broad approach, CDS has been characterized as the confluence of three 3 organizational approaches:

- The World Bank – with a particular focus on local economic development, poverty alleviation, enhancement of the environment, and reform of city finance and overall management

- UN Habitat-UNDP – promoting city consultation as a means of reforming urban government as part of wider processes of stakeholder participation

- The Japanese Government – contributing experience in city planning which had conventionally been interpreted as spatial or physical rather than economic or social planning (Development Planning Unit, 2002).

3 THE CDS PROCESS

The building blocks in putting together a CDS can be viewed as forming a cycle (fig. 1). In designing the CDS, Cities need to be aware there is no single starting place that has been used for CDSs. Some cities have commenced with comprehensive assessments; others with extensive consultation and participation; some

cities have started a CDS with a consultative process to agree upon city visions. Whatever their preferred starting point, Cities will need to complete all of the building blocks at some stage in preparing their CDS. Following the guidance on the "building blocks" will ensure that Monitoring & Evaluation is incorporated into the process of preparing the CDS This guidance framework provides modules covering each of the five CDS building blocks:

- Assessment
- Consultation and Participation
- Visions, goals and objectives
- Action plan and implementation
- Institutionalization

Fig. 1: The building blocks in the CDS process

3.1 Assessment

The Assessment Phase of preparing a CDS is essentially about asking the question "where are we now"? It is the stage at which a City assesses its current situation, and where its leaders, managers and citizens explore important problems or issues where the city has limited or unreliable baseline information. In some case the initial assessment is broad ranging, covering a series of city development challenges. In other instances, CDS initial assessments focus on quite specific challenges or opportunities where the city lacks accurate baseline data (e.g., the drivers of demographic change, the creation of employment, the state of the environment).

3.2 Consultation & Participation

Community (or "stakeholder") Consultation and Participation is a feature of every CDS process. Consultation and Participation activities are about getting people involved in the strategic planning process – finding out what they know about the city, what different groups contribute to city development, what suggestions/ideas they have for the future development of the city, and what their priorities are for reform. In many cities, the CDS process provides a unique opportunity to engage with key stakeholders to develop a shared vision and set of priorities for city development. Effective consultation and participation can also ensure that the CDS has strong "buy-in", which help to facilitate implementation activities.

3.3 Vision/Goals & Objectives

At the core of the CDS process is the task of determining a vision for the development of the city and a clear set of goals and objectives. Establishing a vision, goals and objectives means asking: "where are we trying to get to?" in the short, medium and long term.

This module focuses on the M & E[1] issues associated with defining the vision, goals and objectives of the CDS. The following modules focus on the M&E issues relevant to the development of more detailed action plans and implementation schedules.

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[1] Monitoring & Evaluation

REAL CORP

3.4 Action Plan/Implementation

The CDS Action Plan typically sets out the range of activities (projects, programs, investments, etc.) that will be required in order to achieve the CDS objectives. Realizing the long-term vision for the city invariably implies a large number of activities, interventions and investments. In many cases it also implies significant institutional reforms. It is therefore important to differentiate between actions in the short, medium and long term. In the short term, action plans should be realistic and take resource and capacity issues into account.

3.5 Institutionalization

A city development strategy is of limited value if it is not 'institutionalized', that is, integrated into the city's routine operating procedures and systems (both existing systems and other new initiatives under development). This includes: other strategic planning initiatives, land use planning, budgets, expenditure and investment plans. These are often mandated under national legislation. If the CDS is to maintain its relevance, these initiatives need to be taken into account when preparing the CDS. Furthermore, the results of the CDS process (priorities, action plans, etc.) need to feed in to the cities routine operating procedures and systems (The Cities Alliance, 2005).

4 SUMMARY OF M&E ISSUES

M&E of the various phases of CDS preparation and implementation will help to ensure that:

- All the necessary building blocks are in place
- Assessments, consultation, formulation of a vision, goals and action plans, and strengthening of institutional arrangements have all been carried out thoroughly and in a manner most likely to lead to successful implementation of the strategy.

M&E need to be considered at and incorporated into all stages of CDS preparation so that stakeholders can agree on the questions that need to be asked as work proceeds, who is to be responsible for asking those questions and analyzing the answers, and how the information collected from M&E will be used to correct any deficiencies in the process (The Cities Alliance, 2005).

5 CDS THEMES

CDSs generally explore a number of issues/themes. While all CDSs will have a focus on reducing poverty, Cities may present this commitment quite differently in their strategies. The emphasis on different themes will vary from city to city, and may change over time. The 'thematic' approach to developing CDS M & E encourages cities to focus on the most important outcomes they expect from the CDS. Following the guidance on the themes will ensure that cities have prepared the basis for M&E for the proposed outcomes of the CDS.

While the objectives of individual CDSs differ there are some common "groups" of themes in CDSs internationally. To illustrate how M&E can be integrated into the themes of a CDS we have used a thematic grouping developed by UN-Habitat for developing urban indicators. The five themes are:

- Shelter
- Social development & poverty reduction
- Environmental management
- Economic development
- Governance

5.1 Shelter

Most City Development Strategies include a focus on improving housing, including reducing the proportion of the population living in slums and informal settlements. This module has been developed to help cities to integrate M & E of shelter issues throughout the CDS process (from initial assessment through to implementation, institutionalization and ongoing review and renewal).

5.2 Social Development & Poverty Reduction

Measures to promote social development and reduce/eradicate poverty are a feature of every City Development Strategy. This theme covers a broad range of range of issues, community aspiration and activities and interventions by local government authorities. The social development and poverty reduction elements of a CDS may include objectives and actions relating to public health, education, demographic change, crime and security issues, conflict resolution, and a range of other issues.

5.3 Environmental Management

Addressing environmental issues and strengthening environmental management is a feature of many City Development Strategies. This includes a range of issues, including many that have a direct bearing on other CDS objectives (e.g., poverty reduction and economic development). These include: water quality & water pollution, waste management, managing public lands, air quality and local air pollution, natural disaster risk management, energy efficiency and climate change, access to public transport, and managing natural and cultural heritage.

5.4 Economic Development

Economic development features in most City Development Strategies. Enhancing and sustaining economic development includes are range of inter-related issues including: generating employment/reducing unemployment, supporting small business and micro enterprises, vocational training, infrastructure development, access to capital, exploiting competitive advantages, and promoting information exchange and partnerships between the private and public sector. Some CDS include wide-ranging assessments of the drivers of economic development, whereas other cities have used the CDS to focus on key trends (e.g., public private partnerships) or sectors of the economy (e.g., manufacturing, tourism).

5.5 Governance

In setting out a vision for future, City Development Strategies invariably address the governance and management of city and various aspects of public sector reform. The overarching themes here often relate to promoting efficiency, transparency and accountability. More specifically, the governance elements of a CDS can encompass a broad range of issues including: strengthening local democracy (local elections, stakeholder consultation and participation), restructuring local government institutions (especially managing decentralization of service delivery), improved budgeting and financial management, tackling corruption, improving government procurement practices and various forms of capacity building and training for local government employees (The Cities Alliance, 2005).

6   OUTPUTS OF A CDS

These are:

- A collective vision and strategy for a city, to act as the foundation for economic growth and introduce strategic thinking into city development, institutional, and financial plans
- Defined priorities and action plans, to promote economic change and assist stakeholders in determining development priorities and resolving issues related to inter-sectoral priorities and investment programming
- Development strategies that promote economic growth and address poverty reduction
- Defined policies that lead to an improved investment climate.

In summary, a CDS should have clearly defined aims and outputs, be based on an agreed program logic, incorporate a performance management and evaluation system, establish effective processes, and focus on appropriate outcomes and implementing mechanisms. The ultimate goal is for the city to create the internal institutional and political capacity to innovate and respond to the rapidly changing economic and social realities of today (www.adb.org/Documents/Books).

7   CONSTITUTION OF A GOOD STRATEGY

Characteristics of effective CDS processes, outputs, and outcomes are:

- The CDS is internally consistent. For example, strategic thrusts follow from the Vision and SWOT.

- A limited number of strategic thrusts are put forward, the product of tough choices. Nothing is of equal importance.

- The strategy is realistic, but challenging.

- The strategy has a high probability of producing results, consistent with the Vision.

- Achievement is measurable, and is measured, using lean, powerful, results oriented indicators.

- Strategic thrusts are cross-cutting, involving a variety of modes and agencies.

- Responsibility for implementation is clearly defined, against definitive targets and timelines.

- Incentives are in place to drive performance. These can take a variety of forms, e.g., financial, awards, and community recognition.

- Flexibility exists within the strategic framework to adapt and change tactics as conditions change, but the Vision normally remains constant over the medium run.

- Priorities reflected in budgeting and investment strategies (Cobbett, 2006).

8 VARIATIONS IN THE CDS PRODUCT

Variations in the CDS product related to:

The Stage of Development of the City: A CDS for the City of London will be different from that for a city characterized by poverty, under- and unemployment, and obsolete and uncompetitive economic activities. Obviously the nature of a CDS will also be function of the specific nature of the economic bases, opportunities and threats characterizing a city.

The Stage of Development of the CDS: Many CDSs start off as a strategy to address a particular sectoral issue or improve city service delivery (which is not really a CDS, but what can be called a proto-CDS), and progress to broader governance and economic issues (which is a CDS). Sector specific strategies can be used (and are in effect so used) to "pilot" the participatory process and allow a city to confidently engage broader and more fundamental developmental issues.

The Scale of the Problem or Size of the City: What is possible in a small city or town may not be attainable in a mega-city where there are many conflicting interests and a range of problematic issues.

Variations in the Driving "Needs" of Development: CDSs for East Asian cities may be focused primarily on economic development and positioning in global markets, whereas many CDSs in Africa and South Asia may focus firstly on poverty alleviation and municipal service delivery (GHK Group of Companies, 2000).

9 CHARACTERISTICS OF GOOD GOVERNANCE

Good governance approach has been emphasized in the process of CDS implementation. Improving urban management is a key issue for controlling urban poverty and managing opportunities that decentralization and globalization have created. Because of this, the main goals of CDS has based on improving urban management system by establishing good governance to response their goals and emphasizing it as pre-requisite for achieving other goals (economic development and poverty reduction). (kamelrahimi, 2012)

Good governance has 8 major characteristics. It is participatory, consensus oriented, accountable, transparent, responsive, effective and efficient, equitable and inclusive, and follows the rule of law. Good governance is responsive to the present and future needs of the organization, exercises prudence in policy-setting and decision-making, and that the best interests of all stakeholders are taken into account.

Rule of Law: Good governance requires fair legal frameworks that are enforced by an impartial regulatory body, for the full protection of stakeholders.

Transparency: Transparency means that information should be provided in easily understandable forms and media; that it should be freely available and directly accessible to those who will be affected by governance policies and practices, as well as the outcomes resulting therefrom; and that any decisions taken and their enforcement are in compliance with established rules and regulations.

Responsiveness: Good governance requires that organizations and their processes are designed to serve the best interests of stakeholders within a reasonable timeframe.

Consensus Oriented: Good governance requires consultation to understand the different interests of stakeholders in order to reach a broad consensus of what is in the best interest of the entire stakeholder group and how this can be achieved in a sustainable and prudent manner.

Equity and Inclusiveness: The organization that provides the opportunity for its stakeholders to maintain, enhance, or generally improve their well-being provides the most compelling message regarding its reason for existence and value to society.

Effectiveness and Efficiency: Good governance means that the processes implemented by the organization to produce favorable results meet the needs of its stakeholders, while making the best use of resources – human, technological, financial, natural and environmental – at its disposal.

Accountability: Accountability is a key tenet of good governance. Who is accountable for what should be documented in policy statements. In general, an organization is accountable to those who will be affected by its decisions or actions as well as the applicable rules of law.

Participation: Participation by both men and women, either directly or through legitimate representatives, is a key cornerstone of good governance. Participation needs to be informed and organized, including freedom of expression and assiduous concern for the best interests of the organization and society in general (UNDP, 1997)

10 URBAN MANAGEMENT SYSTEM IN QAZVIN

City councils establishment in Iran is an important step moving from a centralized system to a decentralized planning system and urban management based on citizen's participation (Momeni et al, 2011). Management system of Qazvin city municipality is based on Council-Mayor model. In this pattern, mayor is elected for 4 years by city council. Also the members of city council are elected by people directly. This municipality is formed of some dependent organizations that consist of transportation, green space, terminals, fire station, waste recycling, urban renewal and etc (Qazvin municipality portal, 2011) . generally, four main functions of municipality are classified in services, reclamation, supervision and social welfare. In generally, the elements related to urban management structure are classified in official and non-official decision taking, controlling and monitoring, private sector, implementation and services (kamelrahimi, 2012) (fig 2).
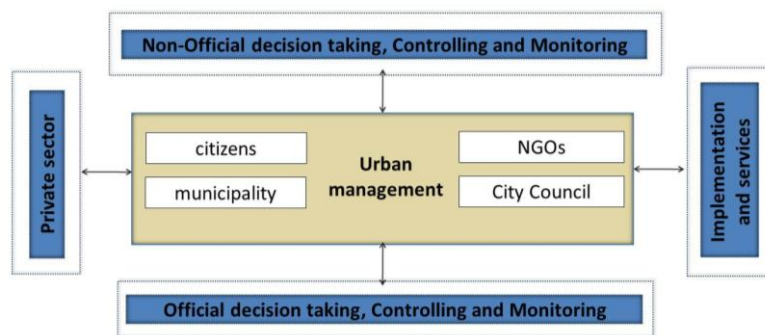
Fig. 2: The relation of elements in urban management of Qazvin

11 THE CDS OF QAZVIN CITY

In the process of Qazvin CDS, first the vision of city development is produced by incorporating peoples and groups opinion that have affected on the plan in national, regional and urban levels related to Qazvin city, then this vision is approved by urban management system. The next step is going to analyze, classify and prioritize the strength, Weakness, threat and Opportunity in the city and produce the final vision and goals from their results. At the final stage, development strategies of Qazvin are established is shown in fig. 3 (Barati, 2009).
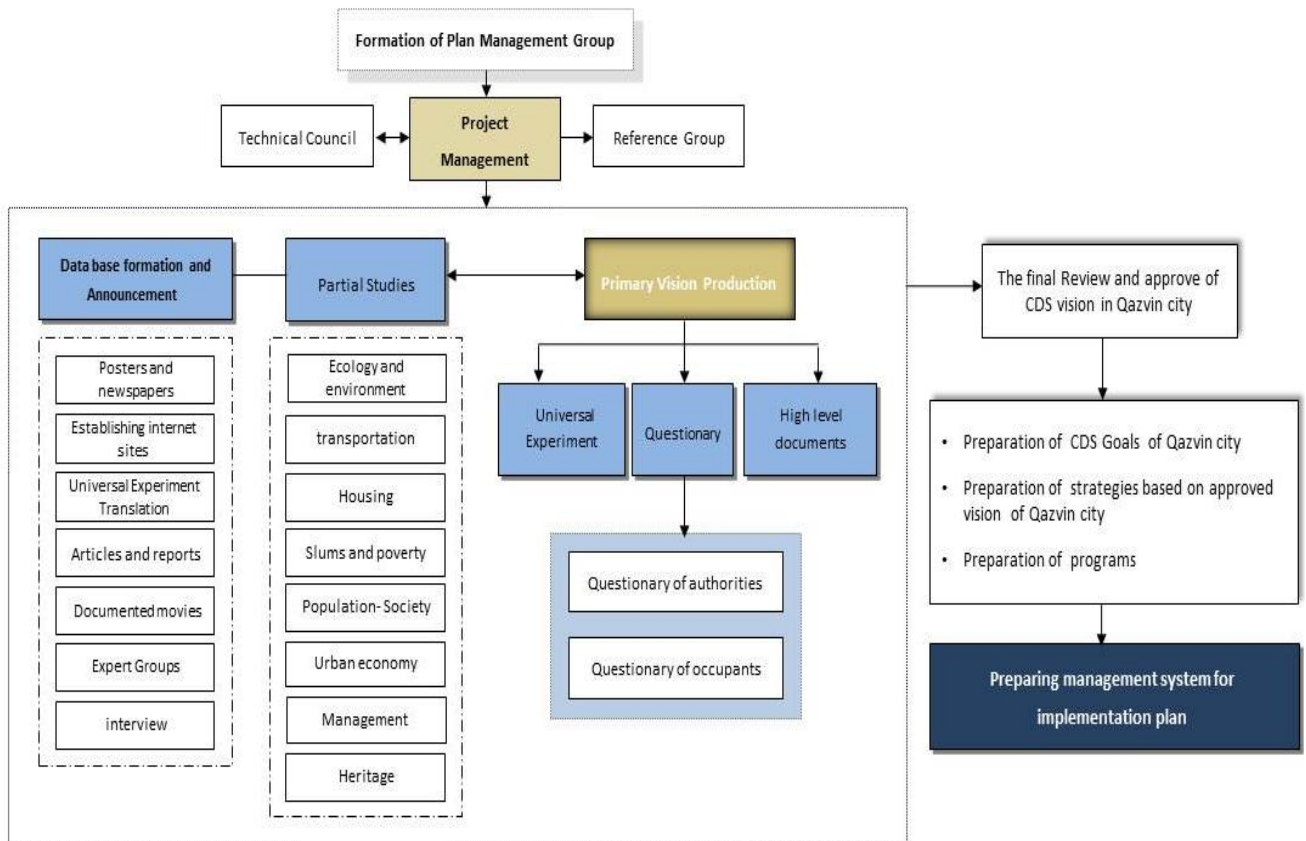
Fig. 3: The process of preparation of Qazvin CDS

12 EVALUATION OF QAZVIN CDS WITH GOOD GOVERNANCE CRITEIA

Analysis of Qazvin management system criterion was led to vision based on difference of urban management structure in status quo and optimal and suitable status of urban good governance- as pre-requisite of implementation of CDS.

In order to evaluate Qazvin CDS, 8 good governance criterions were extracted from theoretical framework studies. Then some sub- criteria based on good governance criterions were defined in order to deign Questionary. 250 questionnaires were filled from occupants and authorities that result of questionnaires analysis were shown as table 1.

Governence criteria	Weight	Sub- criteria	Criteria Score
Rule of law	5	Against the interests of the general and specific	33 %
Participation	7	Role of the private sector (Developers) in urban development plans	26 %
Transparency	7	Free flow of information	30 %
Responsiveness	9	Role of civil society in urban development	31 %
Effectiveness and Efficiency	9	Management, political, social and economic systems	39 %
Accountability	5	Organizational, administrative and implementation resources	37 %
Consensus oriented	7	Civil rights	28 %
Equity and Inclusiveness	5	Urban and social	36 %

Table 1: The rating criteria for each measure based on points derived from completed questionnaire

After assigning weights to each criterion – based on the Delphi method – in the score for each criterion, we can be compared the criterions with each other and by this way, the worst and the best in terms of proximity to urban good governance identified. Based on the results of the questionnaire can be seen that all criterion after applying weight (Table 2), they are accounted a score of less than 40 %. As can be seen in the chart, the

lowest and the highest score were participation and efficiency. So based on finding of the research can be realized the Qazvin management system has many different to City Development Strategy to implement.
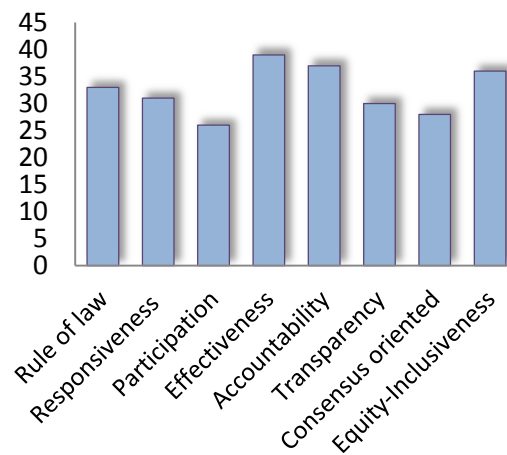
Fig. 4: Compare the criteria of good governance in the Qazvin urban management after applying of the weights of each criterion

13 CONCLUSION

The institutionalization of CDS makes urban management more comprehensive, outward looking, and inclusive of all important segments of the society. CDS will help the municipality establish goals and set priorities, and will assist in linking a long-term view of the city's prospects with short-term actions.

Under the CDS, the city is encouraged to look at workable institutional options under their new autonomy so that they can effectively address constraints to their development. Summarily, a city's institutional action plan where internal policies of the city become enabled and supported by external policies instead of being restrained and hindered by it is sought. Local governments alone cannot turn a city around. They control a miniscule portion of capital available for city building, and often an even smaller percentage of talent in urban innovation. Although important as catalysts to take action, and representatives of the public interest (in theory, at least), local governments must work in partnership with private and civil society interests to change a city's developmental direction.

Evaluating of the level of good governance criterion and urban management system in Qazvin show large differences between the criteria of the optimum levels as a main pre-requisite for the implementation of Qazvin's city development strategy (CDS).These deference is a main problem to implement this plan. No doubt, insist on taking this approach in urban management system in other cities CDS will not success. Because good governance criterion is necessary before adopting CDS approach and conduct to good governance ought to consider for achieving goals and principles of the program.

14 REFERENCES

Barati, N and Sardari, M: CDS of Qazvin to 2032. In: Noavaran parse press, Tehran, 2009.
Cobbett W: City development strategy guidelines: improving city performance. Washington DC, 2006.
Development Planning Unit. Independent Evaluation: An Assessment of the First Three Years. In: University College London, 2002.
ECON Analysis and Centre for Local Government. The Impacts of City Development Strategies. In: University of Technology, Sydney, 2005.
GHK Group of Companies. CDS Taking Stock and Signposting the Way Forward. UK, 2000.
Kamelrahimi, S. Evaluating the Adaptation of City Development Strategy Plan with Iran`s Urban Management Structure with emphasis on urban good governance. In: thesis of M.A, Shahid Beheshti University, Tehran, 2012.
Momeni, M. and Javadian, M. and Shams, H. Application of Neighborhoods Council Associations in Sustainable Urban Management Based on Citizen Participation. In: International Conference on Green Buildings and Sustainable Cities, Procedia Engineering, 2011.
Qazvin municipality portal, 2011.
The Cities Alliance. Guidance Framework: Integrating Monitoring & Evaluation into City Development Strategies, 2005.
UNDP: Governance for Sustainable Human Development. United Nations Development Programme, 1997.
World Bank Memo. City Development Strategies, Purpose and Guidelines, General Terms of Reference, Undated.
www.adb.org/Documents/Books. The City Development Strategy Process.
www.citiesalliance.org

Flooding, Vulnerability and Livelihoods of Low Income Coastal Settlements in Lagos

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1 ABSTRACT

The paper examines livelihoods vulnerability of low income settlements in Lagos, Nigeria to the incidence of flood. It utilizes both primary and secondary data. The primary data includes household survey and qualitative interviews of both household and key informants. While secondary data include literature review of various publications, including government publications. Focusing on individual, household and community vulnerabilities, the paper explores literature on vulnerability, livelihoods and flooding. This paper uses Sustainable Livelihoods Approach as analytical framework to understanding livelihoods vulnerability of two low income settlements in Lagos to the incidence of flooding. The framework enables a holistic appreciation of how household's assets are affected by flood incidence. More specifically impacts of flood events, and factors that intensify the impacts on livelihoods assets of the urban poor are examined. The need to focus on assets arises because assets is the bedrock upon which livelihood is based. Building on the literature and empirical data from Lagos perspective, this paper indicates that the effects of floods on urban poor livelihood are multifaceted but interrelated. It was discovered that though, flood is a natural phenomenon caused mainly by natural events. However the incidence of flood and its associated risks have been exacerbated by human induced activities. Vulnerability of Lagos to flood hazards is a function of various biophysical, topographical, climatic and socio-economic factors. These are manifested in its location (coastal), population density (densely populated and mostly overcrowded), infrastructure provision (often inadequate and poorly maintained), socio-economic characteristics (predominantly poor), and settlements morphology (predominantly unplanned and haphazard). It was further noted that uncoordinated urban expansion into flood prone areas, and increase in the intensity and volume of rain are also contributory factors to incidence of flood hazards in Lagos.

2 INTRODUCTION

Historically, coastal area has traditionally attracted human population as a result of its potential for resources and commerce opportunities. However, it also exposes dwellers to environmental hazards. Costal settlements are particularly vulnerable to climate change-related risks such as sea level rise, flooding among others. Long before now, various studies across the world have suggested that climate change is likely to cause shifts in the global pattern and intensity of rain fall, and thereby, in some regions, increasing the exposure of many people to severe flooding (Vogel, 2000; Few, 2000; Spurgeon et al., 2009). Current global happens as regards flooding have, in fact, come to validate the prediction of these studies (IPCC, 2009).

Cities in developing countries are essentially vulnerable to climate change impacts especially flooding (Vogel, 2000). Flood risks are increasing and worsen the risks already faced by poor and vulnerable people in developing countries (IDS, 2012). Climate change and its associated impacts, particularly flood events have been increasingly felt in the recent years. The vulnerability of cities in developing countries has similarly increased because of the unpredictable and risks associated with flood events. It is evident that climate change has, indeed, increased the risk of flooding, especially, in coastal cities. While coastal cities are generally vulnerable to flood risk, low income settlements and urban poor within such location are more vulnerable because they lack adequate capacity to cope with the associated risks.

With the continuous increase in urban population, flood disasters are increasingly occurring in urban areas, resulting into negative impacts on the livelihoods of the urban poor (Alain et.al., 2008). As noted by Olorunfemi (2011), flood is one of the most occurrence environmental hazards, globally, causing huge annual losses to urban livelihoods. Urban poor, particularly those in informal settlements, are vulnerable to flood risk because of where they live, and the conditions of their settlements and dwellings. Urban poor are the most likely to live in risk prone areas. The quality of their housing is the poorest and least resistant to

extreme weather events. They also lack the resources, and often the information to respond in ways to mitigate their increasing vulnerabilities and associated losses (Feiden, 2011: 1)

Globally, the number of people killed or adversely affected and the number of livelihood damaged by floods have been on the increase (Olorunfemi, 2011). A large proportion of these impacts are felt, mostly, in urban areas of low and middle-income countries. For instance in Nigeria between 1983 and 2009 as indicated in EMDAT disaster database cited in Olorunfemi (2011) over three million people in selected urban areas in Nigeria, Lagos inclusive, were affected by floods.

The effect of climate change-related risks, particularly flood, are already manifesting in Lagos. In the past few years almost every part of Lagos has experienced, and has been affected by flood incidence. However, low income settlements are disproportionally affected by the incidence of flooding due to their multiple forms of vulnerability and multiple sources of deprivation. This paper therefore, through the lens of sustainable livelihood framework, examines how livelihoods of the urban poor in Lagos, Nigeria are affected by flood events and what compound their vulnerability to these events. To achieve these, two low income and flood prone areas in Lagos, Ajegunle and Aboru in Kosofe and Alimosho local govenement areas respectively, were used as case studies

3 LITERATURE REVIEW AND CONCEPTUAL ISSUES

3.1 Understanding Vulnerability

Globally, vulnerability is receiving increasing attention, although little consensus exists about its meaning and usage (Brooks, 2003; Fussel, 2007; Adger, 1999). The concept of vulnerability emerged from the dominant approaches to natural disasters in the 1960s, which focused mainly on investigating hazards as the causes of disasters (Schilderman, et.al., 2004: 415). Ever since then, the concept has been applied in various disciplines, and has been conceptualised from different perspectives depending on the disciplines where it is applied, the authors and the focus of the authors' application. Though, it is not the focus of this paper to engaging with review of these numerous conceptualisations. However, it briefly draws on three perspectives-biophysical, social and integrated approaches in explaining and understanding vulnerability. Thereafter, in the methodology and analytical framework, and analysis sections, it focuses on livelihoods perspectives in understanding the effects of, and vulnerability of urban poor to, within the context of Lagos, floods' events.

Biophysical definition of vulnerability, rooted in risk-hazard approach is widely applied in the field of disasters. It is particularly used in assessing the magnitude of damage experienced by a physical system or unit of a system as a result of an exposure to hazards (Burton et al., 1978; Kates, 1985; Brooks, 2003; Jones and Boer, 2003; Allen, 2003). From social perspective, vulnerability is rooted in political economy, and it is widely applied in poverty and development studies. According to Adger and Kelly (1999: 253), vulnerability is „the state of individuals, of groups, of communities defined in terms of their ability to cope with and adapt to any external stress placed on their livelihoods and well-being". This approach is particularly concerned with how the socio-economic and institutional characteristics of individuals or communities expose them to risks resulting from climate change hazards. Hence, it holds that vulnerability is largely associated with the peculiar characteristics of the society, as defined by social and economic classes, poverty, inequality, exclusion, gender, age and access to resources.

An integrated approach however, adopts a multidisciplinary approach by combining biophysical and social approaches to explaining vulnerability. Based on this approach, Cutter (1993) defines vulnerability as „the likelihood that an individual or group will be exposed to and adversely affected by a hazard. It is the interaction of the hazards of place with the social profile of communities." In the context of climate change, IPCC (2001: 995) defines vulnerability as the extent to which a natural or social system is susceptible to sustaining damage from climate change. Also UNDP (2004) refers to vulnerability as „a human condition or process resulting from physical, social, economic, and environmental factors which determine the likelihood and scale of damage from the impact of a given hazard"

Vulnerability can be expressed as the degree of loss resulting from interactions between occurrence of a natural phenomenon and individuals or communities characteristics (Jha et al., 2012: 175). Turner II. et al. (2003: 8074) hold similar view that vulnerability is the degree to which a system, subsystem, or system component is likely to experience harm due to exposure to hazards, either perturbations or stresses". The

degree of anticipated or experienced damaged is however, a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity (IPCC, 2001: 995).

As noted by Sherbinin et al. (2007) vulnerability is generally identified in terms of three elements: i) system exposure to crises, stresses and shocks; ii) inadequate system capacity to cope; and iii) consequences and attendant risks of slow system recovery. This understanding according to Roy et al. (2012: 11-12) suggests that most vulnerable people or locations are those with most exposure and sensitivity to stresses and with weakest capacity to respond and recover, as a result of factors governing their local and wider contexts. In the context of increased hazards and livelihoods vulnerability, as noted by Wisner et al. (2004: 12) vulnerable groups are those who find it most difficult to reconstruct livelihoods following disaster, and this in turn makes them more vulnerable to the effects of subsequent hazard events.

From which ever perspectives vulnerability is defined or understood, the common thing is that it poses a major threat to physical, social and economic development of individual and community at large, particularly, those groups identified as vulnerable. In the light of this, poor people are especially vulnerable to incidence of climate change hazards, including flooding, because they have few resources, and thus, have limited capability to cope with such hazards whenever they occur.

3.2 Vulnerability, Floods and Livelihoods

For the first time in human history, in 2008, half of the world's population lived in urban areas (UN-HABITAT 2008). UN-Habitat and World Bank projections have it that by years 2030 and 2050 about 60 and 70 percent, respectively, of the world's population will live in urban areas and they will have to cope with challenges of climate change and its associated effects (UN-HABITAT, 2008; WDR, 2010). Flood hazard is one of such effects.

Vulnerability to flood events is increasingly becoming rampant globally. However, rapidly growing low income settlements essentially in developing countries are particularly vulnerable to impacts of flooding (Jha, Bloch and Lamond, 2012). Spatial, physical, and socio-economic characteristics of these settlements, particularly in developing countries, which are characterised by precarious conditions, unprecedented urbanisation and population increase, make them more vulnerable to incidence of flood risks.

Various researches Parnell et al. (2007); WGCCD (2009); WDR (2010) have estimated that, in developing countries, about 95 percent of urban population growth and urban expansion takes place in informal settlements with low-quality and overcrowded housing, and inadequate urban facilities and services.Therefore, from developing countries experence, urbanisation, in a way, is associated with unprecedented urban spatial expansion, involving settlements growing outwards beyond their normal boundaries, including flood prone areas, in order to accommodate population increases. Generally, as noted by Satterthwaite (2011), urban expansion alters the natural landscape, land uses and land cover, and water flows. Uncoordinated and unplanned high level urban expansion into flood plains and water catchment areas, typical of informal settlements in developing countries, are increasing the incidence of flood risks. Wheater and Evans (2009) equally agreed that land use change and unprecedented urbanisation are contributory factors to floods' incidence. They noted that:

The changes in land use associated with urbanization affect soil conditions and the nature of run-off in an area. Increased development of impermeable surfaces leads to enhanced overland flow and reduced infiltration. It also affects the natural storage of water and causes modification of run–off streams (Wheater and Evans 2009)

The increase in urban population resulting from both natural population increase and rural-urban migration has led to an increase demand for land, housing and other resources which are needed for sustainable human living (Olima, 1997). Unfortunately, government at all levels in many developing countries lack capacity to adequately meet these demands. The urban poor generally lack or have limited access to service land, social housing and other livelihood assets. The outcome of the inability of government to cater for the needs of, ever increasing, urban population have led citizens to build illegally or informally, and live under very poor environmental, social and housing conditions (UNECE, 2009).

Interaction between high demand and limited supply of service land and housing to accommodate the continuous urban population increase has, obviously, resulted into uncoordinated and uncontrolled urban expansion especially within the periphery areas of cities in developing countries. The outcome of this

process is that cities are now expanding from core areas unto marginal areas, ecologically fragile sites and hazardous locations such as flood plain, swampy areas, and canal setbacks, where they are expose to flood risks (Satterthwaite, 2006). People, especially urban poor, usually choose such locations because they are mainly the only places affordable to them in the absence of service land. These locations naturally expose the dwellers to various environmental hazards, which threaten their health, well-being and overall livelihoods (IIED, 2001).

In addition to urbanisation and uncoordinated urban expansion to flood prone areas, vulnerability to flood hazards is particularly intensified where combinations of inadequate and poorly maintained infrastructure, low-quality housing and low capability of the urban poor intertwine (World Bank, 2008). The fact that urban poor are typically accommodated and work in informal settlements, often densely populated, with poor construction materials and poorly constructed housing, and lack of access to adequate urban infrastructure facilities make them and their livelihoods more vulnerable to flood risks.

Though flood is a natural phenomenon caused mainly by natural events. However the incidence of floods and its associated risks have been exacerbated by human induced activities. Human activities such as deforestation, wetland reclamation, greenhouse gas emission, poor planning, improper development, and poorly-designed infrastructure particularly, drainage systems are capable of increasing flood events and vulnerability to the associated risks. What is important to note here is that vulnerability to flood events is caused by both natural and human induced activities. While flood originates from natural activities, human induced activities increase its potential to causing damage to physical, natural, and socio-economic environments.

4   METHODOLOGY AND ANALTICAL FRAMEWORK

This paper uses Sustainable Livelihoods Approach as analytical framework to understanding livelihood vulnerability of selected low income settlements in Lagos to the incidence of flooding. More specifically impacts of flood events and factors that intensify the impacts on livelihoods assets of the urban poor are examined. The need to focus on assets arises because assets, on the one hand, are the bedrocks upon which livelihoods are based and, on the other hand, assets define people's capabilities to cope with vulnerabilities (Sen, 1997; Bebbington, 1999). There is a close relationship between vulnerability and assets. The more assets people have, the less vulnerable they generally are; the greater the erosion of people's assets, the greater their vulnerability (Moser and Satterthwaite, 2008: 7). Within livelihoods context, asset is generally defined as stock of natural, physical, human, financial and social capitals, which are used directly or indirectly by individuals and households to making livelihoods. As noted by (Moser and Satterthwaite, 2008) these assets can be acquired, developed, improved and transferred across generations. They can also generate flows or consumption, as well as additional stock (Ford Foundation 2004: 9).

The Sustainable Livelihoods Approach (SLA) provides a framework for research which summarises many of the concepts related to the livelihood assets and livelihood vulnerability (Chamber, 1989; Chambers and Conway, 1992; Chamber, 1995; Carney et al., 1999; Lyons and Snoxell, 2005; Kantor and Nair, 2005). This framework enables a broad range of quantitative and qualitative research design and data collection methods. Consequently, for the purpose of this research, both quantitative and qualitative data collection methods, which included household survey, households' in-depth interview, key informants' interviews, direct observation and published documents, were used. The study was undertaken in Lagos. Specifically, two (2) low income settlements (Ajegunle in Kosofe local government area and Aboru in Alimosho local government area) with high incidence of floods, as identified by Lagos state ministry of Environment, were selected for further empirical study. In each settlement, a total of 100 questionnaires were randomly administered to households' heads giving a ground total of 200 questionnaires in both settlements. In addition, a total of 10 interviews including both households and key informants interviews were conducted in both settlements. The use of multiple methods, no doubt, provided valuable information on vulnerability and impacts of floods on livelihoods of the urban poor in Lagos.

5   VULNERABILITY OF LAGOS TO FLOOD HAZARDS

Vulnerability of Lagos to flood hazards is a function of various biophysical, topographical, climatic and socio-economic factors. These are manifested in its location (coastal), population density (densely populated and mostly overcrowded), infrastructure provision (often inadequate and poorly maintained), socio-economic

characteristics (predominantly poor), and settlements morphology (predominantly unplanned and haphazard).

Lagos, the largest conurbation in Nigeria and one of the largest in sub-Saharan Africa is located in the rain forest of Nigerian coast which lies within latitudes 6°23'N and 6°41'N and longitudes 2°42'E and 3°42E. Lagos state covers an area of 3,577.28 km², the smallest but the most populated urban agglomeration in Nigeria. Lagos has a population density of 4,906.78 persons per square kilometre. However, the situation is worse within Lagos metropolis, which accommodates most of the low income settlements and urban slum. Lagos metropolis is the continuous urbanised area of Lagos state, which consists of 16 local government areas out of the 20 local government areas of Lagos. It covers about 37 % of Lagos state landmass and accommodates about 80 % of the population with a population density of about 1,308 per square kilometre, but in heavily built-up areas the average population density is as high as 20,000 per square kilometre. The occupancy ratio is 8 – 10 persons per room with 72.5 % of households occupying one-room apartment.

Lagos environment is characterized as coastal with wetlands, sandy barrier islands and beaches. Water is the most significant topographical feature in Lagos State. Water bodies (sea, lagoons, rivers, creeks and swamps) cover about 40 % of the total landmass. Most of the land areas in Lagos State have an elevation of less than 15m above sea level. The land surface generally slopes gently downwards from north to south, and is particularly low-lying and flat in Victoria Island, Lagos Island, Ikoyi, and Apapa. The elevation of the built up area of the city ranges between 1m in the coastal areas to about 75 meters above sea level at its northern fringes. The climate in Lagos is tropical with two main seasons- the rainy and dry seasons, which usually lasts from April to October and November to March respectively. Floods usually occur during the rainy season, which are aggravated by the poor surface drainage systems of the coastal lowlands.

In addition to the physical and topographical feature of Lagos, change in global and local climatic factors have also been attributed to the increased incidence of flood hazards experienced across Lagos in the recent years. Long before now, various studies across the world have predicted that climate change is likely to cause shifts in the global pattern and intensity of rain fall as well as sea level rise. Lagos is not immune against these predictions. It is, in fact, predicted that it will have its own share of the associated impacts. Based on Nigerian Meteorological agency projections (NIMET) and the Intergovernmental Panel on Climate Change (IPCC), recent research findings relating to climate change induced hazards, particularly sea level rise and flooding, predict that Lagos is likely to be one of the most negatively impacted conurbations in Nigeria as a result of its low lying and costal location with a high concentration of population and economic activities (Spurgeon et al., 2009). Evidences have clearly shown that the frequency and severity of floods disasters in Nigeria generally and particularly in Lagos over the years have increased considerably. The current increase in flood incidence and its associated risks, experienced across Lagos, have been attributed to the global sea level rise and increase in the intensity and volume of local rainfall. For instance, in early 2011, the Nigeria Institute for Oceanography and Marine predicted a significant increase in the volume of rain especially in the Southern part of the country (Nigeria) where Lagos is located. The volume of rain fall was predicted to be between of 1200 and 2700mm as against 300 and 1100mm in the North.

Tunji Bello, Lagos commissioner for environment in his comment as reported by Vanguard new paper on July 15, 2011 states:

The intensity of rain has increased and the water level has risen incredibly so that the channels that are meant to discharge water from the roads and drainages are completely locked because of the high tide and because both the Atlantic Ocean and Lagoon that receive water from the channels have risen more than usual.

In the past few years, flooding has become a common feature in Lagos. Recent flood occurrences of years 2010, 2011 and 2012 point to the fact that the situation is getting worse. Flooding has, indeed, been identified as one of the major obstacles to sustainable development in Lagos especially among urban poor (Ministry of Economic Planning and Budget, 2004). It is paradoxical, as noted by Adelekan (2010: 440), in the last ten years that the frequency of rain days per annum has reduced in Lagos whereas the severity of rainstorms has increased and therefore resulting into more flood hazards with devastating effects on the residents' livelihoods, particularly the low income. It is projected that there will be a further increase in rain intensity which will result into more storm water. This is expected to have further implications on livelihoods sustainability of the urban poor.

Furthermore, as exemplified by Lagos situation, a host of other factors have been attributed to the continuous vulnerability of cities in developing countries to flood hazards. The factors as noted by various researchers Bull-Kamanga et al. (2003); Lavell et al. (2003); Adelekan, (2010) include- unprecedented urbanisation resulting into uncoordinated urban expansion, particularly into flood prone areas; overcrowding; informal land occupation; poor waste management; disruption of natural drainage channels; inadequate infrastructure, particularly drainage system; poor maintenance of the existing infrastructure; poor housing quality; poverty and weak institutional capacity. In actual fact, urban poor are caught within the webs of these multiple factors because they are the most likely group to experience multiple of these factors simultaneously. At this point it is important to emphasised that all these factors- biophysical, topographical, climatic and socio-economic factors combined to exacerbate vulnerability of Lagos' urban poor to flood hazards

6 LIVELIHOODS VULNERABILITY AND IMPACTS OF FLOOD IN LOW INCOME SETTLEMENTS

Flooding has been identified as one of the major natural hazards which disrupt the prosperity, safety, infrastructure, livelihoods and wellbeing of human settlements, particularly in developing countries, and by implication prevents poor households from moving out of poverty (ActionAid 2006. 134). It further noted that flood has multiple effects on livelihoods of the urban poor:

Flooding has enormous effects on the poor people in African cities. It affects people's health through waterborne diseases, damage to food; it destroys income and causes further deterioration of sanitation, increased exposure to disease and temporary reduction of access to health care facilities. Many schools are closed during flood periods and children have their education interrupted. Some people may not be able to get to work for long periods and suffer loss of income and possible losses of jobs. Flooding thus greatly aggravates poverty (ActionAid, 2006: 7)

In understanding urban poor's livelihoods vulnerability to flooding hazards, as relate to the selected low income settlements, the analysis therefore, focuses on the effects of flood on livelihood assets of the respondents. This paper however, indicates that the effects of floods on urban poor livelihood, in Lagos, are multifaceted but interrelated and cover wide range of livelihood activities and assets.The details of the effects are subsequently discussed.

6.1 Physical Vulnerability – Impact on Physical Assets

The most visibly devastating impact of flood is the damage to physical structures. At the community level, the physical vulnerability is manifested in the destruction of basics infrastructure. As noted by Jha et al. (2012: 161) large scale flooding can cause damage to community infrastructure, particularly roads, which are often the major way of accessing flood affected communities. As revealed by this study, effects of flood on physical assets of low income settlements in Lagos is manifested in physical damage to buildings and community infrastructure (both socio-economic and physical infrastructure), total collapse of buildings, damage and loss of households' productive and non-productive assets. Majorly, households' assets damaged by floods as reported by many respondents included: televisions, beds, chairs, radios, clothes, refrigerators, freezers, carpets, generators. Community infrastructures, including roads, electricity poles and drainage as well as public buildings were reportedly damaged by floods. For example, in Ajegunle, the only public secondary school was severely affected by the October 2010 flood incidence. As reported by residents, the flood did not only damage the school's properties but took over the school completely and displaced both the staff and students. The impact led to disruption of academic activities for more than three weeks before the students were eventually relocated to another school in a relatively distance community (Ketu).

Of course, the relocation of the school has effects on both human and financial assets of the residents. Many respondents interviewed complained of the additional burden the relocation has placed on their, already, inadequate income resulting from increase in transportation cost of school children. Attendance and safety of the students were also areas of concerns for parents. Due to delay in transportation and terrible traffic situation they have to contend with, many students resume late. Some parents complained that sometimes they are unable to afford transportation cost. In such situation, the affected students are made to stay at home.

…….*whenever I or my wife cannot afford to give them transport money; we make them sit at home. Though we are all not happy about it but what can we do?*

The current location of the school means that majority of the students have to cross busy expressway (Ikorodu road) twice on daily basis when going to, and coming from school. It was noted by one key informant: 'the community has lost about seven children, which I know off, in the process of crossing the expressway". This equally has implication for students' attendance. For instance, one female respondent, a widow who has a child in junior secondary school one (JSS1) expressed:

"My boy does not attend school any time I do not have enough money or time to take him to school and also to pick him in the afternoon. For now, I cannot allow him to cross that express alone. I cannot even entrust him with anybody.....I do not want him to join his father too soon. He is the only one I have got, he is my future."

Despite these terrible experiences, Up until the end of 2012 when the study was completed, the school premises was still deserted and overgrown with weeds without hope of when it will be rehabilitated. Also as at the time of field survey, it was observed, in both case study settlements, that many of the damaged infrastructures were yet to be replaced or repaired. This observation was equally corroborated by many respondents. As one of the key informants in Ajegunle said:

"The flood that happened in October 2010 attracted many government officials, including president and Lagos state governor. They came to assess the situation... They sympathized with us and promised to help. We have seen more promises that action."

Another resident interviewed in Aboru expressed:

"More than there (3) weeks now, since some electricity poles got damaged by flood, we have not had electricity in my area and up till now nobody is say or doing anything, that I know of, about replacing them."

Though it was noted that before the incidence, power supply was not regular but residents still manage with the irregularity, whenever it is available. But now, they have to cope with the total blackout without the hope of when the power will be restored. No doubt the situation has implications on the income of the residents; particularly those who operate home based enterprise and artisans who rely solely on electricity for means of productions.

6.2 Human Vulnerability – Impacts on Human Assets

Human assets-related impact and vulnerability is characterised by loss of human life and social networks, and ill health and injury. Loss of human life does not only bring psychological and emotional pains to people who lost loved ones but also can lead to economic and financial vulnerability in the case of losing the bread winner of the household, and increase in medical bill of the household. Furthermore, floods could lead to incidence of disease which potentially could lower ability to labour and also reduce individual and household income.

International Institute for Sustainable Development (2003) states that:

[......] health impacts pose a double jeopardy for poor people's livelihoods: the contribution of key productive members of the household is lost and the cost of health care is expensive and time consuming (IISD, 2003: 15).

The above quote is an indication that ill health and injury, on the one hand, lowers human capability to labour, particularly when it affects households' workforce, and hence reduces household income and on the other hand cost of treatment would increase household expenditures. The severity of impact of ill health and injury on household is a function of the extent to which the affected members contribute to the socio-economic functioning of the household (Jha et al., 2012).

As revealed by this study, during flood and immediately after flood incidence which usually last for about five months from May to July, reaching its peak in July with a little break in August and later to pick up between September and October, environmental sanitation is a major problem for the residents, resulting in high rate of diseases. This experience continues for some times, even, after flooding periods. Common diseases experienced during these periods, as indicated by many respondents, include: diarrhoea, malaria, typhoid, cough and cold. About 82 % of the respondents indicated that at least one member of their household has experienced sickness, during the floods, which sometimes disturb them from carrying out their normal activities, including income generating activities. The study also revealed that, during flooding,

there is usually high incidence of disease outbreak among residents. As stated by one respondent who sells local herbs in Ajegunle:

„Any time we experience flood here, there is usually high demand for herbs and treatments associated with water-borne diseases"

High incidence of disease outbreak experienced during flood hazards has been attributed to environmental pollution and increased underground water contamination that usually occur during flooding, as significant proportion of the residents either rely on well, boreholes or water vendors for their main source of water for drinking and domestic use. The situation is further exacerbated by overcrowding, which aids easy spread of communicable diseases.

Disruptions to academic activities were also reported by respondents across the study areas. It was reported that as a result of July, 2011 flood both primary and secondary school students, across the state, were ordered by government to stay away from schools in order to prevent further lost of lives particularly school children. As reported by many respondents, even after the order was over, for weeks, as a result of the magnitude and devastating effects of the flood, some schools remained shut while some remained not conducive for academic activities.

6.3 Financial Vulnerability- Impacts on Financial Assets

Directly and indirectly, flooding can have a range of negative effects on businesses and economic activities. As noted by Ingirige and Wedawatta (2011) theses effects may include damage to premises, equipment and fittings; loss of stock; reduced customer visits and sales. To this end, flooding has been identified as one of the major factors preventing urban dwellers, especially in Africa, from escaping poverty as a result of its effects on the economy as well as damaged to home, livelihoods and infrastructure (ActionAid, 2006). Replacing community damaged infrastructure resulting from flood events, as well as assisting flood victims has financial implications for government. Individuals also bear the financial brunt of their losses during flood hazard. This situation, as noted by Jha et al. (2012) puts additional burden on both government and individuals' budgets, and as well reduces their economic capability to cope with shocks, in turn adding to the already vulnerable situation.

It was observed that, though, before the experience of the recent flood hazards that occurred in Lagos in years 2010, 2011 and 2012, the residents were generally economically vulnerable. Being essentially low income settlements, the majority (71.4 %) of the residents rely on informal economy with irregular and inadequate income, for their daily survival. However, as expreesed by many respodents, their financial conditions were exacerbated by the experience of flood hazards.

It is important to note that, as observed by Jha, Bloch and Lamond (2012), it is particularly difficult to get accurate data to quantifying, in monetary term, the ripple effects of flood events on the economy and impacts on infrastructure. This statement is true for the current study. Though, it was difficult for the residents to value the actual financial loss to flood but as revealed by the respondents, economic cost of their loss is manifested in damage and loss of household properties, and disruption of economic activities. A large proportion (67.4 %) of the respondents confirm that they have lost properties, which they are yet to recover, to floods while (53 %) states that, in some cases, business activities of at least one members of their households have been disrupted by floods resulting into loss of time and money. One male respondent in Aboru expressed:

„I cannot say this is the total amount of what I lost to flood between last year (2011) and this year but, the point is that many of my properties, I mean my household items, were damaged, and I am yet to replace most of them because I have no money to do so."

Statement of another respondent in Ajegunle corroborated the above quote:

„I do not know what to do neither do I know where to move to, everything I have laboured for over the years, including my certificate have been lost to flood that ravaged last two weeks. Now I am empty, left with nothing…..I am practically back to square one, where do I even start from."

It must be noted that the above statements are not peculiar to these respondents; rather they a common experiences among the residents as revealed by this study. Though, it must be emphasised, flood is a

seasonal event but its associated loss on poor households' livelihoods is often enormous and difficult to cope with.

7 CONCLUSION

The aim of the paper was to contribute to understanding of the vulnerability and impacts of flood on the livelihoods of the urban poor in Lagos, Nigeria through the lens of sustainable livelihood framework. Building on various literature and empirical study, the paper reveales that vulnerability and impacts of flood on urban poor in Lagos are mostly related to physical, human and financial/economic assets. Arguably, these nature of vulnerabilities and impacts are not limited to the residents of the case study settlements but virtually all low income settlements in Lagos experience similar occurrences as shown by the study conducted by Adelekan in 2010 in four other low income settlements (Makoko, Ilaje-Bariga, Ijora-Oloye and Marine Beach Apapa) in Lagos.

Generally, it was discovered that though, flood is a natural phenomenon caused largely by natural events. However the incidence of floods and its associated risks have been exacerbated by human induced activities. Human activities such as deforestation, wetland reclamation, green house gas emission, poor planning, improper development, and poorly-designed infrastructure particularly, drainage systems are capable of increasing flood events and vulnerability to the associated risks. It was further noted that increase in the intensity and volume of rain fall have been attributed to the increase in flood events. In addition to these, vulnerability to flood hazards is particularly intensified where combinations of urbanisation and uncoordinated urban expansion to flood prone areas, inadequate and poor maintained infrastructure, low-quality housing and low capability of urban poor intertwine.

In Lagos, impacts of flood events and factors that intensify vulnerability to flood hazards manifest in different forms. This paper has discussed in detail the magnitude of the effects of flood on the livelihoods of informal settlements dwellers from Lagos experiences. It establishes that effects of flood, on the livelihoods of Lagos urban poor, are enormous and thereby worsen their already vulnerable and impoverished conditions. Though, in Lagos, flood hazard is a city-wide experience as a result of its costal location coupled with uncoordinated urban expansions to flood-prone areas as well as inadequate drainage facilities. However, urban poor are disproportionally vulnerable and affected by the impacts of floods hazards because they already experience multiple deprivations and exclusions in their livelihoods. These are manifested in their low and, often, inadequate income, poor environmental conditions, overcrowding, inadequate access to infrastructure, hazardous and precarious locations among others. These deprivations are experienced simultaneously by urban poor in Lagos. The risks associated with flood hazards therefore hit them hard, and do not only exacerbate their already poor conditions but also hinder their capabilities to move out of poverty.

Unfortunately, as it is at the moment, urban poor do not have adequate capacity to positively change the causes of most of these vulnerabilities. Likewise, on the long term, they do not have capacity to adequately cope with the impacts and loses associated with flood hazards. Against, these backgrounds, government must develop a holistic planning and engineering solutions to curbing future occurrence of flood hazards. It is acknowledged that the focus of this paper is limited to the impacts of flood hazards on the livelihoods of the urban poor and factors that intensify such impacts. Therefore, the paper does not claim to have developed solution to the incidence of floods in Lagos. This, obviously, is a focus of another study, which the authors intend to undertake in the near future.

8 REFERENCES

ActionAid, (2006). Climate Change, Urban Flooding and the Rights of the Urban Poor in Africa: Key findings from six African cities. ActionAid International, Johannesburg

Allen, K. (2003) Vulnerability reduction and the community-based approach, in Pelling (ed.), Natural Disasters and Development in a Globalising World, 170-184.

Bebbington, A. (1999) 'Capitals and Capabilities: A Framework for Analysing Peasant Viability, Rural Livelihoods and Poverty', World Development, 27(12), pp. 2021-2044

Brooks, N., 2003. Vulnerability, risk and adaptation: a conceptual framework. Working Paper 38, Tyndall Centre for Climate Change Research, Norwich, UK.

Burton, I., Kates, R.W., White, G.F., 1978. The Environment as Hazard. Oxford Univiersity Press, Oxford, UK.

Carney, D., Drinkwater, M., Rusinow, T., Neefjes, K., Wanmali, S. and Singh, N. (1999) A Brief Comparison of the Livelihoods Approaches of the UK Department for International Development (DFID), CARE, Oxfam and the United Nations Development Programme (UNDP). London: Department for International Development

Chamber, R. (1989) 'Vulnerability: How the Poor Cope', IDS Bulletin, 20 (2), pp. 1-7.

Chamber, R. (1995) 'Poverty and Livelihoods; Whose Realities Count? ', Environment and Urbanization, 7, (1), pp. 173-204.

Chambers, R. and Conway, G. (1992) Sustainable Rural Livelihoods: Practical Concepts for the 21st Century. Brighton: Institute of Development Studies

IDS (2012): Adaptive Social Protection. http://www.ids.ac.uk/news/when-climate-affects-social-protection

IIED. (2001) Urban Environmental Improvement and Poverty Reduction. London: International Institute for Environment and Development

Ingirige, B. and Wedawatta, G. (2011) 'Impacts of Flood Hazards on Small and Medium Sized Companies', in Lamond, J., Booth, C., Hammond, F. and Proverbs (eds.) Flood Hazards: Impacts and Responses for the Built Environment. Florida: CRC Press.

Intergovernmental Panel on Climate Change (2009) Proceedings of Scoping Meeting for an IPCC Special Report on Extreme Events and Disasters: Managing the Risks on 23–26 March 2009 in Oslo, Norway. IPCC, Stanford.

Jha, A.K., Bloch, R. and Lamond, J. (2012) Cities and Flooding: A Guide to Integrated Urban Flood Risk Management for the 21st Century. Washington DC: The World Bank.

Jones, R. and Boer, R. (2003) Assessing current climate risks Adaptation Policy Framework: A Guide for Policies to Facilitate Adaptation to Climate Change, UNDP, in review

Kantor, P. and Nair, P. (2005) 'Vulnerability Among Slum Dwellers in Lucknow, India: Implications for Urban Livelihood Security ', International Development Planning Review, 27, (3), pp. 333-358.

Kates, R.W., 1985. The interaction of climate and society. In: Kates, R.W., Ausubel, H., Berberian, M. (Eds.), Climate Impact Assessment. Wiley, Chichester, UK (Chapter 1).

Lyons, M. and Snoxell, S. (2005) 'Sustainable Urban Livelihoods and Marketplace Social Capital: Crisis and Strategy in Petty Trade', Urban Studies, 42, (8), pp. 1301-1320.

Olima, W. H. A. (1997) 'The conflicts, shortcomings, and implications of the urban land management system in Kenya', Habitat International, 21, (3), pp. 319-331.

Olima, W.H.A. (1997) 'The conflicts, shortcomings, and implications of the urban land management system in Kenya', Habitat International, 21(3), pp. 319-331.

Parnell S., Simon D., and Vogel C. 2007. "Global environmental change: conceptualizing the growing challenge for cities in poor countries." Area 39 (3): 357-69.

Satterthwaite D. 2011. "How urban societies can adapt to resource shortage

Satterthwaite, D. (2006) 'Humanitarian Action in Urban Contexts', Humanitarian Exchange Magazine 35, 01 November 2006, p.1-45.

Spurgeon, J., Wasilewski, C., Ikpi, A. and Foster, S (2009) Impact of Climate Change on Nigeria's Economy to Climate Change Impacts and Strengthening Disaster Risk Management in East

Turner II., B.L., Kasperson, R.E., Matson, P.A., McCarthy, J.J., Corell, R.W., Christensen, L., Eckley, N., Kasperson, J.X., Luers, A., Martello, M.L., Polsky, C., Pulsipher, A. and Schiller, A. (2003) 'A Framework for Vulnerability Analysis in Sustainability Science. Proceedings of the National Academy of Sciences ', Proceedings of the National Academy of Sciences, 100(14), pp. 8074–8079.

UNECE (2009) Self-Made Cities: In Search of Sustainable Solutions for Informal Settlements in the United Nations Economic Commission for Europe Region. New York and Geneva: United Nations.

UN-HABITAT (2008). State of the World's Cities 2008/2009: Harmonious Cities. London

WDR (World Development Report). 2010. Development and Climate Change.

WGCCD (Working Group on Climate Change and Development). 2009. "Other worlds are possible: Human progress in an age of climate change. The sixth report from the Working Group on Climate Change and Development." NEF (New Economics Foundation).

Wheater, H. and Evans, E. 2009. "Land use, water management and future flood

Wisner, B.; Blaikie, P.; Cannon, T. and Davis, I. (2004) At Risk: Natural Hazards, People's vulnerability and disasters, second edition, London: Routledge

World Bank. (2008). Climate Resilient Cities: 2008 Primer Reducing Vulnerabilities

French Planning System Paradox

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1 ABSTRACT

French planning system have been deeply renewed since the planning act of 2000 usually called loi SRU (loi sur la solidarité et le renouvellement urbains) and some very interesting innovations have been set. Years after years, this renewall has been enriched, especially by the Grenelle de l'Environnement which has been one of the master law of Nicolas Sarkozy's presidency. Lots of new topics are now compulsary at each level of planning : climate change, energy, carbon emissions, urban sprawl and so on. So today, the french planning system aiming to political and technical perfection has became hawfully complex, dangerously unstable and disconnected of land market and building business realities. The reason why such a perfect system does not work as well as planned comes from three unvariant principles which have been edicted by the first french planning act of 1967.

- planning system supposed to manage land use ignores land market and building market rules,

- planning system supposed to be organized from top (regional and city planning) to bottom (local plans and urban design) is in fact only dedicated to individual building licences,

- planning system supposed to organize framing major public decisions concerning cities and communities future has to take, day after day, into consideration such decisions which are taken independantly.

After a short description of the french planning system, this paper proposes to describe and illustrate system dysfunctions. The conclusion aims to open the debate about stakes of integration and synchronisation of regional and urban planning in a sustainable urban development context.

2 INTRODUCTION

Despite many significant reforms since the Urban Solidarity and Renewal Act (loi Solidarité et Renouvellement Urbain) in December 2000 to the Law on National Commitment to the Environment (loi Engagement National pour l'Environnement) in July 2010, the legal framework of urban planning in France set by the Law on Land Use Orientations (loi d'Orientation Foncière) of December 1967, retains three invariant principles tending to neutralize the operational scope of urban planning documents. While elected officials and citizens get involved passionately in the preparation of these documents, parliament continuing to add or enrich urban planning legislation, system is organized so that decisions relating to sustainable urban development continue to take "elsewhere". The purpose of this paper tries to give new understanding of the evolution of urbanization in France.

Since the beginning in 1967, french planning system has been based on two scale level of plans :

- metropolitan area : strategic plan called SDAU (Schéma Directeur d'Aménagement et d'Urbanisme) : perimeter based on local cities grouping,

- city area : local plan called POS (Plan d'Occupation des Sols): supposed to be compatible with the SDAU, perimeter following city border.

Establishing these plans was not compulsory.

These two planning documents contents were quite similar :

- presentation report which describes the area and urban development trends

- zoning plan and rules

- attached files

From 1967 (land use act) to 1983 (decentralisation act) planning documents have been elaborated and acted by local state offices managed by the prefect. From 1983 to 2000 (solidarity and urban renewal act) document have been still elaborated by local state offices but act by cities grouping councils for the SDAU

and by city council for the POS. During these times, several sectoral plans have been established aiming to support sectoral policies. The mains sectoral plans were :

- mobility : PDU (Plans de Déplacements Urbains) estalished by the law on inland transports orientations (Loi d'orientation sur les transports intérieurs) acted in december 1982;
- housing : PLH (Programme Local de l'Habitat) established by law on city orientations (loi d'orientation sur la ville) acted in july 1991.
- water : SAGE (Schémas d'Aménagement et de Gestion des Eaux) established by law on water (loi sur l'eau) acted in january 1992.

These plans have been elaborated by specific cities grouping. SDAU and POS were supposed to be compatible with the SAGE. PDU and PLH were supposed to be compatible with the SDAU (if they exist). POS were supposed to be compatible with PDU and PLH as well. Many sectoral plans have been established at different large scales introducing an awful complexity into the system which was more and more fragile.

So, the Urban Solidarity and Renewal Act (loi Solidarité et Renouvellement Urbain) estalished in December 2000 two new planning documents : at the metropolitan scale, the SCOT (Schéma de COhérence Territoriale) and at the local scale, the PLU (Plan Local d'Urbanisme). Establishing these plans is now compulsory except for small rural communities. Introducing coherence into the system, elaborating plans including PDU and PLH, is now based on the same systemic concept following the principles of the "project approach" as it is practiced in the industrial sector, ie on the Systemic following sequence:

- Inventory (including environmental issues)
- Diagnosis
- selection of goals
- Action Plan
- Operational implementation
- Results (assessment)

Each element of this chain asks the previous under otherwise constant evolution, forming many loops in perpetual movement. The interlocking scales and the relationship of compatibility between all the plans, especially SCOT and PLU, brings high complexity to a system composed by many sub-systems also in permanent evolution.

2.1 The SCOT :

It takes place of the SDAU. If SCOT limits and elaborating process are similar than SDAU, the file contents is very different. First of all, the zoning plan are abolished. A major failure of SDAU zoning plans was the excess of precision, sometimes similar as precise as a local zoning plan. In a SCOT, no map takes place of this zoning plan. Its a true way of progress and new tools and methods of mapping are to be conceived and improved.

Now the file is organised in three chapters:

- presentation report including an important chapter on environmental issues to be taken into consideration and describing incidences of the plan on environment. It presents a diagnosis and justify goals.
- urban sustainable development plan (PADD, Plan d'Aménagement et de Développement Durable)
- guideline

Local authorities have to organise public debates and consult inhabitants from the beginning to the end of the process.

2.2 The PLH :

The main goal of such plans is favouring mixity and diversity of housing. PLH is also a 5 years contract between local authorities and state to finance social dwellings building. That's the reason why the P of PLH means Program. It's also a reason why no public debate has to be organised.

A PLH file contents:

- inventory
- diagnosis
- selection of goals
- action program

Evaluating the first generation of PLH shows that in fact neither diagnosis nor action plan were really shared by local authorities and state services. PLH are mostly conceived by private housing planning companies which work for a long time on housing problems ans policies for local authorities and housing public companies as well.

2.3 The PDU :

The main goal of such plan is limiting car traffic by favouring alternative means of transportation. PDU concerns all means of transportation and SRU law adds parking planning and goods trafic planning as well.

A PDU files contents:

- inventory of traffics
- diagnosis
- selection of goals
- action plan
- assessment indicators

The Action Plan runs 5 years. Local authorities have to organise public debates and to consult inhabitants from the beginning to the end of the process. Assessing the first generation of PDU shows heavy trends:

- mobility increasing : car traffic still increasing, public transportation increasing after declining but the repartition of traffics still profits to car
- public transportation networks developing especially with new tramways which bear now a very positive image of cities and can be considered as contributing to creative economy
- alternative meanings of transportation networks, especially cycling and walking paths.

2.4 The SAGE :

A SAGE file contents :

- presentation report
- maps and graphics.

The report presents :

- analysis of the existing situation of the aquatic environment and a census of the various uses made of water,
- analysis of the main perspectives of development,
- the indication of the possible consequences on public decisions in the field of water.

Graphic documents show :

- the distribution of the resource surface and groundwater, including an indication of quantitative and qualitative objectives,
- the location of the main economic and social activities and public facilities existing or general interest, the bathing areas, the areas of abstraction and discharge,

- the main natural aquatic protect facilities,
- major migration routes of fish species,
- protection zones of drinking water catchments.

SAGE may include requirements on the Water Police and the protection of catchment areas. These requirements are compulsory taken into account in the PLU.

2.5 The PLU :

PLU takes place of POS. Process is quite similar than POS but much more simple but its content is very different:

- presentation report including an important chapter on environmental issues to be taken into consideration and describing incidences of the plan on environment. It presents a diagnosis and justify goals.
- sustainable development plan (PADD, Plan d'Aménagement et de Développement Durable),
- urban design guideline (Orientations d'aménagement),
- zoning plan and building rules
- attached files (public networks)

Local authorities have to organise public debates and to consult inhabitants from the beginning to the end of the process. PLU have to be compatible with SAGE, SCOT, PLH and PDU.

3 URBAN PLANNING AND LAND POLICY : IGNORANCE ESTABLISHED

Curiously, the word "planification" (planning) does not belong to the vocabulary used by the Town Planning Code (code de l'urbanisme), the legislator may be repugnant to use a word and also a concept coming from the Soviet conception of economy. Another curiosity, the articles establishing planning documents mention territory, space, ground, soil but the word "foncier" (land) is missing. None recall that land is the raw material for urban development. None indication of the need for the competent authority to develop and implement a land policy based on public policy. The complexity of the legal instruments of this policy is a convenient alibi to avoid to use it. This refers to the disillusioned remark Pisani Edgar: "I have long believed that the land issue was legal, technical, economic (...) I slowly discovered that it was one of the most significant political problem. "

Moreover, it is not explicitly stated that, in part, the aim of the town planning code is to frame and thus to limit the property right which is "inviolable and sacred" as enrolled in the 17 th article of the Universal Declaration of Human Rights appended to the Constitution of the french Republic because of the "public need" to implement local policies of urban development. So, it is interesting to notice that, since opening in July 2008, the Constitutional Council referral under Question of Priority Constitutionnalité, several articles of the town planning code were canceled, others confirmed.

Finally, despite numerous evocations, including national debate of the "Grenelle" for environment started in september 2007 and concluded by Law on National Commitment to the Environment (loi Engagement National pour l'Environnement) in July 2010, there is still no mention of financial gains generated by the constructability of a plot of land previously unbuildable, which multiplies its value by 30 and, in some sectors, by 100, thus forming a right (virtually) acquired for the lucky owner. So no mention of rules to share that gain with the public authority which has offered such rights and gains, noticing that only a part of financing the public networks and equipments required by new buildable areas is, under conditions, attributable to petitioners. Considering the financial stakes, the competent public authority, most of the time the mayor himself, and is mechanically pressurized by landowners especially in small municipalities. Conversely, if in return, the changes likely to reduce or even remove existing rights of building under new rules approved by the local authority, are not compensable.

In summary, although it is obvious that the land is the raw material of urban development, french texts governing planning documents still do not state the obligation to link land policy and urban planning. Therefore, the purpose of planning documents, and PLU in particular, seems to be limited to state the

boundaries of buildable areas, and thereby to the unjust enrichment of happy landlords. Here is one of the causes of urban sprawl in France, maybe the main one.

4 URBAN PLANNING: THE INVERTED PYRAMID

Since the publication in December 2000 of the Urban Solidarity and Renewal Act, the content of planning documents, SCOT and PLU continues to increase over laws that focus sometimes on environment, sometimes on agriculture, sometimes on transport and mobility, sometimes on housing, to name only the main ones. Each of these themes refers to a sectoral policy formalized by plans of greater significance with which planning documents must contend. The Grenelle de l'Environnement has accentuated this trend adding regional plans for climate, air and energy (Schéma Régional pour le Climat, l'Air et l'Energie) ; and regional plans for ecological corridors (Schéma Régional des Continuités Ecologiques). However, that the town planning code grows, its articulation with other codes is rarely specified. Thus, a few years ago, it was that the planning documents (SCOT and PLU) should be consistent with the plans for water management (Schéma d'Aménagement et de Gestion des Eaux) as stipulated in the Environment code but not the town planning code, forgetting repaired by the law for town planning and housing (loi Urbanisme-Habitat) acted in july 2002. It seems that the list of regional plans and departmental plans to take into account the SCOT and PLU is not clearly stopped: quarries, waste etc ... Thus, one could consider that a PLU is the simple declination of all sectoral policies supra-municipal, at the scale of the municipality.

In addition, compared to a POS, the content of a PLU has grown considerably since the publication of the SRU. The presentation report now includes an important chapter on environmental issues to be taken into consideration and describing incidences of the plan on environment. It contains two more elements: a sustainable development plan (PADD, Plan d'Aménagement et de Développement Durable) and an urban design guideline (Orientations d'aménagement). As if the PLU were a local bible to organize daily citizens's life, the municipality is thus commited to design an ideal urban future in a strict legal framework abundant and complex.

But the daily use of a PLU, in fact its one true purpose, is limited to the supervision of individual permissions: development licenses, building permits, demolition permits. In this regard, it should be noted that this is the number of building permits issued each year (between 5 and 10), who led the state town planning office to convince a municipality to initiate the process of establishing a POS. Thus, the useful part of the PLU is limited to regulation and zoning plan. In this, the French urban planning adheres to established legal principles in the United States in the late nineteenth century, first to preserve the rights of third parties with respect to new construction projects. In this regard, it should be noted that the principle of "one function, one area, one regulation" is derived from the Athens Charter which required the separation of flow and functions "live, work, leisure". The zoning of the local plans (POS, now PLU) could already take into account the diversity of urban functions and it was most often the case in dense urbanized areas but outside the centers of cities, centers zoning mainly continues to be strictly monofunctionnal. Thus, local plans (POS, now PLU) determine, at the scale of the plot, a legal framework, more or less detailed, more or less restrictive.

This setting to the plot, refers ipso facto to individual strategies of landowners who have two constitutional freedoms:

- except expropriation cases related to easements, landowners have no obligation to sell their property,
- except in special cases related to public safety, property owners have no obligation to carry out building.

Faced with the principle of reality, local development plans, in order to meet the needs of the municipality, shall provide wide buildable areas, taking into account land retention observed locally. Thus, in the 90s, outside the metropolitan centers, in many cases the buildable surfaces offered by a POS was permitting to double legally the urbanized surface of the city. Some surveys have shown that, at the usual rate of land consumption, the stock of buildable land was able to face to the demand for 50 years. Two consequences of this practice as old as french local planning :

- Difficulty in correctly programming public investments, especially roads and other public networks. Therefore difficulty to properly allocate the costs of such public investments to the petitioners.

- Difficulty in applying the principle of continuity with the existing urbanization which results in the formation de facto private land reserves.

Municipalities are "condemned" to develop planning documents "perfect" without the means to ensure their implementation in time and in space.

Everybody now can understand the importance of examining requests for individual authorization. The mayors are very attached to their power which they often practice in a very personal way, sometimes discretionary, and the PLU is for them a tool to help the decision reviewable and modifiable as needed for individual demands. Last years, true "standing committees for building permits" have been multiplied which, in defiance of all rights, behave like juries of architecture, requiring as much modifications as necessary to please them. Neither professionals nor petitioners complain of this abuse of power preferring getting slowly their permit than forming a litigation. In another opposite way, professionnals use to negotiate with the municipality in order to impose their projects sometimes getting significant modifications of the rules. This absence of separation of powers could be a question of constitutionality potentially explosive.

In summary, urban planning documents have one, and only one purpose, supervising individual authorization requests. If they do not allow a project supported by the municipality or group together, they are changed or revised accordingly.

5 PLANNING AND PROGRAMMING: THE INVERTED HIERARCHY.

In its wisdom, the legislature took into account, from 1967, the need not to paralyze life in the territories by submitting town planning to projects programming, ie giving legal precedence to projects as they are recognized as general interest (Projet d'Intérêt Général) or as public utility (Déclaration d'Utilité Publique). Legislation provides appropriate devices to make plans compatible with projects under the responsability of State. Thus, despite the excellence of french system of territorial planning, it is common to observe that the major development projects, including transport infrastructure projects, are designed independently of urban planning since, ultimately, these plans should take into account these projects.

This dichotomy is reflected in the organization of public bodies : the services assigned to urban projects programming are different than services assigned to town planning. The State, supposed to be "exemplary", for significant projects (highways and transport infrastructure; polarization of hospital equipments; development of universities; national research centers such as ITER in Cadarache) studies are designed and discussed independently of urban plans that will, in time, set compatibility with these projects. This applies to projects of public facilities under the jurisdiction of the Regions (High Schools, etc..) And Departments (colleges, nursing homes, etc.).. For exemple, the component "school facilities" is mostly missing in SCOT in spite of the link between school equipment and urban mobility and dwelling choices of concerned families. Curiously, this legal fragility of SCOT has not yet been used in litigation.

In addition, projects of designing or refurbishing or adapting public space (including roads and public networks) are mostly not subject to any authorization procedure as soon as the contracting authority owns the land what is the main case in a city. If acquisitions are needed, it will suffice to rank on the list of reserved areas into the PLU, and apply for declaration of public utility. Architects are rarely involved in such projects despite many exemples of good practices (redevelopment of the quays of Bordeaux or the Place Stanislas in Nancy). Thus, between scarification incessant, inappropriate flooring materials, signage and advertising, risky choice for urban furniture, the public space of many French cities seems to come to itself, especially outside the centers of the cities. This confirms that french code of urbanism does not address urban design, but only the right of building.

Finally, many development projects and construction borne by private owners as joint or group of municipalities judge abruptly priority if of general interest as they have not been taken into account in the PLU. Regardless, it is sufficient to initiate an amendment or revision of PLU. For instance, the classification of the Canal du Midi as a World Heritage Site in 1996, abruptly sharpened appetites of marinas developpers who tried to seduce the elected representatives of the municipalities concerned, fortunately with a very uneven success, Without prejudice to the desirability of these projects, this is a good pattern to justify the development of an instrument to ensure consistency of planning documents, SCOT and PLU; and to ensure a reasonable planning and development of the Canal, especially its surroundings. In this respect, it may appear

as a responsibility of the State to preserve this part of the "national territory, the common heritage of the nation".

In summary, the bodies responsible for the decisions that affect urban development in a territory are not the bodies responsible for the preparation of planning documents. As necessary, such decisions have to be taken into consideration by town planning documents, eventually by legal requirement. Actually town planning in France has to be compatible with projects and not the reverse.

6 CONCLUSION

Logically, the three invariant principles outlined above form system: disconnecting the urban planning of land policies on the one hand and programming of public and private investment on the other hand, limiting the subject matter of documents Planning for the establishment of a legal framework for permissions, appears hollow and reverse production system of urbanization in France. It is based fundamentally on respect for private ownership of land, on the individual rather than institutional initiative on personal enrichment rather than collective value creation. There is no "invisible hand" to organize and protect this system, if not the market.

7 REFERENCES

GUET Jean-François : City and regional planning in France, Certu 2008 : http://www.certu-catalogue.fr/city-and-regional-planning-plan-in-france.html
REY Alain: dictionnaire historique de la langue française , Robert 1992
PISANI Edgar : l'utopie foncière, Linteau 2011 (new edition)
CHARLES-NEVEU Brigitte : la QPC en droit de l'urbanisme, Eurojuris 2010
GRENELLE DE L'ENVIRONNEMENT FINAL REPORT : http://www.legrenelle-environnement.fr/IMG/pdf/rapport_final_comop_9.pdf
CERTU et ETD : fiches « décryptage du Grenelle », http://www.projetdeterritoire.com/index.php/Nos-publications/Fiches-decryptage-Grenelle
LE CORBUSIER : la charte d'Athènes, éditions de minuit 1942
GUET Jean-François, PETITET Sylvain, How to restrain urban sprawl? The French way, ISOCARP congress, Dalian, 2009, http://www.isocarp.net/Data/case_studies/1351.pdf
GUET Jean-François : Les enjeux de l''approche intégrée de la planification, Techni.Cités, N° 164, 23 février2009

From Plan to Augmented Reality – Workflow for Successful Implementation of AR Solutions in Planning and Participation Processes

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1 ABSTRACT

This paper describes possibilities and examples in which augmented reality solutions can be implemented in planning and participation processes, based on an analysis of the results of the project "ways2gether – Target-group-specific use of augmented reality and web 2.0 in participative traffic planning processes". An augmented-reality-demonstrator based on the free metaio Mobile SDK was developed as part of the project ways2gether. This new communication and information tool was practically evaluated in three test cases to show the benefit in planning and participation processes in transport planning.

The actual possibilities and challenges in implementing augmented reality in planning processes are discussed, the technical background and a possible workflow for the integration of augmented reality solutions in planning processes are described and finally the benefits and difficulties in using augmented reality in participation processes are explained based on the results of the test cases.

2 AUGMENTED REALITY AND PLANNING

Augmented reality (AR), a term that has been increasingly used since the 1990s, refers to one's own perception – mostly visual – being enhanced through computer-generated information. This can be achieved in a variety of ways, though common to all systems is that virtual reality and reality are combined and overlaid. Another shared characteristic is also that these systems operate interactively in real time and three-dimensional information is provided (Azuma 1997).

The planning sector is becoming increasingly more interested in these instruments, with the opportunity for many planning fields to provide on-site geo-referenced information proving to be an especially interesting expansion of their repertoire of methods. The field of mobile augmented reality is particularly interesting for planning and participation processes thus an additional requirement is that the AR environment has to work on mobile devices.

Due to the increasing number of mobile devices that have a camera, data connection, GPS sensors on board and sufficient computing power, mobile augmented reality applications are becoming more and more interesting for a broader public. The dissemination of (powerful) smartphones and tablets as well as the possibility to use third party applications on mobile devices has caused a visible trend in augmentation in recent years. Augmented reality is seen as an important tool in planning processes, especially in participation processes, to improve communication with "non-planners". Planning information can be shown location based, three-dimensional, and in the context of the "real world" on mobile devices (c.f. Azuma 1997, Azuma et al. 2001, Tönnis 2010, Carmigniani, Furth 2011).

2.1 The use of AR in planning and participation procedures

Current and future uses of augmented reality include the provision of three-dimensional information, such as navigation, marketing, and location information, as well as in the gaming and entertainment industry, assembly, the medical field, or real estate which can be supported by AR information. AR has also been used in advertising, where webcams are attached to PCs and the camera images were overlaid with objects usually supported by QR Codes. AR is also used in sports broadcasts, for example in soccer and ski jumping, where the offside line or the current maximum jump-distance appears virtually.

Even the planning and architectural sector is using augmented reality more and more. Currently the majority of AR applications are being used to provide location-based information. There are some (individual) projects which use three-dimensional AR renderings or provide three-dimensional information, such as

"Smart Vidente", where electric or gas lines in the underground are shown with a special mobile device (Junghanns S., 2008). Other examples, like the "Archeoguide" (Augmented Reality based Cultural Heritage On-site GUIDE), which shows multimedia information such as historical buildings, need special mobile devices (Vlahakis V., et al. 2002).

The other approach is to use common mobile devices such as smart phones or tablet-computer to provide three-dimensional information. The most popular AR browsers such as Layar, Wikitude or Junaio work on regular mobile devices.

The third approach is to use tailored apps on regular mobile devices. One example is from ovos, who developed their own app for the Seestadt Aspern in order to view the master plan on mobile devices (www.ovos.at.) You can view the future city from five different viewpoints which are defined by LLA-markers. However, you are fixed to the point where the LLA marker is set and are unable to move freely within the model.

The ways2gether project focuses on the use of common mobile devices, such as smartphones or tablet-computers, to reach a broader public. We also wanted to make it possible to move freely within the AR model.

For the development of the app we analysed different planning and participation processes in order to point out different possibilities for using AR (Reinwald et al. 2012). In short, the analysis showed a broad spectrum of possibilities in which AR can be implemented, from the possibility to use AR apps for information and consultation to the visualisation of drafts, different versions or final designs. For the ways2gether project we mainly focused on the augmented visualisation of drafts and final designs.

2.2 The project ways2gether

The assumption that by using AR it is possible to make planned changes visible and reduce barriers caused by a lack of three-dimensional imagination (c.f. Zeile 2010) was the starting point for the project "ways2gether – Target-group-specific use of augmented reality and web 2.0 in participative traffic planning processes".[1]

The idea that augmented reality has the potential to improve a participation process and make it more efficient (c.f. Nash 2010) was also a driving factor to start research in this sector. We also expected that new target groups, for example teenagers who are rarely interested in participation processes or people having little time to take part in participation processes due to care obligations, can be reached with these instruments (c.f. Jauschneg, Stoik 2012).

The following article is based on the results of the project ways2gether, which focuses on the reduction of barriers in terms of communication and accessibility in participative planning processes through a specifically tailored augmented reality application (more information on www.ways2gether.at).

3 CHALLENGES TO IMPLEMENT AUGMENTED REALITY IN PLANNING AND PARTICIPATION PROCESSES

The potential uses of AR systems are as described in chapter 2.1 manifold. In the following chapter the requirements and challenges implementing augmented reality solutions are described.

3.1 From reality to augmented reality

To illustrate augmented reality on mobile devices various system components are required. In short, it takes the reality, the built environment, a mobile device with a camera, a three-dimensional plan, as well as software that makes the overlay (see Figure 1).

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[1] Project partners are: DIGITAL – Institute for Information and Communication Technologies, JOANNEUM RESEARCH Forschungsgesellschaft mbH, (Project Leader); Institute of Landscape Planning – University of Natural Resources and Life Sciences, Vienna; MJ Landschaftsplanung e.U.; Kompetenzzentrum für Soziale Arbeit GmbH – FH Campus Wien; verkehrplus – Prognose, Planung und Strategieberatung GmbH; Forschungsgesellschaft Mobilität – Austrian Mobility Research FGM-Amor gemeinnützige Gesellschaft m.b.H.
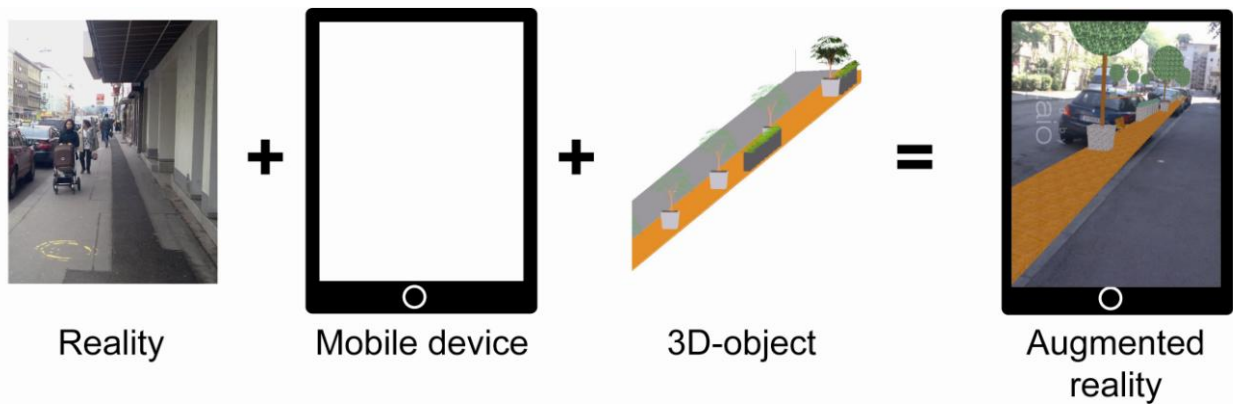
Figure 1: From reality to augmented reality

In detail, this means that by using the camera image, the real situation is recorded and by means of a tracker system (GPS, position sensor, compass) the exact spatial position and the direction of view of the mobile device is determined. This information is processed in an application and a three-dimensional rendering of the model is generated. Using an AR-browser the 3D rendering is shown on the display together with the camera image (see Figure 2).
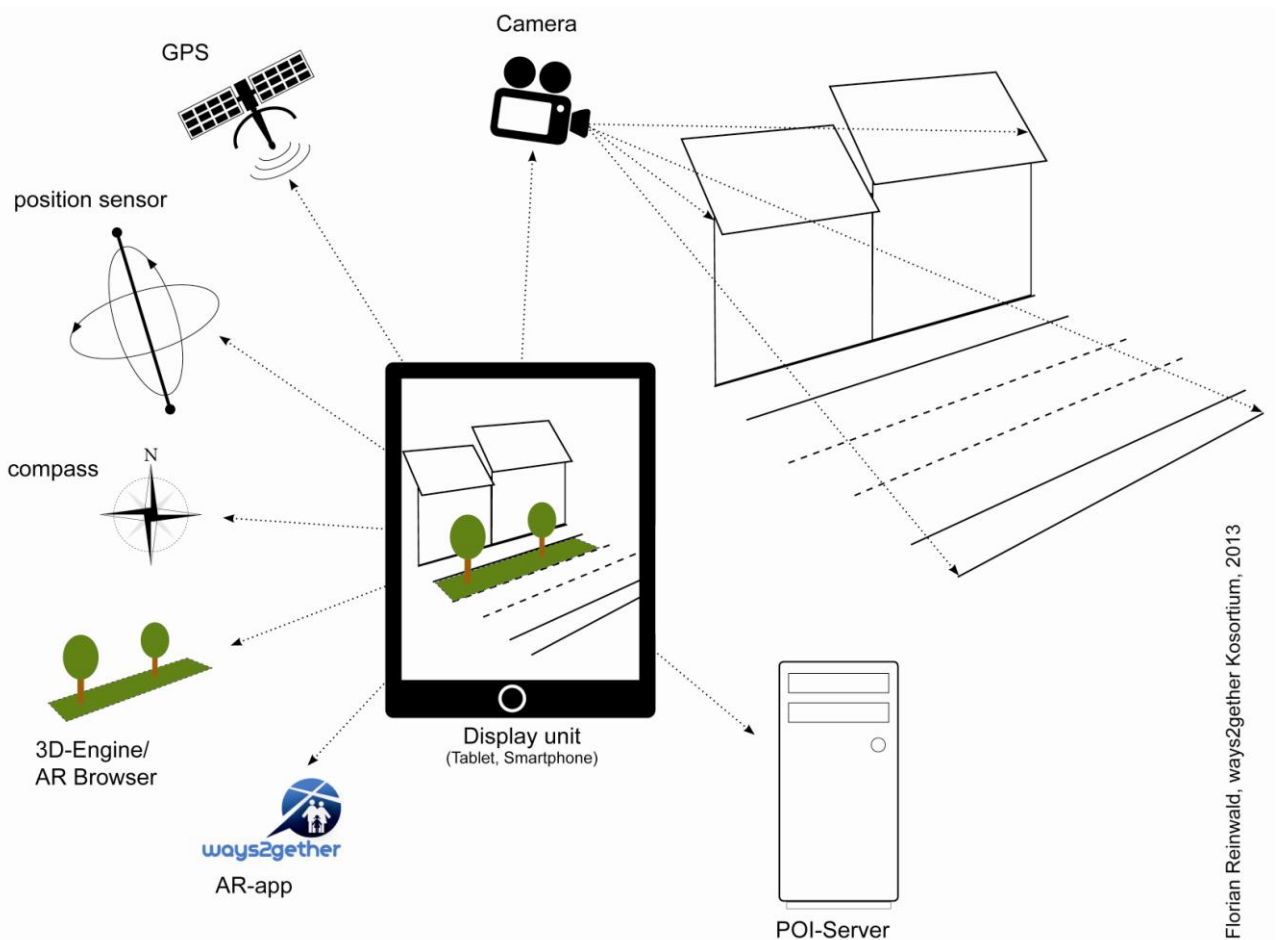
Figure 2: Components of the ways2gether AR system

3.2 Requirements and challenges concerning AR instruments in planning

In order to use AR instruments in planning, additional requirements have to be considered concerning usability, immersion, workflow and accuracy. For the development of the ways2gether app the requirements for an AR system which can be used for planning and participation processes were analysed in expert interviews and by literature research. The analysis shows that the effort for the operation and maintenance must be low for the process facilitators, planners and people who take part in participation procedures.

Whether or not AR is accepted as a tool for planning and participation procedures depends on how easily the AR system can be used.

From the perspective of planners and facilitators, the workflow within a planning process and the consideration of (currently used) data interfaces are of particular importance to the AR instruments. To ensure AR's efficient use in planning and participation processes, the extra effort and the necessary technical skills for planners are to be kept as low as possible. From a technical perspective, challenges are presented especially in relation to GPS accuracy, partially developed software products as well as limitations in the processing power and visualization possibilities (graphics performance) of the mobile devices.

Development in the smartphone and tablet sector is rapid, with new hardware and software products which better meet the high demands of mobile AR tools continuously being introduced on the market. The central challenge in adapting the ways2gether app is – and will remain for the foreseeable future – the inaccuracy of the GPS system, as deviations of up to 7-8m are possible. The restricted level of detail and the limited immersion of the model are a problem.

4   THE WAYS2GETHER APP

The AR framework used for the ways2gether project is based on the metaio Mobile SDK by metaio GmbH (http://www.junaio.com), which includes a 3D rendering engine and can be integrated into your own app. The ways2gether app (see Figure 3) runs in an IOS environment on iPhones and iPads, and is available through the Apple App Store (https://itunes.apple.com/de/app/id515300116?mt=8).

Figure 3: Screenshot of the ways2gether App – on left site the map overview that shows the Seestadt Aspern test case, on the right site the AR-viewer that shows the Seestadt Aspern 3D model.

The ways2gether app is divided into two main components. First there is the map view that provides the user with an overview of all available points of interests (POI) around him. This map view offers the users the ability to drag and drop a specific POI to the users current location, so they can easily visit the selected 3D model without having to go the actual physical location of the POI. Secondly there is the AR viewer, which is a component for visualizing the 3D model connected to each POI.

4.1 Test cases

Three test cases were performed as part of the project: in Wallensteinstraße in Vienna, in Aspern, an urban development project in Vienna, and in Hartberg, a town with 6,500 inhabitants in the province of Styria. The aim here was to test the developed app in the real world, reach different target groups and use the instrument

in various planning and participation processes. The test cases were to cover research questions both in the field of technical development as well as in planning and participation procedures.

The central question for the tests was what are the advantages and disadvantages of using AR. A qualitative and quantitative approach was chosen to analyse the implementation of AR from different perspectives and different settings were chosen regarding the type of area (rural/urban, within a built area/new planning) or the aim of the participation process (presentation of results/consultation/information).

The test itself was conducted using a target and control group setting. One group used the ways2gether app, the other used printed 3D renderings and/or 2D plans to evaluate the planned design. The participants were then asked to fill out a questionnaire, which was quantitatively evaluated. The use of the app and the discussion within the groups were observed and group discussions with facilitators were conducted. The central task of the test cases was also the further development of the ways2gether app and especially to analyse the work-flow.

5 A POSSIBLE WORKFLOW FOR THE INTEGRATION OF AUGMENTED-REALITY SOLUTIONS IN PLANNING PROCESSES EXPLAINED USING THE EXAMPLE OF A TEST CASE

For a successful integration of augmented-reality models in planning processes a specific workflow is needed which considers interfaces, special requirements of the augmented-reality framework as well as the "regular" workflow within a planning and participation process (c.f. Kallenberg 2011, Schultheiß 2011). Central tasks for successful integration include the development of the 3D model and the transfer into the augmented-reality environment. Limitations in mobile AR frameworks mean that the design process necessary for 3D models to achieve the required complexity is quite complicated. Once the ideal complexity has been reached, textures on the model's surface are necessary in order to enhance the user's experience. Additionally, the workflow of the 3D model regarding the export in the OBJ format and the implementation in the augmented-reality framework is crucial.

5.1 Challenges in creating 3D models for augmented-reality test cases on mobile devices

Several challenges have to be overcome in the design process of augmented-reality test cases. The main challenge in this process is definitely the development of the 3D model itself. When developing the 3D model it is very important to keep the model as simple as possible. The metaio Mobile SDK has limitations with regards to complexity of objects in 3D models. Depending on the device (iPhone4S, iPad3, etc.), only a specific number of faces – a face being a closed set of edges which make up a model's surface – can be processed. Different tests done within the ways2gether project confirm the maximum number of faces for the iPhone4S is approximately 8,000 faces, while the maximum number of faces for the iPad3 is approximately 20,000 faces.

First, planners need to ask themselves what kind of audience they want to reach. If the focus is set to the general public then it is recommended to choose a lower level of complexity for the model because the average mobile device only has a moderate computation power. However, if the focus is to impress investors by introducing a new prestige project, then the latest generation of devices can be used and a higher level of complexity can be selected.

There are two kinds of environment scenarios in which the augmentation can take place. It can take place in an urban area, e.g. where a pavement is going to be enlarged (which was the first test case in the ways2gether project done in Wallensteinstrasse) or it can be done in a new undeveloped area, e.g. where a new city district is going to be constructed (which was the second test case in the ways2gether project done in Aspern).

In regular planning processes 2D plans and 3D models are created. If the model or plan has already been created then we need to differ between three starting scenarios:

(1) Only a 2D floor plan has been created, so it is necessary to build the third dimension by hand, as described in more detail in 5.4.

(2) A 3D model has already been created, however the 3D objects inside the model are too complex, e.g. too complex buildings facades. In this case it is unfortunately necessary to reduce the level of complexity by hand, which is indeed a time-consuming task. This scenario is described in more detail in 5.5.

(3) The 3D model fulfills the necessary requirements for augmented reality on mobile devices, which represents the best case and the 3D model can be used without additional expenditure.

At the moment mobile device hardware is definitely the bottleneck for applications using augmented-reality. However, as already mentioned in 3.2, this sector is driven by a high rate of development and perhaps the challenge concerning the usage of realistic details in 3D models on mobile devices can be overcome in a couple of years.

5.2 Tools for the development of AR suitable 3D models

We decided to use Google Sketchup Pro for three reasons:

(1) Google Sketchup Pro can be handled quite easily by people with little to no designing skills. In contrast, acquiring fundamental skills for professional 3D design software such as Blender would take several weeks.

(2) The metaio Mobile SDK requires 3D models in OBJ format. Google Sketchup Pro supports the export of 3D models in OBJ format, so the models can be directly used for the augmented-reality test case.

(3) Google Sketchup Pro can import models in different formats, such as DXF and DWG created by common CAD software, like AutoCAD.

Additionally, Google Sketchup Pro is becoming more and more popular in the (3D) planning sector because it can generate simple and nice looking models within a short time.

5.3 Exporting the 3D model to the required 3D format

Depending on which kind of AR-framework is used, the model needs to be exported in a specific format. At the beginning of the ways2gether project, different AR-frameworks were evaluated (c.f. Reinwald, Murg, Damyanovic 2012) and the metaio Mobile SDK (http://www.metaio.com) was eventually chosen because it was the only framework which fulfilled nearly all of the requirements, such as fast and stable visualization of 3D models, a stable implementation of the device localization, LLA-code recognition (a GPS independent localization feature), and in-app integration – and all for free. The metaio Mobile SDK requires 3D models exported in OBJ-format for static content and 3D models exported in M2D-format for dynamic content, e.g. animated objects.

5.4 Floor plan to 3D model

2D floor plans are not the best starting point for the design task as it could take a great deal of time to build the floor plan up to a 3D model. We experienced this first hand during the ways2gether project when creating the Aspern test case. The planners could only provide a 2D floor plan of the street section which needed to be designed for the test case. This meant it was necessary to build the third dimension by hand, which took several hours. It is always recommended to use a 2D floor plan containing already closed polygon geometries. These geometries can be easily built into the third dimension, which saves valuable time and further costs.

5.5 Reducing the complexity of 3D models

If planners provide high complexity 3D models it is necessary to reduce the complexity to keep the graphic refresh rate running smoothly. There are different reasons for high complexity in 3D models:

(1) The 3D model is much too large, in which case unimportant parts of the 3D model should be removed.

(2) The model's objects are too complex, e.g. buildings with a highly complex facade. The complexity of these objects could be reduced by using special software; otherwise this task needs to be done by hand which is a time consuming process.

(3) The 3D model contains objects that are not really necessary for the augmented reality test case, e.g. electric lines or water pipes that may be hidden behind walls or under the ground. In this case all unnecessary objects should be removed from the model.

5.6 Adding textures and details to the 3D model

To improve the experience of a test case appropriate looking textures should be used. For example, brick-textures should be used for brick walls, bitumen-textures should be used for bitumen roads and glass windows should be translucent (see Figure 4). Moreover, the effect of furniture should not be

underestimated. As shown in Figure 5, it does increase the experience of the augmentation, while also providing an indication for the user so he can estimate the size of objects, e.g. buildings, street width etc. more easily.
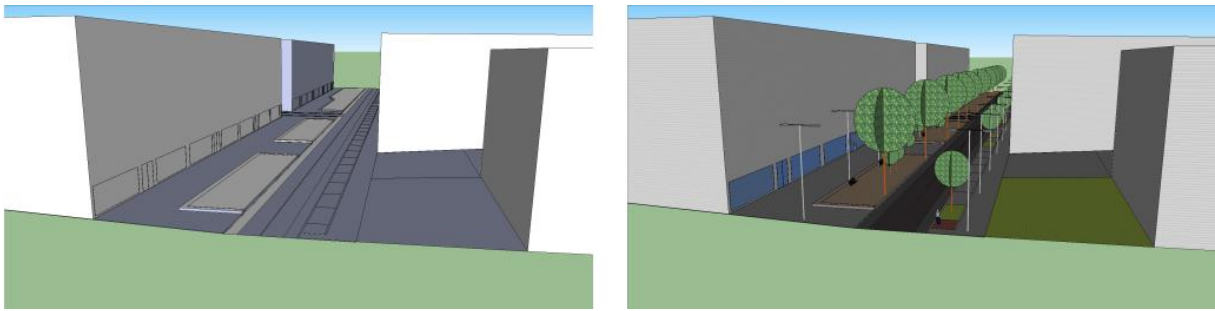
Figure 4: Google Sketchup Screenshot of the Aspern Seestadt – on the left site without textures and on the right site with textures and additional decorative items, to give depth and scale

Figure 5: Google Sketchup Screenshot of the Aspern Seestadt – street view

5.7 Setting up the augmented-reality test case – export of the model in the AR framework

Due to the integration of the metaio Mobile SDK, setting up the augmented reality test case in ways2gether is quite an easy task. There are only a small number of files necessary that are grouped together in a repository on a FTP-server. Only a small number of files stored in the same directory on the FTP server are necessary. As shown in Figure 6, three files build the ground setup for an augmented-reality test case. Every test case is separated into a single directory. In the file Aspern.config.txt (marked by the red frame), basic configurations are stored, such as the model's location, orientation, and heading. The files surrounded by the green frame, Aspern_JRS_orig.mtl and Aspern_JRS_orig.obj, contain information about the 3D model itself. In addition to these three files, textures used in the 3D model also need to be located inside the directory.

The ways2gether app needs a mobile data connection in order to update new augmented reality test cases. After finishing the update process, there is no further need for mobile data connections as long as no new augmented reality test cases are needed.
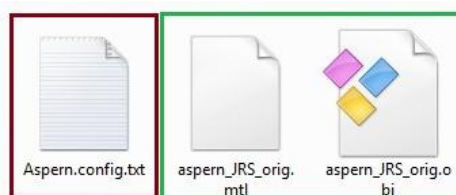
Figure 6: Example files of the Aspern test case used in the ways2gehter project

6 DISCUSSION – THE USE OF AUGMENTED REALITY IN PLANNING AND PARTICIPATION PROCESSES

The initial results of the test cases show a differentiated picture,[2] with around 230 people taking part in the test cases overall. The possibility to be quickly immersed in the situation appears to be an advantage of the augmented reality app. People who are not involved much in creating plans or only rarely read plans in particular can quickly imagine the situation in reality.

Figure 7: Test of the ways2gether App in Seestadt Aspern, Vienna

6.1 First results of the test cases

Augmented 3D visualizations have the advantage that spatial relationships are visible immediately. Thanks to augmented reality it is no longer necessary to explain the difference between the reconstruction represented by objects in the 3D model and the already existing environment. It also helps to overcome language barriers because the model is for the most part self-explanatory. The possibility to view the object from all directions and to move freely within the model is especially seen as an improvement in contrast to traditional renderings presented on paper. In traditional renderings on paper the perspective which is chosen is usually the most attractive. By using an augmented-reality app where you can navigate freely, the possibilities for manipulating perspectives are reduced. The augmented reality app can also provide a better indication of the height of buildings or different ground levels. The option to view objections from a child's perspective was a very interesting feature for most people. In the child's perspective mode the height of all objects inside the 3D model is doubled and by activating this feature the user can put himself into a child's perspective in order to better understand which visual barriers a young child (between seven and ten years old) has to deal with every day. Additionally, the use of iPads was a strong magnet for many teenagers and young adults who otherwise usually are not represented in participatory processes. This younger group reported that the use of new technologies was definitely a motivation for their participation.

6.2 Accuracy of positioning

Urban street canyoning in particular causes a higher inaccuracy of the GPS signal, which influenced the positioning of the 3D object decisively. Metallic elements such as tram tracks, window frames or passing cars influenced the accuracy of the compass which in turn influenced the orientation of the 3D model. When it comes to projects in already built environments it is especially important that the model fits very well into the existing reality otherwise it may lead to misunderstandings among the users.

The implementation of LLA codes – QR (Quick Response) codes containing the latitude and longitude of the current position was tested in order to improve the accuracy of the device's postion. By using LLA codes the device's location can be determined within one-meter accuracy. However, due to the usage of QR codes, the key advantage of the augmented reality app – moving freely within the model – is lost because the user is tied to the location of the QR code.

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[2] To evaluate the ways2gether app, a comparison of means (t-test) was applied. One group used analog plans, the other the AR app. Part of the results of this evaluation is documented in another CORP paper by Martin Berger, Mario Platzer, Christoph Schwarz, Thomas Pilz (2013) Neue Instrumente der Partizipation: Vergleich von Augmented Reality und Perspektiveskizzen im Rahmen des Shared Space Projektes Alleegasse in Hartberg.

A manual control unity was also integrated into the app during the development process so the user could manually modify the three axes of the model, whereby the model could be located more precisely. This workaround still allows the flexibility to freely move within the model. The disadvantage is that a strong three-dimensional imagination is required and the functions of the augmented reality app need to be known in detail. In the test cases for the project therefore guided tours were conducted in small groups with a maximum number of five participants. During these tours a trained person calibrated the model exactly by hand and afterwards the iPad was handed over to the participants.

When it comes to decision-making processes in particular a high accuracy of models and a precise positioning are necessary. It is expected that the usage of special digital video process algorithms, such as edge detection, will prove to be an improvement since the accuracy of GPS systems cannot be greatly increased in the foreseeable future,. Metaio is currently working on a semi-automatic snap-in (snapping) mechanism presented on the insideAR2012 (c.f. Metaio snap-in 2012) that could help to fit the model to its designated location. This feature works with object recognition using the camera of the mobile device. Once a manual setup of the 3D model is done by a user, the model will be automatically located in the correct position and this manual set up can be stored permanently so it is only necessary once.

6.3 Accuracy of the model

Due to current technical limitations, only a low level of immersion – how "real" the virtual world feels – is possible. Some participants in the test groups were a little bit disappointed about the low-detailed objects inside the 3D model because they were already used to the photorealistic renderings used for 3D movies or in computer games. The restriction of the used augmented reality framework regarding the amount of displayed faces and the absence of shadows inside the model reduces the immersion. However, test cases have also shown that the disappointment regarding the quality of representation is, in most cases, only experienced by people who already work in the planning sector.

It is also important to mention that for presenting first drafts – which is often necessary in participation processes – a more reduced schematic representation is necessary to give the impression that changes are still possible and suggestions and feedback are valued and will be taken into account.

6.4 Workflow

As mentioned in 5 there are a number of steps necessary to go from conventional plans or 3D models to the final augmented reality test case. It has been shown that the basics for an augmented reality model can be developed with existing and popular programs. The earlier in the planning process the decision to use an augmented reality model is made, the more easily it can be integrated into regular planning and participation processes. Augmented reality instruments can be used in many phases of the planning process, from the presentation of the first drafts up to the visualization of results.

The Austria-wide (and probably European-wide) first concretely applied test of an augmented reality app in the field of planning tested under real conditions has shown that these tools have great potential to increase the quality of participatory processes. Moreover, the augmented reality app is a helpful tool set and could help to expand the visualization and the presentation of results in planning. The app can also be used as an additional tool to extend the visualization and result presentation in planning.

7   REFERENCES

AZUMA, R. T.: A Survey of Augmented Reality. In: Presence: Teleoperators and Virtual Environments 6. Volume 4 (August 1997), 355 – 385, 1997.
AZUMA, R.; BAILLOT, Y.; BEHRINGER, R.; FEINER, S.; JULIER, S.; MACINTYRE, B.: Recent advances in augmented reality. In: Computer Graphics and Applications. IEEE, Volume: 21, Issue: 6, 34 – 47, 2001.
BERGER M., FALLAST K., FELLENDORF M., KOVACIC G., MAIERBRUGGER G., NOVAK S., PLATZER M., SCHRENK M., SCHROM-FEIERTAG H., WASSERBURGER W.: Planungswerkzeuge in Raum- und Verkehrsplanung – quo vadis?. In: Schrenk M., Popvich V., Zeile P. (Hrsg.): Proceedings Real Corp 2011. Essen, 2011.
JAUSCHNEG M., STOIK, C.: Zielgruppeneinbindung in Verkehrsplanungsprozesse mittels neuer Technologien?. In: Schrenk, M., Popvich V., Zeile, P., Elisei, P. (Hrsg.). 2012. Proceedings Real Corp 2012. Schwechat. 2012.
JUNGHANNS S., SCHALL G., SCHMALSTIEG D.: VIDENTE – What lies beneath?, A new approach of locating and identifying buried utility assets on site, In: Proceedings of the 5th International Symposium on LBS & TeleCartography (LBS´08), showcase, Salzburg, Austria 26.-28. November 2008.
TÖNNIS M.: Augmented Reality. Einblicke in die Erweiterete Realität. Springer Verlag. Heidelberg/Dortrecht/London/NewYork, 2010.

CARMIGNIANI J., FURTH B,: Augmented Reality: An Overview. In: Furth B. (Ed.): Handbook of Augmented Reality. Springer Verlag. Heidelberg/Dortrecht/London/NewYork, 2011

KALLENBERG, P.: Programmierschnittstellen von Augmented-Reality-Browsern im Rahmen des Projekts „Augmenture". In: Kloos U., Martínez N., Tullius G. (Hrsg.): Informatics Inside: Grenzen überwinden –Virtualität erweitert Realität. Hochschule Reutlingen. Reutlingen, 2011.

NASH A.: Web 2.0 Applications for Collaborative Transport Planning. Schrenk M., Popvich V., Zeile P., (Hrsg.): Proceedings Real Corp 2010. Vienna, 2010.

REINWALD F., DAMYANOVIC D., STOIK C., JAUSCHNEG M.: Lastenheft AR-App. ways2gether – Zielgruppenspezifischer Einsatz von Augmented Reality und Web 2.0 in partizipativen Verkehrsplanungsprozessen. Wien, 2012.

REINWALD F., MURG S., DAMYANOVIC D.: Anknüpfungspunkte für Web-2.0- und AR-Instrumente in Verkehrsplanungs- und Beteiligungsprozessen und ihre Umsetzung. In: Schrenk M., Popvich V., Zeile P., Elisei P. (Hrsg.). 2012. Proceedings Real Corp 2012. Schwechat. 2012.

SCHULTHEIß R.: Mobile Augmented-Reality auf Smartphones mit dem AR-Browser Junaio. In: Kloos U., Martínez N., Tullius G. (Hrsg.): Informatics Inside: Grenzen überwinden –Virtualität erweitert Realität. Hochschule Reutlingen. Reutlingen, 2011.

VLAHAKIS V., IOANNIDIS N., KARIGIANNIS J. N., TSOTROS. M., GOUNARIS. M., STRICKER. D., GLEUE, T., DAEHNE, P., ALMEIDA L. : Archeoguide: an augmented reality guide for archaeological sites, In: Computer Graphics and Applications, IEEE, Volume: 22 , Issue: 5, 2002

ZEILE P.: Echtzeitplanung – Die Fortentwicklung der Simulations- und Visualisierungsmethoden für die städtebauliche Gestaltungsplanung. Doktorarbeit. Technische Universität Kaiserslautern. Kaiserslautern, 2010.

Geographic Information System for Land Acquisition Process: A Social Need for Road Infrastructure Development in India

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1   ABSTRACT

India is a developing country and it requires fast space quality infrastructure development, which is the need of current times. For any development, land is required and the land belongs to the people. Government is acquiring land for public purpose for the development of National Highways through National Highway Act of India 1956. Acquisition of land for public purpose displaces people, forcing them to give up their home, assets and means of livelihood. The Government of India (GoI) recognizes the need to minimize large scale displacement to the extent possible and, where displacement is inevitable, the need to handle with utmost care and forethought issues relating to Resettlement and Rehabilitation (R&R) of Project Affected Families (PAF) and formulate R&R Policies (NRRP 2007). But the ground reality differs from R&R policy. For assessment of land details are recorded in a system which is more than two hundred years old. This conventional system is not fulfilling the changing demands of time and ground truthing of space. The upcoming technologies such as Geographical Information System (GIS), data warehousing and web based information dissemination shall be very much helpful in land records management for decision making, strategy planning and predictive modeling. The use of these technological leverages can make land records management efficiently.

Since time immemorial, it has been a constant endeavour of human being to pursue various aspects of life with ease. In the present era of high-end computing, this endeavour of simplifying things is well achieved by an effective tool like GIS, when applied to, as complicated a process as land acquisition. Unlike the conventional procedure of simultaneous handling of various maps such as village cloth maps, engineering drawings and Layout plans etc., which are of different scale, GIS helps to prepare the maps and peruse the maps of multiple types at the same instance through registration of geographic coordinates. The concept of layer mechanism and subsequent superimposition one above the other is used so as to store both non-spatial and spatial data in different thematic layers. GIS technique has determined a fair and accurate location of linear alignment of proposed road corridor from current highways and to manage cadastral information which has to be obtained by satellite imagery, land records, Physical survey and land parcel creation more proactively by Overlay Analysis in accordance with name of the village and plot number basis. For the planners this entire process is made available at fingertips at the Personal Computers (PCs) without unfolding the age old cloth maps. The major hindrance in acquisition is calculation of proposed required area from a specific parcel or environmental sensitive areas, defense lands, alteration of topography etc. Through this approach an effort is made to analyse the various causes of mismatch between the map area and the old-recorded area and also the present manual system of superimposition of maps. In this context this paper describes a proposed automated process of land acquisition through Geographic Information System there by reducing the malpractice of resettlement and rehabilitation issues particularly in road development project in India.

Keywords: Geographical Information System, Land Acquisition, Land Parcel, Data Warehousing, Web based data Information system, Overlay Analysis.

2   HISTORY OF LAND RECODS

The Process of Land Records Management in India is very old. The Arthsastra is supposed to be the first Indian work to mention of the village officers known as "gopa" maintained records on village fields, transfers, due taxes, etc. but that was in a very rudimentary level. Attempt to reform the system was first made by Sher-Shah-Soori (Ruled from 1534-1545) whereby land was categorized, measured and a schedule of crop rates fixed. The system was reformed during Mughal King Akbar regime (Ruled from 1556-1605) by adviser Todar Mal. The subsequent colonial rule by the British implemented the system on scientific lines whereby large scale cadastral surveys were conducted to demarcate the boundaries and extent of each individual landholding, Soil fertility to levy revenue from landholders of each and every village. A "Patwari or Revenue Officer" was responsible for collecting agricultural revenue, reporting the transfer or transition information, maintaining pedigree database and managing land records of the area of his jurisdiction that is

known as a Patwar circle. After passing about two hundred years the system retain the same character and only minor changes have been made according to the needs of the time.

3 OBJECTIVES OF THE STUDY

- Understand existing land record system of India
- Identify Land acquisition act in the case of development of National Highways,
- Methodology for collection of land records
- Steps for preparation of land acquisition plan
- Suggest procedure for developing a computerized Land Records in Road Project Interface
- Information Management System and its implementation plan, for decision making and strategy planning.

4 LAND RECORD SYSTEM OF INDIA

Land record system is at transition stage from 200 year old land record system to more advance computerization systems now. The Computerization of Land Records (CLR) was started in 1988-89 with the intention to remove the inherent flaws in the manual system of maintenance and updation of Land Records. In 1997-98, the scheme was extended to tehsils to start distribution of Records of Rights (ROR) to landowners on demand. So far the scheme has been extended to 582 districts and 3286 tehsils. Computerized copies of ROR are being issued to landowners from 1976 tehsil/taluks across the country. This project can safely claim to be the first successful initiative of e-Governance in India, at the grass-root level. The focus of the entire operation has always been to employ state of the art information technology (IT) to galvanize and transform the existing land records system of the country.
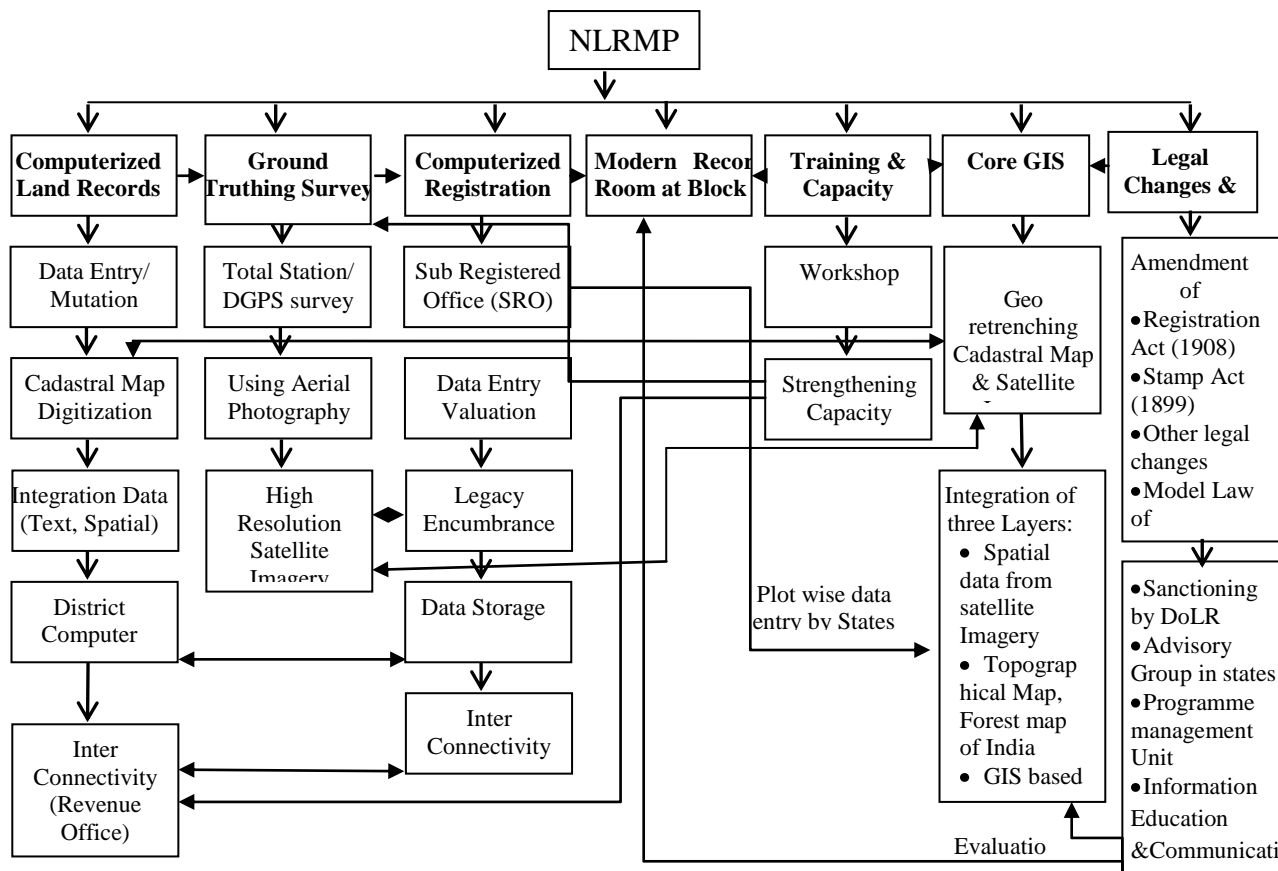
Fig 1: Basic System Architecture towards NLRMP

The Government of India has decided to implement the Centrally-Sponsored scheme in the shape of the National Land Records Modernization Programme (NLRMP)[4] by merging two existing Centrally-Sponsored Schemes of Computerization of Land Records (CLR) and Strengthening of Revenue Administration and Updating of Land Records (SRA&ULR) in the Department of Land Resources (DoLR),

Ministry of Rural Development[1]. The integrated programme would modernize management of land records, minimize scope of land/property disputes, enhance transparency in the land records maintenance system, and facilitate moving eventually towards guaranteed conclusive titles to immovable properties in the country. The major components of the programme are computerization of all land records including mutations, digitization of maps and integration of textual and spatial data, survey/re-survey and updation of all survey and settlement records including creation of original cadastral records wherever necessary, computerization of registration and its integration with the land records maintenance system, development of core Geospatial Information System (GIS) and capacity building. The following is an outline of the components and activities to be taken up under the NLRMP.

5 IDENTIFICATION OF LAND ACQUISITION ACT IN THE CASE OF DEVELOPMENT OF NATIONAL HIGHWAYS

The importance of land requirement in development projects needs no introduction. The ownership of such land may vest with the Government or any private person. For linear pattern projects such as the construction of roads, canals, pipelines, etc., minimum horizontal strip of land is required for acquisition. The land acquisition is generally spread over administrative boundaries of different districts. This necessitates co-ordination between the concerned administrative units. Further, another general feature observed is of encroachment along such linear projects. In this project, on examination it has been observed that such encroachment (Government Land) has been prominent at settlement stretches along the corridor. Such encroachments will be cleared due to requirement of land for the project corridor improvement.

Acquisition of Private Land: However, for the legal private property holders, the acquisition of the land would be taken-care of under the aegis of the Land Acquisition Act 1894 (amended 1984) (L.A Act)[2]. The L.A Act is applicable to all parts of India, but Land Acquisition by this process is lengthy. So for faster land acquisition National Highway Act of 1956 has introduced. Under the provisions of this act, the Government or any department of the Government can acquire land from the people for public purpose.

Legal Framework for Land Acquisition: With the increase of movement of traffic on account of industrial advancement it was found necessary that important highways of the country be developed and maintained by the Central Government. To achieve this objective The National Highways Bill, 1956 was introduced in the Parliament. The Land Acquisition (LA) for this project is to be undertaken in accordance with the provisions of this act. The following are the major provisions of the act for the land acquisition:

Section 3A: Provides for notification to landowners (Notification should be published in two daily newspapers; one in the regional language and the other in English. The same should be published in the Hindi Government Gazette) about the interest of the Government to acquire the notified land;

Section 3B & 3F: Provides power and right to the person authorized by the central government to make inspection, survey, measurements, valuation or inquiry;

Section 3C: Permits landowners to express their objections against such land acquisition;

Section 3D: Declaration of acquisition if no objections has been made to the competent authority;

Section 3E: Provides power to take possession of land once the amount determined by the competent authority has been deposited under sub-section (1) of section 3H;

Section 3G: Allows the competent authority to decide on the compensation to be paid;

Sections 3H: Provision for deposit of payment determined under section 3G in the manner as may be laid down by rules made in this behalf of the central government and

Under Section 3J: As per the provision of this section nothing in the Land acquisition act 1894 shall apply to an acquisition under this act.

6 METHODOLGY FOR COLLECTION OF LAND RECORDS

In order to determine the extent of private property that will be acquired under the project, it is requested the respective District Magistrate of the district to arrange through the concerned revenue officials to provide the Revenue maps of all the villages through which the corridor traverses. The concerned officers from the Revenue Department of different Talukas/Tehsils of respected District were then approached to obtain a copy of the village maps with the demarcated individual plots. The widening plan developed as part of the

Feasibility study was superimposed on these village maps to identify the individual plots that are being affected. The plots numbers of these affected plots were provided to the Revenue Officer for verification of plot numbers and provide the land records for each of them. All this has been compiled as part of the Land Acquisition Report, an independent document prepared for the project.

7 STEPS FOR PREPARATION OF LAND ACQUISITION PLAN

Summary of procedure adopted for land acquisition plan are followed:

Step-1 (Project Initiation): The user agency shall issue letters to Concerned District Collectors, acknowledging them about the project and also ask for providing necessary documents to the user agency. District Collectors have issued letters to Tehsildars, who consecutively directed Revenue Officer to provide respective Village Maps, Revenue Records and Cost of Land to the User Agency for preparation of LAP.

Step-2 (Identification of Villages): The user agency shall identify the villages through which the project corridor is passes.

Step-3 (Collection of Revenue Maps): After the identification of villages, the user agency shall approach respective Revenue Officer for collecting Revenue Maps

Step-4 (Overlapping of Revenue Maps): Once after gathering Revenue Maps, the proposed widening plan would be overlapped or superimposed on the Revenue maps with the help of software packages.

Step-5 (Identification of Affected Plots): The exercise of overlapping could bring out specifically the affected plots. Such affected plots have been market out.

Step-6 (Demarcation): After identification of affected plots, the specific area of the affected plot could be demarcated.

Step-7 (Collection of Land Records): On demarcating the affected area, land records would be collected from Revenue Officer. This could fulfil the requirements of 3A.

Step-8 (Compilation): After collecting land records for all the plots from respective Revenue Officer, the same has been sorted out for affected plots.

Step-9 (Final Land Acquisition Plan): All the information collected from Revenue Officer has been worked out with respect to proposed widening plan there after the final land Acquisition Plan was prepared.

8 FRAMEWORK FOR DEVELOPING COMPUTERSIDED LAND RECORDS IN ROAD PROJECT INTERFACE

In conventional system, query of land records is laborious, time consuming and revolves round a single person (Patwari) that is why integration of geographic data and their pertinent alphanumeric data is indispensable to develop and maintain a comprehensive Land Records Information Management System (LRIMS). The geospatial techniques of the present information age can prove to be very useful to transform the conventional system into an efficient, easy-to-use, updatable, remotely accessible and above all practically applicable LRIMS. The proposed system will not only be useful for the revenue department regarding Information updating, query, reporting, customization, leakage detection and predictive modeling but will also beneficial for other system stakeholders regarding the identification of legal precinct of their respective lands. For land acquisition plan in road infrastructure man machine interface model makes data capturing, ground truthing, plot details, land parcel details and acquisition plan more accurate and less time consuming. As NRLIP is only used for land records and revenue collection but through interface of different stakeholders and department of India LRIMS may role pivotal for decision making process as under:

LRIMS in Road Proiect

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┌──────────────┐      ┌──────────────┐      ┌──────────────┐      ┌──────────────────┐
│   Baseline   │◄────►│ Organization │◄────►│    Public    │      │ System Management &│
│ Information   │      │  Interface   │      │ Participation│      │ Maintenance Module │
│    Module    │      │    Module    │      │    Module    │      │                    │
└──────────────┘      └──────────────┘      └──────────────┘      └──────────────────┘
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Map Interface ◄────► Inter Disciplin ◄────► Public Notice ◄────► Data Updation,

Attribute Data — Plan Act, Notification — Public Opinion — Ground Truthing & updation

Land Acquisition Plan
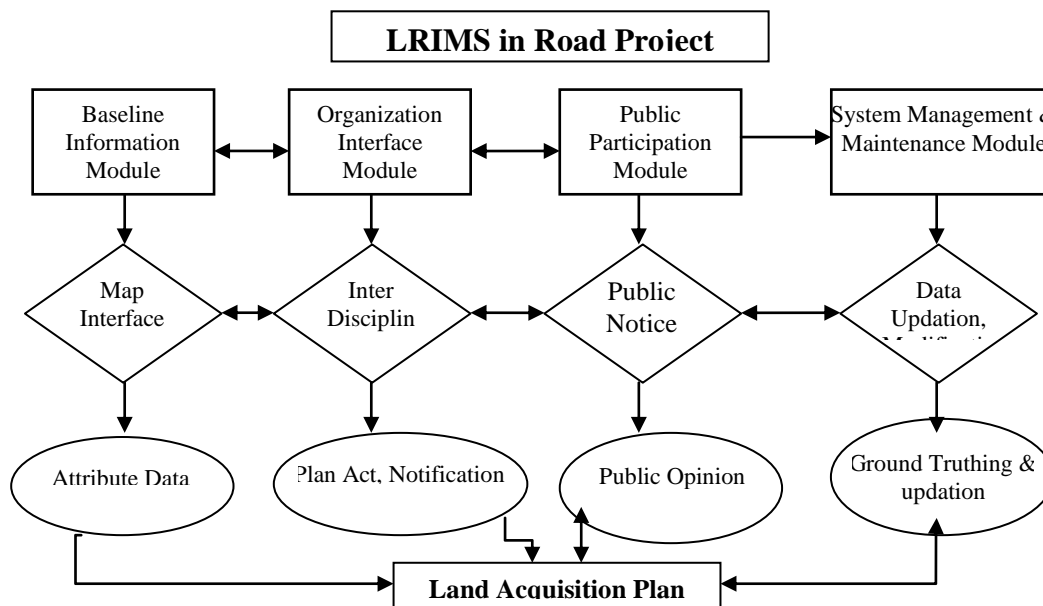
Figure 2: Land Records Information Management System (Land Acquisition Plan)

Base line information Module: The base line information module basically comprise of map, graphic, raster image, base line information, attribute data related to spatial information in one platform i.e. Geographic Information system (GIS)[3]. The module will have the have capabilities of querying building, presentation of the result of the query in both graphical and tabular presentation through overlay analysis. The information system will have zooming facilities starting from 1:1or 2 million scale and zooming up to 1: 500 scale depending upon the resolution imagery and the level of study (Figure:3)

CLIMATE & RAINFALL MAP
GEOLOGY MAP
REVENUE MAP
ENGINEERING DRAWING
DRAINAGE MAP
VEGETATION MAP
SOIL MAP
SATELLITE IMAGERY
TOPOSHEET
SEISMIC ZONE MAP
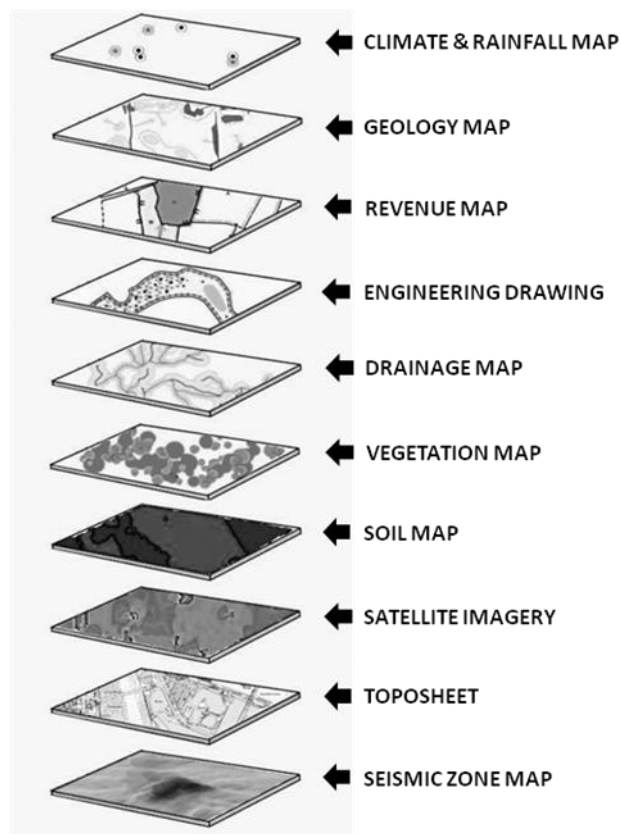
Figure 3: Baseline Information Mapping

The information content of this module will be cadastral map showing details of each land parcel with physiography, Demography, Landuse, Physical and Social infrastructure, sensitive location, housing, open areas, transportation (road, rail, waterways), utilities (water supply, electricity), hot spots, location of

monuments, polluted stretch, problem areas, tourist spots, pilgrim areas, tribal settlement, earth quack prone areas and environmental status and their details etc.

Organizational Interface Module: Broadly speaking in Indian scenario the development, management and decision making bodies for road sector are Ministry of Road and Transportation (MoRTH), National Highway Authority of India (NHAI), Public Works Department (PWD), Rural Road (MDR), Border security Force (BSF). But these bodies are individual. This module will have three sub modules with highway, state roads and others roads. This module will contain alphanumeric data like Jamabandi, Khasra Girdawari, Pedigree Sheet. The basic booklet to be incorporated in thin module will be Government notifications, norms, infrastructure development standards various gazetteer, guidelines and directions published by Government.

Public Participation Module: Public participation is one of the major tasks in land acquisition process. Sections 3A to 3H are involved with different stakeholders. The module will act as a platform for sharing the plan and progress of land acquisition in this computerized interface. This module will contain land parcel details, status of acquisition process, disbursement of compensation and public grievances.
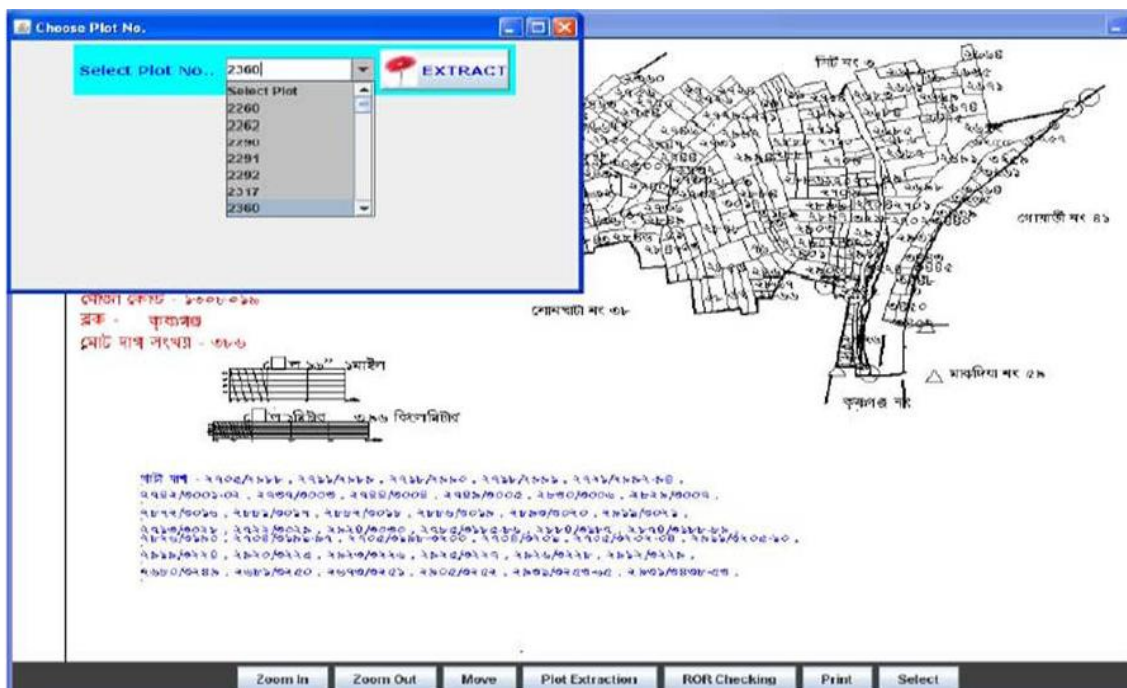
Fig 4: Public participation Module

The system management and maintenance module: The module deals with the maintenance and management of the LRIMS in Land Acquisition system itself. It is basically a user management module. It deals with the various authorization for access, viewing, updation, modification of data, information etc. The user management function may add and delete users for the system and moreover the module-wise authorization will also vary. The data, graphic and map updation may authorized to different user to update the baseline and other information. The system management will be at block level, district level and state level. The average users will only be able to use data, analyse and compare the data but could not be able to revise, add, delete or modify.

9   INFORMATION MANAGEMENT SYSTEM AND ITS IMPLEMENTATION

Integration of Field Measurement Books (FMB) and alphanumeric data is indispensable to have a full-fledged LRIMS. The technologies like GIS, spatial data warehousing and web are very mush helpful to generate a complete LRIMS. All Block offices will have right to update the information as well as to keep a track of ownership, crop yield and revenue and as well as land acquisition status on it. With the aid of these recent technologies all the land record information will be under fingertip (click of mouse). The implementation of this interface will help:

A gateway to dynamic planning: A developing country like India which is in the transition stage of office automation this information system will act as platform of integration of traditional data and information system and the modern and dynamic GIS based information system.

Efficient data management: Land acquisition exercise needs a wide range of data and information. In GIS platform every data and information are stored in different coverage. It helps in integration and differentiation of graphic and data base information with the data table and text.

Tools for data analysis: This information system has the capability of performing the user – based data query. The types of data analysis used by infrastructure planners, developer, decision maker, land owners will be different from the academician, general public. Ever user will retrieve, plot, and analyze the data as per the requirement.

Transparent planning: With the dynamic nature of the information flow the planning, monitoring and management exercise will be more transparent.

Active public participation in planning: the proposed information system will be web based and it would not be software biased. Information Technology could be opened with any operating system. As all the information are easily available the people will be able to take active participation in the land acquisition and developmental activity.

10 CONCLUSION

Modern GIS integrates various kinds of advanced, dynamic, multi-layered, time series data and graphical information which transform the tedious data analysis job to a faster, dynamic and realistic exercise. Regular updation of information makes the monitoring and management of land parcel in records more transparent and realistic approach towards road development. This information system can be used as a tool for road development as well as it can also be a useful support system for change of ownership, land value evaluation and ultimately land acquisition.

11 REFERENCES

[1] Y.V.N. Krishna Murthy, S. Shrinivaa Rao, D.S.Shrinivanan & S. Ardiga, 2000, "Land Information System (LIS) for rural development", Technical proceedings, Geomatics 2000.
[2] C. Umashankar & Bhaskara Rama Murty, 2000, "Implementation of an Integrated Land Records System, Geomatics 2000.
[3] Fred Gifford, 1999, "Internet GIS Architectures—Which Side Is Right for You?" May, 1999, Geo World.
[4] Guidelines of NLRMP, 2009

Geomedia Skills – a Required Prerequisite for Public Participation in Urban Planning?

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1 ABSTRACT

In recent years, the way we communicate and exchange information has undergone tremendous changes. Among other aspects, this is triggered by rapid advances in modern ICT. Meanwhile, communication processes, which are increasingly Web 2.0 mediated, enable reflective and participatory practice, and the use of geomedia (i.e. supporting geovisualisation and geocommunication). Besides, influencing work life and private life, this has also impact on the field of civic responsibility (a core element to democratic societies). A prominent example therefore is the involvement of citizens in urban planning processes. For participatory urban planning the use of Web 2.0 tools, closely linked to geomedia use, opens up a wide range of opportunities in all planning process steps. This encompasses activities related to providing information, consultation, collaboration, and taking part in decision making.

The handling of geomedia – and thus being able to contribute to urban planning processes – requires for particularly skilled citizens, who currently are mostly missed in society. While school education has recently started to consider geomedia competencies as an essential topic, opportunities for such empowerment for adults barely exist. However, to allow planning processes to benefit from ICT and geomedia use, suitable activities in the field of adult education and learning need to be established. Facing this gap, this paper discusses the topic of how adults can become spatially prepared, i.e. how adults' geomedia skills can be developed and strengthened with the intention to permit them to participate in urban planning processes.

2 INTRODUCTION AND BACKGROUND

Today, cities and urban areas get increased attention all over the world. Topics such as rapid urbanization (e.g. Sao Paulo, Brazil), discussions about smarter cities (e.g. Amsterdam, The Netherlands), the need for green cities (e.g. Chicago, USA) and sustainable cities (e.g. Vancouver, Canada), as well as urban deconstruction and reconstruction (e.g. shrinking cities like Leipzig, Germany) provide various challenges for urban planning.

Urban planning, i.e. city planning, is a special branch in the spatial planning domain. It is concerned with settlements and related spatial arrangements, and determining the conditions for the location of structures in urban space. It is widely acknowledged that successful urban planning processes generate economic growth, social and environmental harmony, political advances as well as scientific progress, while missing, poor, or unfavorable urban planning causes social exclusion, poverty, uncontrolled urban sprawl, and environmental problems (UN-HABITAT 2008; URL 1).

Carried out by experts such as (urban) planners, architects, and geographers, urban planning makes use of particular frameworks such as the strategic planning process. These processes consist of several steps corresponding to generic problem solving procedures: They begin with problem definition, involve various forms of analysis, and finally move to prediction and solution design. To solve the problem they also take into account and evaluate alternatives (Hall 2002).

Over the years the way spatial planning processes are conducted changed. Randolph (2004:16) points out: "(…) public participation grew in the 1970s, communication became the emphasis in the 1980s, and the 1990s saw more collaborative approaches involving stakeholders and partners reasoning together."

Thus, pivotal elements, which meanwhile are increasingly linked to urban planning processes, and which open up numerous opportunities are

(1) the involvement of the general public (public participation);

(2) the integration of modern information and communication technology (ICT), i.e. Web 2.0 tools; and

(3) the use of geomedia.

2.1 Public participation and (urban) spatial planning

Today public participation is broadly accepted as a paradigm in support of sustainable spatial planning as well as urban planning. Due to the specific circumstances found in cities, urban planning, more than other planning branches, relies on collaboration between various groups. This encompasses people in authorities, planners, and the general public (Jiang, Huang & Vasek 2003). Advantages refer to give consideration to the multifaceted and oppositional demands made by a growing and highly-divers city population, to become aware of existing conflicts, and to make better-informed and well-grounded decisions.

In doing so, it has proved especially advantageous to involve citizens in all tasks and steps appertaining to urban planning processes: Throughout the entire process citizens can be allowed to contribute, comment, amend, and evaluate information (Jankowski 2009; Renn et al. 1993). Following the so-called ladder of participation this can take on different levels: level 1: inform; level 2: consult; level 3: involve; level 4: collaborate, and level 5: empower (IAP2 2007). In consequence, many urban planning initiatives and projects see citizen participation to be a pivotal element (see e.g. URL 2).

2.2 Public participation and the development of Information and Communication Technology (ICT)

Due to the rapid advance in ICT in recent years, tremendous changes were generated in the way the general public can become involved in planning projects (Ramasubramanian 2010). As presented in Table 1, therefore digital media provide various opportunities (Da Trindade & Wehrhahn 2010; Milovanovic 2003).

	One-way communication	Two-way communication			
	Inform	Consult	Involve	Collaborate	Empower
Objectives	To provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities, and solutions.	To obtain public feedback on analysis, alternatives, and decisions.	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.	To place final decision-making in the hands of the public.
Techniques	Fact sheets Open houses	Public comment Surveys Public meetings	Workshops deliberative polling	Citizen advisory committees Consensus-building Participatory decision-making	Citizen juries Ballots Delegated decision
ICT Example	(Basic) Web sites	On-line polls	On-line discussion forums	On-line services, forms & documents in electronic form	On-line decision making support systems

Table 1: Spectrum and technics of public participation (Hennig & Vogler 2011)

Benefits of incorporating modern ICT in planning are numerous and well-known. Some examples are: a large number of people can get involved in discussions, the exchange of ideas, and in opinion surveys without attending meetings personally at fixed times (bad timing) and fixed locations (far away; bad connection to public transport etc.); the speed of communication between the interested persons can be increased; and the quality of communication can be improved given that quiet, reserved, and less eloquent persons get the possibility to contribute. As highlighted by Jiang, Huang & Vasek (2003) and Milovanovic (2003), better planning results emphasize the positive effects of using according tools. Hence, for planners demand is growing to apply new communication tools allowing for public involvement via Internet (Devisch 2008; Evans-Cowley 2010).

2.3 Geomedia, geovisualisation and geocommunication

Owing to the spatial reference of its objectives, the use of geomedia always plays a central role in spatial planning, in which it considerably improves decision-making (von Haaren 2004). In the context of public

participation the use of geomedia must be underlined as important media for visualization and communication, i.e. geovisualisation and geocommunication (Sieber 2006).

Broadly defined, geomedia denotes any digital information or media that provides a spatial reference. This spans a wide range of representation forms including simple verbal descriptions (e.g. route descriptions), complex digital maps (web maps, digital globes), and spatial data. Further, it comprises location based services and location based communication via spatialized social media platforms (Gryl et al. 2010).

Geovisualization refers to a set of tools and techniques that support spatial data analysis through the use of interactive visualization. By this means, geomedia is communicated in ways that, when combined with human understanding, data exploration and decision-making processes are assisted. Particularly relevant therefore are interactive digital maps: While traditional, static maps (i.e. analog or paper maps) have a limited exploratory capability and the graphical representations are inextricably linked to the data beneath, owing to the use of appropriate functionalities interactive, digital maps allow for extended ways to discover the visualized map content. This relies e.g. on the ability to explore different layers, to navigate a map (zoom, pan), and to change the visual appearance of a map (Jiang, Huang & Vasek 2003; Jiang & Li 2005; MacEachren et al. 2004; MacEachren & Kraak 1997).

Geocommunication is characterized by the use and combination of different types of multimedia elements (text, photo, image, animation, audio and video file etc.) as well as geomedia. In doing so, geomedia is accompanied by explanations and multimedia elements in order to clarify the presented content and give context (Hennig, Vogler & Jekel 2011). At that, a high number of users can collaborate in production and consumption of according features (so called collaborative mapping), employing interactive functionalities provided by computer-based tools (Brodersen & Nielsen 2006; Jobst 2009).

Tools leveraging the power of geomedia (i.e. geovisualisation, geocommunication) in the scope of participatory planning are numerous. Applications used are e.g. simple web mapping tools (allowing for collaborative mapping; e.g. Google Maps, Bing Maps, ScribbleMaps, ArcGIS online, Open Street Map); PP GIS (public participation geographic information systems) developed to benefit from user generated content (i.e. volunteered geographic information); specific social media platforms (allowing for discussions between different actors using text, geomedia and multimedia in a combined way); and geoportals (user interface to spatial data infrastructures; INSPIRE, Open Government Data).

2.4 Arising needs in the framework of public participation, modern ICT and geomedia use

Due to the above outlined changes (concerning public participation, modern ICT, and geomedia use) the spatial planning domain faces several challenges: (1) to elaborate suitable methods and techniques to support participation; (2) to provide appropriate software applications; (3) and to meet the demand for adequately prepared citizens being able to participate in planning processes leveraging ICT and geomedia. Even though in recent years, great attention was paid to the first topics, the last one often and still is left behind.

While pupils through changing school curricula including new teaching concepts and materials are more and more empowered to competently use geomedia, a gap exists on strengthening adults' geomedia skills. However, adults are generally the ones asked to contribute to and to participate in spatial planning processes – as well as to other civic responsibility tasks. In this context, there are still many open questions: 1) How spatially enabled is our society (focusing on Austria)? 2) Which skills are needed to handle geomedia competently (i.e. regarding participatory planning)? 3) How can the public become spatially prepared, i.e. how can adults become skilled geomedia users?

The work presented in this paper is based on experience gained in two projects: "Geomedia 50+" and "AccessibleMap": The "Geomedia 50+" project was carried out in cooperation with the program "University 55-PLUS" (Paris Lodron University of Salzburg; URL 3) and the European network "digital-earth.eu" (URL 4), which supports the exchange of experience and the elaboration of adequate teaching materials. This project focused on specifying competence needs to allow for skilled geomedia use; assessing experience on geomedia use on the part of the general public; and designing an appropriate workshop (including courseware) to endow adults with geomedia skills. The "AccessibleMap" project funded by the Austrian Federal Ministry of Transport, Innovation & Technology within the Benefit program (URL 5) aimed at developing and improving the use of interactive, dynamic web maps according to the requirements of the visually impaired people as well as the elderly.

3   SKILLS ENABLING GEOMEDIA USE

Geomedia empowerment of adults asks for a general understanding of therefore required skills. During the workshop "Geomedia 50+" (first lessons) according aspects were revealed through group discussions with and observation of participants using geomedia and modern ICT. This, on the one hand, allowed for identification and categorization of necessary skills. On the other hand it provided insight into the existing level of geomedia skills amongst the participants. Box 1 gives an overview about selected socio-demographic characteristics of the workshop participants.

Number of participations: 19 (13 finished the course including performance record)

Gender distribution: 14 male and 5 female participations

Education level distribution: 2 hold a Phd degree, 2 hold a diploma's degree (equiv. to M.Sc.), 2 hold a secondary school leaving certificate equiv. to high school, 13 hold a secondary school leaving certificate equiv. to junior high school

Age distribution: 55 to <60 years: 5; 60 to <65years: 4; 65 to > 70 years: 7; 70 to >75 years: 2; 75 to >80 years: 0 and older than 80: 1

Box 1: Selected socio-demographic information on the workshop participants

3.1 Geomedia skills

The competencies needed to allow skilled geomedia use are numerous. Due to the information collected in cooperation with the workshop participants, these skills can be grouped under three categories:

- skills relevant to handle geomedia (produce, use, share, reuse etc.),
- skills relevant to use common Web 2.0 tools, and
- basic (digital) cartographic skills, i.e. knowledge.

These categories and the associated skills are presented in Table 2 and outlined shortly in the following.

Geomedia skills and related tasks & topics

Geomedia skills and related tasks & topics	
ICT / Web 2.0	Register and login
	Publish, share, embed (using different web 2.0 applications)
	Work in a cooperative way
	Use of multimedia (find/create images, URLs, video/audio files; insert, embed, share, these)
	Internet safety issues including topics such as intellectual property rights, and data privacy
Geomedia abilities (focusing on web mapping tools)	Use digital maps (find, open, zoom, pan, explore)
	Create maps and features (markers, lines, areas)
	Add further information (using information windows)
	Handle data files (import, export, transfer)
	Output maps (print, save, export, embed)
	Re-use data (find data, assess data, integrate data)
Geomedia capabilities	Cartographic design: adequate symbology, map picture, background map, use of multimedia
	Multimedia use (transfer data, post, comment)
	Critical reflection on the power of maps

Table 2: Categories and associated skills related to competence needs concerning geomedia use

Non-professional geomedia handling – as it is the case within the framework of participatory planning – bases, among other things, on the use of different types of Web 2.0 tools.

First of all, Geomedia handling asks for the ability to manage web mapping tools and other tools related to geovisualisation and geocommunication. Users must be able to find and open maps, explore maps (by the help of using navigational tools, legends, context information available in information windows or balloons etc.). Beside these basic tasks, users should know how to create own maps and data, i.e. map features (point, line, area), how to import and export data (concerning topics such as data file formats, converter tools), how to add multimedia information (using e.g. information windows, inserting links and images), and how to output and re-use data and maps.

Besides web mapping tools, social media tools (e.g. blogs, forums, social media platforms etc.) play a pivotal role. These Web 2.0 applications allow for publishing and embedding of map objects as well as commenting and discussing on the (geovisualised) content. They require from the users to be familiar with the basics of the principal Web 2.0 philosophy and its main concepts: user collaboration, participation, and interaction. Hence, being able to conduct tasks related to social networking services (SNS) is a prerequisite (Ebersbach, Glaser & Heigl 2011; Richter & Koch 2008): It includes (1) identity management (creating a user profile including access rights; group memberships etc.), (2) expert finding (using different search criteria such as name, interest, company etc.), (3) context awareness (awareness of a common context with other people; essential for successful collaboration), (4) contact management (maintenance of the personal digital network), (5) network awareness (awareness on the activities and status of the members of the personal network and on current changes), and (6) exchange (directly e.g. by instant messaging or indirectly e.g. via bulletin boards).

The purpose of communication is to effectively send a message to the receiver rather or the (map) reader. In doing so, information must be transmitted in a way that people without great knowledge of a subject can perceive and understand the presented subject and can create a pertinent idea of it. To facilitate this, the used media must show and/or explain an object or phenomenon in a vivid and reasonable manner. Use and design of either a single communication medium or a combination of several diverse media is generally based on the functions that the media has to accomplish/fulfill in the communication process (see e.g. Hake, Grünreich & Meng 2002). This requires certain skills and knowledge on cartographic design and multimedia use.

3.2 Level of geomedia skills

Concerning the above mentioned skills (see Table 2), users' knowledge and background vary strongly. This also relates to general computer, Internet and ICT use experience.

A certain level of basic ICT skills (including computer and Internet use skills) constitute the fundament for any competent geomedia handling. It encompasses the use of data, applications, and devices (Möller 2006). While today's young people are described as digital natives (URL 6), most adults lack such native understanding of ICT, Internet, and computer use. Moreover, related skills vary considerable among adults. If not using ICT as part of their working life, these users – particularly the elderly – often show weak or no ICT background at all. Thus, for instance, through surveying and observing the workshop participants it become obvious, that most of them face serious problems in registering for web applications (login), searching the Internet, embedding multimedia elements (e.g. images), and inserting hyperlinks. This is even more true for aspects concerning the use of geomedia. Besides experience to plan a route (using e.g. Google Maps), participants, more or less, were not at all familiar with geomedia handling.

4 CONSEQUENCES AND SOLUTIONS FOR PARTICIPATORY URBAN PLANNING

While participatory urban planning benefits from geomedia use, not only the data and the associated tools are a subject of interest. During the last years they deserved great attention in the context of discussions about spatial data infrastructures (SDI), Open Government Data etc. However, it is not enough to provide user-centered tools and applications if users miss the required skills. Hence, it is equally relevant to enable the public to competently handle geomedia in order to bear their civic responsibilities and duties.

For this, interested persons request support. Solutions accompanying the particular planning process are e.g. (1) help, additional information, and tutorials, (2) e-learning material, (3) webinars, (4) blended learning initiatives, and (5) face-to face workshops, which might integrate all mentioned aspects if needed.

Here, to realize adequate solutions, approaches on GI-education as well as adult education and learning deliver suitable background information. A practical example on how to integrate according topics for adults' geomedia enablement is given by the particularly designed workshop "Geomedia 50+".

4.1 Relevant education and learning approaches

4.1.1   GI -education

To endow spatial literacy a number of educational approaches, which are summarized under the umbrella-term GI-education, exist. Until now, they mainly focus on secondary and higher education. In this context, two diverging conceptual approaches can be outlined, namely "Spatial Thinking" (NRC 2006) and "Spatial Citizenship" (Gryl & Jekel 2012).

The "Spatial Thinking" approach centers on building up GIS skills and aims at enhancing geomedia abilities in order to face an increasing need of GIS professionals in the current and future working environment. In contrast, the "Spatial Citizenship" approach conceptually argues from an everyday life perspective. It targets at fostering geomedia skills to enable everyone to successfully become part of today's emerging spatially enabled society. Relying on social and social geographic theories (see e.g. Werlen 1993) as well as contemporary citizenship education purposes (see e.g. Bennett, Wells & Rank 2009), the "Spatial Citizenship" approach emphasizes three dimensions (see Fig. 1): 1) basic skills in geomedia handling, 2) competencies allowing for a critical reflection on the power of spatial representations such as (digital) maps, and 3) the competence to communicate with geomedia. This shall ensure to have citizens disposing of relevant abilities and capabilities for a critical, reflective, and emancipatory handling of geomedia in modern geocommunication environments. On the basis of this everyday life embedding, and its focus on (post)secondary education, the "Spatial Citizenship" approach provides a reasonable framework for adult education initiatives concerning geomedia use.
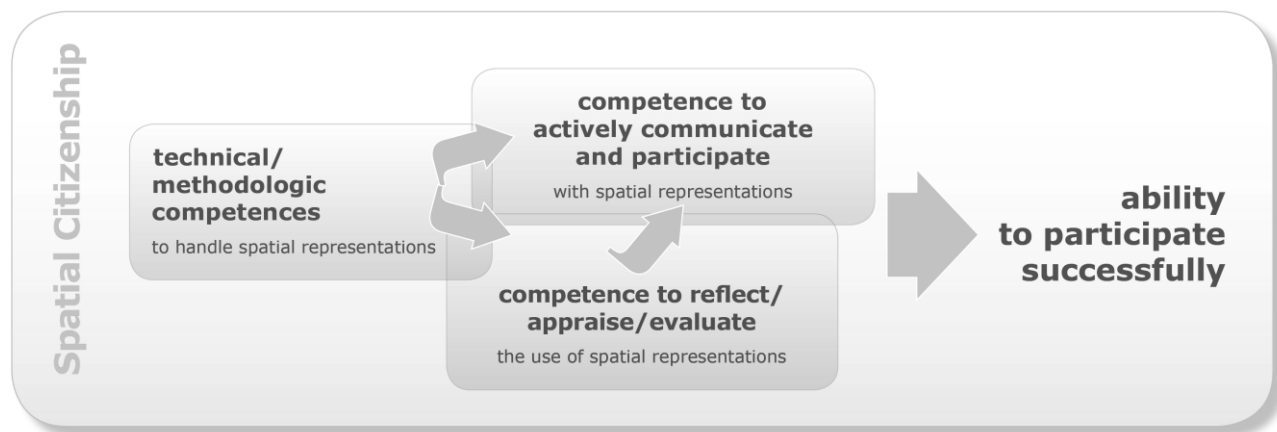
Fig. 1: The concept of "Spatial Citizenship" (Gryl & Jekel 2012)

4.1.2   Adult education and learning

Adult education and learning is considered a strong link in the lifelong learning chain. Recently, it is widely discussed across Europe and steadily gaining importance as it is deemed to have high social and economic significance: It is acknowledged that learning brings equally important benefits for adults' social inclusion, personal fulfillment and development as well as well-being. It enables people to secure an active and constructive role in their communities and in society at large, and can help reduce poverty, health costs and the incidence of criminality (European Union 2006; European Union 2012).

Meanwhile, extensive practical experience and theoretical background on adult education and learning is available (see e.g. Arnold & Pätzhold 2008). General consents exist that adult people learn in a different way from young people: For adults implicit learning plays a central role. They can easily connect new content to already existing knowledge and in consequence have less problems assessing and/ or linking complex topics. Problems are caused by learning under time pressure. Hence, to improve learning outcome it is helpful to give enough time and to recapitulate learning content (BMASK 2010). Ultimately, high quality and attractive adult learning initiatives are most successful (European Union 2012).

As overall concept, support of self-directed learning is essential in adult education and learning. Advantages are numerous: It gives the individual learner greater freedom of choice, it is flexible and it is, by definition, specifically tailored to what learners need (URL 8). Thus, responding to key responsibilities relevant for educators self-directed learning shall target at (1) enabling learners to make informed choices about their development; (2) providing support on an individual, personal level, responding to specific requests for help, (3) providing a range of materials and resources learners can choose those best suited to their personal development needs, and (4) coaching, guiding and assisting learners in using resources and materials to their best effect (URL 8). A selection of principles significant for adult education and learning is listed in Table 3.

Categories	Examples
Action-oriented	Use, tie in with knowledge and abilities of the participants Knowledge on facts and situations Participants ability to decide and judge
Situation-related	Move towards context of everyday life activities Show relationship to everyday life Produce context Experience of the participants
Experience-oriented	Having participants contributing to the course (as co-designer, co-planner)
Science-oriented	Accordance with scientific knowledge
Exemplarity	Course topics as example for other facts and issues Show opportunities for transfer of learning Comparison to other situations

Table 3: Selection of principles significant for adult education and learning (Arnold & Pätzhold 2008; BMASK 2010; European Union 2006)

4.2 Practical example: "Geomedia 50+" – a workshop to build up adults' geomedia skills

The workshop "Geomedia 50 +" (thematically focusing on topics related to Austrian urban areas) was designed and developed based on approaches on GI-education and adult education and learning. The specified list of geomedia skills (see Table 2) was taken into account for the preparation of courseware, the selection of tools, and the elaboration of workshop structure. Selected aspects highlighted in the following sections might provide some guidelines or suggestions on how to face the problem of enabling adults who lack necessary skills to participate in spatial and urban planning processes using geomedia.

4.2.1 Courseware and tools

In order to prepare useful and valuable workshop courseware and to select adequate tools multiple conditions had to be met: It was born in mind that accessibility barriers (might) hamper and discourage participants from the start. As outlined by Neuschmid et al. (2012) and Hennig et al. (2012) – in context with the AccessibleMap" project – this refers to complex computer programs, poorly documented (workflow) instructions, missing additional information (help, user support, glossary etc.), and the use of English language as well as of ICT-specific and planning-specific terms.

Thus, courseware and selected tools not only had to face the situation of varying ICT and computer use background, but also had to consider the need for highly detailed and well-documented training material and description of application use. This allows course participants to (independently) re-pass through learning content and exercises (self-experience). Additional information (access to further information using e.g. links) and exercises support self-directed learning. In doing so, a substantial introduction was given for those characterized by low or no ICT background; those providing advanced background were challenged as they were asked to serve as peer-tutors for ICT-beginners.

Applications belonging to the Google product family were selected to be used in the course. This decision is well-founded: the according tools are easily accessible and usable for everyone (open source, cloud-based storage service); they provide help, tutorials, and user support; and they are available in German language. Further on, they permit to experience a number of different activities related to geomedia handling (see Table 2):

- Google Maps allows users (here: workshop participants) to (cooperatively) create and exchange data and maps. Data can be imported and exported. Multimedia elements and links can be inserted. Several methods exist to share maps with others (send via email, embed in other applications etc.).

- Google Blogger allows users (here: workshop participants) to easily discuss and exchange as well as to publish maps enriching them by verbal information including multimedia and links.

- Google+ allows community building and networking (here: focusing on the workshop participants).

- Google Drive allows sharing of all kinds of documents (doc, xls, ppt etc.) and multimedia elements among a specified community (here: workshop participants). Thus, all materials produced for or during the workshop were made available on Google Drive by both, the educators and the participants.

4.2.2 Workshop structure

The workshop consisted of several units (see Table 4). All course units consist of phases of personal attendance (face-to-face contact) alternating with those relying on self-study and self-experience (self-doing). They combine lectures (imparting necessary theory) with exercises (allowing for practical experience). Time for reflection and recapitulation of the learning content was scheduled in all units. Particularly important was to tie geomedia education with every-day life topics and activities as it is the underpinned for general adult education activities (European Union 2012). Following requirements stressed by BMASK (2010), personal experience, knowledge, and interest were integrated, and benefits were drawn from it. Participants were always encouraged to explore existing possibilities of the used applications and to elaborate individual solutions (e.g. project work).

	Units	Content	Purpose
Personal and group/ team support (f2f teaching, group discussions, email, blog, consultation hour)	Introduction	Collecting participants' perspectives Giving theoretical background Gaining some first own practical experience	Gain insight in participants state of geomedia capabilities and abilities
	Sweetener	Visit of GIS day event hold at University of Salzburg	Provide an overview on the wide range of GI/ geomedia Raise interest and awareness on topics in the context with GI and geomedia
	Handling data and maps	Theoretical Background Practical experience	Provide basic functions of geomedia
	Critical reflection on maps and data	Theoretical Background Practical experience	Provide a critical view on geomedia regarding (political) power etc.
	Project work (team work)	Do a project working (related to an everyday situation) based on learning transfer (prepare a digital map visualizing a self-chosen topic incl. data gathering and management, and deciding on the map layout)	Reflection, recapitulation self-experience
	Presentation	Presentation and discussion of the projects	Reflect on the work done

Table. 4: Introduction of the workshop structure

In the course of the workshop a relevant aspect was to consider the motivational set of the adults: While pupils and in part professionals necessarily have to deal with modern ICT including geomedia, since it is integrated in school education or part of their work, the general public misses such external drivers. Apart from needs triggered by e.g. civic responsibilities and duties, theses users must be seen as self-motivation group. This means that on a first look, no obvious sweeteners exist to encourage this target group to deal with modern ICT and geomedia. Accordingly, it is a pivotal aspect to get these people involved: Adults must be aware of the benefits of acquiring geomedia skills. This asks for inspiration and drive to get them to start activities and further to keep on track.

In addition, courseware and tools must strengthen not only skills on tool use or map design, but also personal attitudes relevant for geomedia use. This covers a wide range of topics: trust in yourself – don't be afraid of

using the computer or the Internet; be curious; transfer of learning concerning the use of other tools (e.g. other web mapping tools); and unfurling the changed way of information and communication etc.

5 CONCLUSION

This paper presented some first practical experience collected in the context of building up geomedia skills on the part of adults. Users providing a certain level of specific competencies are a pre-requisite to allow public participation in urban planning processes benefiting from modern ICT and geomedia. This facilitates to take advantage of important resources for today's' urban planning problems. Education initiatives can therefore draw upon existing approaches on adult education and learning and GI-education

However, it became obvious, that to enable adults to competently use geomedia still a lot needs to be done. Besides, discussions on adults' spatial enablement are closely linked to a number of recently emerging concepts: spatially enabled society (see e.g. Enemark & Rajabifard 2011), societies' digital divide (see e.g. URL 9), and e-Inclusion (see e.g. URL 10). This clearly and further underlines the need for spatial prepared citizens.

6 REFERENCES

ARNOLD, R. & PÄTZHOLD, H. (2008): Bausteine zur Erwachsenbildung. In: Grundlagen der Berufs- und Erwachsenenbildung, Band 53, Schneider Verlag Hohengehren.

BENNETT, W. L., WELLS, C. & RANK, A. (2009): Young citizens and civic learning: two paradigms of citizenship in the digital age. In: Citizenship Studies 13, 2, pp. 105-120.

BMASK BUNDESMINISTERUM FÜR ARBEIT, SOZIALES UND KONSUMENTENSCHUTZ (2010): Internet-Seniorenkurse – Leitfaden für Trainer. Wien

BRODERSEN, L. & NIELSEN, A. (2006): Spatial Data Infrastructure in the Perspective of Modern Geo-Communication. Models, Mutual Dependencies and Definitions. AutoCarto 2006 Research Symposium in Vancouver, WA, Jun 2006.

DA TRINIDAD, S.-C. & WEHRHAHN, R. (2010): Urban Governance und Partizipation. In: Geographische Rundschau 7/2010, pp. 42-49.

DEVISCH, O. (2008): Should planners start playing computer games. Arguments from SimCity and second life. In: Planning Theory and Practices, 9(2), pp. 209–226.

EBERSBACH, A.; GLASER, M. & HEIGL, R. (2011): Social Web. UTB.

ENEMARK, S. & RAJABIFARD, A. (2011), Spatially Enabled Society. In: Geoforum Perspektiv 20, November 2011, pp. 3-16.

EUROPEAN UNION (2006): Adult education trends and issues in Europe. Restricted tender. N0. EAC/43/05 as completed by 11th of August 2006.

EUROPEAN UNION (2012): Strategies for improving participation in and awareness of adult learning. European Guide. Publications Office of the European Union, Luxemburg.

EVANS-COWLEY, J.S. (2010): Planning in the age of Facebook: the role of social networking in planning processes. In: GeoJournal Springer Science+Business Media B.V. 2010.

GRYL, I.; JEKEL, T. & DONERT, K. (2010): GI and Spatial Citizenship. In: Jekel, T.; Koller, A.; Donert, K.; Vogler, R. (eds.): Learning with Geoinformation V. Lernen mit Geoinformation V. Berlin: Wichmann, pp. 2-11.

GRYL, I. & JEKEL, T. (2012): Re-centering GI in secondary education: Towards a spatial citizenship approach. In: Cartographica 2012, no. 1, pp. 2-12.

HAKE, G.; GRÜNREICH, D. & MENG, L. (2002): Kartographie. Visualisierung raum-zeitlicher Informationen. Walter de Gruyter, Berlin, New York.

HALL, P. (2002): Urban and regional planning. Routledge, Taylor & Francis Group, London, New York.

HENNIG, S.; OSBERGER, A.; NEUSCHMID, J.; SCHRENK, M.; WASSERBURGER, W. &ZOBL, F. (2012): Providing Web Maps for Everyone: Understanding Users and their Requirements. In. In: Schrenk, M. (Ed.) Proceedings of 17th International CORP Conference 2012.

HENNIG, S. & VOGLER, R. (2011): Participatory tool development for participatory spatial planning. The GEOKOM-PEP environment. In: JEKEL, T., KOLLER, A., DONERT, K. & VOGLER, R. (eds.): Learning with GI 2011. Implementing Digital Earth in Education. Berlin, pp. 79-88.

HENNIG, S., VOGLER, R. & JEKEL, T. (2011): Web-2.0 Anwendungen zur partizipativen Planung und Sozialen Geokommunikation. In: GIS.Science. Die Zeitschrift für Geoinformatik. 3/2011, pp. 65-74.

IAP2 INTERNATIONAL ASSOCIATION OF PUBLIC PARTICIPATION (2007): Spectrum of Public Participation. http://www.iap2.org/associations/4748/files/spectrum.pdf; last accessed: 24.2.2013

JANKOWSKI, P. (2009): Towards participatory geographic information systems for community-based environmental decision making. In: Journal of Environmental Management 90 (2009), pp. 1966-1971.

JIANG, B.; HUANG, B. & VASEK, V. (2003): Geovisualization for Planning Support Systems. In: Geertman, S. & Stillwell, J. (eds.): Planning Support Systems in Practice, Springer, Berlin, pp. 177-191.

JIANG, B. & LI, Z. (2005): Editorial: Geovisualization: Design, Enhanced Visual Tools and Applications. The Cartographic Journal, 42(1), pp. 3-4.

JOBST, M. (2009): Neo-cartographic interlacement as barrier for Cartographic Heritage. In: E-Perimetron, Vol. 4, No. 4, 2009, pp. 212-220.

MACEACHREN, A. M.; GAHEGAN, M.; PIKE, W.; BREWER, I.; CAI, G. & LENGERICH, E. (2004): Geovisualization for Knowledge Construction and Decision Support. In: IEEE Computer Graphics and Applications, 24 (1), pp. 13-17.

MACEACHREN, A.M. & KRAAK, M.J. (1997): Exploratory cartographic visualization: advancing the agenda. Computers & Geosciences, 23(4), pp. 335-343.

MILOVANOVIC, D. (2003): Interactive planning – use of the ICT as a support for public participation in planning urban development: Serbia and Montenegro cases. 39th ISoCaPR Congress 2003.

MÖLLER, M. (2006): Die "Geo"-Komponente in der Informationsgesellschaft – auf dem Weg zur Geo-Kommunikation. In: Kartographische Nachrichten, Heft 5, 56. Jahrgang, pp. 239-243.

NEUSCHMID, J.; HENNIG, S.; SCHRENK, M.; WASSERBURGER, W. & ZOBL, F. (2012): Barrierefreiheit von online Stadtplänen: Das Beispiel AccessibleMap. In: J. Strobl, et al. (eds.): Angewandte Geoinformatik 2012. Beiträge zum 24. AGIT-Symposium, Salzburg. Wichmann, Berlin, pp.339-347.

NRC – NATIONAL RESEARCH COUNCIL (2006): Learning to Think Spatially: GIS as a Support System in the K-12 Curriculum. Washington DC.

RAMASUBRAMANIAN, L. (2010): Geographic Information Science and Public Participation. Springer Verlag, Berlin, Heidelberg.

RANDOLPH, J. (2004): Environmental Land Use Planning and Management. Island Press, Washington, Covelo, London.

RENN, O.; WEBLER, T.; RAKEL, H.; DIENEL, P. & JOHNSON, B. (1993): Public Participation in decision making: A three-step procedure. In: Policy Sciences 26:3 (1993), pp. 189-214.

RICHTER, A. & KOCH, A. (2008): Functions of Social Networking Services. COOP '08: the 8th International Conference on the Design of Cooperative Systems.

SIEBER, R. (2006): Public Participation Geographic Information Systems: A Literature Review and Framework. In: Annals of the Association of American Geographers, 96(3), 2006, pp. 491-507.

UN-HABITAT UNITED NATIONS HUMAN SETTLEMENTS PROGRAMME (2008): Urban planning best practices on Creating Harmonious Cities – City Experiences. http://www.unhabitat.org/categories.asp?catid=508; last accessed: 25.2.2013.

VON HAAREN, C. (2004): Landschaftsplanung. Ulmer, UTB.

WERLEN, B. (1993): Society, action and space. An alternative human geography. Routledge, London.

URL 1: http://www.thefreedictionary.com/Urban+Studies+and+Planning; last accessed: 22.2.2013

URL 2: https://ypart.eu/; last accessed: 22.2.2013

URL 3: http://www.uni-salzburg.at/portal/page?_pageid=2487,2057604&_dad=portal&_schema=PORTAL; last accessed: 22.2.2013

URL 4: http://www.digital-earth.eu; last accessed: 22.2.2013

URL 5: http://www.ffg.at/benefit; last accessed: 22.2.2013

URL 6: http://www.ieb.net/newsletter/46/dl/digital-natives_artikel.pdf; last accessed: 22.2.2013

URL 7: http://www.netnet.org/students/student %20glossary.htm; last accessed: 22.2.2013

URL 8: http://www.dba.co.uk/tips/vol1/self.htm; last accessed: 22.2.2013

URL 9: http://www.internetworldstats.com/links10.htm; last accessed: 22.2.2013

URL 10: http://ec.europa.eu/information_society/activities/einclusion/index_en.htm; last accessed: 22.2.2013

Gestione delle risorse ambientali e pianificazione del territorio: le linee guida per la Valutazione ambientale strategica come strumento sistemico nei processi di pianificazione e programmazione

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1 INTRODUZIONE

L'attenzione per l'ambiente e la necessità di migliorare la gestione delle risorse naturali sono argomenti di costante attualità. La crisi ambientale ha imposto ai governi internazionali delle scelte difficili in campo pianificatorio e programmatorio, ed è andata rafforzandosi l'esigenza, ma anche la difficoltà, di arrivare a breve termine a una svolta nello sviluppo economico e sociale e a una rapida maturazione di una diffusa consapevolezza sulla nuova realtà, per fare fronte velocemente alle minacce esistenti. E' da questa necessità ha preso forza il concetto di "sviluppo sostenibile", introdotto per la prima volta nel Rapporto Brundtland nel 1987, e poi divenuto costante richiamo nei documenti nazionali e internazionali, in esso la concezione della sostenibilità, nel governo del territorio, va oltre la semplice tutela dell'ambiente in quanto oltre la dimensione ambientale include quella economica e sociale. La questione ambientale, si offre oggi, come arena privilegiata per la sperimentazione di nuove forme di discussione pubblica ed elaborazione di nuovi strumenti decisionali, da ciò ne deriva che è necessario gestire le risorse ambientali tramite una pianificazione partecipata, e più in generale che per integrare la dimensione ambientale nei processi decisionali è necessario attivare forme attive di partecipazione. In tale senso le politiche ambientali vanno ad influenzare sempre di più i processi di governance territoriale, intesa come il processo che comprende la formazione delle decisioni che riguardano un territorio.

Riflettere sull'integrazione dei paradigmi della sostenibilità nei processi di pianificazione e di governance territoriale significa pensare che, ai diversi livelli di governo, sia necessario un gradiente d'innovazione capace di affermare nuove logiche e soprattutto una radicata convinzione che la sostenibilità non sia solo un termine "plastico" e stereotipato Le pratiche valutative si prestano come un valido supporto fin dalle fasi preliminari, tramite un approccio integrato e multisciplinare ai problemi ambientali sociali ed economici.

Un importante strumento di governance, utile nell'orientare le scelte di piano al paradigma dello sviluppo sostenibile, è la Valutazione ambientale strategica (VAS). Rispetto al suo rapporto con la governance, si potrebbe definire la VAS come un insieme di regole, principi, tecniche e strumenti con la funzione di supportare, continuamente, il processo decisionale con lo scopo di generare consenso attorno alle azioni da compiere e, soprattutto, di far sì che tale consenso duri nel tempo e si trasformi in una rete di relazioni stabili in grado di garantire continuità e coerenza al processo di pianificazione.

La VAS nella pratica non viene ancora applicata come un attivo supporto ai processi decisionali, causa forse una scarsa "cultura valutativa", nonostante ci siano a livello comunitario e a livello nazionale e regionale delle linee guida che sistematizzano tale processo con il tentativo di definire uno schema procedurale che assicuri la definizione di scelte partecipate e inclusive della considerazione degli aspetti ambientali.

Considerando la necessità di usare meglio le risorse territoriali anche tramite politiche e linee guida, il paper analizza, partendo da un'introduzione teorica sul concetto della VAS, la strutturazione metodologico procedurale, di una serie di strumenti guida, creati con l'intento fornire ai differenti soggetti coinvolti nella predisposizione e nella attuazione di piani e programmi (pianificatori, valutatori, autorità responsabili, pubblico in generale, ecc.) indicazioni metodologiche di integrazione ambientale utili ed efficaci per l'impostazione delle loro iniziative strategiche, sia che si tratti di piani o di programmi. L'ultima parte del paper analizza in maniera critica le linee guida per la VAS, proposte dalla Regione Sardegna, nell'adeguamento dei piani urbanistici comunali al Piano paesaggistico regionale.

2 CONCETTI CHIAVE DELLA VAS

La Direttiva 2001/42/CE ha introdotto un cambiamento di prospettiva nell'approccio alla pianificazione territoriale, che vede nella VAS uno strumento flessibile, trasparente, partecipato e sistemico nella costruzione della conoscenza. Le parole chiave per una buona VAS, secondo quanto indicato dalla Direttiva e presenti in letteratura sono: strategicità, processo, sostenibilità, partecipazione e alternative. Queste sono evidenziate già nel 1992 da Thérivel che definisce in maniera esaustiva la VAS come un "formale,

sistematico e comprensivo processo di valutazione degli impatti ambientali di una politica, di un piano o programma e delle sue alternative, che include la preparazione di un report scritto, i cui risultati devono essere resi pubblici e integrati nel processo decisionale" (Thérivel et al., 1992).

Rispetto a questi concetti, in letteratura è rinvenibile un interesse crescente verso questi temi. Parlando di strategicità già nel 1989 Bartlett e Baber affermano che ciò che determina il successo di una valutazione di impatto non è tanto la metodologia ma la sua efficacia in particolari circostanze di politica implicita (Bartlett e Baber, 1989). Questa riflessione pone l'accento sulla relazione tra strategia e sulle circostanze in cui la VAS è attuata.

La VAS, per essere efficace, deve andare oltre la semplice analisi degli effetti ambientali di una decisione (Brown e Thérivel, 2000; Kørnøv e Thissen, 2000) incentrandosi maggiormente sul processo decisionale e sulla sua dimensione strategica. Essa, inquadrandosi a un livello cruciale delle scelte può integrare, nel rispetto dei principi della sostenibilità, le scelte di carattere tecnico con quelle di carattere politico avendo come riferimento sistemi di valori articolati e complessi, inseriti in realtà conflittuali e mutevoli (Fusco Girard et al., 2005, 2006, 2008). Questa visione della VAS rispecchia quella di Fischer che la definisce come un modello politico (Fisher, 2002).

La VAS mira a definire un insieme molto più ampio di prospettive, obiettivi e vincoli di quelli inizialmente individuati dal proponente (Harvey, 1992; Brown, 1998) di un piano o di un programma e in questo, l'aspetto partecipativo non è meno importante della fase di individuazione degli impatti (Eggenberger e Partidário, 2000).

E' possibile ottenere un insieme più ampio di prospettive solo se il processo di VAS è un processo condiviso e partecipato, con momenti in cui le comunità si esprimono con fasi di sistematizzazione ed interpretazione delle istanze espresse, integrate esplicitamente nelle decisioni sulle politiche di piano (Zoppi, 2009).

L'individuazione di limiti, opportunità, alternative e la definizione di criteri e opzioni possibili di trasformazione territoriale assumono un efficacia diversa se la VAS viene usata come strumento interattivo (Brunetta, 2002).

Nonostante siano passati ormai tredici anni dall'entrata in vigore della Direttiva comunitaria sussistono notevoli difficoltà nel applicare la VAS secondo le sue parole chiave. Una ragione può essere una scarsa consapevolezza delle potenzialità dello strumento valutativo, dovuta anche al grande ritardo del recepimento della Direttiva 2001/42/CE in alcuni ordinamenti nazionali come quello italiano.[1] Gli stessi proponenti i piani in generale sono poco convinti del fatto che la VAS possa rappresentare per i processi decisionali un valore aggiunto (Brown e Thérivel, 2000). Collegata a questo aspetto è l'eccessiva attenzione alla procedura piuttosto che al processo a scapito del raggiungimento di benefici ambientali più sostanziali (Jay et al., 2007), prestando dunque poca attenzione allo sviluppo concettuale della VAS (Cashmore et al, 2004;. Thissen, 2000).

La VAS nella pratica è usata come una Valutazione d'impatto ambientale applicata ai piani, prestando quindi maggiore importanza all'aspetto della tutela ambientale piuttosto che alla contemporanea considerazione degli aspetti ambientali, economici e sociali, che dovrebbero fare della VAS uno strumento di governance della sostenibilità (Sadler, 1999).

L'endoprocedimentalità della VAS nella formazione di un piano, è un requisito necessario affinchè ci sia l'attributo "strategico" nella valutazione. Essa è anche il presupposto fondamentale affinchè ci sia un coordinamento delle varie politiche settoriali con la pianificazione territoriale, ed è anche una delle maggiori sfide affinchè si possa arrivare ad una vera integrazione tra gli aspetti ambientali, le questioni sociali ed economiche. In quest'ottica l'integrazione è un mezzo privilegiato per aumentare l'efficacia della valutazione ambientale e la valutazione sociale ed economica ne processo decisionale (Kirkpatrick e Lee, 1999).

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[1] In Italia la Direttiva 2001/42/CE è stata recepita con la Parte Seconda del Decreto Legislativo del 3 aprile 2006, n. 152 "Norme in materia ambientale", modificata e integrata dal Decreto Legislativo del 16 gennaio 2008, n. 4 "Ulteriori disposizioni correttive ed integrative del D.lgs. 3 aprile 2006, n. 152, recante norme in materia ambientale," entrato in vigore il 13 marzo 2008 (di seguito D.lgs. 152/2006 ss.mm.ii.), in notevole ritardo rispetto ai tempi prescritti dall'Unione Europea, ragione del procedimento europeo di infrazione che ha portato successivamente ad una condanna della Corte di Giustizia Europea, per la "mancata trasposizione della Direttiva nell'ordinamento nazionale entro il termine prescritto."

3 LE LINEE GUIDA PER LA VAS COME STRUMENTO SISTEMICO NELL'ANALISI DEI PROCESSI DI PIANIFICAZIONE E PROGRAMMAZIONE

La necessità e l'urgenza di controllare l'uso delle risorse naturali nei processi di trasformazione territoriale, ha reso l'utilizzo di linee guida requisito fondamentale, in particolare nella valutazione delle politiche orientate alla pianificazione territoriale; La definizione di strutturazioni metodologiche procedurali può rappresentare un elemento utile ed efficace per la definizione e l'attuazione delle stesse.

In questa sezione si descrivono alcuni esempi di utilizzo di linee guida, analizzate da un punto di vista metodologico, usando come chiave di lettura i temi della VAS, secondo quanto indicato dalla Direttiva 2001/42/CE: la partecipazione, la sostenibilità e l'aspetto strategico.

Le linee guida esaminate sono state create con l'intento di fornire, ai differenti soggetti coinvolti nella predisposizione e nella attuazione di piani e programmi, indicazioni metodologiche utili ed efficaci per l'impostazione delle loro iniziative strategiche, facilitando le applicazioni di un nuovo modello di pianificazione sostenibile, anche attraverso la proposizione di sperimentazioni, esperienze significative e strumenti operativi.

In esse è stato definito un modello tecnico razionale in cui la VAS cerca di influenzare un piano o un programma nel definire un certo set di obiettivi, identificare criticità, definire alternative.

I casi presi in esame sono il Manuale per la valutazione ambientale dei Piani di sviluppo regionale e dei Programmi dei Fondi strutturali 2000 -2006 dell'Unione europea (da qui in avanti Manuale),[2] le Linee guida create per la VAS dei Fondi strutturali 2000-2006[3] e quelle relative alla sperimentazione del progetto Enplan.[4]

Nel Manuale e nelle Linee guida per la VAS dei Fondi Strutturali 2000-2006, il tema della partecipazione è affrontato come elemento chiave della fase decisionale, in particolare, si riconosce nella partecipazione delle comunità locali alla definizione, gestione ed attuazione dei processi della pianificazione territoriale quale presupposto fondamentale per la loro efficacia. E' esaltato il ruolo delle Autorità ambientali[5] nel processo di preparazione dei piani e della valutazione delle loro implicazioni, e si afferma che esse sono chiamate a svolgere un ruolo di grande rilievo, non considerando al contrario, l'importante ruolo svolto dalle comunità locali. In entrambi i documenti non è chiara la metodologia attraverso la quale la partecipazione delle comunità locali possa attuarsi, e considerando che la predisposizioni dei piani (PSR, PSM) e programmi (PO e DocUP) è compito della pubblica amministrazione, ma che la predisposizione dei progetti per i PO. e per i DocUP, è di competenza dei singoli cittadini, imprese, ecc, (Zoppi e Garano, 2003) è chiaro che parlare di partecipazione limitandosi all'ambito relativo alle Autorità ambientali e settoriali, risulti non esaustivo.

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[2] Nell'ambito della regolamentazione dei fondi strutturali 2000-2006, particolare rilevanza fu attribuita alla valutazione ambientale dei piani e dei programmi da presentare ai finanziamenti comunitari. Relativamente alla necessità di migliorare la comprensione e di fornire orientamenti generali, il Directorate General (DG) XI "Ambiente, sicurezza nucleare e protezione civile", della Commissione europea, pubblicò nel 1998, un Manuale per la valutazione ambientale dei Piani di sviluppo regionale e dei Programmi dei Fondi strutturali dell'Unione, in cui si definiscono dal punto di vista operativo, i diversi passi e fasi per la definizione della VAS di questi piani e programmi.
Il manuale definisce i vari stadi del ciclo di programmazione dei Fondi strutturali relativo all'elaborazione dei Piani di Sviluppo Regionale (PSR), dei Quadri Comunitari di Sostegno (QCS) e dei Programmi Operativi (PO), in particolare definisce le componenti principali della VAS nel contesto della procedura di programmazione dei Fondi strutturali, lasciando liberi gli Stati membri e le regioni di integrare ciascuna fase nel rispettivo processo di pianificazione. (Manuale, pag. 22).
[3] Nel 1999, in Italia, il Ministero dell'Ambiente con il Ministero dei Beni e delle attività culturali e Agenzia nazionale per la protezione dell'ambiente (ANPA) ha elaborato le Linee guida per la valutazione ambientale strategica dei Fondi strutturali 2000-2006, che ricalcano le disposizioni del Manuale, definendone modalità pratiche per l'integrazione, offrendo un immediato supporto alle Autorità ambientali e, più in generale, nella loro partecipazione al processo di programmazione, fornendo alle Regioni elementi metodologici essenziali per attivare programmi sostenibili anche nel lungo termine, individuando processi di collaborazione e confronto fra le autorità coinvolte.
[4] Le Linee guida Enplan per la Valutazione Ambientale dei piani e programmi, sono il risultato di un intenso lavoro da parte di 10 Regioni italiane e spagnole, coordinate dalla Regione Lombardia, durato quasi due anni nell'ambito del Progetto Enplan (approvato nel dicembre 2002 e concluso nell'ottobre 2004), sono state predisposte con l'intento di facilitare l'applicazione della Direttiva 2001/42/CE e di un nuovo modello di pianificazione sostenibile.
[5] Secondo il Manuale i principali responsabili dell'elaborazione di piani e programmi e dei relativi processi di valutazione sono le "autorità dello sviluppo" e le "autorità competenti in campo ambientale". Con il termine generico "autorità dello sviluppo" si intendono tutti i ministeri, le agenzie ed altri organismi pubblici

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Contrariamente, nelle Linee guida Enplan, si afferma come il processo di elaborazione dei piani e programmi richieda il coinvolgimento "mirato" di soggetti diversi dall'amministrazione responsabile della elaborazione degli stessi. Tali soggetti comprendono amministrazioni esterne e il pubblico nelle sue diverse articolazioni. Si afferma chiaramente che: "Ciascun soggetto apporta al processo complessivo un contributo di conoscenza e di identificazione dei problemi e delle potenzialità" (Linee guida Enplan, pag.79).

Il tema della sostenibilità è per il Manuale, elemento essenziale, in esso si afferma come sia necessario garantire che nel corso dell'intero processo di programmazione si tenga conto dei potenziali impatti ambientali individuati in fase di elaborazione del piano medesimo. (Manuale, pag.25)

Nella VAS le questioni ambientali e quelle legate allo sviluppo sostenibile devono essere prese in considerazione dal primo stadio della programmazione dei Fondi strutturali (ossia durante l'elaborazione del piano di sviluppo regionale (PSR)), per garantire che i risultati e le informazioni ottenuti vadano a vantaggio dei livelli di pianificazione successivi riducendo gli eventuali conflitti tra obiettivi economici e ambientali (Manuale, pag.25). Affinchè vi sia una reale integrazione, tra la componente ambientale e sviluppo, la procedura dei Fondi strutturali e la VAS debbono garantire che gli obiettivi dei PSR siano essenzialmente sostenibili.(Manuale, pag.24) Questo implica che gli obiettivi non devono limitarsi all'attuazione delle direttive comunitarie o delle legislazioni nazionali, ma concentrarsi sulle opportunità e sui vantaggi derivanti dall'integrazione della dimensione ambientale nei piani di sviluppo .(Manuale, pag.39).

Nelle Linee guida Enplan, si afferma che la sostenibilità rappresenta il filo conduttore per rendere effettivi l'integrazione e il coordinamento tra tutti i settori e le scale di pianificazione e programmazione, di conseguenza lo sviluppo sostenibile non deve intendersi come meta da raggiungere, ma piuttosto come un insieme di condizioni che devono essere rispettate nel governo delle trasformazioni.

Nell'ambito delle Linee guida per la VAS dei Fondi Strutturali 2000-2006 e del Manuale, l'aspetto concernente la strategicità della VAS nelle fasi di pianificazione, consiste nella verifica della rispondenza dei Piani di sviluppo e dei programmi operativi con gli obiettivi dello sviluppo sostenibile,[6] verificandone il complessivo impatto ambientale, ovvero la diretta incidenza sulla qualità dell'ambiente.

La definizione degli obiettivi è il risultato dell'analisi ambientale,[7] ossia lo studio delle pressioni più rilevanti sul territorio, delle emergenze e delle criticità riferite ad esso e attraverso tale analisi è possibile comprendere quali siano le priorità di sviluppo per le Regioni.

Le Linee guida Enplan, dal punto di vista strategico, individuano invece, una fase preliminare di orientamento e impostazione del piano o programma, per il quale si rende necessaria un'analisi di sostenibilità degli orientamenti dello stesso; Orientamenti ai quali fanno parte gli indirizzi politici

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[6] La definizione degli obiettivi deve soddisfare le condizioni di sostenibilità all'accesso alle risorse ambientali. Tali condizioni sono comunemente fatte risalire ai seguenti principi
- il tasso di utilizzazione delle risorse rinnovabili non sia superiore al loro tasso di rigenerazione;
- l'immissione di sostanze inquinanti e di scorie nell'ambiente non superi la capacità di carico dell'ambiente stesso;
- lo stock di risorse non rinnovabili resti costante nel tempo. (Linee guida per la VAS dei Fondi Strutturali 2000-2006 pag. 6).
Nel rispetto di tali principi il Manuale della Comunità europea. individua dieci criteri di sostenibilità per la definizione degli obiettivi del programm. I criteri sono: 1. ridurre al minimo l'impegno delle risorse energetiche non rinnovabili; 2. impiego delle risorse rinnovabili nei limiti della capacità di rigenerazione; 3. uso e gestione corretta, dal punto di vista ambientale, delle sostanze e dei rifiuti pericolosi/inquinanti; 4. conservare e migliorare lo stato della fauna e della flora selvatiche, degli habitat e dei paesaggi; 5. conservare e migliorare la qualità dei suoli e delle risorse idriche; 6. conservare e migliorare la qualità delle risorse storiche e culturali; 7. conservare e migliorare la qualità dell'ambiente locale; 8. protezione dell'atmosfera; 9. sensibilizzare alle problematiche ambientali, sviluppare l'istruzione e la formazione in campoambientale; 10. promuovere la partecipazione del pubblico alle decisioni che comportano uno sviluppo sostenibile.

[7] Nell'ambito di tali Linee guida si fa riferimento a vari tipi di indicatori utili per l'analisi ambientale, e descritti nell'Allegato 1 della guida, dedicato alla presentazione del modello DPSIR (Driving Forces-Pressures-State-Impacts-Responses). Dall'elaborazione dei dati relativi al predetto modello, è possibile ottenere un quadro di riferimento per la definizione degli obiettivi di sviluppo sostenibile, che risultano essere quindi la risposta alle criticità evidenziate dalla descrizione della situazione ambientale e le sue evoluzioni, che offre quindi il sostegno informativo necessario alla esplicitazione delle priorità, all'individuazione di indicatori per valutare in un sistema coordinato l'impatto prevedibile dei piani e consentirne il monitoraggio.

dell'amministrazione responsabile, gli interessi settoriali o territoriali presenti e la pressione sociale su aspetti specifici (Linee guida Enplan, pag. 68).

L'analisi risulta cruciale nella definizione degli obiettivi, poichè essi costituiscono la dichiarazione di ciò che il piano o programma intende raggiungere mediante l'insieme delle sue previsioni. L'integrazione tra obiettivi di carattere ambientale e obiettivi di carattere socio-economico rappresenta uno dei momenti cruciali del processo di pianificazione. Dal punto di vista metodologico le Linee guida Enplan indicano la necessità per un piano o programma orientato alla sostenibilità, di procedere ad una valutazione che non si limiti all'analisi degli aspetti ambientali, ma estesa a comprendere gli aspetti sociali ed economici, considerati componenti intrinseche del concetto di sostenibilità (Linee guida Enplan, pag. 83).

Considerando la situazione odierna, è possibile affermare come i documenti citati nel presente paragrafo, risultino essere comunque attuali, alla luce di una più matura consapevolezza dell'importanza degli aspetti valutativi nei processi di pianificazione. La VAS ha assunto oggi un importante ruolo nel panorama pianificatorio economico e territoriale, con il pieno recepimento nelle legislazioni nazionali della Comunità europea, nonostante le grandi differenze fra i contesti culturali e socio economici di applicazione della Direttiva 2001/42/CE abbiano portato allo sviluppo di molteplici sue interpretazioni conducendo alla composizione di un quadro molto variegato di approcci, strumenti e metodi di applicazione.

4 LE LINEE GUIDA DELLA REGIONE SARDEGNA PER LA VAS DELL'ADEGUAMENTO DEI PIANI URBANISTICI COMUNALI AL PIANO PAESAGGISTICO REGIONALE

Con l'intenzione di fornire un supporto alle amministrazioni comunali e ai professionisti nell'adeguamento degli strumenti urbanistici al Piano paesaggistico regionale,[8] le Linee guida per la VAS dei Piani urbanistici comunali (PUC), definite dalla Regione Sardegna,[9] hanno cercato di integrare il processo di piano stabilito dalla Legge Regionale del 22 Dicembre 1989, n. 45, "Norme per l'uso e la tutela del territorio", con la procedura di VAS disposta dalla parte seconda del D.lgs. n. 152/2006 e ss.mm.ii.

Il tentativo della Regione Sardegna è stato di fare in modo che il processo di integrazione si realizzasse attraverso la completa unione tra il processo di VAS e quello di piano, nonostante si trattasse di due processi disciplinati da normative e tempistiche differenti (Regione Sardegna,2010, p. 11). Tale integrazione non è rinvenibile nelle linee guida predisposte in altre Regioni dove si descrive o solo la procedura di VAS, oppure la procedura di VAS separata totalmente dalla procedura di piano.[10]

Le Linee guida sarde rappresentano per le amministrazioni comunali un valido riferimento non solo dal punto di vista procedurale ma anche metodologico. Sulla redazione del documento di scoping e del rapporto ambientale non si limitano a elencare i contenuti indicati nell'Allegato Sesto del D.lgs. n. 152/2006 e ss.mm.ii., ma forniscono degli indirizzi ulteriori, anche in riferimento ai territori comunali interessati dalla perimetrazione di aree classificate come Siti di Interesse Comunitario e/o Zone di Protezione Speciale e, pertanto, sottoposte oltre che al processo di VAS anche a quello di Valutazione di incidenza ai sensi dell'art. 5 del D.P.R. 357/1997. Il processo di VAS in questo caso è integrato con il processo di Valutazione di incidenza, non soltanto dal punto di vista procedurale (Regione Sardegna,2010, Allegato D).

Le principali criticità rilevabili nelle Linee guida, sono riconducibili a un mancato approfondimento dei temi della partecipazione delle comunità locali al processo di pianificazione, dello sviluppo sostenibile e del processo di costruzione degli obiettivi di piano.

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[8] La Giunta Regionale ha approvato, con Delibera n. 36/7 del 05/09/2006, il Piano paesaggistico regionale – Primo Ambito Omogeneo. La normativa disciplina ventisette Ambiti di Paesaggio che costituiscono il Primo Ambito Omogeneo, corrispondente al territorio costiero. Comuni, province e gli enti gestori delle aree protette hanno l'obbligo di adeguare i rispettivi strumenti di pianificazione e programmazione alle previsioni del piano. In questa fase di adeguamento la VAS, secondo le indicazioni del D.lgs. 152/2006 ss.mm.ii.), è una procedura obbligatoria.

[9] Assessorato della Difesa dell'Ambiente di concerto con Assessorato Enti Locali, Finanze e Urbanistica. La prima versione del 2007 è stata più volte modificata e integrata fino all'ultima versione, approvata con Delibera assessoriale n. 44/51 del 14.12.2010.

[10] Si possono vedere a titolo di esempio i modelli metodologici – procedurali, definiti dalla Regione Lombardia dove si individua uno schema procedurale generale e uno specifico per i vari piani generali e settoriali di livello comunale, provinciale e regionale. La deliberazione della Giunta Regionale della Lombardia di riferimento è la n. 9/761 del 10 Novembre 2010.

Il D.lgs. 152/2006 ss.mm.ii. stabilisce che la fase preliminare deve essere attivata dal proponente in contraddittorio con l'autorità competente,[11] puntualizzando che le consultazioni tra autorità procedente,[12] autorità preposta alla valutazione e autorità competenti in materia ambientale,[13] devono avvenire sin dai momenti preparatori dell'attività di elaborazione di piani e programmi, sulla base di un rapporto preliminare sui possibili impatti ambientali significativi dell'attuazione del piano o programma.

Secondo le Linee guida regionali la fase di scoping deve prevedere un processo partecipativo che coinvolga i soggetti competenti in materia ambientale potenzialmente interessati dalla redazione del piano urbanistico comunale, affinché condividano il livello di dettaglio e la portata delle informazioni da produrre e da elaborare, nonché le metodologie per la conduzione dell'analisi ambientale e della valutazione degli effetti ambientali (Regione Sardegna 2010, p. 22). Durante gli incontri di scoping devono essere illustrati (Regione Sardegna, 2010, p. 23): modalità con cui condurre il processo di VAS; metodologia per l'analisi ambientale (componenti interessate dall'attuazione del piano, indicatori da utilizzare, possibilità di popolarli, metodo di analisi, ecc.); modalità per la conduzione del processo di partecipazione e approvazione dell'elenco dei soggetti coinvolti nel processo (soggetti competenti in materia ambientale, pubblico[14] e pubblico interessato[15]); contenuti del rapporto ambientale.

Nelle Linee guida il pubblico e il pubblico interessato è individuato ma non coinvolto in questa fase. Eppure si afferma nelle stesse che al fine di pervenire alla costruzione di un piano il più possibile condiviso, il processo partecipativo dovrebbe essere avviato sin dalle prime fasi di elaborazione del piano (Regione Sardegna, 2010, p. 45); le stesse Linee guida suggeriscono inoltre, nonostante il D.lgs. 152/2006 e ss.mm.ii, limiti la partecipazione del pubblico ad una fase successiva all'adozione del piano, di prevedere ulteriori momenti di partecipazione, volti a coinvolgere sia i soggetti competenti in materia ambientale sia il pubblico interessato, anche nelle fasi precedenti all'adozione dello stesso, ovvero durante la sua costruzione (Regione Sardegna, 2010, p. 45). Sembrerebbe che, rispetto a questa affermazione e al non coinvolgimento del pubblico e del pubblico interessato in questa fase, lo scoping non faccia parte del processo di costruzione del piano.

In riferimento alla metodologia da usare per il coinvolgimento dei soggetti competenti in materia ambientale durante gli incontri, si suggerisce la metodologia tradizionale basata sulla presentazione del documento di scoping, seguita da una discussione aperta e dalla verbalizzazione delle osservazioni presentate (Regione Sardegna, 2010, p. 46). Le Linee guida propongono anche un questionario da somministrare agli stessi soggetti, attraverso il quale porre loro specifici quesiti in merito alle modalità con cui si intende condurre il processo di VAS e sulle informazioni che si intende inserire nel rapporto ambientale (Regione Sardegna, 2010, pp. 25-28).

Un'altra criticità che si riscontra nelle Linee guida è che le fasi, dal punto della VAS, sembrano far parte di un processo separato da quelle di formazione del piano, nonostante l'integrazione posta in premessa alle stesse (Regione Sardegna, 2010, p. 11). Tale integrazione infatti si riferisce più ad una integrazione temporale delle fasi, ma non ad una integrazione sostanziale tra i due processi nella definizione di obiettivi e azioni.

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[11] La pubblica amministrazione cui compete l'adozione del provvedimento di verifica di assoggettabilità, l'elaborazione del parere motivato, nel caso di valutazione di piani e programmi (art. 5, comma 1, lettera p del D.lgs. 152/2006 ss.mm.ii.).

[12] La pubblica amministrazione che elabora il piano, programma, ovvero nel caso in cui il soggetto che predispone il piano, programma sia un diverso soggetto pubblico o privato, la pubblica amministrazione che recepisce, adotta o approva il piano, programma (art. 5, comma 1, lettera q del D.lgs. 152/2006 ss.mm.ii.).

[13] Le pubbliche amministrazioni e gli enti pubblici che, per le loro specifiche competenze o responsabilità in campo ambientale, possono essere interessate agli impatti sull'ambiente dovuti all'attuazione dei piani, programmi (art. 5, comma 1, lettera s del D.lgs. 152/2006 ss.mm.ii.).

[14] Una o più persone fisiche o giuridiche nonché, ai sensi della legislazione vigente, le associazioni, le organizzazioni o i gruppi di tali persone (art. 5, comma 1, lettera u del D.lgs. 152/2006 ss.mm.ii.).

[15] Il pubblico che subisce o può subire gli effetti delle procedure decisionali in materia ambientale o che ha un interesse in tali procedure; ai fini della presente definizione le organizzazioni non governative che promuovono la protezione dell'ambiente e che soddisfano i requisiti previsti dalla normativa statale vigente, nonché le organizzazioni sindacali maggiormente rappresentative, sono considerate come aventi interesse(art. 5, comma 1, lettera v del D.lgs. 152/2006 ss.mm.ii.).

Si evidenzia, inoltre, la mancanza di una spiegazione del concetto di obiettivo generale e obiettivo specifico di piano e di una metodologia per la loro definizione. Gli obiettivi generali, secondo le Linee guida, devono essere definiti già dalla fase di preparazione, prima ancora della fase di orientamento, se ne deduce quindi, al di fuori della procedura di VAS (Regione Sardegna, 2010, p. 12). "Il processo di VAS, contestuale a quello di elaborazione del piano è avviato dall'amministrazione comunale, in qualità di Autorità procedente, mediante pubblicazione di apposito avviso, sull'Albo comunale e sul sito Internet, contenente la prima definizione degli obiettivi del piano (Regione Sardegna, 2010, p. 15)."

Rispetto all'individuazione degli obiettivi/criteri di sostenibilità, nelle Linee guida, oltre ai principi di cui al c. 2, art. 3 delle N.T.A. del PPR,[16] si indica che si può far riferimento ai dieci criteri proposti dal Manuale[17] L'argomento della sostenibilità è dunque ridotto al segnalare l'opportunità, nella predisposizione del piano, della considerazione dei dieci criteri valutando attraverso quali scelte strategiche e attraverso quali azioni specifiche essi possano essere concretamente perseguiti (Regione Sardegna, 2010, p.16).

Infine, non è rimarcato nelle Linee guida che la valutazione della sostenibilità del piano dovrebbe essere cruciale nella fase di orientamento e che gli obiettivi della tutela ambientale devono essere considerati nel momento in cui le decisioni vengono prese: tale considerazione deve avvenire su una posizione di parità con le altre variabili (economiche, sociali) che costituiscono oggetto della decisione (Caratti e Tarquini, 2002). Inoltre non si fa cenno al fatto che gli obiettivi specifici del piano devono essere relazionati ai suddetti criteri, con la finalità di definizione, per il territorio in esame, di una serie di obiettivi (propri) locali di sostenibilità (Mondini e Norberti, 2008). Solo la contestualizzazione dei criteri ne garantisce una funzione efficace a migliorare la qualità della programmazione e della pianificazione (Zoppi, 2010).

5   CONCLUSIONI

L'analisi delle linee guida in riferimento ai concetti chiave per una buona VAS, permette di evidenziare alcune prospettive di ricerca per migliorare le stesse e renderle maggiormente efficaci.

Partendo dal presupposto che l'endoprocedimentalità della VAS nella formazione di un piano o un programma, è un requisito necessario affinchè vi sia l'attributo "strategico" nella valutazione, si ritiene opportuno continuare a lavorare al miglioramento delle linee guida, affinchè vi sia maggiore integrazione nelle forme prospettate da Eggenberger e Partidário (Eggenberger e Partidário, 2000). In particolare tramite esse, si può agire maggiormente nelle sue forma sostanziale, metodologica e procedurale mentre per una reale integrazione istituzionale e politica è necessaria una maggiore sensibilizzazione e consapevolezza, sia a livello di chi propone il piano ma anche al livello di chi definisce le norme, della doppia valenza della VAS, ossia di controllo esterno del processo e di programmazione interna del processo stesso (Bagnod, 2006). A livello normativo (D.lgs. 152/2006 e ss.mm.ii.) attualmente, si è perso del tutto lo spirito strategico della VAS, la cui importanza si riduce all'oggetto della decisione non più al processo che porta ad essa. Applicare la VAS diventa dunque adottare sostanzialmente, una procedura amministrativa, all'interno della quale, la tutela ambientale e un coinvolgimento minimo dei soggetti interessati sembrano dunque i risultati ottenibili nella migliore delle ipotesi.

In questa prospettiva, considerando che il processo decisionale non segue lo stesso andamento tecnico razionale, teorizzato invece dalle linee guida analizzate nel presente paper, ma che il processo dovrebbe essere influenzato dalle risultanze degli atti di negoziazione e da compromessi (Thissen, 2007), sarebbe opportuno considerare maggiormente nella predisposizione delle stesse linee guida questi aspetti. Questa affermazione è supportata da chi ritiene che, nella VAS, la dicotomia tra aspetti tecnici e aspetti politici possa essere superata dalla coinciliazione di una metodologia valutativa strutturata con la determinazione del consenso (Fischer, 2005) tramite i processi partecipativi.

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[16] Tali principi sono: controllo dell'espansione della città; gestione dell'ecosistema urbano secondo il principio di precauzione; la conservazione e sviluppo del patrimonio naturale e culturale; l'alleggerimento dell'eccessiva pressione urbanistica, in particolare delle zone costiere; le politiche settoriali nel rispetto della conservazione della diversità biologica; le strategie territoriali integrate per le zone ecologicamente sensibili; la protezione del suolo con la riduzione di erosioni, la conservazione e il recupero delle grandi zone umide; la gestione e il recupero degli ecosistemi marini; la conservazione e gestione di paesaggi di interesse culturale, storico, estetico ed ecologico; una più adeguata compatibilità delle misure di sviluppo che incidono sul paesaggio; il recupero dei paesaggi degradati da attività umane.

[17] Cfr nota 6

È quindi auspicabile, a garanzia dell'oggettività e della trasparenza del processo integrato di pianificazione e valutazione che un'ampia partecipazione del pubblico non si risolva in procedure puramente consultative ma in vero dibattito e confronto delle scelte e in seguito, sull'esito della valutazione e sulla definizione delle priorità e degli obiettivi specifici. Decisioni più vantaggiose per tutti gli attori coinvolti presuppongono che gli interessi forti e i conflitti di interesse siano da subito messi in gioco, piuttosto che espressi dietro le quinte.

6 BIBLIOGRAFIA

AA.VV. PROGETTO ENPLAN: Linee guida, Valutazione ambientale di Piani e Programmi, Programma Interreg IIIB, MEDOC Pour la cohésion des territoires de l'Europe du Sud. 2004.

BAGNOD, P.: Valutazione ambientale strategica. In Environment – Ambiente e territorio in Valle d'Aosta,Vol. 15, rivista online disponibile all'indirizzo http://www.regione.vda.it/gestione/riviweb/templates/aspx/environnement.aspx?pkArt=808 [ultimo accesso: 19 febbraio 2013].

BARTLETT, R.V., BABER, W.F.: Bureaucracy or analysis: implications of impact assessment for public administration. In: Bartlett RV (a cura di), Policy through impact assessment – institutionalized analysis as a policy strategy, pp. 143-53. London, Greenwood Press, 1989.

BROWN, A.: The environmental overview as a realistic approach to strategic environmental assessment in developing countries, in A Porter and J Fittipaldi (a cura di), Environmental Methods Review: Retooling Impact Assessment for the New Century (Army Environmental Policy Institute and International Association for Impact Assessment, Fargo), pp 127-134. 1998.

BROWN, L., THÉRIVEL R.: Principles to guide the development of strategic environmental assessment methodology. In: Impact Assessment and Project Appraisal, Vol. 18, Issue 3, pp.183-189. 2000.

BRUNETTA, G.: Valutazione ambientale strategica e grandi eventi – Riflessioni a partire dall'esperienza di Torino 2006, Bollettino della Società Geografica Italiana, serie XII, vol. VII, pp. 913-932. Roma, 2002.

CARATTI, P., TARQUINI, R.: La Valutazione ambientale strategica tra valutazione di impatti e processo decisionale, contributo presentato al convegno "Prospettive di sviluppo della Valutazione Ambientale Strategica in Italia, Fondazione Eni Enrico Mattei, 5 Febbraio 2002, documento disponibile su Internet all'indirizzo http:// db.formez.it/ storicoFontNor. nsf/ bb05f9ea5aa422dbc1256a930025c290/ a25627b87a194af0c1256b88005ad0bc? OpenDocument [ultimo accesso: 23 maggio 2011].

CASHMORE, M., GWILLIAM, R., MORGAN, R., COBB, D., BOND, A.: The interminable issue of effectiveness: substantive purposes, outcomes and research challenges in the advancement of EIA theory. In: Impact Assessment and Project Appraisal, Vol. 22 Issue 4, pp. 295–310. 2004.

COMMISSIONE EUROPEA, DG XI (AMBIENTE E, SICUREZZA NUCLEARE E PROTEZIONE CIVILE): Manuale per la valutazione ambientale dei Piani di Sviluppo Regionale e dei Programmi dei Fondi strutturali dell'Unione Europea, Environmental Resources managmaent. Londra, Regno Unito. 1998.

DIREZIONE GENERALE V.I.A.- SERVIZIO PER LA VALUTAZIONE DI IMPATTO AMBIENTALE, L'INFORMAZIONE AI CITTADINI E LA RELAZIONE SULLA STATO DELL'AMBIENTE- DEL MINISTERO DELL'AMBIENTE, MINISTERO DEI BENI E DELLE ATTIVITÀ CULTURALI E AGENZIA NAZIONALE PER LA PROTEZIONE DELL'AMBIENTE (ANPA): Linee guida per la valutazione ambientale strategica (VAS). In: L'ambiente informa, n. 9 (Supplemento), 1-23. 1999.

EGGENBERGER, M., PARTIDÁRIO, MR.: Development of a framework to assist the integration of environmental, social and economic issues in spatial planning. In: Impact Assessment and Project Appraisal, Vol.18, Issue 3, pp. 201-207. 2000.

FISCHER, T.B.: Towards a more Systematic Approach to Policy, Plan and Programme Environmental Assessment – Some Evidence from Europe", in Marsden S., Dovers S. (a cura di), SEA in Australasia, Sydney Place Federation Press. Sydney. 2002.

FISCHER, T.: What is the right context for SEA to be effective? Conclusions of the SEA stream meeting following the IAIA annual conference, Boston, May, 2005.

FUSCO GIRARD, L., CERRETA, M., DE TORO, P.: Valsi: un sistema di supporto alle decisioni per la pianificazione territoriale. In: D'Ambra L., Rostirolla P., Squillante M. (a cura di), Metodi, Modelli e Tecnologie del'informazione a Supporto delle Decisioni. Parte prima: metodologie, Franco Angeli editore. Milano, 2008.

FUSCO GIRARD, L., CERRETA, M., DE TORO, P.: Integrated Spatial Analysis: A Decision Support System for Territorial Planning, paper presented to the International Meeting MTSID 2006, Methods, Models and Information Technologies for Decision Support. Procida, 28-30 September, 2006.

FUSCO GIRARD, L., CERRETA, M., DE TORO, P.: Valutazione Spaziale Integrata: approcci e strumenti, relazione presentata alla II Giornata di Studi INU Campania, Visioni di territorio: dalle utopie agli scenari. Napoli, 14 novembre 2005.

GARANO, M., ZOPPI C.: La valutazione ambientale strategica nella pianificazione territoriale, Gangemi Editore. Roma, 2003.

HARVEY, N.: South Australia's Coastal Marina Strategy: planning success or recession victim?", Australian Planner, Vol. 30, Issue 1, pp. 4–7. 1992.

JAY, S, JONES, C, SLINN, P, WOOD, C.: Environmental impact assessment: retrospect and prospect. In: Environmental Impact Assessment Review. Vol. 27, Issue 4, , pp. 287–300. 2007.

KIRKPATRICK, C., LEE, N.: Special issue: integrated appraisal and decision-making, In: Environmental Impact Assessment Review, Vol. 19, Issue 3. 1999.

KØRNØV L., THISSEN, W.: Rationality in Decision and Policy-Making: Implications for Strategic Environmental Assessment. In: Impact Assessment and Project Appraisal, Vol.18, pp. 191- 200. 2000.

MONDINI, G., NORBERTI, S.: La Valutazione ambientale strategica delle grandi opere infrastrutturali: il caso dell'arretramento del porto di Genova, paper pubblicato nel CD ROM contenente i lavori presentati nella XXIX Conferenza Scientifica Annuale AISRe [Associazione Italiana di Scienze Regionali], Bari, 24-26 settembre 2008, il saggio è disponibile su Internet all'indirizzo http://www.inter-net.it/aisre/minisito/CD2008/ cd_rom/Paper/Mondini.pdf [ultimo accesso: 19 febbraio 2013].

REGIONE LOMBARDIA: Deliberazione di Giunta Regionale n. 9/761 del 10 novembre 2010 – Modelli metodologici e altri allegati vigenti per la VAS. Documento disponibile su Internet all'indirizzo http://www.cartografia.regione.lombardia.it/ sivas/jsp/normative/normativa.jsf?titolo=regionale&idTipoNormativa=4&directory=leggi_regionali [ultimo accesso: 24 agosto 2011]

REGIONE SARDEGNA: Linee Guida per la Valutazione ambientale strategica dei piani urbanistici comunali, 2010, Documento disponibile su Internet all'indirizzo: http://www.sardegnaambiente.it/ documenti/ 18_269_20110203150553.pdf. [ultimo accesso: 19 febbraio 2013].

SADLER, B.: A framework for environmental, sustainability assessment and assurance. In: Petts J., (a cura di). Handbook of environmental impact assessment, pp. 12 – 32, Blackwell. Oxford, 1999.

THERIVEL, R., WILSON, E., THOMPSON, S., HEANY D., PRITCHARD, D.: Strategic Environmental Assessment, Earthscan. Londra, 1992.

THISSEN, W.: Strategic environmental assessment at a crossroads. In: Impact Assessment Project Appraisal. Vol. 18, Issue 3, pp. 174 – 176. 2000.

WALLINGTON T., BINA O., THISSEN W.: Theorising strategic environmental assessment: Fresh perspectives and future challenges,. In: Environmental Impact Assessment Review, Vol. 27, pp. 569 – 584. 2007.

ZOPPI, C.: VAS di piani urbanistici comunali in adeguamento al Piano paesaggistico Regionale, Convegno Nazionale VAS in Italia: prospettive e criticità, Roma 26 novembre 2009, Documento disponibile su Internet all'indirizzo http://www. inu.it/ attivita_inu / download/ Convegno_VAS_2009 / Materiali/ZOPPI. pdf [ultimo accesso: 19 febbraio 2013].

ZOPPI, C.: VAS: alcune riflessioni su prospettive e problematiche aperte per la sua attuazione in Sardegna, paper pubblicato nel CD ROM contenente i lavori presentati nella XXXI Conferenza Scientifica Annuale AISRe [Associazione Italiana di Scienze Regionali] Aosta, 20-22 settembre 2010, disponibile su Internet all'indirizzo: http://www.inter-net.it/ aisre/minisito/ CD2008/ cd_rom/Paper/Zoppi.pdf, [ultimo accesso: 19 febbraio 2013].

Graffiti in Graz. Spatiotemporale Ansätze zur Analyse eines sozio-kulturellen Phänomens

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1 ABSTRACT

Kaum ein augenfälliges Merkmal der städtischen Umwelt und der darin lebenden Gesellschaft wird bereits so lange und so kontrovers diskutiert wie die Phänomene Street Art und Graffiti. Seit den Anfängen dieser Bewegung wurde sie vielfach lediglich als eine mögliche Ausdrucksform für eine vornehmlich jugendliche Kultur in bestimmten städtischen Lebensräumen interpretiert, wobei in diesem Zusammenhang besonders bemerkenswert scheint, dass diese Form der Artikulation trotz der Konkurrenz von neuen Medien und schnell wachsenden sozialen Netzwerken kaum an Bedeutung verloren hat, sondern – ganz im Gegensatz zu mancherorts geäußerten Vermutungen – diese Spielart der Straßenkunst nun vielmehr ihre angestammten Domänen verlassen hat und verstärkt auf bisher kaum betroffene Gebiete (z.B. viel kleinere, ländlich strukturierte Gemeinden) übergreift. Wie bereits angedeutet, ist die Einschätzung und Bewertung von Graffiti recht widersprüchlich. Für die Anhänger der Street Art-Bewegung handelt es sich einfach um eine zusätzliche und heutzutage weithin akzeptierte oder zumindest hingenommene Möglichkeit zur Schaffung und Ausgestaltung künstlerischer Freiräume, während ihre Gegner Graffiti auf einer Ebene mit Vandalismus, Verletzung von Eigentumsrechten und Beschädigung von Eigentum angesiedelt sehen. Darüber hinaus neigen viele (bezeichnenderweise meist betagtere) Bürger dazu, das Vorhandensein/die Platzierung von Graffiti als Kennzeichnung eines gesetzesfreien Raums zu interpretieren, in dem es das Stadtregiment respektive die Exekutive versäumt hat, den „Gesetzesbrechern" entgegenzutreten und die Bürger und ihr Eigentum zu schützen. Die unkorrigierte Prolongation dieser Missentwicklung kann zu sinkenden Mieterträgen oder Handelsumsätzen und schließlich sogar zum Rückgang der Immobilienwerte selbst führen. Mehr oder weniger deutlich erkennbare Blight-Phänomene fördern zusätzlich den Eindruck von Bandenaktivitäten.

Unter Berücksichtigung all dieser Aspekte liegt das Ziel der in der vorliegenden Arbeit dargelegten Forschungen einerseits auf der Erfassung und Dokumentation des status quo bzw. der ihn bestimmenden Faktoren, andererseits aber auch auf der Analyse und Visualisierung der Graffiti und ihrer Verteilungsmuster sowie der Interaktionen/Abhängigkeiten/Korrelationen zwischen den entscheidenden Faktoren. Es ist wichtig zu erwähnen, dass wegen der großflächigen Verbreitung dieses Phänomens die meisten Untersuchungen entweder auf einzelne Arten von Graffiti und/oder auf relativ kleinräumige Areale konzentriert durchgeführt wurden. Im Gegensatz dazu ist es das Ziel des vom Autor entwickelten Ansatzes, flächendeckend möglichst viele bis zu einem bstimmten Zeitpunkt innerhalb der Grenzen von Graz auftretenden Graffiti zu berücksichtigen. Aus methodischer Sicht besteht der Workflow dafür aus drei Arbeitsschritten, der Phase der Datenerfassung und -beschreibung, jenem der Modellbildung und schließlich die Analyse und Visualisierung der Resultate: Der erste Schritt wird mit der Durchführung von Vorstudien gesetzt, deren Ergebnisse den lokalen Kontext für das Wissen über die Eigenschaften der Street Art und/oder Graffiti bereitstellen; daraus werden wichtige Erkenntnisse für Design und Implementierung eines GIS-Datenbankkerns (Stufe 2) abgeleitet, der in weiterer Folge alle Projekt-relevanten raumbezogenen Daten (herkömmliche Attribute, Bilder etc.) aufnimmt, die im dritten Schritt durch die Werkzeuge des Prozessmodells (ebenfalls im Abschnitt 2 entworfen) analysiert werden. Der gesamte Prozess stellt dabei ein iteratives Verfahren dar, in dem schon ab dem ersten Durchlauf der aus zwei Stufen (Vorerhebung und Haupterhebung) stammende Inhalt der Datenbank Einfluß auf die Ergebnisse nehmen kann. Zusätzlich verengen Strategien zur Pattern Analysis und zur Abgrenzung von Hot Spots den räumlichen Fokus (und damit den Aufwand) für zukünftige Datenerfassungs-Kampagnen und ermöglichen daher eine gezieltere Beobachtung und damit indirekt bei gleichem Aufwand auch die Konstruktion von längeren Beobachtungs-Trajektorien. Obwohl damit das Potential der Methode gegenwärtig noch nicht völlig ausgelotet wird, ist das System schon jetzt in der Lage, eine breite Palette von Graffiti-relevanten Einblicken zu gewähren. Lokale Muster der verschiedenen Arten von Graffiti, Untergründe, Stile, etc. der graphischen Daten (d.h. der Zeichen) können miteinander verglichen und mit unterschiedlichsten sozio-ökonomischen Daten überlagert werden und so Hot Spots oder Ganggebiete identifiziert werden. Last but not least kann die Entwicklung des Phänomens Graffiti und seine räumlichen Verteilungsmuster auf dem Bildschirm und durch Hardcopy visualisiert werden.

2 RAHMENBEDINGUNGEN UND MOTIVATION

Wie bereits in der Einleitung dargelegt, handelt es sich beim Themenbereich „Graffiti" noch immer um eines der am widersprüchlichsten aufgenommenen und wohl auch kontroversiell verstandenen Phänomene des menschlichen Kulturbewusstseins. Akzeptiert man die Ergebnisse einschlägiger Studien als annähernd ubiquitär gültig, so kann man davon ausgehen, dass es sich dabei um eine Ausdrucksform von etwa zwischen 10 und 40 Jahre alten Menschen handelt, wobei andere Merkmale zur Person (Geschlecht, Familien-verhältnisse,…) bzw. zum Umfeld (Beruf, Beschäftigtenstand, Schulbildung,…) kaum eine signifikante Rolle zu spielen scheinen; komplettiert wird diese Gruppe von einschlägig Aktiven noch von Studierenden bzw. Künstlern und politischen Aktivisten (HALSEY & YOUNG 2002); vergleichbare Studien wie die der neuseeländischen Stadt Manakau engen den Kreis der in Frage kommenden Personen bei 5 % Irrtumswahrscheinlichkeit sogar noch weiter ein, nämlich auf die 12 bis 17 jährigen (MANAKAU CITY COUNCIL 2006). Während aber hinsichtlich der Charakterisierung der Aktionisten weiter reichende Übereinstimmung besteht bleiben andere Bereiche des betroffenen Umfeldes nahezu unbestimmt. So zeigt eine annähernd repräsentative Untersuchung der Graffiti-bezogenen Beiträge in den Online-Ausgaben der auflagenstärksten steirischen Tageszeitungen bzw. in den wichtigsten Grazer Online-Magazinen seit Januar 2012 – gemessen an seiner gesellschaftlichen Relevanz – eine durchgängig relativ starke mediale Präsenz des Themas. So äußerte sich „Der Standard" 25 Mal, „Die Presse" 7 Mal, „Heute" 14 Mal, die „Kleine Zeitung" 26 Mal, die „Kronen Zeitung" 36 Mal, der „Kurier" 17 Mal und „Mein Bezirk"/„Meine Woche" in 26 Reportagen zum Thema.

Fig. 1: Eine Auswahl von Schlagzeilen aus dem Online-Archiv der Kleinen Zeitung für den Zeitraum Jänner 2012 bis März 2013

Obwohl die in Fig. 1 zusammengestellten Schlagzeilen auf Grund der Ausrichtung des Mediums gesell-schaftspolitisch betrachtet nur einen Teil des tatsächlichen Spektrums widerspiegeln, erlauben sie doch eine über das bisher festgestellte hinausgehende Charakterisierung der „Szene". Dabei bleibt unbestreitbar, dass aus den Aktivitäten zum Teil recht beträchtlicher Sachschaden an privatem und öffentlichem Eigentum entsteht, dessen Begleichung von den Verursachern in den seltensten Fällen eingefordert werden kann. Man kann also davon ausgehen, dass der Tenor der Art wie Graffiti in der Öffentlichkeit verstanden wird eher negativ als neutral besetzt ist. Anders ausgedrückt: Graffiti wird weit weniger oft als Kunstform verstanden denn als Sachbeschädigung, ein Urteil das im übrigen auch mit der Botschaft der gewählten Schlagzeilen korreliert: Positiv besetzten Graffiti-Meldungen wie etwa die Schaffung zusätzlicher legaler „Arbeits-flächen" durch Stadt und Gönner aus der Wirtschaft wird – ebenso wie der Berichterstattung über Graffiti-Workshops – relativ wenig Platz eingeräumt. Desweiteren zeigt die Auswahl, dass es sich dabei längst nicht mehr um ein rein städtisches Phänomen handelt, sondern dass sich die Schadensmeldungen aus den ländlicheren Regionen des Bundeslandes häufen, die „Sprayer-Kultur" aber auch nicht an den Stadtgrenzen Halt gemacht hat und auf diese Art offenbar so etwas wie ein „Graffiti-Tourismus" entstanden ist. Bemerkenswert scheint in diesem Zusammenhang auch, dass trotz des mitunter beträchtlichen Aufwandes der Ordnungshüter (Zivilstreife, verdeckte Ermittler, Bildung von Sonderkommissionen) die Zeitspanne

zwischen Beginn der Aktivität und Ausforschung in den meisten Fällen relativ lange währt; dies bedeutet aus der Sicht der betroffenen Eigentümer eine Erhöhung des Schadenspotentials verbunden mit Frustration und sinkendem Vertrauen in die Möglichkeiten der Exekutive. Und das obwohl sich letztere redlich bemüht, ihre diesbezüglich vorhandenen Erfolge auch ins rechte Licht zu rücken. Was bleibt ist das in der jeweiligen Umgebung vielfach als störend empfundene Artefakt und ein auch objektiv fassbarer Eindruck von Verwahrlosung und Niedergang in einem Gebiet, das als Weltkulturerbe an einem im Sinne des Tourismus positiven Erscheinungsbild interessiert sein muss.

3 GRUNDLAGEN UND EINGESETZTE METHODIK

Im Gegensatz zur bisher in diesem Zusammenhang meist geübten Untersuchungspraxis versucht der dargestellte Ansatz schon wegen seiner umfassenden Ausrichtung das Phänomen möglichst ganzheitlich zu erfassen. Das würde in Richtung einer flächendeckenden Totalerhebung weisen, deren Fehlen von der Forschergemeinschaft zwar beklagt wird, die aber im Vergleich mit ähnlich gelagerten Arbeiten der Street Art Forschung sowohl thematisch als auch räumlich eher die Ausnahme als die Regel darstellt (SIEGL 1993, SCHAEFER-WIERY & SIEGL 2001, BAUER 2002, SIEGL & SCHRAGE 2008, STAHL 2009 und PHILIPPS 2011). Ähnliche Ergebnisse auf der internationalen Ebene wie etwa in Arbeiten über London und New York (MACDONALD 2001) legen zudem die Vermutung nahe, dass die Implementierung umfangreicherer auch konzeptionell untermauerter Datenbanken trotz bemerkenswerter Vorläufer wohl erst mit der zunehmenden Digitalisierung der Gesellschaft in großem Stil angedacht wurden. Bedauerlicher Weise sind aber gerade diese Entwicklungen wie etwa das Auckland City's Graffiti Tracker Database (LOCAL GOVERNMENT NEW ZEALAND 2006) bzw. eine nicht näher spezifizierte Graffiti-Datenbank der „kesicherheit.de" (DIE GRAZER VOLKSPARTEI GEMEINDERATS-KLUB 2011) ausschließlich in sicherheitspolitischem Kontext zu sehen was auch erklärt, warum Hintergrundinformationen darüber nicht zugänglich sind und deshalb auch für wissenschaftliche Arbeiten nicht zur Verfügung stehen.

Für die vorliegende Studie stellte sich hinsichtlich des projektierten Zielgebietes zunächst die Frage nach einer akzeptablen Außengrenze, wobei sich nicht zuletzt wegen der später angestrebten Verknüpfbarkeit der Entitäten mit z.B. sozioökonomischen Daten eine auf Verwaltungsgrenzen (Zählsprengeln) basierende Grenzziehung anbot (die Ergebnisse der später durchgeführten Vorerhebungen haben diese Annahme übrigens insoferne gestützt als sich – mit Ausnahme der an die Ausfallsstraßen angrenzenden Gebiete – stadtauswärts ein deutlicher Rückgang der Graffiti-Häufigkeiten beobachten ließ). Der Aufwand für die Aufnahme möglichst vieler der auf den daraus resultierenden, etwas über 120 km² des Grazer Stadtgebietes vorkommenden „Einträge" konnte dadurch weiter reduziert werden, dass als wenig relevant eingeschätzte Bereiche identifiziert und – je nach dem Befund einer stichprobenartig durchgeführten Überprüfung endgültig ausgeschieden oder – in selteren Fällen – im Unersuchungsgebiet belassen wurden. Nach diesem Schritt zeigte sich im Rahmen von Geländebegehungen, dass sich das Auftreten von Graffiti auf bestimmte Areale entlang der Strassenzüge konzentrierte sowie deutliche „Expositionsunterschiede", wohl infolge der Absicht der Writer, ihre Werke nach Möglichkeit für die Allgemeinheit sichtbar zu machen) zu erkennen waren. Letzteres bringt insoferne sogar erhebungstechnische Vorteile mit sich, als die Zahl der durch Unbegehbarkeit bestimmter Flächen nicht erhebbaren Graffiti (in zeitweilig abgeschlossenen Innenhöfen sowie anderen nicht öffentlich zugänglichen bzw. einsehbaren Bereichen des Grazer Stadtgebietes) sowohl zahlenmäßig gering als auch abschätzbar bleibt. So haben in ausggewählten Gebieten durchgeführte Tests ergeben, dass mit einer Dunkelziffer von etwa 3 % zu rechnet ist. Angesichts dieser Überlegungen versteht sich von selbst, dass der ursprünglich wenigstens implizit erhobene Totalitätsanspruch schon aus statistischen Gründen nur mehr symbolisch erfüllt werden kann: Immerhin ergibt sich aus der schrittweisen Fokussierung ein letztlich zu berücksichtigendes Untersuchungsgebiet von etwa 17,5 km² mit etwa 27 km Strassenlänge (Fig. 2); damit kann sichergestellt werden, dass das ganze Gebiet mit vertretbarem Aufwand auch in sinnvollen Intervallen untersucht werden kann um auf diese Weise auch zeitliche Längsschnitte mit brauchbarer Aussagekraft ableiten zu können.

Die erste Vollerhebung wurde unter diesen geänderten Rahmenbedingungen im Sommer 2011 durchgeführt und beschäftigte sich im Wesentlichen mit der partiellen Umsetzung des in Strategiepapieren für die Vermeidung von illegalen Graffiti niedergelegten Handlungskonzeptes (MINISTRY OF JUSTICE). Dieses sogenannte SARA-Framework besteht in seinem Grundmuster aus einem 4 Stufen-Plan (Scanning-Analysis-Response und Assessment) und definiert dadurch die stragetische Vorgangsweise. Durch das Scanning

sollen einerseits Basisdaten akquiriert und kartographische Grundlagen geschaffen werden; gleichzeitig sollen aber auch mögliche Probleme erkannt und durch geeignete Parameter beschrieben werden, sodass bereits auf dieser Ebene die analytische Herausarbeitung von Hot Spots möglich gemacht wird. Wichtig scheint in diesem Zusammenhang besonders, dass durch wiederholtes Scanning einerseits zufällige Erscheinungsformen und -muster weitestgehend ausgeschlossen werden können, darüber hinaus aber auch die zeitliche Dimension des Problems ausreichend genau beschrieben werden kann.

Die anschließende Analyse wird in Art und Umfang naturgemäß hochgradig von den an SARA geknüpften Erwartungshaltungen bzw. von den nachgeordneten Paketen „Response" (umfasst die aus der Analyse abgeleiteten Gegenmassnahmen gleich welcher Art) und „Assessment" (Überprüfung inwieweit die eingeleiteten Gegenmaßnahmen den erhofften Erfolg gebracht haben) bestimmt. Da sich die Intentionen des vorliegenden Projektes gravierend von jenen des Vorläufers unterscheiden und die in Graz gesammelten Daten ausschließlich zur Beschreibung des aktuellen Zustandes und zur tiefer gehenden Erforschung des Umfeldes einer urban-kulturellen Ausdrucksform verwendet werden sollen, weicht das in diesem Beitrag vorgestellte Konzept bereits in der in der zweiten Phase vom Vorbild ab; so wird auch völlig auf die Einbeziehung der persönlichen Aspekte von (aktiven wie auch passiven) Beteiligten verzichtet; desweiteren bleiben auch allfällige Gegenmaßnahmen unberücksichtigt. Stattdessen wird versucht, das Problem auf rein deskriptive Weise bzw. durch die Auswertung kombinierter Datenebenen zu unterschiedlichen Themen-bereichen zu beleuchten.

Fig. 2: Übersicht über Lage und Ausdehnung des untersuchten Gebietes (rot schraffiert)

4 DAS DATENMODELL

Das aus den Ergebnissen der Vorerhebungen zusammengestellte und durch die dort und während der ersten Haupterhebung (unterstützt von Studierenden des Instituts für Geographie und Raumforschung der Universität Graz) gewonnenen Erkenntnisse modifizierte Datenmodell orientiert sich an den Elementen des Wiener Modells der Graffiti-Forschung (SIEGL 2002), das die Erfassung von 23 Charakteristika vorsieht, auf deren Basis eine mulitvariate Klassifikation ermöglicht werden soll (Tabelle 1).

Merkmal	Ausprägung (exemplarisch) bzw. Erläuterung
Entstehungszeitraum	Datum
Erhebungszeitraum	Datum
Herkunftsregion	Erhebungszone
Produzentengeschlecht	m, w
Altersgruppe	Kinder, Jugendliche, Erwachsene
(Sub-)Gruppe	Skinheads, Punks,…
Gesellschaftsschicht des Aktivisten	keine Angabe (k.A.)
Standort/Fundort	k.A.
Grundfläche/Trägermaterial	k.A.
Technische Ausführung	3 mögliche Varianten
Haltbarkeit	k.A.
Farbe	monochrom/multicolor
formal	flächig, graphisch
Größe	k.A.
inhaltlich/thematisch	k.A.
Absicht	bewusst, neben anderer Tätigkeit entstanden
?	Legalität Illegalität Tradition
Spontanität	spontan, geplante Aktivität
interaktiv mit vorgegebenen Strukturen	k.A.
?	Basisgraffito, Kunstgraffito
Anonymität	k.A.
?	Initialgraffito, Reaktives Graffito (S-R-Modell)
Originalität	k.A.

Tabelle 1: Die Merkmale des Wiener Modells der Graffiti-Forschung

Der für die vorliegende Studie zum Einsatz gebrachte Kriterienkatalog stimmt nur teilweise mit dem Wiener Grundmodell überein, ein Fakt das auf unterschiedliche Gründe zurückzuführen ist. Hauptverantwortlich dafür ist der vom Autor gewählte Ansatz, der vornehmlich auf der Beschreibung des Phänomens durch objektiv erfass- und dokumentierbare Kriterien beruht und Subjektiva (z.B.: Originalität) genauso wie nur durch Befragung direkt oder indirekt beteiligter Personen zu erhaltende Informationen (z.B.: bewusst oder neben anderer Tätigkeit entstanden) ausblendet. Leitidee war stattdessen der Versuch, eine – im Rahmen der Möglichkeiten – universelle Datenbasis zu schaffen, die hochgradig skalierbar, noch genügend Spielraum für spätere Erweiterungen bietet. Als Ausgangspunkt für die Entwicklung des Konzeptes dienten die fünf Fragen: Wo? (Positionsbeschreibung), Wer? (Grobcharakterisierung des Betroffenen/der betroffenen Organisation), Wie? (Beschreibung der Entität hinsichtlich ihrer Umgebung), Was? (Beschreibung der Entität) und Wann? (Zeitpunkt der Erstaufnahme).

Gerade dem „Wo?" kommt dabei in doppelter Hinsicht besonderes Augenmerk zu: Der für die Erhebung vorgesehene Workflow beruht hardwareseitig hauptsächlich auf der Verwendung von GPS-fähigen Kameras, deren hoch auflösende Bilder (18 oder mehr Megapixel) vom Objekt und seiner Umgebung sowohl einen Eindruck von der Szenerie selbst als auch von graphischen Details bereit stellen. Sozusagen on-the-fly protokollieren diese Kameras außerdem noch die Beobachter-Koordinaten (bezogen auf ein frei wählbares Referenzsystem) sowie die Blickrichtung und weitere photographisch relevante Daten. Bei Verwendung des speicherschonenden JPEG-Bildformates können diese Informationen für die spätere Auswertung im EXIF-Header abgelegt werden, sodass sich eine allenfalls notwendige visuelle Nachjustierung von Standortkoordinaten oder Blickwinkel auch im Labor ohne größeren Zeitaufwand genauso durchführen lässt wie etwa die Zuordnung der Photos zu Standpunkten. Nebenbei wurden – sozusagen durch den technischen Fortschritt – auch aus der Sicht des Wiener Modells „neue" Daten gesammelt. Besonders die automatische Verortung des Materials liefert ein zentrales Element in der weiteren Verarbeitung; ihre funktionale Bedeutung für die späteren Analysen und die Visualisierung der Ergebnisse (Kartenherstellung) machte

jedoch auch von vorne herein klar, dass für das Management der anfallenden Datenmengen nur ein Speichermodell in Frage kam, welches dieser Eigenart auch Rechnung tragen konnte. Jede Lösung ohne die Verwendung geo-rationaler Datenbanksysteme hätte den freiwilligen Verzicht auf den Mehrwert aus allen GIS-basierten Analyse-werkzeugen bedeutet und wäre damit einer beinahe vollständigen Entwertung des Systems in seiner vorgeschlagenen Form gleichgekommen.

Schlussendlich haben die geänderten Rahmenbedingungen auch Möglichkeiten für eine Modifikation des zugrunde liegenden Modells geschaffen, um es den Grazer Gegebenheiten besser anpassen und auch in diesem Sinne weiter entwickeln zu können. Fig. 3a-h zeigen Beispiele fürdie in Graz erhobenen Attribute (in Klammer die möglichen Merkmalsausprägungen). Die übrigen Attribute ohne Bildbeispiele finden sich in Tabelle 2. In allen Fällen wird der Ortsbezug dabei über Lagepunkte hergestellt.

Verkehrsschild *Müllkuebel* *Wand*

Schild *Tür/Tor* *Infrastruktureinrichtung*

Fig.: 3a Betroffenes Objekt (Wand, Tür/Tor, Infrastruktureinrichtung, Verkehrsschild, Hinweistafel, Fenster, anderes)

privat *Unternehmen* *öffentlich*

Fig.: 3b Geschädigter (privat, Unternehmen, öffentlich)

Front · Versteckt · Torbogen

Fig.: 3c Exposition (Wand, Front, Durchgang, erhöht, versteckt, anderes)

Stein · Verputz fein · Metall

Fig.: 3d Graffiti-Untergrund (Beton, Stein, Verputz grob, Verputz fein, Metall, Holz, Papier, Kunststoff, Asphalt, anderes)

Writing · Tag · Ultra (Fußball)

Fig.: 3e Graffiti-Typ (Writing, Murials, Tags, Etching, Politisches Graffiti, Ultras, Gang, Adbusting, ThrowUps)

unten · im Arbeitsbereich eines Halbw. · darüber

Fig.: 3f (Graffiti-Höhe (unten, im Arbeitsgebiets eines Halbwüchsigen, darüber, nur mit Werkzeug (Leiter) erreichbar)

Fig.: 3g Graffiti-Größe (klein (weniger als 1/2 m²), mittel (1/2m²), groß, sehr groß (länger als 3 m)

Fig.: 3h Graffiti-Werkzeug (Spraydose, Stift, Kratzen, Aetzen, Rollen, Pinsel, anderes)

Merkmal	Inhaltliche Beschreibung
X-Koordinate	UTM 33 N
Y-Koordinate	UTM 33 N
Datum (Key)	Aufnahmedatum
Graffiti-Farbe	einfarbig, zweifarbig, mehrfarbig
Graffiti-Statement	Aussage, Bedeutung, Symbolik des Graffiti
Bild mit interner Kamera des Gerätes	Link auf Photo (interne Kamera)
Vergleichsbild mit externer Kamera	Link auf Photo (externe Kamera)
Anmerkung	zusätzliche Erläuterungen, Ergänzungen, Hinweise

Tabelle 2: Zusätzliche Attribute

5 ANALYSEN UND ERGEBNISSE

Bis zur gegenwärtigen Ausbaustufe lag das Hauptaugenmerk in erster Linie auf der Konzeption eines flexiblken Datenmodells bzw. auf der Akquise und Bereitstellung des Datenmaterials. Deshalb wurden bis dato grundsätzlich zwei verschiedene Auswertungstypen realisiert, die sich grob mit „Abfragen" und „Overlay Operationen" umschreiben lassen. Erstgenannte Variante ist zwar methodisch trivial, ermöglicht aber wegen der Einzigartigkeit der Untersuchung doch auch interessante Quantifizierungen, die an dieser Stelle trotz des knappen Platzes nicht ganz verschwiegen werden können. So konnten seit Beginn der Arbeiten etwa 14 km² des projektierten Untersuchungsgebietes (das entspricht etwa 20 Straßenkilometern) zum Teil mehrfach untersucht werden. Im Zuge dieser Kampagnen wurden ca. 8800 Entitäten lokalisiert und dokumentarisch aufgearbeitet woraus sich – abgesehen von der räumlichen Verteilung – folgende Charakteristika ableiten lassen: Der weitaus größte Anteil der Graffiti wurden an Wänden (68 %) bzw. an Infrastruktureinrichtungen (23 %) und meist in Reichweite von Halbwüchsigen (95 %) platziert. Es handelt sich ferner um kleine bis mittelgroße (insgesamt etwa 96 %) mittels Spraydosen (55 %) oder Stiften (41 %) hergestellte Tags auf Feinputz oder Metallflächen. Abgesehen von extrem ausgeleuchteten oder überwachten Arealen scheinen sich die Akteure eher selten von für sie günstigen Lichtverhältnissen oder von bestimmten Expositionen leiten zu lassen. Besonders auffällig ist weiters der angesichts der absoluten Zahl an Einträgen verschwindend geringe Teil von Graffiti mit politischen bzw. gesellschaftskritischen Botschaften. Hier

lassen sich nur einige wenige einschlägige Zonen ausmachen, was Rückschlüsse auf das Alter bzw. den sozialen/gesellschaftlichen Background der Akteure nahelegt. Als weiterer interessanter Aspekt kann die Existenz von Crossings gewertet werden. Trotz der für Graz relativ zahlreichen Aktivitätszonen finden sich diese Übermalungen die als Ausdruck konkurrierender territorialer Ansprüche gewertet werden können nur in etwa 4 oder 5 „Überlappungsbereichen" was darauf hindeutet, dass die einschlägige Szene in Graz arm an diesbezüglichen Rivalitäten sein dürfte.

Neben diesen basalen Analysen wurde das verfügbare Datenmaterial noch einer Reihen von weiteren Tests unterzogen, wobei ausgehend von a priori durch Experten als interessierend festgelegte Problemfelder mittels Merkmalskombinationen untersucht werden sollten. Aus den zur Verfügung stehenden 11 Analyseszenarien (Tabelle 3) wurde für diese Arbeit der Themenkomplex „Sport/Ultras" herausgegriffen, um damit die Möglichkeiten des Systems näher zu beschreiben.

Schwerpunkt	Zugeordnete Forschungsfragen
Miet-/Kaufpreis	Zusammenhang und Korrelationsmuster zwischen Graffiti und Miet-/Kaufpreis
Politik	Politisch motivierte Graffiti im Umfeld von Einrichtungen politischer Gruppen
Sport/Ultras	Muster und Verbreitung sportlich motivierter Graffiti
Schulen/Ausbildungsstätten	Gibt es eine „typisch schulische" Graffiti-Szene?
Ausländer	Verteilung von Ausländer-/ausländerfeindlichen Graffiti
Öffentlicher Personennahverkehr	Typisierung der Graffiti im der Umgebung von Haltestellen bestimmter Linien
Industrie- und Gewerbegebiete	Wie unterscheidet sich die Graffiti-Kultur im Bereich von I&G-Flächen?
Polizeistationen/Überwachungskameras	Verbreitung und Typisierung von Graffiti in „sicheren Räumen"
Szenelokale/In-Treffs	Gibt es einen Zusammenhang zwischen Nachtschwärmern und Graffiti?
Sehenswürdigkeiten	Werden auch touristische Präferrenzräume zur Vermittlung von Botschaften genutzt?
Beleuchtung	Ist gute Ausleuchtung ein Schutz vor Graffiti-Aktivisten?

Tabelle 3: Übersicht über aktuelle Analyseszenarien und die zugeordneten Forschungsfragen

Das Thema bot sich besonders deswegen zur Analyse an, als die Sportstadt Graz neben 2 rivalisierenden Fußballklubs auch noch über einen Eishockeyklub in der obersten Spielklasse und zahlreiche weitere kleinere Sportvereine mit ausgeprägter Fan-Kultur verfügt. Hinzu kommt noch, dass sich sportbezogene Graffiti/Ultras leicht als solche erkennen und daher auch unmissverständlich zuordnen lassen. Für die vorliegende Studie wurden folgende Forschungsfragen formuliert: Ist eine räumliche Konzentration sportlich motivierter Graffiti im Stadtgebiet bzw. im Umfeld von Sportstätten nachweisbar? Gibt es eher Unterschiede oder eher Gemeinsamkeiten in den Signaturen der sportbezogenen Graffiti-Kultur? Welche Sportarten sind besonders Thema von Graffiti? Zur Klärung dieser Fragen wurde mit „Sportstätten" ein zusätzlicher Datenlayer eingeführt, der die Informationen zu relevanten Grazer Sportstätten verortet. Dabei wurden – entsprechend ihrer unterschiedlichen Publikumswirksamkeit – auch unterschiedliche Einflußräume angenommen. Während der Analyse zeigte sich ein strukturelles Problem dieser Thematik, nämlich die potentielle Verfälschung der Ergebnisse durch den Fakt, dass gerade die raumintensiven Sportanlagen eher an der Peripherie liegen, wohingegen der Graffiti-Gesamtbestand eine deutliche Konzentration im inneren Stadtbereich zeigt. Weiters war – abgesehen von einer deutlichen Erhöhung im Umfeld der bedeutungsmäßig klar dominierenden UPC-Arena keinerlei auffälliger Zusammenhang zwischen Sportstätten und Ultras nachweisbar. Im Umfeld dieses großen Fußballstadions dominierten die rivalisierenden Anhänger-organisationen der beiden Stadtklubs und liefern sich (besonders schön durch die Photo-Zeitreihen zu dokumenieren) intensive Verdrängungswettkämpfe. Auch außerhalb dieses Bereiches dominiert der Fußball, jedoch nur selten in auffälliger Konzentration; so im Weichbild der Universität und bestimmter Schulen, was Rückschlüsse auf den persönlichen Hintergrund der Klientel nahelegt; andere Konzentrationen sind aufgrund des Stils bzw. des Musters eher besonders rührigen Individualisten zuzuordnen als organisierten Gruppierungen. Unter Berücksichtigung anderer Kriterien lässt sich zusammenfassend folgendes feststellen: Hauptziel der mehrheitlich einfarbigen Graffiti-Verziehrungen sind Fronten bzw. Wände von

Infrastruktureinrichtungen der öffentlichen Hand (75 %) gefolgt vom Privatbesitz (23 %). Auffälligkeiten zeigt auch die Anbringungshöhe der Werke: In Sportstättennähe wurden mehr als 36 % unterhalb der „Arbeitshöhe" eines Halbwüchsigen angebracht, dies entspricht etwa dem doppelten des städtischen Durchschnitts. Die Größenverteilung wiederum spiegelt zu einem guten Teil die Verfügbarkeit von Freiflächen wider: 75 % mittlere und große gegenüber nur 20 % kleinen Graffiti; im inneren Stadtbereich kehren sich diese Verhältnisse annähernd um.

6 ZUSAMMENFASSUNG UND AUSBLICK

Obwohl das Informationssystem in seiner gegenwärtigen Ausbaustufe durchaus in der Lage ist, die oben beschriebenen Interessenten – Abfragen bzw. Verschneidungen mit zusätzlichen Datenebenen zufriedenstellend durchzuführen hat doch gerade der vor kurzem parallel zum fortgesetzten Update angelaufene intensivere Testbetrieb gezeigt in welche Richtungen die Entwicklung vorangetrieben werden könnte. Abgesehen von der Einbindung bisher noch unberücksichtigt gebliebener Informationsebenen und der Ausweitung (HAWORTH et. al. 2013) bzw. Automatisierung der bereits implementierten analytischen Fähigkeiten könnte besonders eine verbesserte Visualisierung (perspektivisches, lagerichtiges Draping der erfassten Entitäten) und ein beschleunigtes Handling bei der Datenakquise (etwa Datenübermittlung und Datenbank-Einspielung über web-basierte Crowd Mapping Apps) zur Nutzwertsteigerung beitragen. Schlußendlich könnten auch bisher ausgelagerte untergeordnete Funktionen wie etwa der Test von ähnlichen Graffiti auf Übereinstimmung in den Systemkern aufgenommen werden und so die Kompaktheit des Paketes steigern.

7 REFERENCES

BAUER, M.: Toilettengraffiti im Lauf der Zeit. Die Entwicklung geschlechtsspezifischer und politischer Unterschiede. Wien, 2002.
DIE GRAZER VOLKSPARTEI GEMEINDERATSKLUB: Antrag betreffend Maßnahmen gegen Graffiti Vandalismus und die Bereitstellung von legalen Graffiti Flächen. Graz, 2011.
HALSEY, M. & YOUNG, A.: The Meanings of Graffiti and Municipal Administration. Melbourne, 2002.
HAWORTH, B., BRUCE, E., IVESON, K.: Spatio-temporal analysis of graffiti occurrence in an inner-city urban environment. Sydney, 2013.
MACDONALD, N.: The Graffiti Subculture. Youth, Masculinity and Identity in London and New York. Houndmills, 2001.
MANAKAU CITY COUNCIL: Manakau City Council's Submission to the Local Government and Environment Select Committee on the Manakau City Council (Control of Graffiti) Bill. Manakau, 2006.
MINISTRY OF JUSTICE: National Guidelines for Crime Prevention through Environmental Design in New Zealand. Wellington, 2005.
LOCAL GOVERNMENT NEW ZEALAND. How to beat graffiti guide 06. Wellington, 2006
PHILIPPS, A.: LFS-Arbeitsbericht Nr. 5. Leipzig, 2011.
SCHAEFER-WIERY, S. & SIEGL, N.: Graffiti – Dokumentation. Städte und Länder – Teil 1.Wien, 2001.
SIEGL, N.: Kommunikation am Klo. Graffiti von Frauen und Männern. Wien ,1993
SIEGL, N.& SCHRAGE, D.: Rechtsextreme Symbole und Parolen. Graffiti und Sticker als Medium interkultureller Kommunikation. Wien, 2008.
SIEGL, N.: Kulturphänomen Graffiti. Das Wiener Modell der Graffiti-Forschung. Teil 2: Das Wiener Modell der Graffiti-Forschung. Grundlagen der Graffitiforschung, Kollegen und Ansätze. http://www.graffitieuropa.org/kultur2.htm. Wien, 2013.
STAHL, J.: Street Art. Königswinter, 2009.

Historical Buildings Integration Into a Modern Industrial Urban Environment of Perm

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1 ABSTRACT

Perm is a 300 years old modern industrial city. Architectural heritage was formed by several "architectural layers", each of them has its own period and place in the history of the city. As a whole, architectural styles of Perm have similarities with such styles in Ekaterinburg, Chelyabinsk and other Ural cities. Influence of activity of architects of 18th and 19th centuries and Soviet principles of planning of territories and designing of houses is traced in historical parts of the city.

For preservation of historical heritage of Perm, protection zones are defined in the rules of land usage and in the general plan of Perm. Despite this the shape of all of historical buildings is changing because of expansion of the city, new economic and political conditions, new needs and requirements.

In our research following morphotypes are being observed: houses of 19th century (two floors: 1st – brick materials, 2nd – wood materials), merchant houses (two floors, brick materials), Perm socialistic town, buildings of 1980s and 1990s and new constructions.

To define negative factors influencing historical heritage and to set protection measures for each of morphotypes it's necessary to analyze its existing position from the point of view of primary ideas of the projects. The analyses are in several scales: from large scale describing status of historical buildings in the city or in the district, to smaller scale defining condition of a certain building and its external changing. Moreover, processes are being analyzed which are occurring on the territory around these historical buildings (inside and outside the blocks).

The result of this architectural research is setting directives for the development of regulating documents dealing with certain historical buildings and morphotypes for preservation of unities of ensembles and interrelation with surrounding buildings. The practical application of this research is an establishment of new parameters for each type of historical buildings in urban codes.

2 HISTORICAL AND ARCHITECTURAL HERITAGE OF PERM

Perm is a city on the border between of Europe and Asia with one million inhabitants. In the past it was an industrial city but now Perm is developing as a cultural and scientific center of the Perm Krai and Western Urals.

The master plan of the city was accepted in 2010. Besides, there is a strategic master plan of Perm describing the main directions of the city development elaborated in 2011.

In connection with increasing of new construction and new strategy of the city consolidation of central parts of the city there is an urgent question about preservation of historical parts of the city and preservation of integrity of architectural and planning ensembles which form historical heritage of the city.

Urban environment cannot be absolutely identical and homogeneous. The city is concentration of different styles and times. You can often see variety of buildings "for any taste". Therefore urban planners face a question: "How is it possible to combine this diversity and uniqueness of different morphotypes of the city to get one city fabric preserving identity? Should we understand each building or each group forming city fabric?" Only the main architectural dominants usually are preserved, but ordinary buildings are disappearing. It is important because the majority ordinary buildings are forming shape of the city and "sense of the place".

3 PRINCIPLES OF THE ANALYSIS

Establishing of a strategy of historical heritage preservation is an important issue for the city. Because the heritage is its uniqueness and identity, in the long run it is the history of the city.

The protection zones are set up in the rules of land use of Perm. City-planning activity mode and measures of preservation are defined for each of these zones. But the particular factors which are worsening the life of architectural heritage are not revealed and not described in urban codes.

The work for establishing of the strategy of historical heritage preservation was made by developing strategic master-plan of Perm. In the part "Heritage Strategy" the main ensembles of the central parts of the city are revealed. The results of this work are the main directions within the limits of which the researches and works for preservation of historical heritage will be made (strategic master plan of Perm).

"Within borders of this work there were selected six key ensembles which are possessing an obvious historical value for Perm. The key ensembles are supplemented with individual zones: here we can see groups of buildings estimated as important for architectural and town-planning activity of Perm."

If we talk about preservation of historical buildings we should pay attention to big meaning have such factors as aesthetic parameters and the safety of original appearance. Not only buildings form the ensemble, but it is formed also by the environment around these buildings and buildings situated nearly. All visible facades of the street make its shape, but high, length and decor of buildings make the rhythm of the street. The reflection of ideas of one building to the another and vice versa is "rhyme" of the street creating its integrity.

Our research work is connected with revealing the links between historical buildings and new buildings; the list of the problems connected with integration new buildings into historical center's environment; preservation integrity of historically important buildings within dynamic city environment.

For researching the most widespread morphotypes of Perm are defined: houses of 19th century (two floors: 1st – bricks materials, 2nd – wood materials), merchant houses (two floor, brick materials), Perm socialistic town, buildings of 1980s and 1990s and new constructions.

The plans of each typology are compiled for defining of morphotypes placement. The research aimed at historical parts of Perm. The prevailing buildings which are forming ensembles and the shape of the street are selected for each part. The typical blocks of each typology are described from the point of view of the following parameters:

(1) analysis of their placement in the district/city;

(2) analysis of their planning structure and placement in the quarter;

(3) analysis of the architectural integrity, facades, physical wear;

(4) analysis of the environment around the block.

The analysis has several stages for getting the most general and complete idea of these buildings. The first stage is to identify a common list of problems. The next stage is a detailed reviewing of each of the historic buildings and establishing relationships with the surrounding buildings and environment.

4 THE FIRST STAGE OF THE ANALYSIS. EXISTING SITUATION AND PROBLEMS OF CENTRAL PART OF PERM

The blocks of historical center of Perm are formed by buildings of XIX century in style of classicism and a modernist style with the features caused by character of applied materials and local traditions. Usually it is brick or wood buildings which have two or three floors. For this moment in the city's fabric there are pieces of such historical buildings, but they are replaced by new buildings which are appearing suddenly without a functional design and planning.

One of the main features of this type of buildings is a lot of decorative elements on the facades. The main colours of facades are yellow, green or white. The facades have a certain rhytm which composes a certain rhytm of the whole street. (Fig.1)

Fig.1 Roofs elements. The mercant houses (XIX century).

The quarters with such buildings are closed blocks. Administrative offices and commercial activity are situated on the street-side, but the accesses for people living in these buildings are inside of the quarter.
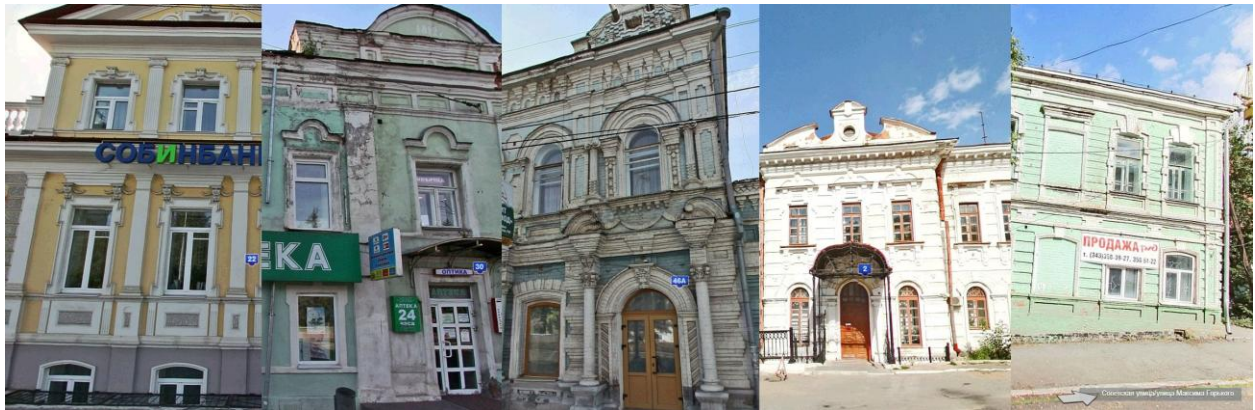
Fig.2 Fragments of facades of historical part of Perm

The main feature of central streets is using of the first floors for commercial activities. The different shops and service enterprises on the first floors help to enliven the streets.

One of principles of new urbanism is natural surveillance. It means that spaces with social activities are more comfortable. But for historical blocks such activites was usually not provided. Therefore we shoud observe shops and cafes appeared on the first floors not only as functional features but also as components forming an aestetic view of the streets. Moreover, we should think wheather each certain building can receive additional load (additional functions) or not. Probably, these buildings are needed to exempt from unnecessary functions and unusual arcitectural detales.

Sibirskaya and Kirov streets are the main streets of Perm. The visual analysis of facades of these streets revealed that additional functions seem to be a great disadvantage and harm for historical buildings.
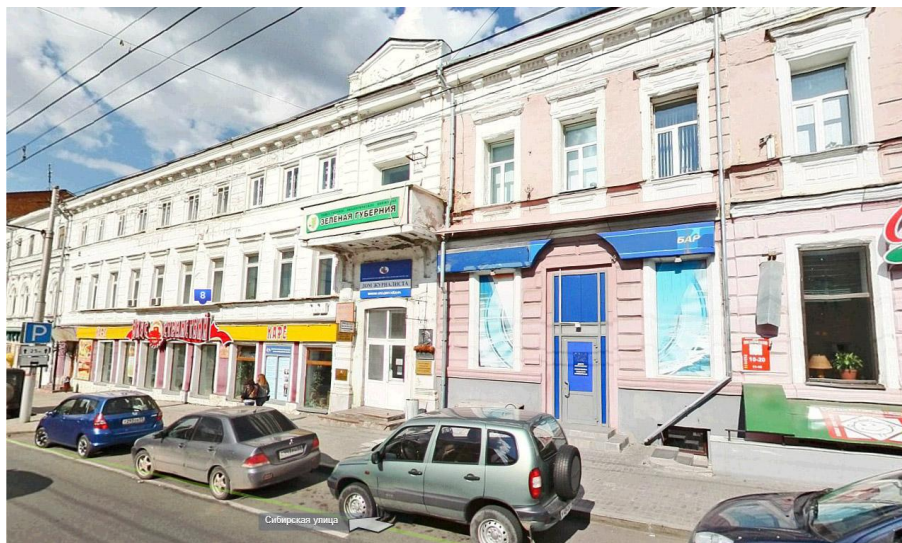
Fig.3 Façade of building, Sibirskay street.

In particular, bad solutions of entrances groups, ladders and accesses to buildings broke the red line of the street. Moreover, it is bad for appearance of facades, it makes too strong differences of color palettes (different with original colours). (Fig.3,4)

Fig.4 Façade of building, Kirov street.

In the survey of blocks of buildings of the XIX century one more problem of historical part of Perm was defined.
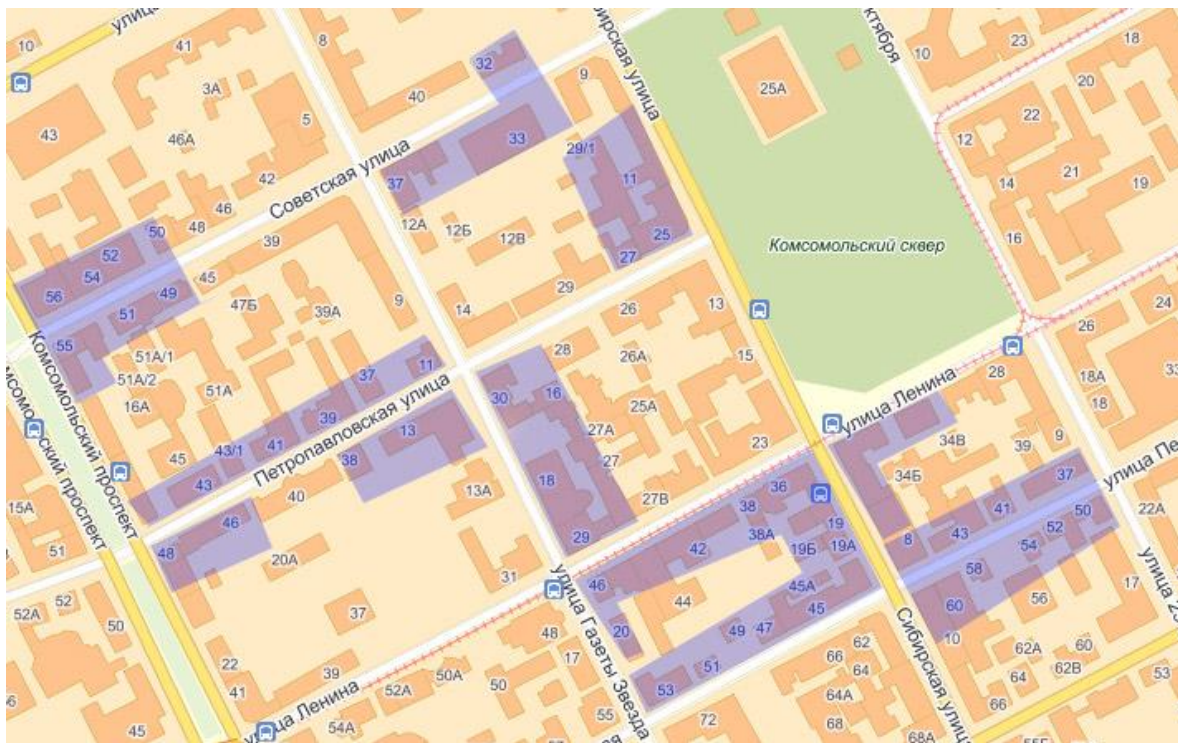
Fig.5 The revealing of blocks of historical buildings. The central part of Perm (2Gis map).

Blocks formed by historical buildings are situated on the borders of quarters. But inside parts of these blocks are filled by new buildings (usually in other styles), which are higher than historical buildings on the borders. New constructions interrupt complete perception of facades of achitectural heritage.

Nowadays most of blocks of historical buildings have only corner buildings. The new constructions, which are the similar historical buildings, are built in blocks for restoration and reconstruction of historical appearance of the street. It helps to save integrity of composition or ensemble, but in most cases architects design new projects without links to environment of historical blocks, therefore urban environment is disjunct.
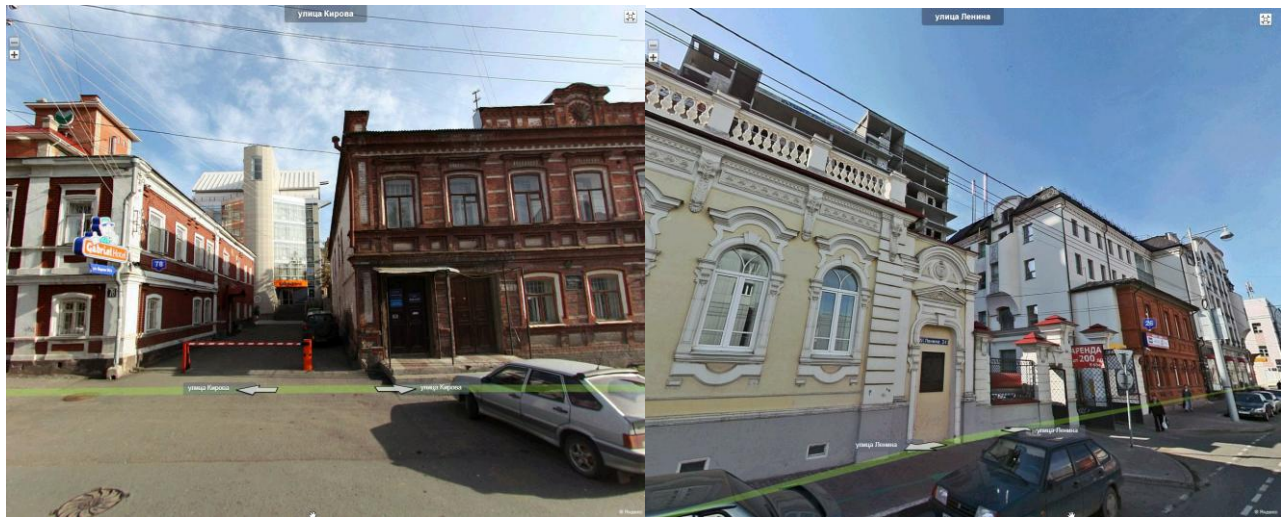
Fig.6 Break of the lines of facades by buildings inside block.

Obviously there is a necessity to develop the list of valued elements of historical environment, which are typical for certain morphotypes, and we need to find new tools for preservation of the shape of historical blocks. Moreover, we should pay attention to value of physical wear, the materials of constructions and possibilities for functional adaptation.

5 CONCLUSIONS

For this moment in the Russian Federation there are instruments for preservation of architectural heritage. For example, architects design sweep of the streets for understanding of general shape of the street or block; maps of typologies and conditions of buildings for understanding value of heritage and necessity of restoration. But laws which regulate fulfillment of such analyses cannot work effectively because they doesn't have specific indications, limitations, and tools which could be free and useful for all who are interested in them.

The local normative documents need in rethinking about functional load of historical parts of the city. It needs to more distinctly define the list of types of value elements of historical environment and fix this typology with the help of photomaterials and detailed descriptions.

Sociological polls can help to determine restrictions for usage of historical heritage. It can give understanding of what is really important for citizens: which places are important and significant and what they want to preserve.

Thus, the existing register of historical buildings of Perm needs to be supplemented to be improved. It needs to add descriptions not only of main buildings and architectural dominants, those of ordinary buildings and blocks of historical parts of the city as well. It has to be an open register because it can be an important resourse with information about historical quarters for all who are interested in it.

6 REFERENCES

KUZNETSOVA, Anastasia: Problemy integratsii istoricheskoj zastroyki v sredu sovremennogo promyshlennogo goroda Perm. In: Vestnik PNIPU. Master's Gournal, Vol. 1. Perm, 2013.
KCAP Architects&Planners: Transforming of the city. Perm Strategic Masterplan. Perm, 2010
KORCHAGIN, Pavel: Gubernskaya stoliza Perm. Perm, 2006.
LOZHKIN, Aleksandr: Ob adresatah proektov zon ohrany obyektov kul'turnogo nasledija. In: Vestnik PNIPU. Urbanistika, Vol. 4, pp. 40-46. Perm, 2012.
PROHOROV, Aleksandr: Razvertka ulicy ili vid goroda. In: Arhitekton: izvestija vuzov, Vol. 3 (8). Ekaterinburg, 2004. [Online] http://archvuz.ru/2004_3/9
REGAME, Svetlana, MARKUS, Konstantin: Vologda. Problemy preobrazovaniya istoricheskogo tsentra. In: Arkhitekturnyy Vestnik, Vol. 6, pp. 19-24. Moscow, 1997.

Hot Town, Summer in the City – Entwicklung von hitzerelevanten Anpassungsstrategien im Städtetourismus

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1 ABSTRACT

In zahlreichen Studien gibt es bereits Hinweise darauf, dass in Zukunft eine kontinuierliche Zunahme der Hitzetage (mindestens 30°C) und -perioden (drei aufeinanderfolgende Tage mit über 30°C) für den städtischen Raum zu erwarten ist (Formayer et al., 2008). Schon heute weist Wien durchschnittlich ca. 11-13 Hitzetage pro Jahr auf – eine Anzahl, die sich bis Mitte des Jahrhunderts sogar mehr als verdoppeln könnte (Moshammer et al., 2007). Dichte Bebauung sowie ein geringer Anteil an Grünräumen verstärken Hitzeeffekte in urbanen Gebieten und es kommt zur Ausbildung von Wärmeinseln. Nicht nur die Bevölkerung, sondern auch Touristinnen und Touristen, die Wien vorwiegend in den Sommermonaten besuchen (Magistratsabteilung 5, 2010), sind von der Hitze negativ betroffen. Um Strategien zu identifizieren, die den Aufenthalt von Städtetouristinnen und Städtetouristen in Zukunft trotz Hitze erträglich gestalten können, wurde das Projekt „Hot town, summer in the city – Die Auswirkungen von Hitzetagen auf das Freizeit- und Erholungsverhalten sowie das Besichtigungsprogramm von Städtetouristinnen und Städtetouristen" ins Leben gerufen.

Ziele des Projektes waren sowohl die Identifikation räumlicher und zeitlicher Adaptionsstrategien der Städtetouristinnen und Städtetouristen an Hitzetagen als auch die Identifikation von Schlüsselfaktoren für Strategien seitens der Tourismuswirtschaft, Stadtverwaltung und -planung, um Anpassungen an die Folgen des erwarteten verstärkten Wärmeinseleffekts vorzunehmen.

2 METHODE

Ein wesentlicher Teil des Projektes stellte eine standardisierte mündliche Befragung dar, in der das Verhalten bzw. die Verhaltensänderungen von Touristinnen und Touristen an Hitzetagen erhoben wurden. Mit Hilfe der Befragung wurde u. a. herausgefunden, wie störend die Temperaturen bei Sehenswürdigkeiten, Einkaufsstraßen, Gaststätten sowie in der Unterkunft empfunden werden und ob das Besichtigungsprogramm an die hohen Temperaturen angepasst wird. Weiters wurde eruiert, welche Maßnahmen sich die Touristinnen und Touristen wünschen, um den Aufenthalt in der Stadt bei hohen Temperaturen angenehmer zu gestalten. Die Touristinnen und Touristen wurden außerdem gebeten, ihr thermisches Wärmeempfinden in einer Skala und die Lufttemperatur in Form einer Maximaltemperatur einzuschätzen. Die Befragungen fanden an drei Tagen (23.07.2010, 10.07.2011 und 14.07.2011) jeweils unmittelbar nach einem Hitzetag statt und wurden in der Umgebung ausgewählter Wiener Touristenattraktionen (Stephansplatz, Burggarten, zwischen dem Kunst- und Naturhistorischen Museum, Prater, Schloss Schönbrunn sowie Grinzing bzw. Kahlenberg) unter Verwendung eines strukturierten Fragebogens sowohl in deutscher als auch englischer Sprache durchgeführt.

Im Zuge der Literaturrecherche wurden sowohl Fachbeiträge als auch aktuelle wissenschaftliche Publikationen im Hinblick auf die Übertragbarkeit der Maßnahmen auf den Tourismus in Wien und Österreich analysiert. Allerdings konnten nur wenige Anpassungsstrategien bezüglich Klimawandel und Städtetourismus im Speziellen gefunden werden, weshalb die Suche auf generelle Maßnahmen, die die Hitze für die Bevölkerung urbaner Agglomerationsräume erträglicher gestalten, ausgedehnt wurde.

Aufbauend auf der Literaturrecherche wurde ein World Café veranstaltet, an dem 34 Personen aus den unterschiedlichen Fachbereichen (Tourismus, Meteorologie, Stadt- und Raumplanung, Architektur, Medizin etc.) teilnahmen, um Anpassungsstrategien und ihre Umsetzbarkeit im Bereich der Tourismuswirtschaft zu diskutieren.

Im Anschluss daran wurden in Form eines Management Letters und aufbauend auf den Ergebnissen der Befragung, der Literaturrecherche sowie des World Cafés Handlungsempfehlungen zur Anpassung an hohe Temperaturen für die Tourismuswirtschaft erarbeitet.
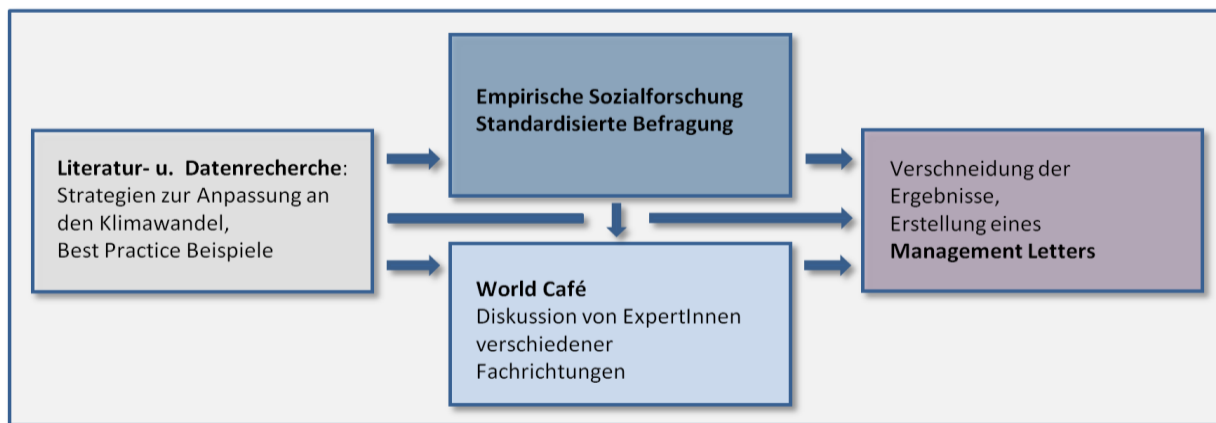
Abb. 1: Projektablauf
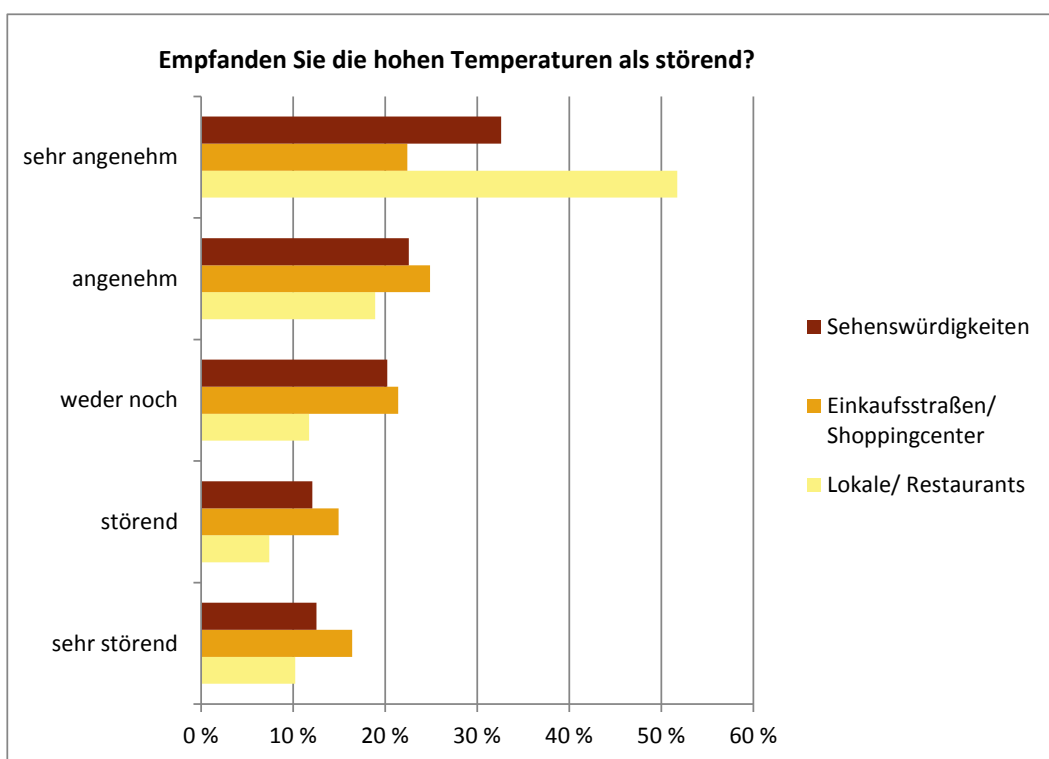
Abb. 2: Befragungsergebnisse: „Temperaturempfinden der Befragten bei/in Sehenswürdigkeiten, Einkaufsstraßen/Shoppingcentern und Lokalen/Restaurants"

3 ERGEBNISSE

3.1 Ergebnisse der Befragung

In Summe wurden 365 Interviews mit Touristinnen und Touristen aus 57 verschiedenen Ländern durchgeführt. Der Großteil der befragten Personen stammte aus Deutschland (33,2 %); aber auch die USA (6,6 %), die Niederlande (5,2 %), die Schweiz (4,9 %) sowie Österreich (3,8 %) waren häufig vertreten. Mehr als die Hälfte der Befragten besuchte Wien zum ersten Mal im Rahmen eines Urlaubes, die durchschnittliche Aufenthaltsdauer der Touristinnen und Touristen betrug sechs Nächte.

Ein Drittel der Probandinnen und Probanden gab an, von der Hitze in Wien überrascht worden zu sein und nicht mit derart hohen Temperaturen gerechnet zu haben. Beinahe ein Viertel der Touristinnen und Touristen hat nicht vor, Wien nochmals im Sommer zu besuchen.

Mit welchen Maßnahmen lassen sich die Temperaturen in Wien angenehmer gestalten

Legend:
- 1=sehr wichtig
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9=unwichtig

Categories (top to bottom):
- Mehr Wasserspender/Trinkbrunnen
- Mehr beschattete Sitzgelegenheiten in öffentlichen Freiräumen
- Mehr klimatisierte öffentliche Verkehrsmittel
- Mehr beschattete Bereiche bei den Sehenswürdigkeiten
- Mehr beschattete Fußgängerzonen/Gehsteige
- Mit Sprühnebel gekühlte Gastgärten
- Auskunftsservice in der Unterkunft über "Zufluchtsorte"/alternatives Programm
- Längere Öffnungszeiten von Geschäften
- Mehr klimatisierte Museen /Theater
- Längere Öffnungszeiten von Museen/Ausstellungen
- Längere Öffnungszeiten von Gastgärten
- Mehr klimatisierte Geschäfte
- Mehr Open-Air-Lokale der anderen Art (z.B. Strandbar)
- Mehr Angebote an leichterer Kost/kleineren Portionen in Hotels/Restaurants etc.
- Mehr Sitzgelegenheiten in Geschäften
- Mehr Grünflächen

Abb. 3: Befragungsergebnisse: „Maßnahmen, die einen Wien-Aufenthalt bei hohen Temperaturen angenehmer gestalten"

Zwei Drittel der Befragten hatten trotz der Hitze am Vortag ihr Tagesprogramm nicht an die hohen Temperaturen angepasst, wobei jene Personen, die nur ein paar Tage in Wien blieben, dieses weniger stark anpassten als Touristinnen und Touristen mit längerer Aufenthaltsdauer. Die Änderungen des Programms betrafen u.a. das Einplanen längerer Pausen oder das bewusste Aufsuchen von kühleren Orten (z.B. Parks/Erholungsgebiete). Zu einem großen Teil gemieden wurden vor allem (Pracht-)Bauten.

Auf die Frage, welche Sehenswürdigkeiten, Einkaufsstraßen und Gaststätten sie am vorangegangenen Hitzetag besucht haben und ob sie die Temperaturen dort als störend wahrnahmen, gab der Großteil der Probandinnen und Probanden (70 %) an, die Temperaturen in Lokalen/Restaurants als angenehm bzw. sehr

angenehm empfunden zu haben. Mehr als die Hälfte der Touristinnen und Touristen war mit den Temperaturen bei den Sehenswürdigkeiten zufrieden, während hingegen die hohen Temperaturen in Einkaufsstraßen/Shoppingcentern am störendsten empfunden wurden. Die Maßnahmen, die sich die Befragten in allen drei Kategorien am häufigsten gegen hohe Temperaturen wünschten, waren „Klimaanlagen" und „Beschattung".

Als wichtigste Maßnahme gegen hohe Temperaturen in Wien bewerteten die Touristinnen und Touristen „mehr Wasserspender/Trinkbrunnen" (78 %). Daher wurden im Management Letter (siehe Kapitel 4) Maßnahmen zur Verbesserung der Trinkwasserversorgung der Touristinnen und Touristen prioritär vorgeschlagen. Ein weiterer Wunsch, der von einem Großteil der Befragten geäußert wurde, war jener nach mehr Beschattung. So wünschten sich 73 Prozent mehr beschattete Sitzgelegenheiten im öffentlichen Freiraum, 61 Prozent mehr beschattete Bereiche bei den Sehenswürdigkeiten und 60 Prozent mehr beschattete Fußgängerzonen/Gehsteige. Maßnahmen zur Verbesserung der Aufenthaltsqualität der Touristinnen und Touristen im Freien (Pflanzung schattenspendender Bäume, Schaffung „kurzer Wege", Erstellung eines „Hitze-Stadtplans" etc.) haben somit gleichfalls eine hohe Wichtigkeit. Weitere empfohlene Maßnahmen betreffen die Anpassung des Besichtigungsprogramms und die Weitergabe hitzerelevanter Informationen an die Touristinnen und Touristen (z.B. „Cool Tours" bzw. Alternativangebote in der Unterkunft), was eine adäquate Schulung von Mitarbeiterinnen und Mitarbeiter im Tourismusbereich voraussetzt. Da mehr klimatisierte öffentliche Verkehrsmittel (67 %) und mit Sprühnebel gekühlte Gastgärten (59 %) bei der Befragung ebenso als wichtige Möglichkeiten zur Attraktivierung des Wien-Aufenthaltes bei hohen Temperaturen eingestuft wurden, wurden Maßnahmen zur Forcierung der energieeffizienten Kühlung in von Touristinnen und Touristen genutzten Einrichtungen (z.B. Passivkühlung, Dach- und Fassadenbegrünung) auch bei den Handlungsempfehlungen vorrangig berücksichtigt.

3.2 Ergebnisse der Literaturrecherche sowie des World Cafés

Im Rahmen der Literaturrecherche wurden vier übergeordnete Kategorien identifiziert und die jeweiligen – auch im World Café erarbeiteten – Maßnahmen diesen zugeordnet.

Maßnahmen im Bereich der Tourismus-Architektur

Zur Reduktion der sommerlichen Überhitzung von Gebäuden können Maßnahmen der passiven Kühlung (z.B. Nachtlüftung, Hauswandverschattung, Reduktion von Wärmequellen, helle Baumaterialen) sowie „aktive" Kühltechnologien (z.B. geothermische Kühltechnologien, Fernkälte oder solare Kühlung) beitragen. Wasserflächen bzw. Sprühnebel auf Dächern sowie die Dach- und Fassadenbegrünung können ebenso die Temperaturen im Gebäude senken, wobei letztere Maßnahme auch als potenzielles touristisches Ziel beworben werden kann (z.B. Vertical Gardens von Patrick Blanc auf Museen, Ausstellungsgebäuden und Hotels). Allerdings muss bezüglich Umsetzung berücksichtigt werden, dass einige der angeführten Maßnahmen bisher nur in Gebieten mit warmen Wintern erprobt wurden.

Maßnahmen in der Stadt-, Raum- und Landschaftsplanung

Maßnahmen zur Reduktion des Wärmeinseleffekts, die bereits bei der Bebauungs- und Flächenwidmungsplanung sowie der Bauordnung berücksichtigt werden sollten, beinhalten die Entsiegelung sowie die Begrünung von z.B. Straßenzügen und Gleisanlagen, die Errichtung von Parks (z.B. Pocket Parks) oder auch die Freihaltung von innerstädtischen Grünzügen und Frischluftschneisen. Ebenso tragen Verschattungselemente (z.B. Arkaden in stark besonnten Einkaufsstraßen) und – aufgrund der Verdunstungskühlung – bewegtes Wasser (z.B. Springbrunnen, Wasserzerstäuber, in offenen Rinnen abgeleitetes Regenwasser) zu angenehmeren Temperaturen in der Stadt bei.

Infrastrukturelle Maßnahmen

Die Überlagerung der touristischen Hauptrouten mit Wärmebildern (Wärmeinselkataster) kann dazu beitragen, bei den stark durch Hitze belasteten und stark frequentierten Orten (Hot Spots) gezielt Gegenmaßnahmen zu setzen. Diese beinhalten die Errichtung von beschatteten Sitzgelegenheiten (z.B. durch Sonnensegel), Abkühlungsräumen oder Trinkbrunnen (Hochquellwasser als „Unique Selling Proposition") sowie den Einsatz von Sprühnebel in Freibereichen (Gastgärten, Haltestellen, Passagen etc.). Durch die Nutzung von Gewässern als Verkehrsweg könnte der Aufenthalt in der Stadt bei Hitze ebenfalls angenehmer gestaltet werden.

Organisatorische Maßnahmen

Zur Verringerung der gesundheitlichen Risiken von Hitzewellen eignen sich Hitzewarnsysteme und ein auf Hitzebelastungen zugeschnittenes Informationsmanagement. Maßnahmen der Stadtverwaltung bei Erreichen einer bestimmten kritischen Temperatur beinhalten u.a. das Öffnen von „Abkühlungsorten" (z.B. klimatisierte Verwaltungsgebäude), Gratis-Eintritt in Schwimmbäder, verlängerte Öffnungszeiten von z.B. Schwimmbädern, Kirchen oder Einkaufszentren sowie die Verteilung von Wasser. Stadtpläne, die kühle Orte, Trinkbrunnen oder kurze Wege anzeigen, sowie hitzerelevante Informationen, die in der Unterkunft oder im Internet erhältlich sind, erleichtern das Besichtigungsprogramm der Touristinnen und Touristen an heißen Tagen. Die Förderung von kühlen Fortbewegungsmitteln in der Stadt, die Einbeziehung von Naherholungsgebieten in touristische Programme sowie das Vermeiden der heißen Mittags- und Nachmittagsstunden durch die Anpassung von Tagesprogrammen (z.B. durch Unterhaltungsangebote in Quartieren, Führungen in den „Untergrund") sind weitere Maßnahmen, die den Aufenthalt in der Stadt bei Hitze erträglicher gestalten. Bei einigen der organisatorischen Maßnahmen (z.B. angepasstes Lüften) ist allerdings eine adäquate Einschulung der Touristikerinnen und Touristiker empfehlenswert.

Maßnahme	Beschreibung
Maßnahmen zur Verbesserung der Trinkwasser-versorgung der Touristinnen und Touristen	Erhöhung der Anzahl an Trinkbrunnen bei Sehenswürdigkeiten, in Einkaufsstraßen und entlang touristischer Routen (z.B. durch Trinkaufsatz auf Feuerhydranten) – eventuell in Kooperation mit Geschäften/touristischen Einrichtungen in Form von Sponsoring/Patenschaften.
	Vermarktung des Österreichisches Wassers mit hoher Trinkwasser-Qualität als Alleinstellungsmerkmal („Unique Selling Proposition").
	Aufstellung von Wasserspendern in touristisch stark frequentierten Gebäuden.
	Gastgewerbebetriebe und Geschäfte können Touristinnen und Touristen mit eigenen Piktogrammen und/oder Informationen in mehreren Sprachen auf die kostenlose Ausgabe von Leitungswasser hinweisen.
Maßnahmen zur Verbesserung der Aufenthalts-qualität der Touristinnen und Touristen im Freien	Die klimatische Optimierung von touristischen Routen, Einkaufsstraßen und Bereichen vor den Sehenswürdigkeiten sowie bei Wartebereichen sollte erfolgen durch: Begrünung, v.a. schattenspendende Bäume (dort wo diese Maßnahme nicht möglich bzw. sinnvoll ist – bspw. barocke Schlossgärten –, sollten temporäre Sonnensegel zum Einsatz kommen), Errichtung von Sitzgelegenheiten in beschatteten Bereichen, Schaffung „kurzer Wege" (bspw. Öffnung von Durchgängen – ev. Übernahme der Wegehalterpflichten durch die öffentliche Hand bzw. touristische Einrichtungen, die im Umfeld angesiedelt sind).
	Ein „Hitze-Stadtplan" sollte als Print-Version (Verteilung von kostenlosen Plänen sowie Aufnahme in Reiseführer) und als Internet-Applikation für Smartphones erstellt werden, in dem alle Trinkbrunnen, „kühle Routen", Abkühlungsorte (z.B. Kirchen, Arkaden, geöffnete öffentliche Gebäude, kühle öffentliche Verkehrsmittel etc.) eingezeichnet sind.
Maßnahmen zur Anpassung des Besichtigungs-programms und Weitergabe hitzerelevanter Informationen an die Touristinnen und Touristen	Mehrsprachige Informationen über speziell für Zielgruppen zugeschnittene Alternativprogramme an Hitzetagen durch das Personal an der Rezeption in der Unterkunft, auf einer Online-Plattform, in Form von Internet-Applikationen oder über SMS-Dienste.
	Anbieten von attraktiven Angeboten in der Unterkunft während Hitzestunden (z.B. Dokumentarfilme über die Stadt).
	Hitzewarnungen in Unterkünften an Touristinnen und Touristen weitergeben (z.B. durch Aushang an der Rezeption, aktuelle Informationsfolder).
	Angebot eines hitzeangepassten Besichtigungsprogramms durch Stadtführerinnen und Stadtführer („Cool Tours").
	Für die Umsetzung der oben genannten Maßnahmen sind Schulungen von Personal in Unterkünften und von Stadtführerinnen und Stadtführern sowie Adaptierung von Aus- und Weiterbildungslehrplänen erforderlich.
Maßnahmen zur Forcierung der energieeffizienten Kühlung1 in von Touristinnen und Touristen genutzten Einrichtungen	Forcierung von energieeffizienten Kühlungsmethoden wie bspw. Passivkühlung (z.B. Betonkernaktivierung2[, Dämmung), solare Kühlung3 und Verdunstungskühlung (z.B. Sprühregen am Dach) sowie Dach-/Fassadenbegrünung (vermarktbar auch als Touristenenattraktion) für Unterkünfte und touristisch interessante Gebäude.
	Forcierung von energieeffizienten Kühlungsmethoden für öffentliche Verkehrsmittel (Garnituren, Haltestellen) durch Kooperation mit dem Tourismus bzw. Sponsoring durch Betriebe.
	Touristinnen und Touristen sollten darüber aufgeklärt werden, welche Art von Kühlung bzw. warum keine Kühlung (z.B. aus Denkmalschutzgründen) in der jeweiligen Einrichtung angewendet wird.
	Schaffung einer Beratungsstelle („Klima-Coach") speziell für die Tourismusbranche, die über Umsetzung von energieeffizienten Kühlungsmethoden, Fördermöglichkeiten, Denkmalschutz, Vermarktungsmöglichkeiten, Information von Touristinnen und Touristen etc. berät.
	Schulung der Touristiker (Personal in Unterkünften, touristisch interessanten Gebäuden etc.) bezüglich hitzeadäquatem Verhalten wie bspw. richtiges Lüften und Weitergabe dieser Informationen an die Touristinnen und Touristen.
	Betriebe des Gastgewerbes, die zu wenig an Hitze angepasst sind, sollten – z.B. über Förderungen – dazu motiviert werden, adäquate Maßnahmen (Beschattung, Sprühnebel etc.) durchzuführen.

Abb. 4: Auszug aus dem Management Letter: zur Umsetzung empfohlene Maßnahmen (Allex et. al, 2011)

4 SCHLUSSFOLGERUNG UND HANDLUNGSEMPFEHLUNGEN

Da viele der erarbeiteten Adaptionsstrategien nicht nur Touristinnen und Touristen, sondern auch die Bevölkerung betreffen, sind positive Auswirkungen über den Städtetourismus hinaus zu erwarten. Durch die Umsetzung der Anpassungsmaßnahmen und die Hervorhebung der Stärken österreichischer Städte (z.B.

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[1] Obwohl sich die befragten Touristinnen und Touristen zum Großteil Klimaanlagen wünschten, wurde bei den Maßnahmen auf das Ziel des Klimaschutzes (d.h. eine hohe Energieeffizienz bei möglichst geringem CO_2-Output) geachtet.
[2] Frei zugängliche Betonteile dienen als Kühlelemente.
[3] Betrieb von Kältemaschinen durch thermische Solaranlagen.

Wasserversorgung) kann das Bild einer kühlen Stadt in einem heißen Sommer vermittelt und als Alleinstellungsmerkmal („Unique Selling Proposition") vermarktet werden.

Jene Maßnahmen, die basierend auf den Ergebnissen der Befragung, der Literaturrecherche sowie des World Cafés erarbeitet und zur Umsetzung in österreichischen Tourismus-Städten empfohlen wurden, wurden in Form eines Management Letters zusammengefasst:

Abb. 5 und 6: Touristinnen und Touristen bei einem mobilen Trinkbrunnen am Heldenplatz in Wien (1. Bezirk) bzw. am Weg zum Schloss Schönbrunn (13. Bezirk); Fotos: Allex

5 REFERENCES

Allex, B., Liebl, U., Brandenburg, C., Gerersdorfer, T., Czachs, C. (2011): „Hot town, summer in the city" – Die Auswirkungen von Hitzetagen auf das Freizeit- und Erholungsverhalten sowie das Besichtigungsprogramm von Städtetouristinnen und Städtetouristen – dargestellt am Beispiel Wiens. Endbericht von StartClim2010.F in StartClim2010: Anpassung an den Klimawandel: Weitere Beiträge zur Erstellung einer Anpassungsstrategie für Österreich, Auftraggeber: BMLFUW, BMWF, BMWFJ, ÖBF. Online unter: http://www.austroclim.at/fileadmin/user_upload/StartClim2010_reports/StCl10_endbericht.pdf [24.02.2013].
Formayer, H., Haas, P., Hofstätter, M., Radanovics, S., Kromp-Kolb, H. (2008): Räumlich und zeitlich hochaufgelöste Temperaturszenarien für Wien und ausgewählte Analysen bezüglich Adaptionsstrategien. Endbericht einer Studie im Auftrag der Wiener Umweltschutzabteilung – MA 22 der Stadt Wien gemeinsam mit der MA 27 – EU-Strategie und Wirtschaftsentwicklung, 82.
Magistratsabteilung 5, Referat Statistik und Analyse (2010): Ankünfte und Übernachtungen in allen Unterkünften. Herausgeber: WienTourismus. Online unter: http://b2b.wien.info/de/statistik/daten/ankuenfte-naechtigungen-2010 [24.02.2013].
Moshammer, H., Hutter, H.-P., Frank, A., Gerersdorfer, T., Hlava, A., Sprinzl, G., Leitner, B. (2007): Einflüsse der Temperatur auf Mortalität und Morbidität in Wien. Endbericht von StartClim2005.A1a in StartClim 2005: Klimawandel und Gesundheit BMLFUW, BMGF, Umweltbundesamt.

6 WEITERFÜHRENDE INFORMATION

StartClim

Housing Quality and Lost (Public) Space in Croatia

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1 ABSTRACT

In the post-socialist period and within the current social transition context, urban and rural Croatia has, just like other transition countries, experienced many changes in the social structure and space. One example is the housing quality which is a replica of the situation in the Croatian society and has also undergone some major changes. Socially oriented housing construction co-financed by the state and the cities is in an unfavourable position compared to private housing construction. In the last twenty years the amount of the social housing construction has been only a minor part of the total contruction work in the country. For instance, out of nine newly planned residential housing developments in Zagreb, the capital city, only three have been completed and the work on the rest of them has stopped and is unlikely to continue. Private construction work prevails especially on the edge of the city and is characterised by high density housing. This type of housing construction doesn't benefit the majority of citizens in search of accommodation (price per square meter is too high, low-quality building). There is also a big problem of the community facilities (primary and secondary infrastructure, schools, kindergartens, playgrounds, green areas, sidewalks, public transport etc.). The existing globalisation-transition circumstances of the Croatian society corroborate the fact which experts of various profiles often point out: ignoring the process of (urban) planning will irreparably damage the space. The city transformation shows the absence of comprehensive urban planning which results in an ever increasing number of random buildings which do not fit in the surroundings. This leads up to yet another important issue – the shrinking and, in some cases, disappearance of public space which becomes the "lost space". In recent years there has been a lot of building in the city core and on the edge which does not quite fit in the existing urban structure, image or the skyline of the city. The current situation in the process of planning can be characterized as a conflict and imbalance between the powerful actors (mostly political and economic) and less powerful actors (mostly professional and civil). The actors who have the political power and influence and the ones who possess the capital are forming an "alliance" between two important layers of the social structure. The lack of civil and professional actors, "lost spatial actors", and therefore of civic aggregation is also present and that is also the cause of public space "disappearance" and undermined process of public participation.

2 INTRODUCTION

Croatia and its space are characterised by the post-socialist context in which new and remarkable social, political and economic changes have occurred since the 1990s. The champions of these changes are new social actors, primarily economic actors (for example, investors) and political actors (for example, town mayors). In the past, in socialism, their influence was not big. The state was the most powerful. "In Croatia the existing social context (transition and post-socialism) makes the social actors increasingly important. New social changes affect the activities and behaviour of new and old actors. Their importance and operations can not be separated from the process of restructuring of modern society today, globalization or transition. Both urban and rural space of Croatia has undergone significant physical transformation in the transition period but even more social changes"(Svirčić Gotovac, 2012:13-14).

These changes are mostly visible in spatial and urban planning. In socialism urban planning was based on well-defined, long-term strategies. Post-socialism is determined by a completely different attitude to space: no strategic, long-term planning, no careful consideration for space development. The consequences are evident. "Socialism is believed to be one of the most constructive periods in the urban development of Zagreb. Not only regarding the quantity of housing development but also its quality and the quality of life of Zagreb's citizens" (Jukić, Mlinar, Smokvina, 2011). The new capitalist system and its market laws prefer to make a quick profit on investment. So most investment is private and responsible for urban planning. Politicians often side with investors and not with other segments of the society (for example, professional or civil actors).The consequence are numerous thoughtless and inadequate interventions in space, on the periphery and in the centre of towns. This is visible in both residential and commercial construction. "Consequently, land-use planning at the municipial level has been characterized by the prevalence of ad hoc

political decisions and not long-term strategic visions. Also, the development control was weak, and there was a 'laissez-faire' approach to the city development" (Hamilton, Dimitrovska Andrews, Pichler-Milanović, 2005:475).

In the Croatian society today along with the systematic neglect of spatial development there is also insufficient participation of people in public and political life. It is important to point out that people do not take an active part in problems regarding their immediate living environment."The Law on Spatial Planning and Construction does not precisely define the role of citizens and their participation. The problem is also that the existing regulations are not interpreted to the benefit of citizens and the insistence on their real, transparent participation. They merely satisfy the minimum of legal procedure" (Toš and students, 2012). In Croatia today there is only a public presentation and a public debate which normally last for two weeks after the plans are made. After that, there is no response to the reaction of the public which suggests that people do not have any real influence on the matter. Public debate is not a sufficiently effective method and other steps should precede it, such as information about the stages of the project and some professional opinions about the project (its advantages and drawbacks). For the public this would mean a longer period of involvement leading to more democratic decision-making processes. Greater participation can affect people's living conditions at the local level which correlates with their total quality of living. The quality of living can be measured at different levels, from the quality of immediate neighbourhood to the quality of living in a particular country and they are dependent on each other.

In the existing globalization and transitional circumstances, spatial transformations are happening in Croatia with almost no participation of its inhabitants and citizens. Public interest is often neglected and private interest is promoted (investors' and partial interests). Such relations between different social actors in the process of spatial planning can be characterised as the conflict and imbalance between the powerful (usually political and economic) actors and the less powerful (mostly professional and civil) actors. "Urban phenomenon comprises a complex set of actors and each type of society and each type of urban society means a power hierarchy of actors. A different power structure for a different system"(Bassand, 2001). It is precisely the power of a specific actor which defines how much difference their activities will eventually make to space. In many post-socialist countries the neo-liberal thinking is characterized by a low political priority given by central governments to physical planning, regional development and housing policy. There is an absence of comprehensive national spatial development strategy and coherent regional policies, together with local and regional government reforms and disputes regarding the basis of new planning legislation (Sykora, 1994; Dimitrovska Andrews and Ploštajner, 2000; Pichler-Milanović, 2001).

3 TRANSFORMATION OF URBAN SPACE IN ZAGREB

Zagreb region, the capital city, the largest (macroregional) center and its county has only a little more than one million inhabitants (1,107,623) (Croatian Bureau of Statistics, 2011), and is, according to the world urban population statistics, a relatively small metropolitain area. In comparison with other Croatian towns, however, it is the biggest centre and with its metropolitan area the only one with over a million inhabitants. If compared with big European towns, for example with "ten towns similar in size and the number of people (such as Amsterdam, Athens and Stockholm, smaller than Zagreb, such as Zurich and Dublin or bigger than Zagreb, such as Barcelona, Vienna, Budapest, Prague and Warsaw), Zagreb has the biggest average number of people per household (2.8) and Amsterdam the smallest (1.8)" (ZagrebPlan, 2013:129).

The second-largest Croatian town Split and its county have less than half a million inhabitants (454,798) (Croatian Bureau of Statistics, 2011). These data show that most problems of urbanization, high density housing or moving to towns are connected with Zagreb. With its modernization and transformation characteristics Zagreb greatly differs from the rest of the country. Also various research indicators of the quality of life and especially the quality of housing in Zagreb considerably differ from the rest of the country.[1]

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[1] The quality of life in the majority of settlements in the Croatian settlements network is defined by the quality of their equipment (infrastructure and institutions), as shown in the 2004 research. It is difficult to compare the biggest towns, such as Zagreb and Split, especially with numerous rural settlements where the quality of life is often reduced to basic existence, whereas higher levels are hard to attain for most people. Urban agglomerations, that is, macroregional centers in Croatia are well ahead of most urban or rural settlements regarding life quality although they also have a lot of

In most countries of the world since the 1990s the role of private investors has become increasingly important and they have made some big financial investments. It also means they have made some major decisions about what cities will look like in the future. Processes related to the construction work in city centres, such as urban renewal and gentrification, have also grown stronger in Zagreb since the 1990s. "Earlier the process of gentrification was generally associated with the real estate market of developed countries and their leading cities (the so-called command-center cities). Today, however, it is becoming a global process and an urban strategy going beyond liberal urban policy or sporadic and local occurrence" (Smith, 2002:427). Attractive real estate in the very city center has made gentrification possible and revived construction work there, with uneven involvement of spatial actors, especially experts and politicians. A large number of shopping centres and underground garages has been built near the centre. By letting the traffic in the city centre rather than reducing the number of cars, Zagreb is not following trends in developed European cities. Experts and residents take part in these city changes only marginally while some actors, namely investors, make a maximum profit. In the process of urban renewal the role of the state has weakened and individuals or private actors play a prominent role. Because of inadequate involvement of the state and city authorities in the process of renewal and revitalization of the city centre, these new actors have become extremely powerful in urban space and responsible for its future look without having sufficient respect for the historical and urban identity of the city. Even some protected parts of the old city core have been radically altered and expanded, the changes usually accompanied by discordant opinions of experts and politicians.[2] Still, the most remarkable transformations of urban space have happened on the edge of the city because of numerous open possibilities there.

4 RESEARCH RESULTS

The paper gives an overview of long-time research carried out by the sociology of space group at the Institute for Social Research in Zagreb[3] regarding the quality of life of residents of Zagreb and the relations among the social actors (economic, political, professional and civil actors). Mixed-type methodology has been used, qualitative (semi-structured interviews) and quantitative (surveys). In order to get an insight into the changes of the last two decades (the transition period) brought about by the new social system and new rules among the actors, the most interesting research results obtained from 2004 to 2009 are presented. The results of the 2004 survey representative sample contribute to the criticism of living conditions in new housing estates and high density housing areas in Zagreb. They show that their level of equipment (infrastructure and facilities) is rather unsatisfactory especially on the edge of the city. Interviews conducted in 2007, 2008 and 2009 with target actors and their representatives point to obvious inequality among actors in the City of Zagreb and the rest of Croatia. This problem becomes bigger when power is frequently abused for selfish interests which is often the case with political and economic actors.

Public space with its facilities is available to everyone and is managed by the city for the benefit of its citizens (Low, 1992). One of the main characteristics of public space is that various organized and spontaneous activities take place there. Also public space is multidimensional: social, cultural, political and economic. Increasing privatization of public space leads to its discrimination and loss.

All attributes of public space which are not connected with the market and economy disappear. Permanent accessibility, openness, safety, constant liveliness – everything is seriously disrupted.

All research done by the above mentioned group aims to contribute to the protection of space, especially public space (squares, streets, parks, playgrounds, all facilities useful in everyday life), in the city centre as well as in various housing estates. Public space is evidently threatened and becoming scarce. It is deliberately eliminated from the planning process as such and converted into private or semi-public space (for example, a new shopping mall, residential or office building). Thus it is becoming lost space.

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downsides due to their size. Generally speaking, towns still achieve better results. This is why towns permanently attract and receive new residents, especially the City of Zagreb, the biggest urban centre.

[2] Flower Square is a Lower Town protected architectural unity in the heart of the city where a modern shopping centre and an underground garage have been built in spite of strong protests coming from experts and citizens.

[3] The sociology of space group at the Institute for Social Research in Zagreb has been researching urban and rural issues (including the quality of life in urban and rural areas of Croatia) for almost 50 years. The authors of this paper are part of the group.

In the sequence of this paper the mentioned results will be shortly introduced on the examples of spatial transformations in Zagreb, primarily transformations of residential and business construction.

4.1 Residential construction

High density housing in residential areas has paradoxically led to a reduced quality of life in broader city areas. The reason is that the housing construction has not always been matched by the housing quality. The life quality of residents in some new housing estates in Zagreb has therefore fallen (Pictures 1 and 2). Private investment has taken little care of either technical or social (institutional) infrastructure of the new settlements. The city authorities, on the other hand, have not demanded the investors' help with the infrastructure necessary for everyday life of citizens when giving them municipal land plots (schools, kinder gartens, shops, health and culture centres, playgrounds, parks, green areas). And the city itself often lacks finance for the complete infrastructure so the present one does not meet the citizens' real needs and requirements.

Picture 1 New housing construction and high density housing in Zagreb

Picture 2 High density housing in a new estate in Zagreb

The housing quality has undergone a lot of both positive and negative changes in the period of transition. The most obvious change is a large number of new flats and housing estates initiated by private investors,

much less by the state (city). Socially oriented housing construction subsidized by the state (city) is currently stagnating although in the last few years new projects have been considered offering flats to citizens at a favourable price (new housing estates). Fewer than planned have been built and then the construction has stopped. And so it has remained in the shadow of the private sector.

The quality of living in such housing estates is often low and the private-public partnership model[4] is a complete failure. The city authorities frequently refer to this particular model, well recognized and successful in Europe. It is used for various projects where investors make a profit but also offer useful services and additional attractions to citizens. In Croatia, because of the crisis in the town planning process, investors are given locations which are not necessarily economically advantageous to the city and the whole profit fills their pockets making them the sole beneficiaries of the partnership. The city authorities fail to realize that the model has been unsuccessfully applied. Building flats for citizens has not benefited them, the citizens of Zagreb, only specific individuals, the so-called new actors (investors, developers etc.).

Picture 3 High density housing in a business district

Picture 4 Business tower near the centre of the city

The above mentioned is supported by the fact that "40,000 new flats were built in Zagreb from 2001 to 2008. There are about 20,000 unsold new flats on the real estate market now, plus some old flats on sale. A lot of people live in parts of the town with no essential services, no local employment, low-quality public spaces, no green areas, sport and recreation facilities" (ZagrebPlan, 2013:127). At the same time, paradoxically, the

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[4] The term refers to the cooperation between big private investors (often corporations) and the local authorities. The partnership has become quite common recently (Carmon, 1999).

new flats are unaffordable to most citizens because of their exorbitant prices per square meter. It is therefore clear that the principal goal is not being achieved: citizens are not provided with the satisfactory housing quality. European Charter on Housing states that "controlling the expansion of suburban and urban zones should become an important goal for the Community if sustainable development is to be maintained (Article 5, Section 2, European Housing Charter). Suburban zones of Zagreb are hardly good examples of sustainable development.

4.2 Commercial construction

Beside residential construction in broader city areas, urban transformations are visible in other types of construction: shopping centers, new business zones and high-rise office blocks. In the twenty years of transition we have witnessed in both residential and commercial construction (Pictures 3 and 4). In socialism business high towers grew on vacant land areas expanding horizontally. Today they are placed in already occupied zones. This results in the shrinking of public space and the infrastructure of the chosen locations is insufficient for new high-rises. They are yet another example of urban transformations dictated by private investment.

Zagreb has become crowded with shopping centers, in the city center and on the periphery, as well as with underground parking garages, mostly in the centre. Shopping centres usually buy cheap land and the infrastructure is already there. After some time they close down (there are too many) and become brownfields available for re-use. Underground garages are seemingly solutions for the traffic but are in actual fact just additional profit for investors.

These examples in Zagreb (high rises, shopping centers and underground parking garages) do not stand for urban renewal but random, incomplete and chaotic urban transformations. And so does residential housing construction. "In town planning for many years now there has been a string of illogical decisions. They have allocated the best municipal land to shopping centers and businesses and moved residential projects to less convenient locations" (Jukić; Mlinar; Smokvina, 2011:43).

5   DISCUSSION

Looking at high density housing in Zagreb, another aspect of the problem that comes to mind is used and irretrievably lost space, especially public space. When public spaces are generally shrinking and being destroyed, this building surplus is a paradox (lost space). It is not useful for the public. What is useful (schools, kinder gartens, sport centers, parks) is not being built and the old, existing institutions are put under additional pressure. Such inadequate use of space speaks at the same time of unnecessarily wasted space and the absence of strategies and policies for managing the city better, both its residential and business needs.

It is apparent that there is a serious imbalance between social actors in Croatia. The imbalance is visible between very powerful (economic and political) actors and less powerful (civil and professional) actors who are even completely powerless in some circumstances (lost spatial actors). A situation like this is not problematic as such because it is a normal part of social reality; when, however, it puts public interest and public space in danger, everything changes. Participation of the public in spatial planning and decision-making processes regarding their immediate environment has not been satisfactory for a while now. Non-government organizations (NGOs), a new type of actors, have come in conflict with economic actors. They are critical of the present situation and try to introduce some changes in the decision-making and increase participation of the public. They are therefore "regulators" of democracy. Zagreb's authorities manage the town development weakly and non-transparently favouring private investors. Some professional actors also side with investors forgetting the rules of their profession and contributing to "dotted", random housing construction. Decision-making procedures are non-transparent and frequent alterations of the Master Plan are noticeable, too. This should not be the case because of the Plan's importance for the city urban planning.

Bearing in mind everything mentioned so far, it is essential to correct the mistakes of the transition period and give a more prominent role in the management of town affairs to professional and civil actors. Today's random and chaotic construction at locations lacking the necessary facilities, will not help. Interdisciplinary urban planning does not exist either, one can talk about the so-called "death of urbanism" in the transition period. Spatial planning should be given greater care and appreciation than has been the case in these last years. This comprises transparent participation of the public (experts and civil actors) in practical and legal matters.

Today when the concept of sustainable development has been globally accepted and the majority of countries are planning their spatial development accordingly, it is impossible to behave otherwise. Everybody's commitment should be to preserve our space for the future and yet its irrevocable waste or neglect contradict the concept. The 2009 strategy for sustainable development[5] "brings together various development policies trying to find suitable solutions for all three sustainable development components: economic, social and environmental... and will be guided by the following general principles..."; here we wish to stress "the creation of an open and democratic society and the participation of citizens"(Narodne novine, the Official Gazette of the Republic of Croatia, 2009:2-3). Since strategically important documents exist, they are to be applied which has not always been the case so far. It is vital to raise the awareness that space is an important resource for the future development. Only then can space be saved and its loss minimized.

6   REFERENCES

BASSAND, Michel: Pour un renouveau de la sociologie urbaine: onze thèses. Urbanisme, Vol. 10, Issue 321, pp. 84-88, 2001.
CARMON, Naomi: Three Generations of Urban Renewal Policies: Analysis and Policy Implications. Geoforum. Vol. 30, pp. 145-158, 1999.
CROATIAN BUREAU OF STATISTICS, Zagreb, 2011. (www.dzs.hr)
DIMITROVSKA ANDREWS, Kaliopa; PLOŠTAJNER, Zlatka: Local Effects of Transformation Processes in Slovenia. In: Informationene zur Raumentwicklung, Vol. 7/8, pp. 435-449, 2001.
European Charter on Housing. In: Review of Social Policy. Zagreb, Vol.14, Issue 3-4, pp.391-399, 2007.
HAMILTON, Ian, F. E.; DIMITROVSKA ANDREWS Kaliopa; PICHLER-MILANOVIĆ, Nataša (Eds.): Transformation of Cities in Central and Eastern Europe. Tokyo; New York; Paris, 2005.
JUKIĆ, Tihomir.; MLINAR, Ivan.; SMOKVINA, Marina: Zagreb – Housing in the City and Residential Areas. Zagreb, 2011.
LOW, Setha, M. Symbolic Ties That Bind: Place Attachment in the Plaza. In: ALTMAN, Irwin. and LOW, Setha, M. (Eds.) Place Attachment. New York, 1992.
PICHLER-MILANOVIĆ, Nataša: Urban Housing Markets in Central and Eastern Europe: Convergence, Divergence or Policy Collapse. In: European Journal of Housing Policy. Vol.1, Issue 2, pp. 135-187, 2001.
SMITH, Niel: New Globalism, New Urbanism: Gentrification as Global Urban Strategy. In: Antipode. Vol.34, Issue 3, pp. 427-450, 2002.
SVIRČIĆ GOTOVAC, Anđelina: Actors of Social Changes in Space (2007-2011). In: SVIRČIĆ GOTOVAC, Anđelina; ZLATAR, Jelena (Eds.): Actors of Social Changes in Space; Transformation of Space and Quality of Life in Croatia. Zagreb, 2012.
SYKORA, Ludek: Local Urban Restructuring As a Mirror of Globalization Processes: Prague in the 1990s. In: Urban Studies, Vol.7, Issue 31, pp. 1149-1166, 1994.
TOŠ, Igor and students: Participation in the Processes of Built Environment Development. Report on Field Research. Zagreb, 2012.
ZagrebPlan. Zagreb Development Strategy. Strategic Development Orientation until the End of the Year 2013. Zagreb, 2013.
http://img214.imageshack.us/img214/4640/img48353vrbaninovi.jpg
http://www.jutarnji.hr/pad-cijena-bez-prodaje-stanova/442523/
http://www.skyscrapercity.com/showthread.php?p=97546007
http://mw2.google.com/mw-panoramio/photos/medium/32727109.jpg
http://narodne-novine.nn.hr/clanci/sluzbeni/2009_03_30_658.html
http://www.dzs.hr/Hrv/censuses/census2011/results/htm/H01_01_01/H01_01_01.html
http://www.deloitte.com/assets/DcomCroatia/Local %20Assets/Office %20Locations/Zagreb_tower_Deloitte-02-750x300.jpg

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[5] Croatia accepted this strategy in 2009 as the Strategy for Sustainable Development of the Republic of Croatia in the Croatian Parliament.

Human Sensory Assessment Methods in Urban Planning – a Case Study in Alexandria

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1 ABSTRACT

With the advancement of digital and sensor technologies, architecture as well as planning domains are continuously endeavoring to reach new horizons. Various kinds of sensor networks are producing data, which can be relevant for urban environments. This data can concern a variety of fields such as infrastructure, mobility, or climate. Primarily, data should be gathered to supply people with information about their environment. With the help of this data and information, surrounding impacts, which influence peoples' perception, can be identified. The main problem is the lack of comprehensive methods for measuring how people feel in their cities, and how they react on certain urban impacts. The main interest of urban planning should not be limited to infrastructures, buildings, and spaces, but rather concentrate on the people who use those buildings and spaces. It is therefore necessary to develop new methods for measuring "people's feelings" in the city with specific indicators and parameters. The presented joint German Egyptian project between the University of Kaiserslautern and Alexandria University aims at exchanging experiences and knowledge in the field of Human Sensory Assessment and its potential use for urban planning. Technologies and methodologies for data collection, analysis, and visualization are part of the research. Within the project, emotional data has been gathered and analyzed for a walk of locals and foreigners on one of the main promenades of Alexandria. The goal is to study if and how different cultural backgrounds might affect the perception of the participants in different urban spaces.

2 INTRODUCTION

Improving the living conditions in our cities should be the main goal of every planner, developer, politician, and citizen. This research makes use of emerging technologies of geo- and mobile-data processing within the field of urban planning to efficiently collect and visualize qualitative data rather than only quantitative data. An example from the field of emission control explains the circumstances: A sound impact can be clearly classified in decibel labels with the help of sensors, but it is not quite clear to what extent sound is felt as personal burden. There are other parameters in a city like green areas or fountains that can positively influence the feelings in an urban environment. This project focuses on collecting information about cities with up-to-date applications and methods. It is also discussed if and how residents and foreigners respond differently to the same urban settings and situations. In this collaborative project of German and Egyptian University partners, the exchange of experiences and knowledge between both groups within the fields of urban planning and computer science was another important aim. Therefore, different state-of-art applications for data collection through geo- and mobile-data processing methods were developed and tested. Within the project, data has been gathered, analyzed, and compared for several urban spots in Egypt and Germany. The aim of the project was not only to test the data processing methods, but also to compare measured emotional stress in the given case studies. They enable to figure out the existence of indications, which can define to what extent different cultural environments can influence the perception of the surrounding situations.

3 STATE OF RESEARCH

Background research on using human sensory assessment methods in urban planning to identify "points of (negative) emotions" was already conducted by several research groups, starting with the "Mental Maps" by Kevin Lynch in his "Image of the city" (Lynch, 1960), where participants sketched a map out of their mind of the investigated city. Yet critics claim this technique needed drawing skills to produce the map. Results of

tracking people with the help of GPS technology were delivered by Phillips et al. (2001) and by Elgethum et al. (2003). The approach to digitally map feelings like fear in a city was introduced by Sorin Matei. In his "Mental Maps Concept", he visualized for the first time feelings on a digital map and created a three-dimensional model for a better understanding of the environment in the city of Los Angeles (Matei et al., 2001). Unfortunately, he gave his approach the technical term "mental map" similar to Lynch. The difference is that Lynch created maps "out of the mind" and Matei made "emotional maps".

As a result of the developments in recent years, from "ubiquitous computing" towards "pervasive sensing", small, connected, flexible sensors (like smartphones) build the basis for pervasive sensing approaches of urban areas (Martino et al., 2010). Goodchild refers to this phenomenon as "Citizens as Sensors" (Goodchild, 2007). Other authors use the term "People-Centric Urban Sensing" (Lane et al., 2006, Campbell et al. 2006) or simply "urban sensing" (Cuff et al. 2008). Citizens that want to be involved in a planning process, can now produce and deliver data, and thus are more in the focus of planning considerations. They act as active sensors for the urban environment. Based on the development of mobile communication techniques, Mark Weisers vision of "ubiquitous computing" comes true (Weiser 1991). This contextual shift, described as "urban sensing", can be a trigger for a "fundamental transition from science and engineering into the realms of politics, aesthetics, interpretation, and motivation" (Cuff et al. 2008, p.1).

The first one who combined emotional data with the help of physiological parameters (skin resistance level) and GPS data was Christian Nold in his art project Biomapping (Nold, 2008 and 2009). Other examples for collecting "human sensor data" in cities were provided by the MIT Senseable City Lab (Martino et al., 2010 and Resch et al., 2011). Characteristical features and peculiarities of the Geoweb are "the development and changing nature of map-based data mash-ups" and the explanation of "the basic concepts behind map mash-ups, how geospatial data gathering and analysis has changed and how new technologies and standards are impacting on this" (Batty et al. 2010, p. 1089).

4 METHODOLOGY AND TECHNICAL SPECIFICATION

With the help of the psycho physiological monitoring, a practicable method was created to identify geo-referenced stress reactions in a city (Zeile et al. 2009, Bergner 2010, Zeile et al. 2011, and Exner et al. 2012). The experimental research consistently shows that emotional reactions are associated with changes in specific physiological parameters, like skin conductivity and skin temperature, resulting from the activity of the autonomic nervous system (Kreibig, 2010). In several projects, the method, the analysis, and the workflow were tested in pre-studies (Taha et al 2012a and Taha et al 2012b), or tailored to a specific target group (Bergner & Zeile 2012). However, the analysis is still to a large part carried out manually, which consumes a large amount of time. One task was to speed up the workflow by implementing some automated analyses, with the aim to improve quantitative and qualitative test methods concerning human sensory assessment. Furthermore, another research task was to figure out the possibilities for identifying a difference of participants' measured emotions, especially based on their country of origin and cultural background. The main focus is to find efficient ways to analyze the difference between participants from different cultural backgrounds, both in local and foreign environments. In order to do this, the study took place at the Eastern Harbour/Cornice in Alexandria.

4.1 Scientific Approach

Human sensory assessment is based on the usage of body sensors for measuring human physiological data (in this case skin conductivity and skin temperature) in real-time. Besides the physical activity, reasons for changes in physiological data are found in psychological processes (Kreibig, 2010). Trigger is a humans' emotion in context of their current environments. In the research project at hand, the sensor wristband "BMS Smartband" (Bodymonitor Systeme, 2013) was utilised. The wristband records physiological data in a TXT-file, which can be analyzed in a further step to find emotion patterns. The synchronization of the resulting emotion data with geo positions gathered by means of mobile GPS trackers is obligatory. The participants were also equipped with cameras for linking the collected emotion data with the perceived surrounding environment.

In previous studies, the transformation of raw physiological data to resulting emotion data (linked with geo position) was a time intensive and not fully automated process. Combining different processing steps in a defined workflow, and especially the reduction of complexity regarding the exchange of data between

different software components, was an elementary success of the project. Furthermore, whole data sets can directly be linked with individual video data of the participants to separate identified emotion sequences. A qualitative analysis of the trigger for specific emotions can thus conveniently be conducted afterwards for every study participant. Finally, the resulting data can automatically be formatted to allow the generation of heat maps that visualize identified stress hot spots in urban spaces.

For an identification of the original triggers of stress in these urban areas, a closer look to the individual runs is essential. Therefore, it was necessary to create a new workflow of analyzing the corresponding movie files, in which all the tracks in the line of sight of the respective participant were recorded. In earlier projects, the analysis of the movies was manually carried out by comparing the timestamps of the movie, the GPS tracker and the timestamp of the Smartband which delivers the data of the individual stress level of each participant. For the visual comparison of the results, all datasets were integrated in a movie timeline (Figure 1). As a result, it is possible to synchronize heart rate, skin conductance, and stress responses with GPS and the video signal. In addition, the visual detection of individual impacts on stress – like bad road conditions, orientation problems etc. – is possible (compare Exner et al. 2012).
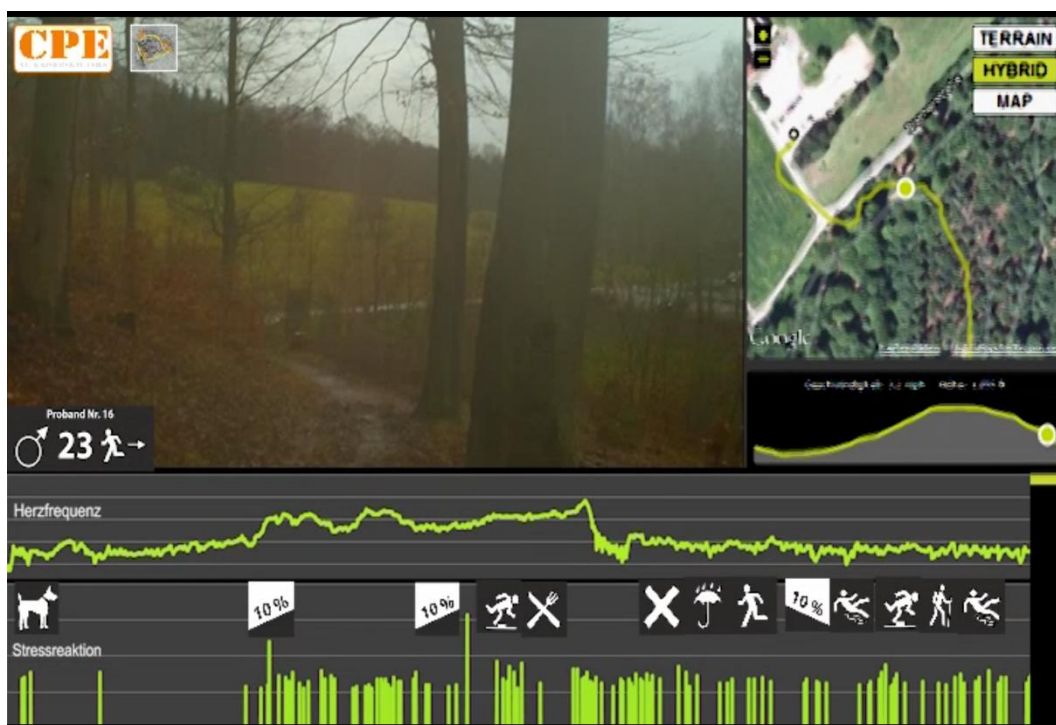
Fig. 1: Retrospective individual video analyses of a test run during a hiking tour of one proband (Exner et al. 2012)

4.2 Technical Specification

One of the main tasks was to develop tools that facilitate the carried out tasks: (1) Automatically synchronizing the datasets of GPS-Tracker, camera, and Smartband, and (2) Identification of the stress phases of the track, and automatic extraction of movie snippets of the corresponding time periods. Based on this, the identified stress points have to be stored in a geo-database and then visualized. This task was done to aggregate all the individual stress points in a so called "stress hotspot heatmap", in which all the individual stress spots were combined by a point density analysis (similar to RADAR Sensing, compare Zeile et al. 2012). Some of these tasks can be realized using the RADAR platform (Memmel & Groß 2011), which is based on the ALOE framework (Memmel & Schirru 2007).

The data processing was mainly realized using Perl scripts that can be applied on any common operating system to provide the flexibility to also allow a web-based processing of data in the future. Perl is a general-purpose, interpreted programming language that offers powerful means to analyze and manipulate data, especially by means of regular expressions. Using this as basis, the tools could quickly be developed, and required adaptation request could instantly be considered in situ. To merge all the different data sources, the data has to be synchronized on a common frequency. In our studies, a one-second span was used. In case there are unwanted time gaps in the data provided by the GPS tracker, a further preprocessing step can be conducted by applying the "GPS Interpolation" script. Using the generated CSV as an input, this script

automatically interpolates missing data by taking into account the last and next known position and timestamp of an identified gap.

Once the data is correctly aggregated, a software called "StressPhaseIdentifier" can be applied to identify stress phases based on a previously conducted analysis on changes of humans' physiological data. The script provides an enhanced CSV file with information about the stress phases, a short overview of all identified stress phases, and statistical information such as the average length of a phase. In addition, the script can also automatically extract corresponding video snippets when the user provides a respective file. In this case, an offset has to be specified to match the timestamps of GPS and video data. The extraction of snippets was realized using the "ffmpeg library" that is available on any common UNIX-based system. Finally, the file with identified stress phases can be used as input for the "GenerateHeatmapInput" component that will automatically generate a JSON representation usable as input for the generation of heatmaps within the RADAR system (Figure 2).

Figure 2: An exampe for a heat map of aggregated stress reactions in the market and old town area, Alexandria – Egypt

5 CASE STUDY: EMOTIONAL MAPPING IN ALEXANDRIA

This study is a continuation of a previous test carried out in 2011 (Taha, Raslan, & Bergner, 2012b). Both tests took place on the promenade along the Eastern Harbor in Alexandria. The Eastern Harbor Promenade, or as called "El Cornice" by Alexandrians, is an average of a 4.0 km stretch along the water front (3.87 km on the sea side and 4.30 km on the inner side), from the Citadel on its west end to the Bibliotheca Alexandrina on the east (Figure 3). It is a path heavily used by pedestrians and vehicles alike, as well as for locals and city visitors. Characteristics for the inner side of the path are that it is almost completely planted with palms or trees, and that there exists almost 40 intersections without crossing aids along the path. The outer (waterfront) side is only partially planted with palm trees in its first half, and again towards the end of the path, across the Bibliotheca Alexandrina. There exists only two minor intersections along this side of the walk by the recreational zone is section four. The carried out study aims at drawing two comparisons: The first is between both sides of the promenade, and how they differently affect pedestrians, while the second comparison is drawn between locals and foreigners, to study if and how background, culture, or previous acquaintance with the place might influence the emotions of pedestrians.

For this general comparison of the test runs and the collected emotion data of the study participants, the analysis was carried out with the statistical indicators "average time span between stress reactions" and "average duration of stress reactions". With the help of these indicators, the differences between the test groups was figured out in a statistical approach.

Figure 3: The Study Area with Street Sections along the Path

5.1 Pre-study

A similar study was carried out one year prior to this study with only two Egyptian female participants. The previous study took place on Thursday, November 3rd 2011, around 8:30 am. The exemplary results of last year's study can be found in (Taha, et al., 2012b) and are recapitulated as hypothesis for future research as follows: Passing cars don't affect the participants. Shady areas as well as sunny parts of the course have no influence on people's wellbeing in November weather conditions. The area with high volume of traffic area around the monument of unknown soldier was expected as a stress hot spot, but in this experiment, there was no change in skin response of the participant. The wider perception of the waterfront participant involves more spatial impressions, more stress signals are measured here.

5.2 Study Eastern Harbour

The experiment took place on Sunday, November 18th 2012 around 8:30 am. Both studies were executed on normal working days. It started at the west side of the Eastern Harbor (green node) and ended almost 45 minutes later at Bibliotheca Alexandrina at the east side of the Harbor (blue node). The weather conditions were pleasant that day, with a clear sky and moderate temperature. A group of seven persons participated in this test: Three Egyptian females and four German males. Each participant was equipped with one video camera, one GPS tracker, as well as one SMART-Band. Three participants took the outer side of the path (the one closer to the waterfront), while four participants took the inner path (the one adjacent to the buildings). Each group included locals as well as foreigners. Besides the testing of the above mentioned new workflow and techniques, another task in this set-up was to re-examine the hypotheses of the above mentioned study. Especially the points if there are more impacts on the waterfront side and how people feel in the high dense traffic areas should be proofed, because these results from the former study were unexpected at that time. Another interesting task was, if there is a speed reduction of the urban flaneurs, if the have to cross small intersections and are there differences between locals and foreigners.

5.3 Findings and Analysis

5.3.1 Speed, Stress Reaction durations and Intervals

When comparing both sides of the promenade, it is noticeable that participants taking the outer and longer side of the walk had more uniform speed and were relatively faster than those taking the inner side (4.65 km/h and 4.14 km/h), who had bigger variations in their speed (Table 1, Figures 4 & 5). The average speed of both groups was around 4.5km/h, which is, accordingly to literature, a normal average speed for pedestrians (Knoblauch, Pietrucha, Nitzburg, 2007). Stress reactions on the outer side were less in number (127.75 vs. 146.75), longer in duration (5.6 vs. 4.9 sec) and with bigger time span intervals (16.99 vs. 13.58 sec) than those on the inner side of the promenade (Table 1).

	Average Duration of Stress Reaction (sec)	Average Time Span between Stress Reactions (sec)	Average Speed (km/h)	Number of Reactions
Outer Path	5.60	16.99	4.65	127.75
Inner Path	4.90	13.58	4.14	146.75
Foreigners	5.12	13.80	4.24	150.75
Locals	5.38	16.77	4.45	123.75

Table 1: Average stress analysis indicators based on walked path and nationality

When comparing the readings of foreigners and locals, it is noticed that the speed discrepancy might be negligible, where it varied between 4.24 km/h for foreigners, and 4.45 km/h for locals. As for stress reactions, foreigners demonstrated a bigger number (150.75 vs. 123.75), slightly shorter duration (5.12 vs. 5.38 sec), and smaller time span intervals (13.8 vs. 16.77 sec) between stress reactions than locals.
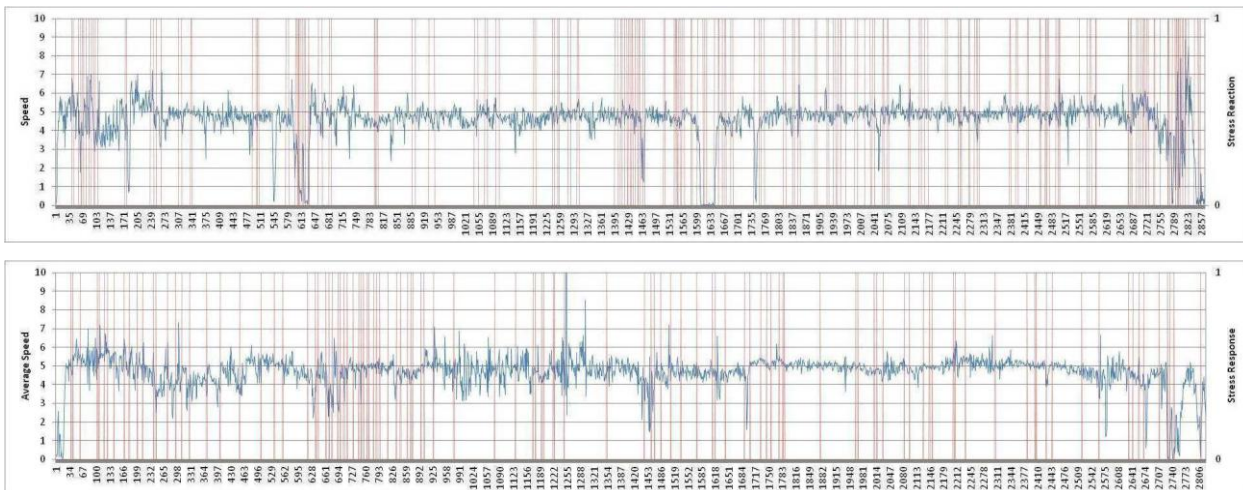
Figure 4: Speed and stress response by time for two participants on the outer side of the promenade
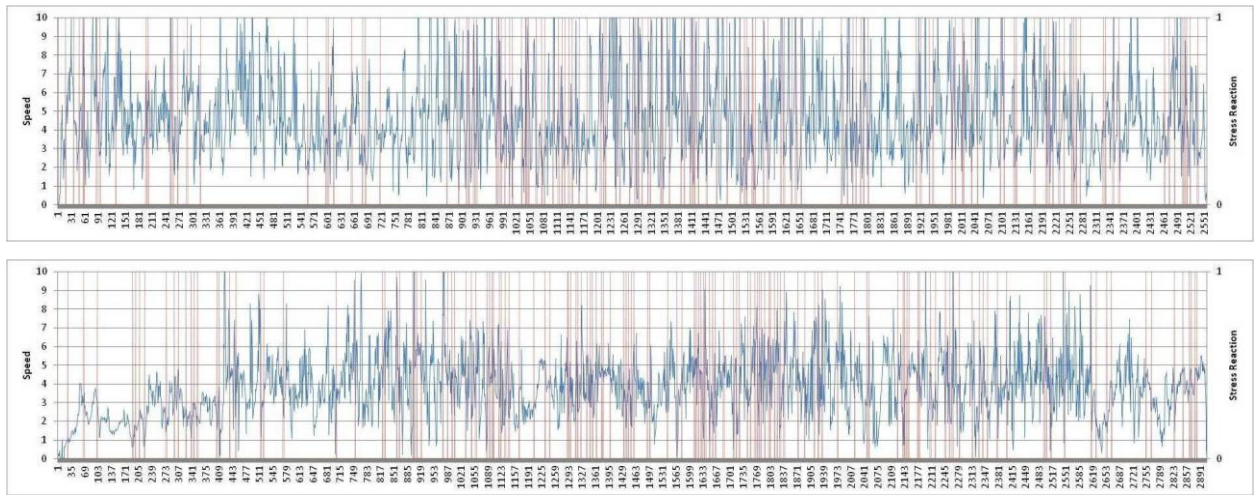
Figure 5: Speed and stress response by time for two participants on the inner side of the promenade
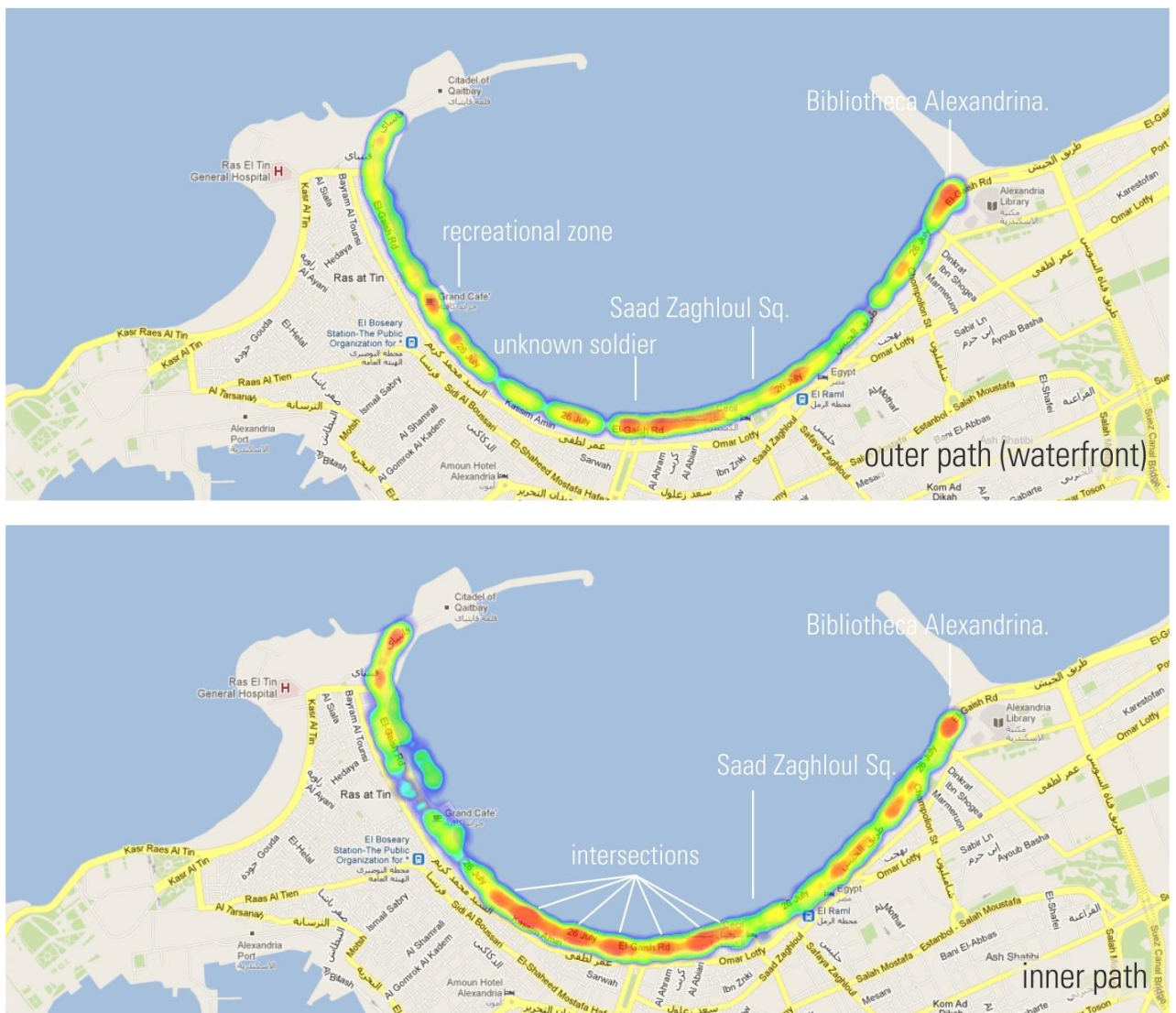
Figure 6: Heat maps for outer path vs. inner path along the waterfront

5.3.2 Stress Reactions Locations

As evident from charts, heat maps, and tables (Figures 4, 5, and 6 and Table 1), stress reactions were present all through the path on both sides- although not uniform. Coinciding with our expectations, however contradicting with a previous study carried out on the same path (Taha, et al., 2012b). More stress reactions were sensed on the inner side of the path than on the outer side. Along the outer side of the path, intense

stress reactions were sensed when participants had to cross the street by the recreational zone at point four, and by crossing the major Cornice Avenue by Bibliotheca Alexandria towards the end of the walk. Another high intensity stress zone can be found through the middle part of the path between the French Gardens and Saad Zaghloul Square (Figures 6 & 7).

Figure 7: Locations of intense stress reactions along the outer path. (Left) Recreational area, (middle) between French Gardens and Saad Zaghoul Square and (right) crossing El Cornice to reach endpoint at Biblioteca Alexandrina on "inner path"

As for the inner side of the path, intense stress reactions are higher in number and cover a larger part of the path. Again, they occur at street intersections (Figures 6 & 8), which significantly occur more often on this side of the path, as well as at sections with bad or missing pavements, where the study participants had to walk side by side with passing-by vehicles.
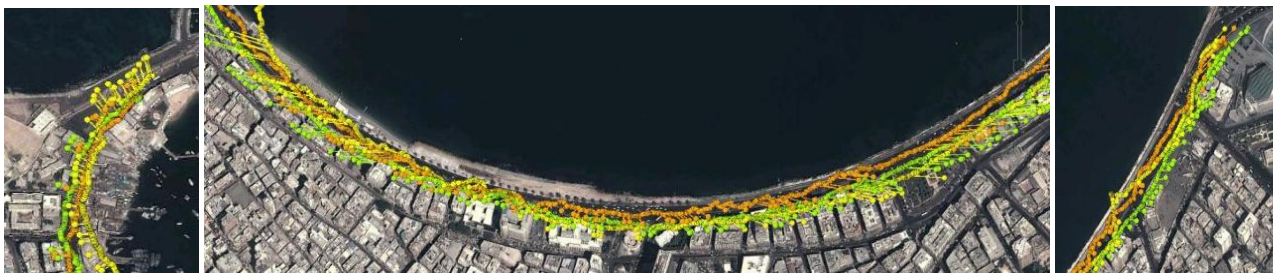
Figure 8: Locations of intense stress reactions along the inners path. (Left) Citadel area, (middle) between Court House area and Saad Zaghloul Square, (right) Bibliotheca Alexandrina

Through the middle part of the path, more vehicles were passing by, and more public trasportation micro-busses were stopping to let passengers in and out of the cars. This caused a higher level of noise and crowdiness than on both end of the path, and caused higher number in stress reactions during this part and on both the inner and the outer sides of the path.

One of the questions this project is trying to answer is if and how locals and foreigners respond differently to the same urban settings and situations. From the preliminary results of this carried out test, it is evident that foreigners faced a higher number of stress reactions than locals (Table 1). These were distributed along the whole path, although in higher intensities in locations of major street crossings, high densities of pedestrians and vehicles and in noisy zones. On the other hand, locals faced a less number in stress reactions, and were concentrated in the middle part of the path, where high levels of noise and dense numbers of vehicles and pedestrians were present (Figure 9).

5.4 Results

The results of this study, although to a certain limit, contradict with those of the year before (Taha, et al., 2012b), but nevertheless they are more reasonable and cope with the initial expectations made for stressful situations within urban environments. Major intersections, like the intersections at the Unknown-Soldier Monument represent two of the major streets with a high traffic density, where the traffic situation gets often quite chaotic, even for locals. The first intersection – walking direction from the right side of the image) to the left side of image) – is a hub for all sorts of public transportation: taxis, mini-buses and larger buses. While crossing this intersections, the study participants had to take care of mini-buses parked at the intersection, loading and unloading passengers, as well as other vehicles coming from the main street, taking a right-turn (coming from the blind spot) into the side-street. On the second intersection, participants had to dodge vehicles, since there are no means to slow vehicles down by traffic signals or speed tables. Both intersections caused stress situations for both foreigners as well as locals (Figure 10).

Figure 9: Heat maps for foreigners vs. locals along both sides of the path

Figure 10: Equal Stress responses at the crossings of the Unknown Soldier Monument for locals (red & orange) and foreigners (green & yellow)
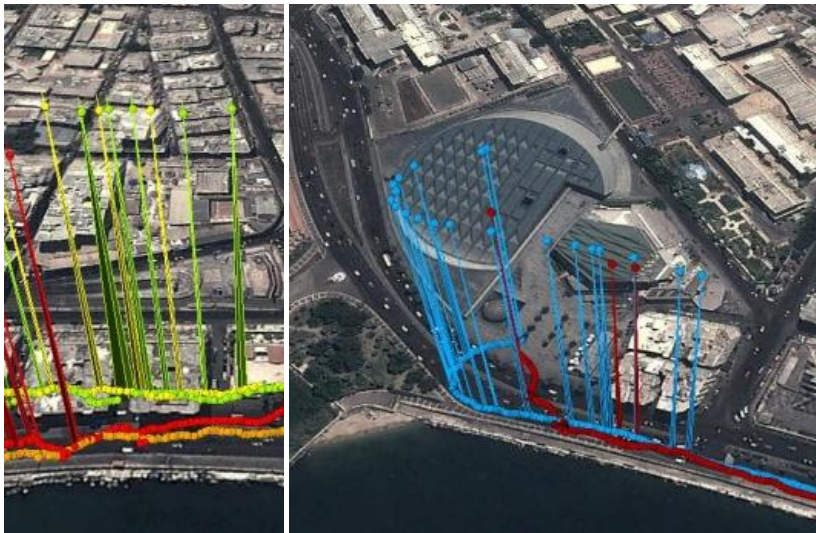
Figure 11: Increased number of stress responses for foreigners (green, yellow & blue) than for locals (red, orange & dark red) at minor crossings, as well as at the Cornice Avenue crossing

Other situations were pretty different between foreigners and locals. Crossing minor intersections on the inner side of the path presented almost no stress reactions for locals, while they presented stressful situations for foreigners. Another evident situation was the crossing of the Cornice Avenue across Bibliotheca Alexandrina. For a foreigner participant, the crossing of the avenue was an extremely stressful situation, where more than 20 stress reactions were measured during the process of deciding and actually crossing the avenue. On the other hand, for the local participant, only three stress reactions were measured (Figure 11).

At intersections, where it was hard to anticipate from which direction vehicles are coming, or when they are coming from a blind spot of the study participants, both foreigners and locals faced almost the same level of stess. While at other intersections, where locals might be accustomed to crossing streets where no street signals are present, foreigners show a higher level of stress than locals.

Unlike previous measurements (Taha et al., 2012b), there were more stress responses on the sidewalk of the inner path than on the sidewalk near the waterfront in this study. This concurs with our initial assumptions that having to cross street intersections, and passing by sections where the sidewalk is blocked by cars or has bad or missing pavements, would cause more stress situations. Hence in this study, stress reactions were recorded all through the path on the inner side, while they were mainly recorded in outer side only when noise was caused through the middle part of the path. This doesn't refute the hypothesis that a wider perception angle might cause higher stress reactions (compare Taha et al., 2012b). Finally, the authors are aware of the fact that there is a need for further studies with more participants with different local circumstances for further validation of the given hypothesis.

6 CONCLUSION

The presented method of human sensory assessment in urban planning shows a high potential for a better understanding of urban space and the perception of its users. In the case studies, it was researched if different cultural backgrounds influence the perception of space. Besides the mentioned restraints relating the resilience of the gathered data, the results indicate that being in one's native environment or in an estranged one, does not influence how Egyptians or Germans experience their surroundings. In general, German participants have shorter stress reactions than the Egyptian participants, but the frequency of stress reactions of the German participants is higher. Individual stress reactions can now be identified in an efficient way in the optimized workflow. To achieve more quantitative results for statements about urban environment, a higher number of participants is needed. The next step in research will be the combination of the fields "Human Sensory Assessment" and "CAVE-Technologies" (Cave Automatic Virtual Environment – Technologies) for an objective verification of the gathered data and for an exclusion of impacts, which do not belong to the "real" built and architectural environment. This can be applied to interior spaces as well as open urban spaces. Users can navigate through spaces in real-time to simulate a virtual tour. With this setting, it might be possible for the first time to create an urban environment in which the user only reacts on the (virtual) built environment. This means, a laboratory situation, free of external influences will be created.

As a conclusion, the presented method repertoire has a high chance to become an important component for urban planning and sociological analysis in perception of space. It can give planners tools for a more comprehensive view of interdependencies between people and their urban environment.

7 ACKNOWLEDGEMENT

8 REFERENCES

BATTY, M., SUCHID, A. CROOKS, A., HUDSON-SMITH, A., JACKSON, M., MILTON, R, MORLEY, J.: Data mash-ups and the future of mapping. Tech Watch. Bristol, United Kingdom, 2010.

BODYMONITOR SYSTEME: Bodymonitor System. Available in <http://bodymonitor.de> Accessed in 12 February 2013.

CAMPELL A.T., EISENMANN S.B., LANE N.D., MILUZZO E., PETERSON R.A.: People-centric urban sensing [Internet]. In: Proceedings of the 2nd annual international workshop on Wireless internet. Boston, Massachusetts: ACM, p.18, 2006.

CUFF, D., HANSEN, M. & KANG, J.: Urban Sensing: Out of the Woods. In: Communications of the ACM, 51(3), p. 24-33, 2008.

ELGENTHUN, K., FENSKE, R. A., YOST, G. and PALCISKO, G. J. (2003). Time-location analysis for exposure assessment studies of children using a novel global positioning system instrument, Environmental Health Perspectives, Vol. 111, No. 1, 115-122.

EXNER, J.-P., BERGNERr, B., ZEILE, P. und BROSCHART, D.: Humansensorik in der räumlichen Planung, in: Strobl, J. ; Blaschke, T. ; Griesebner, G. (Hrsg.): Angewandte Geoinformatik 2011, p. 690-699, Berlin – Salzburg 2012.

GOODCHILD, M. F.: Citizens as Sensors: The World of Volunteered Geography, Geo- Journal, 69 (4), p. 211-221.New York/Heidelberg, 2007.

KNOBLAUCH, R., PIETRUCHA, M., & NITZBURG, M.: Fields Studies of Pedestrian Walking Speed and Start-Up Time. TRB, National Research Council, Vol. 1538, pp. 27-38. Washington. DC, 2007.

KREIBIG, S. D.: Autonomic nervous system activity in emotion: A review. Biological Psychology, 84 (3), p. 394-421, 2010.

LANE ND, EISENMANN SB, MUSOLESI M, MILUZZO E, CAMPBELL AT. Urban sensing systems: opportunistic or participatory? , in: Proceedings of the 9th workshop on Mobile computing systems and applications. Napa Valley, California: ACM; 2008, p. 11-16. Available in <http://portal.acm.org/citation.cfm?id=1411763>. Accessed in 12 February 2013.

LYNCH, K. (1960) The Image of the City, MIT Press, Cambridge, MA.

MARTINO, M., BRITTER, R., OUTRAM, C., ZACHARIAS, C., BIDERMANN, A.: (2010): Senseable City: Digital Urban and Modelling.

MATEI, S., BALL-ROKEACH, S. and QIU, J. (2001): Fear and misperception of Los Angeles urban space: A spatial statistical study of communication-shaped mental maps, Communication Research, Vol. 28, No. 4, 429-463.

MEMMEL, M., SCHIRRU, R.: ALOE – A Socially Aware Learning Resource and Metadata Hub. In Martin Wolpers, Ralf Klamma and Erik Duval (Eds.): Proceedings of the EC-TEL 2007 Poster Session. CEUR workshop proceedings, 2007.

MEMMEL, M.; GRO? F.: RADAR – Potentials for Supporting Urban Development with a Social Geocontent Hub, in: Schrenk, M.; Popovich, Vasily, V.; Zeile, P. (Eds.): Proceedings REAL CORP 2011, p. 777-784, ISBN 978-3-9503110-1-3, Schwechat, (Austria), 2011.

NOLD, C. (2008) Biomapping, Available in <http://www.biomapping.net/> Accessed in 25 February 2011

NOLD, C. (2009) Emotional Cartography – Technologies of the Self, Published under Creative Commons License, ISBN 978-0-9557623-1-4S. Available in <http://emotionalcartography.net/EmotionalCartography.pdf> Accessed in 25 February 2011

RESCH, B., MITTLBÖCK, M., KRANZER, S., SAGL, G., HEISTRACHER, T., BLASCHKE, T. (2011) „People as Sensors" mittels Personalisierten Geo-Trackings, Salzburg, in: Strobl, J.; Blaschke, T.; Griesebner, G. (Hrsg.): Angewandte Geoinformatik 2011, Berlin – Salzburg, 682-687.

TAHA, D., RASLAN, R., BERGNER, B. S.: The Egyptian Revolution from the Perspective of an Urban Planner: Demonstrations on the Streets of Alexandria, Egypt, in: Schrenk M., Popovich V., Zeile P., Elisei, P. (Eds.): Proceedings REAL CORP 2012, p. 851-858, Schwechat (Austria), 2012a.

TAHA, D.; RASLAN, R.; BERGNER, B. S.: Humans as sensors to enhance the Built Environment: a Case Study of the Eastern Harbor, Alexandria, Egypt; in: Schrenk M., Popovich V., Zeile P., Elisei, P. (Eds.): Proceedings REAL CORP 2012, p. 367-375, Schwechat (Austria), 2012b.

WEISER, M. (1991) The computer for the twenty-first century. Scientific American, 9/1991, 94.

ZEILE, P., EXNER, J.-P. and STREICH, B. (2009) Human as sensors? The measurement of physiological data in city areas and the potential benefit for urban planning. Proceedings 11th International Conference on Computers in Urban Planning and Urban Management. Centre of Urban Studies and Urban Planning, The University of Hong Kong, Hong Kong.

ZEILE; P.; MEMMEL, M.; EXNER, J.: A New Urban Sensing and Monitoring Approach: Tagging the City with the RADAR SENSING App.; in: Schrenk M., Popovich V., Zeile P., Elisei, P. (Eds.): Proceedings REAL CORP 2012, p. 17-25, Schwechat, (Austria), 2012.

Incremental Planning – Cooperative Scenario and/or Masterplan? Long- and Short-Term Planning Horizon of Urban Design Projects within the Existing Urban Fabric. Analysis of Projects in Vienna and Switzerland with Regard to the Factors Triggering Varying Planning Times

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1 ABSTRACT – INCREMENTAL PLANNING – COOPERATIVE SCENARIO AND/OR MASTERPLAN?
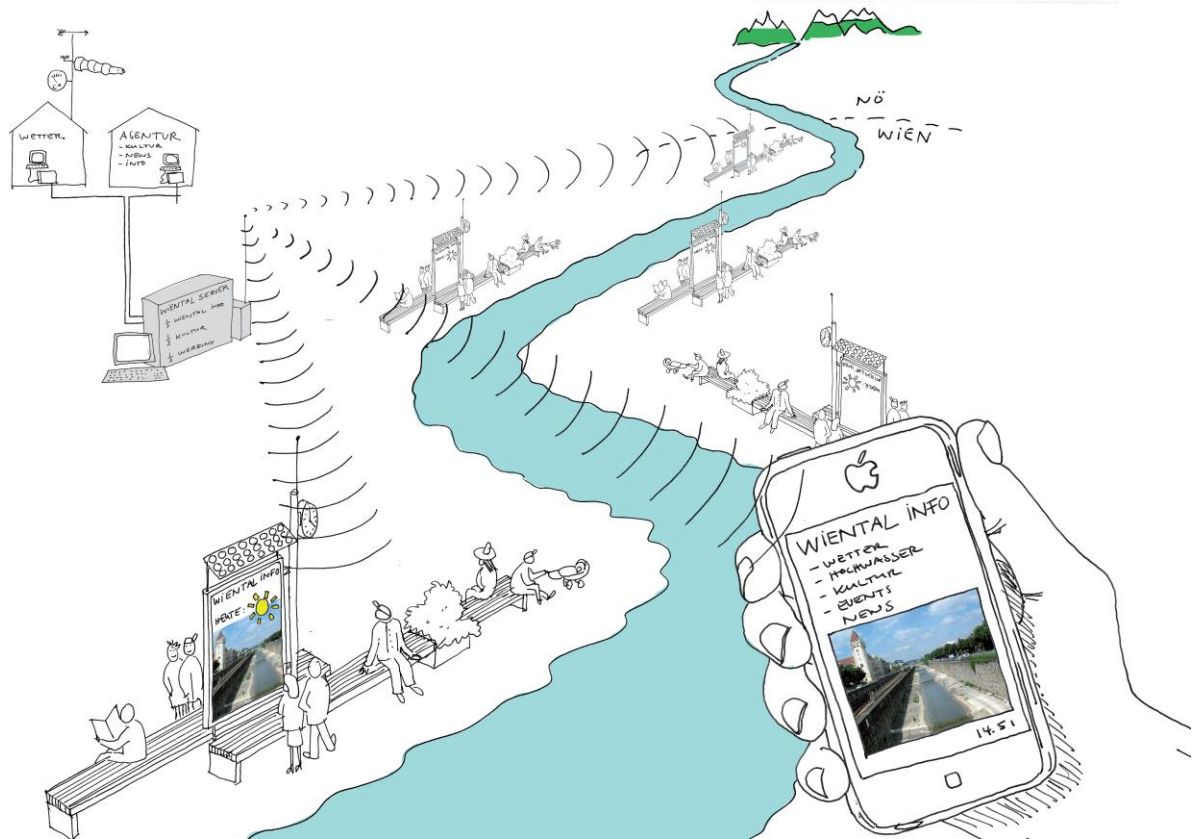
Fig. 1: Vienna River Valley Masterplan by Tillner & Willinger / Auböck & Karasz – interactive information and communication

Incremental planning means to break down the long-term planning horizon into smaller entities, i.e. to develop an overall plan with intermediate stages which are complete projects by themselves. These "plans within the plan" can be implemented independantly at different points in time. They work combined or parallel but add up to a whole like pieces of a puzzle.

2 INCREMENTAL PLANNING – CASE STUDIES IN DELFT, VIENNA AND ZUERICH

Currently, in the City of Vienna, as in many other European cities after Stuttgart 21 and after the financial crisis 2008, urban planners and architects can no longer conceive a comprehensive masterplan for an urban area and then hope to see it implemented as planned. The era of long-term master-planning has long gone. It is replaced by a more open system that adresses flexibility for future changes of developments.Participatory processes of all kind that are mainly structured to be inclusive for all stake-holders, community members, politicians have become . In these processes the planners retreat into the back-ground, they are invited to develop creative ideas in discussion groups and interdisciplinary working-groups. The advantage of this process is clearly the inclusion of all parties, the amicable and open atmosphere in which all issues are discussed before the planning process starts. The potential disadvantage of this type of process is, that with the disappearance of an "author" also vanishes a sense of responsibility. Several recent planning projects that were organized as a "cooperative workshop" ended with no clear result. In this paper this new trend is illustrated with two projects in Vienna: the Gürtel URBION and the Vienna terraces in the Vienna River Valley. A different type of cooperative process and masterplan is illustrated with a long-term planning project in Switzerland, the european country with the longest tradition of particpatory planning due to its

direct democracy. Swiss citizens are used to vote on a multitude of subjects – the addition to the modern art museum in Zuerich or the bonus payment of Swiss executive managers of private companies. Before the actual vote, they are supplied with in-depth information on the subject at-hand. Nevertheless, the creative process of design and the responsibility of decision-making are not transferred to the public. Finally, the Guertel project is an early and exceptional example of incremental planning; it was conceived in the late 1990s at a time when traditional master-planning was still the norm. The most recent and dramatic european example for a change in planning approaches is to be found in the dutch city of Delft: Spoorzone Delft (2009-2012), a   municipal project of exceptional magnitude. Spoorzone Delft consists of a new railway tunnel below the city centre and the subsequent area development of the current above-ground railway tracks and station area into a mixed use area (housing, office space, retail, services, etc.)1)

An existing railway is moved underground, the large tunnel project is covered with public green spaces, adjacent to the park large sites for new development are created. The land value was calculated based on the potential sq.mt. of housing created and one developer was selected by the city of Delft who should invest and contribute with the land purchase to the municipal tunnel expenses. The original concept was conceived by the spanish planner Busquets before the crisis in 2008 and represents a classic master-plan, 95 % of the planned uses were residential apartment-buildings arranged in classic block structures.

Fig. 2: Spoorzone Delft, original Masterplan by Joan Busquets with linear park and residential blocks

The crisis in 2008 brought the project to a sudden halt, the developer was no longer capable of financing the project. By 2012, the city of Delft found a viable solution in reducing the developers responsibility to one third of the project and inviting other developers to participate. The masterplan was rethought and a new participatory process started with three new planning teams. Some components of the old plan were fixed, i.e. the park by Busquets above the tunnel. The new plan was created in an open atmosphere by including various parties and the public, it features built-in flexibility, the percentage of housing was reduced to approximately 78 %. The plan is now conceived in phases and temporary uses are included, so various cultural groups and initiatives will be selected to activate the area while the construction of the tunnel continues.

3   PUBLIC PARTICIPATION OVER A LONGER TIME PERIOD – HOW TO KEEP THE INTEREST ALIVE WITH PHASED IMPLEMENTATION AND SMALLER PROJECTS

Planning and Urban Design projects that are focused on the public realm and are not immediately linked to building projects quite often face a long time frame until implementation actually starts. The absence of private property development and related stake-holders make these projects "purely public" and therefore dependent on public financing. The lengthy processes to secure financing are usually accompanied by political change. Therefore, strategies have to be developed to secure support for these projects over a long time-frame. Public awareness is high when projects begin with public meetings, participation processes, ect. But when the process lasts too long with no signs of pending implementation, dwindling public interest is the consequence. Once formerly active community members have retreated from the process, it is difficult to rekindle their enthusiasm. Therefore, it is advisable to design smaller projects into the overall plan that can be implemented quickly and without problems. The planners have to actively search for these situations on the site in order to successfully organize their separate implementation.

3.1 Strategies to start with small-scale short-term projects to actively engage the community

One strategy that can help to start implementation immediately, is to plan on several levels and for parallel processes. Short-term measurements that can be realized quickly and with small budgets are conceived, as well as an overall planning concept for the mid- and long-term.

This strategy has the advantage, that first steps can be approved and financed more easily than large-scale projects where the public debate and the political agenda can delay the implemenation ad infinitum. These exemplary projects have not only a high quality of their own but also act as a "scout" and represent the overall planning concept.

The public, the client and the planners can readjust the concept following the first experiences. Since community participation has become quite common in order to accommodate different needs in a changing society and to increase identification with the neighborhoods, the test case can actually reinforce and deepen the community involvement.

3.2 International Examples of long-term and short-term planning projects with high levels of public support

Internationally, several famous planning projects have become extremely successful, once they were finally implemented. An aspect that is often forgotten though is the long process and the enduring public engagement before these projects were finally realized. One of the most popular public space projects of all time is the New York Highline. Today, it is hard to imagine that for decades, James Corner,(Field Operations), the landscape architect, the architects Diller + Scofidio and local community groups fought for the creation of this public space on an abandoned rail line against severe public resistance. The Boston Dig or the Seattle Freeway Bridge, the L.A. River or the Glendale Freeway Park are other examples that spanned decades. In Barcelona the extension of the Avenida Diagonal and in Madrid the Rio project are examples where with intense political backing projects of that magnitude were implemented faster. The absence of public participation processes in Spain is one reason why in the past, these projects could be realized in comparatively short time spans. Today, as a consequence of the financial crisis and many scandals in connection to land development, also Spain has experienced an awakened and alert public, where projects can no longer be implemented without information and public discussions and will readjust towards a more participatory planning approach. Smaller public budgets will also inspire innovative low-budget projects.

3.3 Local Examples of incremental planning in phases – Opfikon, CH

The "incremental planning process" and the public involvement will be investigated by exploring three practical examples in Zuerich and Vienna over the course of 20 years.

To combat the bland suburban sprawl of metropolitan Zürich, Swiss authorities desire the creation of new small urban centers to root the expansion. The creation of the Opfikon Master Plan is part of this initiative and the Market Place is its first intervention.
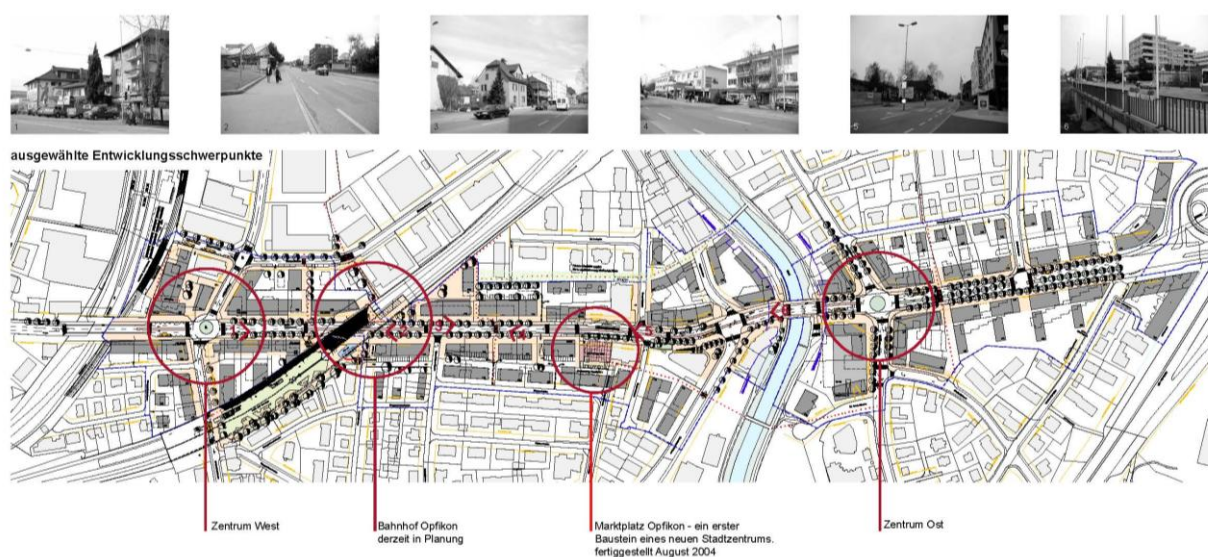
Fig. 2: Opfikon Masterplan by Tillner & Willinger with four areas selected for implementation

One is the "planning of a center" for the community of Opfikon, a suburb of Zürich, located only 5 minutes from the airport Kloten. The lack of a center was apparent to the city authorities and a motion to reduce through-traffic and increase pedestrian movements led to the planning initiative of a new master-plan by Tillner & Willinger in cooperation with swissplanners Planpartner and the innovative traffic planners METRON from Bern. In 2000 this new plan started and also adressed the topic of incremental planning – therefore it included immediate action: a public square „ market-place" as a gathering spot for the community that was designed already after the 1st year of planning and built in 2006. This was possible thanks to an unbureaucratic linkage to a private construction project. The 2nd intervention, the redesign of a traffic intersection, was to follow in 2011.

The Master Plan defined four urban centers along the main traffic axis, Schaffhauserstrasse. One of the new centers, the Market Place transformed the square into a multifunctional plaza that provides a place with a sense of identity to anchor the disparately developed area. The ground surface, made of red prefab concrete panels, and the red-housed access ramp of the underground garage are the strikingly new defining elements of the square.

Fig. 3 : Opfikon Market Place, the 1st intervention of the masterplan by Tillner & Willinger

Fig. 4 : Opfikon Market Place

Reacting to the inconsistency of the surroundings, the square is organized into three different areas of activity. Parallel to Schaffhauserstrasse, there is a footpath separated from the busy road by a strip of green and clearly delineated from the center of the square by a layer of black asphalt. On the opposite side, the southern edge serves as a buffer zone to the adjacent residential area. An elevated wooden area with benches, sheltered by a greening pergola, invites passers-by to stop and rest. The various materials used for the surfaces accentuate the different qualities of the three zones. The inclusion of a quaint café with an outdoor area breathes new life into the square.

The whole process was accompanied by public meetings with the property-owners and stake-holders. Their recommendations and responses were adressed in a professional manner while still adhering to the desired high level of quality. The Swiss model of an open public debate with citizens and property owners is a result

of a long tradition of direct democracy. This allows for in-depth discussions of the planning agenda with a non-professional audience and consequently, a successful implementation of the plan by private developers.

3.4 Local Examples of incremental phased planning – Vienna URBION
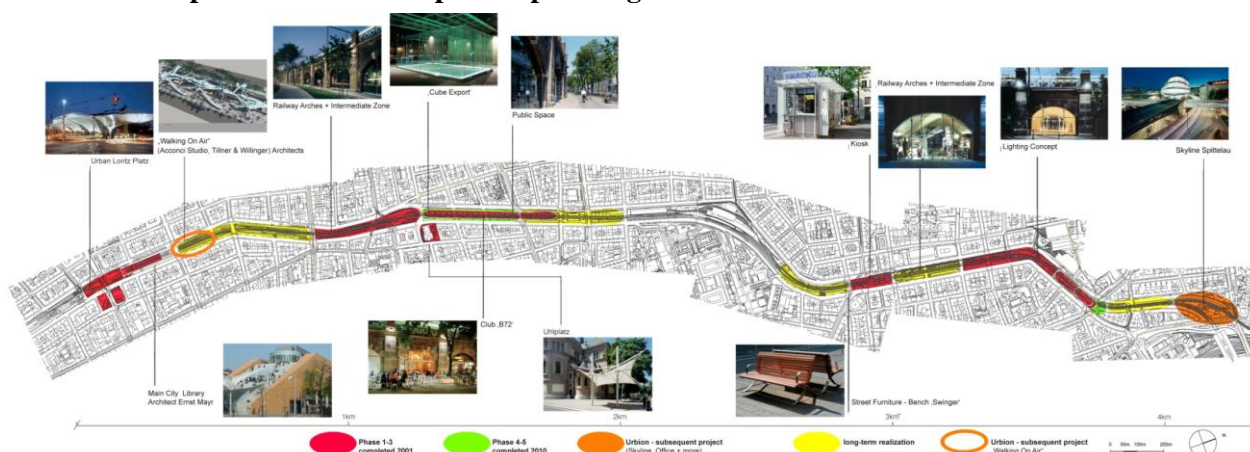
Fig. 5 : Vienna Gürtel map of phased intervention with various interventions of the masterplan by Tillner & Willinger

The second example is the re-programming of the center of the Vienna Westgürtel 1994-2000, a highway separating the inner from the outer city districts since the 1960s which was the target of numerous planning initiatives until the mid 1990s. 1995 a successful EU co–funded project started: "URBION". City-wide revitalization of the Vienna Gürtel, implementing new urbanistic uses to transform the image of a previously derelict zone. URBION was one of the five key projects of the EU URBAN program.

The Vienna Gürtel is the transportation backbone of the city with ten municipal districts bordering its busy lanes. The historic railway "Stadtbahn" project by Otto Wagner (today the Vienna Underground), which runs along the highway, is the primary means of access to the entire URBAN zone. At the core of the Gürtel concept was the preservation of the architectural heritage of Otto Wagner and how to address the conflicting demands of public space versus high traffic volumes. By designing transparent and connective architecture for the Gürtel median, the area re-emerged as a pivotal space of interaction that once again links the outer and inner districts.

URBION developed a comprehensive set of measures for a new, low-cost design of the median strip that would respect existing structures and could be implemented in consecutive phases.

Key to the success was the immediate implementation of certain measures, i.e. lighting the arches or installing new uses, while the overall plan was developed further. The open space was transformed to accommodate newly designed bike paths, pedestrian areas with generous landscaping, squares and parks. The arches were filled with new activity thanks to the life-music-clubs. Image transformation was the key to the success of URBION

Fig. 6 : Vienna Gürtel: electronic music event with DJ in the RHIZ

Fundamental to the "image transposition" strategy was the general improvement of the Gürtel with green landscaping, pedestrian and bicycle zones, and populating the "Stadtbahn" brick arches with cultural and

entertainment facilities, restaurants and music clubs. Thus, the lively Gürtel provides daytime recreation as well as a progressive nightlife destination.

At first, immediately implementable measures were instrumental for the success of the project. The public awareness of the project was extremely high – therefore it was important to proof that this was not yet another theoretical plan but finally a realistic chance for improvement of this forgotten and neglected part of the city. Therefore, the strategy to start with implementable and modest improvements of the public spaces proved successful. The first step taken was to illuminate the dark areas of the Gürtel median. Formerly unattractive and inhospitable public spaces were transformed into inviting public promenades. But even before any design measures were taken, a use concept was developed in order to secure long-term social acceptance and liveliness of an area that had a negative reputation and as a consequence was derelict and unattended at night. This use concept was based on an analysis of the adjacent neighborhoods and a series of interviews with their inhabitants. Young families, singles and students had moved to this area that was traditionally populated by immigrants from Turkey and eastern european countries, thus creating a lively ethnic mix with an attractive open-air market, „Brunnenmarkt“ and some original stores and interesting affordable restaurants. This was a good starting-point for the idea of a „life-music-mile“, a series of pubs and bars with live-music entertainment. The idea was first tested by inviting a reknown music-club, the Chelsea, to move to the Gürtel. After the opening it then became an immediate success and established the Gürtel median as „the spot for avant-garde life-music“. The RHIZ was the second club to follow and quickly became the hot-spot for avant-garde electronic music in Vienna. Today, the scene has established itself and celebrates annually in August the „Gürtel night-walk“ with open-air concerts along the median.

A lighting concept was also developed, on one hand to illuminate the historic structure, on the other hand to create an inviting atmosphere and increase public safety on the promenades.

Fig. 7 : Vienna Gürtel illuminated public spaces in the median as one of the first immediate interventions of the masterplan

4   FAÇADE CONCEPT

Decades of newglect had left many of the Stadtbahn arches below the elevated train line either bricked-over or shuttered with billboards, thereby concealing the original viaduct structureThe aspect of securing and reviving the historic heritage of Otto Wagner (who thought long-term) became an important chapter of the revitalization project.

Fig. 8 : Vienna Gürtel – historical image of the historic Otto Wagner facades

A flexible modular system was created to accommodate the varying arches, in addition to a discrete lighting solution for the viaduct and overpasses. A minimal steel structure and a uniform, spot-fixed glazing system achieves a high level of transparency, promoting public safety and cultural preservation. The structural elements respect the design principles of Otto Wagner's original façade.

Fig. 9 : Vienna Gürtel – the transparent facade respects the proportions of the historic Otto Wagner facades

4.1 Local Examples of incremental phased planning – The Vienna Valley

Within the boundaries of Vienna the River Wien runs along a length of 14 kilometres, from the retention basins in the west of the city to the point where it flows into the Danube Canal. Along its length the urban context of the Wiental (River Vienna Valley) shows a number of very different characteristics, from the scattered development, commercial areas and extensive green spaces in the west followed by a gradual, but at places very abrupt, development to the densely developed inner city areas.

In the course of history the Wiental has developed from a natural river into a regulated urban watercourse and from the mid-20th century onwards, thanks to the intensive development of road and rail connections, it became the most important traffic artery leading into the city from the west.

The Vienna Valley also was the target for numerous planning initiatives, most of them were abandoned due to incompatibility with the historic heritage of the river walls, a protected monument. The previous projects relied on major public investments along the entire length of the river and would have caused enormous costs, which also led to their cancellation. 2008 a new plan took a different, more local and sensitive approach and identified locations where existing public amenities can be maintained and immediate improvement of the public realm for the citizens could be realized.
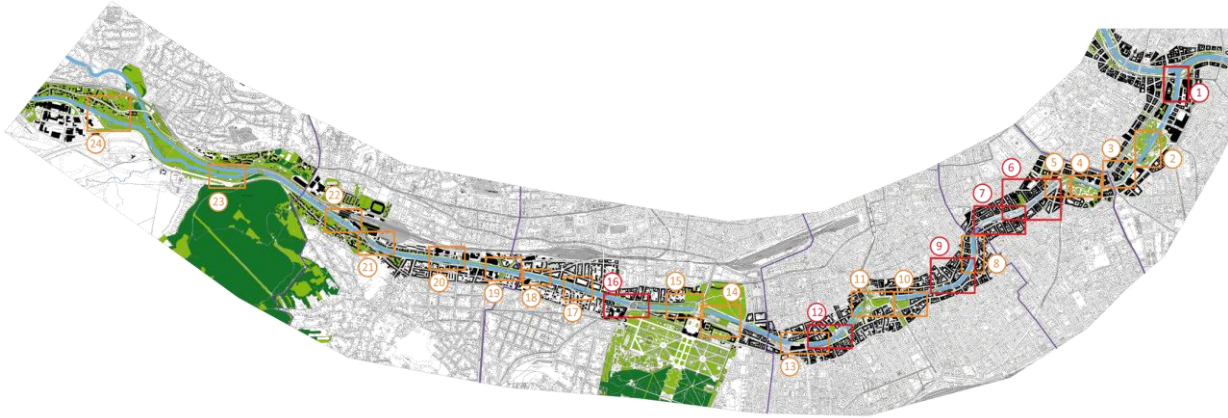
Fig. 10: Vienna Valley – selected areas of intervention

4.2 The Wiental – a study on five levels

The considerable length and linear nature of the Wiental as a space means that it presents urban planning with a very special kind of challenge.

To deal adequately with the scale and complexity of this planning area in the framework of the study, the latter is divided up into five spatial or content layers that allow the preparation of a detailed yet overall view, an analysis and a design concept. The study proceeds in steps from the large to the small scale, in this way not losing sight of the overall context.

4.2.1   Level 1

In the 1st level an examination is made of the overall regional context of the Wiental, and the historical, hydrological and cultural background of this planning area is explained.

4.2.2   Level 2

On the basis of level 1 an understanding of the nature of the Wiental within the Vienna metropolitan area boundaries can be acquired. The second level deals with the important overall characteristics of the Wiental within Vienna itself.

4.2.3   Level 3

In Level 3, the next step, the Wiental is divided into six sections, each of which is characterised by a relatively homogeneous urban appearance and therefore offers the next, more precise framework for an urban analysis.

4.2.4   Level 4

On Level 4 local urban areas are identified within these six sections that make focused, strategic and detailed planning and design possible. These sections are described in the report as "intervention areas".

4.2.5   Level 5

Finally, on Level 5 individual typological measures for the respective intervention areas are suggested and are then summarised in an overall catalogue. By using these typologies along the entire length of the Wiental a continuous linear design language is developed. The goal is to enable the development of a "Wiental identity" and to anchor the river in the public consciousness.

4.2.6   Level 1: The Wiental in Vienna and Lower Austria

Level 1 outlines the historical background, the hydrological conditions as well as the cultural context within the regional setting.

4.2.7   History

In historical terms the transformation from a natural river to a regulated watercourse, or the planning of a monumental boulevard from Karlsplatz to Schönbrunn, which Otto Wagner carried out in part by culverting

the River Wien in the area of the Naschmarkt, represent important measures that have had a lasting impact on the appearance of the city of Vienna. These are the current basis for planning.

4.2.8   The Wiental as a culture axis

Here the issue is the cultural identity of the River Wien.

It is not just the river itself that is a constant within the urban diversity. The many cultural monuments arranged like a chain of pearls along it also form a constant and a culture axis that contributes to the linear identity of the Wiental.

This on the one hand gives the current experience of the Wiental a special quality, while on the other these cultural attractions form important lynchpins, also for future urban planning, where local measures can be employed to further develop the current experience of the linear River Wien.

Other examples of important planning strategies for the Wiental include improving urban connections between important cultural features such as the Urania and Karlsplatz, or making it possible for people to experience the River Wien, for example in the Naschmarkt area where the river was culverted and an open space made over it.

4.2.9   Level 4: Intervention areas (fig.10)

Within the study 24 intervention areas were identified which are distributed across the six sections, starting from where the River Wien flows into the Danube Canal to the retention basins in the west of the city.

These areas were chosen because in them the necessity for individual urban design measures condenses to such an extent that, on account of their complexity, their spatial dimensions or due to the way in which they overlap, the measures necessary can only be planned within an overall context.

Each intervention area is examined in three respects:

(1) Current situation: urban characteristics

In a first diagram the current situation is sketched, here attention is paid to urban design qualities and categories such as existing high urban quality and attractors, open spaces with potential for upgrading, barriers or visual axes.
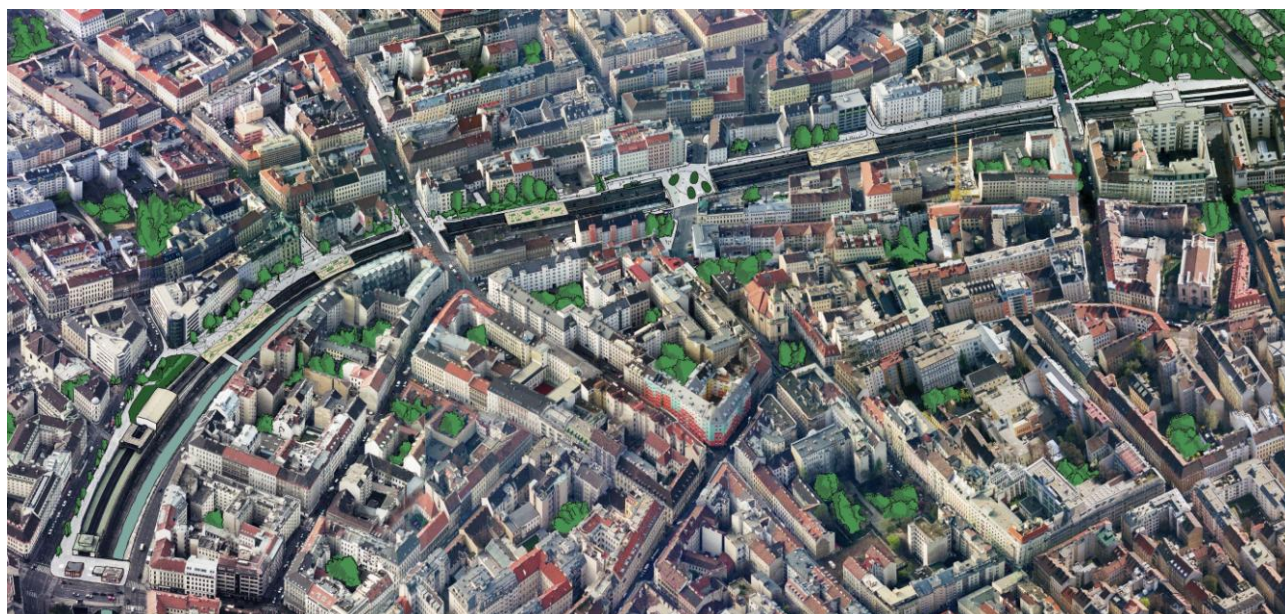
Fig. 11: Vienna Valley – selected areas of intervention – 4 terraces above the subway connect to the river

 (2) Goal: improved connectivity

A second diagram depicts the targeted improvements to connectivity. Here the special focus is on important routes, the connections of pedestrian and bike paths including those that need to be optimized, as well as the shortage of crossings over the River Wien.

(3) Goal: urban cohesion, the creation of identity

A third diagram shows a series of measures aimed at upgrading the urban mesh. Important measures proposed include improving the amount of open space available by means of parks, green areas or public squares, reduction in traffic volume, urban furniture, improved street crossings with traffic lights, individual tree planting as well as so-called info or aqua points and crossings over the River Wien.

The proposed measures were organized into those that can be implemented in the short-term, medium term or long term, as well as an approximate classification of the measures in terms of the financial expenditure they involve.

The project also proposes the conversion of traffic areas into pedestrian zones, novel connections between the districts and the river embankments, and introduces green landscaping. Thanks to the „small implementable" projects, a public space and river terraces will be realized in 2014, following and representing the overall plan.

Fig. 12: Vienna Valley – selected areas of intervention – Terrace 1, wooden deck above the subway connects to the river

Nevillebrücke/Underground station Pilgramgasse (Intervention area 9)

This intervention area is in an urban area with a high population density that is characterised by the footpath and bike path running along the River Wien. However this important traffic connection is unclear, too narrow and not adequately connected to the neighbouring urban districts.

The low amount of traffic travelling across the Nevillebrücke means that it could be closed to motorised vehicles and used as public green space. Here a proposal for a new design will be presented.

5 CONCLUSION

In order to not only conceive but also implement long-term planning projects that improve the public realm within the built-up city fabric, it has obviously become necessary to actively engage the community. But furthermore the "incremental planning" process helps to keep the public interested and heighten their enthusiasm while being able to test the ideas and readjust the plan if necessary.

The applicability of this strategy of incremental planning to similar challenges lies at hand. In times of dwindling city budgets and rising media attention authorities and planners have no longer the time to develop elaborate plans.

6 REFERENCES

City of Opfikon, Zuerich, "Zentrumsplan Schaffhauser Straße"
MA 18, Planning Departmt. of the City of Vienna, Tillner: "URBION", URBan RevitalizatION of the Vienna Gürtel, Vienna, 2000.
Tillner & Willinger, Auböck & Karasz for MA 21A: "The Vienna Valley Development Plan", Vienna, 2009
Spoorzone Delft www.mountainworks.nl

Information Around Us: Questions Connected to Information and Data Heterogeneities in Planning Activities

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1 ABSTRACT

Information, data and knowledge represent the most interesting and desired resources and commodities in the world. It relates also to spatial planning and urban planning activities as well as to development of cities. These processes are strongly connected to spatial plans but also to another types of supporting information and data such as Volunteered Geographic Information, social media, data provided by local authorities or by business subjects and last but not least information, knowledge and experience of particular users).

We (as a data experts) suppose that there is enough various information and data resources to satisfy all needs and requirements of participants of above-mentioned activities (planners, decision-makers, researchers, visitors, business subjects and citizens). In contrast to our opinion they feel a lack of information and data. Why can we see totally different views?

There are several reasons. Data sets are provided as self-standing products without a chance to interconnect independent data from various resources. All involved subjects want and need to have data and information, but they are not able to find them, because they are provided in very complicated and unintelligible form. For example the metadata and data catalogues based on metadata are mainly focused on experts or computers and not on common users. Similarly the conditions of using (licences, digital rights management) are also connected to expert terminology and usage. Users are confused by a quality and reliability of data and information (e.g. the latest problems related to a quality of some map products in mobile navigation systems).

Current research in the field of processing and distribution of data and information is focused on technological aspects (e.g. implementation of standards or data models). But typical users do not need sophisticated and complicated solutions, but intelligible and understandable products. For example they do not use the large possibilities of connection of web services and support of standards. They need to have connected useful and reliable data and they are not interesting in processes and technologies running in the background.

The low attractiveness is the latest factor of "inaccessibility" of information and data connected to spatial planning and urban development. Except above-mentioned orientation to technical solution it means ways of presentation and publication. Information and data producers prefer raw data (tables, database queries) instead of processed data and information (maps, graphs, infographics) connected with approaches of data journalism.

Goals of this paper are not only to show general questions related to information and data exploitation in the contemporary cities (that are indicated in previous paragraphs). We would like to present simple case study indicating some solutions. The case study covers a proposal of list of necessary harmonization and integration steps and examples of data integration and presentation to provide local information for citizens.

2 INTRODUCTION

Information, data and knowledge with spatial component represent the most interesting and desired resources and commodities in all levels of spatial planning and urban planning activities as well as in development processes of regions, cities and municipalities. These processes are strongly connected to spatial plans but also to another types of supporting information and data, including Volunteered Geographic Information (VGI), crowdsourcing activities and data provided as results of international of global activities.

We (as a spatial data experts) suppose that there is enough various information and data resources to satisfy all needs and requirements of participants of above-mentioned activities (planners, decision-makers, researchers, visitors, business subjects and citizens). In contrast to our opinion they feel a lack of information and data.

The heterogeneity of data is one and very important reason. The research in projects such as Humboldt, Plan4all, Habitats or Plan4business have been focused on technological aspects of processing and

distribution of data and information (e.g. implementation of standards, formats conversion, INSPIRE complience or data models). The main goals of this paper are not only to show general questions related to information and data exploitation in the contemporary cities and regions (they are mentioned for instance in Cerba et al., 2012a and Cerba et al., 2012b). We would like to present simple case study based on interconnection of three data sets indicating some solutions. The case study covers data description, a proposal of list of necessary harmonization and integration steps and examples of data integration and presentation to provide local information for citizens.

This paper is composed of four parts. The first (Introduction) is focused on presentation of different view of amount of accessible spatial data. In the second section (Data Sets) the three data sets mentioned in next part are introduced, including their properties important from the view of data harmonization. The third section ()Harmonization describes selected case study of harmonization of spatial data of themes "land use" and "land cover". The last part (Conclusion) summarizes results of harmonization and proposes new steps that can improve the harmonization effect and usability of data.

3 DATA SETS

Our case study developed in the Plan4business[1] and Habitats[2] projects has worked with three main data sets. All these data are free accessible and could be used for collecting information about "land use" and "land cover". Therefore they are important from the view of planning activities above all in regional level or in cross-border areas without any other consistent data set.

	CLC (version 2006)	UA	OSM
Coverage	EU states + European Free Trade Association (EFTA) + states Turkey,	EU Large Urban Zones with more than 100.000 inhabitants	Global
Theme	Land use / land cover	Land use / land cover	All spatial features
Provider	European Environment Agency	European Environment Agency	OpenStreetMap Foundation
Geometry	Areas (in vector version)	Areas	Points (nodes), lines (ways), areas(or polygons as closed ways)
Nomenclature	CLC nomenclature; three-levels hierarchy containing code numbers and explanations	CLC nomenclature; four-levels hierarchy containing code numbers and explanations	Tag containing key (type of element) and value (detail specification of key)
Original format	GeoTIFF	ESRI shapefile	.osm (XML based format)
Granularity	100 m resolution	100 times higher than CORINE land cover	Depend on each contributor
Updating / Last version	Temporal coverge: 2006; Last upload 7 May 2012	Temporal coverge: 2005-2007; Last upload 28 May 2010	Every day (but not systematic, it depends on an activity of particular contributors)
Download	http://www.eea.europa.eu/data-and-maps; including seamless vector versions in ESRI shapefile format	http://www.eea.europa.eu/data-and-maps; ZIP archives containing ESRI shapefile data	http://wiki.openstreetmap.org/wiki/Download; including links to external sources containing ESRI shapefile data
Licence	EEA standard re-use policy: unless otherwise indicated, re-use of content on the EEA website for commercial or non-commercial purposes is permitted free of charge	EEA standard re-use policy: unless otherwise indicated, re-use of content on the EEA website for commercial or non-commercial purposes is permitted free of charge	Open Data Commons Open Database License (data); Creative Commons CC-BY-SA (maps)
Level of Open Data (5 star deployment scheme for Open Data)	**	**	***

Table 1: Comparison of the main attributes of CLC, UA and OSM.

CORINE Land Cover (CLC; CORINE land cover, 1995) is probably the most known "land cover" (as well as "land use") data set and classification system in Europe. The project CORINE (Coordination of Information on the Environment) was realized in Europe in years 1985-1990. It was focused on collecting, coordination and ensuring of high-quality information on environment and natural resources. The regular updated database is managed by EEA (European Environmental Agency). The CLC nomenclature is composed of 44 classes that are divided into three levels. The CLC system was extended in many another

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[1] http://www.plan4business.eu

[2] http://www.inspiredhabitats.eu

projects – in the paper (Feranec & Oťahel, 2004) is described the 4th level of CLC and the document (Kopecká, 2006) mentions the 5th level at that.

Urban Atlas (UA) data set provides reliable, inter-comparable, high-resolution land use maps for 305 Large Urban Zones and their surroundings (more than 100.000 inhabitants) for the reference year 2006. It is published by EEA. Urban Atlas uses the classification that is very similar to CLC, but in some categories (e.g. natural landscapes) is simplified, while categories describing artificial surfaces are more detailed. (the paragraph is based on Meirich, 2008 and Urban Atlas web page)

OpenStreetMap (OSM; http://www.openstreetmap.org) represents one of the most typical example of neogegraphy and Volunteered geographic information. The data are not focused on "land use" and "land cover" in the first place. But OSM contains many elements related to both above-mentioned themes (e.g. forest, waters). More information about OSM and another project based on OSM are found in the web page of the project or in the paper Hackly & Weber, 2008.

The table 1 summarizes main attributes (coverage, type of geometry, formats or links to download) of above-mentioned data sets. The last row contains the classification of data sets according five star deployment scheme for Open Data suggested by Tim Barners-Lee. Two stars means using of open licence (we consider the EEA rules as "open") and providing structured-data. The third star label using of non-proprietary format.

4   HARMONIZATION (UA A CLC A OSM)

The harmonization of spatial data of CLC, UA and OSM data sets is based on general principles of spatial data harmonization (see Cerba et al., 2012a, Cerba et al., 2012b). They come out of the statement that data represents just a limited model of real world and therefore the efficient spatial data harmonization has to be composed of particular harmonization steps that process particular properties of data such as spatial reference systems, portrayal rules or data models (an overview possible harmonization steps in figure Data harmonization components in D2.5, 2007).

All harmonization steps follow the first main and the most important task – why do we need harmonize? There are several reasons for the case study presented in this paper. CLC is complete (it covers most of Europe). But it is not very detailed and frequently updated. UA is more detailed but it provides isolated data (not complete coverage of interest area, but only densely populated regions). Similarly to CLC the UA is quite old. OSM is regularly updated, but this data set has with different quality (including low granularity and missing elements). Exploitation of benefits of all three data sets represents the real reason for harmonization. Users should be able to find the best information about "land use" and "land cover" themes without regard to original data.

In the next paragraphs we follow selected harmonization steps that are important from the point of view of harmonization of CLC, UA and OSM (above all information about "land use" and "land cover" as a reference data of spatial planning). Harmonization of conditions of usage arise from licences (see Table 1). The CLC and UA data sets are based on EEA standard re-use policy, that enables re-use of content on the EEA website for commercial or non-commercial purposes is permitted free of charge unless otherwise indicated. OSM is licensed by two different ways – maps by Creative Commons CC-BY-SA (it means users are free to copy, distribute and transmit the work, to adapt the work and to make commercial use of the work; they must attribute the work in the manner specified by the author or licensor and distribute the resulting work only under the same or similar license). The OSM data uses the Open Data Commons Open Database License. It has similar approach – to keep an attribution and share-alike.

All three data sets are connected to European space, but except OSM they do not cover complete Europe. CLC and UA include countries cooperating with EEA, moreover UA does not represent continuous coverage. Therefore the following course of advance of harmonization has been suggested:

(1) To take CLC as fundamental data set.

(2) To add UA objects that are not a part of CLC data.

(3) To replace these CLC objects with UA objects that cover or overlap original CLC data.

(4) To decide if OSM data in particular areas are suitable to an accuracy improvement of combination of CLC a UA data.

(5) To add OSM objects in the same way as UA data (see points 2 and 3). There is established the wiki project transforming CLC data set to OpenStreetMap[3], including nomenclature.[4]

(5) Because the CLC nomenclature is the most detailed, the UA and OSM classification should be transformed to CLC classes.

The process of harmonization will be consisted in following steps:

(1) Development of common data model – a minimal variant has to contain geometry, an id and a nomenclature code (CLC), extended model can include for example original code or another attributes.

(2) Transformation of OSM elements (ways and closed ways) to polygons to have one geometry. This step will be realized by a GIS (Geographic Information System) tool.

(3) Harmonization of classification codes – this activity could be implemented by a matching table. There is also an advanced solution based on ontology (describing particular nomenclatures, their components, properties and relations) and an ETL (Extract-Transform-Load) tool, that enable to transform source data to common data model, including changing classifications. The rules of classification transformation will be derived from ontology (more information about this approach in Cerba, 2011).

Another technical solution of proposed harmonization process could be based on application of spatial databases. This approach is very fitting for large data set, that could be processed very effectively. Databases enable to implement the majority of above-mentioned harmonization steps (e.g. transformation of nomenclatures or changing of data models). More about spatial data harmonization based on databases as well as another approaches to harmonization are published in Cerba et al., 2012a.

5 CONCLUSION

This paper shows the essential principles of spatial data harmonization in the case of integration three data sets (CLC, UA and OSM) that contain information of themes "land use" and "land cover". These types of information are important for many human activities including spatial planning or regional development. These data sets are also illustrative of example of sufficient amount of data that could be felt as apparent shortage because of difficult way of possibilities of data integration and combination.

The real harmonization (presented in this article) represents a sequence of simple harmonization steps depending of spatial data aspects that have to be harmonized. Just a design of the whole harmonization process (including particular sub-steps and their parameters) means the key (and usually underestimated) part of the spatial data harmonization and integration. It is connected to essential question – What is the target and meaning of concrete harmonization?

In the introduction there is mentioned a feeling a lack of information and data by real users and providers of spatial planning activities. The spatial data harmonization (as the main topic of this research) does not represent a final solution of this problem. There are another reasons lack of information and data. (1) Data sets are provided as self-standing products without a chance to interconnect independent data from various resources. (2) All involved subjects want and need to have data and information, but they are not able to find them, because they are provided in very complicated and unintelligible form. For example the metadata and data catalogues based on metadata are mainly focused on experts or computers and not on common users. (3) Similarly the conditions of using (licences, digital rights management) are also connected to expert terminology and usage. These reasons do not represent the scope or this paper, but a subject of following research. (4) Spatial data problems can include also a transformation to KML (Keyhole Markup Language) format instead of using of very complicated GML (Geography Markup Language) format for spatial data storage or (5) links to semantic tools such as controlled vocabularies, gazetteers or thesauruses. The next research in the field of making spatial data more accessible to common users can be focused on an (6) improvement of the low attractiveness which is the last (but not least) factor of "inaccessibility" of information and data connected to spatial planning and urban development. Except above-mentioned orientation to technical solution it means various ways of presentation and publication. Information and data producers prefer raw data (tables, database queries) instead of processed data and information (maps, graphs, infographics) connected with approaches of computer graphics (including 3D objects) and data journalism.

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[3] http://wiki.openstreetmap.org/wiki/WikiProject_Corine_Land_Cover
[4] http://wiki.openstreetmap.org/wiki/Corine_Land_Cover

6 REFERENCES

CERBA, Otakar: Ontologie jako nastroj pro navrhy datovych modelu vybranych temat priloh smernice INSPIRE. Dissertation, Univerzita Karlova v Praze, 2011.

CERBA, Otakar, JEDLICKA, Karel, CHARVAT, Karel, JEZEK, Jan, JANECKA, Karel, MILDORF, Tomas: The Overview Of Spatial Data Harmonisation Approaches And Tools. In Proceedings Vol. 1. 4th International Conference on Cartography and GIS, Albena, 2012. ISSN: 1314-0604.

CERBA, Otakar, JEDLICKA, Karel, CHARVAT, Karel: Ontologies and ETL Tool in Free Spatial Data Integration. In GeoCart'2012 and ICA Regional Symposium on Cartography for Australasia and Oceania, Auckland, 2012. ISBN: 978-0-473-22313-7.

CORINE land cover. Commission of the European Communities, 1995.

Drafting Team "Data Specifications" – deliverable D2.5: Generic Conceptual Model. Drafting Team "Data Specifications", 2007.

FERANEC, Jan., OTAHEĹ, Jan: The 4th Level CORINE Land Cover Nomenclature For The PHARE Countries. In Developments in strategic landscape monitoring for the Nordic countries. Groom, G. (ed.). Nordic Council of Ministers, Copenhagen (Dánsko), 2004. p. 54-63.

HAKLAY, Mordechai, WEBER, Patrick: OpenStreetMap: User-Generated Street Maps, In Pervasive Computing, IEEE , vol.7, no.4, pp.12-18, Oct.-Dec. 2008.

KOPECKÁ, Monika: Identifikácia a hodnotenie zmien krajiny vo veľkej mierke (na príklade okolia Trnavy) . In Geografický časopis, roč. 58, č. 2, 2006. s. 125-148. ISSN 0016-7193.

MEIRICH, Susanne. Mapping Guide for a European Urban Atlas. GSE Land Consortium, 2008.

Infrastructures of Smart Platforms – Mobile Tools to Control Intelligent Networks in Dynamic Urban Space

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1 ABSTRACT

Energy and communication networks are in today's urban environment ubiquitous and are highly dynamic infrastructures. It is important for these networks to quickly respond to changes and adapt the parameters in order to be able to strive for the best possible utilization and also to satisfy the needs of the user. The aim of this paper is to show the influence of intelligent networks on users, and the integration of information via smart platforms in everyday life is examined. Smart power grids and control systems for Electric Mobility will be used as examples. Since conflicts between the optimum utilization of networks, human needs, and economic aspects, occur regularly, their interdependencies will be shown in a conflict triangle. The core function of smart networks, in addition to collecting and interpreting the information and the control of the endpoints , is to generate an optimal solution of the conflict. Hence, the features of smart grids will be worked out with special emphasis on renewable energy and electric mobile transport systems. Particular attention is paid to the information flows, which are caused by a high demand of the data source and the control of the systems at the endpoints. As a result, an assessment with regard to privacy aspects will be presented. Then the most widespread and most innovative smart grids used platforms are shown and analyzed. Criteria for the assessment of usability, transparency and efficiency of the platform will be defined and subsequently included in a utility analysis. In focus are mobile applications because of their ubiquitority. Finally, a concept of a meta-platform for centralized and simplified control of various smart networks is designed and presented.

2 INTRODUCTION

The dream of an inexhaustible source of light, heat, energy, and agility seems to be in reach in face of new technologies and developments. Renewable energy sources have the potential to provide an inexhaustible supply of energy. These sources include geothermal energy, renewable resources, hydropower, wind power, and solar radiation. The statement about the inexhaustibility of these resources is limited to the human perspective. It must be assumed that even the sun and our planet have a limited lifespan. In politics, sustainable energy and an energy revolution, is often an issue. The global initiative, "Sustainable Energy for All," attempts to connect three aims and to implement them by 2030. These aims are a universal access to modern energy services, doubling the share of renewable energy in the global energy mix, and doubling the global rate of improvement of energy efficiency [cf. SUSTAINABLE ENERGY FOR ALL OF US, 2012]. In Germany, objectives or strategies and long-term scenarios for sustainable energy policies have been developed as well. The main aspects of these scenarios are the substantial development of renewable energy (RE), the significantly increased use efficiency in all sectors, and the increased conversion efficiency. The increase of the conversion efficiency is to be realized in mutual structural and temporal interaction in all sectors of the energy industry, by further extension of combined heat and power, and the replacement of obsolete power plants (nuclear power plants) through more efficient ones [cf. BMU, 2009].

On a national level, the federal government attempts, through the Climate Change Initiative of the German Federal Ministry for the Environment, to reduce greenhouse gas emissions by 40 % by 2020 (compared to 1990) [cf. BMU, 2007:1FF]. Additionally, on an international level, the federal government attempts, through the International Climate Initiative, to support Countries with funded projects. The projects should especially help developing countries, emerging countries, and the transition countries in protecting the climate. Furthermore, hope is set in the computer and artificial intelligence (AI) and network to solve current global problems. These techniques may offer some help with the protection of the climate, climate monitoring, and in the energy industries. Just networking and knowledge by linking such networks are an important part to solve many problems of humanity. Due to the high penetration rate of networks in the population, mobile information systems can help us to connect knowledge. Mobile information systems

provide access to information resources and information services through "end-user terminals," which are mobile and whose operation is possible in almost any environment or location [cf. PERNICI, 2006:4]. Examples of these are mobile phones, netbooks, notebooks, PDAs, etc. The devices differ from each other especially in size, weight, performance, power consumption, built-in sensor technology, and usability. Increasingly, computers surround us. Often they are imperceptible or we use them unconsciously, for instance a brake assist supports driving a car or, in the household, we get help of intelligent waste disposal units. In the future, we will not adapt to the computer, but the Computer will adapt to us. These small computer systems that are incorporated into other articles, are referred to as "embedded computers," and they are highly interconnected. Literature also often speaks of "ubiquitous computing" or "pervasive computing [cf. MOSEMANN, 2009: XII]." Now, it is time to integrate these tools in the protection of the climate and in the energy industry.

3 ELECTRICITY PRODUCTION AND POWER GRIDS

The power grid consists of different parts, which are differentiated by their voltages: The transmission and distribution grid. The passage of current generates costs, which are fees for grid use and are part of the electricity price. The transmission and distribution grid operator`s range of tasks changed through the integration of renewable energy (RE): From the pure transmission and distribution "on demand" towards more balance and flexibility. In addition, the grid gains a more and more important storage function. In particular, through the feed-in of wind power there are grid shut-downs, because the existing network capacity is not sufficient to accommodate the amount of electricity produced. The wind turbines must be switched off in order to prevent damage to the grid.

Integration as such is heterogeneous: It must be distinguished between grid-related problems (smart grid) and market issues (smart market) even if the concatenation is narrow. This distinction is analogous to the categorization of the Federal Grid Agency (FNA) [cf. BUNDESNETZAGENTUR, 2011:4FF]. Due to subadditivity, the power grid has all the characteristics of a natural monopoly. After the liberalization of the electricity market, which was associated with an unbundling of vertically integrated energy producers and suppliers, various instruments of incentive regulation for grid fees were introduced by law (AregV) since 2009. Currently (2013), the revenue cap regulatory tool is applied in Germany. As part of the unbundling, the energy producers were forced to outsource their grids to legally independent companies. Since the opening of the internal market in 1998, the energy producers are forced to lead through the current from other providers, in order that the end user has the possibility to choose between different suppliers. The aim of the incentive regulation instruments is to encourage the efficiency of the grid operator, which should lead to lower grid fees. It is important to secure the availability of supply and reliability.

For this reason, there is always a quality component integrated into the various regulatory instruments, which ensures that efficiency gains, in form of cost savings, do not lead to a higher failure rate. Prior to the introduction of the renewable energy law (REL), electricity was generated on demand, which was estimated from the aggregated consumption curves of the end users. The priority purchase and transmission obligation of RE, which is derived from §4 of the REL, leads to an extension of the grid function. Additional to the pure transport function from the generation source to the customer and a guarantee to deliver the desired amount of energy at any time, great flexibility and storage function is required of the power grid because of the additional feed-in of RE. The ideal grid is able to absorb, store, and deploy any amount of electricity generated at any time. Such a grid would have to be capacitatively oversized by a multiple. This cause significant higher fees for grid expansion and, therefore, higher fees for the grid use, which would ultimately lead to higher electricity prices. At this bottleneck, the idea of the Smart Grid applies: The available grid capacity and electricity is supplied to the end user, who is able to directly control it, by purchasing energy and capacity.

Definition of a Smart Grid: "The conventional electricity grid is a smart grid when it is upgraded through communication, measurement, control and automation systems, and IT components. As a result, "smart" means that grid conditions can be recorded in "real time" and opportunities for control and regulation of the grid are integrated, so that the existing grid capacity can be fully used."

Definition of a Smart Market: "Smart Market is the area of the grid in which quantities of energy or derived services, based on the available grid capacity, are traded between various market partners [cf. BUNDESNETZAGENTUR, 2011:11]."

The challenges for the Smart Grid and Smart Market are: More coordination, more flexibility, and more innovation. Just by feeding-in fluctuant RE, the demand for grid capacity increases significantly. Greater fluctuation and the need for storage are the causes for this. In addition to grid-related means, in the form of smart grid components, it is necessary to influence production and consumption according to market signals, in order to guarantee stable grid operation. The resulting price-sensitive behavior of grid users, leads to an integration of electricity from RE into the market. Nevertheless, a wide grid extension is still necessary, but to a much lesser extent than without smart grid and smart market. Through the integration of information and communication technology into the grid, consumers have the possibility to participate in the energy markets itself. Thus, new marketplaces will emerge that differ significantly from the traditional ones.

Changes of the energy consumption could be monetarily valued and traded in order to increase grid stability. In the development of a safe, economical energy supply, which is mostly based on RE, a smart grid is not an end in itself, but rather plays a subservient role. Out of this reason, it has to be the aim to bring as many parts as possible of the grid services to the market. The allocation of competitive functions to the grid operators is not possible due to the unbundling regulations. Economically, a scenario with vertical integrated energy providers would not be desirable because of the risk of cross-subsidization of competitive areas, to the detriment of the regulated areas. This leads to distortions of competition. Occurring grid problems should mainly be solved by the market, regulatory intervention should be kept to a minimum. A good solution in the conflict between economic efficiency, consumer needs, and grid utilization has to be found. Due to the importance of energy supply and the market characteristics, a regulatory instance cannot be completely eliminated.

To generate the data, which is needed to control the power grid and the consumption, smart meters are used. These form the basis for the introduction of flexible rates and energy efficient behavior, being essentially used for the market, not for the grid. While the transmission grids in Germany are already lead intelligently, there is still space for improvement in the distribution grids. However, since there are 850 electricity network operators with completely different characteristics, it is impossible to introduce a standard. The legal provisions of ARegV require the selection of the most efficient path, taking into account the necessary grid expansion. The expansion towards smart grids is done as capital-effective as possible by means of intelligent restructuring. The technical requirements, such as the laying of fiber optic cables for the customers, are not prerequisites for the installation of smart meters. Indeed, depending on market conditions and stakeholder needs, the form of the communication infrastructure will be decided individually. The additional amount of information is not considered separately from the rest of the infrastructure, but can be integrated into the planning, because neither a special optimization for smart grids nor a particular bandwidth is necessary. It can be assumed that a low-sized broadband internet access to transport the information flows is currently sufficient. To achieve the aim of the grid capacity management in the form of the most efficient power grid usage, the market involvement for the users should be facilitated, to avoid, or respectively to reduce inhibitions. This requires constantly available instruments, which allow the users` participation in the market in a simple, understandable way. This may be ensured by programs, or mobile applications (Apps).

4 ELECTRIC MOBILITY

The expansion of electric mobility in combination with RE is considered to be strategically important by the federal government of Germany. The reduction in carbon dioxide (CO_2) emissions and the dependence on fossil fuels are the crucial reasons. Additionally, the German supremacy in the automobile sector should be maintained and strengthened. Electric mobility was identified as an essential element on the way to a sustainable energy supply and the introduction of electric vehicles will take place in several phases, which are designed by the political framework and the interaction of global and local operating participants [cf. DIE BUNDESREGIERUNG, 2009:4FF].

By incorporating batteries into the power grid, the grid stability can be increased in the long term. This is becoming more and more important. Smart charging systems contribute to the load management besides the additional energy demand. A constant load curve can be generated by an increased absorption in production peaks. In medium term, there will be the option of providing control energy.[1] With the ability to store the

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[1] Control energy serves to compensate unforeseen fluctuations in current demand. The batteries of smart vehicles are able to provide control energy.

absorbed energy and release it again into the grid, electric mobility affects the whole concept of RE in a positive way. In the future, the forms of mobility, especially in conurbations, will change. They will adapt to the needs of the residents of metropolitan areas. However, these changes must offer economic advantages and an increase in the perceived quality of life. Thus, the ownership of a vehicle is emotionally important for many people [cf. DIE BUNDESREGIERUNG, 2009:9].

In the first phase of the grid integration, the charging of electric vehicles will still be vehicle sided. Capacity bottlenecks are avoided due to the vehicle's intelligent control of the charging process, which takes place during off-peak times. In the second phase of the grid integration, the vehicle's battery can also function as a grid storage component with the possibility of back-feeding energy. In this stage, additional power capacity is needed due to the increased number of vehicles. The use of smart grids is necessary for the equalization of load curves, since they help to avoid inefficient utilization of power stations and grid utilization, and the reduction of the power station`s control and reserve capacity. Since 2008, the research program "E-Energy: ICT-based energy system of the future" of the federal government of Germany, whose aim is to test new concepts for digital energy grid systems and market relations, is being tested in six regions [cf. DIE BUNDESREGIERUNG, 2009:21FF].

Information and communication techniques are used for the accounting of the loading and unloading of electric cars, which communicate the data generated by smart meters through networks. These mechanisms serve both, the individual needs of users and the grid-sided coordination. Not all interests can be satisfied to the same extent at all times. Appropriate priority-based conflict resolution mechanisms need to be established where the grid stability and security of supply must be guaranteed. Mobile applications are ubiquitous helpers for the users to acquaint themselves with costs and amounts and control over the flexible pricing of their own consumption within their individual preference.

5 CONFLICT TRIANGLE

The conflicts between the needs of users, the optimal grid utilization, and economic aspects of electricity generation can be represented in a conflict triangle (Fig. 2). The user needs to get any amount of energy at a reasonable price at any time, especially during times of high demand. Through the aggregation of numerous private and commercial consumer demands, one can observe an equalization of load peaks, but they are nevertheless significant. Demand peaks are mainly in the morning from 7am to 8am, around noon, and from 6pm to 8pm. Minima are usually between 2am and 4am in the morning. To guarantee security of supply, large over capacities need to be kept ready on generation and supply side. Additionally to the needs of an affordable energy supply and security of supply, environmental awareness has been added in the last years. This includes interest in the origin and generation of electricity, an awareness of energy conservation, as well as an increasing price consciousness. These, partially new emerged, customer needs are supplemented by the claim for more comfort. Smart grids bear, on the one hand, the new user needs; on the other hand, they reduce overcapacities in supply and generation and facilitate the integration of RE.

An appropriate solution for the control of smart grids is offered by software solutions with user-friendly graphical interfaces, which are ubiquitously usable in the form of mobile applications. They offer the user a permanent overview of consumption and prices as well as a way to control their feed-in of current. Looking at the power supply of a fictitious operator, which consists of various types of power plants, the marginal costs of production per kilowatt hour (kWh) emerge in the following ascending order: nuclear power plant, lignite power plant, hard coal power plant, gas and steam power plant, gas turbine power plant, oil-fired power station. According to the merit order effect, the power plants are activated in ascending order of their marginal costs and according to their physical and operational characteristics, when demand increases. Thus, gas turbine and oil power plants have extremely short reaction times and can respond to needs very fast and flexible, but weeks and months are needed to regulate nuclear power plants. The last activated, and regarding the marginal cost most expensive power plant, determines the price of electricity for the entire quantity sold. In consequence, for power plant operators it is of major economic interest to sell their electricity during peak load times. Since the introduction of the REL, there is an obligation for priority supply of renewable energy. Therefore, RE will be fed-in regardless of their marginal costs. On average, the use of the most expensive types of power plants becomes increasingly rare, so the producer surplus is consequently reduced as a consequence of the law [cf. SENSFUSS, 2011:3]. This situation is not marked-based, because RE are fed-in with priority, not in order of their marginal production costs. Only through the integration of the external

effects of the conventional current production, RE are competitive. This observation refers to the average marginal cost per kWh of renewable electricity. In individual cases (hydroelectric and wind power) RE are competitive with cheap conventional alternatives. Externalities such as air pollution or the long term consequences of nuclear power plants can hardly be measured monetarily. Thus, the internalization of externalities is just vague and speculative. The capacity and infrastructure of transmission and distribution grid must be designed so that the needs of the customers are covered at all times. Ideally, the power supply can also take up the energy generated at any time. If the share of RE increases, this is more and more difficult, for instance due to the high volatility of fluctuating energies like wind. To protect the grid from overloading under certain weather conditions, the plants must be taken off the grid. The tasks of the power grid are increasingly in transition: From a transmission medium, purely driven by demand, into an intelligent infrastructure, which determines market prices for the existing grid capacity and to adapt the demand to the offer. Without this coordination function significant power overcapacities would be feed into the grid, which would cause higher electricity prices for the costumers. A smart grid leads to a reduction of overcapacities and a better integration of RE. The core functions of stability and availability with minimal downtime, must remain unaffected by this paradigm shift.

6 PRIVACY ASPECTS

In the context of smart metering, detailed and finely granular data of the energy use of customers is gained. The data will be used to equalize peak loads and to optimize the utilization of grids and producer capacities, and therefore the costs. Due to the broad and highly detailed data base an accurate profile of individual households and persons, which contains personal and sensitive private data, can be created. In this context, data privacy considerations have to be done. By law, all Member States of the European Union are obliged to introduce smart grids and smart meters [cf. EUROPÄISCHE UNION, 2009].

Germany started with these measures in 2011 as part of the amendment of the Energy Act. The resulting data are worthy of protection, because of their high sensitivity. For this reason, the European Commission published appropriate recommendations to protect privacy in March 2012 [cf. EUROPEAN COMMISSION, 2012].

The constitutional inclusion of the right to informational self-determination results from Article 2 paragraph 1 of the German Constitution (GG), in conjunction with Article 1 paragraph 1 GG. The principles are purpose limitation, data prevention, transparency, data sovereignty of the individual, data security, and "privacy by design." Smart meters only collect the data which is necessary for purposes of §21.1 German Energy Act (EnWG). Data processing systems shall be designed in a way that as little as possible personal data will be gathered and the reading intervals should be large. The data has to be aggregated and made anonymous, as far as it does not circumvents the original purpose. The data generation is expected to be at the end-user side and not at an external processing point so the number of data access points is minimal. The end-user should be informed of the nature and use of the smart meter data and he or she has enforceable claims for cancellation, change, and contradiction at all times. In order to comply with the requirements of the right to informational self-determination, the collected person-specific data may be solely processed under the control of the person concerned. Specific technical mechanisms have to be implemented, allowing the end-user to control all available data. Technical and organizational measures should be taken to prevent the misuse of the data. Standards must be established that provide the necessary protection and control options to the consumer [cf. KONFERENZ DER DATENSCHUTZBEAUFTRAGTEN DES BUNDES UND DER LÄNDER UND DÜSSELDORFER KREIS, 2012:5FF].

Depending on the granularity and time intervals, it was measured by current studies that 15-minute-intervals are sufficient to determine when people stay at home, and whether they eat or sleep [cf. MOLINA, 2010]. Investigations, in which a smart meter of the company Discovery GmbH has been tested (results were obtained in August and September 2011, the measured distances were two seconds) confirmed that. It was possible to extract the activities of refrigerator, water heater, geyser, kitchen appliances, washing machine, TV, lamp, and stove from the consumption profiles. Especially, by the power consumption of the TV, the TV, the exact determination of light and dark sequences can be identified, and, by this, even the watched film.

To read-out of the pattern of the total consumption profile was possible without great technical effort. This leads to the conclusion that from a large data set the recognition of a predefined audio-visual content is

possible. The users' power consumption data could also be used for finding copyright protected material. The comparison of the pattern of consumption profiles with a corresponding database data could identify law violations [cf. DAPRIM, 2011:1F]. This example shows the scope of collection and analysis of consumption data. To avoid a development towards the "transparent consumer," appropriate technical measures must be implemented. For this, the profiles need to be made technically fuzzy, or aggregated and made anonymous to a certain level.

7 MOBILE APPLICATIONS FOR SMART GRID DEVICES

Various mobile applications for smart home and smart mobiles are examined on the criteria of functionality, usability, transparency and efficiency. They were weighted and supported by sub-criteria, which were evaluated (Fig. 1, Tab. 1).

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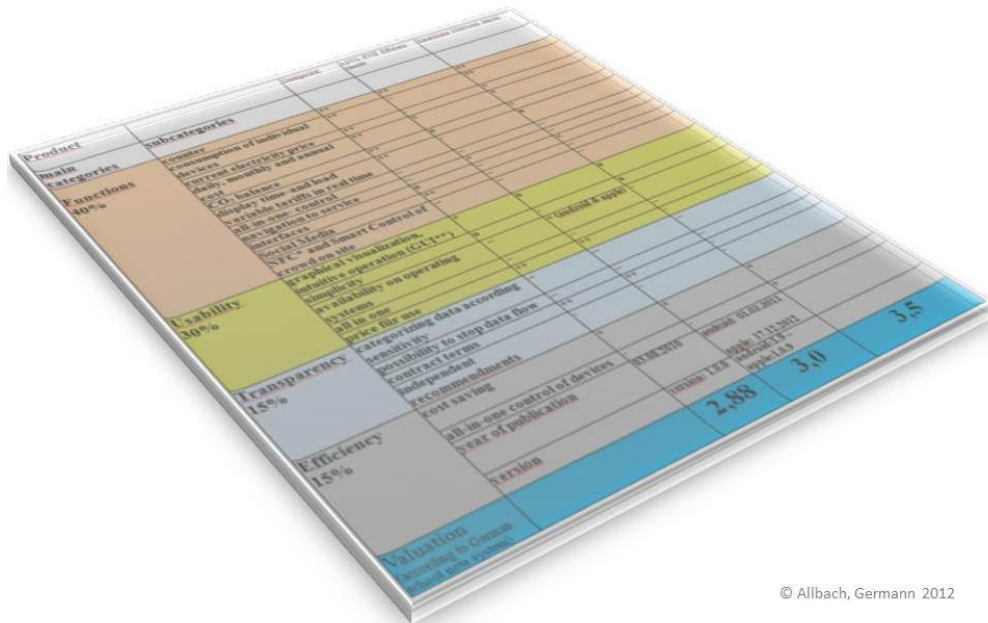
Fig. 1: Use Mobile apps to control smart devices and vehicles (Extract!).

valuation	School note	meaning
++	1	The component or function meets all the requirements in their entirety or beyond
+	2	The component or function meets the most important requirements entirely
o	3	The component or feature satisfies the key requirements to a satisfactory extent
-	4	The component or feature has significant deficiencies
--	5	The component or function does not meet the requirements

Table 1: Valuation scheme.

It was noticeable that none of the programs which were analyzed had the opportunity to control all intelligent devices, including electric vehicles. Instead, there were some standard functions, such as counter and overview of costs, which worked out well in general. As a result, the use of multiple applications is required in order and to control the whole, with smart technology equipped home and the electric vehicles. The lack of coordination among the components makes the use difficult and can discourage potential users. Another common feature was the fact that many of the apps were downloaded for free, but the access to the service has to be paid. There is also a lack of transparency. The pricing is confusing and complex in itself. An extensive test was complicated since a contract had to be completed with the electricity supplier to obtain access and to test the application. Under data protection aspects, the installation of apps is disputable. Therefore, some programs require full access to Internet, phone book, and the cell phone's memory card.

Mobile devices already have useful features and a rudimentary ability to conduct a kind of "Urban Sensing." Unfortunately, this is only available for the purchaser's own internal use of the mobile telecommunication companies. By CDRs (Call Detail Records), which are gathered of each SMS (Short Message Service) or of

every call, additional data is gained. It is possible to determine the position of every CDR with an inaccuracy of one kilometer. From the recorded data conclusions about the distance traveled were gained. It was further found that, for example, residents of Manhattan had covered only 2.5 miles per day, as opposed to the residents of Los Angeles, which moved five miles per day. The data is not 100 % accurate, but it shows clearly how much this information could bring to city and energy planners. [cf. SIMONITE, 2010]. This data can be also used to optimize the schedules of carsharing-concepts and to control the devices in the smart houses. Mobile device applications act as coordinator between the supply and demand for network capacity, transport infrastructure and energy consumption (Fig. 2). A future use of Near Field Communication (NFC), Smartphones, and a meta-app could, besides paying and buying tickets, serve to steer users currents. Examples are users (e.g. at a bus stop) who want to travel by public transportation, carsharing, or ridesharing. The app would allow them to group together and use the available transport possibilities. Social, economic, and environmental benefits can be gained by connecting the interfaces to various social media platforms.
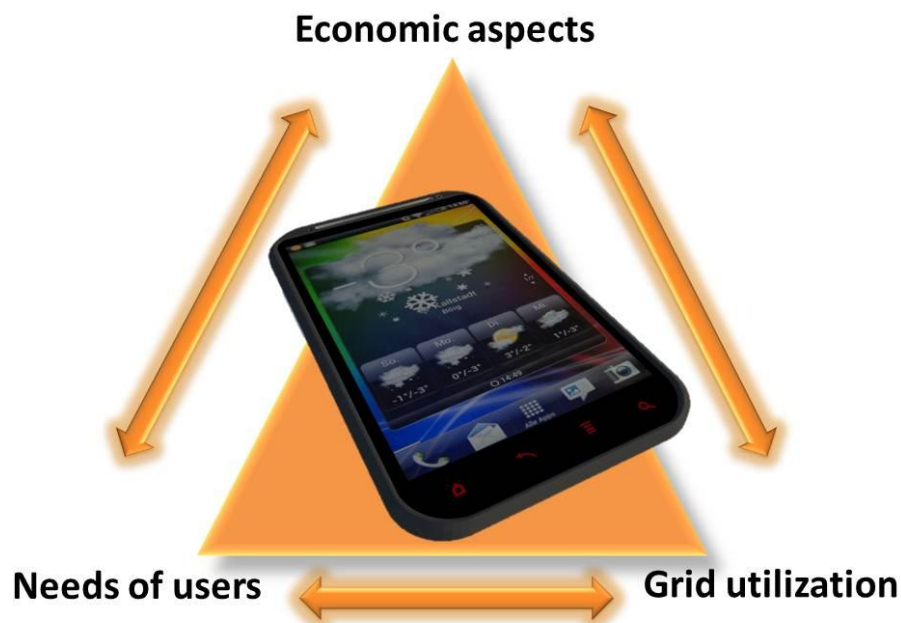
Fig. 2: Conflict triangle with smart phone and meta-app as coordinator.

A meta-app for smart grid devices has to meet various technical and content requirements:

- Stability
- Security
- Provide interfaces
- Standardization
- Always online
- Semantic analysis
- Usability
- Modularity
- Scalability
- Storage capacity
- Simplicity
- Expendability
- All-in-one solution

The meta-application has to be easy to use for all user groups-even old people with only little technical knowledge should be able to use it. Usability is a key criterion for a successful market introduction of such a project. Only if it is easy to understand, to configure and to use, people can explore the benefits of the program. These benefits consist of cost savings, more comfort, and social aspects like a good environmental consciousness. It is also important to offer the user the possibility to share his opinion und data via the Social Media platforms. It can also be considered to integrate an own Social Media platform into the app. A standard for an interface has to be definedin order to guarantee a smooth exchange of the different data types. It has to be ensured by the the meta-app that the sensitive private data cannot be abused. This can be done by a secure transmission with encoding and an integrated firewall. The app should consist of different modules, which can be chosen by the user to adapt to his or her individual needs. A semantic analysis can be used to interpret the user`s behavior and to recommend and inform the user about new offers, developments and laws. Despite an analysis tool, persistent storage must be provided for this function. To keep the storage scalable and always available, the data can be stored in online clouds which are independent of devices or locations.

The most important function of the meta-app is the unique selling proposition: The all-in-one-solution. It has to be extendable and flexible to react to new developments in energy market, technology, and society. This seems to be the only possibility that users will accept such an application as omnipotent control tool for their smart homes, devices, and vehicles.

8   CONCLUSION

Through the energy revolution and integration of RE, society faces significant challenges. Awareness of energy saving, environmental protection, and generational responsibility must be strengthened. These changes must be as economically efficient and as convenient as possible to overcome resistance. Without tangible benefit, monetarily, social and legal incentives, it will fail to perform a complete change in the responsible use of resources and capacities. Goods, such as current and grid capacity according to their timing and quantity of availability, will receive a market price and will thus be tradable. Smart power grids, the intelligent control device, and electric cars are essential to master a successful energy revolution. Modern ICT collects data, transmits it via the Internet, evaluates them, and serves for coordination and allocation. The Internet owes its success to the principle "keep it simple and smart." It offers information and communication possibilities to almost everyone. Nobody is excluded per se. This must also be the basic idea for smart grids, smart devices, and cars. A system that is to be successfully established in the market must, in all its complexity, be easily accessible and invite to participate. The implementation of the system implies an immense need for coordination, for which the current infrastructure is sufficient. However, the use for consumers must be as easy and comfortable as possible. This can be realized through mobile apps, respectively a meta-app, which handles all the tasks and the control and coordination of intelligent structures.

The ideal meta-app is modular, scalable, compatible and adaptive to individual needs, drives all smart devices of a user, is safe and intuitive to use, and produces a noticeable benefit (e.g. economically or climate change). It is a critical fact that smart devices and apps still have significant gaps in data protection. This has to be corrected by far-reaching legislative requirements to prevent a possible refusal of the users. The technological gap between developing countries and the modern ICT society becomes increasingly larger. The countries with lower economic standards have no access to smart technologies. It is essential to integrate these regions to reach global climate change aims. This must be institutionalized through agreements between governments. On the production side, cost reductions and compatibility can be realized through mass production and standardization. Under the given market conditions and with focus on the needs of the users, apps could serve to adjust the energy consumption by a significant degree of the production and to relieve the grids, as well as to avoid over capacity and bottlenecks in grid and current production. Ultimately, mobile apps to control smart components accelerate this development. They make sure to shape the energy revolution faster, more economical, more efficient, and comfortable, thus, they make a contribution for saving energy and an economic, secure, and sustainable power supply.

9   REFERENCES

BMU, Klimaagenda 2020: Der Umbau der Industriegesellschaft. 2007. [Internet: http://www.bmu.de/fileadmin/bmu-import/files/pdfs/allgemein/application/pdf/hintergrund_klimaagenda.pdf].

BMU: Langfristszenarien und Strategien für den Ausbau erneuerbarer Energien in Deutschland unter Berücksichtigung der europäischen und globalen Entwicklung. 2009. [Internet, URL: http://www.erneuerbareenergien.de/files/pdfs/allgemein/application/pdf/leitszenario2009_kurzfassung_bf.pdf].

BUNDESNETZAGENTUR: Smart Grid und Smart Market, Eckpunktepapier der Bundesnetzagentur zu den Aspekten des sich verändernden Energieversorgungssystems. 2011. [Internet, URL: http://www.bundesnetzagentur.de/SharedDocs/Downloads/DE/BNetzA/Sachgebiete/Energie/Sonderthemen/SmartGridEckpunktepapier/SmartGridPapierpdf.pdf?__blob=publicationFile].

DAPRIM, Fachhochschule Münster: Hintergrund und experimentelle Ergebnisse zum Thema „Smart Meter und Datenschutz". 2011. [Internet: http://www.its.fh-muenster.de/greveler/pubs/smartmeter_sep11_v06.pdf].

DIE BUNDESREGIERUNG: Nationaler Entwicklungsplan Elektromobilität der Bundesregierung. 2009. [Internet: http://www.bmbf.de/pubRD/nationaler_entwicklungsplan_elektromobilitaet.pdf].

EUROPEAN COMMISSION: Commission Recommendation of 9.3.2012 on preparations for the roll-out of smart metering systems. 2012. [Internet: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:073:0009:0022:EN:PDF]

EUROPÄISCHE UNION: Richtlinie 2009/72/EG des europäischen Parlamentes und Rates vom 13. Juli 2009 über gemeinsame Vorschriften für den Elektrizitätsbinnenmarkt. 2009. [Internet: http://eur lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:211:0055:0093:DE:PDF].

KONFERENZ DER DATENSCHUTZBEAUFTRAGTEN DES BUNDES UND DER LÄNDER UND DÜSSELDORFER KREIS: Orientierungshilfe datenschutzgerechtes Smart Metering. 2012. [Internet: www.datenschutz.hessen.de/download.php?download_ID=254].

MOLINA, Markham et al: Private Memoirs of a Smart Meter. Proceedings of the 2nd ACM Workshop on Embedded Systems for Energy Efficiency in Building, 2010.

MOSEMANN, Heiko, Kose, Matthias: Android. Hanser Verlag, München Wien, 2009.

PERNICI, B.: Mobile Information Systems. Springer-Verlag, Berlin, Heidelberg, 2006.

SENSFUSS, Frank: Analysen zum Merit-Order Effekt erneuerbarer Energien. 2011. [Internet: http://www.erneuerbare-energien.de/fileadmin/ee-import/files/pdfs/allgemein/application/pdf/meritorder_bf.pdf].

SIMONITE, Tom: Mobile Data: A Gold Mine for Telcos. 2010.

SUSTAINABLE ENERGY FOR ALL OF US. 2012.
[Internet: http://www.sustainableenergyforall.org/about-us] article. In: Title of the Periodical, Vol. 47, Issue 5, pp. 123-456. Vienna, 2009].

Interactive Simulation of Urban Environments over Time with Respect to Human Values

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1 ABSTRACT

The private and public sectors try to expand the scope of decision-making In return for a reduction of uncertainly concerning the decision- making environment. In many cases, neither planners nor citizens have sufficient information about how the various alternatives will play out over the long term and This represents a gap in informed decision making. Sophisticated urban simulation models can support such analyses by predicting the long-term effects of alternative policies. Again a simulation approach may be used to help professional as well as participant planners in learning about the problems they are facing and the available methods for dealing with them, and In providing relevant information about the external environment. But data is not the only element of effective democratic decision making. In a democratic society, public deliberation by citizens and their elected representatives must precede such major decisions. While urban simulation systems have been investigated for many years, do not simulate detailed interactive aspects. Instead, they use regular grids as spatial data structure. To better support the use of urban simulation systems in public deliberation, it is intended to design tools to support urban planners, citizens, and other stakeholders in their interaction with today urban indicators. The development of these tools is guided by Value Sensitive Design, theoretically grounded approach to technology design that accounts for human values throughout the design process. It is intended to introduce a simulation system for 4D cities that can simulate interactive three-dimensional urban environments over time. The main novelty of this research is that it does not rely on land-use simulation on a regular grid, but instead present a complete and inherently interactive simulation that includes visualizing alternative futures of urban environments as change over time. To meet these goals, technical documentation designed, indicator perspectives and household indicators are refined to help a variety of stakeholders, planners, modelers and citizens.

2 INTRODUCTION

Regional officials, urban planners, and citizens must grapple with issues such as traffic jams, resource consumption, and urban sprawl. Decisions about new freeways, transit service expansion, or land-use regulations are often controversial and expensive, with long-term consequences. Simulation is a technique for representing the workings of a complex system such as the governmental activities of a large city or the total economy of a multi-county region. Planning applications of simulation models will vary with the style of planning. Simulation models provide scenarios and projections of what is likely to happen. In policy planning limiting factors in local and regional change are identified and alternative approaches for moving away from an unsatisfactory social or economic situation are devised and tested.

Decision-makers must attempt to understand how different alternatives might affect land use, transportation, and environmental impacts over the next several decades. Without carefully considering longterm effects, the chosen alternative might lead to the exact opposite of the original goal. Because these decisions will affect the entire region for many years, it makes sense to inform decision making with long-term analyses that are as accurate as possible. Sophisticated urban simulation models can support such analyses by predicting the long-term effects of alternative policies. But, in regarding to the effective democratic decision making in a democratic society, in addition to providing accurate information, a design goal for an urban simulation system should also be able to facilitate public understanding and citizen engagement.

Participant planning refers to community forms of decision making which can involve neighborhoods, cooperatives or voluntary organizations. Spatial contiguity of individuals in the participant style of planning is an important, though not necessarily essential, requirement. Again a simulation approach may be used to help professional as well as participant planners in learning about the problems they are facing and the available methods for dealing with them, and in providing relevant information about the external environment. Value Sensitive Design is a theoretically grounded approach to technology design that

accounts for human values, such as privacy, fairness, and democracy, throughout the design process. The method has three key features: an interactional perspective, attention to indirect as well as direct stakeholders, and a tripartite methodology. An interactional perspective views values as stemming from a symbiosis of technology and social forces: People and social systems influence technological development, while technologies shape individual behavior and social systems.

To better support the use of urban simulation systems in public deliberation, tools are designed to support urban planners, citizens, and other stakeholders in their interaction with Urban Simulation indicators. The development of these tools is guided by Value Sensitive Design. To meet these goals, three tools are refined to help a variety of stakeholders planners, modelers, citizens: technical documentation designed to make information about indicators readily accessible; indicator perspectives that provide a platform for organizations to advocate for the use of particular indicators in decision making; and household indicators that let citizens look at simulation results from the viewpoint of their own household within the region.

A simulation system is presented that can simulate a three-dimensional urban model over time, which does not rely on land-use simulation on a regular grid, but instead builds a complete and inherently interactive simulation that includes variety of democratic society aspects. While urban simulation has been investigated for many years, even micro-simulation systems such as UrbanSim (Waddell.p,2002-2003) do not simulate detailed social aspects. Instead, they use regular grids as spatial data structure. Each grid cell represents a collection of households and businesses, but no social features is simulated. Including detailed urban community in an urban simulation is aimed. This will allow to create 4D cities i.e. interactive three-dimensional urban environments that change over time.

3   CHALLENGE OF URBAN SIMULATION INDICATORS

One of the most famous urban simulation system which is widely used,UrbanSim, is a complex software system that models a region's urban processes over the next several decades. The system takes hours to run, resulting in a massive database that contains detailed information about the region's households, jobs, travel routes, and real estate in each simulated future year. Our indicator tools aim to help stakeholders extract useful information from this very large database. UrbanSim currently supports 55 indicators for extracting information from simulation results, and one of our goals in the indicator tools is to support urban planners in developing new indicators for their particular region. Presenting simulation results with a consistent set of indicators for all the candidate policy alternatives can greatly enhance scenario assessment and comparison.

Most UrbanSim models are discrete-choice models, in which the probability that a given agent will make a particular choice is a function of a set of variables that measure the relative attractiveness of that choice. For example, in a residential location, the probability that a particular household will choose to locate to a residential unit within a particular area depends on household attributes, such as income and number of children, as well as attributes of the potential dwelling, such as cost and location. An external travel model simulates trips between the locations of various households and jobs. The resulting patterns of transportation use and congestion then give rise to accessibility measures for different locations, which in turn influence the desirability of these locations for housing or jobs.

So, User-centered design methodologies focus their attention on direct stakeholders, those who actually use the system.Value Sensitive Design emphasizes consideration of indirect stakeholders as well, those who do not use the system but are affected by its use. For UrbanSim, direct stakeholders are urban planners and modelers; indirect stakeholders include the residents of the region being modeled. Part of the UrbanSim vision is to empower indirect stakeholders to become direct stakeholders to let citizens interact directly with UrbanSim's output, and ultimately to run different simulations themselves. Finally, the tripartite methodology consists of conceptual, empirical, and technical investigations.The application of these investigations is both interactive and integrative; results from new investigations build on and integrate earlier ones. As part of supporting a democratic society, it is decided that the system should not a priori favor or rule out any given set of stakeholder values, but should allow various stakeholders to articulate the values most important to them and to evaluate alternatives in light of these values (Davis.j et al,2006).

4   VALUES IN DEMOCRATIC PLANNING

Commitment to three core values helps Urban Simulation achieve the goal of supporting democratic urban planning: democratic engagement, freedom from bias, and political legitimacy.

4.1 Democratic engagement

Democratic urban planning requires that citizens be engaged in decision making. While acknowledging that engaged citizenship is not simple to characterize. A democratically engaged citizen is one who participates in civic and political life, and who has the values, attitudes, opinions, skills, and resources to do so effectively (Carpini.M.X,2004). To foster engaged attitudes, consistent opinions, and enthusiastic participation, a planning system must provide information about the issues that form the substance of political life. Urban simulation helps fulfill that requirement by providing information about the potential impacts of land-use and transportation alternatives a major political issue. But providing information is not enough. Citizens must want to use it. Through urban simulation, it is intended to seek to foster such democratic engagement, not only to help citizens make more informed decisions, but also to encourage an attitude that can lead to participation in public decision making. Information systems, such as online discussion forums or tools for citizens to propose new policy and investment packages, for example, could provide new opportunities for citizen participation in urban planning. Of course, systems such as UrbanSim supplement not replace informal discussions, town meetings, and voting.

4.2 Freedom from bias

It is refered to bias in computer systems as computer systems that systematically and unfairly discriminate against certain individuals in favor of others (Friedman.B and Nissenbaum.H,1996). A system discriminates unfairly if it denies an opportunity or a good or if it assigns an undesirable outcome to an individual or a group of individuals on grounds that are unreasonable or inappropriate. To warrant the term biased, then, discrimination must be both systematic and unfair. Freedom from bias was first identified as an explicitly supported value, on that it was intended to support the simulation, because it is a moral good in itself. However, there are other reasons to support this value: Freedom from bias is instrumental in providing an equal opportunity to participate in a democratic society; stakeholders whose concerns are represented in the system could have a privileged place in deliberation relative to those whose concerns are not represented.

4.3 Political legitimacy

UrbanSim's legitimacy is crucial for its effective use in urban planning. Unresolved disagreements about its legitimacy might disenchant some stakeholders or cause the agency to stop using the system. The conceptual investigation of political legitimacy draws primarily on the work of Jürgen Habermas. The use of modeling software is just one part of the planning process, and even the best-designed system could be used in a process lacking in legitimacy. Because most factors are beyond control, it is focused on the modeling system's "legitimation potential" rather than the legitimacy of the entire decision-making process (Habermas.J,1979). Communicative action plays a key role in legitimation potential. Habermas defines communicative action as speech in which all parties aim for mutual understanding without manipulative or strategic designs. In communicative action, each utterance raises four validity claims, which they have been mapped to testable design goals. Achieving these goals helps establish urban simulation's legitimacy.

- Comprehensibility: Can a wide range of stakeholders understand the information provided?

- Accuracy and transparency: Are the models and data a reasonable representation of reality? Are the inner workings and design of urban simulation transparent to stakeholders so they can assess its accuracy?

- Clarity of intent: Is the intent behind the information, to advocate for a particular position, or to provide relatively neutral, factual information, clear to the users?

- Appropriateness with respect to values and norms: Is the information relevant to the stakeholders' values in the decision-making context? Although comprehensibility, accuracy, transparency, freedom from bias, and relevance to decision making are not new goals for operational models,(Fleischmann.K.R and Wallace.W.A,2005) trying these goals to the potential for achieving legitimacy helps us understand their significance for models that must support democratic decision making.

5   INTERACTIVE DESIGN OF URBAN SIMULATION INDICATORS

Part of our work described in this article is intended primarily to create an interaction design around urban simulation indicators through technical documentation, indicator perspectives, and household indicators.

5.1 Technical documentation

Technical documentation in being set to provide comprehensible, useful, factual information about the indicators to urban planners and other stakeholders, with an eye toward minimizing both actual and perceived bias (Winograd.T and Flores.F,1986). Feedback from urban planners, modelers, and policy experts has led to standardize the technical documentation for each indicator to consist of eleven sections, including (among others) its name, an informal definition, a more formal specification, known limitations, and advice for interpreting results. The technical documentation also includes the Structured Query Language (SQL) code used to compute the indicator from databases of simulation results, as well as input and expected output for a unit test to check the code's correctness (Borning.A et al,2005). Through interviews in which the planners interacted with this system, it has been obtained that they required much less time to complete each of four tasks using the technical documentation as compared with their current work practices. This result is evidence that the information fragmentation problem in terms of both consolidating information and making it readily accessible has been solved at least partially. This in turn would improve task performance by increasing comprehension and making indicator evaluation more meaningful. The results also supported our hypothesis that including live SQL code, unit test information, and limitations increases indicator transparency and comprehensibility.

5.2 Room for advocacy

In formative evaluations of design for technical documentation, much of the strongest feedback was about neutrality. Earlier documentation versions included a section describing the desired direction of change for the indicator. Given the goal of democratic urban planning, having stakeholders advocate values and put forth opinions is an essential and integral part of the overall process, not an inconvenient blemish on an otherwise clean technical exercise. In order to enable stakeholders to use indicators to represent and express their views, yet maintain the informative role of technical documentation, one solution is to construct indicator perspectives, which stakeholders can use to tell a story and advocate particular values and criteria for evaluating outcomes. In keeping with emphasis on fair representation, it is needed to choose partners that cover a range of views. Thus, it is logical to provide opportunities for broader involvement, actively soliciting partners as needed to ensure that the perspectives cover a wide range of political views and economic interests. Preliminary results of examining this hypothesis confirm that the indicator perspectives framework is indeed useful in advocating for specific views and values and will be a valuable source of information about urban simulation indicators.

5.3 Personal touch

While indicators such as population density and total vehicle miles traveled are familiar to urban planners who monitor or model regional trends, such aggregate measures are probably less compelling to citizens not well versed in urban planning. To reach these citizens, household indicators are created that show how policy alternatives could affect their own households (Davis.J,2006). Through such indicators, It is considered to encourage citizens to become involved in evaluating the impact of transportation and land-use choices. On the basis of this information, the application answers questions the users might pose: Where could I afford to live in the region? How long would it take to get to work? How long would I have to travel to get out of the city? Initial user study results support the hypothesis that citizens can more readily understand household indicators because they can compare such indicators directly to living, working, and getting around. Household indicators also aim to engage citizens by showing them how policy decisions could affect their lives in the long term. Earlier work on the technical documentation aimed to provide comprehensible, accurate, transparent, useful and relatively neutral technical information to urban planners. Household indicators, in contrast, focus on providing information that is comprehensible to citizens and clearly relevant to their own lives. However, commitments to accuracy, transparency and freedom from bias remain. In meeting accuracy commitment, it is intended not to oversimplify to enhance comprehensibility. The commitment to transparency presents the challenges of conveying uncertainty in simulation results and having results explanations at hand when questions arise.

6 INTERACTIVE SIMULAION RESULTS

Virtual worlds can be achieved by simulating time-depended phenomena such as urban growth, transitions in land use, changes in building density, changes in the wealth and cleanliness of urban neighborhoods, and changes due to transportation policies or infrastructure. Urban simulation can be made more comprehensible by visualizing alternative futures of urban environments. One of the approaches to tackle the problem is to make the simulation inherently interactive. In order to show how to use urban simulation as an efficient modeling tool for nowadays democratic communities, it is necessary to answer that how to model the three-dimensional geometry of urban environments as it changes over time due to the democratic society and human values. Evaluating that how urban planning applications can benefit from more detailed simulation can be as a concept of future works. The main contributions of this research is to extend previous procedural urban modeling methods by entering human value features appropriate for changing cities over time. Instead of creating a single static city, a sequence of urban configurations can be created at interactive speed that can be edited during simulation. The results of interactive simulation will be expessed here in three categories of making 4D image for future, achievement of democratic view in planning and coordination between planning and design.

6.1 Making 4D image for future

System of interacting urban simulations are applied due to the complexity of urban environments, while previous work in simulation uses drastic geometric simplifications and aggregation. For example, UrbanSim uses grid cells with a side length of 150m. While this is considered a micro-simulation it produces a gridded output and is still at a scale that does not capture any interesting visual geometric details for threedimensional urban visualization considering human values. The major challenge of this design is to integrate various components into a coherent framework and to make sure that all necessary quantities are simulated. Comparison to computer graphics simulations, While there is some initial work in urban simulation, the existing attempts are not developed far enough to be competitive. The main difficulty of such a large simulation system is to find a useful set of parameters to produce simulations of high quality by regarding to social values. Two series of simulations are shown in the columns in Fig.1. The left series shows the transition from low density to high density by considering physical elements. The right column shows a simulation for a transition of a city based on social values and sustainable development features such as sufficient green areas.
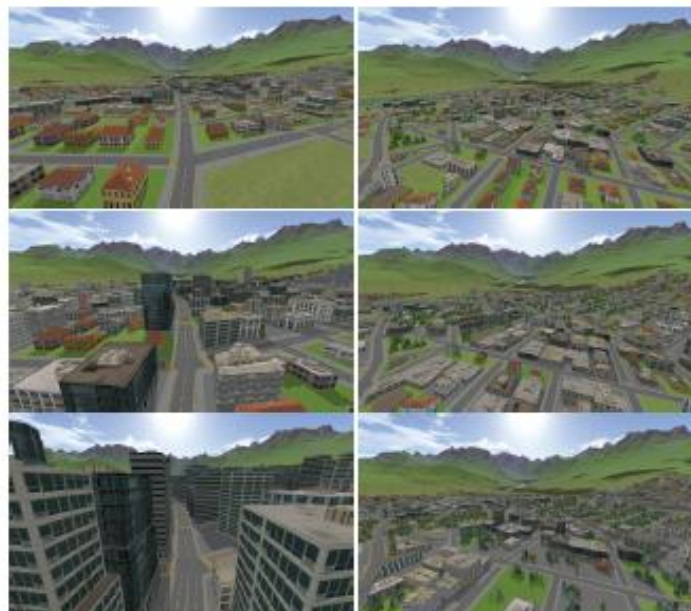
Fig. 1: The left series shows the transition from low density to high density by considering physical elements. The right column shows a transition of a city based on social values and sustainable development features (Weber.B et al,2009).

6.2 Achievement of democratic view in planning

Optimistic theorists have commonly argued that increased participation in democratic deliberation will produce better decisions, a more legitimate system, and a more sympathetic and public-spirited citizenry.

However, researchers have found little evidence to support this wishful thinking; indeed, the evidence indicates that participation in problematic processes will as easily produce cynicism, distrust, and a widespread desire to avoid being required to participate in political decision making processes at all. People are most interested in a process of governance that is usually invisible, with opportunities for imposing accountability when citizens feel the need. What people really want is for participation to seem unnecessary.

If citizens are to learn to engage in an effective democratic process of debate and compromise, they need to recognize that experts can disagree over goals and strategies in areas where there are value-driven choices to be made. They also need to be convinced that "details matter" when considering alternative approaches to important issues, and that details can matter for reasons that transcend particular interests. In other words, the process of deliberation and decision making, with its detailed considerations, needs to be explicitly oriented to substantive concerns.

This is precisely one of the ways that a design-centered process can make a difference, at least in so far as the design process is a careful study of the ways that details can matter, and to the extent that the public can be engaged in this process. Discussions of the importance of design have tended to get caught up in the issue of whether design can cause changes in social behavior. This is a misleading question, however, because design is already social action. Places are not just containers for social life, but themselves social accomplishments, things we do together, with more or less coherence, purpose and self-consciousness.

Design matters first and foremost because it is a practice of organizing our intentions in a series of explicit decisions concerning those qualities of the world we choose to recognize as significant. Urban design may matter most to the extent that its "logic of action" is shifted from a practice of creating visual and social effects by manipulating urban form to a practice of engaging others in the cooperative game of place making. Conceived in this way, urban design can link the sustained collaboration that gives coherent and meaningful form to diverse, complex places to a capacity for democratic self-government and the inclusive, vital, and open-ended quality of democratic culture.

The neighborhood provides a concrete image of a combination of uses into a "balanced mix" relevant to the practical geography of everyday life. The neighborhood unit is not just a nostalgic image, but a paradigmatic representation of the core value of urbanism as a particular normative condition: the extent to which each house, each project built in a community, contributes to the completion of a street, neighborhood or town; to the achievement of emergent possibilities; to a history that gives the place depth and meaning; and to the richness, variety, amenity, functionality, and pleasure of a shared world. Ideally, this is to be achieved not by the hand of a single designer emulating historic cities or working scenographic effects, but as the cumulative effect of individual projects of diverse architectural type and stylistic expression as an open conversation and not simply a scripted dialogue. Even as the mix of uses in a place changes, even as unpredictable social changes take place, the distinctiveness and quality of the place can be maintained.

In order to emphasize on the importance of moving from the scale of the lot and block to the scale of the region, the idea of a rural-urban transect offers a way to think analytically and systematically about neighborhoods, cities and regions as ecologies of diverse places in a way that makes explicit connections between issues of form, scale, geography, and social experience. The transect organizes empirical description of real places as built, experienced and lived, using a typological analysis that moves from the finest level of detail to the regional interlacing of human settlement and natural ecosystems. The gradient from rural to urban encompasses variations in the relationship between human settlement and natural conditions; in the articulations of public and private life; and in spatial morphology and building typologies associated with interconnected variation in managing relations of humans with each other and with nature.

As a transect-based analysis thus highlights ways that form matters at every level of scale, urban design acquires a clear purpose as a practice aimed at realizing the formative aspirations of a community. One of the key components in the production of urbanism is time and the expectation that no planner or designer completes the process, only provides conditions for a collaboration that includes not only current stakeholders but future cohorts. Emphasis on form-based coding is one way to create a framework for the collaborative capacity necessary to sustain certain qualities of place over time, elevating common practice to a consistent level while not constraining either excellence or individualizing impulses. Any design intervention can be regarded as contributing to the history of the place, and as participating in an open-ended but still coherent, goal-oriented process. Urban design becomes a medium in which civic connection can be

manifested in tangible form. At the same time, this also implies that a community has the political capacity to sustain the realization of a coherent urbanism, and come to terms with real divisions and conflicts in the community as it articulates a shared vision (Brain.D,2006).

The idea of a transect thus enables urban designers to build a place-making toolkit out of precise community analysis. A transect-oriented planning process can frame the issues in terms of an articulated range of interconnected differences, establishing the ability to debate each decision in terms of principles operationalized at different scales. To put it simply, it allows us to understand each building, development project, or design decision as tied not just to individual utility but to a process for sustaining place value.

In the context of design-centered public process, such analysis can become the scaffold for effective public discourse, enabling citizens to learn what is at stake if a particular decision were to be codified. Citizens can make clear and principled decisions about what goes appropriately where, avoiding absolute prohibitions in favor of the question of where something might actually contribute to the emergent quality of a place. The combination of analytical clarity and the flexibility of a system of transformation rules enables a continually improvised urban order, reflecting not just the vagaries of the market or the randomly aggregated aspirations of individuals, but a civic sensibility that infuses each individual project with a sense of responsibility for a positive collective outcome.

6.3 Coordination between planning and design

In spite of the expansion of participatory opportunities over the last couple of decades, ultimately the form and character of urban development is determined by developers' ability to work through a highly politicized and unpredictable regulatory process with their bottom line intact. The conventional planning process often produces documents that are little more than summaries of vaguely defined goals, transcriptions of public comment, and broad policy recommendations generally leaving implementation to the vagaries of negotiation between marketoriented entrepreneurs and bureaucratic regulators. Meanwhile, the low-density, automobile-dominated patterns built into current zoning ordinances, subdivision regulations, and conventional traffic design standards become the path of least resistance through the regulatory gauntlet. In a sense, the more "democratic" the public process seems to be, the less genuinely democratic the process of shaping the future of our communities has actually become. The conventional development regime has the effect of literally dis-placing politics, both in the sense that politics are removed from whole arenas of technical decision making, and in the sense that the politics of land use come to be increasingly about technical issues, rather than about the qualities of place.

Emphasis on a design-centered process has been reflected in the practice of allowing the public to engage the specific decisions about urban and architectural form in the context of a charrette, and broad efforts to establish a clear and collaboratively produced vision. This is not to say that simply proposing an urban ideal will bring about a revival of civic life, much less resolve all the challenging issues of social justice and democratization. There has not been explicit recognition of the ways that might more systematically engage the broader movement of civic innovation oriented to democratization, social justice, and environmental responsibility. Nor have the advocates of social capital and civic engagement generally recognized the potential importance of urban design.

Designers and planners generally need to work with a more sophisticated understanding of the conditions and possibilities of democratic politics. We need to get past the naïve notion of democracy that makes us think that a process becomes more democratic simply by including more people in the meetings. In practical terms, communities need to build civic capacity around an understanding of the complex forms of human settlement, not simply as the reflex of market activity or the unintended consequence of regulatory policy, but as a clear and purposeful reflection of a democratically constructed vision. Designers and planners need to face up to the political challenge implied in such a goal (Brain.D,2006).

The shaping of the urban environment needs innovative solutions like those that have emerged over the last

decade in connection to issues like watershed restoration and environmental justice. A design-centered and transectbased approach offers the possibility of a planning process capable of enabling effective engagement and constructing a sense of collective responsibility across even deep social and political divisions. At the same time, civic groups need to understand that cities might be made better on purpose, but that to accomplish this we need to get past the reduction of urbanism to social and economic functions apparently

beyond our control and understand the ways that design can matter as a medium in which to recognize, articulate and realize civic aspirations.

7 CONCLUSION

The following research aimed to inform public deliberation and decision making about major effects of entering human values in the process of urban simulation for a democratic society in order to support citizen discussion and comment. All these efforts are part of an overall agenda: to better support informed public deliberation and democratic engagement in the urban planning process. Our application of this method has led to five interaction design goals:

- Improve the system's functionality by developing new tools for stakeholders to learn about, select, and visualize indicators to use in decision making.

- Support citizens and other stakeholders in evaluating alternatives with respect to their own values.

- Enhance the system's transparency with respect to its design, assumptions, and limitations, so it is not a black box.

- Contribute to the system's legitimacy by providing information that is credible and appropriate to the use context.

- Foster citizen engagement in the decision process by providing tailored information and opportunities for involvement.

As a result it was demonstrated that the output of the interactive simulation can be drastically improved compared to previous work opening the door to new applications of urban planning.

8 REFERENCES

BORNING.A et al., "Informing Public Deliberation: Value Sensitive Design of Indicators for a Large-Scale Urban Simulation," Proc. European Conf. Computer-Supported Cooperative Work (ECCSCW 2005), Springer, 2005, pp. 449-468.

BRAIN.D, "Democracy and urban design: the Transect as civic renewal," Places, 18(1), 2006.

CARPINI.M.X, "Mediating Democratic Engagement: The Impact of Communications on Citizens' Involvement in Political and Civic Life," Handbook of Political Communication Research, L.L. Kaid, ed., Lawrence Erlbaum Assoc., 2004, pp. 395-434.

DAVIS.J, LIN.P, BORNING.A, FRIEDMAN.B, H. KAHN JR.P, and WADDELL.P, "Simulations for Urban Planning: Designing for Human Values", Grinnell College, University of Washington, 2006.

DAVIS.J, "Household Indicators: Design to Inform and Engage Citizens," CHI 2006 Extended Abstracts on Human Factors in Computing Systems, ACM Press, 2006, pp. 688-693 Simulations for Urban Planning: Designing for Human ValuesJanet Davis Grinnell College

FLEISCHMANN.K.R and WALLACE.W.A, "A Covenant with Transparency: Opening the Black Box of Models," Comm. ACM, vol. 48, no. 5, 2005, pp. 93-97.

FRIEDMANN.B and NISSENBAUM.H, "Bias in Computer Systems," ACM Trans. Information Systems, vol. 14, no. 3, 1996, pp. 330-347.

HABERMAS.J, Communication and the Evolution of Society, T. McCarthy, translator, Beacon Press, 1979.

WADDELL P.: Urbansim: Modeling urban development for land use, transportation and environmental planning. In Journal of the American Planning Association (2002), vol. 68, pp. 297–314.

WADDELL P., BORNING A., NOTH M., FREIER N., BECKE M., ULFARSSON G.: Microsimulation of urban development and location choices: Design and implementation of urbansim. Networks and Spatial Economics 3, 5 (2003), 43–67.

WEBER.B, MULLER.P, WONKA.P and GROSS.M, "Interactive Geometric Simulation of 4D Cities," ETH Zürich, Procedural Inc, Arizona State University, USA, vol.28, no.2, 2009.

WINOGRAD.T and FLORES.F, "Understanding Computers and Cognition: A New Foundation for Design", Ablex, 1986.

Interweaving the Digital and Analog Lives of Cities: Urban Sensing and User-Generated Cities

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1 ABSTRACT

A research process lasting from 2009 to 2012 has conceptualized, designed and implemented multiple tools and strategies to experiment novel forms of technologically-supported urban interaction. The goal of this process has been to understand the rituals which have started to shape contemporary citizens' perception and performance of urban public and private spaces. An ethnographic approach has been used to gather insights about these emergent rituals, affecting the ways in which people have transformed the ways in which they work, learn, relate, consume, travel and entertain themselves in the city.

With the active collaboration of public administrations, organizations, citizen groups, tourist operators and research teams these practices have been enacted in the cities of Rome, Turin, Trieste, Cosenza, London, Berlin and Hong Kong for variable amounts of time. Engagement and results have been formally gathered, observed, processed and measured, allowing the research team to both explore the current scenario and envision new ones.

Real-time content harvesting from social networks, natural language analysis, geo-referencing/geo-coding/geo-parsing technologies, expert systems and ubiquitous technologies such as smartphones, custom electronic devices and conceptual consumer products have been employed to explore the ways in which people are and will be able to: perceive and understand their urban surroundings; access services and information; co-produce knowledge and distributed intelligence; collaborate in the creation of shared projects and city-governance practices; create and maintain peer-to-peer infrastructures for connectivity, commerce, services and culture.

This paper will present the initial analysis – including previous research taken into account in the fields of urban sensing, citizen science, urban planning, urban infrastructure management, urban environment perception and more –; the methodologies, both shared and project-specific, used to conceive, design, implement the prototypes and to measure their effects; the reports about each project in the aforementioned cities, including their usage on-the-field as well as elements of urban and digital ethnographic observation and user experience analysis; a description of a scenario for further research and for the production of service and product concepts, some of which are already in-progress, in the areas of the arts, culture, tourism and city administration.

What emerges is the opportunity to create multi-layered interactive landscapes in urban contexts which allow city dwellers to communicate, collaborate, govern their city, exchange knowledge and information, consume, entertain themselves, produce and distribute services.

2 INTRODUCTION

2.1 What is a map?

In current times we are often exposed to the opportunity of looking at satellite images or to global views of our planet.

With no earthly frontiers left to discover, it is possible and appropriate to step back to assess a few of the fundamental questions which form the foundation of the ways in we see and experience space.

What is a map?

Maps are metaphors: abstract, scaled models of space that, in some of the many possible ways, relate to "real" space according to one or more approaches.

A map is an abstracted model of space to aid in understanding spatial relationships and better decision making (MacEachren, 1994; Kraak & Ormeling, 1996).

Furthermore, the Humanities focus on a more critical point of view, stressing context. For example in the structuralist approach exemplified by Norman J. W. Thrower, in 1972, in which he states that "the map is a sensitive indicator of the changing thought of man".

Both definitions, as well as the many others which are available, stress the fact that no map is ever neutral in the representation of a space. They, are, in fact, an abstraction of space produced by its interpretation in terms of a set of goals set forth a-priori by the subject making the map, to support decision making processes, to highlight a certain set of features of the territories being represented, or to share specific knowledge an information about them.

This idea is related to the one which sees a map emerging as a result of a specific mental model according to which we represent a territory.

For example Kevin Lynch suggests the possibility of creating a map as the result of "both of immediate sensation and of the memory of past experienced [that] is used to interpret information and to guide action". This concept of map allows for both a sense of emotional security and a deeper human experience: knowing where one is in space makes one feel secure, happy and situated.

In "The Image of the City" Lynch's focus emphasized the connection of this state of well-being with concept of "knowing the place", going beyond the to idea of the utility of way-finding and point-of-interest services, and highlighting, instead, the opportunities for individual and cultural growth brought on by this condition of knowledge and perception.

For Lynch it was not of primary importance to know the exact whereabouts of a certain place or location, but, rather, to have a distinct sensation of a specific place, a story to tell, a memory or information to share. He saw the city as an incredibly complex time-based media, as a potentially dis-harmonic symphony of prodigious proportions in which millions of people collaborated in playing their score, their own vision and perception of space, both influencing and being influenced by others by acts of diffused micro storytelling (e.g.: giving a direction; narrating a memory...). Including the suggestive and radical possibilities exposed by authors such as Debord and de Certeau, in which perception of space became performance of space, to suggest its critical usage and reinterpretation.

This is, basically, what a map is: a way to express what we perceive of a territory, coming from memory, narrative, cognition, sensation, possibility, opportunity, or availability of information, statistics, services.

A way to experience, perceive and perform the territory.

2.2 Interweaving the digital and analog lives of cities

It is from this idea that we can imagine analyzing the ways in which contemporary's wide, accessible and ubiquitous access to all sorts of digital media have radically transformed the ways in which human beings relate, learn, work, consume, entertain themselves and collaborate.

Among the most influential factors which contribute to this transformation is the availability of digital tools, devices and frameworks which have direct impacts on our perception of space at individual, social, collective and cultural levels.

The "Curious Rituals"[1] project is aimed at identifying "gestures, postures and digital rituals that typically emerged with the use of digital technologies". The project's approach is remarkable in understanding these "rituals" as "the results of a co-construction between technical/physical constraints, contextual variables, designers intents and people's understanding". They are seen as a possibility to "envision the future of material culture", as a way to be able to observe those practices which constitute the present of the ways in which we are influenced by the digital objects around us, and to infer those ones which will constitute its (near) future.

In is possible to imagine extending the "ritual" approach to go beyond the areas of industrial and application design, to include all the domains in which the digital and analog parts of our lives interweave with each other.

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[1] Found ad http://curiousrituals.wordpress.com/about/

It is possible, thus, imagine to prepare a methodology which allows us to observe and research the practices (the rituals) by which human beings in a diverse set of contexts have learned to use certain kinds of technologies to substantially transform their experience of public and private spaces.

In doing so, we must show how these digital technologies act at the level of transcoding (Manovich, 2001), by being able to communicate through interfaces establishing crucial boundaries among our reality and the digital. There is a definite decay in this perceived boundary, a turn towards a more permeable membrane, through which digital information flows out and human information flows in, respectively enhancing our lived experience and structuring and organizing data around biological, evolutionary and cultural patterns.

The concept of variability is, according to Manovich, just as fundamental, as it implies both the possibility for this information and its flows to be recombined, enriched and reassembled in multiple ways.

This is one of the main connections that link historical changes in media technologies to social change.

The possibility to construct systems in which a multiplicity of points of view can be freely expressed by allowing people to produce digital content that can be, in turn, recombined and reassembled (curated) to contribute to other people's view on the world perfectly fits the logic of post-industrial society (Zook & Graham, 2007).

These two features, transcoding and variability, together with the wide availability and accessibility of digital tools and devices (such as smartphones) which allow users to ubiquitously produce information in real-time, merge to describe a scenario in which many of the rituals of our daily lives can be seen to revolve around the possibility to experiencing our urban lives through the contributions of the expression of a multiplicity of points of view.

We can, thus, imagine multiple types of digital tools and devices which are conceived to allow people to generate information about their urban surroundings in a multiplicity of ways – both intended and to be created by city dwellers themselves through the availability of accessible tools – that can be harvested – in real-time or offline – to create a novel form of spatial infrastructure: a multi-author, emergent, non-linear, ubiquitous, polyphonic, multi-layered narrative of the city which can be used by multiple types of stakeholders to explore the visions, imaginaries, desires and emotions of people to gain better, more informed insights which can help shape urban policies and architectural practices.

2.3 Ethical and methodological issues

The frameworks that we're dealing with assume the possibility of being able to disseminate – with the population and around the city – a number of devices, sensors and visualization tools which are able, on one side, to harvest user generated data and, on the other side, to make it available for further elaboration to those services – created by administrations, organizations, companies and autonomously by citizens and other types of city dwellers – that allow people to conceive novel ways to perceive their urban environment: to collaborate; to become more aware and active in using energy and natural resources; to learn and exchange knowledge; to promote well-being.

A number of ethical and methodological issues open up with this kinds of practices. Here we wish to briefly address them.

2.3.1 Privacy and control

The scenario in which a system of some type is able to capture masses of data related to the behavior of its users can become dangerous in terms of the possible breaches in people's security an privacy.

The information regarding the fact that User X is at a certain location and stuck in a traffic jam can conveniently be used to promote alternative paths or the usage of public transportation. But it can also be used to harvest information about the user's habits, the paths he/she follows every day to go to work, the places he/she goes to to have fun, where he/she goes shopping, etc.

This is something that already happens with credit cards, store carts and with the CCTV cameras disseminated along our public spaces, and awareness about these mechanisms, on both their positive and negative uses, has been promoted all along the research.

In the research presented in this contribution, specific care has been given to this kind of problem, using multiple tools and approaches: the possibility for anonymity; clear, transparent interfaces and procedures that

allow users to understand the exact ways in which their data is used, and to conveniently block usages which they don't agree on; opt-in strategies, more than opt-out ones; full transparency and disclosure; and more.

2.3.2 The risks of semplification, the loss of complexity

Statistics are not „real life".

The fact that 48 % of the population of the city i live in has used, in the past 24 hours, the word „sad" in one or more of the content they published on social networks doesn't necessarily mean that 48 % of its citizens are „sad".

This kind of problem is typical of the algorithmic systems that aim at being able to interpret user behavior in some way, to extract information about emotions, behavioral patterns, sentiment, relational structures etc.

In is due to a number of causes: the extreme difficulty for these kinds of systems to interpret things such as irony, sarcasm, poetics, etc; the lack of further contextual information; and more.

Furthermore, statistics can be built according to different strategies to obtain different results, and they can be performed to varying levels of detail, aggregation and granularity, in ways according to which specific phenomena may become less evident, of disappear altogether.

To address this issue we have focused on a number of different strategies.

First of all, the complete transparency and availability of data and information.

All collected data and information has been publicly released, in real-time, using open licensing strategies and by providing users (institutional, administrative, corporate as well as citizens) those tools which can be conveniently used to gain access to them: dashboards, APIs (Application Programming Interfaces, openly available software programming libraries which allow users to develop their own applications and elaborations the data), extraction tools, etcetera.

Secondarily, but not less important, by working on the territories (by performing workshops, lectures and entire projects, anywhere from communities to full enterprises or organizations) to suggest possible usage scenarios for this kind of data and supporting the autonomous development of the tools which they perceive as being more useful and effective: to collaborate, work together, learn and exchange knowledge, to support novel forms of welfare and well-being and, in general, to truly become active, more informed and aware, agents in the governance of their city and in the promotion of the well-being of their communities.

Third, by providing mechanisms for wide accessibility and usability of this information, allowing even non-experts to be able to interpret, if not use, the available knowledge through easy to use customizable visualizations and interactive systems.

In this way, whenever we have been able to, we have supported the creation of entire urban ecosystems, more than the emergence of single initiatives, in which hierarchical and a- hierarchical strategies combine and co-exist a the level of p2p (peer-to-peer), by allowing for the existence and free, accessible, manifestation of a multiplicity of – even dissonant – voices and points of view.

Our approach, thus, is that of going beyond the service-based approach: to use urban sensing as an anthropological opportunity instead of a series of packaged services and bureaucratic/administrative tools.

2.3.3 The industrialization of human experience and narratives

Strongly connected to the previous issue, is the one that sees the emergence of a tendency to industrialize the availability of Open Data and, as an extension to that, the products of human experience and narratives.

Starting from the latter, it is not a mystery that, whenever we use the web to subscribe to social media services, such as Facebook or Twitter, we are not adhering to a „free" service but merely joining one which we pay for with the possibility, for the service providers, to use our personal data to support their business models. In this way, businesses are able to use the things we say every day, the information about the places we have visited and the media (video, images, audio) we have produced to sell anything from marketing data, user behavioral patterns up to, in the more serious cases, to information about the political alignment of users.

On the other side, the wide spread of the Open Data movement – that global tendency which is seeing more an more organizations changing their approaches towards the ownership of the data they produce or collect

through their institutional or business activities – is experiencing the rise of a trend which sees the emergence of these new practices of transparency and disclosure as a mere opportunity for the development of business, administrative and bureaucratic processes.

The two issues meet at the point where it is becoming progressively clearer that the focus on most organizations dealing with social media and Open Data is really more on the possibility to develop new business models than on the promotion of the wider opportunities which become globally available through these practices, both at cultural, anthropological levels, and at the level of developing a true, global process that is able to support people in becoming active, aware agents of their times.

Everything points in this direction: from the lack of a true cultural, diffused approach to people's education on the matters regarding their participation to social networks, allowing for the de-facto privatization of the digital ecosystem of people's relationships and information; up to the reduction of the processes of Open Data to a mere sequence of transactions at business, administrative and bureaucratic levels, without addressing the cultural and anthropological dimensions of these types of operations.

In our approach we tried to assess these two issues by doing the exact opposite.

We have focused on the educational, cultural and anthropological dimensions of these processes, using technologies as an opportunity to develop the imaginaries and visions of people (students, citizens, activists...) to try to promote their own possibility to envision ways in which they will be able to collaborate to become active, aware agents of their times.

In the specifics: we have focused in using engaging, exciting tools to suggest the possibility to build emergent, polyphonic, ubiquitous, non-linear narratives of the urban environment, to be used to construct community driven tools dedicated to the promotion of well-being, welfare, wise and effective usage of energy and of natural resources, collaboration, knowledge sharing and, more in general, to promote new tools which are able to suggest novel forms of perception in the urban environment and of diffused, p2p city-governance.

3 METHODOLOGY

A formal methodology has bees developed and refined over time and across the various iterations of the projects dealing with Urban Sensing.

The first phase of each project begins from a context analysis, from an anthropological point of view, and on its desired impacts on the urban ecosystem. The contextual analysis can assume many forms, from scenarios involving surveys, to more advanced techniques involving user observation and co-participation.

The result of this phase, the scenario, is intended to be merged to the project's objectives to try and determine the which forms of new urban rituals could embody the urban practices which are the object of the project: could it be an application? An interaction with an urban screen? A typical transmedial user journey?

At this point the concept is developed, in respect of the ethical issues.

The concept is created across several iterations, and can (and usually is) refined multiple times throughout the project's life.

The means and methods through which it will be possible to measure and evaluate the quantitative ad qualitative usage of the designs is also formalized at this stage, together with the concept.

To support the project's technical/technological requirements software, devices and infrastructural platforms are developed at this point, and refined/integrated throughout the project's lifecycle.

During this phase special care is put on providing the tools and documentation to enable the educational and cultural strategies which are a fundamental component of our approach, and that will be used across workshops and as freely available development platforms.

At this time the project is deployed. The systems and practices are introduced to territories and population, by promote practical experimentation in real-life scenarios. Feedback processes are also suggested and promoted, to imagine redesign iterations or suggestion for next designs.

Measurements and evaluations are performed on the usage of the systems and frameworks (both qualitative and quantitative). Documentation is produced. Best practices and design guidelines are extracted.

In the different scenarios explored in the following sections, multiple approaches and strategies have been chosen to engage both the local population and different types of city dwellers (tourists, people coming to an event...), and to provide them with short and long term benefits. In the Atlas of Rome, for example, participants were easily recruited among the visitors of the exhibit, and a very detailed scenario about the possibility to research and establish participative practices for urban governance was provided as a possibilitisic benefit that many of them were ready to explore.

More difficult situations took place as well, such as in the case of the VivaCosenza example below, which featured a very low level of spontaneous citizen engagement which we were able to raise only by performing a capillary set of workshops together with citizen associations, local arts collectives, schools and with the support of already trusted communities which we have been able to identify after a thorough ethnographic observation on the field.

Also, the expected outcomes of the single projects vary depending on the cases. While each of the described examples has its roots in scientific research and academic practice, the different techniques and solutions found in each case have easily opened up to multiple usage scenarios. From the more artistically oriented, such as in the VersuS example below, to all the ones which have had a tangible business impact, such as the ConnectiCity and Trieste examples.

4 CASES

4.1 The Atlas of Rome

After an initial test produced for the Franz Mayer museum in Mexico City, we designed a 35 meter long architectural projection and sound environment for Rome's "Festa dell'Architettura" in 2010, organized by the City Administration together with the Italian Order of the Architects.

The Atlas of Rome's purpose was to portray in real-time the evolution of the visions, desires and actions created by architects, institutions, operators and citizens onto the city of Rome: 16 information domains had been classified to describe the overall wellness of the city.

Information was captured from multiple sources and processed using Natural Language Analysis (Hanks, 2005; Tuulos, 2004), and then was geo-referenced either through GPS enabled devices or by using a large database of Named Entities, including the names of streets, malls, cinemas, museums, landmarks, neighborhoods, common alternative names of places, pubs, bars, shops, stores, gyms, and other dozens of types of locations.

Content was also directly provided by citizens using web and mobile interfaces.

Illustration 1: The Atlas of Rome

Collected information was shown on the 35 meter wide surface using a Processing application. Different information visualizations were designed to aggregate information according to themes, time-frames and types of activities.[2]

Passer-by's possibility to interact in real-time with the installation produced radically positive effects: the fact that a large-scale architectural surface was actually responding in real-time to their interactions powerfully combined with the tangible effect of having own information published onto the projection. The combined effect of being able to both contribute and interact had a distinct empowering effect on people, who spontaneously started to discuss possible uses for this kind of system in areas such as participatory urban planning, policy making and decision-making at city level.

A neighborhood version of the Atlas was also produced, to experiment on the possibility to visualize the trending topics of the digital conversations taking place in neighborhoods in which a smaller, urban-screen based, version of the visualizations was placed.

4.2 Riots in Rome

The possibility to harvest information in real-time from cities using user generated content on social networks was used in occasion of the first instantiation of the VersuS project.[3]

The first prototype was created in occasion of the protest which took place in the city of Rome on October 15th 2011, in occasion of the event organized worldwide by the "Occupy" movement, and which quickly degenerated into violent uprisings all over the city's centre.

VersuS was created to collect all social network activity during the protest.

Different social networks were observed using different techniques, including Twitter, Flickr and Foursquare APIs and Facebook's Graph API to first identify relevant sources (user profiles and pages focused on the city and on the themes of the protest) and then harvested for information (about 16000 profiles and their connections were harvested).
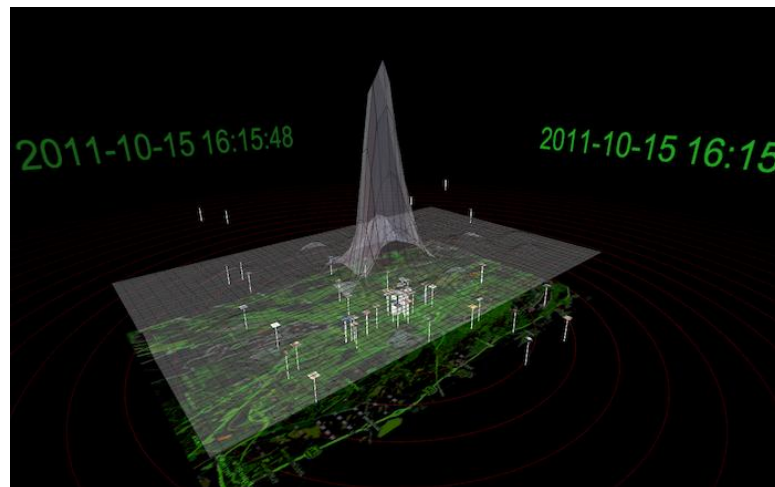
Riots VS Rome

Natural Language Analysis and GeoParsing/GeoReferencing procedures were applied to identify content which was actually relevant to the protest allowing us to select more than 92000 information elements in the time-frame of the protest.

A series of visualizations were designed to investigate on the results of the process.

A geo-referenced parametric surface showed the real-time geographical intensity of communication and allowed to clearly follow the protest, documenting how a large number of individuals actively used social media to communicate and collaborate during the riots.

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[2] http://www.artisopensource.net/2010/06/07/atlas-of-the-visions-festa-dellarchitettura-index-urbis-rome/
[3] http://www.artisopensource.net/category/projects/versus-projects/

Qualitative analysis was then visualized to display usage scenarios for this information, from the points of view of administrations, police and security and citizens. In this occasion we were able to observe how tens of thousands of valuable information elements emerged in real-time for each of these application scenarios.

4.3 Love versus Turin

A similar technique was used in the city of Turin to harvest information about the emotions of citizens and tourists.
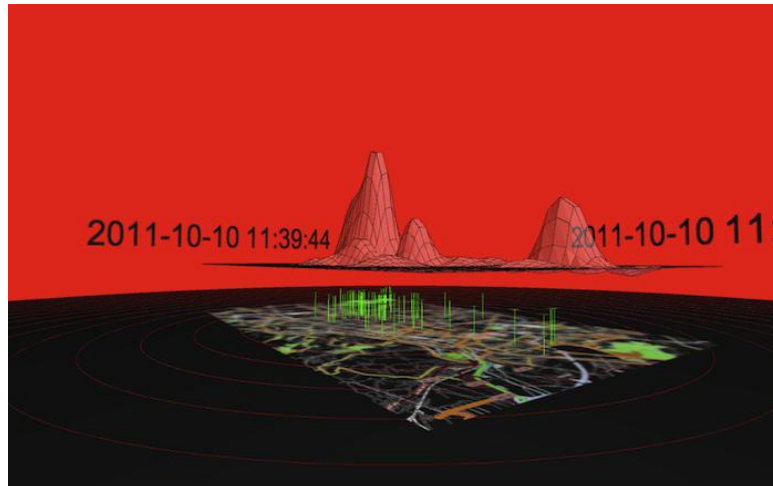
Love VS Turin

This time the content collected from social media sites and, then, geo-referenced was processed to explicitly extract information related to the emotions expressed by users. "Love" was used, specifically.

The experiment was able to express multiple interesting elements about the ways in which citizens experience and perceive the city in emotional terms, including: the emergent definitions of landmarks; the distribution of specific emotions through different neighborhoods; the time-based sequences according to which different emotions manifest themselves in various locations of the city (for example their emergence across traffic jams and various situations of urban distress).

The project served as a useful foundation for its next instances.
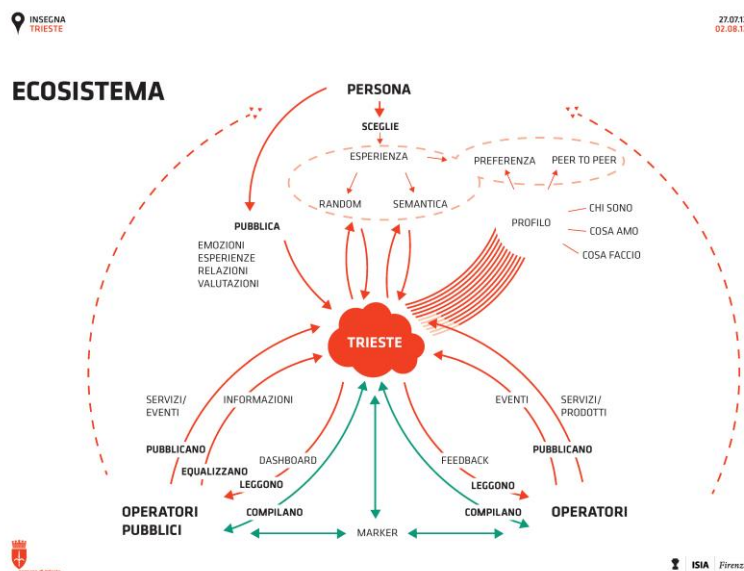
Insegna Trieste

4.4 Urban communication in Trieste

Organized by the City Administration of the City of Trieste and by ISIA Design Florence, and with the collaboration of the Regional Administration of Friuli Venezia Giulia, the Faculty of Architecture of the University of Trieste, ISIA Urbino, IUAV University and the University of Nova Gorica a workshop has

gathered students to explore the city of Trieste from a new point of view, and trying to answer the question: "What is the information architecture of the city, as interpreted from a variety of cultures and points of view? How is it possible to define strategies and methodologies to design a system of signs, technologies and methodologies to represent it in meaningful ways? What is the future of urban signage?"[4]

Urban signage is the street-interface for the city's Information Architecture.

Starting from the existing scenario we have imagined to extend the set of techniques, methodologies and technologies which were classically used to design urban signage, and to include a wider, holistic, set of considerations into the discourse.

Ubiquitous technologies, tagging, augmented reality, urban screens and other technologies can be used to radically transform our experience of cities, as we navigate through streets, landmarks, businesses and opportunities for socialization, entertainment, culture, information and relation.

To transform the city into a place where no spectators exist: in the Network everyone is a performer.

Choosing, connecting, looking, conversing, recognizing and interacting: everything in the Network becomes construction.

From consumers to cultural producers, disseminated in time and space, and connected by transforming links, multiple and emergent.

The results of the workshop, which engaged the local population as well as the students coming from the universities, have been many and varied, including the draft definition of a possible urban ecosystem, the idea of the "City as a Platform" as an opportunity for free expression and business, a concept for a movable landmark and the definition to setup a "city construction kit", a mix of free hardware and software technologies which can be used to develop the city's digital ecosystem and its connection to its analog life.[5]

4.5 A contemporary arts festival in Cosenza

VivaCosenza Performance Lab is an international event about art and performance that is held in December in the city of Cosenza, an ancient and beautiful site of the south of Italy.[6]
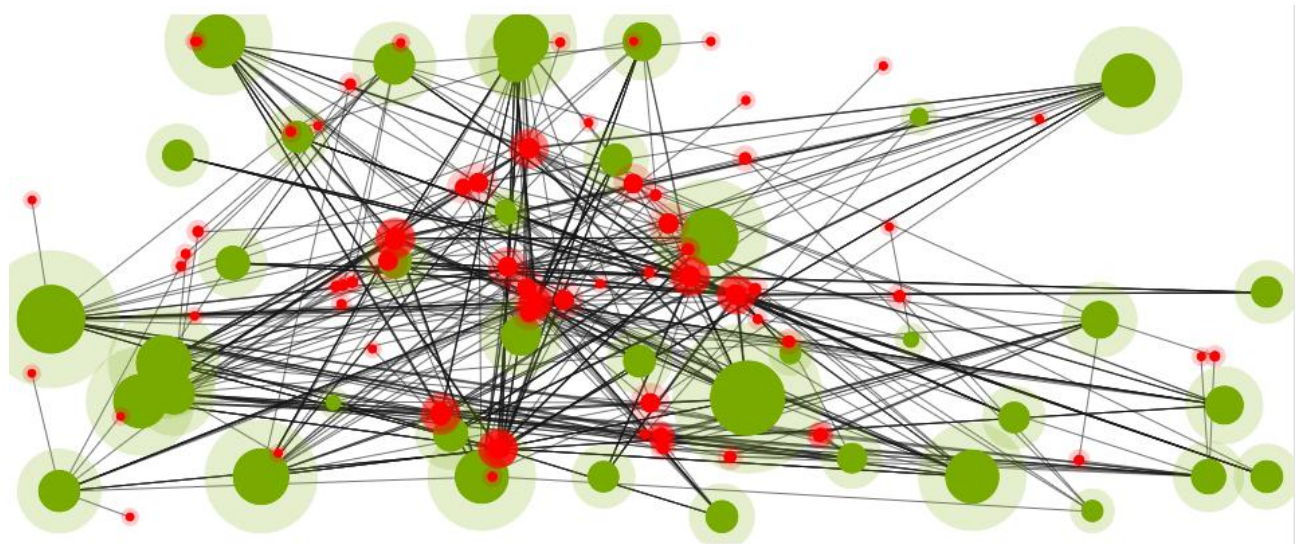
VivaCosenza

We were invited to create the "digital life" of the city during the festival, so we created some tools which could be used by students and citizens to enact the real-time, participatory narratives of the event.

Using a series of open technologies which we had developed for the VersuS family of projects, we have setup a system which is able to capture in real-time all of the social network activity of citizens, students,

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[4] http://www.artisopensource.net/2012/07/25/redesigning-urban-communication-in-trieste/
[5] http://www.artisopensource.net/2012/08/10/trieste-cloud-city-new-frontiers-of-urban-communication/
[6] http://www.artisopensource.net/2012/12/01/vivacosenza-how-to-transform-a-city-event-into-a-real-time-participatory-performance/

visitors, organizations and institutions of the city of Cosenza and also of the people who have used social networks to communicate about the festival and the city from other locations.

A set of language-based technologies have then been used to classify all this information, in real time.

Furthermore, special projects have been created by high-school and university students, who have been asked to create communication formats for the festival, dealing with arts, food culture and new forms of journalism and storytelling.

All of the emergent communication which has been generated in real-time during the festival has been visualized both online, on smartphone/tablet applications as well as using a projection mapping in a public space in the city, so that all citizens have been able to experience the digital life of the city directly from public space.

The objective of the platform is to understand the ways in which these kinds of technologies can be used to transform the life of the citizens of the city, to imagine, design and enact novel participatory approaches.

In this, we have suggested a new role for institutions, who can become promoters and maintainers of new forms of expression which are available and accessible to everyone.

Just as we used technology to create an infrastructure for expression to be used by students to create their own formats, we imagine a "city as a platform" (for example as we suggested in Trieste), where ubiquitous infrastructure (both cultural and technological) is made accessible and usable through public policies, enabling citizens and city dwellers to basically have the tools to design and build their own digital, cultural, business, communication, storytelling, envisioning ecosystem.

In the project we have started from scratch with students and have setup a basic set of technologies, for them to be used as building blocks for their communication and storytelling formats.

The issues of privacy and control have also been the object of multiple workshops which engaged the wider population in imagining convenient, safe usage scenarios for these technologies.

4.6 Feeling happy to be in London and Berlin

A series of installations were presented at the Ljubljana Design Biennial exploring the possibility to listen in real-time to the emotions, expressions and information generated by users on social network and using ubiquitous technologies, and to publish them onto the cities which they are related to.[7]

Berlin Wants to be here

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[7] http://www.artisopensource.net/2012/09/20/versus-at-bio23-ljubljana-design-biennial/
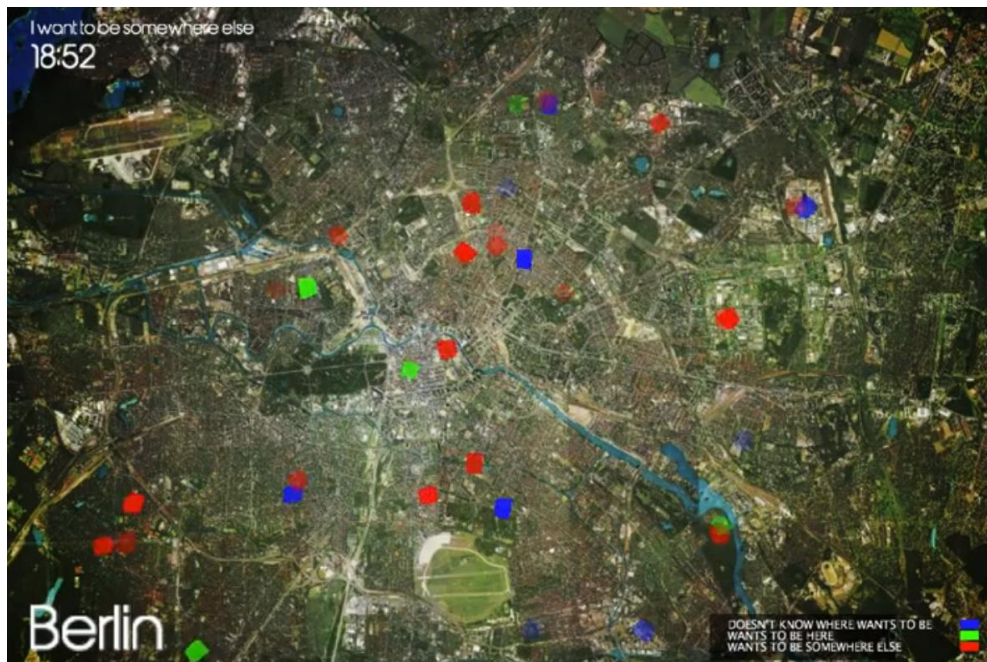
A scenario emerged according to which it becomes possible to realize information landscapes which are ubiquitously accessible and which change our experience or urban spaces.

These projects also suggest the possibility to use these methodologies and technologies to promote novel forms of participatory practices in urban spaces, for decision-making, policy-making and urban planning and design.

Among the installations, two dealt with the well-being expressed by social network users in the various locations of the city of Berlin and London.

5 CONCLUSION

The next steps of this series of projects will engage the exploration of the possibilities offered by using novel forms of devices (such as the ones that will be produced in Trieste with the "city construction kit") as well as an even stronger push in the direction of various forms of mobile interaction, as the possibility to disseminate ubiquitous technologies is, in our experience, among the leading drivers to this kind of innovation.

A specific note has to be made in relation to the themes of urban screens. Our experiences have shown how their limitations in terms of ubiquity and on the possibility to show only a limited number of decipherable points of view are matched by the ways in which they provide user-generated interventions high visibility and the distinct perception of participation to city life and governance.

Thus, they can and need to be carefully chosen in the design of such kinds of projects.

As far as we are concerned, and from the point of view of a research that allows us to cross the boundaries of architecture, anthropology, cognitive science, interaction design and many more, this type of projects represents both an opportunity and a frontier, in which the dangers coming from the industrial open data and of human experiences and narratives match the opportunities to promote a sustainable, feasible rise of new, free, accessible "anthropological gestures", and the freedom of expression, self-determination, organization that go with them, situated in the location of what seems to be the place of the destiny of human beings of the near future: the city.

6 REFERENCES

DE CERTEAU, Michel: "The Practice of Everyday Life". Berkeley and Los Angeles: University of California Press, 1984.
DEBORD, Guy: "Introduction to a Critique of Urban Geography" in "Les Lèvres Nues", N. 6. Brussels, 1955.
HANKS, P., PUSTEJOVSKY, J.: A Pattern Dictionary for Natural Language Processing in Revue française de linguistique appliquée 2/2005 (Vol. X), p. 63-82. Paris, Cairn, 2005.
KRAAK, Menno-Jan; ORMELING, Ferjan: "Cartography: Visualization of Spatial Data". Essex: Addison Wesley, 1996.
LYNCH, Kevin: "The Image of the City". Cambridge, MA: MIT Press, 1960.
MACEACHREN, Alan M.: "Some Truth with Maps: A Primer on Symbolization & Design". Washington D.C.: Association of American Geographers, 1994.
MANOVICH, Lev: "The Language of New Media". Cambridge, MA, MIT Press: 2001.
THROWER, Norman J. W.: "Maps & Man: An Examination of Cartography in Relation to Culture and Civilization". Englewood Cliffs, NJ.: Prentice-Hall, Inc, 1972.
TUULOS, V.H., TIRRI, H.: Combining Topic Models and Social Networks for Chat Data Mining in WI '04 Proceedings of the 2004 IEEE/WIC/ACM International Conference on Web Intelligence, Proceedings, pp. 206-213. New York, ACM: 2004.
ZOOK, M. A., GRAHAM, M.: Mapping DigiPlace: geocoded Internet data and the representation of place in Environment and Planning B: Planning and Design 2007, volume 34, pages 466-482.

Keeping the Public Sphere Anchored to Social Changes

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1 ABSTRACT

Despite the theoretical passage from the regulatory approach of (especially Italian) spatial planning to the „soft" and „synaptic" dimension of planning theory, due to the spread of European policies and visions towards a broader perspective that considers physical and social aspects as strictly inter-connected, a „stellar" distance still remains between urban planning and social practices, formal projects and true life, „shadow" and official „production" of urban space, and the continue irreducible re-emerging of what formal planning tends to exclude.

Moving from an analisys of the still existing and deeply rooted resistences – and related „dis-regulations" – against innovative trends in Italian planning practice and research, a possible experimental path (rather than a „best practice") is proposed as a tentative way to re-lead „shadow" experiences and actions within official planning processes without denying their alternative vision, in order to keep a broadened public sphere anchored to social changes.

2 INNOVATIVE TRENDS AND ROOTED RESISTENCES IN THE ITALIAN PLANNING PRACTICE AND RESEARCH.

Despite the theoretical passage from the regulatory approach of (especially Italian) spatial planning, that substantially means land-use regulation, to the „soft" (Faludi, 2010) and „synaptic" (Scoppetta, 2012) dimension of planning theory, due to the spread of European policies and visions towards a broader perspective that considers physical and social aspects as strictly inter-connected, a „stellar" distance still remains between Italian urban planning and social practices, formal projects and true life, „shadow" and official „production" (Lefebvre, 1974) of urban space, and the continue irreducible re-emerging of what formal planning tends to exclude (de Certeau, 1980). Recalling Rimbaud – and also André Breton's Manifest of Surrealism, both quoted in Kundera (1992) – one could say „la vie est ailleurs" („life is elsewhere").

In the case of Italy – a country in which „planning" means „urbanism", and requires a design input so that planning education is strongly connected with architecture and engineering, differently from both French regional-economic approach and the more discretionary comprehensive integrated approach of UK and North-West European countries – the Europeianisation of urban and territorial policies has meant, during the decade of the '90s, the flourishing of innovative tools and practices that, despite their heterogeneity, can be grouped at least in two main „families": on the one hand, programs concerning urban renewal and regeneration; on the other, programs aimed at the economic development. Such integrated and necessarily inter-sectoral experiences, sharing an attitude towards managing rather than planning in traditional „spatial" terms, tend to emphasise the learning dimension as a basis for further implementations as well as the involvement of both local actors and social networks. Such innovative actions could lead to a shift in traditional planning practices, since the old and rigid hierarchies of plans (in which only one solution is allowed from the general to the more detailed level) are subverted, as more contextualized multiple suggestions can usefully come from the local level.

But traditional approaches still remain, and seem to be strongly rooted also in academic research,[1] so that we can find proposals aimed at regenerating urban peripheries based on a 1000 x 1000-meters „rational" grid (with a central place obviously located in the centre: where, otherwise?) that is exactly the same of certain plans of the early '30s – such as, for example, the Albertini's or Greppi's plans for the city of Milan (see: Albertini, 1929) – in which the idea of the territory as an a-historical tabula rasa, traffic (and market)-oriented engineering, juridical technical tools and „methodologies" were utilised for the increasing of the value of soils as well as the role of the planner itself was to be framed within the need of clearly identify (and steadly occupy) its own disciplinary (and professional) field of action outside the architectural sphere (see: Bianchetti & Ernesti, 1987).

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[1] As an estreme case, see: http://www.urbanisticatre.uniroma3.it/RICERCA/cerasoli_periferie_cittalia.pdf (anyway, a Spanish version also exists, and it is surprisingly labelled as „peer reviewed").

In other words, the three main (often interrelated) research paths explored since the end of the '70s – networking, governance, and rescaling – often seem to remain still ignored in certain pockets of Italian planning theory and practice, and this probably deals with the difficulties in abandoning an (also professional) „mythical" role by making space for further social actors. Not to mention the too often ambiguous relationship between planning practice (and practitioners) and always changing political purposes, which are strictly linked to electoral needs and end up to be „intricately involved in framing and re-framing property markets" (Adams & Tiesdell, 2010) (in other words: to be functional to global/local private interests). In this sense, it is to be added that, in the highly bureaucratic and sectoralised Italian administrative context – too often collusive or, at least, concentrated in preserving its fragment of corporative power – each administrative step can correspond to a „dis-regulation" (Donolo, 2001), that is: a hypertrophic characteristic of formal system that is used by particularist circles to strenghten their power of intermediation as well as the production of non-decisive regulations, whose sense consists of preserving ad infinitum the power of such particularistic circuits by multiplying the opportunities that allow the mediators to mediate.

Such strong persistence of the traditional „rational" and bureaucratic planning frame ends to lead to a substantial distrust towards the „suspicious intentions" (De Carlo, 1980) of the rhetoric on civic engagement in planning processes in all its multifaceted and variegated declinations, since the comforting recipe of standardised and self-referential participatory „best practices" can be seen as corresponding to the first five – „manipulation", „therapy", „informing", „consultation", „placation" – of Arnstein's (1969) „ladders of citizens participation", where the latter is thought as embedded in a „system maintaining" and not in a „system transforming" (Chawla & Heft, 2002) approach. According to this perspective, also the „collaborative rationality" (Innes & Booher, 2010) substantially ends to support the structure of hegemonic power, as it supposes mainly cooperative interactive networks and tends to deny the existence of conflict. In fact, even though a somewhat political dimension of urban planning is recognised, the latter paradoxically ends to be not really explored.

Furthermore, this merely formal approach to civic engagement cannot allow the production of social capital as a pure public good unintentionally resulting from participatory activities and constituting the prior condition to the development of a local society (Coleman, 1988). On the contrary, it rather tends to favour the persistence of the particularistic social capital, i.e.: the result of intentional actions and utilitarian strategies of certain (and often well-known) groups whose scopes are limited and unsustainable in the long run for the society as a whole. As also the academic context tends to be (and too often really is) involved with such particularistic networks and economic interests, the lack of independent academic research – focusing more and more on often unilaterally defined „best practices" as a useful way to avoid considering the existing critical scientific literature produced abroad – obviously does not help in offering insights into the ways in which both contrasting dis-regulations and strenghtening innovative existing trends. It is not a coincidence, however, that illegal planning (and academic) practices and their negative spatial effects are little studied[2] in a country in which illegal interests are strongly rooted due to the historical presence of criminal organisations and activities, and, as many national scandals have shown, corruption largely influences the economic development (and sometimes the academic world).

Last but not least, the described situation does not allow to undestand the shift concerning social needs that contemporary planning is asked answering, namely post-modern social needs emerging from the relevant changes occurred in the still ongoing re-structuring of the contemporary urban space/society.

3   FREE-ZONES INTO URBAN VOIDS, AND THE PARADOX OF CREATIVITY.

3.1 Something happens in residual urban spaces.

Structural changes that have led to the emerging of the so called „new economy" are also the origin of a visible change in urban morphology. Indeed, the European and North American cities that were invested by the processes of industrialization, are dotted with „urban voids" following the process of de-industrialization. The large urban containers, emptied of their previous functions, remain unused for a long time and caught between the complexity of decision-making and speculative expectations dictated by the market. Thus, they end up being both resources diverted from cities and places of insecurity. These abandoned and unused areas

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[2] Exceptions can be found, for example, in studies carried out in recent years by Marco Cremaschi or Daniela De Leo.

are often gradually repopulated by spontaneous, creative and often temporary actions reflecting the self-organizing capacity of urban communities and their minorities. These „free-zones" are often located where living and working arrangement have momentarily run wild: areas of illegal building, residual spaces and demolition areas, red-light districts, temporary occupations, and so on. They are characterized by permanent elusiveness, guerrilla tactics, fundamental uncontrollability and relative isolation, and they also often deal with the ever-shifting relationship between what is legal and illegal, legitimate and illegitimate, authorized and unauthorized.

Free-zones are strictly connected with the practice of squatting: these are urban actors, with specific needs, that are generally excluded or undervaluated by the traditional planning practices and urban policies, and they have neither the political power to see their interests prevail in the ordinary property market and through traditional planning practices. But their presence may enhance the general cultural diversity of an urban area since they often introduce there those uses, such as open spaces, social, cultural and commercial amenities as well as new kinds of informal accessible spaces where people can act, perform and interact (Franck & Stevens, 2007; Haydn & Temel, 2006), that the existing urban form, property values, institutional regulations had previously precluded, so that one could say that these uses compensate for deficiencies in publicy-founded action (Urban Catalyst, 2001).

3.2 Free-zones and creativity.

As Jacobs (1961) had noted by underlining lower rents of disinvested building as a reason enabling creative and risky experimental tenancies for their location, architecture, and former uses, post-industrial „free zones" of cities often host and inspire those „creative" activities that are seen by the well-known Richard Florida's theory (2002) as a driver of attractiveness of the city, since it is believed that economic growth and competitiveness do not just depend on the presence of high-value production, services or flows of goods and investments, but also rely on the city's innovativeness and creative environment, which in turn will attract further creative people and innovative knowledge. Such approach has emerged as part of the broader debate on social economic regeneration as a consequence of the transition to a post-Fordist economy, within which urban cultural policies – in both consumption-oriented and production-oriented version – have assumed a relevant role. Their nature has substantially changed compared to that they originally played from the post-war period onwards, since their function shifted towards fighting the economic decline through flagship projects, city marketing, and the „construction" of decisive mutations in the social behaviours and lifestyle of the urban population (Zukin, 1995), affirming a new post-industrial identity (Cochrane, 2007). All these factors have led to a „culturalisation of entrepreneurialism" (Ribera-Fumaz, 2009) as part of the new „cognitive capitalism" (Moulier-Boutang, 2007), based on the „convergence of economic and culture" (Garcia, 2004) aimed at producing „goods and services whose consumer appeal is derived pre-eminently from the fact that they transmit non-utilitarian aesthetic and semiotic signals" (Scott, 2007). Thus, the cultural dimension has lost its meaning of empowerment (in the sense used by Friedman, 1987) as it has become nothing but an „instrumental" goal.

Thus, on the one hand, creative milieus tend to appear in those areas (and related to those themes) which are deliberately left unplanned, revealing a sort of „shadow planning" involving niches and disadvantaged or neglected zones: contested and „waiting" spaces located in-between different options regarding uses, different life trajectories, different projects and city ideas. On the other hand, instead, creative use of derelict urban sites can also be interpreted as a case of post-fordist production aimed at exploiting the niche of amortised investments – and creative enterprises are typically small, low-capital, and flexible about the spaces they occupy – that are able (and especially in time of reduced public spending!) to accelerate their re-commodification and to optimise their economic potential by cultivating new consumer groups. These ambiguous aspects are documented in the case of Berlin (SenStadt, 2007), where both creative actors and the unused spaces they transform are seen as „the few remaining pools of untapped resources" (Colomb, 2012a), since such new goldfields of symbolic capital fit well to neoliberal demands. It is not a coincidence, therefore, that many scholars (Colomb, 2012a; 2012b; Hamnett, 2003; Pratt, 2009) have found significant parallels between creative re-appropriation and earlier waves of gentrification of post-industrial cities such as New York and London, since they can be seen as „an attractive 'first step' for numerous start-up ventures in the creative economy" (SenStadt, 2007). Thus, those urban actors generally excluded or underevaluated by the traditional planning practices and urban policies can also end being seen as „entrepreneurial self-starters"

or „role models for a neo-liberal society" (Lange, 2007) as well as the activities they informally introduce can be framed within the neo-liberal shift from stable government-led urban service provision and regulation to flexible governance and increasing reliance on entrepreneurial private investments.

3.3 Free-zones and current (preoccupying) trends in urban policies.

At the same time, especially in recent times, tolerance – whose crucial significance for the city's creative and innovative capacity seems to be obvious – is often at odds with another challenge facing metropolises, i.e: how to guarantee sufficient basic quality in areas such as safety, restricting anti-social behaviour, preventing street garbage and so on.

A (preoccupying) example in this sense is given by the British case, where a „zero tolerance" program (Hubbard, 2004a; Belina & Helms, 2003) was promoted since 1997 by the Tony Blair's New Labour party as well as a „Crime and Disorder Act" (1998), an „Anti-Social Behaviour Act" (2003), a „Respect Action Plan" (2006) (see: Johnston, 2004; Lees, 1998), all focusing on the enforcing on control especially over the youth (Rogers & Coaffee, 2005) through „Anti-Social Behaviour Orders", „Child Curfews", „Parenting Orders". Together with the spread of surveillance and control techniques, such as Closed Control Television systems (Coaffee, 2005; Fyfe, 2004; Fyfe & Bannister, 1998; Norris, 1998), such legislative tools, mirroring the Major Giuliani's policies in New York (Schneider & Kitchen, 2002), include not only crimes, but also a wider spectrum of incivilities and anti-social behaviours (Charman & Savage, 2002; Flint, 2006; Flint & Nixon, 2006), which tend to blur the distinction between disruptive and criminal behaviour (Charman & Savage, 2002) and to highlight the emerging of a „politics of behaviour" (Field, 2003) aimed at removing forms of „intimidation" and „tyranny" (Bannister et al., 2006) in public spaces and based on a concept of „majority" that seem to correspond to a specific target group, i.e: the „respectable" (Bannister et al., 2006) consuming urban dwellers (Coleman et al., 2005; Amin et al., 2000; Flusty, 2001). In this sense, many scholars (MacLeod, 2002; MacLeod & Ward, 2002; Atkinson, 2003; Raco, 2003b; Hubbard, 2004b; Bannister et al., 2006; Cameron & Coaffee, 2006; Johnstone & MacLeod, 2006) underline that elements of „revanchist urbanism", as defined by Smith (1996), have characterised New Labour's urban policies. They also highlight the fact that such forms of control of public spaces against certain specific categories of people or activities considered „suspicious" (Coleman & Sim, 2000; Coleman, 2003; 2004) go hand in hand (Morton & Kitchen, 2005) with the emphasys on the concept of „quality" of public spaces given by a extremely detailed design, i.e.: „interdictory architectures" (MacLeod, 2002) of regenerated urban spaces, associated with expectations of specific behaviours (Atkinson, 2003) in spaces where non-consumption can be seen as a form of deviance, according to the deterministic assumption of „a relationship between urban forms and urban behaviours" (Raco, 2003a; as an antecedent, see: Newman, 1972; 1997).[3]

Therefore, a paradox is to be highlighted here. On the one hand, the acceptance of a multiplicity of compatible or conflicting outlooks, lifestyles, codes of behaviour and urban expressions is assumed as a prerequisite for innovation. On the other hand, the strict rules on city use and zero tolerance for wild-side activities tend to snuff out inspiring innovations and lead to the migration of creative potential. But, beyond the absence of commercial attention to derelict urban spaces, cheap rents, and flexible spaces, it is precisely the freedom from constraints that allows new creative actors, who are not purely motivated by profit, to inhabit and operate there.

Furthermore, it is to be underlined that, although free-zones activities may take shape in specific locations, since its informal nature the so-called „creative class" is not so much organised around places as around

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[3] With reference to the Italian case as described in the previous chapter also in its academic and cultural (but also political) dimension, it is to be noted that, despite the existing vast and harshly critical literature on the London case and the wide public debate involving academics and opinionists, with criticism also coming from Richard Rogers himself (i.e: the main New Labour's planner), in Italy Blair's urban polices are presented, instead, as a „best practice" by generically emphasising the concept of „quality of design" as well as the „zero-cost" dimension especially concerning social aspects (who quality is for?). As a significant example, see the issue n. 231 of the Italian journal „Urbanistica Informazioni" (which claims being a peer-reviewed journal) and , particularly, the Lucia Nucci's article (p. 14), without bibliography with the exception of a few official documents. In this sense, the title of the journal allows some irony, since „informazioni" means „informations", so that one could say „dis-informations": in fact, the violent riots occurred in London in August 2011 (with the regenerated and gentrified Southwark literally fenced by police testifying the substantial failure of such approach in achieving its explicit social goals) as well as the related intense debate are not mentioned.

autonomous networks of like-minded participants. The condensation of free-zones activities is not particularly determined by physical conditions, but rather by societal and informal forces in local and global networks of innovators. This means that the creative milieus cannot simply be pinned down in a defined zoning perimeter or in bureaucratic regulations. Finally, as creative activities and uses are intrinsically „bottom-up", they are difficult to create „top-down", and being them short-term, unavoidably contrasting with planning's general focus on fixed long-term visions. Thus, as creative milieus simply happen, and basically cannot be planned, how can urban planning – which is too often primarily oriented towards imposing and regulating – possibly be expected to come up with an effective, appropriate response to something like the fostering of creative milieus? How should policies respond to bottom-up movements and how should the free-zones be facilitated in a way which preserves their own dynamics and characteristics?

4 FREE ZONES AS „RE-ACTIVATION DEVICES".

4.1 Unpacking free-zones.

The establishing of free-zones derives from temporary actions that may have different lifetimes, visibility, opening and closing effects, may result in improving or deteriorating the physical conditions of the area, may produce involvement or mimesis, cohabitation or conflict among actors. Anyway, opening and cleaning, designing and changing, imagining and adapting residual spaces can be intended as a creative activity that requires actors' organisational and relational skills and may be defined as „re-activation devices".

By analysing such re-appropriation of urban spaces as a process, it is possible to clearly distinguish different phases corresponding to specific behaviours, tactics and roles of actors. The first phase may be termed as „colonization", for which well fits the geological metaphor of the earthquake, flooding space with new activities and communication codes, upsetting established local balances and activating energies and competencies that are able to re-organize the area but also to arouse strong oppositions and turmoil. It may take the form of an „event", which can be a planned action and have different durations: the rave parties are the extreme version of this tendency to such rhapsodic constructing of temporary and mobile places that leaves a trace only in the local imaginary. Vice versa, the event can become a pioneer tactic when some temporary uses redefining the abandoned site are able to settle and become permanent. Ephemeral actions can then trigger new uses and practices permanently subverting the semantic codes of that space by staying as symbols of a project and, finally, becoming a rooting place. In this case, seems appropriate the botanic metaphor of the „graft", understood as a practice with different transformation stages: sowing, flowering, and harvesting.

In fact, the beginning of temporary activities results in a start-up phase disseminating new uses and populations; then a waiting time to flowering, in which practices may die or germinate to root and, finally, to be collected and cared for by a „community of practices" (Wenger, 1998). Such communities are spontaneous groups of individuals whose identity is defined from a common interest or a shared activity and who interact in an informal and not hierarchical way through a process of socialization of forms of knowledge that are not easily transferable or formalizable through traditional learning procedures. Therefore, the gradualness of such a process of creative re-appropriation allows time to root activities, and this rooting is a premise in constant care, which is not simply public and civic maintenance of spaces – even necessary – but a guarantee that the re-activation process will continue over time.

When a temporary action stops a permanent use or an already established practice (e.g.: by occupying spaces as a political action), this addresses the need for networking with other organizations and/or finding the support of media. Otherwise, it will be a practice of short lifetime, which, anyway, will show how that space could host other activities. It also may be the case of coexistence (or clashing), in the same abandoned spaces, of different actors and temporary uses, which can be understood in two ways: the first concerns the possibility that the same space is contested by groups with different goals. There will then give rise to conflict or to negotiation and possible co-habitation. A form of co-existence is the persistence of temporary uses even after the settling of new permanent activities, as in the case of an abandoned area that „officially" becomes a parking, but continues to host an informal market on certain days of the week. Anyway, the consolidation of re-appropriation practices can occur after a long period of negotiation with the institutions, but especially by building consensus around temporary activities through the establishing of the new informal uses within the collective imaginary and, then, by formalizing them. In this sense, information and

communication are active devices in witnessing the existence of activities and actors in the residual spaces: both short neighborhood and longer networks may accompany the transformation. At this stage, the artistic expression and experience can play a relevant role.

4.2 Extending networks and coalitions.

In fact, moving from the link connecting art and society (Dewey, 1989), the metaphorical „natural" language historically allowed over time a constant creative reinterpretation of spaces, in which the artistic experience played a crucial role in self-representation of communities: think of religious or popular celebrations and events that defined urban hierarchies and structured public spaces. In this sense, artistic experience can be seen as strictly (re)linked to social practices.

This leads to focus on the articulated field of the contemporary urban art, especially on those artistic experiences based on an overcoming of the concept of form, as dadaist, surrealist and situationist approach. These kind of artistic expressions are based on an interpretation of space as inter-relation and on practices, which are intended as „la partie la plus vivante qui se joue sur l'échiquier de l'art" (Borriaud, 2001). Therefore, it is possible to intend contemporary aesthetic approaches as a contested field of perceptions, experiences, lifestyles and values which articulate cultural practices, research of meaning, processes of individual or collective identification. It means that the artistic experience constitutes a sort of potential multiplier of sensitive experiences, also by those who are not definable as belonging to underground urban movements. In this sense, examples in establishing larger coalitions are given by experiences in which squatting costituted a tactical tool used in the preservation of a cityscape or landscape (for example: against the construction of roads or office blocks) by occupying those places where original inhabitants and users have already been displaced. In neighbourhoods that are under threat of function change, opportunities exist for coalitions between squatters and „legal", traditional inhabitants that share the same interest in protecting their dwellings. Furthermore, coalitions can be extended to cover the issue of quality of life in the neighbourhood. Wider coalitions, across neighbourhoods and across social groups, are possible as well. In Amsterdam, squatting played a role in most of the major protests in the '70s that substantially thwarted the planners' program to modernize the old city. The 1979-1981 squatting wave in Berlin started as conservational squatting. In 1979 in Kreuzberg, the community action group „SO 36" occupied an empty fire station to prevent demolition. The activists proceeded to occupy houses that were slated for razing, because they wanted to preserve both useable housing stock and the structure of the neighbourhood. Historically, squatters have also played an important role as initiators of community groups, as in the case of the neighbourhood committee in Amsterdam's Bethaniën district, the first neighbourhood group to resist city development. Also, protesters against the destruction of a cityscape or landscape deliberately occupied houses that were in the way of a planned subway line (Amsterdam, Nieuwmarkt, 1972-1975), a motorway (UK, the No M11 Link Road campaign in the 1990s) or railway (Betuwelijn, Netherlands. 1998-99). In the case of Rome, occupations of publicly-owned (sometimes historical) office or industrial building that are going to be sold at a very low price in the name of the economic crisis mean highlighting a relevant national issue, and claim social uses rather than 5-stars-hotels or luxury residences, as well as occupations for housing needs show that a low-cost housing problem exists and needs to be urgently tackled, exactly in the same way in which occupations of public schools and universities demand public investments in public (and not private) education.

Finally, such low-impact and reversible „re-appropriations", which act on the urban fabric as an „acupuncture" (Oswalt, 2000), seem able to create micro-economies, as witnessed by experiences such as „Bricolage Plantage" in Bremen, „No Longer Empty" or „Mutual Housing Association" in New York, „Micronomics" and „Micromarchè" in Bruxelles, and many others.

5 CREATIVELY MANAGING URBAN TEMPORARITY.

5.1 A more sensitive approach for re-connecting „shadow" to official planning.

Moving from the evidence of the relevance of free-zones – „micro-utopias under construction" (Paba, 2004), „spaces of insurgent citizenship" (Sandercock, 2003), „places of possibilities" (Lefebvre, 1968) – also in the achievement of an international status, the challenge is to involve within planning theory and practices such interstitial, molecular and often invisible micro-movements without erasing their distinctive features.

Such challenge is to be framed within the emerging deliberative planning theories focusing on the need to elaborate new forms of interaction and innovative not codified answers and solutions to urban (social) problems. This research field focuses on an interpretation in which city is not only intended in a physical (material) sense, but also as a complex plot of inter-subjective emotional inter-relations which involves places. The attention is oriented towards the effects of social representations and actions on urban spaces in order to allow the construction of a local (not global) „actionable knowledge" (Argyris, 1996) enlarging the objectives of planning to the production of social capital. Sensitivity thus needs to be developed in urban and planning policies regarding the conditions under which spontaneous bottom-up initiatives arise. The formal, regulatory, ossifying, territorial-based aspect of urban policy needs to be at least complemented with a greater attention to informal, self-managed, pioneering, elusive, network-based free-zones issues. The reference to Landry's concept (2000) of „cultural literacy", although not appropriate at all, perhaps may be helpful to recall the fracture historically determined between languages – between the objective, scientific („modern") language of planning and the subjective, metaphorical and symbolic („pre-modern") language of „natural" (Alexander, 1975) historical cities – used in the construction of public spaces. In this sense, Landry's „cultural literacy" may be intended as close to the Sandercock's „new literacies" (Sandercock, 2003) through which planners should plan „by negotiating desires and fears, mediating memories and hopes, facilitating change and transformation".

Re-connecting „shadow" to official planning, inter-acting with the always changing free-zones, understanding the role of creative temporary activities within urban regeneration strategies delineate a subtle and contaminative path, which is difficult to lead within a model since shadow planning, free-zones, ephemeral creative activities can assume diverse forms and intensities. Furthermore, because the terrain of some particular artistic experiences is that of a playful dimension, it is implicit that rules are in turn determined by the players. In addition, the difficult to lead them within a model lies in their strong relationship with the specificity of places and problems. But, surely, such an approach may constitute an interstitial experimental space, open to free expression, and also to errors. It need time to be spent, an inter(trans)-disciplinary and contaminative attitude, investment on social capital and also a sort of renewal of planning imaginary. In this sense, the co-evolution of both actors and spaces directly involves the public administrations and their capacity in overcoming traditional and codified procedures and practices: this needs a „visionary leadership" (Sandercock, 2003), which is able to decide to assume and manage all the (inevitable) risks in terms of political consensus, also related to the time factor, strictly linked to this particular kind of experiences. This also implies a shift from an only „material" renewal of spaces towards a broader meaning of regeneration intended as empowerment, which also includes the „immaterial" dimension. Last but not least, problems and risks related to the ambiguities connected to „processes of construction of images" (Scoppetta, 2006; 2009) – as observed in many cases of gentrification – are not to be excluded.

A common feature of such tentative experiences may be that they generally start from spontaneous phenomena of appropriation and often illegal occupation in order to develop self-interested actions that – once proved effective with respect to a wider circle of people – end up to attract the attention of institutions. The latter comes into play later, by making themselves available to negotiation paths that may result in agreements and partnerships not initially considered and sometimes defined through incremental and even conflicting processes. Very often the contrast between the regeneration purposes expressed by the local institutions – inspired by traditional models and oriented to the demolition or renovation of spaces in order to set up traditional functions and/or conventional services – and the aspirations of the informally settled groups (also carrying out their own informal experimentations) can generate an inter-active space that may become an opportunity for collaboration and creative planning, developing new frames within which mobilising additional skills and expertise (architectural, technical, commercial, management, and so on). Obviously, ideas for project cannot derive from pre-established patterns, but they rather may be the innovative outcome of both the area and the long rooting process of new activities. Even the identification of possible managing models, moreover, can only derives from the practical organization and functioning of spaces, by involving multifaceted and different expertise, knowledge, experiences and interests.

5.2 Shifting in planning practices by introducing the concept of temporary „re-use".

Anyway, what is sure is the loss of meaning of certain traditional categories, such as that of „destination of use", which is well adapted to a no longer feasible model of government alluding to an unidirectional and pre-structured assignment of functions. On the contrary, the category of re-use can be more easily traced back to an idea of planning as an articulated and incremental process resulting of the intersection and overlapping of multiple forms of rationality and dynamics among the actors. Such an approach also allows to tackle in an integrated way physical and social aspects that – despite the evolution of planning discipline from the rationalist and functionalist spatial planning, now finally passed – continue to be pointlessly considered as opposite spheres. It shows, on the contrary, that one can be functional to the other: physical aspects, in fact, may be an opportunity in new ways to tackle social aspects, while the latter may be in turn a diriment criterion for rethinking the first ones.

The way in which the temporal dimension is tackled and perceived by the actors becomes crucial since it concerns the possibility of sedimentation and rooting of actors, knowledge, interactions, images and imaginary, mutual learning processes, policies and projects. In this sense, difficulties lie in the fact that public institutions and social groups generally have different routines, needs and time horizons: while the former are stable organizations that base their ability to act and their legitimacy on standardised procedures responding to internal logic (too often allowing dis-regulations), the latter usually act according to different times and priorities, which are related to the achievement of specific goals. Therefore, two different needs are to be reconciled: on the one hand, to construct inter-active spaces that will enable the institutions to move according to their specific abilities; on the other hand, to allow social groups to develop their potential by following appropriate times.

All this implies, of course, a radical shift in urban planning (in fact, already occurred, at least in part) and forces to rethink the role of planner: although – as Faludi (2000) suggests – many planners still like to see themselves at the centre of the action, controlling or reining in other actors, in the globalization age, they can no longer play the „mythical" technical role of the origin of a discipline founded to address the problems due to the industrial revolution by clearly separating functions and designing „modern" orthogonal grids as if there had been neither the crisis of the so-called „normal science" nor the assumption of the paradigm of complexity (Prigogine & Stengers, 1979). Time (and post-colonial studies) raised, moreover, the veils that concealed the essentially political nature of „technical" solutions. And, on the other hand, European policies have definitively sanctioned the shift from government to governance, i.e: from a model centred on the exclusive role of the public actor to another based on collaboration among different and multifaceted subjects.

6   KEEPING THE PUBLIC SPHERE ANCHORED TO SOCIAL CHANGES (A CONCLUSION).

It is evident, therefore, that re-connecting „shadow" to official planning also implies a radical shift in public administration in terms of a greater inter-sectoral and integrated approach, by re-organizing the internal structures. Neither the involvement of creative resources of the society can be intended (as it commonly happens) as a strategy of conflict anticipating/mediating or as an action aimed at building consensus in advance on institutional initiatives. And, in practices of „participatory planning", in spite of significant investments in listening and consultation processes, ideas and proposals are too often trivial and obvious (more green, more security, a playground, a parking ...). It rather means moving on to consider citizens not only as passive recipients of services but as active agents, with knowledge, experiences, skills and abilities that are no longer exclusively concentrated within the institutions. This rather requires the experimentation of innovative configurations of the relationship between institutions and society by exploiting the specific resources that both are able to offer in different situations: for every actor involved, this means to be ready to play different, sometimes multiple and not pre-defined roles, with the institutional as a potential point of reference.

More generally, it is to be understood – by both public administrators and planners – that re-connecting „shadow" to official planning does not deal with the need of subtracting urban spaces to irregular, anti-social and dangerous activities according to a pervasive (presumed) „safety" demand (too often hiding not explicit interests of specific groups). It rather deals with the possibility to enlarge and re-conceptualize the public sphere by intercepting the new and not always easily decipherable social needs (Amin & Thrift, 2005) that have added to the well-known traditional ones, which are (were) normally faced by conventional services. In

this sense, considering free-zones as a not irrelevant factor in the production of urban space means to keep the public sphere anchored to social changes by abandoning the traditional (but no longer useful) logic based on the old concept of „needs" (which requires direct strategies) and rather privileging the opportunities for action, which refers to indirect strategies through which the new emerging needs may be intercepted.

As delineated, the proposed experimental and contaminative path aims to offer insights into alternative ideas of „creativity" – into what creativity could be – by shifting from a neo-liberal vision in which it is intended as a tool for attracting global investments towards, instead, a more comprehensive concept of creativity as „capacity" (Sen, 1999), positive freedom and awareness.

7 REFERENCES

ADAMS, D., TIESDELL S.: Planners as Market Actors: Rethinking State–Market Relations in Land and Property. In: Planning Theory & Practice, Vol. 11, Issue 2, 2010.

ALBERTINI, C.: Il piano regolatore del centro di Milano. In: Rassegna di Architettura, Vol. 1, 1929.

ALEXANDER, Ch.: A city is not a tree. In: Architectural Forum, Vol. 122, Issue 1-2, 1975.

AMIN, A., THRIFT, N.: Città. Ripensare la dimensione urbana. Il Mulino, Bologna, 2005.

AMIN, A., MASSEY, D., THRIFT, N.: Cities for the Many Not for the Few, Policy Press, Bristol, 2000.

ARGYRIS, C.: Actionable Knowledge: Design Causality in the Service of Consequential Theory. In: The Journal of Applied Behavioural Science, Vol. 32, Issue 4, 1996.

ARNSTEIN, S.: The Ladder of Citizen Participation. In: Journal of the Institute of American Planners, Vol. 4, 1969.

ATKINSON, R.: Domestication by cappuccino or a revenge on urban space?. In: Urban Studies, Vol. 40, Issue 9, 2003.

BANNISTER, J., FYFE, N., KEARNS, A.: Respectable or respectful? (In)civility and the city. In: Urban Studies, Vol. 43, Issue 5-6), 2006.

BELINA, B., HELMS, G.: Zero tolerance for the industrial past and other threats: Policing and urban entrepreneurialism in Britain and Germany. In: Urban Studies, Vol. 40, Issue 9, 2003.

BIANCHETTI, C., ERNESTI G. (eds.): Il tecnico urbanista: tre momenti di definizione delle competenze disciplinari. In: Urbanistica, Vol 86, 1987.

BOURRIAUD, N.: Esthétique Relationelle. Le Presses du reel, Dijon, 2001.

CAMERON, S., COAFFEE, J.: Housing Market Renewal as Urban Revanchism?. Paper presented at the Revenge and Renewal Conference, University of Newcastle, 10 – 11 August 2006.

CHARMAN, S., SAVAGE, S.: Toughing it out: New Labour's criminal record. In: POWELL, M. (ed.): Evaluating New Labour's Welfare Reforms. Policy Press, Bristol, 2002.

CHAWLA, L., HEFT, H.: Children's Competence and the Ecology of Communities: A Functional Approach to the Evaluation of Participation. In: Journal of Environmental Psychology, Vol. 22. 2002

COAFFEE, J.: Urban renaissance in the age of terrorism: Revanchism, automated social control or the end of reflection?. In: International Journal of Urban and Regional Research, Vol. 29, Issue 2, 2005.

COCHRANE, A. Understanding Urban Policy. Blackwell, Oxford, 2007.

COLEMAN, J.S.: Social capital in the creation of human capital. In: American Journal of Sociology, Vol. 94, 1988.

COLEMAN, R.: Watching the degenerate: Street camera surveillance and urban regeneration. In: Local Economy, Vol. 19, Issue 3, 2004.

COLEMAN, R.: Images from a neoliberal city: The state, surveillance and social control. In: Critical Criminology, Vol. 12, 2003.

COLEMAN, R., TOMBS, S., WHYTE, D.: Capital, crime control and statecraft in the entrepreneurial city. In: Urban Studies, Vol. 42, Issue 13), 2005.

COLEMAN, R., SIM, J.: 'You'll never walk alone': CCTV surveillance, order and neoliberal rule in Liverpool city centre. In: British Journal of Sociology, Vol. 51, 2000.

COLOMB, C.: Staging the New Berlin: Place Marketing and the Politics of Urban Reinvention Post-1989. Routledge, London, 2012a.

COLOMB, C.: Pushing the urban frontier: Temporary uses of space, city marketing, and the creative city discourse in 2000s Berlin. In: Journal of Urban Affairs, Vol. 34, Issue 2, pp. 131-52, 2012b.

DE CARLO, G.: Altri appunti sulla partecipazione con riferimento a un settore dell'architettura dove sembrerebbe più ovvia. In: ILLICH, I., TURNER, J.F.C., DE CARLO, G., LA CECLA, F.: Autocostruzione e tecnologie conviviali per un uso delle tecnologie alternative nel costruire-abitare, Clueb, Bologna, 1980.

DE CERTEAU, M.: L'invention du quotidien. Gallimard, Paris, 1980.

DEWEY, J.: Art as experience. In: BOYDSTON, J. (ed.) John Dewey: The Later Works, 1925–1953, vol. 10. Southern Illinois University Press, Carbondale, 1989.

DONOLO, C.: Disordine. L'economia criminale e le strategie della sfiducia. Donzelli, Roma. 2001

FALUDI, A.: Beyond Lisbon: Soft European Spatial Planning. In: disP, Vol. 182, 2010.

FALUDI, A.: The performance of spatial planning. In: Planning Practice and Research, Vol. 15, 2000.

FIELD, F.: Neighbours from Hell: The Politics of Behaviour. Politicos, London, 2003.

FLINT, J. (ed.): Housing, urban governance and anti-social behaviour. Perspectives, policy and practice. Policy Press, Bristol, 2006.

FLINT, J., NIXON, J.: Governing neighbours: Anti-social behaviour orders and new forms of regulating conduct in the UK. In: Urban Studies, Vol. 43, Issue 5-6), 2006.

FLORIDA, R.: The Rise of the Creative Class. And How It's Transforming Work, Leisure and Everyday Life. Basic Books, Cambridge (MA), 2002.

FLUTSY, S.: The banality of interdiction: Surveillance, control and the displacement of diversity. In: International Journal of Urban and Regional Research, Vol. 25, 2001.

FRANCK, K.A., STEVENS, Q. (eds.): Loose Space: Possibility and Diversity in Public Life. Routledge, London, 2007.

FRIEDMANN, J.: Planning in the public domain: from knowledge to action. Princeton University Press, Princeton-New York, 1987.

FYFE, N.: Zero tolerance, maximum surveillance? Deviance, difference and crime control in the late modern city. In: LEES, L. (ed.): The Emancipatory City: Paradoxes and Possibilities, Sage, London 2004.

FYFE, N., BANNISTER, J.: The eyes upon the street: closed circuit television surveillance and the city. In: FYFE, N. (ed.): Images of the Street: Planning, Identity and Control in Public Space, Routledge, London, 1998.

GARCIA, B.: Cultural Policy and Urban Regeneration in Western Europe Cities: Lessons from Experience, Prospect for the Future. Local Economy, Vol. 19, Issue 4, 2004.

HAMNETT, C.:. Gentrification and the Middle-class Remaking of Inner London, 1961–2001. In: Urban Studies, Vol. 40, Issue 12, pp. 2401–26, 2003.

HAYDN, F., TEMEL, R. (eds.): Temporary Urban Spaces: Concepts for the Use of City Spaces. Birkhäuser, Basel, 2006.

HUBBARD, P.: Cleansing the metropolis: Sex work and the politics of zero tolerance. In: Urban Studies, Vol. 41, Issue 9, 2004a.

HUBBARD, P.: Revenge and injustice in the neoliberal city: Uncovering masculinist agendas. In: Antipode, Vol. 36, Issue 4, 2004b.

INNES, J.E., BOOHER, D.E.: Planning With Complexity: An Introduction to Collaborative Rationality for Public Policy. Routledge, London, 2010.

JACOBS, J.: The Death and Life of Great American Cities. Random House, New York, 1961.

JOHNSTONE, C.: Crime, disorder and urban renaissance. In: JOHNSTONE, C., WHITEHEAD, M. (eds.): New Horizons in British Urban Policy: Perspectives on New Labour's Urban Renaissance, Ashgate, Aldershot, 2004.

JOHNSTONE, C., MACLEOD, G.: From Urban Renaissance to Sustainable Communities: Soft-focusing Revanchism in England's Towns and Cities?. Paper presented at the Revenge and Renewal Conference, University of Newcastle, 10 – 11 August 2006.

KUNDERA, M.: La vita è altrove. Adelphi, Milano, 1992.

LANDRY, Ch.: The creative city. A toolkit for urban innovators. Earthscan, London, 2000.

LANGE, B.: Entrepreneurial Temporary Use: An Incubator for the Creative Economy. In: SenStadt (ed.):. Urban Pioneers: Temporary Use and Urban Development in Berlin. Jovis, Berlin, pp. 135-42, 2007.

LEES, L.: Urban renaissance and the street: space of control and contestation. In: FYFE, N. (ed.): Images of the Street: Planning, Identity and Control in Public Space, Routledge, London, 1998.

LEFEBVRE, H.: La production de l'espace. Paris, Anthropos, 1974.

LEFEBVRE, H.: Le Droit à la ville, Ed. du Seuil, Paris, 1968.

MACLEOD, G.: From urban entrepreneurialism to a 'Revanchist city'? On the spatial injustices of Glasgow's renaissance. In: Antipode, Vol. 34, Issue 3, 2002.

MACLEOD, G., WARD, K.: Spaces of Utopia and Dystopia: Landscaping the contemporary city. In: Geografiska Annaler, Vol. 84B, Issue 3-4, 2002.

MORTON, C., KITCHEN, T.: Crime prevention and the british planning system: Operational relationships between planners and the police. In: Planning Practice & Research, Vol. 20, Issue 4, 2005.

MOULIER-BOUTANG, Y.: Le capitalisme cognitif. Comprendre la nouvelle grande transformation et ses enjeux. Éditions Amsterdam, Paris, 2007.

NEWMAN, O.: Creating Defensible Space. Office of Policy Development and Research, Washington DC, 1997.

NEWMAN, O.: Defensible Space: Crime Prevention through Environmental Design. Macmillan, New York, 1972.

NORRIS, J. (ed.): Surveillance, CCTV and Social Control. Ashgate, Aldershot, 1998.

OSWALT, P.: Berlin – Stadt ohne Form. Berlin, 2000.

PABA, G.: Insurgent city. Topografia di un'altra Firenze. In: Urbanistica, Vol. 123, 2004.

PRATT, A.C.: Urban regeneration: from the arts feel good factor to the cultural economy: a case study of Hoxton, London. In: Urban Studies, Vol. 46, Issue 5–6, pp. 1041–61, 2009.

PRIGOGINE, I., STENGERS, I.: La nouvelle alliance. Gallimard, Paris, 1979.

RACO, M.: New Labour, community and the future of Britain's urban renaissance. In: IMRIE, R., RACO, M. (eds.): Urban renaissance? New Labour, Community and Urban Policy. Policy Press, Bristol, 2003a.

RACO, M.: Remaking place and securitising space: Urban regeneration and the strategies, tactics and practices of policing in the UK. In: Urban Studies, Vol. 40, Issue 9, 2003b.

RIBERA-FUMAZ, R.: From urban political economy to cultural political economy: rethinking culture and economy in and beyond the urban. In: Progress in Human Geography, Vol. 33, Issue 4, 2009.

ROGERS, P., COAFFEE, J.: Moral panics and urban renaissance: Policy, tactics and youth in public space. In: City, Vol. 9, Issue 3, 2005

SANDERCOCK, L.: Cosmopolis II: Mongrel Cities of the 21st Century. Continuum Intl Pub Group, London, 2003.

SCHNEIDER, R., KITCHEN, T.: Planning for Crime Prevention: A Transatlantic Perspective. Routledge, London, 2002.

SCOPPETTA, C.: The Baltic Sea Macro Region. A soft synaptic space within European rescaling processes. In: Smart planning per le città gateway in Europa. Connettere popoli, economie e luoghi", Atti della IX Biennale delle Città e degli Urbanisti Europei, Genova 14-17/9/2011, INU Edizioni, Roma, 2012.

SCOPPETTA, C.: Immaginare la metropoli della transizione. La città come living machine. Campisano, Roma, 2009.

SCOPPETTA, C.: Salvador de Bahia. Ambiguità dei processi di costruzione dell'immagine negli interventi di sviluppo del turismo culturale. In: Urbanistica pvs, Vol. 42-43, 2006.

SCOTT, A.J.: Capitalism and urbanization in a new key? The cognitive-cultural dimension. In: Social Forces, Vol. 85, Issue 4, 2007.

SEN, A.: Development as Freedom. Oxford University Press, Oxford, 1999.

SENSTADT (Senatsverwaltung für Stadtentwicklung Berlin) (ed.): Urban Pioneers: Temporary Use and Urban Development in Berlin. Jovis, Berlin, 2007.

SMITH, N.: The New Urban Frontier: Gentrification and the Revanchist City. Routledge, London, 1996.

URBAN CATALYST: Analysis report Berlin study draft. Technische Universität Berlin, Berlin, 2001.

WENGER, E.: Communities of Practice: Learning, Meaning, and Identity. University Press, Cambridge, 1998.

ZUCCONI, G.: La città contesa. Jaca Book, Milano, 1989.

ZUKIN, S.: The Cultures of Cities. Blackwell, Oxford, 1995.

Klimaverträglich mobil in Zeiten des demographischen Wandels – Wie wohnen Mobilität bestimmt

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1 ABSTRACT

Die Bundesrepublik Deutschland will bis zum Jahr 2020 den Ausstoß von Treibhausgasen[1] um 40 % im Vergleich zum Jahr 1990 verringern. Langfristig wird sogar eine Reduzierung von mindestens 80 % angestrebt. Im Vergleich zum Basis-Niveau 1990 sind die sind die Treibhausgasemissionen – trotz eines leichtes Anstiegs in Höhe von 2,7 % im Jahr 2010 gegenüber 2009 – um fast 25 % zurückgegangen. Hauptverursacher der Treibhausgasemissionen ist der Ausstoß von CO_2. Um eine nachhaltige Klimaschutzpolitik umzusetzen und die gesteckten Ziele auch wirklich zu erreichen, sind vielfältige Maßnahmen notwendig; Deutschland ist immer noch einer der größten Emittenten der Industriestaaten (Umweltbundesamt 2012). Die Klimaerwärmung und globale Umweltprobleme sind zu einem wesentlichen Teil auch auf den Verkehrssektor zurückzuführen; ist er doch mit ca. 28 % der größte Energieendverbraucher und für knapp 20 % der CO_2-Emissionen verantwortlich (BMVBS 2011). Während der CO_2-Ausstoß seit dem Jahr 1990 bundesweit insgesamt um ca. 20 % gesunken ist, beträgt der Rückgang im Verkehrssektor aufgrund steigender Verkehrsleistungen jedoch nur knapp 6,5 % (dena 2010).

Zum Anstieg der Verkehrsleistung trägt auch der demografische Wandel in nicht unerheblichem Maße bei: So stieg die Führerscheinquote in Deutschland seit dem Jahr 2000 bei den über 60-Jährigen von gut 63 % Prozent auf ca. 80 % an (BMVBS 2010). Und auch die Autonutzung steigt in der Altersgruppe stetig. Mobilität bedeutet – nicht für ältere Menschen – Selbstständigkeit, Freiheit und ein hohes Maß an Lebensqualität. Aufgrund der aktuellen Führerscheinquote der heute 40-Jährigen von mehr als 95 % können die künftig Älteren potentiell häufiger einen Pkw führen. Dies kann sich auf der einen Seite negativ auf den Klimaschutz auswirken und hat auf der anderen Seite auch Folgen für jeden einzelnen: sich auf komplexe Straßenverkehrssituationen und neue Strecken einzustellen, wird mit zunehmendem Alter nicht leichter. Selbst für viele routinierte Autofahrerinnen und Autofahrer kommt irgendwann der Zeitpunkt, da sie sich hinter dem Steuer nicht mehr sicher fühlen. Auch die Entwicklung der Mobilitätskosten spielt eine zentrale Rolle bei der Sicherung einer eigenständigen Mobilität, hängt doch die Pkw-Ausstattung eines Haushaltes direkt mit der Höhe des Haushaltseinkommens zusammen. Je größer der Haushalt und je höher das Haushaltseinkommen ist, desto höher ist i.d.R. auch die Anzahl der Pkw im Haushalt. Alternative Mobilitätsangebote tragen nicht nur zu einer Teilhabe bei, sie können insbesondere bei älterern Menschen Fitness und Selbstvertrauen stärken und die Selbstständigkeit sichern und erhalten.

Das Thema Wohnen und Klimaschutz wird bislang vor allem unter dem Aspekt der energetischen Sanierung behandelt, Mobilität findet in diesem Zusammenhang bislang hingegen kaum Berücksichtigung. Das ist auf den ersten Blick auch nicht verwunderlich, werden doch ca. 35 % der Endenergie zur Beheizung, Warmwasserversorgung und Beleuchtung von Gebäuden benötigt. Andererseits starten oder enden aber mehr als 80 % aller täglichen Wege an der Wohnung; der Wohnstandort ist damit der zentrale Ausgangs- und Endpunkt fast aller Alltagsaktivitäten (BMVBS 2010). Hier werden jeden Tag aufs Neue Entscheidungen zur Verkehrsmittelwahl zur Bewältigung vielfältiger (Alltags)Wege getroffen. Schon bei der Wahl des Wohnstandortes spielt die Verkehrsanbindung eine entscheidende Rolle. Insbesondere für ältere Menschen, aber auch für Familien mit älteren Kindern und Jugendlichen ist dabei die Anbindung an Öffentliche Verkehrsmittel von besonderer Bedeutung. Der Standort und die verkehrliche Erschließung einer Wohnsiedlung bilden die „harten" Rahmenbedingungen für das Mobilitätsverhalten ihrer Bewohnerinnen und Bewohner. So ist der Verkehr ist ein nicht unerheblicher Belastungsfaktor für ein gesundes und sicheres Wohnumfeld, aber gleichzeitig auch ein Motiv für das „Häuschen im Grünen": eine Spirale der Verkehrserzeugung. Durch eine stärkere Verknüpfung der Themenfelder Wohnen und Mobilität sowohl im Hinblick auf die „Hardware" wie wohnstandortnahe Verkehrsinfrastruktur (und das meint nicht nur eine gute Erschließung für den MIV) als auch auf weiche Maßnahmen wie wohnstandortbezogene

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[1] Kohlendioxid (CO_2), Methan (CH_4), Fluorchlorkohlenwasserstoffe (FCKW), Distickstoffmomoxid(N_2O) und Schwefelhexafluorid (SF_6)

Mobilitätsdienstleistungen (z. B. ÖPNV-Ticketing, Car-Sharing oder Car-Pooling, Mobilitätsinformation, Verleih von E-Bikes, Reparaturdienste, Zustellservice) kann der Zugang zu verschiedenen Verkehrsmitteln am Wohnstandort verbessert werden. Wohnungsunternehmen, Verkehrsunternehmen und weitere Mobilitätsdienstleister können durch die Bereitstellung verschiedener Mobilitätsangebote, einen Beitrag leisten, die Wahlfreiheit bei der Verkehrsmittelwahl am Wohnstandort zu sichern. Die Förderung einer umweltfreundlicher Mobilität am Wohnstandort bietet neben den positiven Effekten für das Klima auch signifikante Vorteile für alle Bewohnerinnen und Bewohner und insbesondere ältere Menschen und finanzschwache Haushalte.

2   UNTERSCHIEDLICHE VORAUSSETZUNGEN IN STADT UND UMLAND

Dass der Pkw-Besitz und die Siedlungsstruktur eng miteinander verknüpft sind, ist nicht weiter verwunderlich. So ist der Motorisierungsgrad in ländlichen Regionen am höchsten; die Bewohnerinnen und Bewohner sind aber genauso viel (oder wenig) unterwegs wie Menschen in verdichteten Kreisen und den Kernstädten. Sie sind insgesamt weniger lange unterwegs, legen aber weitere Wege zurück. Dass städtische Dichte verbunden mit einem guten Angebot an Öffentlichen Verkehrsmitteln zu einer reduzierten Nutzung des Pkw beiträgt, zeigen auch die Ergebnisse der deutschen Mobilitätserhebung „Mobilität in Deutschland 2008" (MiD).[2] Mit abnehmender Bevölkerungsdichte – verbunden auch mit einem schlechter werdenden Angebot des Öffentlichen Verkehrs – steigt auch die Anzahl der Pkw im Haushalt. Aber auch zwischen Stadt, Stadtrand und direktem Umland zeigen sich deutliche Unterschiede.

Dicht bebaute Gebiete weisen i.d.R. deutlich bessere Bedingungen für die Nutzung Öffentlicher Verkehrsmittel auf; dispers verteilte Einfamilienhausgebiete und am Stadtrand liegende Einzelhandelszentren oder Gewerbegebiete können oftmals nur mit dem MIV effizient erschlossen werden. Das Verkehrssystem hat umgekehrt aber auch einen hohen Einfluss auf die Ausprägung der Raum- und Siedlungsstruktur. (BMVBS 2010)

So zeigen beispielsweise die Kernstädte Frankfurt am Main und Offenbach die Potenziale einer umweltfreundlicheren Mobilität im Vergleich zum Umland deutlich (Endemann 2013): In der Region Rhein Main besitzen insgesamt 19 % der Haushalte keinen Pkw: in den Kernstädten Frankfurt am Main und Offenbach sind es 31 % , im Umland dagegen verfügen nur 12 % der Haushalte nicht über einen Pkw.

Zwei und mehr Pkw im Haushalt besitzen in den Kernstädten nur 17 % der Haushalte, im Umland hingegen sind es mehr als ein Drittel aller Haushalte. Ein Grund dafür ist sicherlich auch, dass in den Kernstädten deutlich mehr 1-Personen-Haushalte zu finden sind. Steht dem Haushalt allerdings ein Pkw zur Verfügung, dann werden Öffentliche Verkehrsmittel deutlich weniger genutzt (BMVBS 2010).

Kein Auto zu zu besitzen, kann aber auch bedeuten, dass man keinen eigenen Pkw haben möchte; so verzichten ca. 20 % der Haushalte ohne Pkw aus Einstellungsgründen oder weil sie „einen Pkw einfach nicht brauchen" auf ein eigenes Auto. Diese Haushalte sind allerdings aus guten Gründen eher in den Kernstädten zu finden und zu einem sehr großen Anteil 1-Personen-Haushalte (BMVBS 2010).

Bei guten Mobilitätsoptionen werden Öffentliche Verkehrsmittel auch häufiger genutzt, dies zeigen die Auswertungen der MiD beispielsweise in der Region Rhein-Main ganz deutlich. So besitzen dort 33 % der Personen (ab 14 Jahre) in den Kernstädten eine Zeitkarte für den ÖPNV; im Umland sind es nur 16 %; allerdings können auch zwei Drittel der befragten Stadtbewohner einen Schienenhaltpunkt im Umkreis von maximal einem Kilometer erreichen; bei den Menschen aus dem Umland sind es nur gut 40 % (Endemann 2013).

Im Hinblick auf die täglichen CO_2-Emissionen pro Person, den sogenannten CO_2-Fußabdruck aus dem Verkehr, lässt sich feststellen, dass dieser in ländlichen Kreisen um fast ein Viertel höher liegt als in den Kernstädten. Dies ist insbesondere auf den deutlich höheren Anteil des motorisierten Individualverkehrs zurückzuführen – weniger auf die etwas längeren Wege.

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[2] Mobilität in Deutschland (MID) ist die bundesweite Haushaltsbefragung zum Verkehrsverhalten der Bevölkerung. Hierbei werden die außerhäuslichen Aktivitäten und Wege aller im Haushalt lebenden Personen von ausgewählten Stichprobenhaushalten in einem bestimmten Stichtag mittels eines standardisierten Fragebogens erfasst. Im Rahmen der letzten Erhebung im Jahr 2008 erfolgt eine Stichtagserhebung über 12 Monate in ca. 25.000 Haushalten mit mehr als 62.000 Personen.

Insgesamt lässt sich sagen, dass in den weniger dicht besiedelten Gebieten der motorisierte Indivdualverkehr zunimmt, bei einem gleichzeitigen Bedeutungsverlust des ÖPNV.

3 BEDEUTUNG DER ÖV-ANBINDUNG DES WOHNSTANDORTES UND MOBILITÄTSVORAUSSETZUNGEN

Dass die Anbindung an Öffentliche Verkehrsmittel bei der Wohnstandortwahl eine hohe Bedeutung hat, zeigen u.a. die Ergebnisse des Forschungsprojektes „Demographischer Wandel und Wanderungen in der Stadtregion" deutlich. Im Rahmen dieses Vorhabens wurden unter Beteiligung des ILS Zu- bzw. Umzügler zu den Anlässen ihres Umzugs und zur Bedeutung verschiedener Kriterien für die Wahl ihres neuen Wohnstandortes gefragt. Für elf verschiedene Kriterien wurde dabei um eine Bewertung gebeten. Wie nicht anders zu erwarten, haben die Wohnkosten eine besondere Bedeutung und werden von ca. 60 % als „sehr wichtig" eingestuft, für knapp 40 % ist das „Wohnen im Grünen" sehr wichtig und an dritter Stelle steht schon das Kriterium „Anbindung an Busse und Bahnen"; für 33 % der Befragten ist dieser Aspekt sehr wichtig und 40 % von ihnen bewerten die Anbindung an Öffentliche Verkehrsmittel immer noch als wichtig.

Betrachtet man die Gewichtung der verschiedenen Kriterien nach Lebensphasen, so zeigen sich interessante Unterschiede (vgl. Abb. 1). Bei den jungen Haushalten, unabhängig davon, ob Single- oder Paar-Haushalt sind die Wohnkosten von zentraler Bedeutung. Andere Kriterien spielen in dieser Altersgruppe kaum eine Rolle. Dass die Kosten für die Mobilität bei dieser Betrachtung mit einbezogen werden, darf bezweifelt werden, wie auch verschiedene Untersuchungen belegen.

Bei den anderen Haushaltstypen und mit zunehmendem Alter werden die Anforderungen an den Wohnstandort deutlich umfangreicher. Für Familien stehen die Belange der Kinder eindeutig im Vordergrund („kindgerechtes Wohnumfeld", gerne im „Grünen" und „Betreuungsangebote und Schulen"), andere Ansprüche an die Infrastruktur wie etwa „Einkaufsmöglichkeiten im Ort" oder auch die „Anbindung an Busse und Bahnen" werden zurückgestellt. Wahrscheinlich auch deshalb, weil bei einem begrenzten Budget nicht alle Wünsche gleichermaßen zu erfüllen sind. Die Folgen für die alltägliche Mobilität sind absehbar: die Kosten steigen, weite Wege zu Einkaufsmöglichkeiten benötigen einen hohen Zeitaufwand, Kinder werden zur Schule und zu Freizeiteinrichtungen gefahren, bei einem hohen Zeit- und Organisationsaufwand – insbesondere für die Mütter. Ältere Menschen hingegen beziehen deutlich mehr Aspekte in ihre Wohnstandortwahl ein; gleichermaßen bedeutsam sind für sie: kurze Wege zu Versorgungseinrichtungen und Grünanlagen, die Anbindung an Öffentliche Verkehrsmittel zur Gewährleistung ihrer persönlichen Mobilität auch unabhängig vom Pkw, aber auch der Erhalt persönlicher Bindungen („Freunde/Familie am Ort") sowie die Wohnkosten spielen eine Rolle (Dittrich-Wesbuer, Osterhage 2008). In Verbindung mit der absehbaren demographischen Entwicklung bekommen diese Ergebnisse sicherlich noch einmal eine ganz andere Bedeutung.
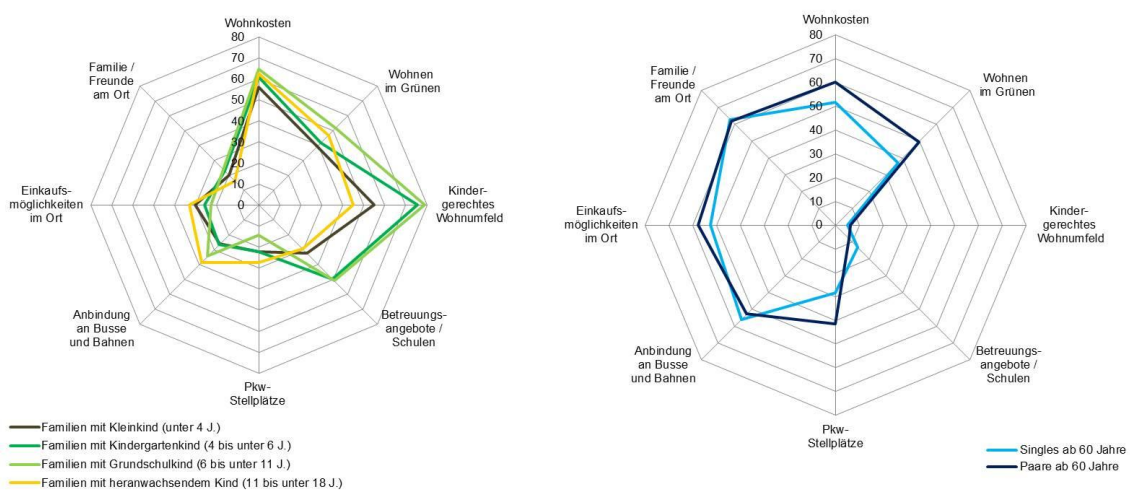
Abb. 1: Kriterien der Wohnstandortwahl nach Haushaltstypen im Bergischen Land; Quelle: ILS trends 2/2008

Betrachtet man die tatsächliche Verkehrsmittelwahl der Bevölkerung so sind je nach Alter und Lebensphase deutliche Unterschiede zu erkennen. Verglichen mit Alleinerziehenden, Personen aus Familienhaushalten und Alleinlebenden unter 65 Jahren, bewegen sich Ältere Menschen ab 65 Jahren (bislang noch) häufig mit

Verkehrsmitteln des Umweltverbundes (zu Fuß, mit dem Fahrrad und öffentlichen Verkehrsmittel) fort. Während Männer in dieser Altersgruppe immerhin noch auf der Hälfte ihrer Wege den Pkw benutzen, sind es bei älteren Frauen nur 23 % (Abb. 2). Dafür sind diese aber auch überdurchschnittlich häufig als Mitfahrerinnen im Pkw und zu Fuß unterwegs.

Dass der ÖPNV älteren Menschen besonders wichtig ist, spiegelt sich in der Verkehrsmittelnutzung nicht direkt wider; werden doch nur 9 % der Wege mit Bus und Bahn zurückgelegt. Deutlich ist jedoch, dass die Verkehrsmittel des Umweltverbundes insgesamt im Alter an Bedeutung gewinnen, auch wenn der Pkw weiterhin das Verkehrsmittel ist, welches am häufigsten genutzt wird.

Das Geschlecht hat noch immer Einfluss auf das Mobilitätsverhalten – insgesamt legen Frauen deutlich kürzere Distanzen als Männer zurück, wobei ihre tägliche Unterwegszeit nur unwesentlich geringer ist. Dies ist darauf zurückzuführen, dass Frauen in allen Altersgruppen und Lebensphasen häufiger zu Fuß und mit öffentlichen Verkehrsmitteln unterwegs sind. Sie sind auch diejenigen, die eine Vielzahl von Begleit- und Versorgungswegen zurücklegen; sie sind es, die die Kinder zur Schule und zum Sport fahren und sich um die Versorgung ihrer älteren Angehörigen kümmern und dazu einen Großteil der Hausarbeit übernehmen.

Personen aus Familienhaushalten messen dem ÖPNV insgesamt keine große Bedeutung zu. Sie sind diejenige Gruppe, die am häufigsten – zumindest einen Pkw zur Verfügung hat und diesen dann auch entsprechend nutzen.
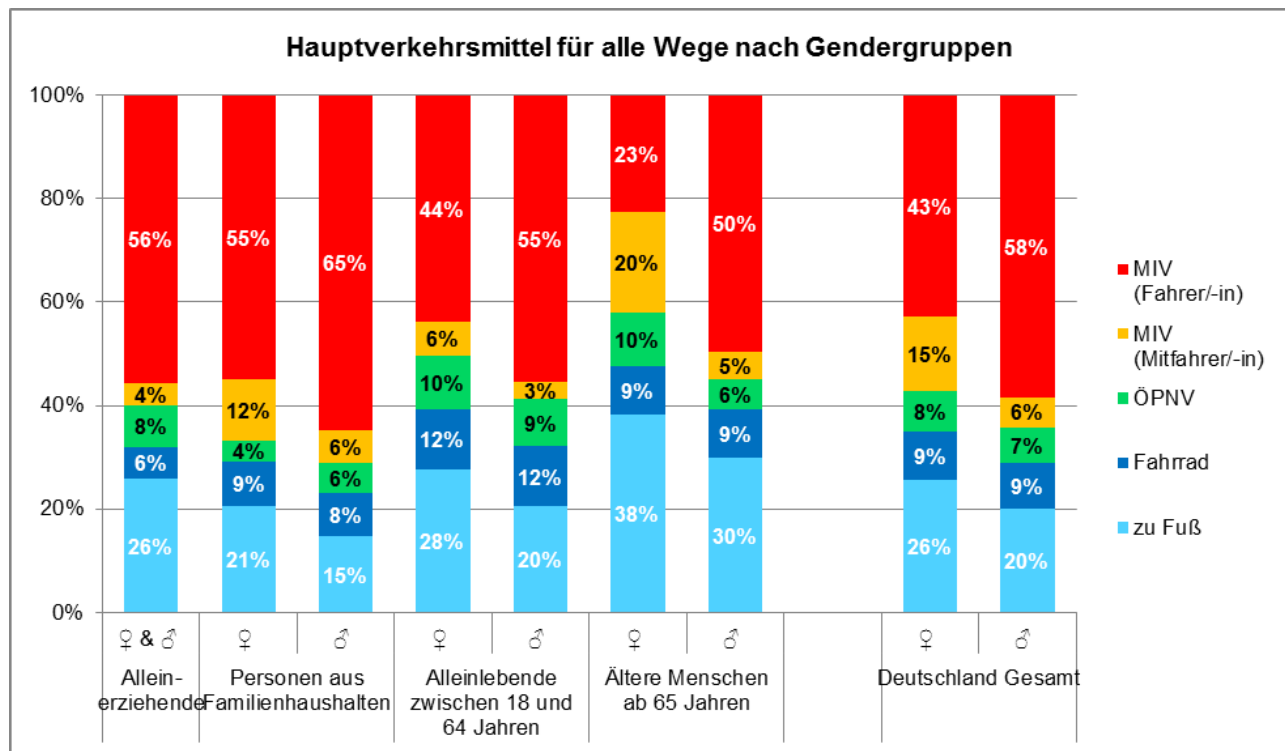
Abb. 2: Hauptverkehrsmittelnutzung nach Gendergruppen, Quelle: MiD 2008, eigene Berechnungen

Eine zentrale Mobilitätsvoraussetzung ist der Führerscheinbesitz; der Anteil der Personen, die einen Führerschein besitzen ist in den letzten Jahren kontinuierlich angestiegen. Insgesamt verfügen 93 % der Männer und 83 % der Frauen in Deutschland über einen Führerschein (BMVBS 2010). Dass der Führerscheinbesitz nicht automatisch mit der Pkw-Verfügbarkeit und damit auch der Pkw-Nutzung einhergehen muss, zeigt sich insbesondere in der Gruppe der jungen Erwachsenen. Besondere im urbanen Raum sind sie immer häufiger mit Öffentlichen Verkehrsmitteln oder dem Fahrrad unterwegs (ebenda). Ob dies eine Trendwende bedeutet, wird sich den kommenden Jahren zeigen.

Die zukünftig älteren Menschen können zwar potentiell häufiger einen Pkw führen – das verdeutlicht die hohe Führerscheinquote, jedoch bestimmen im hohen Alter auch Faktoren wie gesundheitliche Einschränkungen, Beeinträchtigung des Bewegungsapparates etc., aber auch die finanziellen Ressourcen die Mobilitätsmöglichkeiten, weshalb zu vermuten ist, dass der Umweltverbund von großer Bedeutung bleibt.

Die Pkw-Ausstattung eines Haushaltes hängt auch mit der Höhe des Haushaltseinkommens zusammen. Es zeigt sich, dass mehr als die Hälfte aller Haushalte der unteren Einkommensklassen keinen Pkw besitzt. Je größer der Haushalt und je höher das Haushaltseinkommen ist, desto wahrscheinlicher ist der Pkw-Besitz und auch die Zahl der Pkw im Haushalt. Eine weitere wichtige Rolle spielen Faktoren wie die Raumstruktur oder ob Kinder im Haushalt leben.
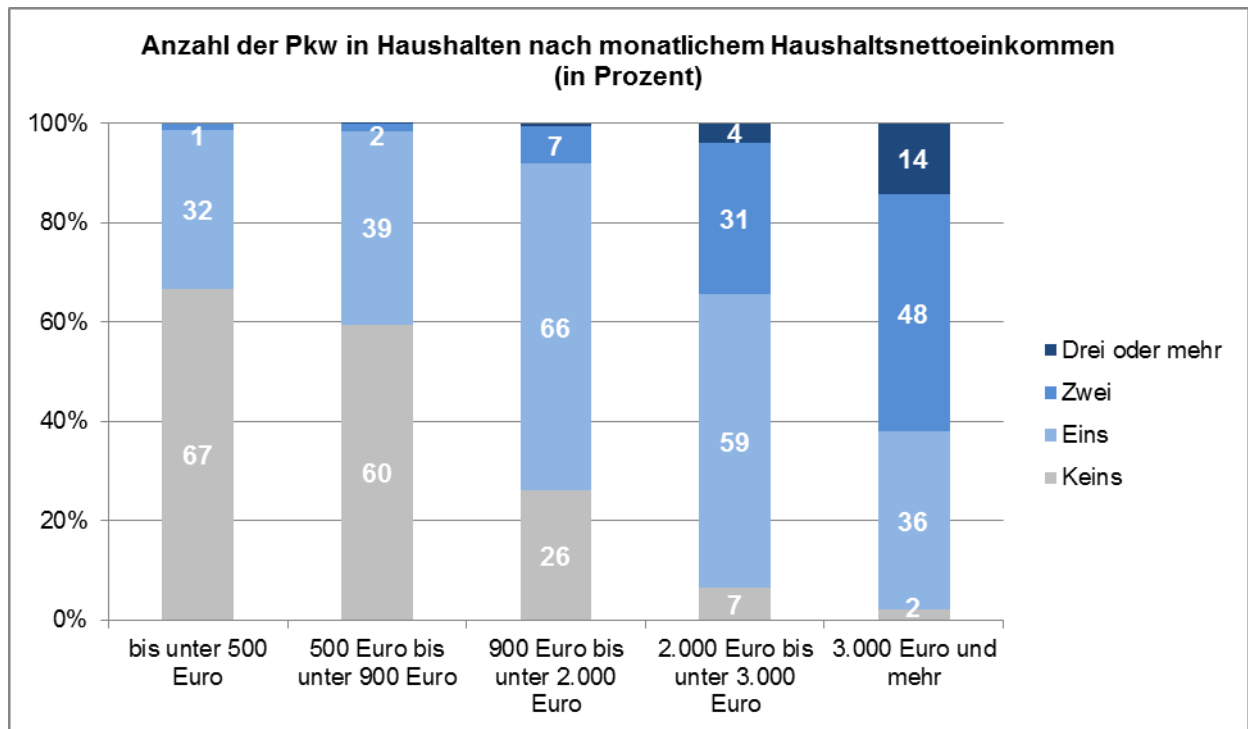
Abb. 3: Anzahl der Pkw in Haushalten nach monatlichem Haushaltsnettoeinkommen, Quelle: Eigene Darstellung nach BMVBS 2010

4 MOBILITÄTSSICHERUNG EINE AUFGABE AUCH FÜR WOHNUNGSUNTERNEHMEN

Seit einiger Zeit verfolgen bereits viele Wohnungsunternehmen die Strategie, ihr „Produkt Wohnung" zum „Produkt Wohnen" auszuweiten, um Kundinnen und Kunden zu gewinnen und an ihr Unternehmen zu binden. So bieten sie beispielsweise einen Umzugsservice, Notrufsysteme, aber auch vergünstigte Mitgliedschaften in Fitnessstudios oder Urlaubsreisen an. Angebote, die die Alltagsmobilität der Bewohnerinnen und Bewohner unterstützen finden sich bislang jedoch noch eher selten.

Durch eine stärkere Verknüpfung der beiden Themenfelder Wohnen und Mobilität sowohl in Bezug auf die wohnstandortnahe Verkehrsinfrastruktur als auch auf „weiche" Maßnahmen wie ÖPNV-Ticketing, Car-Sharing, Mobilitätsinformation, Reparaturdienste, Zustellservice etc. kann der Zugang zu allen Verkehrsmitteln am Wohnstandort verbessert und so eine Wahlfreiheit ermöglicht werden.

Unter diesen Voraussetzungen können Bewohnerinnen und Bewohner immer wieder neu entscheiden, welches Verkehrsmittel sie für welchen Weg aktuell nutzen möchten – auch wenn kein eigenes Auto vorhanden ist oder aufgrund von altersbedingten Einschränkungen das Führen eines Pkw nicht (mehr) möglich ist. Dieser Ansatz ist nicht nur im Wohnungsneubau interessant, sondern kann auch im Bestand etabliert werden. Bei der Umsetzung entsprechender Maßnahmen sind neben der Kommune, die in Ausübung ihrer Planungshoheit Voraussetzungen für den Umweltverbund schafft, viele weitere Akteure gefragt.

Wohnstandortbezogene Mobilitätsdienstleistungen können die traditionellen Geschäftsfelder der Wohnungswirtschaft „rund ums Bauen und Wohnen" ergänzen und die Wohnzufriedenheit der Mieterinnen und Mieter steigern. Insbesondere größere Wohnungsunternehmen können ihr Kernprodukt „Wohnung" durch entsprechendes Engagement attraktiver gestalten.

Um den Bewohnerinnen und Bewohnern eine umweltfreundliche Verkehrsmittelwahl am Wohnstandort zu erleichtern, können neben infrastrukturellen Maßnahmen eine Vielzahl bereits erprobter Mobilitätsdienstleistungen – auch oder gerade durch Wohnungsunternehmen – implementiert werden. Denn

schon bei der Wahl des Wohnstandortes (s.o.) spielen die Anbindung an die örtlichen Verkehrssysteme sowie Art und Umfang der Mobilitätsangebote eine entscheidende Rolle.

Für die Verkehrsunternehmen und andere Mobilitätsdienstleister ergeben sich durch neue Kooperationspartner wie Wohnungsunternehmen auch neue Vertriebswege. Über den „Großkunden Wohnungsunternehmen" können neue Absatzmärkte erschlossen werden, Kundinnen und Kunden können über Direktmailing zielgruppengenau angesprochen werden. Zudem besteht durch einen Kooperationsvertrag mit dem solventen Partner „Wohnungsunternehmen als Großkunde" eine gesicherte Finanzierung und hohe Planungssicherheit.

Auch für Kommunen als Aufgabenträger für die Stadt- und Verkehrsplanung sind wohnstandortbezogene Mobilitätsdienstleistungen ein Beitrag zur umweltverträglichen Abwicklung des Verkehrs und damit eine Maßnahme zu einer nachhaltigeren Stadtentwicklung. Die wohnstandortnahe Bereitstellung aller Verkehrsmittel und eine umfassende Information über das Angebot vor Ort, ermöglichen die Erreichbarkeit alltäglicher Ziele unabhängig vom Besitz eines eigenen Pkw. Davon profitieren alle Bewohnerinnen und Bewohner und insbesondere ältere Menschen und finanzschwache Haushalte.

Die Initiierung, Umsetzung und Finanzierung entsprechender Mobilitätsangebote, sollte vor diesem Hintergrund nicht länger nur eine Aufgabe der kommunalen Stadtentwicklung, Verkehrsplanung und der Verkehrsbetriebe sein, sondern in Kooperation mit Wohnungseigentümern und ggf. auch mit anderen Anbietern von Mobilitätsdienstleistungen angepackt werden.

Definition Wohnstandortbezogenes Mobilitätsmanagement

Unter wohnstandortbezogenem Mobilitätsmanagement werden Maßnahmen bzw. Maßnahmenpakete verstanden, die für Bewohnerinnen und Bewohner bestimmter Quartiere oder Mieterinnen und Mieter bestimmter Wohnungsunternehmen in Kooperation von Wohnungsunternehmen und Mobilitätsdienstleistern entwickelt werden und über die herkömmliche Dienstleistung hinaus einen spezifischen Nutzen für die Adressaten beinhalten.[3]

5 BEISPIELE WOHNSTANDORBEZOGENER MOBILITÄTSDIENSTLEISTUNGEN

Zu Hause beginnen und enden die meisten aller Alltagswege(ketten); hier werden jeden Tag aufs Neue Entscheidungen über die Wahl des geeigneten Verkehrsmittels zur Bewältigung dieser Wege getroffen. Dass wir inzwischen deutlich multimodaler unterwegs sind und festgefahrene, autoorientierte Verhaltensmuster – zumindest in Ansätzen (gerade bei der jüngeren Generation) aufgeweicht sind, zeigen inzwischen eine Reihe von Studien (z. B. ifmo 2011). Je nach Anlass und Ziel werden unterschiedliche Verkehrsmittel gewählt oder auch miteinander kombiniert. Damit dies auch funktioniert, muss ein entsprechendes Angebot vorhanden sein – hier gilt es entsprechende Voraussetzungen zu schaffen, nicht zuletzt auch vor dem Hintergrund der demographischen Entwicklung und der Umweltproblematik, die die aktuellen Herausforderungen für die Städte darstellen.

Es gilt also, Handlungsspielräume zu erweitern sowie Mobilitätsalternativen und die dafür notwendige Infrastruktur am Wohnstandort bereitzustellen, um auch wirklich eine Wahlfreiheit zu errreichen. Diese setzt neben Infrastruktur und Verfügbarkeit verschiedener Verkehrsmittel auch den Zugang zu Informationen über die entsprechenden Verkehrsmittel voraus. Hier setzt das wohnstandortbezogene Mobilitätsmanagement an.

Im Folgenden werden verschiedene Servicefelder und einige bereits erprobte Maßnahmen kurz vorgestellt.

5.1 Angebote rund um den öffentlichen Verkehr

Im Fokus dieses Servicefeldes stehen zwei Dienstleistungen: preisreduzierte ÖPNV-Abonnements, so genannte „Mietertickets" und wohnortbezogene Informationen zum öffentlichen Nahverkehr.

Beim Mieterticket garantiert ein Wohnungsunternehmen als Großkunde eine Mindestabnahme an Tickets und erhält so vom lokalen Verkehrsunternehmen einen Preisnachlass, den Großkundenrabatt. Die Wohnungsunternehmen geben diesen Preisnachlass an ihre Mieterinnen und Mieter weiter, die so in den Genuss preisreduzierter ÖPNV-Tickets kommen. Die speziellen Konditionen variieren nach lokalen und

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[3] Diese Definition wurde im Rahmen des EU-Projekts ADD HOME unter Mitwirkung des ILS entwickelt. http://www.mobilitaetsmanagement.nrw.de/cms1/index.php?option=com_content&view=article&id=88&Itemid=55

regionalen Tarifen und werden zwischen Wohnungsunternehmen und Verkehrsunternehmen ausgehandelt. Erfolgreiche Umsetzungen finden sich in Deutschland beispielsweise in Bielefeld, Bochum oder Kassel.

Ort	Akteure	Merkmale
Bielefeld	moBiel – als lokales Verkehrsunternehmen; Bielefelder Gemeinnützige Wohnungsbaugesellschaft mbH; Baugenossenschaft Freie Scholle e. G.	10 %iger Preisnachlass auf herkömmliche Abotarife bei gleicher Leistung
Bochum	BOGESTRA – Bochum-Gelsenkirchener Straßenbahnen AG; VBW Bauen und Wohnen GmbH	11,5 %iger Preisnachlass auf herkömmliche Abo-Tarife bei nahezu gleicher Leistung (Ticket jedoch nicht übertragbar), gilt für alle Haushaltsmitglieder
Kassel-Unterneustadt	Kasseler Verkehrsgesellschaft und Nordhessischer Verkehrsverbund; WOHNSTADT GmbH, Vereinigte Wohnstätten 1889 eG	für eine Person pro autofreiem Haushalt 75 % Preisnachlass auf herkömmlichen Abo-Tarif im ersten Jahr (durch finanzielle Beteiligung der Wohnungsunternehmen); 10 % in Folgejahren und für weitere Haushaltsmitglieder

Tabelle. 1: Beispiele erfolgreicher Mieterticket-Angebote, Quelle ILS 2011

Die Nutzung von Öffentlichen Verkehrsmitteln setzt Kenntnis über Tarife, Abfahrtszeiten, Liniennetz, Takt usw. voraus. Informationen am „Schwarzen Brett" im Hauseingangsbereich oder elektronische Fahrplan-Terminals, die an zentralen Orten im Wohngebiet aufgestellt werden, können den Zugang zu Informationen erleichtern. Die Bochumer VBW Bauen und Wohnen hält beispielsweise ein Starterpaket für neue Mieterinnen und Mieter bereit, das u.a. Informationen zum ÖPNV, Gutscheine für Tagestickets und Informationen zum Mieterticket enthält.

In Zusammenarbeit mit den örtlichen Verkehrsunternehmen lässt sich oftmals auch die Bedienqualität der Öffentlichen Verkehrsmittel (durch Taktverdichtung, Quartiersbusse etc.), Erreichbarkeit und Ausstattungsqualität der Haltestellen in den Wohngebieten verbessern.

5.1.1   Beispiel: VBW Mieterticket

Bereits seit dem Jahr 2003 bietet die Bochumer Wohnungsbaugesellschaft Vereinigte Bauen und Wohnen GmbH (VBW) als Kooperationspartnerin des örtlichen Verkehrsunternehmens Bochum-Gelsenkirchener Straßenbahnen AG (BOGESTRA) ihren Mieterinnen und Mietern ein vergünstigtes Ticket an. Beim VBW-Mieterticket handelt es sich um ein spezielles Großkundenabonnement des Wohnungsunternehmens; das Wohnungsunternehmen garantiert gegenüber dem Verkehrsunternehmen eine Mindestabnahme. Die Tickets werden (im Jahresabo) mit einem Preisnachlass von ca. 11,5 % angeboten. Dabei können die Mieterinnen und Mieter auf das gesamte Ticketsortiment des Verkehrsverbundes Rhein Ruhr zugreifen. Die Tickets können für alle Haushaltsmitglieder erworben werden, sind jedoch nicht übertragbar.

Die Verträge für die Tickets werden zwischen der BOGESTRA und den Mieterinnen und Mietern abgeschlossen; der Geldeinzug wird von der BOGESTRA übernommen.

Auch wenn der Preisvorteil bereits ein schlagkräftiges Angebot für den Bezug der Tickets ist, muss das Produkt intensiv kommuniziert und beworben werden. Die Produktion von Werbematerialien wird vom Verkehrsunternehmen übernommen und auch die Schulung der Mitarbeiter und Mitarbeiterinnen des Wohnungsunternehmens übernimmt das Verkehrsunternehmen. Alle neuen Mieterinnen und Mieter erhalten mit Abschluss des Mietvertrages entsprechende Informationen zum Mieterticket. Regelmäßig wird auch in der Mieterzeitschrift über das Ticket informiert und über die Homepage der VBW beworben.

Dass sich die Anstrengungen für beide Seiten gelohnt haben, belegen die Zahlen. Derzeit nutzen mehr als 1.250 Mieterinnen und Mieter dieses Angebot, dabei halten sich Neukunden und Stammkunden die Waage. Der größte Anteil der Mietertickets – fast 50 % – aller Tickets entfallen auf die Seniorentickets, die sog. Bärentickets, die von Menschen ab 60 Jahren erworben werden können.

5.1.2   Mieterticket Bielefeld

Bei der Mobilitätsdienstleistung „moBiel-Mieterticket" handelt es sich um ein vergünstigtes Ticketangebot für die Mieterinnen und Mieter der „Bielefelder Gemeinnützige Wohnungsbaugesellschaft" (BGW) und die Mitglieder der Freien Scholle eG. Durch die Garantie einer Mindestabnahme von 100 Tickets treten die Wohnungsunternehmen als Großkunden auf und handeln mit moBiel einen Großkundenrabatt von 10 % aus, der an die Mieterinnen und Mieter weitergegeben wird.

Der 10 % Preisnachlass gilt für das gesamte Ticketangebot im Abonnement und ist für alle Mitglieder des Haushaltes.

Die Verträge werden auch hier zwischen dem Verkehrsunternehmen und den Mieterinnen und Mietern direkt geschlossen, sie gelten zunächst für ein Jahr bei automatischer Verlängerung und sind monatlich kündbar. Die Zahl der verkauften Mietertickets hat sich seit der Einführung im Jahr 2005 um 320 % auf ca. 1.500 Tickets pro Monat gesteigert; die Tendenz ist weiter steigend (Kutziewski 2012).

5.2 Verkehrsmittelübergreifende Informationsdienstleistungen

Neben Informationen, die Verkehrsunternehmen bereitstellen, können verkehrsmittelübergreifende Informationen von den Wohnungsunternehmen selbst weitergegeben werden. Als Informationsmedien sind in erster Linie Kunden- bzw. Mieterzeitungen und Internetauftritte zu nennen.

Informationen speziell für Neukunden können auch über individuell zugeschnittene, persönliche Beratungen oder sog. Starterpakete platziert werden. Diese können beispielsweise Fußgänger- und Fahrradstadtpläne, Stadt-, Stadtteil- und Verbundfahrpläne, Infoflyer zum Car-Sharing, zur Radstation oder zum örtlichen Nahversorgungsangebot beinhalten. Darüber hinaus können den Starterpaketen Schnupper-Tickets für Bus & Bahn oder andere Mobilitätsdienstleistungen beiliegen. Die Entwicklungsgesellschaft Langenhagen hält beispielsweise in Kooperation mit dem GVH – Großraum-Verkehr-Hannover und Stadtmobil Hannover für Hauseigentümer ein Starterpaket bereit; enthalten sind u.a. Radwegekarten, ÖPNV-Fahrpläne, Informationen zum Car-Sharing und einen Gutschein für eine ermäßigte Car-Sharing Mitgliedschaft.

5.3 Wohnstandortbezogene Dienstleistungen rund um die Nahmobilität

Fahrräder brauchen eine diebstahlsichere, witterungsgeschützten und nach Möglichkeit ebenerdige Abstellmöglichkeit; dies gilt verstärkt für E-Bikes und Pedelecs. Was so banal klingt, ist leider immer noch nicht selbstverständlich. Fahrradboxen oder -häuser nahe den Hauseingängen bieten einen solch guten Service zur Fahrradunterbringung. Lassen sich aus Platzgründen – z. B. in Altbauquartieren – auf dem Grundstück keine Fahrradboxen unterbringen, ist dies unter bestimmten Voraussetzungen auch im öffentlichen Straßenraum möglich. Fahrradkeller können mit Hilfe von Rampen und Elektronik ebenfalls barrierefrei zugänglich sein. Fahrradbügel für Kurzzeitparker vor den Hauseingängen vereinfachen den Alltagsgebrauch.

Reparaturmöglichkeiten vor Ort oder gar ein entsprechendes Dienstleistungsangebot sorgen für rasche Instandsetzung und Instandhaltung von Fahrrädern. Weitere Serviceleistungen können beispielsweise Verleihangebote von Kinderanhängern und -trailern, Pedelecs, Lastenfahrrädern oder Tandems sein.

Verbesserungen für den Fußverkehr liegen hauptsächlich im baulich-gestalterischen Bereich des Wohnumfeldes – Begrünung und Bepflanzung, Möblierung und vor allem Fußwegeverbindungen in die Stadtteilzentren. Aber auch Transporthilfen können das Zufußgehen bequemer und einfacher machen. Einkaufstrolleys – durch ein Wohnungsunternehmen als Dankeschön bereitgestellt und mit dem Firmenlogo versehen – können darüber hinaus als Werbeträger eingesetzt werden.

5.4 Wohnstandortbezogene Serviceangebote rund um den Pkw

Hier steht vor allem der Wunsch nach einer hohen Pkw-Verfügbarkeit durch ein entsprechendes Car-Sharing-Angebot im Vordergrund. Meistens wird das Angebot in Kooperation mit einem örtlichen Car-Sharing-Unternehmen realisiert, welches entweder eine neue Car-Sharing-Station wohnortnah einrichtet oder bereits in Wohnortnähe vertreten ist. Die Parkplätze werden i. d. R. von den Wohnungsunternehmen oder Eigentümergemeinschaften zur Verfügung gestellt. Die Fahrzeugbereitstellung sowie die Wartungs-, Buchungs- und Abrechnungsvorgänge übernimmt das Car-Sharing-Unternehmen.

Unterscheiden lassen sich offene und exklusive Angebote. Bei offenen Angeboten stehen die Fahrzeuge den Wohnkunden zu besonderen Konditionen zur Verfügung, sind aber auch offen für alle anderen Kunden des Car-Sharing-Unternehmens und kann so auch zu einer Verbesserung der Auslastung beitragen. Gleichzeitig können die Wohnkunden nicht nur die Fahrzeuge an "ihrer" Station nutzen, sondern sämtliche Fahrzeuge des Car-Sharing-Unternehmens und damit auf eine große Vielfalt an Fahrzeugtypen zugreifen.

Exklusive Angebote können hingegen ausschließlich die Wohnkunden nutzen. Damit ist der Nutzerkreis eher klein, dafür aber persönlich bekannt. Die Fahrzeuge werden vom Wohnungsunternehmen selbst

bereitgestellt. Besonders interessant für Wohnungsunternehmen wird ein Car-Sharing-Angebot, wenn die eigenen Dienstfahrten ebenfalls mit Car-Sharing-Fahrzeugen durchgeführt werden und so die Anzahl der Firmenfahrzeuge reduziert werden kann.

Ort	Akteure	Merkmale
Berlin	GSW Immobilien GmbH; Greenwheels	neue Stationen in unmittelbarer Nähe zu GSW-Wohnungsbeständen; offenes Car-Sharing; günstige Konditionen für Mieterinnen und Mieter (wie für ÖPNV-Abo-Kunden)
Bonn	Bewohner des autoarmen Stadtquartiers Bonn-Amaryllis	nachbarschaftlich organisiertes Car-Sharing
Köln	GAG Immobilien AG, cambio carsharing Köln	neue Stationen in unmittelbarer Nähe zu GAG-Wohnungsbeständen; vergünstigte Teilnahme an offenem Car-Sharing
Münster	Wohnungsgesellschaft Münsterland Stadtteilauto Münster	neue Station für autofreie Gartensiedlung Weißenburg; offenes Car-Sharing; vergünstigte Teilnahme für Mieterinnen und Mieter der Siedlung

Tabelle 2: Beispiele erfolgreicher Car-Sharing-Angebote, Quelle: ILS 2011

6 FAZIT

Eine Reihe von Pilotprojekten hat bereits gezeigt, dass mobilitätsbezogene Serviceangebote von Wohnungsunternehmen in Bestandsquartieren mit einkommensschwächeren Haushalten, mit älteren Bewohnerinnen und Bewohnern und mit vergleichsweise geringer Pkw-Quote auf messbare Nachfrage treffen. Gerade für diese Nutzergruppen werden Angebote geschaffen, die ihre Mobilität und damit Teilhabemöglichkeit sicherstellen.

Darüber hinaus tragen die Angebote zumindest bei den Nutzerinnen und Nutzern zum Imagegewinn, zur Kundenzufriedenheit und damit auch zur Kundenbindung sowohl für das Wohnungs- als auch das involvierte Verkehrsunternehmen bei. Das Engagement für die Mobilität der Mieter wird insgesamt positiv wahrgenommen und überwiegend als wichtig erachtet. Im Falle des Mietertickets ist zu vermuten, dass zumindest bei einem Teil der Neukundinnen und Neukunden, die als sogenannte Wahlfreie mehrere Verkehrsmittel zur Auswahl haben, mit dem Abonnement auch Veränderungen des Mobilitätsverhaltens einhergehen. Finanzschwache Haushalte profitieren monetär von dem kostengünstigen Ticket.

Mobilitätsdienstleister können über den Kooperationspartner Wohnungsunternehmen gegebenenfalls neue Absatzmärkte erreichen und ein zielgruppengenaues Marketing entwickeln, da die Zielgruppe i. d. R. bereits gut bekannt ist. Bei der Akquisition neuer Kunden kann der Mobilitätsdienstleister unter Umständen von dem Vertrauensverhältnis profitieren, das das Wohnungsunternehmen als vermittelnder Partner mit seinen Mieterinnen und Mietern pflegt. Wenn das Angebot über den vertrauten Partner kommuniziert wird, genießt dies eine höhere Akzeptanz. Wohnstandortbezogene Mobilitätsdienstleistungen können darüber hinaus die Kundenbindung von Mieterinnen und Mietern, die bereits Kunden des Mobilitätsdienstleisters sind, erhöhen.

Für die öffentliche Hand kann das verstärkte Engagement einer Verknüpfung der Bereiche Wohnen und Mobilität bedeuten, dass der kommunale Modal Split positiv zu Gunsten des Umweltverbundes beeinflusst wird. Es kann dazu beitragen, dass Mobilitätsoptionen für benachteiligte Bevölkerungsgruppen gesichert werden. Vor allem bei der Setzung der infrastrukturellen Rahmenbedingungen kommt der Kommune eine zentrale Bedeutung zu; aber auch in weiteren Handlungsfeldern haben haben Kommunen gute Voraussetzungen, Wohnstandortbezogenes Mobilitätsmanagement zu unerstützen und so, auch in ihrem eigenen Interesse, eine effizientere und umweltverträglichere Mobilität zu fördern.

Insagesamt lässt sich sagen, dass insbesondere sogenannte „weiche Maßnahmen" kostengünstig realisierbar sind und reletiv schnell umgesetzt werden können. Und es besteht in der Regel eine Win-Win-Situation für alle beteiligten Akteure und die Bewohnerinnen und Bewohner.

7 LITERATUR

BÄUMER, Doris; VELINI, Roberta; STEGER-VONMETZ, Christian; KÖLLINGER, Claus: Wohnstandortbezogenes Mobilitätsmanagement. Projektdokumentation des EU-Projektes ADD HOME. O.O., 2010.
BUNDESMINISTERIUM FÜR VERKEHR, BAU UND STADTENTWICKLUNG (BMVBS): Mobilität in Deutschland 2008. Ergebnisbericht. Struktur – Aufkommen – Emissionen – Trends. Bonn und Berlin, 2010.

BUNDESMINISTERIUM FÜR VERKEHR, BAU UND STADTENTWICKLUNG (BMVBS): Verkehr in Zahlen 2011/2012. Hamburg, 2011.

DEUTSCHE ENERGIE AGENTUR (dena): effizient mobil. Das Aktionsprogramm für Mobilitätsmanagement. Projektdokumentation 2008 – 2010. Berlin, 2010.

DITTRICH-WESBUER, Andrea; OSTERHAGE, Frank: Wohnstandortentscheidungen in der Stadtregion. Das Beispiel „Bergisches Land". In: INSTITUT FÜR LANDES- UND STADTENTWICKLUNGSFORSCHUNG (ILS): ILS Trends 2/08. Dortmund, 2008.

ENDEMANN, Peter: MiD in Stadt und Region. Mehr Nachfrage für Bus und Bahn. Ergebnisse der Mobilität in Deutschland für die Region Frankfurt/Rhein-Main. In: Der Nahverkehr 1-2, 2013, pp. 28 – 35.

INSTITUT FÜR LANDES- UND STADTENTWICKLUNGSFORSCHUNG UND BAUWESEN DES LANDES NORDRHEIN-WESTFALEN (ILS NRW): Mieterticket und Co. Erfolgsfaktoren siedlungsbezogener Mobilitätsdienstleistungen. (=ILS-Schriften, Band 191). Dortmund, 2003.

INSTITUT FÜR LANDES- UND STADTENTWICKLUNGSFORSCHUNG (ILS); LEG ARBEITSMARKT- UND STRUKTURENTWIKLUNG: Mobilität trifft Wohnen. Eine aussichtsreiche Begegnung. Dokumentation des 9. Fachgesprächs „Wohnungsunternehmen als Akteure in der integrierten Stadt(teil)entwicklung. Dortmund, 2009.

INSTITUT FÜR LANDES- UND STADTENTWICKLUNGSFORSCHUNG (ILS): Mobilität trifft Wohnen – Eine Aussichtsreiche Begegnung. Unveröffentlichtes Arbeitspapier. Dortmund, 2011.

INSTITUT FÜR MOBILITÄTSFORSCHUNG (ifmo): Mobilität junger Menschen im Wandel. Multimodaler und Weiblicher. München, 2011.

INSTITUT FÜR MOBILITÄTSFORSCHUNG (ifmo): Mobilität 2025. Der Einfluss von Einkommen, Mobilitätskosten und Demographie. Berlin, 2008.

KUTZIEWSKI, Gerhard: moBiel. Mobilitätsdienstleister in Bielefeld mit Ausstrahlung in die Region Ostwestfalen-Lippe. In: STIEWE, Mechtild; REUTTER, Ulrike: Mobilitätsmanagement. Wissenschaftliche Grundlagen und Wirkungen in der Praxis. Essen, 2012.

STIEWE, Mechtild: Mietertickets und mehr – Beispiele wohnstandortbezogenen Mobilitätsmanagements. Vortrag auf der Tagung „Wohnen und Mobilität: Mobilitätsplanung bei Wohnsiedlung – Ansätze für die 2000 Watt-Gesellschaft" der HRS Hochschule für Technik Rapperswil, 04.10.2012, Rapperswil, Schweiz.

STIEWE, Mechtild; REUTTER, Ulrike: Mobilitätsmanagement. Wissenschaftliche Grundlagen und Wirkungen in der Praxis. Essen, 2012.

VERKEHRSCLUB ÖSTERREICH (VCÖ): Mobilität und Verkehr im demographischen Wandel. (=VCÖ-Schriftenreihe „Mobilität mit Zukunft 1/2007). Wien, 2007.

VCÖ-FORSCHUNGSINSTITUT: Wie Wohnen Mobilität lenkt. (=VCÖ-Schriftenreihe „Mobilität mit Zukunft" 4/2010). Wien, 2010.

www.mobilitaetsmanagement.nrw.de

Kollektive Strategien für zukunftsfähige Stadtentwicklung – Erfahrungen aus einem partizipativen Szenarienprozess in Niederösterreich

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1 ABSTRACT

In view of uncertain and incomplete knowledge, predictions and forecasts often turn out to be an insufficient base for decision making in urban planning. Moreover, strictly science driven approaches are not sufficient to provide a full problem analysis and evaluation and to develop broadly accepted strategies for future development (Truffer 2007). In this context, participatory scenario planning offers a method for the synthesis of manifold sources of multi-disciplinary expert knowledge and lay knowledge of the local population (e.g., regarding the local problems perceived or the future urban development desired). This paper argues that participatory scenario planning allows the integration of qualitative target-knowledge such as visions on desired development paths with expert knowledge and may contribute to a broader sense of community and cohesion by offering a partnership learning environment. The paper draws on experiences from a case study in the city of Korneuburg, a district capital in Lower Austria with about 12.000 inhabitants, next-door to the metropolis of Vienna. The methodological framework relies on building stones of formalised scenario analysis, a structural and development analysis combined with normative future visions of stakeholders and a participatory process giving special attention to community building. Different forms of direct interaction are complemented by a web-blog, an online mapping tool for the youth and an analogue (B)logbook.

The still ongoing process already showed that the scenario method was very helpful for the integration of expert and lay knowledge into four scenarios for the future development of Korneuburg until 2036. Incidentally, it created a framework for social learning on the question of what constitutes desired urban development and – maybe even more important – it generated sense of community, identity and social capital among those who will have to implement the future strategies by their collective action.

2 EINLEITUNG

Entscheidungsträgerinnen und Entscheidungsträger in der Stadtentwicklung sind herausgefordert, Zukunftsstrategien zu entwerfen, die einem hohen Ausmaß an Komplexität gerecht werden. Dem demographischen oder klimatischen Wandel muss beispielsweise ebenso Rechenschaft getragen werden, wie technologischen Entwicklungen oder der Vielzahl an involvierten Akteurinnen, Akteuren und Interessen. In diesem Kontext oft unvorhersehbarer Veränderungen und Unsicherheiten sollen Entscheidungen in der Gegenwart dennoch vorausschauend reflektiert und zukunftsfähig ausgerichtet werden können (Kosow und Gaßner 2008; McDonald et al. 2009). Angesichts des hohen Grades an unsicherem und unvollständigem Wissen sind Vorhersagen und Prognosen oft eine nicht adäquate Entscheidungsgrundlage.

In diesem Kontext bietet die Szenarioentwicklung eine Methode für die Synthese vielfältiger Quellen multidisziplinären Expertenwissens und des Erfahrungswissens der lokalen Bevölkerung (z.B. Wahrnehmung lokaler Problemstellungen oder Wünsche für zukünftige Entwicklungen) und unterstreicht damit die Stärke der Regionalentwicklung, lokalem Wissen mit hoher Sensibilität zu begegnen (Barnes, 2003). Die Szenariomethode hat sich bereits als vielversprechendes Werkzeug etabliert, mögliche Zukunftsperspektiven als Entscheidungsgrundlage für lokale und regionale Entwicklungsstrategien zu veranschaulichen (Kirchner-Heßler 2004). Der vorliegende Artikel stellt dar, dass Szenarienprozesse darüber hinaus geeignet sind, qualitatives Zielwissen wie Visionen und gewünschte Entwicklungspfade in Planungsinstrumente zu integrieren sowie zur Stärkung von Gemeinschaftssinn und Zusammenhalt beizutragen, indem soziale Lernprozesse initiiert und forciert werden.

Die Argumentation stützt sich auf Erfahrungen aus dem partizipativen Leitbildprozess der Stadt Korneuburg. Die niederösterreichische Bezirkshauptstadt mit rund 12.000 Einwohnerinnen und Einwohnern, unmittelbar vor den Toren Wiens gelegen, startete im April 2012 einen partizipativen Szenarienprozess. Dieser wurde bottom-up initiiert und umfasst Akteurinnen und Akteure aller im Gemeinderat vertretenen Fraktionen, der Verwaltung sowie aus Zivilgesellschaft und Bürgerinnen und Bürger ebenso wie ein Wissenschaftlerteam

mit disziplinären Hintergründen in Geographie, Architektur, Landschaftsplanung und Regionalentwicklung. Ende 2013 sollen ein breit akzeptiertes und politisch verabschiedetes Leitbild mit der Ausrichtung auf das Jahr 2036 (900 Jahre Stadtjubiläum) sowie ein Masterplan mit Handlungsempfehlungen für die nächsten zehn Jahre fertiggestellt sein.

Im Rahmen des Projekts Korneuburg 2036 wurde die Methode der formativen Szenarioentwicklung (Erheben von Trends und Einflussfaktoren sowie der Bandbreite möglicher zukünftiger Ausprägungen und deren Kombination) mit einem normativen Visions-Prozess verknüpft. Verschiedene Wissensebenen – quantitatives und qualitatives Systemwissen, Zielwissen darüber, wie die Zukunft Korneuburgs in den Augen der Bürgerinnen und Bürger aussehen könnte und Handlungs-/Transformationswissen, um den angestrebten Zustand erreichen zu können – werden im diesem Prozess integriert (Truffer 2007). Die Zusammenführung von verschiedenen Akteurinnen und Akteuren und deren Wissensbeständen impliziert auch die Chance, einen gemeinsamen Lernprozess und damit einen Beitrag zum Community Building zu leisten – nicht zuletzt als Beitrag zur Steigerung der Akzeptanz der erarbeiteten Ergebnisse.

Da der Szenarioprozess hinsichtlich seines Potentials für Community Building und Wissensintegration diskutiert werden soll, wird zu diesen Themen im folgenden Abschnitt ein Überblick aus der Literatur gegeben. Danach werden die Fallstudien-Stadt Korneuburg, die beteiligten Stakeholder und die einzelnen Schritte des Szenarioprozesses sowie die Ergebnisse im Detail dargestellt. Schließlich wird diskutiert, ob die Erwartungen hinsichtlich community building, social learning und Wissensintegration tatsächlich erfüllt werden konnten.

2.1 Die Szenariomethodik – eine Einführung

In der Literatur finden sich vielfältige Definitionen von Szenarien, auch die methodischen Verfahrensweisen zu deren Erstellung unterscheiden sich je nach Zielsetzung. Wilms (2006) beschreibt ein Szenario als "plausibel ausformuliertes, hypothetisches Zukunftsbild eines abgegrenzten Problemfeldes, das alternative Entwicklungsmöglichkeiten berücksichtigt und der Entscheidungsvorbereitung dient". Szenarien bieten "eine Einschätzung dessen, was denkbar und plausibel ist" (Groß et al. 2011) und zeichnen damit (im Gegensatz zu Prognosen und Trendfortschreibung) nicht die Zukunft, wie sie (vermutlich) sein wird, sondern wie sie sein könnte (Wiek 2002). Normative Szenarien konstruieren mögliche positive und wünschenswerte Zukunftssituationen "Was wollen wir und wie können wir es erreichen?" (Schulz-Montag 2006). Gleichzeitig kann aufgezeigt werden, worin gegenwärtiges Handeln resultiert und welche Entwicklungsperspektiven sich durch Verhaltensänderungen einstellen. Ein Szenario beschreibt demnach nicht nur einen hypothetischen Zustand in der Zukunft, sondern auch die Entwicklungswege, Handlungsschritte und treibenden Kräfte, aus denen ein bestimmtes Zukunftsbild resultiert und dient u.a. der "Ermittlung von kritischen Entscheidungspunkten und Eröffnung von Handlungsoptionen" (Schulz-Montag 2006).
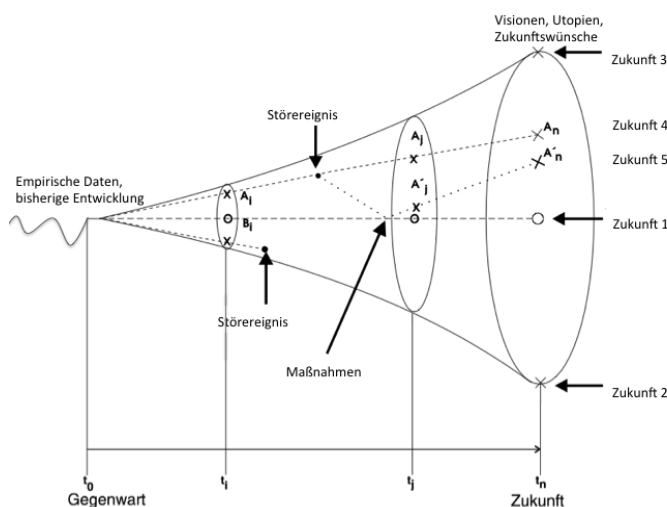
Abb. 1: Der Szenariotrichter (verändert nach Liening und Mittelstädt, 2009)

Allen Ansätzen gemeinsam ist das Aufspannen möglicher Zukunftsräume in einem weiten Planungshorizont. Ziel ist ein – von gegenwärtigen Bedingungen, Normen und Grenzen losgelöstes – Aufzeigen von

Entwicklungsperspektiven. Die Szenariomethode versucht zunächst, auf Basis struktureller Analysen von Vergangenheit und Gegenwart jene driving forces zu identifizieren, welche die Entwicklung des Systems wesentlich steuern und analysiert darauf aufbauend mehrere Zukunftspfade dieser Entwicklungsfakoren in ihren Wechselwirkungen zueinander, um schließlich konsistente Bilder über mögliche Zustände in der Zukunft darzustellen. Unter Einbezug qualitativer Informationen von lokalen Wissensträgerinnen und Wissensträgern werden verschiedene plausible und mitunter stark divergierende Zukünfte in narrativer Form erarbeitet. Qualitative, narrative Szenarien-Elemente eignen sich vor allem zur Analyse komplexer Situationen mit einem hohen Ausmaß an Unsicherheiten und wenn relevante Informationen nicht gänzlich quantifiziert werden können. Gleichsam kann die Kombination qualitativer und quantitativer Elemente die Konsistenz und Robustheit von Szenarien erhöhen (van Notten et al. 2003).

Ursprünglich im militärischen Kontext entstanden und zunächst vorwiegend im Kontext ökonomischer Fragestellungen weiterentwickelt hat sich die Szenarioerstellung als Methode in der räumlichen Planung etabliert. Auch in Österreich wurden bereits mehrere Szenarienprozesse zur Entwicklug von Regionen und Städten durchgeführt (z.B. ÖROK 2009; Penker und Wytrzens 2005; Muhar und Freyer 2006). Die Stärken der Methodik im Anwendungskontext dieses Papers liegen darin, "die vielschichtigen qualitativen und quantitativen Informationen zu verknüpfen, deren Systemdynamik zu erfassen und in einer vernetzten, ganzheitlichen und interdisziplinären Betrachtung transparente und nachvollziehbare Zukunftsbilder zu entwickeln, aus denen eine zukunftsrobuste Leitstrategie abgeleitet werden kann" (Kirchner-Heßler 2004). Die Ergebnisse des Szenarioprojekts beruhen auf der Integration wissenschaftlicher Studien und quantitativem sowie qualitativem Datenmaterial mit implizitem (Ziel-)Wissen von Expertinnen und Experten aus Zivilgesellschaft, Politik und Verwaltung. Ziel ist der Entwurf von zwei bis fünf visionären Szenarien sowie die anschließende Auswahl (Abstimmung durch Bürgerinnen und Bürger) des gewünschten Zukunftsbildes und dessen Überführung in ein Stadtleitbild, welches in der Folge als Grundlage für zukünftige Entscheidungen dienen kann (Masterplan). Anspruch an die methodische Vorgehensweise war, komplexe Szenarienbilder (im Gegensatz zu sektoralen Szenarien) erarbeiten zu können, die multiple, miteinander in Wechselwirkung stehende und multidisziplinäre Fragestellungen auf verschiedenen räumlichen Ebenen erfassen. Die Szenarien sollten nicht eine Fortschreibung aktueller Entwicklungen abbilden, sondern als backcasting-Szenarien von der Gegenwart losgelöste Zustände in der Zukunft entwerfen sowie die Wege zu deren Erreichung explorieren (dazu auch van Notten et al. 2003).

2.2 Die partizipative Szenarioentwicklung als Lernort für nachhaltige Stadtentwicklung

Die Komplexität räumlicher Entwicklung und ihrer Planbarkeit für die Zukunft erfordert eine neue Form der Wissensproduktion, als "Mode 2 Wissenschaft" (Gibbons et al. 1994; Nowotny et al. 2001) oder "post normale Wissenschaft" (Funtowicz und Ravetz 1993) bezeichnet. Der gemeinsamen Wissensproduktion durch Gesellschaft und Wissenschaft kommt dabei neben Interdisziplinarität, Problemorientierung und Kontextualisierung eine entscheidende Rolle zu. Hirsch-Hadorn et al. (2008) betonen die Bedeutung regionaler Akteurinnen und Akteuren als Trägerinnen und Träger impliziten Wissens zu regionalen Präferenzen und Prioritäten sowie über die "Erfahrung, ob, wo und wie in bestehende Verhaltensmuster interveniert werden kann". Die Szenarioentwicklung bietet hierzu ein geeignetes Instrument, um "gemeinsam mit den Akteuren eine zukunftsrobuste Strategie in einem komplexen Themenfeld zu entwickeln" (Kirchner-Heßler 2004). Sie stützt sich nicht ausschließlich auf wissenschaftliches und quantifizierbares Expertenwissen (im Gegensatz zu Prognosen oder Simulationen), sondern integriert als transdisziplinäres Instrument alltagspraktisches Wissen von Praxisakteurinnen und Praxisakteuren sowie deren Einschätzungen zu regionalen Prioritäten oder regionaler Handlungsfähigkeit (Graf 2004; McDonald et al. 2009), was die Problemlösungskompetenz des Methodeneinsatzes erhöht (Truffer 2007).

Damit Leitbilder nicht allein Papier bleiben, sondern sich in an einem gemeinsamen Ziel ausgerichteten kollektiven Verhalten der relevanten Kräfte einer Stadt niederschlagen, damit sie tatsächlich zu Problemlösungen und Verhaltensänderungen führen, wird soziales Lernen als zentraler Erfolgsfaktor gesehen. Gerade Erfahrungen aus der nachhaltigen Stadtentwicklung, unterstrichen durch neueste Ergebnisse der Umweltpsychologie, zeigen die Relevanz eines kollektiven Lernprozesses, der sich dann in gemeinsamen Handeln für die Stadt ausdrückt.

In der Nachhaltigkeitsforschung herrscht Konsens über die zentrale Rolle von Bildungs- und Lernprozessen für die Umsetzung nachhaltiger Entwicklung (UNCED 1992; Schmidt 2009,). "Sowohl die formale als auch

die nichtformale Bildung ... sind auch von entscheidender Bedeutung fur die Schaffung eines ökologischen und eines ethischen Bewusstseins, von Werten und Einstellungen, Fähigkeiten und Verhaltensweisen, die mit einer nachhaltigen Entwicklung vereinbar sind, sowie fur eine wirksame Beteiligung der Öffentlichkeit an der Entscheidungsfindung.“ Daraus leitet sich die Notwendigkeit, ab "die Öffentlichkeit verstärkt fur Umwelt- und Entwicklungsfragen zu sensibilisieren und ihre Beteiligung an der Lösungsfindung zu steigern sowie ein Bewusstsein fur die eigene Verantwortung fur die Umwelt sowie eine bessere Motivation und ein stärkeres Engagement fur die nachhaltige Entwicklung zu fördern.” (UNCED 1992). Crompton (2010) betont, dass Emotionen und gesellschaftliche, kulturell geprägte Werte einen bedeutenderen Einfluss auf Entscheidungen und Handlungen der Menschen haben, als die Verarbeitung von kognitiven Fakten. Dieses Argument unterstreicht die Unzulänglichkeit rein wissenschaftlich geleiteter Entscheidungsverfahren und die Relevanz der Möglichkeit jedes Einzelnen, an Entscheidungsprozessen beteiligt und in Mitverantwortung gezogen zu werden. Die lokale und regionale Ebene gelten als uberschaubare Systeme gesellschaftlicher Entscheidungen und erfahren dadurch „eine Stärkung im Kontext nachhaltiger sozialer Entwicklung“ (Albert et al. 2001, 15).

3 DAS SZENARIENPROJEKT "ZUKUNFTSVISION KORNEUBURG 2036"

3.1 Korneuburg 2036 – die Stadt und die beteiligten Akteurinnen und Akteure

Die niederösterreichische Bezirkshauptstadt Korneuburg mit rund 12.000 Einwohnerinnen und Einwohnern liegt unmittelbar vor den Toren Wiens, wodurch sich spezifische Herausforderungen für die Gemeinde ergeben. Im April 2012 startete die Stadt, die im Jahr 2036 ihr 900-jähriges Stadtjubiläum feiert, den partizipativen Szenarienprozess "Zukunftsperspektiven Korneuburg 2036", der Ende 2013 abgeschlossen sein soll. Zielsetzung des Projektes ist die partizipative und kommunikative Leitbildentwicklung entlang der Frage "Wie wollen wir im Jahr 2036 gemeinsam wohnen, leben und arbeiten?" sowie die Erarbeitung eines Masterplanes mit Handlungsempfehlungen zu dessen Umsetzung für die nächsten zehn Jahre. Der Prozess wurde vor Beginn der Projektlaufzeit von der Zukunfts Initiative Korneuburg (ZIK) initiiert und an die politisch Verantwortlichen herangetragen, weshalb von einem bottom-up Prozess mit einem hohen Grad an Motivation und Identifikation einzelner Akteurinnen und Akteure gesprochen werden kann. Zur Begleitung des Prozesses wurde ein wissenschaftliches Team mit disziplinären Hintergründen in Geographie, Architektur, Landschaftsplanung, Regionalentwicklung und partizipativen Methoden bestellt.

Die breite Beteiligung der Korneuburger Bürgerinnen und Bürger am Leitbildprozess wurde als ein zentrales Projektziel durch die Initiatoren (ZIK), aber auch durch die politisch Verantwortlichen formuliert und als Auftrag an die wissenschaftliche Projektbegleitung gerichtet. Dem Design des partizipativen Prozesses kam daher besonderes Augenmerk zu. Die Szenarienmethodik erfüllte diesen Anspruch durch ihre Flexibilität und Anpassungsfähigkeit an die Fragestellung, sowie den damit verbundenen kreativen und offenen Arbeitsprozess. Um die Beteiligung der Bevölkerung im Rahmen des Projektes zu gewährleisten, wurde einerseits ein repräsentatives Kernteam (Steuerrad, s.u.) gegründet, dessen Mitglieder die Bereitschaft tragen, das Projekt mit einem hohen Grad an Motivation, persönlichem Zeiteinsatz und Kontinuität voranzutreiben und inhaltlich mitzugestalten. Andererseits wurden gemeinsam mit diesem Kernteam Wege gesucht, einem möglichst großen Anteil der Korneuburgerinnen und Korneuburger die Mitsprache in der Leitbilderstellung zu ermöglichen.

Die Beteiligung unterscheidet sich in der Intensität je nach den Projektphasen und reicht von Information über Konsultation bis hin zur Abstimmung. Besonders während der ersten Projektphase der Szenarioerstellung stehen ein Webblog sowie ein Online-mapping-tool für die Jugendlichen (Youthplaces) zur Verfügung. Um die Erreichbarkeit nicht auf Personen mit Zugang und Affinität zu digitalen Medien zu beschränken, wurde darüber hinaus ein analoges (B)Logbuch zur Verfügung gestellt, das sich auf „Wanderschaft“ in Korneuburgs Lokalen, Geschäften, Einrichtungen,... befindet und an diesen Orten jedermann/frau einlädt, seine/ihre Wünsche und Vorstellungen einzutragen. Die Ergebnisse aus Webblog und (B)Logbuch werden laufend in den Prozess integriert.

Das Steuerrad umfasst 28 Personen (inkl. Vertretungen), die als Kernteam am Projekt arbeiten und stimmberechtigt sind. Vertreten sind neben dem amtierenden Bürgermeister sämtliche politische Fraktionen, die lokale Verwaltung, Zivilgesellschaft und Bürgerinnen und Bürger, die ihre jeweiligen Herkunftssysteme repräsentieren. Zu Beginn des Prozesses wurde gemeinschaftlich eine Geschäftsordnung erarbeitet, die das

Zusammenarbeiten und die damit verbundenen Rechte und Pflichten regelt. In im Schnitt einmal pro Monat stattfindenden Workshops arbeiten Prozessbegleiter und Steuerradsmitglieder zusammen an I) der Entwicklung von 3 – 5 plausiblen, visionären Zukunftsbildern, die einerseits durch quantitative Analysen und Fortschreibungen sowie andererseits durch normative Zukunftsvorstellungen (Visionen, Wunschbilder) der Bevölkerung gestützt sind, II) an einem Design sowie der Durchführung eines breiten partizipativen Rückkoppelungsprozesses (Konsultationswoche), zur Unterstützung der Entscheidungsfindung und der Auswahl eines Wunschszenarios (oder einer Kombination aus mehreren), sowie III) dessen Überführung in ein Leitbild sowie im weiteren die Ausarbeitung konkreter mittelfristiger Handlungsanleitungen zur Erreichung des gewünschten Zustandes (Back-Casting/Masterplan).

Ende 2013 soll ein breit akzeptiertes und politisch abgesegnetes Leitbild für Korneuburg 2036 sowie der Masterplan für die nächsten zehn Jahre fertig gestellt und der Öffentlichkeit präsentiert sein.
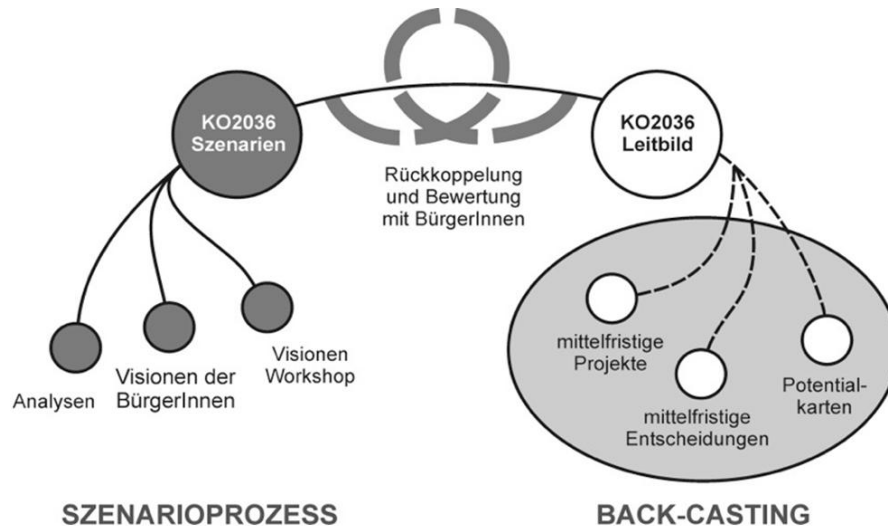
Abb. 2: Prozessdarstellung und Beteiligung im Projekt Korneuburg 2036 (verändert nach Dumreicher 2010)

3.2 Die methodischen Schritte – vom Heute in die Zukunft

Abbildung 3 stellt die Abfolge der methodischen Schritte im Rahmen des Projektes „Korneuburg 2036" chronologisch dar. Die einzelnen Arbeitsschritte werden in den folgenden Kapiteln näher erläutert.

3.2.1 Systemanalyse und Systemabgrenzung – Zusammenschau von externem Expertenblick und Insiderwissen

Die Systemanalyse und -abgrenzung wurde in mehreren Stufen vollzogen. Die Einschätzungen von Wissenschaftlerinnen und Wissenschaftlern sowie lokalen Wissensträgerinnen und Wissensträgern wurden in diesem Prozess erhoben (wissenschaftsgeleitete vs. partizipative Systemanalyse) und die Ergebnisse anschließend synthetisiert.

Zu Projektbeginn stand eine wissenschaftsgeleitete Struktur- und Entwicklungsanalyse (Untersuchung von Vergangenheit, Gegenwart und Zukunftstrends der Stadtgemeinde, quantitatives und qualitatives Systemwissen), deren Ergebnisse mit qualitativen Erfahrungen der lokalen Wissensträgerinnen und Wissensträger (qualitatives Systemwissen) abgeglichen wurden (siehe Workshops). Die Struktur- und Entwicklungsanalyse fokussierte vor allem auf eine Analyse und Bestandsaufnahme der Siedlungsstruktur und Bevölkerungsentwicklung und hatte zum Ziel, die komplexen Zusammenhänge aufzuzeigen, von denen eine weitere Entwicklung abhängen kann und die auf ganz unterschiedlichen Maßstabsebenen wirken. Neben Siedlungs- und Bevölkerungsentwicklung wurden auch die Bereiche „Wirtschaft ", „Verkehr" und „Umwelt" und deren Wechselwirkungen analysiert. Die Ergebnisse geben Antworten auf die Frage „Welche Spiel- und Gestaltungsräume stehen zur Verfügung?", um zukünftige Entwicklungsmöglichkeiten der Stadt hinsichtlich ihrer Machbarkeit zu beleuchten.

In einem nächsten Schritt wurden durch die Kombination der Ergebnisse aus der Strukturanalyse und der Einschätzung der Steuerradmitglieder sieben zentrale Handlungsfelder definiert.

Im Rahmen von Workshops im Steuerrad, zu denen jeweils externe themenbezogene Expertinnen und Experten geladen wurden, wurden die Handlungsfelder gemeinsam diskutiert und die jeweiligen

Einflussfaktoren (driving forces) für jedes der Felder abgeleitet (partizipative Systemanalyse). Besonderes Augenmerk wurde auf die Frage gerichtet, welche Faktoren durch Korneuburg (Politik,Wirtschaft, Zivilgesellschaft) selbst steuerbar sind. Im Zuge dieser Workshop fand ein sehr konstruktiver, gemeinsamer Lernprozess statt, der ein individuelles wie auch kollektives Verständnis des Systems Korneuburg entstehen ließ. Die Ergebnisse beruhen auf der Integration wissenschaftlicher Studien und quantitativem sowie qualitativem Datenmaterial mit implizitem Wissen von Expertinnen und Experten aus Zivilgesellschaft, Politik und Verwaltung.
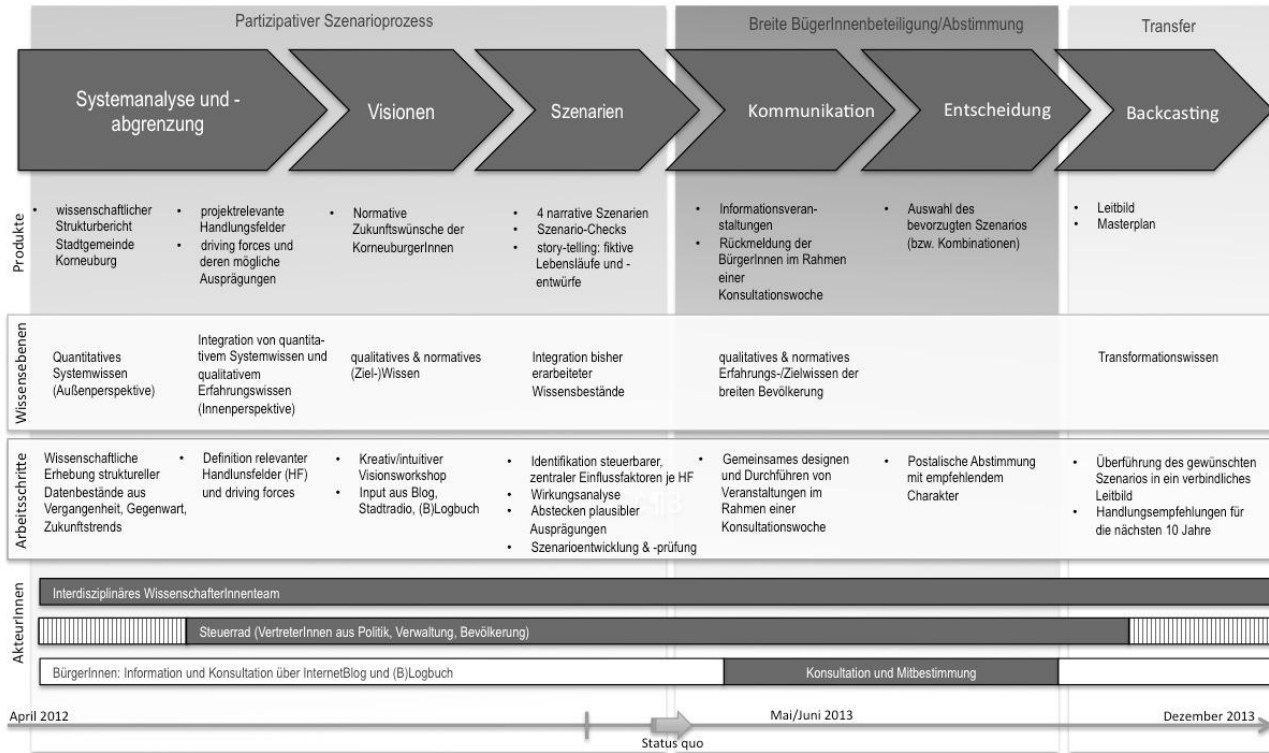
Abb. 3: Prozessschritte im Projekt Korneuburg 2036 – Wissensebenen, Arbeitsschritte, Akteurinnen und Akteure

3.2.2 Die Zukunft hat viele Gesichter – die Integration von visionären Wünschen der Bevölkerung

Um Szenarien entwickeln zu können, die an den Wünschen der lokalen Bevölkerung anknüpfen, wurden in einem nächsten Schritt Zukunftswünsche (Visionen, qualitatives Zielwissen) der Steuerradsmitglieder im Rahmen eines kreativen Visionsworkshops im Steuerrad erhoben. Ergänzt wurden die Ergebnisse durch Einträge im Webblog des Projektes sowie des (B)Logbuchs, welche der breiten Bevölkerung zugänglich sind.

Die Mitglieder des Steuerrades wurden gebeten, in einem lockeren und kreativen Setting Zeitungsartikel zu erarbeiten, die zeigen, wie sich Korneuburg im Jahr 2036 ihren Wünschen nach präsentiert. Daraus entstand eine große Bandbreite an Entwicklungsoptionen, die sich aufgrund der wissenschaftlichen Analyse nicht ergeben hätten, die in weiterer Folge – je nach Realisierbarkeit – in die Szenarien einflossen.

3.2.3 Szenarioentwicklung und Konsistenzanalyse

Die zentrale Vorgehensweise der Integration von Systemwissen und Zielwissen erfolgte über die Szenariomethode, basierend auf Bausteinen der formativen Szenarioanalyse (nach Scholz 1999; 2002). Aus diesem integrierten Wissensbestand wurden für die sieben Handlungsfelder jeweils die relevantesten Einflussfaktoren identifiziert (aus Strukturanalyse und Stakeholder-Workshops). Der Fokus lag dabei auf jenen Faktoren, die durch Korneuburg steuerbar sind.

Die Einflussfaktoren wurden einer Wirkungsanalyse unterzogen, die der Darstellung und Bewertung von Beziehungen zwischen den einzelnen Faktoren dient. Anhand einer Wirkungsmatrix wurden durch das wissenschaftliche Beraterteam die Einflussfaktoren paarweise auf ihre Wechselwirkungen hin untersucht (Skala 0 = keine Wirkung bis 2 = starke Wirkung.). Auf diese Weise lässt sich auch feststellen, wie die

einzelnen Faktoren die Entwicklung des Gesamtsystems beeinflussen (aktive, passive Faktoren, puffernde, kritische Faktoren), siehe Abb. 4.

Cross-Impact-Matrix
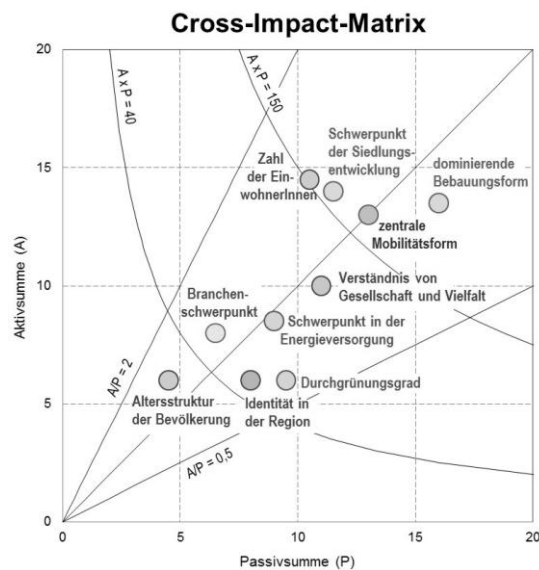
Abb. 4: Cross Impact Matrix der Einflussfaktoren

Für jeden dieser steuerbaren driving forces wurden in einem nächsten Schritt basierend auf der Strukturanalyse und Experteneinschätzungen die Bandbreite möglicher zukünftige Ausprägungen abgesteckt.

Aus den Visionen wurden im Anschluss die dahinter stehenden Wertestrukturen abgeleitet (z.B. innovativ, kompetent oder nachhaltig und energieautark). Entlang dieser Wertestrukturen führte das Beraterteam konsistente Kombinationen von möglichen Ausprägungen der Einflussfaktoren zu plausiblen Szenarien zusammen. Diese Szenarien wurden sodann einer paarweisen Konsistenzbewertung unterzogen (vgl. dazu Kirchner-Heßler 2004). Auf diese Weise konnten Inkonsistenzen in den Szenarien identifiziert und durch Adaption ausgemerzt werden. Das Ergebnis sind vier Szenarien, die in der Folge dem Steuerrad vorgestellt wurden.

3.2.4 Robustheitscheck

Um die Szenariogeschichten in Hinblick auf Risiken in der Realisierbarkeit und Umsetzung zu prüfen, wurden diese einem Robustheitscheck unterzogen. Dabei wurde ihre Stabilität in Bezug auf europäische Herausforderungen sowie die Abhängigkeit von nicht beeinflussbaren Faktoren überprüft. Anhand von fünf zentrale Herausforderungen (Europäische Kommission 2011) – Globalisierung, demographischer Wandel, Klimawandel, sichere, nachhaltige und wettbewerbsfähige Energieversorgung und soziale Polarisierung – wurde jedes Szenario hinsichtlich der entstehenden Risiken und Chancen diskutiert. Zwei der Szenarien stellten sich als weitgehend robust gegenüber den Herausforderungen dar, bei zwei weiteren wurde deutlich, dass sich Chancen wie auch Risiken gleichermaßen ergeben. Ob positive oder negative Auswirkungen enstehen, hängt nicht zuletzt von einer bewussten Steuerung ab. In einem nächsten Schritt wurde beurteilt, wie abhängig die Szenarien von nicht beeinflussbaren Rahmenbedingungen, wie z.B. Entscheidungen auf nationalpolitischer Ebene oder Abhängigkeit von öffentlichen Budgets und Förderungen sind.

Beide Analysen zeigten, dass vor allem eines der Szenarien mit einem relativ hohen Risiko behaftet ist, durch äußere Bedingungen in seiner Umsetzung beeinträchtigt zu werden. Im Steuerrad wurde dennoch die Entscheidung gefällt, alle vier Szenarien weiter zu tragen und an die Bürgerinnen und Bürger zu kommunizieren, unter Offenlegung der Risiken und Umsetzungschancen.

3.2.5 Storytelling – vom abstrakten Text zum Leben im Jahr 2036

Um die bislang noch recht abstrakten Szenarien an die Bürgerinnen und Bürger kommunizieren zu können, formulierten die Mitglieder des Steurrads kreative Geschichten und Lebensläufe zu den vier Entwicklungsperspektiven. Sie wurden herausgefordert, allgemeine Eckpunkte auf konkrete Lebenssituationen anzuwenden. Dadurch sollte sich einerseits die Identifikation mit den Szenarien erhöhen und andererseits vom reinen Vorstellen dessen, wie etwas sein könnte, zum individuellen und kollektiven Handeln angeregt werden, das zur Umsetzung nötig ist. Die entworfenen Lebensläufe und Geschichten aus

dem Alltag von Korneuburgerinnen und Korneuburgern im Jahr 2036 dienen als Basis für die weitere Aufbereitung der Szenarien für die Konsultationswoche im Juni 2013 und als Grundlage für eine visuelle Veranschaulichung.

3.2.6   Weitere Projektschritte in der Zukunft

Nächster Meilenstein ist die Präsentation der erarbeiteten Szenarien im Korneuburger Gemeinderat Ende März. Diese dient der Information der politisch Verantwortlichen über den Prozessfortschritt sowie der gemeinsamen Entscheidung darüber, welche Szenarien im Rahmen der Konsultationswoche präsentiert werden und wie die Abstimmung durch die Bürgerinnen und Bürger vonstatten gehen wird.

Ende Mai/Anfang Juni findet die Konsultationswoche statt, im Rahmen derer die Korneuburger Bevölkerung eingeladen ist, sich über die Szenarien zu informieren und Wünsche und Vorschläge einzubringen und zu diskutieren. Eine Kombination aus aufsuchenden Veranstaltungen in einzelnen Stadtteilen und zentralen Präsentationsveranstaltungen soll eine möglichst hohe Beteiligungsquote erzielen. Die Ergebnisse werden im Steuerrad zu konkreten Fragen und Szenarienvarianten verdichtet und schließlich zur postalischen Abstimmung durch die Bürgerinnen und Bürger freigegeben. Das Abstimmungsergebnis wird wiederum im Steuerrad weiterbehandelt und dann als Empfehlung an den Gemeinderat weitergegeben.

4   ERGEBNISSE

Die Wirkungsanalyse der Einflussfaktoren (Prüfen von Aktivität, Passivität und Wechselwirkungen der Faktoren) machte sichtbar, dass im Besonderen die Faktoren „Zahl der Einwohner" und „Schwerpunkt der Siedlungsenwicklung" kritisch für die zukünftige Entwicklung der Stadt und deren Gestaltungsmöglichkeiten sind. Die Frage der Einwohnerzahl war ein von Beginn an sehr kontrovers diskutiertes Thema. Verschiedene Ressentiments und Vorurteile die mit der Vorstellung des Wachstums einhergingen, prägten die Diskussionsrunden. Die Spannbreite der Wünsche reichte vom „Konservieren" der bisherigen Überschaubarkeit, die Korneuburg in den Augen einzelner einen dörflichen Charakter verlieh, bis hin zur Anpassung/Angliederung an das System Wien. In diesem Punkt war die objektive Außensicht besonders hilfreich, um eine realistische Einschätzung kommunizieren zu können. Ein Null- bis Wenigwachstum ist für Korneuburg aufgrund verschiedener Faktoren kaum wirklichkeitsnah.

Die vier Szenarienentwürfe unterscheiden sich deutlich bezüglich der zentralen Stellschrauben „Bevölkerungszahl" und „Siedlungsentwicklung" (siehe Abb. 5), die konsequenterweise in starker Beziehung zu einander stehen. Wie sich Korneuburg im Jahr 2036 darstellt, hängt wesentlich davon ab, wie auf den Bevölkerungs- und Siedlungsdruck reagiert wird und welche Strategien dafür entwickelt werden. Doch auch in Bezug auf die anderen Einflussfaktoren sind sehr unterschiedliche Zukunftsoptionen für die Stadt Korneuburg entstanden (Tabelle 1).
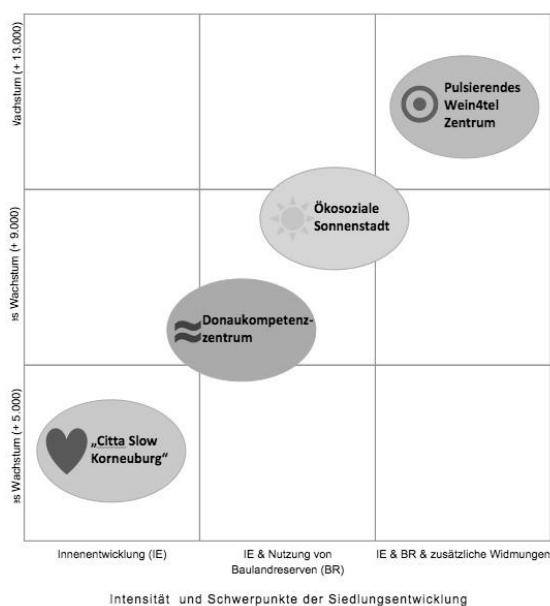
Abb 5: Szenariogeschichten in ihren Ausprägungen entlang der zentralen Einflussfaktoren Bevölkerungs- und Siedlungsentwicklung

Szenario 1: Donaukompetenzzentrum Korneuburg	Szenario 2: Ökosoziale Sonnenstadt
Korneuburg hat sich als Zentrum für grüne Zukunftstechnologien etabliert. Technologieunternehmen, Forschungs- und Bildungseinrichtungen und in den Bereichen Wasser- und Umwelttechnologien haben sich am Wissenschaftscampus an der Donaulände angesiedelt und sind über Wirtschaftscluster mit Unternehmen in den umliegenden Regionen verbunden. Der Technologiestandort profitiert auch von seiner Nähe zu Wien und dort ansässigen Firmen, Wissenschaftlern und F&E-Einrichtungen. Die Stadt bietet ein vielfältiges Bildungsangebot an diversen Schulstandorten, aber auch im Bereich der Erwachsenenbildung. Schülerinnen, Schüler, sowie Forscherinnen, Forscher und hochqualifizierte Arbeitnehmerinnen und Arbeitnehmer pendeln aus Wien und der Region nach Korneuburg und beleben das städtische Leben der rund 21.000-Einwohner-Stadt mit urbanem Flair. Bauaktivitäten finden vor allem im innerstädtischen Bereich statt, zusätzlich wird ein junger Stadtteil an der Donaulände/Werft entwickelt. Bei den Neubauten wird auf eine attraktive Grün- und Freiraumgestaltung sowie auf eine funktionierende Nahversorgung und attraktive Sportangebote geachtet, um die Lebensqualität auch in dichteren Gebieten zu steigern. Leistbares Wohnen ist nicht nur im energieautarken, schwimmenden Studierendenheim realisiert, sondern auch durch geförderte Wohnungen in anderen Stadtteilen realisiert. Die Stadt behält ein heterogenes Stadtbild, dichtere Strukturen und lose Verbauung wechseln einander ab. Das neue Donauviertel mit seinem Kongresszentrum ist öffentlich bestens mit dem Zentrum sowie dem Bahnhof verbunden, ein Cityliner mit flexiblem Fahrtendienst verbindet Korneuburg mit Klosterneuburg und Wien auf dem Wasserweg , abgestimmt mit den Fahrplänen der weiteren öffentlichen Verbindungen ins Hinterland. Für jene Personen, die mit dem Pkw einpendelt bietet Korneuburg ein attraktives Parkraum- und Garagenkonzept. Im gesamten Stadtgebiet werden der öffentliche Verkehr mit guter Abstimmung auf Fahrpläne der Regionalbusse sowie Rad- und Fußgängerrouten ausgebaut. Die Energieversorgung ist auf Effizienz und Nachhaltigkeit hin optimiert – Energieautarkie ist ein erklärtes Zukunftsziel.	Korneuburg nimmt als erste energieautarke Stadt Niederösterreichs eine Vorreiterrolle als ökosoziale Stadt ein. Die Energieproduktion übersteigt den Bedarf der Stadt mit rund 22.000 Einwohnern. Korneuburg wurde zum Netto-Exporteur von Energie. Das Stadtbild ist geprägt von dichterer Bebauung, vor allem verdichtetem Flachbau (2-3 geschossig). Die Gebäude sind zum überwiegenden Teil mit Solaranlagen versehen. Der Fokus der Bebauung liegt auf der Innenentwicklung sowie der Erschließung des Zwischenlandes und des Nordrands. Generationen-gemischtes Wohnen hat sich als Erfolgskonzept für Jung und Alt erwiesen. Gleichzeitig weisen Korneuburgs Neubaugebiete einen hohen Grünanteil und hohe Lebensqualität auf, erreicht durch innovative Grünraumgestaltung wie grüne Fassaden, Dachgärten und einer Vielzahl an Flächen für urban gardening und city farming, die das soziale Miteinander beleben und Identität und Zusammenhalt steigern. Vor allem am Donauufer locken attraktive Kultur-, Sport- und Freizeitangebote sowie Erholungszonen. Am autofreien Hauptplatz ist ein mit einem Photovoltaikdach versehener Arkadenbau im Einklang mit der historischen Bausubstanz entstanden. So ist zum einen die Nutzung des Platzes bei jeder Witterung möglich, zum anderen wird so zur Energieversorgung beigetragen. Der modern gestaltete Platz zeichnet sich durch Grünzonen und Aufenthaltsqualität genauso aus wie durch ein qualitativ hochwertiges Einkaufsangebot und einen attraktiven Branchenmix. Der Hauptplatz ist DER soziale Treffpunkt der Stadt. Rege Marktaktivitäten sorgen für die Nahversorgung – u.a. mit Produkten aus der Region – und fördern das Miteinander. Korneuburg bietet eine hohe Quantität wie auch Qualität öko-sozialer Dienstleistungen und hat österreichweit einen hervorragenden Ruf als ökosoziales Innovationszentrum . Klein- und mittelständige Unternehmen profitieren von der kritischen Masse an Solarprojekten und entsprechendem Know-how in der Stadt und haben sich auch international unter den technologieführenden Unternehmen etabliert. Die meisten Wege werden mit e-Autos oder öffentlichen Verkehrsmitteln bzw. auf den gut ausgebauten Rad- oder Fußwegen zurückgelegt. Die Bewohnerinnen und Bewohner übernehmen Eigenverantwortung für ihre Stadt und gestalten das Gemeindeleben aktiv mit.
Szenario 3: Pulsierendes Wein4telZentrum	Szenario 4: Citta Slow Korneuburg
Korneuburg ist DAS Einkaufs- und Dienstleistungszentrum des Weinviertels, das im Handel nicht in Konkurrenzkampf zu naheliegenden Einkaufszentren tritt, sondern sich durch Persönlichkeit, Kundennähe, Flexibilität und Aufenthaltsqualität sowie durch die hohe Qualität regionaler Produkte positioniert. Das Stadtbild ist von urbanem Charakter und von dichter Verbauung geprägt – bei gleichzeitig sorgsamen Bedacht auf den Erhalt der historischen Bausubstanz. Sämtliche Baulandreserven (Stand 2012) wurden bebaut und zusätzliche Widmungen an den Rändern vorgenommen, wo neue Stadtteile entstanden sind (Zwischenland, Nordrand, Donau). Nach den jüngsten Eingemeindungen zählt Korneuburg 30.000 Einwohnerinnen und Einwohner (davon ca. 20.000 im ursprünglichen Stadtgebiet). Das differenzierte Bildungs- und Dienstleistungsangebot, städtischer Lifestyle und der pulsierende Hauptplatz ziehen Menschen aus allen Teilen des Weinviertels an und machen Korneuburg zur sozialen Drehscheibe im Wein4tel. Das städtische Leben ist geprägt von Barrierefreiheit und Offenheit. Die öffentlichen Verkehrsanbindungen in die Region wurden intensiv ausgebaut (z.B. S-Bahntangente Krems-HL-KO-GF-MB) ebenso wie die Verbindungswege für den motorisierten Individualverkehr, z.B. ein durchdachtes Park- und Garagensystem. Korneuburg bietet mit der großen Bandbreite an sozialen Dienstleistungen und einen umfassenden Branchenmix attraktive Arbeitsplätze für die Stadt und die Region. Ein buntes Angebot an kulturellen und touristischen Einrichtungen und Events belebt die gesamte Stadt, vor allem auch das neue Wohn- und Freizeitviertel an der Donau (Strandmeile mit Bars, Kultureinrichtungen, Hotels, Kino), das mit öffentlichen Verkehrsmitteln und weiteren Straßenverbindungen direkt vom Stadtzentrum aus rasch erreichbar ist.	Nähe, soziales Miteinander und Lebensqualität werden in der eigenständigen Kleinstadt Korneuburg groß geschrieben. Das Erscheinungsbild ist geprägt von suburbanem Charakter, kleinen und individuellen Einheiten und einem großen Ausmaß an öffentlichen Plätzen und Grünflächen, die zusammenhängende Grünachsen durch das gesamte Stadtgebiet bilden. Das Angebot in der rund 18.000-Einwohner-Stadt ist vor allem für junge Familien aber auch die älteren Generationen attraktiv. Barrierefreiheit ist im Wohnbau sowie im öffentlichen Raum ein wichtiges Thema. Der städtische Verkehrsraum ist für Fußgängerinnen und Fußgänger optimiert, die Stadt der kurzen Wege ein gelebtes Ideal. Der verkehrsberuhigte Hauptplatz ist ein beliebter Aufenthaltsort, der für alle Generationen attraktive Angebote (Kinderspielplatz, Grünflächen, Cafes etc) bietet. Der entschleunigte Lebensstil erlaubt es, dass der Mensch im Mittelpunkt steht. Das Donaugelände ist ein beliebter Ort der Erholung. Radfahrerinnen und Radfahrer am Donauradweg machen gerne einen Abstecher auf den einladenden Hauptplatz wo spezielle Angebote (Cafés, Restaurants, geführte Stadtspaziergänge, E-Tankstelle, Fahrrad-Reparatur, Kleinkunst etc.) auf sie warten. Korneuburg ist auch ein attraktives Ausflugsziel für Personen aus Wien und dem Umland, die das gemütlich kleinstädtische Flair und das Angebot in puncto Kleinkunst und sanftem Tourismus schätzen. Neue Wohnungen wurden vor allem im zentralen Bereich errichtet (Innenentwicklung), wobei auf kleinteilige Einheiten und flexible – der jeweiligen Lebensphase angepasste – Wohnformen gesetzt wird. Autofreie Plätze, Märkte mit regionalen Produkten, Cafés und kulturelle Angebote beleben den Alltag in der Kleinstadt. Gelebte Nachbarschaft, soziale Dienste, hochwertige Kinderbetreuung und qualitative Altenversorgung sind das Aushängeschild der Stadtgemeinde.

Tabelle 1: Entwicklungsszenarien Korneuburg 2036

5 DISKUSSION UND AUSBLICK

Der noch andauerende Prozess zeigte bereits, dass die Szenariomethode ein hilfreiches Tool zur Integration verschiedener Wissensebenen darstellt. Sie schuf darüber hinaus einen Rahmen für soziales Lernen und ließ aus einem sehr partnerschaftlichen Prozess eine gemeinsame Identität und Zusammenhalt unter den Beteiligten vor Ort entstehen, die in weiterer Konsequenz durch ihr individuelles und kollektives Handeln

zur Realisierung des Stadtleitbildes beitragen müssen. Nicht zuletzt fand ein spannender Lernprozess für beide Seiten – Wissenschaftlerinnen und Wissenschaftlern sowie lokalen Expertinnen und Experten – statt, der neue Eindrücke und Erfahrungen über Erkenntnisgewinn und den Umgang mit Unsicherheiten hervorbrachte.

5.1 Kontinuität und Wertschätzung im Projekt

Obwohl seitens der Steuerradsmitglieder ein vergleichsweise hoher Zeiteinsatz gefordert wird, zeigt sich eine relativ hohe Kontinuität der Beteiligten, was vermutlich auch auf die bottom-up Genese des Projektes, zurück zu führen ist. Einzig für die Vertreterinnen und Vertreter der lokalen Wirtschaft ist es problematisch, konsequent an den Sitzungen teilzunehmen, da die geschäftlichen Verpflichtungen sich mit den Terminen z.T. überschnitten (Weihnachtsgeschäft, Lange Einkaufsnacht etc.), hieraus entsteht Handlungsbedarf für zukünftige Projektvorhaben. Innerhalb des Steuerrads herrscht eine sehr wertschätzende Grundhaltung, die eine konstruktive Diskussion und Zusammenarbeit, auch über politische Fraktionen hinweg, und im Dialog mit den Bürgerinnen und Bürgern ermöglicht.

Die Entscheidung darüber, wie der Beteiligungsprozess (Einbindung der breiten Bevölkerung und Entscheidung über das gewünschte Szenario als Grundlage für ein Leitbild) gestaltet wird und welche Rolle den Bürgerinnen und Bürgern dabei zukommt, wurde dem Steuerrad überlassen. Daraus wird auch das hohe Maß an Vertrauen, das dem Prozess seitens der Stadtregierung entgegengebracht wird, deutlich. Das Steuerrad entschied sich für eine Informations- und Konsultationswoche (s.o.) mit anschließender postalischer Abstimmung und überstieg mit diesem Entschluss letztlich die Erwartungen des Betreuerinnen- und Betreuerteams, da zu Beginn des Prozesses lediglich ein formloses Bewerten der Szenariengeschichten angedacht war.

5.2 Die Szenariomethode als Rahmen zur Wissensintegration

Der methodische Zugang ermöglichte es, quantitatives und qualitatives Systemwissen, Zielwissen und Handlungs-/Transformationswissen zusammenzuführen. Dass die Integration dieser Wissensbestände nicht ein rein summarisches Zusammenfügen von Forschungsergebnissen und Expertinnen- sowie Experteneinschätzungen am Ende eines Projektes sein kann, unterstreicht Truffer (2007): die Frage der Wissensintegration darf nicht als eine rein technisch-organisatorische diskutiert werden, sondern ist vielmehr "als aktiver sozialer Konstruktions- und Aushandlungsprozess zu verstehen". Wissensintegration kann demnach als gemeinsamer Lernprozess verstanden werden, der wiederum neues Wissen generiert. Dieser Lernprozess fand für die wissenschaftlichen Begleitung und die Beteiligten vor Ort gleichermaßen statt. So mussten Kompromisse darüber eingegangen werden, was die „richtigen Annahmen" oder die „Wahrheit" darstellt und es musste ein Verständnis darüber geschaffen werden, dass mit Unsicherheiten auf verschiedene Weisen umgegangen werden kann. So konnte z.B. die Festlegung der relevanten Handlungsfelder nur durch eine gegenseitige Annäherung in einem Aushandlungsprozess vorgenommen werden. Der Robustheitscheck der Szenarien ergab wiederum, dass ein Szenario aus externer Expertinnen- und Expertensicht mit einer zu hohen Unsicherheit verbunden ist und damit nicht zur Umsetzung empfohlen werden kann. Die lokalen Beteiligten entschieden trotz dieses Risikos, dieses Szenario weiter zu bearbeiten. Darin liegt eine wesentliche Herausforderung transdisziplinärer Projekte – zu lernen, dass die wissenschaftliche, objektive Aussensicht oftmals nicht genügt und nicht immer mit subjektiven Erfahrungen vor Ort korreliert.

5.3 Die Szenariomethode als Beitrag zu sozialem Lernen, Sense of Coummunity und Identität

Die klare Untergliederung der Szenariomethode in einzelne, gut abgrenzbare Teilschritte stellt für die Anwendbarkeit in einem partizipativen Lernprozess einen Vorteil dar: Das gemeinsame schrittweise Erarbeiten der Szenarien ermöglicht ein hohes Grad an Identifikation und Motivation durch die Teilnehmerinnen und Teilnehmer (Kirchner-Heßler 2004). Als essentiell stellt sich dabei die kontinuierliche Beteiligung der Akteurinnen und Akteure am Planungsprozess dar, um Brüche im Wissensstand und Planungsablauf zu vermeiden (Kirchner-Heßler 2004).

Gleichzeitig wird ein gemeinsames Lernen der Beteiligten gefördert, die einerseits einen Einblick in das zu untersuchende System und dessen Entwicklungsdynamik erlangen, aber auch für die Verantwortung des individuellen und kollektiven Handelns sensibilisiert werden. Das Verstehen von Systemen (z.B. kommunale Entwicklung) sowie der Dynamik der Einflussfaktoren trägt dazu bei, die Komplexität analytischer zu

begreifen, das eigene Handeln und dessen Konsequenzen zu erkennen und Bedarf in der Änderung von Verhalten zu sehen. Durch die individuelle Betroffenheit und die kollektive Auseinandersetzung mit einer gewünschten Zukunftsgestaltung des gemeinsamen Lebensumfeldes (Gemeinde, Region) ist von einer steigenden Umsetzungswahrscheinlichkeit auszugehen.

Der Einsatz der partizipativen Szenarioplanung in der städtischen Entwicklung ermöglicht demnach einen Erfahrungsraum für kollektives soziales Lernen, in der partnerschaftlichen Auseinandersetzung über die Frage, was erwünschte nachhaltige städtische Entwicklung auszeichnet und welche Handlungs- und Verhaltensweisen in der Gegenwart erforderlich sind um die gesteckten Ziele zu erreichen.

6 REFERENCES

ALBERT, Roland, BRUNNER, Paul H., FROMM, Elisabeth, GASSNER, Jochen, GRABHER, Andrea, KRATOCHVIL, Ruth, KROTESCHEK, Christian, LINDENTHAL, Thomas, MILESTAD, Rebecka, MOSER, Anton, NARODOSLAWSKY, Michael, POLLAK, Michael, REHSE, Lothar STEINMÜLLER, Horst, WALLNER, Heinz P., WIMMER, Robert und WOHLMEYER, Heinrich 2001. 2.Sustain Bericht – Umsetzung nachhaltiger Entwicklung in Österreich. Berichte aus Energie- und Umweltforschung 38/2001. Graz, 2001

BARNES, Trevor J.: What's Wrong with American Regional Science? A View from Science Studies. In: Canadian Journal of Regional Science, Vor. 26, Issue 1, pp. 3-26. 2003.

CROMPTON, Tom, BREWER, Joe, CHILTON, Paul und KASSER, Tim. (2010): Common Cause – The case for Working with our Cultural Values. WWF-UK, 2010. http://www.foe.co.uk/resource/reports/common_cause_report.pdf (03.05.2011)

DUMREICHER, Heidi: SINOPOLIS – Science Identifying Nationwide Operational Policy Options for Longterm Integrated Scenarios. Nicht publizierter Projektantrag. 2010.

EUROPÄISCHE KOMMISSION: REGIONS 2020. An Assessment of Future Challenges for EU Regions. Brüssel, 2008.

FUNTOWICZ, Silvio O. und RAVETZ, Jerome R.: Science for the post-nomal age. In: Futures, Vol. 25. pp. 739-755. 1993.

GIBBONS, Michael, LIMOGES, Camille, NOWOTNY, Helga, SCHWARTZMAN, Simon, SCOTT, Peter und TROW, Martin: The New Production of Knowledge: the dynamics of science and research in contemporary societies. Sage Publications. London, 1994.

GRAF, Hans G.: Zukunftsforschung und Management. In: IZT – Institut für Zukunftsstudien und Technologiebewertung (Hrsg.): Zukunftsforschung im Spannungsfeld von Visionen und Alltagshandeln. Werkstattbericht Nr. 64. pp 21-28. München, 2004.

GROß, Christiane, RITZINGER, Anne und MAGEL, Holger: Auf der Suche nach dem Dorf von Morgen. In: disP – The Planning Review, Vol. 47, Issue 185, pp.44 – 55. 2011.

HIRSCH-HADORN, Gertrude, BIEBER-KLEMM, Susette, GROSSENBACHER-MANUY, Walter, HOFFMANN-RIEM, Holger, JOYE, Dominique, POHL, Christian, WIESMANN, Urs und ZEMP, Elisabeth: The Emergence of Transdisciplinarity as a form of Research. In: HIRSCH-HADORN, Gertrude, BIEBER-KLEMM, Susette, GROSSENBACHER-MANUY, Walter, HOFFMANN-RIEM, Holger, JOYE, Dominique, POHL, Christian, WIESMANN, Uurs und ZEMP, Elisabeth (Hrsg.): Handbook of Transdisciplinary Research. pp. 19-39. Springer. Dordrecht, 2008.

KIRCHER-HEßLER, Ralf: Die formative Szenario-Analyse in der partizipativen Raumplanung und Regionalentwicklung. In: GAIA – Ecological Perspectives for Science and Society, Vol.13, Issue 2, pp. 121-130. 2004.

KOSOW, Hannah und GAßNER, Robert: Methoden der Zukunfts- und Szenarioanalyse – Überblick, Bewertung und Auswahlkriterien. Werkstattbericht Nr. 103. Berlin, Institut für Zukunftsstudien und Technologiebewertung, 2008.

MC DONALD, David, BAMMER, Gabriele und DEANE, Peter: Research Integration Using Dialogue Methods. The Australian National University. Canbera, 2009.

MUHAR, Andreas und FREYER, Bernd (Hrsg.): Transdisziplinäre Kooperation in der universitären Ausbildung. Die Fallstudie Leben 2014 in der Nationalparkregion Hohe Tauern/Oberpinzgau. Facultas. Wien, 2006.

NOWOTNY, Helga, SCOTT, Peter und GIBBONS, Michael: Re-Thinking Science. Knowledge and the Public in an Age of Uncertainty. Polity Press. Cambridge, 2001.

ÖROK: Szenarien der Raumentwicklung Österreichs 2030 – Regionale Herausforderungen und Handlungsempfehlungen. ÖROK-Band 176/II. Wien, 2009.

PENKER, Marianne und WYTRZENS, Hans Karl: Scenarios for the Austrian food chain in 2020 and its landscape impacts. In: Landscape and Urban Planning, Vol. 71, Issue 2/4. pp. 175-189. 2005.

SCHMIDT, Christine: Nachhaltigkeit lernen? Der Diskurs um Bildung für nachhaltige Entwicklung aus der Sicht evolutionstheoretischer Anthropologie. Schriftenreihe Ökologie und Erziehungswissenschaft. Opladen & Farming Hills MI, 2009.

SCHOLZ, Roland W. und TIETJE, Olaf: Embedded Case Study Methods – Integrating Quantitative and Qualitative Knowledge. California, 2002.

SCHULZ-MONTAG, Beate und MÜLLER-STOFFELS, Marc: Szenarien. Instrumente für Innovations- und Strategieprozesse. In: WILMS, Falko E. P. (Hrsg): Szenariotechnik. Vom Umgang mit der Zukunft. pp. 381 – 379. Bern, Stuttgart, Wien, 2006.

TRUFFER, Bernhard: Wissensintegration in transdisziplinären Projekten – Flexibles Rollenverständnis als Schlüsselkompetenz für das Schnittstellenmanagement. In: GAIA – Ecological Perspectives for Science and Society, Vol.16, Issue 1, pp. 41-45. 2007.

UNCED: Agenda 21. Konferenz für Entwicklung und Umwelt der Vereinten Nationen. Rio de Janeiro, 1992.

VAN NOTTEN, Philip W. F., ROTMANS, Jan, VAN ASSELT, Marjolein B. A. und ROTHMAN, Dale S.: An updated scenario typology. In: Futures, Vol. 34, pp. 423 – 443. 2003.

WIEK, Arnim: Szenarien für die Entwicklung der Landschaftsnutzung im Kanton Appenzell Ausserrhoden. In: SCHOLZ, Roland W., STAUFFACHER Michael, BÖSCH, Sandro und WIEK, Arnim (Hrsg.): Landschaftsnutzung für die Zukunft – Der Fall Appenzell Ausserrhoden, ETH – UNS Fallstudie 2001. Zürich, 2002.

Landscape as a Connection – Beyond Boundaries

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1 ABSTRACT

This research deals with several problems of the contemporary city – problem of administrative boundaries and relationship between the city and its public spaces.[1] Cities are ever increasing, often uncontrolled and rarely planned as a whole, almost always without thinking about city's identity. Furthermore the problem of boundaries in general is evident in the periphery which is undeveloped edge of the city. In Croatia boundaries are an obstacle to urban planning, they make it difficult to overview the entire space of the city because its illogical divisions. What is an urban landscape and how it can contribute to development of the new image of the 21st century city is a current theme of planning (eg. Grand Paris considerations). At the Faculty of Zagreb cities from different regions are being researched through a series of workshops in Landscape Architecture and Urbanism. The aim is to reject administrative boundaries in order to create new area of a city based on the landscape.

We analysed current trends in urban planning with the landscape as a main resource, connecting separated city units and periphery. There are three types dealing with the activation of public spaces: first is about different highlines (Paris, NewYork, Rotterdam), second is about linear parks systems above infrastructure (Milano, Barcelona) and third are waterfronts (along canals, rivers and coastlines). Case study for this article demonstrates how these examples and world trends can be used to connect two cities in a logical way – beyond boundaries. The motto of graduate work was: the future of the city will be created on the periphery as the core is taken by the history. Project result is connection of the ancient city of Salona with the current centre of the city Split – the historic and world heritage Diocletian's Palace. The connection is achieved through linear park.

2 INTRODUCTION

Urban settlements (towns and cities) are never completed duo to continuous changes in spatial treatment and way of life. However the city until the 19th c. had a clear edge with its fortifications of bastions and lawns of glacis. This fortification space frame was in the 19th c. used for new roads, public buildings, parks and walkways creating new urban, representative, social and public places for future city perimeter. Since then cities are growing and old boundaries are being erased, merging the city with suburbs, regions and landscape. Administrative boundaries are a necessity for effective functioning of the city. Today different administrative networks share common role in organizing political, municipal and economical life of the city, region or country. All together, while special boundaries are disappearing, administrative boundaries are being determined. As a consequence urban planning is becoming more challenging discipline which needs to mediate between both administrative directive and special facts in growing urban areas.[2]

3 THEORETICAL BACKGROUND

3.1 City and urban landscape

Since the 18th c. landscape architecture has an important role in shaping of urban space and it affected on public places in various ways. Viennese Ringsstrasse and Zagreb Horseshoe are models for how urban landscape can influence upon the urban surrounding of public buildings and special connection. Landscape architecture can induct cultural, social and urban process of development, like the Central Park in New York, or it can be financial basis in living areas as it is with Regent's Park and squares in London. It is also an element of urban representation – avenues and boulevards of Paris and other cities. Some of these places have different aim: places of city excursions and recreation (Maksimir in Zagreb, Bois de Boulogne forest in

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[1] This research is part of the research project "The Urban and Landscape Heritage of Croatia as Part of the European Culture" which is being carried out by the Faculty of Architecture at the University of Zagreb.
[2] Tagliagambe 2008: 62 ; Doucet 2008: 93-113

Paris, Prater and Augarten in Vienna etc.), or places of daily rest (thematic parks, park squares, pocket gardens etc.).[3]

Fig. 1: Zagreb Horseshoe; Viennese Ringsstrasse; New York Central Park; London Regent's Park; Paris La Villette[4]

In theoretical thinking of the city concepts every time has its characteristic idea, like green belts in the 19th c. Europe replacing city fortifications, or large recreational space in American cities at the same time. In the 20th c. there is the landscape concept of garden city and its counterpoise modern urbanism where quantitative criteria of "empty or green" space are the main element of the void among the city structure. At the end of the 20th and the beginning of the 21st c. there are new rethinking of the cityscape and landscape in general out of which new deconstruvistic parks (La Villette) are created in the context of the transformation of cities. This initiated a global process of affirmation of landscape architecture and also the development of new urban-landscape theory such as New Urbanism, Landscape Urbanism and Ecological Urbanism. While the New Urbanism aims to make contemporary interpretations of historic urban patterns, Landscape Urbanism seeks to comprehensively address to the spatial and social problems of the city by offering a socially active urban space. Ecological Urbanism logically carries on ideas of Landscape Urbanism with strong ecological approach adequate to the contemporary times. Landscape Urbanism as a new paradigm o the 21st c. has had the most influence in Europe practice. Town planning in the spirit of Landscape Urbanism is not based upon territorial city growth but upon reaffirmation and rediscovery of neglected and ignored city space, connecting them into system for the new urban image guided by landscape beyond the boundary division.[5]

3.2 Landscape Architecture Workshop at the Faculty of Architecture in Zagreb

Series of Master Workshops and Master Thesis within topic of Urbanscape Emanation[6] are being held since 2010 at the University of Zagreb on a described theoretical basis. The main goal is rediscovery of space led not by administrative and existing situations but guided by impressions – modification of consciousness. Most important part of the Workshop is research work where by mapping and analysing we search for the meaning of time and structures in the space. Students choose a task and the space they wish to research and design and in this way Croatian cities from different regions are being compared and analysed in the context of contemporary examples of town planning in which landscape architecture is primary medium for more humane-scaled planning and protection of heritage and public space.

4   LANDSCAPE AS A CONNECTION

Cities in current planning are viewed more as dynamic systems and less as a formal and static configurations and constellations. Squares, parks and districts known to us as traditional urban typologies, are fading in their design meaning. Meanwhile contemporary city is shaped by infrastructure (indeterminate by space boundaries) and its network that envelops the whole city and more.[7] Out of this contemporary projects there are three types of urban landscape, described in next segments of text and all of them establish connections of public, multipurpose places.

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[3] Bojanić, Obad Šćitaroci, 2004.

[4]   collage   author   Tamara   Marić   [source: http://old.d-a-z.hr/img/novosti-potkova-v-1267628477.jpg; http://photomoodblog.wordpress.com/tag/aerial/;   http://www.bu.edu/av/ah/fall2008/ah382/lecture15/Picture40.jpg; http://london.wikia.com/wiki/Regents_Park;   http://madrid2008-09.blogspot.com/2009/05/apuntes-miercoles-6-de-mayo.html]

[5] Bojanić, Matuhina 2012; Marić, Bojanić, 2012

[6]Emanation – emission (the act of emitting) – causing to flow forth; the effect that any entity, system, and/or being has on its environment, Prof. Bojana Bojanić Obad Šćitaroci, PhD lectures Contemporary Landscape Architecture

[7] Hauck, Keller, Kleinekort, 2006

Fig. 2: New York High Line, phase 1 2009, James Corner with Diller Scofidio+Renfro; Barcelona La Sagrera linear park, 2011, West 8; Manchester Irwell City Park, 2010, FoRM ass.; Grand Paris Axe Seine, 2009, Antoine Grumbach; Madrid Rio, GOD AUTOR ; Toronto Waterfront, 2009, West 8[8]

4.1 Highlines as Airscape

Reshaping and transforming character of space by reaffirming it through landscape architecture often leads to the creation of new pedestrian walkways and bicycle paths which rise above the level which can be achieved also by lowering the existing level of vehicular traffic. Those are contemporary promenades and James Corner's project with Diller Scofidio+Renfro – High Line of New York City[9] – shows how this concept can become a great success for inhabitants and tourist. This is an urban renewal project which has transformed unused elevated freight rail line into a 1.6 km public space and extraordinary touristic attraction on the West Side of Manhattan. The project has its conceptual origins in 4.7 km green belt that follows the old Vincennes railway line in Paris called Promenade plantée designed by landscape architect Jacques Vergely and architect Philippe Mathieux and opened in 1993. High Line has opened its first stage of the project in 2009, second in 2011 and third is under construction. Since than many cities are thinking about the elevated parks and airscape projects of transformations in urban fabric. There are plans for 4.3 km Bloomingdale Trail in Chicago; also for an old Reading Viaduct elevated rail in Philadelphia; old railway arches at the Bishopsgate Goods Yard in London. Location of another old elevated track which is being considered for new park and shops can be found in Rotterdam. This success is a result of attractive mix of today increasingly popular walkspace and walkscape.[10] Humans have always had the need to have a better view, which is probably why we have stood ourselves on two feet through evolution.

Except the highline there are many other new types of airscape in general that can be seen as contemporary landscape architecture projects with interventions of elevating from the ground. They can be lifted structures like the highline itself is (Tiger and Turtle, Magic Mountain 2011; Tezuka Architects, Ring around Tree, 2011) or they can be in close connection with the landscape which they emphasizes (Massimiliano Fuksas, The entry in the cave Niaux, 1993; Reiulf Ramstad Architects, National touristic route Trollstigen, 2010).[11] These projects help the communities and small neighbourhoods to be better connected with healthier urban environment and more profitable touristic public spaces.

4.2 Linear parks above and along the traffic and infrastructure

Similar to the highlines but in much larger scale there are linear parks systems or even networks for the new future image of the cities. La Sagrera linear park,[12] a project for Barcelona diagonal green axis by West 8, 2011, connects Natural environment of the City: sea and the mountains, bringing the City strong ecological mark for this European metropolis. It is counterpoint to today's backbone of the city Diagonal Avenue with shaded way for the pedestrians, bicycles and skaters through neighbourhoods, El Clot Park, historical gardens and installations of fountains. Inspired as a solution for the new railway connections this linear park has underground and ground traffic depending upon the urban situation through 40 ha of urban landscape. After huge city road in Madrid went down below the ground a large linear park along the river Manzanares was built. It is a project that consist of 6 parks, city beach, recreational and cultural space and it is called

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[8] collage author Tamara Marić (footnotes: 8, 12, 11, 14, 15, 16)

[9] http://www.archdaily.com/141990/141990/ [28.2.2013.]; http://www.bbc.co.uk/news/magazine-19872874[28.2.2013.]

[10] Walkspace = space of motion, space where we are moving; walkscape = places that we observe during the motion.

[11] This is a part of the student seminar, author Jakov Fatović, univ.bacc.ing.arch., mentor: Prof. Bojana Bojanić Obad Šćitaroci, PhD, from course: Contemporary Landscape Architecture at the Faculty of Architecture University of Zagreb

[12] http://www.west8.nl/projects/sagrera_linear_park/?s=Sagrera %20Linear %20Park [28.2.2013.]

Madrid Rio.[13] Altogether there is 30 km of bicycle routes, 33 pedestrian bridges and more than 30000 new trees. This project revitalized the town on the other side of the river and made possible future development of the city. Both project give strong landscape concept to the city, more ecologically aware image. In this scale city is planned together with its periphery and further with its surroundings, respecting the historical urban patterns but giving it new idea(s) in dealing with contemporary problems of city growth. Madrid Rio is at the same time part of the subgroup type of waterfront projects.

4.3 Waterfronts

Waterfronts are fortunate to have the natural element of water as attraction and motivator for relaxation and recreation. Its shoreline area can be the edge of the sea, lakes, rivers or canals, all places that are attractive for designing and redesigning in the new spirit to make them more active in the cities life. Research project that deals with this topic is called URBEM[14] (Urban River Basin Enhancement Methods).

One of the most known contemporary project is Irwell City Park[15] in Manchester from 2010, FoRM ass., in which along 8 km of new vision for the river and its corridor cities conurbation is connected. It connects also two parts of the city on the other side of river by creating new and regenerating areas that have become isolated and fragmented. Toronto has developed explicit strategies of different relations of the city user and the shore of the lake Ontario. Grand Paris[16] – Axe Seine is solution for Grand Paris by the author Antoine Grumbach, it follows and creates linear network of extended community of the Seine which goes beyond city boundaries and landscape creating connection from Paris to Le Havre.

Waterfront projects in urban space are attractive but delicate places which have particular surprising and valuable natural feature. Waterfront landscape is logical in its appearance but it is hard to articulate relationship between its elements and the city.

4.4 Comparison of urban landscape concepts

By these three types of urban landscape it is possible to distinguish some of the themes at Landscape Architecture Workshop and Master Thesis in Zagreb. The knowledge gained through the analysed project samples is first interpreted and readjusted to the scale and space and then applied adequately in the solution concepts in both urban or landscape environments or scenarios.

4.4.1 Lungomare Airscape

Intersection of Urban and Natural Scenery of the Brač Island[17] is the name of Master Thesis at one of the south islands of Croatia in Adriatic Sea. Island was recognized in division of its north / urban side (with the large number of settlements), and south / landscape side (with only one bigger settlement – Bol). Due to the topography, this touristic attractive island especially south side can't be connected by lungomare at the coast. That is why in this thesis lungomare is displaced along the top contour of the Island where urban and landscape side of the Island meet (fig. 3). This kind of project where different and many settlement units need to work together in common goal are rare because it is hard to make an agreement from all sides, although the Master plans for islands in Croatia need to be done for the whole islands. The quality of this project is that it uses existing pathways (pedestrian, bicycle or road) to connect interesting viewpoints, historical and new landscape places. It becomes airscape of "elevated lungomare" making it possible to put it into realization almost immediately.

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[13]   http://www.madrid.es/UnidadWeb/Contenidos/Publicaciones/TemaUrbanismo/ProgOperUrbanismoVivienda2007_201/Ficheros/ Espa %C3 %B1ol/04_area_de_proyectos_singulares.pdf [28.2.2013.]

[14] http://www.urbem.net/ [28.2.2013.]

[15] http://www.formassociates.eu/project.php?id=1&cat=6 [28.2.2013.]

[16]   http://www.diplomatie.gouv.fr/en/france/geography/regions-and-towns/regions/article/the-ten-grand-paris-projects-for [28.2.2013.]; http://www.apur.org/sites/default/files/documents/AUDAS_axe_Seine.pdf [28.2.2013.]

[17] NEJAŠMIĆ, Nera: Interweaving of Urban and Natural Scenery of the Island of Brač. Master Thesis, 2012, Faculty of Architecture, study programme of architecture and urbanism and Master Thesis for design study programme, University of Zagreb, mentor: Prof. Bojana Bojanić Obad Šćitaroci, PhD (architecture) and Prof. Mladen Orešić, mr.diz., Ass.Prof. Ivana Fabrio, mr.diz.

Fig. 3: Elevated Lungomare. Project for island of Brač – author: Nera Nejašmić (footnote 17)

4.4.2   Infrastructural re-use

Two projects can be compared with the examples of highline and linear parks along infrastructure. They are somewhere in between this two types creating the linear landscape along forgotten historical road Napoleon road at the Pelješac peninsula or unused railroad south of Dubrovnik in Konavle.[18]

They are both the results of the Landscape Architecture Workshop projects and the first one is named Napoleon's road of Pelješac – Touristic and Recreational Route and it re-activates 61km of historically strategically important road along the peninsula making accessible 48 of historical localities around the road from prehistory to the 19th century. Second work called Konavle-Reactivation of Railroad aims to, like High line, redefine in War (nineties of the 20th c.) destroyed rout. It is situated in the topographically demanding area, which is why this rail is an engineering achievement and it gives a lot of spectacular views and ambience. Altogether it connects the southernmost parts of the Croatia in the interesting manner making it very important for the whole country.

Fig. 4: Reactivation along Infrastructure. Project for peninsula of Pelješac – author Dijana Pavić, project for region of Konavle – author Marija Milić (footnote 18)

4.4.3   Waterfront connection and comparison

Croatian littoral is characterised by its coast with numerous islands along the eastern side of the Adriatic Sea. To make this attractive and interesting landscape a vivid place during the whole year, it`s necessary to put into network a hinterland, mainland and islands. This theme was a part of research in one Master Thesis of Zadar Archipelago, where analysis was based on historical processions and nowdays migrations and processions in order to explain and direct new future processions as the east-west connection.[19]

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[18] PAVIĆ, Dijana: Napoleon's Road of Pelješac – Touristic and Recreational Route. MILIĆ, Marija: Konavle-Reactivation of Railroad. Both projects have been done in academic year 2010/11 at the Workshop of Landscape Architecture, University of Zagreb by mentorship of Prof. Bojana Bojanić Obad Šćitaroci, PhD

[19] KOZINA, Petar: Zadarski procesijun. Master Thesis, 2012, Faculty of Architecture, University of Zagreb, mentor: Prof. Bojana Bojanić Obad Šćitaroci, PhD
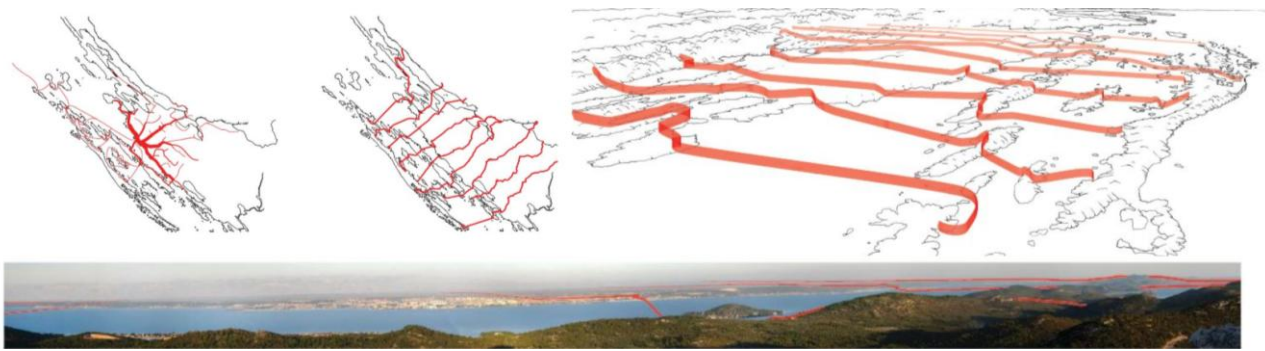
Fig. 5: Connecting Hinterland, Mainland and Islands in Zadar Archipelago – author Petar Kozina, (footnote 19)

Here we want to show how waterfronts are very important topic for Croatia, especially in the Mediterranean part on the coastline, but also in the continental part at the shores of rivers. In Mediterranean coast we can compare two approaches in different cities with the Toronto waterfront.

In Kaštela – the linear city between the city of Split and Trogir – urban promenade as real lungomare was suggested.[20] It is very important project because its linear structure is very hard to organize and because of it Kaštela are divided into 7 segments without the sense of one city. Public space that would be gained is the best possible way of connection to achieve this. Minimal interventions are needed for the beginning part and after that it is up to users and community to make an effort for improvements in different parts and places which is the main difference from the serious strategically organized interventions in Toronto. More like Toronto, project in Rijeka deals with the problems of the largest port city in Croatia.[21] Its coast is almost nowhere accessible for the public and now when the most of the industrial buildings are shut down revitalisation is necessity. In Master thesis for the coast of Rijeka it was attempted to put it into realization by organizing coast in frames of Waterfronts with different ration of interventions inside of them.
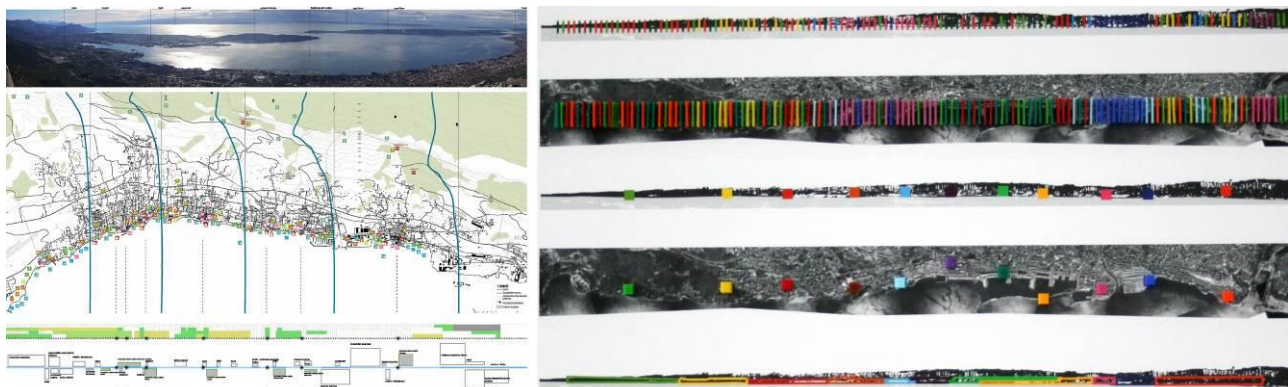
Fig. 6: Waterfronts in the Mediterranean Croatia. Promenade project for the linear city of Kaštela – author: Batina Iva, project for the coast of the city of Rijeka – author: Marija Peranić (footnote 20, 21)

In continental Croatia waterfronts are a part of relationship between Rivers and Cities. Two larger cities in this Region are the special cases of this relation. Capital city was until 1960's situated between river Sava and mountain Medvednica with little connections to the river. When the city crossed the river a new part of the city was created in the spirit of modern urbanism. Today still this isn't the city at the river but the city cannot ignore that a river is running through it. That's way one Master thesis of Landscape Architecture tried to establish the logical connections of the city and the River without ruining the relationship between them in the way it has been for centuries.[22] And in the East Croatia Osijek is very specific city situated only on one river bank of Drava. Another Master thesis deals with this type of city by saving the landscape for the time

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[20] BATINA, Iva: Kaštela – Urban Development of Coastal Areas. Workshop of Landscape Architecture, academic year 2011/12, Faculty of Architecture, University of Zagreb, mentor: Prof. Bojana Bojanić Obad Šćitaroci, PhD.

[21] PERANIĆ, Marija: Redefining the City Coast of Rijeka. Master Thesis, 2012, Faculty of Architecture, University of Zagreb, mentor: Prof. Bojana Bojanić Obad Šćitaroci, PhD.

[22] SELAK, Ana: Zagreb and Sava – Connecting Networks of Urban and River Landscape. Master Thesis, 2012, Faculty of Architecture, University of Zagreb, mentor: Prof. Bojana Bojanić Obad Šćitaroci, PhD

when city will cross on the other side.[23] This shows how the waterfront landscape can connect not only urban areas but also urban spaces with landscape areas.
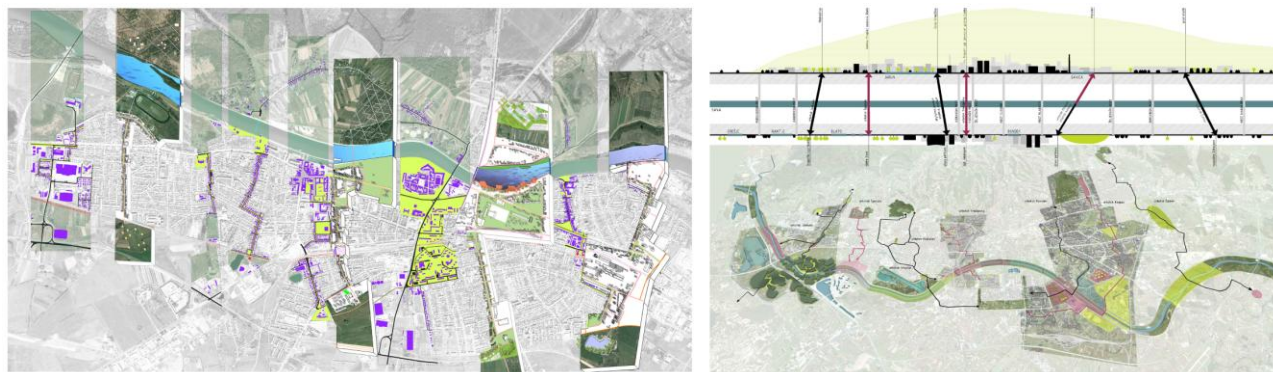
Fig. 7: Waterfronts in Continental Croatia. Project for the city grid in Osijek – author: Ksenija Radić, project for the landscape network in Zagreb – author: Ana Selak (footnotes 22, 23)

5 CASE STUDY: URBAN LANDSCAPE OF THE CITY OF SPLIT

Here is an example of how urban boundaries can be non effective in the urban planning of region and the city. The subject of research is the Mediterranean city of Split. It is topographically a peninsula which ends with another peninsula called Marjan.[24]

Long ago when Split was just a small settlement, in the north on the Jadro river delta there was the ancient city of Salona, which was a Greek harbor and later a grand Roman city. Salona is the real beginning of the city of Split. In the late 4th century AD Diocletian's Palace, was built on the site of a former village. This royal palace was (and still is) a unique Roman building large in scale and situated on the periphery of Salona and is now part of UNESCO World Heritage list. In 6th century AD residents of Salona fled from the Avars´ invasion settling in the old royal palace which soon grew into a medieval burg. That is the story of Split´s origin. The growth of the city was slow and gradual during a long period of time. As opposed to the centuries of slow growth, during the 20th century the city of Split rapidly widens its built territory. Back than Solin with the archeological park Salona was administrative part of the city of Split as its distant periphery. Today (when Solins is indeed periphery of Split) it is not the case, boundaries are separated, Solin is town and the city of Split is now peninsula where a huge urban expansion in the 20th century leaves the city with very few urban open spaces except with a huge landscape area of the Marjan peninsula.

Fig. 7: The City of Split: peninsula city, Diocletian Palace, Diocletian Aqueduct, Salona roman amphitheatre (footnote 24)

5.1 Connections beyond Boundary

Marjan park-forest is the most precious part of landscape in the city surroundings. It is the space of walkability, recreation, culture and strong history and due to that if was an impulse for designing an urban landscape of the city of Split as a Master thesis assignment. With the motto of graduate work: the future of the city will be created on the periphery as the core is taken by the history, this research and design aims to connect two cities (Split and Solin) in a logical way – beyond boundaries – connecting Marjan park-forest, Diocletian's Palace, City and archeological park Salona.

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[23] RADIĆ, Ksenija: Osijek Garden Grid – Transformation of Urban Peripheries. Master Thesis 2011, Faculty of Architecture, University of Zagreb, mentor: Prof. Bojana Bojanić Obad Šćitaroci, PhD

[24] MARIĆ, Tamara: Landscape Planning of Split Urban Peripheries – Walking Choreography,Visual Illusions and Waiting Areas. Master Thesis, 2011, Faculty of Architecture, University of Zagreb, mentor: Prof. Bojana Bojanić Obad Šćitaroci, PhD.

Marjan landscape is the formula for how public spaces should be formed and designed only in urban character in order to achieve a healthier city with healthier inhabitants. Also reversed, with this kind of approach to the city planning, awareness about the Marjan peninsula values and problems can be induced. And with time more attention would be given to the forest and the coast of Marjan as a consequence of a Mediterranean lifestyle with more tourists actually visiting the city of Split instead of just passing by and through the city.

Fig. 8: The City of Split Interventions: new usage, elements of shades and new Park of Aqueduct (footnote 24)
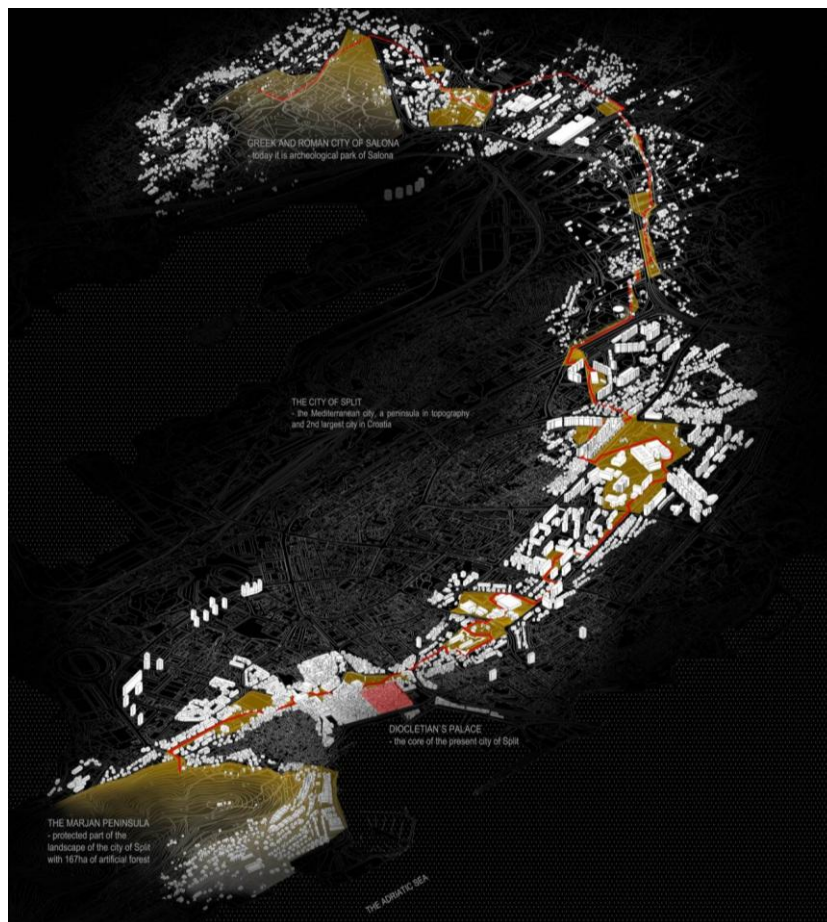
Fig. 9: Linear Landscape of The City of Split – author: Tamara Marić

In order to carry out this concept, linear space was divided into five urban areas between the Marjan peninsula and Salona Park: 1) the historic and social nucleus with Diocletian's palace 2) Gripe fortress connected with Gripe sports and commercial centre 3) residential areas 4) university campus 5) contemporary periphery along road entry to the city of Split. In every area suitable interventions were proposed considering urban existing conditions and master plan. It is necessary to make small interventions in public space of the core (Diocletian's Palace, the fortress) and in the residential areas around its museums, schools, parks, grove, avenues, and sight-seeing points, such as: considering other purposes, ways of using the space, planting trees, or changing path material. In the city core re-using and re-designing public space is necessary and economically acceptable intervention. In residential areas it is necessary to create places of

shade and "soft facade" in order to activate open spaces in-between the buildings. By creating and adapting these places, the landscape would come to life and neighbourhoods would accomplish great walkability with many health, environmental, and economic benefits. On the other hand, only one large intervention is enough to connect Marjan and Salona all the way and for that in the periphery – the Aqueduct Park was proposed. It is a cultural park along the Diocletian aqueduct remains, from the University campus to Salona as an amplifier of the importance of the Diocletian's Palace. Interventions are mapped and visualized and connections are designed through solution of public transport line, bicycle route and places of waiting at the viewpoints.

5.2 Resulting urban landscape – The Pulse of the City of Split

This Mediterranean city landscape of history, urbanism, society and culture – The Pulse of Split – connects the city core (Diocletian's Palace) with the periphery and with its historical core, the Greek and Roman city of Salona. It also links the Marjan peninsula on one side and its present archaeological park Salona on the other. At the same time it passes through all historical levels of the city urban development, which gives different features to the landscape. By this it has joined towns making it possible to stay as two administrative units but united around the same interests for the future.

Indeed, urban landscape here becomes the pulse – the heartbeat of the city because it connects everything important about this city with a contemporary approach to landscape space as a walkscape thus reminding the city of the things it has forgotten about.

6 VALORIZATION: "LANDSCAPE IN-BETWEEN, WHY AND WHAN?"

In this research contemporary projects have been explained through categorisation in three themes: airscapes (highline projects as a part of it), linear parks above and along the existing and active traffic and infrastructure, and waterfronts. All three have in common that they give public land for the public good by transforming public space into vivid public places for the citizen and tourists. In this way landscape is seen as opportunity for regeneration or/and city development and better growth. Many projects belong at least partially in more than one of these types, by which they show how this categorisation is not mutually exclusive. Highlines are in one way linear parks but on the former infrastructure of transportation, now becoming infrastructure of different kind – infrastructure of walkspace and walkscape. Linear parks category includes projects of greater area and systems of urban landscapes along either diagonal or linear corridors. Sometimes it can be in relation to the water element in the city (Madrid Rio) becoming also waterfront which gives it higher value and justification. Waterfronts are project which are not only placed on the shores but also planned and designed primarily as relation to the sea, river, canal or lake.

These categories are compared to the projects for the Landscape Architecture Workshop and Master Thesis in Croatian cities at the Faculty of Architecture in Zagreb. Projects have been chosen carefully so that they can be compared with classification above, but bearing in mind the scale, reach and possibilities of Croatia. Therefore the division is not taken literally, but is carefully and purposely adjusted. In airscape example of Brač it is shown how lungomare can be a variation of this category. Infrastructural re-use is in Croatian scale between highlines and linear park category, because bigger linear parks would not be economically possible in Croatia, at least for now, but even more importantly they are not necessary or a priority due to large number of National Parks and other protected landscapes at the state level. Werfronts are shown through more projects because they are in Croatia a very important and delicate topic. Also here landscape of water itself is a way of connecting the parts in a unit, we just need to make this connection happen in a positive way.

These project proposals are developed by students under the mentorship of Prof. Bojana Bojanić Obad Šćitaroci, PhD. at the faculty during one semester and the idea is to show to the public administrations how they can use and direct their urban and regional planning or design to improve tourism, living and nature. Most of the projects have been presented to public (Brač, Zadar and Rijeka) and reactions from the inhabitants were excellent. In Bol on Brač lungomare airscape was presented together with the exhibition in the summer program.[25] In Zadar the office for space planning was interested in this project and they have taken it into consideration. Other projects have been carried on in the workshops, for example in Split

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[25] http://www.boljani.info/images/stories/2011/poster-smanjeno.jpg [28.2.2013.]

workshop called Marjan 2011,[26] in Dubrovnik workshop the research work of Dubrovnik surroundings (Kaštela and Pelješac including) was presented and further developed. In Kaštela there was an international workshop dealing with lungomare promenade called 7 Bisera Kaštela-Croatia.[27] It is difficult to make an impact on the administration of cities but the attention was turned to the problems and possible direction for solutions were shown.

7 CONCLUSION

Important part of this research was to show how boundaries are necessary, but they can be limiting in the process of urban planning. It offers also a possible solution for this conflict in the form of using landscape architecture in planning in a way that it explains how landscape can, especially urban landscape define new boundaries. As well it is shown how can landscape be a help to urban planning without changing the boundaries. This is the reason why urban landscape is beginning to be a method in urban planning and the theme of urban designs of the cities from the end of the 20th c. since when new theories have been arising in form of Landscape Urbanism and Ecological Urbanism.

This new theories see landscape as a potential for new urban revival of the cities giving them contemporary more human image. Rediscovery of neglected and ignored city space and their redesign and reaffirmation is shown on types of projects giving the correlation between examples in practice and study projects at the University of Zagreb. Highline, like the one in New York, and promenade, like student project in Kaštela, connect parts of the cities or different communities in one whole, like in airscape of Brač. New landscapes along and above infrastructures show us how to connect peripheries and the city (Madrid Rio) or one region (wider surroundings of Dubrovnik). Waterfronts connect urban and natural landscape making attractive new public places and it is very important topic in planning of the Croatia and in the world in general.

Case study of urban landscape of Split illustrates how boundaries can become a problem for design or/and development of important historical and urban parts leaving an archaeological site of world importance to be gradually destroyed by spreading suburban areas of town Solin and not using the space adequate to its potential. City landscape of Split has been seen as a solution for this problem as a way to connect Split and Solin (centre and periphery) without administrative changes. This urban landscape would give more value to the world heritage Diocletian's Palace connecting it with Salona and other historical places with contemporary image for the whole city and its periphery.

Landscape can be a tool in urban planning when city or region need a new image, promotion or healthier space. It is necessary to use landscape as a connection when it is about areas with strong historical and cultural heritage or natural environment, where urban landscape design can properly make this places usable in non violate form.

8 REFERENCES

ALYMONINO, Aldo, MOSCO, Valerio Paolo: Contemporary Public Space / Un-volumetric Architecture. Milano, 2008.
BOJANIĆ, OBAD ŠĆITAROCI, Bojana, MATUHINA, Nikola: Landscape Urbanism, New Spatial Paradigm. In "Prostor", Vol. 43, Issue 1, pp. 106-117 [http://www.arhitekt.unizg.hr/prostor/Lists/Clanci/Attachments/369/08_bojanic.pdf]
CARERI, Francesco: Walkscape – walking as an aesthetic practice. Barcelona, 2007.
CUTHERBERT, Alexander R.: Understanding Cities – Method in Urban Design. Routledge, London and New York, 2011.
DOUCET, Isabelle: [Centrality] and/or Cent][rality: A Matter of Placing the Boundaries, Urban Landscape Perspectives, Vol. 2, pp. 93-123, Sptinger, 2008.
KIPAR, Andreas, PAGLIARO, Valeria: Green Rays in Milan. In: "TOPOS", Vol. 77, pp. 50-54, München, 2011.
KULLMAN, Karl: Thin parks/thick edges: towards a linear park typology for (post)infrastructural sites. In: "JoLA", Vol. 4, Issue 12, pp. 70-81,Wageningen, 2011.
HAUCK, Thomas, KELLER, Regine, KLEINEKORT, Volker: Infrastructural urbanism – Addressing the In-Between. Berlin, 2006.
MARIĆ, Tamara, BOJANIĆ OBAD ŠĆITAROCI, Bojana: Walkspace / Linear Space – Motion in the City of Split. In: "Prostor",
Vol. 43, Issue 1, pp. 118-131, Zagreb, 2012 [http://www.arhitekt.unizg.hr/prostor/default.aspx]
MOSTAFI, Mohsen: Why Ecological Urbanism? Why now?. In: "TOPOS", Vol. 71, pp. 30-35, München, 2010.
TAGLIAGAMBE, Silvano: Landscape as a Regenerative Structure of a Fragmented Territory. Urban Landscape Perspectives, Vol. 2, pp. 61-79, Sptinger, 2008.
TURNER, Tom: City As Landscape – a post-modern view of design and planning. Oxford, 1996.
1000xLandscape Architecture, Braun, 2009.
Recovering Landscape – essays in Contemporary Landscape Architecture. New York, 1999.
Urban Landscape Perspectives. Vol. 2, ed. Giovanni Maciocco, Springer, 2008.

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[26] http://pogledaj.to/arhitektura/magarce-na-marjan/ [28.2.2013.]

[27] http://www.7bisera.info/ [28.2.2013.]

Le Politiche Temporali Urbane tra Pianificazione e Inclusività Sociale: il Caso dei Piani Territoriali dei Tempi e degli Spazi della Regione Puglia in Italia

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1 ABSTRACT

Con l'inizio della rivoluzione informatica, la discontinuità generatasi con il pensiero prospettico di matrice rinascimentale e le nuove esperienze sensoriali e percettive di tipo interattivo, in cui il parametro "tempo" diviene dominante rispetto al parametro "spazio", consentono di supporre che esso possa diventare il nuovo fondamento dell'architettura contemporanea, decretando il passaggio dalla progettazione degli "spazi" a quella dei "tempi". I tentativi di unire tempo, architettura e città, che lascerebbero già intravedere l'avvento di nuove tipologie architettoniche e urbane, nascono principalmente dal bisogno di rispondere a necessità fondamentali per il benessere dei cittadini, tra cui l'esigenza di una città "inclusiva" dei bisogni sociali dei suoi utenti diversificati per età, sesso, etnia e livello culturale.

Il caso studio presentato riguarda le poltiche sociali della Regione Puglia, eccellente modello di riferimento per il sud dell'Italia: la L.R. n. 19/2006 "Disciplina del sistema integrato dei servizi sociali per la dignità e il benessere dei cittadini e delle cittadine di Puglia" e la L.R. n. 7/ 2007 "Norme per le politiche di genere e i servizi per la conciliazione vita-lavoro in Puglia" hanno sostenuto la nascita di un sistema di governance delle politiche di genere, che includono le politiche temporali urbane alla base del Piano Territoriale dei Tempi e degli Spazi (PTTS) della città, strumento pianificatorio ad indirizzo strategico con l'obiettivo di rispondere concretamente ai bisogni di conciliazione vita-lavoro delle famiglie in contesti locali. Presentato a livello di Ambito Territoriale Sociale (ATS), il piano si attua per mezzo di Studi di Fattibilita dei PTTS (n. 28 studi avviati per altrettanti ATS su n. 45 ATS presenti), il cui fine è quello di implementare azioni spazio-temporali, diffondere la mobilità sostenibile, promuovere la conciliazione dei tempi di vita-lavoro e la rivitalizzazione sociale dei contesti urbani e, per mezzo delle Banche del Tempo, promuovere l'uso del tempo per fini di solidarietà sociale.

La rilevanza assegnata alla mobilità sostenibile nelle politiche temporali urbane della CE viene recepita a livello regionale dai PTTS, le cui direttive si integreranno a livello locale con i Piani Urbani di Mobilità Sostenibile (PUMS), introdotti con la L.S. n. 340/2000. In Puglia sono in corso la formazione di una rete ciclabile regionale integrata con la rete delle infrastrutture per la mobilità e una serie di iniziative didattico-comunicative per la diffusione, tra giovani e studenti, di pratiche per l'uso della bicicletta e per gli spostamenti a piedi, nel pieno rispetto dell'ambiente per una migliore qualità della vita.

2 TEMPO, ARCHITETTURA E CITTÀ

Il concetto di "spazio", che ha dominato la teoria e la pratica dell'architettura dei secoli scorsi, sembra stia per cedere il passo al concetto di "tempo", che, seppur presente, non ha quasi mai determinato in modo sostanziale sino ad oggi le scelte alla base del progetto architettonico e urbano. La crisi della "modernità" classica e l'avvento di quella che viene definita "nuova modernità"[3] avrebbe generato il cambio di paradigma dalla società industriale a quella elettronico-informatica, aprendo la strada a nuove sperimentazioni teoriche e progettuali, in cui il tempo sembra configurarsi come il nuovo parametro della progettazione architettonica all'interno della città contemporanea dell'era dell'informatica.

2.1 La questione del tempo

Il "tempo" è essenzialmente questione esistenziale e filosofica, prima ancora che progettuale. Nella storia della filosofia si sono avvicendate diverse visioni e concezioni a tal riguardo: tempo come causalità, tempo come coscienza e tempo come possibilità.

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[1] Autrice del paragrafo "La mobilità sostenibile in Puglia".
[2] Autrice dei paragrafi "Tempo, Architettura e Città" e "Le politiche sociali Puglia Regione Puglia".
[3] Z. Bauman: Modernità liquida. Bari, 2002.

Il concetto di tempo come causalità (tempo oggettivo) ha origine con Aristotele, per il quale il tempo è l'ordine misurabile del movimento, e arriva sino a Newton, che distingue un tempo assoluto (tempo di durata) da un tempo relativo (tempo lineare), e infine a Kant, secondo il quale l'ordine di successione temporale coincide con l'ordine di causalità, decretando il pasaggio alla concezione moderna del tempo. La concezione del tempo come coscienza (tempo soggettivo) nasce, invece, con Plotino e Sant'Agostino e giunge sino a Hegel, che considera il tempo come intuizione del movimento e del divenire, approdando ad un'idea in cui il tempo si riduce alla coscienza pura. Dopo Hegel, il concetto è ripreso da Bergson, per il quale il tempo vissuto equivale alla durata della coscienza, e da Husserl, per il quale il tempo coincide con la coscienza nel tempo presente. La concezione del tempo come possibilità (tempo progettuale), infine, viene formulata da Heidegger: il tempo si riduce a struttura delle possibilità, secondo una rivalutazione del ruolo del futuro in favore di un tempo che è possibilità e progettualità. Grazie anche a Einstein e alla sua teoria della relatività, il tempo cessa di essere "necessità" per diventare "possibilità", di più ordini e di più tempi.

Tra le varie interpretazioni e definizioni del tempo esposte, particolarmente attuale risulta essere quella di Husserl, che sviluppa il discorso sul tempo a partire da una fenomenologia della coscienza interna, secondo cui il tempo non è creato dalla coscienza, ma coincide con la vita della coscienza, ed è elemento sempre presente, anche quando non percepito, che rende possibile lo svolgersi degli eventi e la loro percezione e da cui ha origine il mondo spazio-temporale. Dopo Husserl, anche il filosofo Maurice Merleau-Ponty, esponente della fenomenologia francese del Novecento, sostiene le qualità fenomeniche del tempo in opposizione alla concezione di tempo lineare, dicharando in tal senso che il tempo è una "rete di intenzionalità" e "non è una linea". In continuità con tali visioni, le teorie odierne che forse rappresentano di più il tempo sono quelle che si basano su concetti derivanti dalla tradizione fenomenologica, che abbandonano il concetto di tempo lineare, rinunciando all'idea di un tempo unico in favore di nuovi modelli (tempo ciclico, simultaneo, ecc.), e presuppongono una "coscienza del tempo" (fenomenologia della coscienza di E. Husserl) e una consapevolezza di "qualità" del tempo (fenomenologia urbana di K. Lynch.).

2.2 Spazio e Tempo in Architettura

Nel 1941 viene pubblicato negli Stati Uniti il libro dal titolo "Spazio, tempo e architettura: lo sviluppo di una nuova tradizione", in cui lo storico svizzero Sigfried Giedion analizza, parallelamente alla storia dell'architettura, l'evoluzione delle concezioni di spazio e tempo, portando all'attenzione del dibattito architettonico di quel periodo il tema del "tempo" in architettura. Egli sostiene, infatti, che alla base dell'architettura contemporanea vi sia una concezione di tipo spazio-temporale, affermando che, dopo i postulati della geometria euclidea e cartesiana e della prospettiva quattrocentesca basata sullo spazio a tre dimensioni, agli inizi del Novecento si affermano le teorie del fisico A. Einstein e del matematico H. Minkowski sullo spazio a quattro dimensioni,[4] per giungere, infine, agli spazi dinamici generatisi con l'invenzione dell'automobile, che integrano il "movimento" alla concezione architettonica contemporanea.

Dopo Giedion, è, infatti, l'urbanista francese Paul Virilio a sostenere che l'avvento della velocità, dell'elettronica e dell'informatica segna i nuovi confini dello spazio e dei suoi rituali d'accesso: non più porte ma sistemi di ascolto elettronico, non più recinti ma superfici-limite, interfacce, in una "città sovraesposta", in cui la velocità abolisce la nozione di dimensione fisica e "l'architettura urbana deve ormai venire a patti con l'aprirsi di uno spazio-tempo tecnologico". Agli inizi degli anni Settanta il filosofo Michael Foucault afferma che la storia è finita ("La storia è discontinuità", Microfisica del potere, 1977), sostenendo che la storia era fatta di frammenti e eventi sparsi e che non esisteva più un discorso sulla storia nè l'unità dell'esperienza, ma solo pluralità, del soggetto e degli eventi (M. Cacciari, F. Rella, M. Tafuri, G. Teyssot, Il dispositivo Foucault, 1977). Negli stessi anni, sulla scia delle affermazioni di Foucault, il filosofo Gilles Deleuze anticipava alcuni dei temi centrali nella sperimentazione progettuale contemporanea: le sue teorie hanno introdotto nella pratica architettonica termini come affiliazione, spazio fluido e stirato, piega e flessibilità. Eppure, nonostante gli assunti diversi e i diversi esiti formali, esiste ancora un elemento che accomuna le esperienze della fine del XX secolo e non consente ancora di parlare di avvento di una nuova era in architettura ed è la permanenza della prospettiva. Giedion sosteneva che la prospettiva viene superata nel movimento artistico del Cubismo, a differenza di quanto affermato da Franco Purini, secondo il quale, invece, il Cubismo non si sarebbe mai veramente liberato dagli schemi prospettici, ravvisando una

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[4] A. Einstein, Sulla elettrodinamica dei corpi in movimento (1905) e H. Minkowski, Space and Time (1908).

sostanziale continuità della presenza della prospettiva per tutto il Novecento, anche nel decostruttivismo, poiché la negazione del punto di vista unico moltiplicato in una pluralità di nuovi punti di vista, in realtà non segnerebbe la fine della prospettiva come forma simbolica, così come teorizzata da Erwin Panofsky (La prospettiva come forma simbolica, 1926). E' solo con l'architettura digitale che si può cominciare a parlare di discontinuità con il pensiero prospettico di matrice rinascimentale. Superato, infatti, il rapporto tra l'uomo e la realtà creato dallo spazio prospettico, la rivoluzione digitale sostituisce alle entità classiche della prospettiva delle entità indirette, in base alle quali al segno subentra un'informazione, con il risultato che le immagini non sono più definite dalla distanza ma dalla prossimità dello schermo, che però si fa inaccessibile in un rapporto di presenza/assenza e si configura come "digital divide", muro che ormai divide due epoche umane, quella passata da quella futura.[5] La rivoluzione informatica rappresenta sicuramente uno degli aspetti più imponenti della contemporaneità, tra i quali il nuovo valore della discontinuità e il fenomeno dell'interattività stanno generando nuove esperienze percettive, in cui il parametro "tempo" diviene dominante rispetto al parametro "spazio". Il nuovo ruolo del tempo, che nell'architettura digitale si lega alla questione della percezione sensoriale e individuale, mentre nell'architettura reale si esprime già nell'attenzione per la progettazione di alcuni edifici e degli spazi e dei tempi della città, consente di supporre che possa diventare il nuovo fondamento dell'architettura contemporanea, decretando il passaggio dalla progettazione degli "spazi" a quella dei "tempi".

2.3 Nuove città per nuove società

I tentativi di unire il tempo all'architettura e alla città nascono principalmente dal problema di sincronizzare i tempi degli edifici con quelli della città e questi con quelli degli abitanti, un problema che in definitiva esiste da sempre, ma che l'accelerazione temporale del digitale sembra aver accresciuto in modo esponenziale.

Nel 2005 il gruppo di ricerca olandese composto da B. Leupen, J. Van Zwol e R. Heijne presenta la propria ricerca in un testo intitolato "The 4th dimension: Time-based Architecture", riportando all'attenzione del dibattito contemporaneo sull'architettura il tema del "tempo" nel progetto architettonico.[6] Nella storia dell'architettura olandese, l'elemento "tempo" rappresenta un fattore di continuità, che a partire dalla prima metà del XX secolo, quando J. Brinkman e J. Van den Broek già affrontavano il tema dell'abitazione flessibile, attraversa l'opera di H. Herzberger con i suoi "edifici polivalenti" sino ai progetti più contemporanei di MVRDV e di R. Koolhaas (OMA), in cui l'architettura prende forma dal programma temporale e il tempo sociale, grazie a politche di welfare integrate alla cultura del progetto, si traduce in architettura e economia.[7]
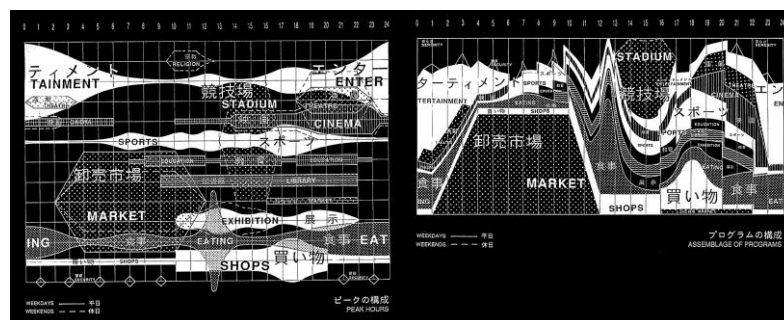
Fig.1: OMA, Yokohama Terminal Airport (2002), Schema n. 1 – Diagramma delle analisi delle ore di punta, Schema n. 2 – Diagramma temporale della costruzione del programma.

Studi più recenti affermano che vi sono già architetture temporali latenti "dentro architetture spaziali che già esistono ma che, attraverso la progettazione architettonica temporale, vengono rifunzionalizzate, reinventate, ricostruite per contenere tutti i tempi dell'abitare". I nuovi media, che includono simultaneità e ubiquità, e i nuovi mezzi di trasporto sempre più veloci, in grado di deformare le coordinate spazio-temporali, mutano il

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[5] F. Purini: Digital Divide. In: AAVV, Architettura e cultura digitale, a cura di L. Sacchi e M. Unali, Milano, 2003.

[6] Il concetto di "time-based" deriva dal mondo video e cinematografico e introduce nella progettazione architettonica gli strumenti per il controllo dinamico della forma e del tempo.

[7] Gli edifici Time-Based sono concepiti come polivalenti, parzialmente permanenti e modificabili, semi-permanenti o smontabili e hanno tutti alla base un modello concettuale per l'utilizzo di uno stesso spazio per usi differenti in tempi differenti, coniugando il tema della flessibilità con quello del tempo. B. Leupen, R. Heijne, J. van Zwol, Time-based Architecture, Rotterdam, 2005.

rapporto con gli spazi in cui si vive e iniziano a delineare una città contemporanea che "sfida le dimensioni del tempo per prefigurare le nuove morfologie urbane e tipologie architettoniche".[8] Se, dunque, il processo di destrutturazione della concezione spazio-temporale della modernità tende ad estremizzarsi sempre più, si profilano all'orizzonte nuove strategie di riappropriazione e ridefinizione dello spazio-tempo vissuto, attivate dai soggetti nelle loro pratiche quotidiane. Comprendere, infatti, il modo in cui oggi si articola il rapporto tra spazio e tempo, consente non solo di trovare risposte ai problemi dell'architettura, ma equivale anche a dotarsi di un dispositivo per l'interpretazione di alcune dinamiche molto complesse in atto nella città e nella società contemporanea: il problema della sicurezza e il governo dell'incertezza, la ridefinizione dei confini tra pubblico e privato, l'impatto delle nuove tecnologie sulle pratiche quotidiane, l'accelerazione dei ritmi della vita, la conciliazione dei tempi vita-lavoro, le differenze di genere, l'inclusione sociale. Il luogo in cui queste dinamiche si manifestano è il "quotidiano", fenomenologicamente inteso come "risultato delle pratiche di appropriazione e trasformazione degli spazi urbani", ed è in quel "quotidiano" che possono trovare una soluzione. Se ci si sofferma sulle pratiche prodotte da tali luoghi, più che sui luoghi stessi, ci si accorge che non esistono più uno spazio e un tempo uniformi, ma una "rete" disomogenea di tempi quotidiani che si interseca con spazi diversi all'interno della città. Il significato di tali relazioni spazio-temporali, inoltre, non è uguale per tutti i soggetti che ne fanno esperienza, ma varia a seconda del ceto sociale, del genere e dell'appartenenza etnica. Attraverso la crescente attenzione per le pratiche della vita quotidiana è in atto oggi un percorso di rivalutazione in positivo delle "differenze", che se in passato erano considerate questione privata, oggi appaiono centrali per la promozione di nuove forme di azione sociale finalizzata al recupero del valore della socialità e al dialogo con le istituzioni politiche, e per il recupero del ruolo del "pubblico" rispetto al "privato", grazie al quale diventa possibile rispondere a necessità fondamentali per il benessere dei cittadini, tra cui l'esigenza di una "città inclusiva" dei bisogni sociali dei suoi utenti diversificati per età, sesso, etnia e livello culturale.[9]

3 LE POLITICHE SOCIALI DELLA REGIONE PUGLIA (IT)

Sullo sfondo del difficile contesto economico internazionale, le politiche attuate in Italia negli ultimi anni per fronteggiare lo stato generalizzato di crisi hanno spesso avuto l'effetto di penalizzare ancora di più la condizione della fasce sociali più deboli, con il conseguente aumento del fenomeno della disoccupazione e del lavoro precario e il peggioramento delle condizioni sociali e della qualità di vita della popolazione.

La Regione Puglia, raccogliendo la sfida posta dalle difficoltà di un sistema economico fortemente instabile, ha inteso promuovere nuovi momenti di riflessione e sperimentazione con cui avviare uno sviluppo economico e sociale più equo e inclusivo. Con la programmazione dei fondi europei 2007-2013, infatti, è partita "una stagione nuova per l'esigibilità dei diritti sociali e del diritto al benessere e alla dignità di tutti i cittadini e le cittadine pugliesi", grazie all'attuazione di politiche integrate basate sui bisogni degli attori sociali, sullo sviluppo di nuovi settori produttivi, sulla crescita delle risorse immateriali e sull'attenzione allo sviluppo del capitale sociale territoriale. La carenza della normativa regionale in termini di esigibilità dei diritti ha imposto l'elaborazione di due nuove e importanti leggi: la L.R. n. 19/2006 "Disciplina del sistema integrato dei servizi sociali per la dignità e il benessere dei cittadini e delle cittadine di Puglia" e la L.R. n. 7/2007 "Norme per le politiche di genere e i servizi per la conciliazione vita-lavoro in Puglia" i cui principi base sono "Dignità delle persone, Universalità dei diritti, Valorizzazione delle potenzialità e delle risorse delle persone e delle famiglie, Equità nella distribuzione delle risorse, dei poteri e delle responsabilità tra i sessi, Rispetto delle identità e Valorizzazione delle differenze di genere, cultura, e religione". Tali leggi hanno sostenuto la nascita di un sistema di governance delle Politiche di genere, che includono le Politiche temporali urbane, all'interno delle quali trovano espressione misure che valorizzano i "processi di costruzione di dinamiche di inclusione, benessere e integrazione sociale" e promuovono "una pianificazione territoriale in grado di favorire la qualità della vita di donne e uomini". Tra queste le principali sono le Politiche di sostegno alle genitorialità e di conciliazione, i Piani dei Tempi e degli Spazi, i Patti sociali di Genere, la Carta per le Pari Opportunità e l'Uguaglianza nel Lavoro, il Fondo pubblico-privato per il sostegno alla flessibilità del Lavoro.[10]

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[8] A. Barbara: Sensi, Tempo e Architettura. Spazi possibili per umani e non. Milano, 2012.

[9] PRIN Costruzione e ricostruzione dello spazio-tempo nelle pratiche del quotidiano, Università degli Studi di Cagliari.

[10] S. Molendini: Le Politiche di Genere della Regione Puglia. In: Rivista di Scienze Sociali, n. 4 – Studi di genere, Foggia, 2012.

3.1 Le politiche temporali urbane in Europa e in Italia

Nel 2000 la Comunità Europea dà una prima definizione delle politiche temporali nella Risoluzione 218/2002 sulla partecipazione equilibrata delle donne e degli uomini all'attività professionale e alla vita familiare (GUCE n. C 218 del 31 luglio 2000): "Le Politiche temporali urbane indicano un insieme di azioni mirate a migliorare la qualità della vita dei cittadini e la qualità urbana, attraverso la progettazione e la realizzazione di interventi sui tempi e gli orari della città. Lo scopo di questi interventi è una migliore conciliazione dei tempi familiari, dei tempi di lavoro e dei tempi per sé, una più efficace organizzazione degli orari dei servizi pubblici e dell'uso spaziale e temporale della città". Tra i vari Paesi che hanno seguito tali indirizzi, l'Italia è stato il primo a dotarsi di una legislazione specifica per la conciliazione dei tempi di vita-lavoro, avendo contribuito ad alimentare il dibattito europeo intorno al tema delle politiche temporali.[11] Con l'iniziativa di legge popolare "Le donne cambiano i tempi", infatti, la Sezione Femminile del P.C.I. nel 1989 si interessò per la prima volta alle tematiche relative alla conciliazione dei tempi di cura parentale, agli orari di lavoro ed al tempo per sé, proponendo di intervenire in tre direzioni: l'organizzazione dei tempi delle città, il coordinamento dei servizi di interesse pubblico, l'offerta di servizi organizzati in base agli orari. Le prime leggi nazionali sono la L. n. 142/1990 "Ordinamento delle Autonomie Locali" e la L. n. 125/1991 "Azioni positive per la realizzazione della parita' uomo-donna nel lavoro". A queste segue la L. n. 53/2000 "Disposizioni per il sostegno della maternità e della paternità, per il diritto alla cura e alla formazione e per il coordinamento dei tempi delle città", che al Capo VII – "Tempi delle Città", dispone che le Regioni definiscano con proprie leggi "norme per il coordinamento da parte dei comuni degli orari degli esercizi commerciali, dei servizi pubblici e degli uffici periferici delle amministrazioni pubbliche e la promozione dell'uso del tempo per fini di solidarietà sociale". Essa obbliga i Sindaci di città con più di 30.000 abitanti a predisporre un Piano Territoriale degli Orari, a istituire un Ufficio Tempi e a individuare un Dirigente in materia (art. 24) e a istituire un Tavolo di concertazione delle Istituzioni cittadine per l'attuazione dei progetti contenuti nel Piano (art. 25).

3.2 La programmazione della Regione Puglia: i Piani Territoriali dei Tempi e degli Spazi (PTTS)

In attuazione dell'art. 22 (Compiti delle regioni) della L. 53/2000, la Regione Puglia ha emanato la L.R. n. 7/ 2007 "Norme per le politiche di genere e i servizi per la conciliazione vita-lavoro in Puglia", che pone a fondamento delle strategie di sviluppo regionale e territoriale l'affermazione di una nuova cittadinanza basata sulle differenze di genere e la partecipazione attiva della stessa e definisce al Titolo II – "Coordinamento dei tempi delle città" i compiti di Regione, Province, Comuni per la progettazione e l'attuazione dei Piani degli Orari, istituendo anche un Gruppo di Lavoro Interassessorile e un Tavolo permanente di Partenariato sulle politiche di genere. Preceduta dalla L.R. n. 19/2006 "Disciplina del sistema integrato dei servizi sociali per la dignità e il benessere dei cittadini e delle cittadine di Puglia" (art. 28 – "Conciliazione dei tempi di vita e di lavoro e armonizzazione dei tempi delle città"), tale legge è seguita dal R. R. n. 21/2008 "Regolamento per la predisposizione e l'attuazione dei Piani territoriali degli orari e degli spazi e per la costituzione, la promozione e il sostegno delle banche dei tempi", che definisce criteri e modalità per la concessione di contributi per promuovere la progettazione e l'adozione dei Piani Territoriali dei Tempi e degli Spazi, e dalla D.G.R. n. 1267/2009 "Linee guida regionali per la predisposizione degli studi di fattibilità per la progettazione dei Piani dei Tempi e degli Spazi".

Il Piano Territoriale dei Tempi e degli Spazi è definito come uno "strumento di pianificazione territoriale, volto a razionalizzare l'organizzazione dei tempi della città e a migliorare le condizioni di fruizione quotidiana dei servizi, attraverso la qualificazione dei programmi di azione per lo sviluppo economico, lo sviluppo urbano sostenibile e l'inclusione sociale, al fine di sostenere le pari opportunità fra uomini e donne e di favorire la qualità della vita attraverso la conciliazione dei tempi di lavoro, di relazione, di cura parentale, di formazione e del tempo per sé delle persone che risiedono sul territorio regionale, anche temporaneamente" (R.R. 21/2008, art. 2). Esso si configura dunque come strumento pianificatorio ad indirizzo strategico con l'obiettivo di rispondere concretamente ai bisogni di conciliazione vita-lavoro delle famiglie in contesti locali. Presentato a livello di Ambito Territoriale Sociale (ATS), essendo quello il

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[11] "La prima ricerca europea in materia di politiche temporali è stata promossa nel 1997 dalla Fondazione europea per il miglioramento delle condizioni di vita e lavoro, con sede a Dublino. Lo studio riconosceva l'origine italiana delle politiche dei tempi e l'innovazione delle stesse nel panorama delle politiche di genere". A. Pozzi: Un focus sulle politiche di conciliazione temporale. In: Mutamento Sociale n. 15, 05/2007, Milano.

contesto che presenta maggiori ostacoli per la gestione della famiglia e della città, il piano si attua per mezzo di Studi di Fattibilita, il cui fine è quello di implementare azioni spazio-temporali, diffondere la mobilità sostenibile, promuovere la conciliazione dei tempi di vita-lavoro e la rivitalizzazione sociale dei contesti urbani, e per mezzo delle Banche del Tempo, il cui fine è promuovere l'uso del tempo per fini di solidarietà sociale.

Lo Studio di Fattibilità definisce e descrive le strategie e le linee d'azione finalizzate alla redazione del PTTS attraverso la creazione dell'Ufficio dei Tempi e degli Spazi della città, l'analisi del contesto di riferimento, i meccanismi di costruzione del partenariato istituzionale, l'individuazione delle risorse finanziarie e umane per la fattibilità economica del piano, la strategia di comunicazione. Il PTTS, invece, deve necessariamente contenere l'analisi dell'ambito territoriale di riferimento, esigenze e criticità, finalità e obiettivi, misure previste (linee d'azione), target dei destinatari, risorse per le misure previste, partenariato attivato, cronoprogramma e piano finanziario delle attività, modalità di integrazione con i Piani di Zona e i Piani di Distretto, modalità di raccordo con la pianificazione territoriale ai vari livelli, modalità di gestione, controllo e monitoraggio, azioni di informazione e comunicazione. I Modelli di Intervento contenuti nelle Linee Guida, indicativi e non esaustivi delle iniziative attivabili, prevedono le seguenti Linee di Azione: Orari delle scuole, Orari dei servizi pubblici comunali, Orari del commercio e dei pubblici servizi, Orari dei servizi di trasporto pubblico locale, Orari dei servizi dedicati all'infanzia, Miglioramento dell'accesso ai servizi attraverso gli sturmenti della società dell'informazione, Formazione degli operatori delle amministrazioni pubbliche da parte delle provincie e sensibilizzazione dei cittadini (linea d'azione trasversale). Attraverso tali Azioni i Comuni coordinano e amministrano gli orari dei servizi pubblici, compresi gli uffici centrali e periferici delle amministrazioni pubbliche, gli esercizi commerciali e i pubblici servizi, le attività di trasporto, socio-sanitarie, di formazione e istruzione, culturali, sportive, turistiche e di spettacolo. Per i contributi agli studi di fattibilità sono state stanziate risorse complessive di € 3 milioni a valere sull'Intesa Famiglia Dipartimento Politiche Famiglia. Gli ambiti sociali che hanno già elaborato e presentato lo studio di fattibilità tra il 2010 e il 2011, rispondendo all'Avviso Pubblico pubblicato sul BURP della Regione Puglia n. 194/2009, sono n. 28 su n. 45 ATS presenti.

3.2.1 Lo Studio di Fattibilità "Abitare i tempi e gli spazi della città di Bari"

Il caso qui esposto riguarda lo Studio di Fattibilità per la redazione del Piano Territoriale dei Tempi e degli Spazi presentato dall'Ambito Territoriale Sociale della città di Bari il 30 giugno 2012. La città di Bari, capoluogo della Regione Puglia, a partire dal 2007 ha promosso e sviluppato con la Provincia e altri trenta comuni, sulla base di importanti modelli nazionali e internazionali, il Piano strategico Metropoli Terra di Bari, nell'intento di avviare la definizione degli scenari futuri dell'area metropolitana e la pianificazione della stessa nell'ottica della sviluppo sostenibile di medio e lungo periodo.

Nell'ambito di tale contesto, la visione alla base del Piano Territoriale dei Tempi e degli Spazi per la città di Bari contempla il miglioramento dell'abitabilità del tempo urbano, in favore della conciliazione dei diversi spazi di vita dei cittadini e di un maggiore coordinamento tra attori istituzionali e sociali.

Il processo di avvio dello studio di fattibilità ha previsto, infatti, due momenti fondamentali: l'analisi dei fabbisogni della cittadinanza e la partecipazione degli attori sociali. Ai fini dell'analisi conoscitiva dei bisogni del territorio oggetto di studio, si è resa necessaria un'indagine sugli utilizzi di tempo e spazio nella città. L'analisi è stata fatta su un campione di popolazione per mezzo di questionari (n. 320 questionari compilati) specifici per fasce d'età su argomenti relativi alle esigenze di accesso ai servizi pubblico-privati e alla mobilità urbana. I fabbisogni emersi sono stati raggruppati in quattro macrocategorie: mobilità pubblica sostenibile (potenziamento del trasporto pubblico, attenzione per le utenze deboli, potenziamento di bike e car-sharing), conciliazione vita-lavoro (flessibilità nell'orario di entrata a scuola, ampliamento della fascia oraria di apertura degli sportelli pubblici), accessibilità ai servizi pubblici (più efficiente comunicazione del comune con i cittadini, orari di apertura dei negozi più vicini alle esigenze dei cittadini, aperture domenicali degli esercizi commerciali), qualità urbana (nuovi spazi verdi, spazi per la cultura.). La modalità partecipativa della progettazione del piano ha previsto l'attivazione di focus-groups su base territoriale nelle circoscrizioni che hanno coinvolto il Terzo Settore, di forum urbani presso la sala consiliare del comune di Bari alla presenza di rappresentanti istituzionali, l'invito alle Asl e allle parrocchie.

Sulla base dell'analisi di contesto e delle proposte scaturite dagli incontri con gli attori sociali, è stata costruita l'architettura del PTTS, secondo una visione strategica articolata in quattro Linee d'azione, da attuarsi per mezzo di progetti sperimentali.

Le azioni strategiche sono:

Linea di azione 1 – Mobilità sostenibile urbana, con l'obiettivo di incentivare e implementare il Trasporto Pubblico Locale (TPL) e le modalità di spostamento collettivo, ridurre l'uso dei mezzi di trasporto privati, ridurre l'impatto ambientale. Progetti: TPL Bari, Car-pooling e sharing, Rete ciclopedonale Biciplan, Mobilità scolastica.

Linea di azione 2 – Conciliazione vita lavoro, con l'obiettivo di pianificare e regoalre gli orari e la fruizione degli spazi, garantire maggiori servizi e più qualificati per le fasce più deboli della popolazione, promuovere l'attivismo dei cittadini nella solidarietà. Progetti: Micronidi familiari, Coordinamento metropolitano delle Banche del Tempo, Albo dei lavori di cura, Commercio in rete.

Linea di azione 3 – Accessibilità ai servizi pubblici, con l'obiettivo di rafforzare le capacità delle istituzioni nell'erogazione dei servizi, rafforzare le competenze entro l'amministrazione sulle politiche di conciliazione e di organizzazione spazio-temporale, istituire un dialogo permanente di confronto tra Amministrazione e cittadini sugli usi del tempo e dello spazio. Progetti: Giornata del cittadino, Portale e-Gov, Ufficio dei Tempi e degli Spazi, Formazione PA.

Linea d'azione 4 – Qualità urbana, con l'obiettivo di aumentare la presenza di verde urbano, istitizionalizzare un luogo che possa favorire il dibattito urbano ed educare alla città. Progetti: Urban Center, Greening Project.

Il governo del Piano è affidato ad un Ufficio del Piano dei Tempi e degli Spazi, la cui struttura organizzativa ha il compito di attuare i PTTS e di istituire una Consulta dei Tempi, composta da soggetti rappresentativi del territorio, per il monitoraggio ciclico e l'animazione del dibattito sulla qualità urbana.
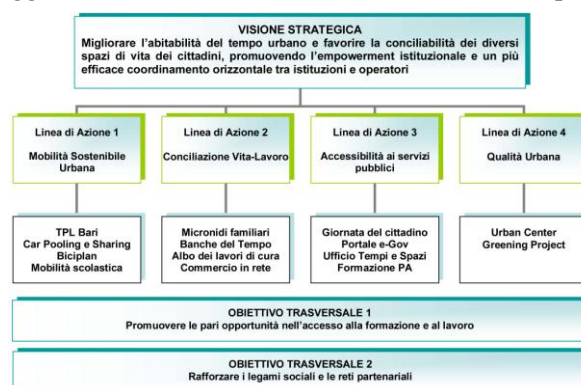
Fig.2: L'architettura del PTTS dell'Ambito Sociale della città di Bari.

4 LA MOBILITÀ SOSTENIBILE IN PUGLIA

L'obiettivo globale della politica di coesione della Puglia cofinanziata dal FESR per il periodo 2007-2013 è quello di favorire la piena convergenza della Regione in termini di crescita e occupazione, garantendo la sostenibilità del modello di sviluppo. Nell'ambito di questa strategia generale un riguardo particolare è stato dato ai temi della mobilità urbana sostenibile e dello sviluppo degli attrattori culturali, in quanto il sistema insediativo della Regione Puglia ha causato la perdita di identità dei centri limitrofi ai capoluoghi e lo spopolamento e declino economico dei centri minori. A questo si è accompagnato il declino demografico delle città centrali, determinato dai processi migratori verso le corone urbane dovuti sia ai differenziali di prezzo e alla scarsa offerta di alloggi pubblici, sia alla scarsa qualità urbana (inquinamento, criminalità, congestione, degrado, carenza di luoghi della socialità e di servizi di assistenza). Siamo in presenza di un'armatura urbana policentrica, nella quale da un lato sono assenti grandi agglomerazioni metropolitane con problemi di congestione e relative diseconomie esterne, dall'altro sono presenti sistemi di piccole città legate da consolidate relazioni reciproche e notevole affinità di risorse e problemi. Di conseguenza da un lato il sistema di trasporto risulta deficitario oltre che sul versante della intermodalità, della interconnessione su scala regionale e sovraregionale, anche su quello della qualificazione dei servizi collettivi di base, dall'altro il turismo regionale risulta ancora eccessivamente incentrato sulla valorizzazione delle risorse naturali nei

mesi estivi, mentre la domanda di turismo culturale risulta piuttosto limitata, anche a causa di un'offerta poco valorizzata e incapace di attrarre flussi turistici destagionalizzati.

4.1 Piano urbano della mobilità sostenibile

Il Piano Urbano della Mobilità Sostenibile è un piano strategico, costruito su strumenti di pianificazione esistenti, che tiene conto dei principi di integrazione, partecipazione e valutazione per soddisfare i bisogni di mobilità attuali e futuri degli individui al fine di migliorare la qualità della vita e l'attrattività dell'ambiente urbano. Una città impegnata nella pianificazione della mobilità sostenibile è vista come una città innovativa a cui fare riferimento e contribuisce a fornire una migliore immagine di se stessa. Pianificare la mobilità concentrandosi sulle persone e sui luoghi piuttosto che sulle auto ed il traffico comporta innegabili benefici per l'ambiente e la salute, anche in termini di riduzione di inquinamento termico ed acustico e di consumo di energia, ed aiuta a mitigare i cambiamenti climatici.
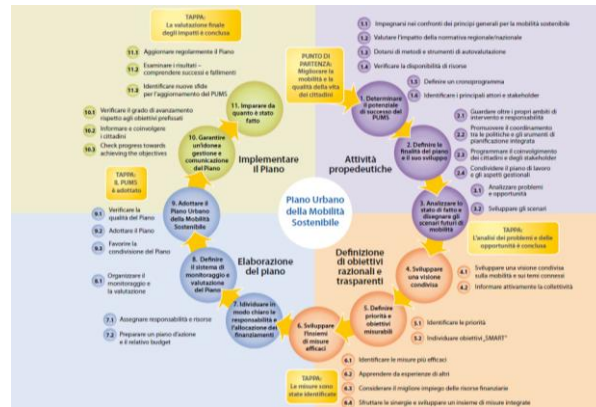
Fig.3: Schema del PUMS.

Il piano è basato su una visione dei trasporti e della mobilità di lungo periodo che comprende l'intero agglomerato urbano e include tutte le forme e i modi di trasporto pubblico e privato, passeggeri e merci, motorizzato e non motorizzato, circolazione e sosta, e che mira ad aumentare l'efficienza ed economicità delle forme di trasporto presenti sull'intero agglomerato urbano, pubbliche e private, passeggeri e merci, motorizzate e non motorizzate, di circolazione e sosta. È uno strumento caratterizzato da una visione chiara, da obiettivi e traguardi misurabili e da un approccio integrato e partecipativo. Il coinvolgimento dei cittadini e degli altri portatori di interessi è un aspetto fondamentale lungo tutto il processo di Pianificazione per capire perchè alcuni gruppi di cittadini dovrebbero essere coinvolti e quale l'influenza che potrebbero esercitare. Solo così le decisioni relative a specifiche misure di mobilità urbana sostenibile, come per l'appunto lo stesso PUMS, possono ottenere una significativa "legittimazione pubblica".

Nello sviluppo di un Piano Urbano della Mobilità Sostenibile, la visione spazia necessariamente oltre gli ambiti dei trasporti e della mobilità e considera opportunamente aspetti sociali, economici, ambientali e politico-istituzionali, nell'ambito di una strategia complessiva di sviluppo sostenibile. La rilevanza di un Piano Urbano della Mobilità Sostenibile è tale da necessitare la guida dell'Assessorato ai Trasporti e alla Mobilità del Comune di riferimento e il coinvolgimento di altri uffici e dipartimenti comunali e regionali nel processo di pianificazione (urbanistica e sviluppo del territorio, sviluppo economico, ambiente, servizi sociali, salute, sicurezza). Un approccio integrato che tiene conto di strumenti e politiche di diversi settori, livelli amministrativi e autorità limitrofe e tenta di risolvere i deficit di integrazione e cooperazione per perseguire innovazione e miglioramento. Tale visione strategica deve essere specificata con obiettivi concreti, fornisce una descrizione qualitativa del futuro urbano desiderato e serve ad orientare lo sviluppo di adeguate misure di pianificazione.

La selezione delle misure non deve basarsi solo sull'efficacia ma anche sull'economicità e su un'analisi dei costi e dei benefici dei trasporti, che tenga conto dei più ampi costi e benefici sociali. Soprattutto in un periodo di budget limitati per la mobilità e i trasporti urbani, è fondamentale legare le ricadute delle misure e degli interventi alle risorse spese. Questo aspetto richiede una opportuna valutazione delle opzioni con una particolare attenzione alla qualità dell'aria e agli impatti derivanti dalle emissioni di gas serra. La Commissione Europea nel Libro Bianco sui Trasporti (2011) ha rimarcato l'importanza di internalizzare i costi esterni di tutti i modi di trasporto applicando principi comuni alle specificità di ciascun modo.

4.2 Le reti ciclo – pedonali

In Puglia è in atto una forte campagna di comunicazione, sensibilizzazione e informazione innovativa su tutto quello che attiene la bicicletta, mezzo economico e flessibile: l'uso delle piste ciclabili, il rispetto delle regole in città, il bike sharing, la realizzazione di momenti di condivisione e animazione territoriale utili alla diffusione della cultura sulla mobilità ciclabile. Esistono ben 1653 km di possibili percorsi per cui sostanziale diventa il potenziamento della rete ciclabile regionale integrata con la rete delle infrastrutture per la mobilità, mediante la realizzazione di opere specifiche, quali piste e corsie ciclabili, ciclovie, itinerari ciclopedonali, segnaletica, misure di moderazione del traffico, finalizzate ad indurre un'andatura più lenta che consenta la circolazione in sicurezza e libertà di pedoni e ciclisti.

Decidere di incoraggiare la gente ad abbandonare l'auto e utilizzare la bicicletta comporta delle responsabilità in termini di scelte politiche e strategiche, finalizzate a decongestionare il traffico e la sosta e a permettere al cittadino di andare in bici con tutti gli strumenti necessari, a livello infrastrutturale e non solo. Per questo è in corso il programma "Crea-Attiva-Mente" che si sviluppa attraverso due direttrici principali: il Progetto "Mente locale", per il recupero degli immobili a servizio del TPL, al fine di trasformare i luoghi non vissuti, o vissuti in modo sfuggente, in fucine di sperimentazione di buone pratiche per la mobilità sostenibile e la valorizzazione dell'ambiente; il Progetto "Cicloattivi", per lo sviluppo della mobilità ciclistica e la tutela degli utenti deboli della strada. Sempre nell'ambito di "Crea-Attiva-Mente" alla fine di gennaio è stato pubblicato il bando del Progetto "PugliApedali" con il quale si intende valorizzare e sviluppare l'impegno delle amministrazioni locali e il coinvolgimento di imprese, associazioni ed enti del no-profit pugliesi per la promozione della mobilità sostenibile e per lo sviluppo turistico del territorio.

Inoltre, la Regione Puglia ha partecipato, in qualità di Lead Partner, al "Progetto CYRONMED" – Cycle Route Network of the Mediterranean, che ha permesso di realizzare un interessante manuale di buone pratiche, il "Vademecum della ciclabilità", con il fine di incoraggiare i Comuni e le Province ad indirizzare le loro scelte verso una mobilità sempre più eco-sostenibile. La Puglia compare in ben 5 itinerari: Via dei Pellegrini: Londra – Roma – Brindisi; Via Adriatica: Delta del Po – Leuca; Via dei Borboni: Bari – Napoli; Alta via dell'Italia centrale: Dal Parco del Gargano alle Foreste Casentinesi; Via dei Tre mari: Otranto – Taranto – Sapri; Variante ionica Torre Lapillo – S. Maria di Leuca.

Fig.4: Gli Itinerari del Progetto CYRONMED

Il progetto CYRONMED ha contribuito a modificare il modo di concepire i piani di intervento infrastrutturale e a far entrare, all'interno della programmazione e della pianificazione regionale, il tema delle reti ciclabili e della loro integrazione modale con le altre reti trasportistiche. Tali indicazioni sono state recepite dal Piano Regionale dei Trasporti e dal Piano Paesaggistico Territoriale Regionale che considerano la rete ciclabile regionale come infrastruttura essenziale per lo sviluppo della mobilità sostenibile, mentre il DRAG (Documento Regionale per l'Assetto Generale) ha introdotto i piani delle reti ciclabili sulla viabilità di competenza tra i contenuti della Pianificazione Territoriale di Comuni e Province.

Sono numerose pure le iniziative di sensibilizzazione e le attività e gli interventi di educazione, formazione e comunicazione per la diffusione della mobilità sostenibile, a cui si affianca la realizzazione di percorsi casa-scuola per bambini (Piedibus e Bicibus), per incentivare gli spostamenti quotidiani a piedi con il coinvolgimento dei cittadini più giovani e degli studenti di tutte le scuole di ogni ordine e grado. L'Assessorato alle Infrastrutture e alla Mobilità della Regione Puglia, in collaborazione con Legambiente

Puglia e l'Anci Puglia, ha recentemente presentato alla stampa il dossier sui "Comuni Bicicloni", nato proprio con l'obiettivo di fotografare lo stato della mobilità sostenibile nei Comuni pugliesi e di costruire un primo database da integrare gradualmente per incentivare l'uso delle biciclette nelle città come forma di mobilità ordinaria. Fra i Comuni grandi e piccoli che sono all'avanguardia in questo processo di trasformazione che parte dal basso, emerge Bari, attiva già da anni sul fronte della mobilità sostenibile e dotatat anche di un mobility manager nell'organigramma dell'amministrazione comunale. Oltre a possedere il servizio di bikesharing (intercettabili in ormai più di 20 punti) e numerosi cicloparcheggi nell'ambito del Progetto "BiciPlan", si distingue per la realizzazione di un piano della mobilità con interventi infrastrutturali riguardanti il completamento e il potenziamento dei sistemi di offerta dei trasporti su rete ferroviaria e rete stradale e del sistema di parcheggi, la sperimentazione del trasporto ON DEMAND, mediante l'utilizzo di alcune mini-navette elettriche già di proprietà dell' AMTAB. L'Amministrazione locale sta anche puntando sulla promozione del Progetto Car-Pooling & Car-Sharing, per chi, per diverse esigenze, proprio non riesce o non può lasciare a casa l'auto. Il primo necessita di mezzi di proprietà degli stessi utenti della strada e il secondo di dotazione di parco mezzi, di solito sostenibili, auto o minicar elettriche. In entrambi i casi per l'avvio, non servono spese per l'attivazione di portali o strumenti particolari.

5 CONCLUSIONI

Le esperienze degli ultimi decenni nell'ambito della pianificazione territoriale hanno evidenziato che le principali trasformazioni strutturali e culturali delle società contemporanee sono sempre accompagnate da importanti cambiamenti nell'utilizzo dei tempi e degli spazi di vita, che spingono verso nuovi utilizzi del territorio e del tempo e generano nei cittadini nuove aspettative di qualità della vita e di maggiore coinvolgimento nelle scelte pubbliche. Un governo del territorio interessato non più solo all'organizzazione e alla gestione dello spazio, ma che integra nelle sue scelte di base anche le esigenze di tutte la fasce sociali, il bisogno di sicurezza, la cultura, la formazione, i tempi, la mobilità sostenibile, è un governo che si avvia verso un nuovo modello di politica. La Regione Puglia ha raccolto la sfida posta dalla crisi economica in atto e, attraverso le poliche sociali, di genere e temporali che sta attuando, insegue la visione di una città a misura di donne e uomini, in cui promuovere sempre la qualità della vita e in cui il valore del Tempo possa essere considerato come il bene più prezioso da utilizzare per sè e in favore degli altri.

6 BIBLIOGRAFIA

AAVV: Architettura e cultura digitale (a cura di L. Sacchi e M. Unali). Milano, 2003
AAVV, oma/rem koolhaas 1992-1996, EL CROQUIS n. 79, Barcellona 1996
ATS BARI: Studio di fattiblità per la realizzazione del Piano Territoriale dei Tempi e degli Spazi dell'ambito di Bari. Bari, 2012
BARBARA, Anna: Sensi, Tempo e Architettura. Spazi possibili per umani e non. Milano, 2012
BAUMAN, Zygmunt: Modernità liquida. Bari, 2002
CONSIGLIO REGIONALE DELLA REGIONE PUGLIA: Interventi per favorire lo sviluppo della mobilità ciclistica, 2013
DELEUZE, Gilles: La piega – Leibniz e il Barocco. Torino, 2004
ELTISPLUS: Guidelines-Developing and Implementing a Sustainable Urban Mobility Plan, 2011
EUROPEAN COMMISION: White Paper-Roadmap to a Single European Transport Area. Bruxelles, 2011
GIEDION, Sigfried: Spazio, tempo e architettura. Milano, 1954
HEIDEGGER, Martin: Essere e tempo. Milano, 2011
HUSSERL, Edmund: Per la fenomenologia della coscienza interna del tempo. Milano, 2004
LEUPEN, Bernard, HEIJNE, René, VAN ZWOL, Jasper: Time-based Architecture. Rotterdam, 2005
LYNCH, Kevin: L'immagine della città. Venezia, 1964.
POZZI, Alessandro: Un focus sulle politiche di conciliazione temporale. In: Mutamento Sociale, n. 15. Milano, 2007
UNIVERSITÀ DEGLI STUDI DI CAGLIARI: PRIN Costruzione e ricostruzione dello spazio-tempo nelle pratiche del quotidiano.
MERLEAU-PONTY, Maurice: Fenomenologia della percezione. Milano 2003
MOLENDINI, Serenella: Le Politiche di Genere della Regione Puglia. In: Rivista di Scienze Sociali, n. 4. Foggia, 2012.
SAGGIO, Antonino: Introduzione alla rivoluzione informatica. Roma, 2007
TUMMERS L. (2010), To the heart of planning: is the hardware of spatial planning open to feminist alternatives?. In: Ernst W. (ed.) 2010), Geschlecht und Innovation. Gender Mainstreaming in Techno-Wissenschaftbetrieb. Internationale Genderforshung in Niedersachsen. Teilband 4. LIT-Verlag. Berlin. p. 117-136.
VIRILIO, Paul: Lo spazio critico. Bari, 1988

7 RINGRAZIAMENTI

London After the Spectacle Year, Who Claims Which Space and Who Gets it?

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1 ABSTRACT

This aim of this paper is to look at the lull after an exceptional 'year of spectacles' in London and how the development industry is pursuing property-led growth with government support. Their spatial strategies are discussed in the context of alternative scenarios for urban change, proposed by Erik Swingedouw in terms of the 'post-political city'[1] and by Henri Lefebvre in his writings on the paths to difference[2] and the right to the city.[3]

2 ABOUT THE POLITICS OF SPACE

A generation apart, but in what could be arguably considered pre-revolutionary conditions, Henri Lefebvre and Erik Swyngedouw were/are reflecting on an alternative to the global, neo-liberal, capitalistic model of urban change, its underlying social relations and governance. Lefebvre wrote the "Differentialist Manifesto" (Le Manifeste Differentialiste) in 1970 after his involvement in the protests of May 1968 in Paris. His concern is with the hegemony of the global model which confounds growth with development, and he explores possible alternatives of paths rather than end-state models for the production of 'urban' space.[4] Also preoccupied with the dominant model of (urban) governance and prospects for alternatives Swyngedouw uses 'police' ('le police'- the existing social order), 'politics' (la politique) and 'the political' (le politique), terms he borrowed from Jacques Ranciere[5] to critique what he perceives as the post-political, post-democratic period following the global financial crisis of 2007.

Both Lefebvre and Swyngedouw are focusing on theoretical deliberations about the nature of urbanisation, the former from a philosophical, historic and political-economy point of view, the latter from a geographic-environmental and political science perspective of reinstating urban justice, equality and freedom.[6] They both analyse and denounce the hegemony of the dominant model of society (the new order as moral and political order[7] – the neo-liberal order[8]) and explore alternative urban transformations. Lefebvre is reconstructing 'difference' as a way of gaining a universal sense of alternative paths toward differentiated urban social relations.[9] For him, the modern world – progress – this chaos – starts to make sense if one distinguishes among conflicts and confrontations, "the titanic struggle between homogenising powers" (which have access to enormous means) and "differential capacities".[10] Swyngedouw, through identifying

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[1] E.g. Erik Swyngedouw. 2009. The Antinomies of the Post-political City: In Search of a Democratic Politics of Environmental Production. In: International Journal of Urban and Regional Research. Volume 33.3, September 2009. Pp 601-620.

[2] Henri Lefebvre. 1970. Le Manifeste Differentialiste. Idees, nrf.

[3] Henri Lefebvre. 1971. Le droit a la Ville I; Espace et Politique, le Droit a la Ville II. Editions anthropos, 1971/1972.

[4] Henri Lefebvre. (1974) 1991. The Production of Space. Blackwell.

[5] 'the police', the urban policy order, – 'la police', 'le policier' – is the organisation of society where everyone has an assigned place. 'Politics ' – 'la politique', is a process of emancipation. 'The political' – 'le politique', is the place of encounter of the two heterogeneous processes above, one governmental, the other emancipatory. These terms are proposed by Jacques Ranciere, cf. e.g. Au Bords du Politique. Osisris. 1990. La Fabrique Editions 1998, Folio 2003. They are taken by number of current thinkers about the post-political city.

[6] Erik Swyngedouw. 2010. Polis: Designing the Post-Political City and the Insurgent Polis. In: Civic City Cahier 5, Bedford Press, London. http://www.thepolisblog.org/2011/06/eric-swyngedouw-on-designing-post.html The Post-Political City. 2007. In: Bavo (2007) Urban Politics Now, reflect series, NAI Rotterdam. http://www.scribd.com/doc/56916007/The-Post-Political-City

[7] L'ordre nouveau comme l'ordre moral et politique (Henri Lefebvre, Le Manifeste Differentialiste; homogene et different, p 49).

[8] 'Le policier'- determining the limits which the existing order declares to be possible. Erik Swyngedouw, Frank Moulaert, Arantxa Rodriguez. 2009. Spaces of neoliberalism, urban restructuring in North America and Western Europe. Ch9. Polis.

[9] "…Is it possible to conceive a strategy of difference?... Thinking which conceives the processes and social relations as a whole can assume this role…Henri Lefebvre, Le Manifeste Differentialiste, p 101 op.cit"

[10] Lefebvre, Le Manifeste Diferentialiste, Ch I: Homogene et Different, p 49, translated JR.

the 'non-part', the part of society with no properly defined place within it, is using the universal as a starting point to re-politicise public civic space.

The simultaneous generation of scarcity and abundance is another theme they have in common. They adopt a different take though on social movements and their effectiveness in bringing about fundamental societal transformation and urban change. Lefebvre is more optimistic about their possible contribution to urban change than Swyngedouw who, in his more recent writings, sees them as an inherent part of the existing, in his view deficient urban governance which has inbuilt instruments to tame or absorb them. They both refer to human rights, and the right to the city, as well as to utopia as the ultimate imagined path towards change, again in a slightly different light. Perhaps these rather abstract critical explorations of urban justice may shed some light on the production of space in London in the current contradictory and divisive climate of austerity.

3 LONDON, THE 'SPECTACLE CITY'

There exists a political consensus that 2012 was an exceptional year for London. It found itself in a permanent state of pageant and delivered a plethora of world class spectacles which may well have masked the effects of the crisis at the heart of London's financial sector and the hurt of scarcity. Epitomising the society of spectacle, London had been groomed for exceptional celebration to attract spectators from all over the world.

*1_dia London Spectacle city: Queen's diamond jubilee celebrations, source: http://static.guim.co.uk/sys-images/Guardian/Pix/pictures/2012/6/3/1338744517609/The-Thames-Diamond-Jubile-054.jpg

In rapid succession London staged the Queen's Diamond Jubilee, the Olympic Games, the Cultural Olympiad, the Gay Pride Parade and the international Frieze art fair, besides numerous global political summits, premieres of films with the fastest ever return on investment, while the Lord Mayor and the Mayor of London were rivalling with fireworks. Did the vertiginous speed and ephemerity of events, instantly diffused worldwide, indicate the path from spectacle society to digital society, from the real to the virtual world which, according to Michel Serres,[11] is transforming the perception as well as the experience of space and time?

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[11] Michel Serres. 2012. Petite Poucette. Manifeste, editions Le Pommier.

2_dia Thames with Shard and City skyscrapers, source: http://medias.photodeck.com/889602a8-22b3-11e1-bd22-8147863a0125/View %20from %20Tower %20Bridge %20panorama2_pr_xlarge.jpg

A counterpoint to this trajectory into digital society is the material urban development which London has completed during that time in its traditional physical environment: the 'Shard', the highest skyscraper in Western Europe designed by 'starchitect' Renzo Piano,[12] and, equalling the Victorians, major transportation infrastructure like the multimodal interchange in Stratford near the Olympic site and work on the new east-west Crossrail to ease commuter traffic. Besides the Olympic mega-buildings themselves, all these material changes took place in the context of the Mayor of London's expansionist ambitions laid down in the new London Plan.[13]

The mayor, together with corporate business and other key stakeholders in London insist that 'the show must go on'. The consensus model evoked by Lefebvre and Swyngedouw as well as by the latter's urban populism have certainly been a contributing factor to keeping London among the key world cities, retaining and attracting foreign visitors, the best talent and global inward investment. London continues to benefit from the lion's share of public finance, despite austerity measures imposed by the Chancellor of the Exchequer which are hitting the lower paid Londoners hard.

How can London keep this momentum going when the economy is hovering around no growth and austerity measures are likely to stay in place for the foreseeable future? Despite London's job losses, including in the financial sector, unemployment is far higher in the north of the country. Those experiencing hardship remain unconvinced that London should continue to be privileged, and they doubt London's claim to be the economic engine of the nation and the necessary driver of recovery everywhere else. Therefore, the question of who would benefit from London's continuous growth and who would lose out remains at the forefront of current political debate.[14] This does not prevent the governance lobbies from demanding a world-class hub airport[15] and more high speed rail[16] to guarantee London's competitiveness in the global market.
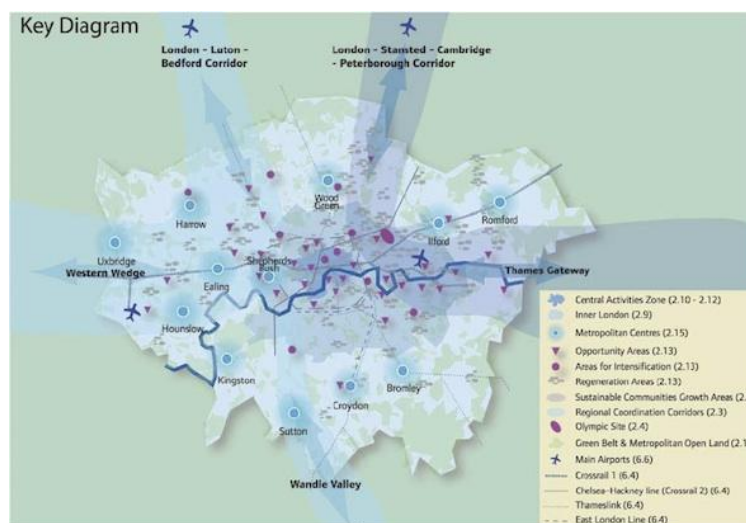
3_dia Mayor's London Plan 2011, key strategic development diagram, source GLA

4 AFTER THE 'FIREWORKS'

The 2011 census data revealed the contrast between London's rapid population growth, well above expectations, and stagnation in other parts of the country. The available maps of the economically active population in England and Wales, or of car ownership illustrate the difference between the north and the

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[12] although overtaken by the Mercury Tower in Moscow soon afterwards.

[13] London Plan 2011. http://www.london.gov.uk/priorities/planning/londonplan

[14] E.g. Doreen Massey. The Political Struggle Ahead. N: Soundings, number 45, August 2010. Pp6-18. Lawrence and Wishart.

[15] Thames estuary airport designed by Foster + Partners. http://www.kentonline.co.uk/medway_messenger/news/2013/february/11/boris.aspx

[16] High Speed 2 route proposal. http://www.hs2.org.uk/

south.[17] Spatial analyses of this data by the Greater London Authority show growing unevenness and divergence also within London. Overall, London's population increased by one million in 10 years from 7.17 million in 2001 to 8.17 million in 2011.[18] For the first time, the indigenous British population was in a minority with 44.9 %. London Boroughs with a high immigrant population were among the fastest growing ones, where household sizes are larger than average, and overcrowding tends to be higher.
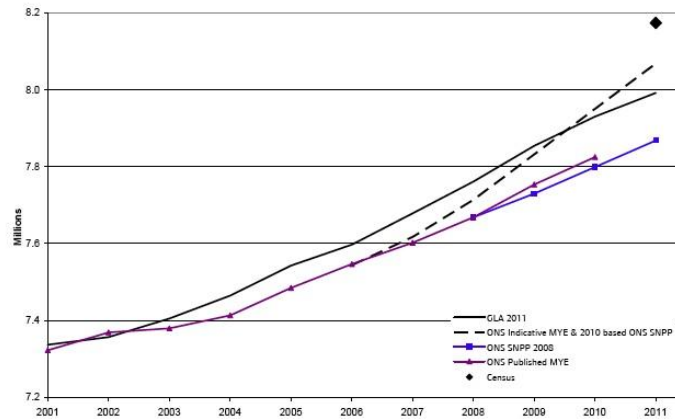
4_dia London population growth 2001 – 2011, source: Greater London Authority, Datastore

5_dia Legacy area and its nebula, source: ‚Design for London', GLA

Although no income data maps are available, it is known that London Boroughs with high numbers of immigrants constitute the poorest parts of London. The East End has been traditionally a reception area. The boroughs there have a significantly higher proportion of social housing and pressure for affordable housing remains intense. Encouraged by the changes brought about by the Olympic Games, symbolised by one of the

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[17] http://www.dailymail.co.uk/news/article-2246288/Census-2011-UK-immigrant-population-jumps-THREE-MILLION -10-years.html

[18] Cf. interactive atlas, GLA datastore. http://data.london.gov.uk/census

biggest new shopping centres in Europe,[19] the local mayor of Newham is not keen to maintain a large disadvantaged population and sees an opportunity to obtain a greater social mix in the development foreseen on the Olympic site. He resists the potential influx of poorer residents who will no longer by able to afford their social housing elsewhere, especially in central areas when the housing benefits will be capped in spring 2013. Quite the reverse, he welcomes housing for high income households which is expected to be provided by private developers, once they have managed to get hold of land[20] from the London Legacy Development Corporation (LLDC). This new successor agency of the Olympic Park Legacy Company[21] is now in charge not only of the development of the Olympic site but of many areas around it where it has inherited public land holdings and for which it has become the planning authority with compulsory purchase powers, substituting for local authorities.[22]

The mayor of Newham most certainly follows the dominant growth model and has little time for the alternative local social movements which are demanding a different development model for themselves.[23] In this sense, Swyngedouw could well be right with his interpretation that small scale, fragmented groups who attempt to produce an environment for a different lifestyle are being side-lined or displaced by what he calls post-political 'policing'. A current deal under discussion is a large university campus which University College London (UCL)[24] is planning on the site of an existing social housing estate still inhabited.[25]

Why UCL is not willing or able to build on available brown field land, for example on the Olympic site, or in the nearby recently established Enterprise Zone in the Royal Docks[26] with prime sites on waterfronts and where a new university campus has been established recently[27] may be explained by the hegemonic growth model, rather than by alternative possibilities of generating genuine socio-economic development in this impoverished area.

6_dia Carpenter Estate today, already decanted in parts, despite resident resistance, source:
http://www.demotix.com/news/1347789/shame-newham-council-carpenters-estate-london#media-1347751

Can Lefebvre's concepts, elaborated in the Production of Space,[28] shed some light on these current and intensely conflicting development choices? He proposes a unitary theory of physical, mental and social space which simultaneously represents the political, implies concealing ideology, and embodies technological utopia. His dialectic approach to the continuous interplay between human action and space rests on a

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[19] Westfield, financed and built by a 'global' consortium and compulsory gateway to the Olympic games 2012.

[20] As legacy development is expected to be private sector led, there are no regulations considered hindrances regarding the use of land and access to housing. Judging from recent examples of 'luxury' housing provision by foreign investment companies or even through buy to let arrangements many of these dwelling stay empty as their expected capital appreciation far exceeds short term rent incomes, let alone any form of 'controlled rent' arrangements.

[21] and other local development corporations, including various now defunct Thames Gateway Corporations (covering land along the Thames estuary to the sea).

[22] LLDC: http://www.londonlegacy.co.uk/about-us/london-legacy-development-corporation/

[23] e.g. Community Land Trusts, Community Forum, Stratford Renaissance Partnership, Local Regeneration Consortium, Self-Build Architects, and many more have been marginalized and did not benefit from the various legacy budgets.

[24] Newham's proposal for the regeneration of the Carpenter Estate. http://www.newham.gov.uk/Regen/GreaterCarpen tersNeighbourhoodResidentNewsletter.htm

[25] Eg. The residents of the Carpenter Estate against UCL proposal. See below

[26] http://www.newhamrecorder.co.uk/newham-life/organisations/london_s_royal_docks_to_be_enterprise_zone_1_838 959 www.royaldockslondon.com/

[27] UEL: University of East London. http://www.uel.ac.uk/

[28] Henri Lefebvre. 1991. The Production of Space. Blackwell (La Production de l'Espace. 1974. Anthropos). Pp 32-33.

conceptual triad, comprising 'spatial practice', 'representations of space' and 'representational spaces'. Would his concept of social space produced under the capitalist system, which has to encompass biological reproduction (the family), the reproduction of labour power (the working class) and the reproduction of the social relations of production (constitutive of capitalism) leave room for at least some alternatives to the currently dominant, negotiated rather than planned development process?

He most definitely includes this possibility when he discusses 'from the contradictions of space to differential space' and refers to 'alternative society' and 'counter-culture'.[29] Not only does he acknowledge the existence of such alternative movements from the bottom-up – protest, ecological, communal – because they "allow to break the barriers of the forbidden", but he also considers them as an inherent part of the dialectic of spatial practice and a necessary force of the dynamic of the production of space. What remains debatable is the extent to which such local movements are able to remain part of the urban process in the longer term. The conflicts around the Olympic site show clearly divergence, or at least the will to differentiation, the claim to 'being other', which represents in its own way a universal right to the city for all parts of the differentiated society, so very present in the East End of London. The jury is still out on medium term 'footholding', let alone the long term establishment of culturally, economically and socially diverse groups alongside each other and the 'habiter' produced by the dominant model of growth. For the time being at least this is an outlook which runs contrary to the gentrification process in the making on and around the Olympic site.

5   URBAN 'MOMENTS', SINCE THE ECONOMIC BANKING CRISIS 2008

London's transformation as a global city has been divided for some time into international, development-led physical growth, accompanied by socio-economic polarisation. The latter is becoming apparent in hardship which is creeping from the bottom of society up the social strata. It is also expressed in physical change of London's urban space and, in particular, in its representational spaces. During the recurrent phases of economic crisis these trends become more visible. It could be argued that the current, post-spectacle moment is somewhat different as it compounds the aftermath of an exceptional state of profligate expansion with its inherent characteristics of economic downturn, moreover in a different context of polity, of Swyngedouw's 'polic(y)ing', or Lefebvre's 'political space'.

When governance is strong and firmly top-down, supported by outstanding resources, it would seem logical that the dominant model of growth would increase its hegemonic position. To some extent this appears true, at least on the surface. The development industry exercises a central place in London's urban change. Very large sites, often 'brown fields', meaning with discounted land values, are made available to the development industry, frequently with direct and indirect subsidies. The Olympic site is a point in time, as were Docklands three decades ago. The public good, or what is left of it, is negotiated not regulated ex ante, while the private interest, with property rights at its heart, is given a free reign. Paradoxically, two questions come to mind. Why do such developments take almost a generation to get realised, and why would this process leave any room for alternative manoeuvres?

For Swyngedouw at al,[30] "the search for competitive development has become the leading objective of the new urban polic(y)ing … to reassert the position of cities in the consolidating global economy". This is certainly London's political position. Even if one would agree with Swyngedouw's notion of post-democracy, during which "urban regeneration is increasingly framed in a common and consensual language of competitive creativity, flexibility, efficiency, state entrepreneurship, strategic partnership and collaborative advantage",[31] the ensuing development process is neither homogeneous, nor continuous, nor universal. Precisely, because such potential regeneration sites are so large, so derelict, so unmanageable, in such unfashionable locations, they are prone to infiltration, to what Swyngedouw terms 'the political', which enables contesting, resisting, dissident groups to invade such spaces, appropriate them at least temporarily, and apply their own projects to them, with their own creativity, flexibility and entrepreneurship. The timeframe is of the essence in this cat and mouse process, but the hegemonic system is learning and pre-

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[29] Henri Lefebvre. 1970. The production of Space, op.cit, Ch 6 sections XVIII-XX.

[30] Erik Swyngedouw, Frank Moulaert, Arantxa Rodriguez. 2002. Neoliberal urbanisation in Europe, large scale urban development project and the new urban policy. Antipode 34 (3) pp 542-577.

[31] Eric Swyngedouw. The post-political city. 2006. In: BAVO (2007). Urban Politics Now, Reflect Series, Netherland Architecture Institute. Rotterdam.

empting, hence the blue fence around the Olympic site, surmounted by electrically charged razor wire. Despite all these precautions, some artists managed to 'infiltrate' what happened on the site. One of them, Jom Woodall, was monitoring the development process with three cameras day and night and created an audio-visual history of the present for all the other displaced people to see and to act upon.[32]

Opposed to that, the development industry had to create its own narrative. Arguably these narratives are reflecting Lefebvre's differentiation, albeit from the top-down rather than across socio-cultural groups. The narrative of the Olympic Games was global and guided by the International Olympic Committee (IOC) and its culture. London's second financial city, Canary Wharf, took this opportunity to revive its narrative, by benefiting from the proximity of the global exposure which the Olympic Games offered East London. The largest private property owner on the Isle of Dogs produced new masterplans,[33] revived its construction efforts, diversifying into luxury housing, shopping malls and other commercial premises, in competition or as a reinforcement of the constructions which emerged on and around the Olympic site.

7_dia Canary Wharf extension, Wood Wharf (project) in the London Docks, source:
http://en.wikipedia.org/wiki/File:Wood_Wharf_Development.jpg

The City of London Corporation exposed its own narrative at the Cultural Olympiad, under the banner of 'Developing City'.[34] At a lavish exhibition and during breakfast talks the City promoted its long term future of 2050, green and sustainable, by colonising the Thames – the only still protected, truly generous open space in London – with 'green' islands to accommodate the 'developing city' and satiate its space bulimia. This fascinating self-projection took place in an unfinished new building, one of many located at the very heart of the City, above a tributary river of the Thames where excavations uncovered important Roman ruins. The City Corporation's self-image was portrayed as 'the resilient city', quite appropriate considering that it has managed to preserve its medieval, pre-democratic status and will continue to do so, unchallenged. This self-representation shows that the homogeneity and the hegemony of the dominant growth model adopts various forms of 'police', although their generic 'raison d'etre' is congruent with the dominant, speculative, free market development model.

Detached from use value or need for such types of buildings, and regardless of economic crisis or politics of austerity, the process which drives exchange value of real estate pushes property development ahead relentlessly, despite the detrimental effect of glut on rents. The production of space in this case is the

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[32] Alyssa Moxley. Jim Woodall's Olympic State, an observation story. In: Theatre of Dissent, adventures in London's Olympic State. 2012. Hilary Powell & Isaac Marreno-Guillamon (eds). Marshgate Press.

[33] Cf. Wood Wharf development. www.canarywharf.com/...wharf/...wharf/WW %20at %20Canary %20...

[34] http://www.newlondonarchitecture.org/exhibition.php?id=368&name=the_developing_city

reflection of the workings of the political economy, a material expression of the capitalistic post-political state. The City of London, like many CBDs accommodating capitalist financial centres is the concrete expression of this hegemonic process. There, skyscrapers multiply, compete with each other's heights, are periodically stopped in their track for lack of debt finance, get destroyed to make way for ever higher densities, simultaneously driven by increasing land values while pushing them up in turn.

The West End does not look idly on and builds and builds, according to slightly different drivers, but as integral part of this hegemonic meta-system of real estate-led, albeit often fictituous economic growth. Clearly, in places with such high densities there is no idle land available for spontaneous, temporary uses. Besides, confined to just one square mile the City is easier to 'police' than hundreds of hectares out of sight and civilisation in the East End, until they are recuperated by the same hegemonous growth model.

8_dia Vision 2050 for the heart of the City of London, John Robertson, architects http://www.jra.co.uk/projects/exhibitions/12/the-developing-city/

9_dia Olympic site, aerial view http://www.londonlegacy.co.uk/mayoral-development-corporation-to-move-to-westfield/

6   WHERE NEXT?

Even when there is saturation, overproduction, glut, and a few property companies are going bankrupt it is not for long. The economic cycle will recover eventually, so cranes lie idle just for a while, debts will be

written off, and the momentum will be reactivated. As land is finite, especially urban land and land in places of centrality, competition is fierce, so any less lucrative use of land will need to be displaced according to the logic of this system. For that reason, there is little chance that those who were displaced from the Olympic site will find new housing when it will be produced eventually. It will be well out of there reach financially, and they will have settled elsewhere for it will take a very long time to develop this site, especially as no time limit is imposed on this free market property development process, despite taking place on land which was purchased with the public purse and owned by the public sector. Moreover, privileged accessibility – high speed rail interchanges and fast connections to international airport hubs are attractors for the mobile international business class and of little use to deprived local neighbourhoods dependent on local, often unskilled employment.

Unfortunately, the opportunity of spectacle does not present itself everywhere and other areas, in the West End for example, come up with different solutions. Under the pretext of scarcity local authorities aim to displace low income people, the unemployed, the disabled from high land value sites, away from their social support structures to other cities in the north of the country. They attract global excess capital to the most expensive sites instead where gated condominiums, most of them staying empty, are erected. The scarcity programme reveals itself as a powerful spatial segregator.
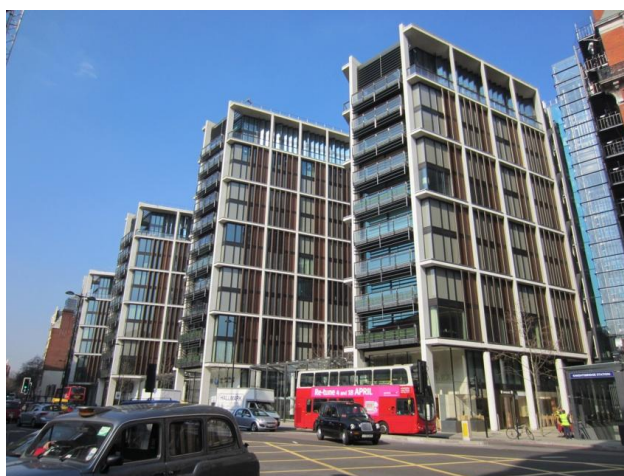
10_dia One Knightsbridge, photo Judith Ryser

11_dia Bar 25 Berlin, source: http://www.tip-berlin.de/kultur-und-freizeit-stadtleben-und-leute/countdown-bar-25-berlin

Where does this process belong in Lefebvre's analysis of the production of space and in Swyngedouw's post-political, post-democratic condition? For the former, it may not correspond to his idea of differentiation which underlies his dialectic. For the latter, the variations of the hegemonic model may simply confirm its resilience and staying power, and may make total social change even more remote. In these circumstances, is there any possibility of alternative urban development, of greater diversity, of a post-democratic return to democracy or, better perhaps, an advancement towards a post-post democratic model, in the form of assemblages between innovative and creative productions of space? Is it possible to imagine a post-post political scenario, considering that both Lefebvre and Swyngedouw conceive the production of space as fundamentally political? Meanwhile, where does this leave what regulates the city de facto, what produces the urban space at present? Will it be just more of the same? With perhaps minute forgotten spaces which

may be colonised differently, at least on a temporary basis, like in Berlin, where obviously pressure on land is not comparable with London – a world city and seat of global finance?

7 CONCLUSION: SOME HOPE?

"Differentialism is not a system. Is it a matter of debate on difference? No. It is about living. Not about thinking but being differently". This is how Lefebvre ends his differentialist manifesto. Are there examples of such different ways of living? Two urban situations come to mind in London, Coin Street on the Southbank of the Thames[35] and Bromley By Bow Centre,[36] an island of communal calm and serenity in the middle of the cosmopolitan London East End kaleidoscope. Both these urban spaces are resilient, as they have lasted for more than two decades against all mainstream odds. They started very much in terms of 'spatial practice', to the point of making things, of building their own world with their internal resources and with what the hegemonic system was discarding.

12_dia (left) Coin Street, London. 13_dia (right) Bomley by Bow centre, photos Judith Ryser

It could be argued that by now they form an integral part of the urban fabric, albeit slightly different from mainstream places if observed with a critical eye. They produced a representational space of their ideal of 'living differently'. Their spatial praxis over time was also influenced by 'the politic', as they reinvented how they were going to materialise their wanting, thinking, doing things differently, as consenting individuals towards a common goal. Their self-managed collective decisions guided them in inventing their representations of space and the way they constructed and, most importantly, are living their representational spaces.

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[35] Coin Street Community Builders are those who initiated the transformation of the Coin Street area and are still managing the site http://www.coinstreet.org/

[36] The Bromley by Bow Centre originated from the reform church but has become an inclusive local public service for the local cosmopolitan neighbourhood. http://www.bbbc.org.uk/

Longing for the Ordinary – the Meaning of Authentic Places in the North-American Metropolis

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1 ABSTRACT

Under pressure of advancing technology, rapid growth and globalisation, the Northern-American metropolis changed radically over the last 50 years. The cityscape of American cities such as New York, Los Angeles, Chicago and Houston represent fascinating processes of urbanisation. They became regional metropolises with extended post-suburban neighbourhoods and dispersed centres (Soja, 1989). Infrastructure in its broadest meaning eroded our orientation on physical presence and the meaning of proximity (Harvey, 1989). This regional urbanism serves an anonymous network society, and it does not include public space as we were used to know it. It resulted in a public realm that lost its scale, not only geographical and in time, but especially in the scale of human interaction (Koolhaas, 1995). Paradoxically – or not? – we see a growing desire for the romantic city, authentic spaces and ordinary places. This manifests itself in all kind of simulations of the past. Feelings of authenticity are tried to be reproduced in contemporary city centres, city extensions and shopping malls. But is that the ordinary space we long for? And what determines a sense of authenticity? Does the contemporary metropolis needs authentic places after all?

Building on the theme of the REAL CORP 2013 conference, this paper explores theoretically and conceptually how the compression of time and space relates to humans desire for authenticity, and the seeming disability of modernist planners in preserving it. The literature review aims to give an oversight of the various concepts of authenticity from a philosophical and conceptual point of view and to outline critiques on the commercialisation of public space in the North-American Metropolis. The review will offer a meaningful contribution to the debate of contemporary city development versus the connotation of authenticity in citizens daily live. This use of theory and philosophy, as basis for debate, is relevant for the originally technocratic-oriented planning discipline. Although it might feel uncomfortable at first, selected writers are beyond doubt constructive in broadening our view on the consequences of modernistic planning regimes concerning the issue of authenticity.

In this review I will outline two perspectives on the concept of authentic place, and two critiques of contemporary placemaking. The two concepts, defined by David Harvey (1996, 2000) and Doreen Massey (1993, 1994) originate (and criticize) the meta-concept of philosopher Martin Heidegger who argued that the construction of that place is one of the existential necessities for people to define themselves in relation to the material world (Heidegger, 1971). David Harvey criticizes Heideggers argument and elaborates on what he calls 'rootedness', a reactionary sense of place. Doreen Massey elaborates further on that, arguing for the redefinition of place as an inclusive and progressive site of social life. Michael Sorkin (1992) was one of the first to critique the heavenly 'disneyfication' of the public realm of the city, describing another layer that is driven by endless consumerism. Finally Sharon Zuking (2009) brings the discussion of authenticity back on Jane Jacobs and develops an argument for the restoration of the city's soul.

2 FAREWELL OLD CITY

Now we since the 1960's have witnessed 50 years of modernisation and transformation in the Western metropolis, the question of authenticity slowly seems to come back in. The vast development of infrastructures repeatability speeded up ordinary life and transformed the city into a increasingly generic urban fabric. The implementation of the North-American freeways from the 1950s onwards for instance, radically questioned the concept of distance and the meaning of central places. But also non-tangible infrastructures as the internet changed daily life in the metropolis. It eroded the meaning of place and distance, and by that – discrete and concrete – changed the perception of city space fundamentally. Nowadays people increasingly are longing back to the 'old city'. Profit driven developers have no difficulties in fulfilling this desire for romance. Faked authenticity then manifests itself in all kind of simulations of the past, in cosy stucco apartment blocks, Italian village like shopping malls and city extensions.

3 DEFINING SPACE AND PLACE

To put this literature review in the right perspective, first we define the rather vague concepts of space and place. Space is a more abstract concept then place. When we speak of space we tend to think of outer-space or the spaces of pure geometry. Spaces have areas and volumes, places have space between them. The Chinese geographer Yi-Fu Tuan linked space to movement and place to pauses:

What begins as undifferentiated space becomes place as we get to know it better and endow it with value (....) The ideas 'space' and 'place' require each other for definition. From the security and stability of place we are aware of the openness, freedom and threat of space, and vice verse. Furthermore, if we think of space as that which allows movement, then place is pause; each pause in movement makes it possible for location to be transformed into place (Tuan 1977:6).

4 META CONCEPT: SPACE AS THE HUMAN CONSTRUCT

Martin Heidegger can help us understanding the importance of ordinary public spaces. Heidegger argues that a fundamental element in the construction of a place is the existential necessity for people to define themselves in relation to the material world. He contended that human beings originate in an alienated condition and define themselves, among other ways, spatially. The creation of 'place' roots them in the world, their homes and localities becoming biographies of this creation (Heidegger, 1971).

One of the difficulties in clarifying the relation between space and place is, not only that the two are necessarily connected, but that this concept for years tended to be understood only spatially. In such, place is most often treated as either a certain position in space or else as a certain portion of space. This way of understanding place is itself tied to a particular conception of space as identical with physical space, as it is articulated within the system of the physical sciences – articulated in terms of the measurable and the quantifiable. Heidegger comments on the modern concept of space and the way it has come to dominate the idea of place, stating:

"For us today space is not determined by way of place; rather, all places, as constellations of points, are determined by infinite space that is everywhere homogeneous and nowhere distinctive" (Heidegger 1971:249).

The concepts of place, and of space, that are at issue for Heidegger cannot be assumed to be identical with any narrowly physical conception, nor can it be assumed that place can be taken as derivative of space, or as identical with spatial location, position, area, or volume. In this respect, place should not be assumed to be identical with the "where" of a thing. Although this is one sense of place, it is not the only or the primary sense – place also refers us to that open, cleared, gathered "region" or "locale" in which we find ourselves along with other persons and things (Cresswell, 2004).

Central to Heideggers philosophy is the notion of 'dwelling': the basic capacity to achieve a form of spiritual unity between humans and the material world. Through repeated experiences and complex associations, our capacity for dwelling allows us to construct places; to give them meanings that are deepened and qualified over time with a continuous flow of nuances. For Heidegger 'dwelling' was the very essence of existence, the things that makes humans humans. Heidegger used the illustration of a farmhouse in the German Black Forest to make this point:

"Here the self-sufficiency of the power to let earth and heaven, divinities and mortals enter in simple oneness into things, ordered the house. It places the farm on the wind sheltered slope looking south, among the meadows close to the spring. It gave it the wide overhanging shingle roof whose proper slope bears up under the burden of snow, and which, reaching deepening down, shields the cambers against the storms of the long winter nights. It did not forget the altar corner behind the community table; it made room in this chamber for the hallowed places of childbed and the 'three of the dead' – for that is what they called a coffin there; the Totenbaum – and in this way it designed for the different generations under on the character of their journey through time. A craft which itself is sprung from dwelling, still uses its tools and frames as things, built the farmhouse" (Heidegger 1971: 160).

Place as dwelling then is a spiritual and philosophical endeavour that unites natural and human worlds. A properly authentic existence to Heidegger is one rooted in place.

5 PLACE AS EVENT

5.1 Imagined rootedness

David Harvey in his work critiques Heideggers concept of seeing place-as-dwelling as the 'locale of the truth of being' – the thing that makes humans humans (Harvey, 1996). Harvey points out that Heideggers thinking was heavenly influenced by the time-space compression in the Germany that was becoming a war state. It was this terror that forced Heidegger to withdraw from the world into his Black Forest farmhouse, a situation that for Harvey is hard to relate to:

"For example, what might the conditions of 'dwelling' be in a highly industrialized, modernist and capitalist world? We cannot turn back to the Black Forest farmhouse, but what is it that we might turn to? The issue of authenticity (rootedness) of the experience of place [...] is a difficult one. To begin with... the problem of authenticity is itself peculiarly modern. Only as modern industrialization separates us from the production and we encounter the environment as a finished commodity does it emerge" (Harvey 1996:302).

Cresswell (2004) argues that it is not possible any more for large numbers of modern dwellers to retreat to farmhouses in the Black Forest or anywhere else. He links Harvey's critique on Heidegger to the contemporary efforts to make places more distinctive and visible and to provide a sense of pride and belonging. As Harvey notes this takes often the form of 'heritage' where a sense of rootedness in the past and in place is provided for the consumption of locals and tourists. Something that we nowadays can easily refer to – for instance the San Diego 'Gas Lamp district' (fig. 1) – an urban area being cleaned up and marketed as a form of heritage. Signposts appear with kitschy 'old' maps and detailed histories. All of this we can relate to as a search for authenticity and rootedness. In his text Harvey refers to the work of Yi-Fu Tuan when he borrows the argument that being rooted in place is a different kind of experience from having and cultivating a sense of place:

"A truly rooted community may have shrines and monuments, but it is unlikely to have museums and societies for the preservation of the past. The effort to evoke a sense of place and of the past is now often deliberate and conscious" (Harvey 1996:302).

Fig. 1: San Diego Gas Lamp District – 2012 (by author).

Harvey continues by stating that place is often seen as the locus of collective memory, an argument he shares whit among others Christine Boyer (1994). This locus, being a site where identity is created through the construction of memories, linking a group of people into the past.

"The preservation or construction of a sense of place is then an active moment in the passage from memory to hope, from past to future. And the reconstruction of places can reveal hidden memories that hold out the prospect for different futures" (Harvey 1996:306).

This construction of imagined places is important to Harvey, he would later dedicate the book Spaces of Hope entirely to the theme (Harvey, 2000). Harvey portrays in both of these works place as a deeply ambiguous facet of modern and postmodern life.

On the one hand investments in place can play a role in resisting the global circulation of capital but on the other it is often quite an exclusionary force in the world where groups of people define themselves against threatening others, who are not included in the particular local expression of place.

5.2 The sense of place

Doreen Massey's paper 'a global sense of place' (1994) is in many ways a response on Harvey's way of thinking, a response that hinges on a redefinition of place as an inclusive and progressive site of social life (Cresswell, 2004). Her plea is for a new conceptualization of place as open and hybrid – a product of interconnecting flows, of routes rather than roots. This extroverted notion of place calls into question the whole history of place as a centre of meaning connected to a 'rooted' and 'authentic' sense of identity; forever challenged by mobility.

Harvey's critique on Heidegger was already echoed by Doreen Massey in her paper 'power geometry' (Massey, 1993). Although her work has also been important in bringing ideas of place and space to greater prominence in contemporary theory, nevertheless, Massey explicitly criticizes what she takes to be the "Heideggerian view of Space/Place as Being" and raises a variety of objections to such an account (Malpas, 2007), claiming that:

"There are a number of distinct ways in which the notion of place which is derived from Heidegger is problematical. One is the idea that places have single essential identities. Another is the idea that the identity of place – the sense of place – is constructed out of an introverted, inward-looking history based on delving into the past for internalized origins... Another problem with the conception of place which derives from Heidegger is that it seems to require the drawing of boundaries... [Another aspect of] the Heideggerian approach, and one which from the point of view of the physical sciences now looks out of date, is the strict dichotomization of time and space..."(Massey 1993:64).

Massey describes a twofold problem with the definition of place as a merely static and rooted reaction to a dynamic and mobile world. First she argues that it may be the case that people do need a sense of place to hold on to – to be 'rooted'. Secondly Massey sees the flow and flows of global movement not necessarily as anxiety provoking. The reactionary sense of place that troubles Harvey is for Massey marked as problematic by at least three interconnected ways of thinking. Being: the idea that places have single, essential identities, the idea that the sense of place is constructed out of an introverted inward-looking history and the conception of place as something that requires the drawing of boundaries (Massey 1994). In her paper Massey describes Kilburn, a neighbourhood of London where she lived for years. Her description is a celebration of diversity and hybridity, an evocative mix of people of multiple ethnicities living and working side by side:

"While Kilburn may have a character of its own, it is absolutely not a seamless, coherent identity, a single sense of place that everyone shares. It could hardly be less so. [...] Moreover, not only does Kilburn then have many different identities (or its full identity is a complex mix of all these) it is also, looked at in this way, absolutely not introverted. It is [...] impossible even to begin thinking about Kilburn High Road without bringing into play half of the world and a considerable amount of British imperialist history [...]. Imagining in this way provokes in you (or at least in me) a really global sense of place" (Massey 1994:174-175).

Massey's Kilburn is, in her words, a 'meeting place' where a particular 'constellation of social relations' comes together in place. Her observations of Kilburn draw towards a – what she defines – new extrovert, progressive and global sense of place. This definition of place is marked by:

(1) Place as process

(2) Place as defined by the outside

(3) Place as site of multiple identities and histories

(4) A uniqueness of place defined by its interactions

Reviewing the outlined perceptions of place by Heidegger, Harvey and Massey it seems important to notice the very local context in which they developed there concepts or to what context they refer. Heidegger uses the complete, romanticised and slightly naive, isolation of the Black Forest farmhouse. David Harvey refers

to Guilford, a place that sees itself under threat from difference and seeks to create clear boundaries to distinguish itself from the threatening outside. Massey's Kilburn on the other hand is a place of radical openness, in this perspective it is not surprising that her considerations are different. Where Harvey sees place as too reactionary, Massey's context allows her to suggest that it is okay to seek identity in place because that identity is never fixed and bounded.

6 THE CONTEMPORARY DEBATE.

6.1 See you in Disneyland

Michael Sorkins book 'Variations on a Theme Park' (Sorkin, 1992) was one of the most critical contributions with great impact on the discussion on urban renewal at the moment of publishing. In the early 90s he was one of the first to draw a problematic conclusion: in a predominantly suburban America, Disneyland was one of the few places where real urbanity can be experienced on a manner that is not threatening.

A safe place where all the infrastructure is organised well, where everything works and where everything is neat, where reigns an utopian ethos of pleasant living. According to Sorkin it is no wonder that private developers have taken Disneyland as an example for their new projects. Around the world, Disney is the benchmark (Sorkin, 1992).

Sorkin abhors this Disneyfication. The illusion of parochialism and universal happiness for all, based on an almost completely passive way of leisure – a world without work – is his problem. For Sorkin even worse is the lack of freedom of choice, a result of cutting away everything that might disturb people – nonconformity, the aberrant. His most fundamental objection, however, focuses on the lack of democracy, of real citizenship. Sorkin uses television (another popular 90s phenomena in urban critical theory) as a metaphor:

"[...] the structure of this city is a lot like television. TV's main event is the cut, the elision between broadcast bits, the seamless slide from soap opera to docudrama to a world from our sponsor. The 'design' of television is all about erasing differences among these bits, about asserting equal value for all the elements in the net, so that any of the infinite combinations that the broadcast day produces can make 'sense'. The new city likewise eradicates genuine particularity in favour of a continuous urban field, a conceptual grid of boundless reach" (Sorkin 1992:xii)

Sorkin argues that what is missing in the city is not just a matter of any particular building or place, rather the spaces in between, the connections that make sense of form. Liberated from its 'centres' and edges – due to advanced infrastructures – and by a new world order bent on a 'single citizenship of consumption (Sorkin, 1992), the new city threatens an unimagined sameness even as it multiplies the illusory choices of the TV system. Sorkin sets out three characteristics that mark this city, and outline his book. First is the scattering of stable relations to local physical and cultural geography, the loosening of ties to any specific space. Second is the obsession with 'security', both technological and physical. Third is the realm of the city turning into one of simulations, the city as theme park. Universal Studio City Walk functions then as a great example, being the ultimate fusion of being completely isolated – heavenly monitored and an extreme constellation of the fictive.

Comprehensively Sorkin elaborates on the relation that he sees between Disney Land and the garden city, both in organization as in scale. Their location on the urban perimeter, at the intersection of highways and their strict internal order – radiating from a strong centre the parks are thematically zoned. Whereas the ground plane is dedicated to the pedestrian circulation, its perimeters and airspace are the terrain of extensive and expressive transport systems: trains, monorails and aerial gondolas. He sees it as a particular way of urbanism, one that accelerates trends that are everywhere noticeable. According to Sorkin the problems addressed by 'Disneyzone' are quintessentially modern: crime, transportation, waste, the relationship of work and leisure, the transience of populations and the growing hegemony of simulacrum (Sorkin, 1992)

Sorkin argues in extent that like world fairs, theme parks offer 'intensifications of the present, the transformation of the world by an exponential increase in its commodities. And for Sorkin the motion is essential in this experience, movement is ubiquitous and central:

"Getting there, then, is not half the fun: it's all the fun. At Disneyland one is constantly poised in a condition of becoming, always someplace that is 'like' someplace else. The simulations referent is ever elsewhere, the

'authenticity' of the substitution always depends on the knowledge, however faded, of some absent genuine. Disneyland is in perpetual shadow, propelling its visitors to an unvisitable past or future, or to some (inconvenient) geography" (Sorkin 1992:216)

Sorkin links Disneyland to an existing city. Los Angeles. Where historic themes describe the city's own self-description. The genius of the city resides – according to Sorkin – not simply in dispersal but in juxtaposition. The Disney visitor seeks and delights in the relationship between what he or she finds and its observes back home.

"In the Disney utopia, we all become involuntary flaneurs and flaneuses, global drifters, holding high our lamps as we look everywhere for an honest image [...] Like television, it is a machine for the continuous transformation of what exists [...] into what doesn't [...]. It's a genetic utopia, where every product is some sort of mutant" (Sorkin 1992:232).

6.2 The death and life of authentic urban places

What was considered a 'typical', 'authentic', 'original' district was taken over by representatives of the wealthy middle class and everything that initially was so appealing – particularly the mixing of the population and the creative atmosphere – has disappeared. In Amsterdam this process of gentrification occurred for instance in the Jordaan: for long being a typical Amsterdam neighbourhood, but whereas nowadays all 'real Jordanezen' moved to periferal Purmerend or Almere. New York is the biggest offender of them all, the anonymous blogger Brooks of the Lost City blog viciously described Bloomberg's city as:

"homogeneous, anodyne, whitewashed, suburban, toothless, chain-store-ridden, ordinary, exclusive and terribly, terribly expensive. A town for tourists and the upper 2 %. He took a world-class capital of culture, individuality and independent endeavour and turned it into the smoothest, first-class, gated community Houston ever saw" (Brooks 2010).

Sharon Zukin in 'Naked City: The Death and Life of Authentic Urban Places' focuses on urban change that manifest in specific neighbourhoods. Building on the argument of Jane Jacobs but in the same time critiquing it (Zukin, 2009). To this end she analyses accurately what has happened in a few famous New York neighbourhoods like Williamsburg, East Village and the area around Union Square, but also a former no-go area as Harlem. Zukin distinct a pattern: ramshackle neighbourhoods get discovered by squatters, artists, immigrants and undergo a metamorphosis. There are then attractive shops with local products, restaurants with exotic foods and there is a dynamic, cosmopolitan atmosphere. The 'authentic neighbourhood' is born.

Jacobs showed a world that was disappearing in the time she wrote about it (Jacobs, 1961). There are no housewives any more who spend all day monitoring the street and talking with the grocer on the corner. Existence is mobile and has become hectic, we have barely the opportunity to deeply root into our neighbourhoods. Zukin argues that authenticity refers to the 'look' and 'feel' of a place, as well as the social connectedness that place inspires:

"Yearning for authenticity reflects the separation between our experience and of space and our sense of self that is so much part of modern mentalities. Though we think authenticity refers to a neighbourhood's innate qualities, it really expresses our own anxieties about how places changes. The idea of authenticity is important because it connects our individual yearning to root ourselves in a singular time and place to a cosmic grasp of larger social forces that remake our world from many small and often invisible actions" (Zukin 2009:220).

Zukin shows that cities are subject to the market and therefore sensitive to changes in appearance, taste and fashion. Whether we like it or not, Zukin argues, our preference for designer clothing, healthy food and audiovisual toys dispels vulgar and cheap eats tents and mass stores. Likewise, our desire to live in the large former warehouses ensure that such buildings are restored and made suitable for habitation. But this applies to everything that formerly sat dispelled and disappears. 'Authentic' is then a buzzword, obsolete before you know it.

7   REACTIVATING THE ORDINARY

Recreating a sense of urban vitality means that one does not just introduce 'publicness' as what would be 'places to meet'. As argued before, it requires a deeper understanding of the city. The goal would be to keep working on the locus of the city and one might completely has to rediscover or reactive it. It are the

singularity of residuals from the former city with its civic events, failed attempts and its particular natural setting. All those have an intrinsic order and logic, but require an almost simple way of looking to the city. Turning this understanding into a laboratory, I have been working on a project that reactivates and reconnects urban spaces in Downtown Los Angeles (Beijer, 2013).

Los Angeles downtown's rich diversity of 'theme districts' lacks continuity in the experience of the public realm. Great micro-environments are of a distance from each other that is too far to walk, while downtown at the same time is utterly inconvenient to drive. Empty plots and big parking lots are opportunities for further intensification and when located around interesting zones, public parks and other means of public transport - they can serve as location for monorail stations. Hereby the laboratory is not about the monorail in itself. Building on Los Angeles' rich history of exaggeration, the rendering of this exploration plays in the realm of optimistic utopia.

Instead of homogenising the urban landscape and turning the diversity into an nondescript themepark, the monorail helps to manifest the various identities and characters. Just by being an nondescript generic element itself that only connects great micro spheres. Overlaid histories from 1888 to 2011 (fig. 2) of the historic 'hotspots', show the arguments of this thesis. Attractive and meaningful spaces don't just suddenly appear, most of them are residuals from earlier urban ecologies. Former time frames are mapped (grey tones) on the next phase (purple), questioning the relation between morphology, centrality and infrastructures.

Rendering a future where ordinary and authentic places are not just a gimmick or only get articulated through decorative shells. But a future where the ordinary place is one of historic existence. Intrinsic logic that one conceives through feeling it, realizing it without the oppressive demand to consume it.
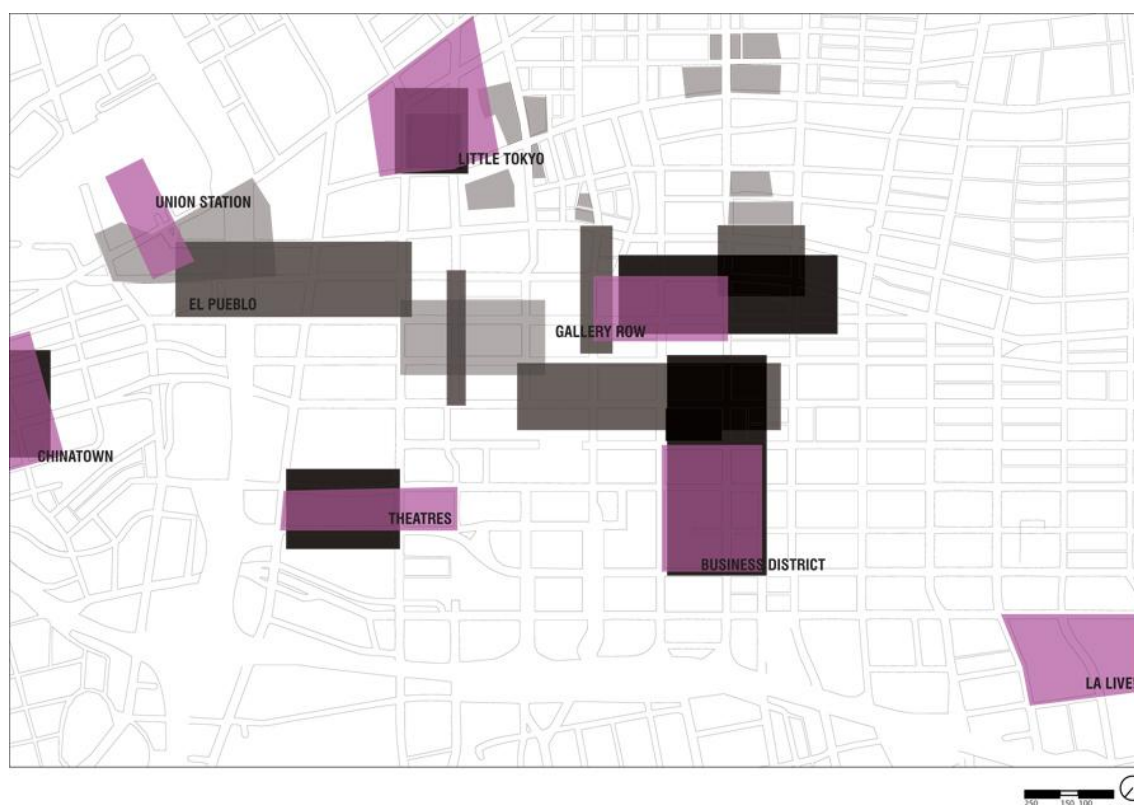
Fig. 2: The historic layering of contemporary hotspots (purple), from 1888 to 2011 in Los Angeles (by author).

8 CONCLUSION

One of the difficulties in clarifying the relation between space and place is, not only that the two are necessarily connected, but that this concept for years tended to be understood only spatially. Then Heideggers overarching philosophical notion of 'dwelling' is an interesting perspective. Dwelling as a basic capacity to achieve a form of spiritual unity between humans and the material world allows us to construct places, give them meaning and nuance them. Harvey portrays place as a deeply ambiguous facet of post-modern life. The reconstruction of places thus can reveal hidden memories that hold out the prospect for different futures. Harvey points out that investments in place in the same time often can be quite an

exclusionary force in the world where groups of people define themselves against threatening others who are not included in the particular local expression of place.

The sense of being rooted in place, argued by Harvey is something we find back in Massey's work. But she is able to bring it closer to life in the complexity of the metropolis. Massey points out that the problematic definition of place as a merely static and rooted reaction to a dynamic and mobile world. She argues that people might do need a sense of place to hold on to – to be 'rooted' – but to her the flows of global movement not necessarily have to be seen as anxiety provoking. Whereas the notions of people as Heidegger, Harvey and Massey remain rather abstract, the concrete critique by Sorkin and Zukin clearly points out the problematic paradox the public domain of the metropolis is in. Sorkin argues that what is missing in the city is not just a matter of any particular buildings or places, rather the spaces in between, the connections that make sense of forms. Sorkin abhors the thematisation of public space; the illusion of parochialism and universal happiness for all and the lack of freedom of choice.

Existence became mobile and increasingly hectic and Zukin argues that we barely have the opportunity to deeply root into our neighbourhoods. Zukin argues that authenticity refers to the 'look' and 'feel' of a place, as well as the social connectedness that place inspires. She makes the argument that longing for authenticity reflects the separation between our experience and of space and our sense of self, that is so much part of modern mentalities. Though we think authenticity refers to a neighbourhood's innate qualities, it really expresses our own anxieties about how places changes. And then we can try to grasp the meaning of ordinary, authentic places in the city. A recommendation would be to start with leaving the city the city. Commercial driven urban development led to a public domain that became private, visualising a complete lack of democracy, of real citizenship. The thematisation of the street partly deluded the city by decorating it with false notions of romanticism, but also by making it increasingly exclusive and unjust.

The goal would be to keep working on the locus of the city, the collective memory. Rediscovering the singularity of residuals from the former city with its civic events, failed attempts and its particular natural setting. The preservation of a sense of place is then an active moment in the passage from memory to hope, from past to a better future.

9   REFERENCES

BEIJER, J.H.E. (2013). Los Angeles: the metropolis and five stages of modernity. Unpublished MSc thesis, Delft University of Technology.
BROOKS (2010). Goodbye To All That. Available: http://lostnewyorkcity.blogspot.nl/2010/06/goodbye-to-all-that.html. Last accessed 20th Oct 2012.
CRESSWELL, T. (2004) Place, a short introduction. Oxford, Blackwell.
HARVEY, D. (1989) The Condition of Postmodernity. Cambridge, Blackwell.
HARVEY, D. (1996) Justice, Nature, and the Geography of Difference. Cambridge,   Blackwell.
HARVEY, D. (2000) Spaces of Hope. Edinburgh, Edinburgh University Press.
HEIDEGGER, M. (1971) Poetry Language Thought. New York, Harper & Row.
JACOBS, J. (1961) The Death and Life of Great American Cities. New York, Random   House.
MALPAS, J. (2007) Heidegger's Topology: Being, Place, World. Cambridge, MIT Press
MASSEY, D. (1993) "Power-geometry and a progressive sense of place" in J. Bird (ed.), Mapping the   Futures: Local Cultures, Global Change. London, Routledge
MASSEY, D. (1994) A global sense of place. Minneapolis : University of Minnesota Press.
SORKIN, M. (1992) Variations on a themepark. New York, Hill and Wang.
TUAN, Y. (1977) Space and Place: The Perspective of Experience. Minneapolis, University of   Minnesota Press.
ZUKIN, S. (2009) Naked City: The Death and Life of Authentic Urban Places. Oxford, Oxford   University Press.

L'altra faccia dell'economia: gli street vendors e l'uso dello spazio urbano nell'area metropolitana di Cagliari

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1 ABSTRACT

L'attività del commercio ambulante ha svolto un ruolo di primaria importanza nell'evoluzione della definizione concettuale dell'economia informale: oggi, nell'era della globalizzazione, tale fenomeno rappresenta una fetta importante dell'economia sia nei paesi in via di sviluppo sia nei paesi sviluppati. Gli attori principali del settore informale sono gli street vendors, i quali occupano spazi urbani nello svolgere la loro attività di vendita, caratterizzata per lo più da alimentari e oggettistica varia.

Tale fenomeno è un aspetto " poco esplorato" dal punto di vista della pianificazione urbana. Questo infatti fa parte di quella faccia della città globalmente riconosciuta in quanto facente parte della vita di tutti i giorni, ma mai compresa sino in fondo per la complessità della sua natura. Anche in piccole realtà quale è quella di Cagliari, è possibile riscontrare la presenza dei venditori ambulanti.

Dopo un breve excursus sullo stato dell'arte, il paper analizza il fenomeno circoscritto all'area metropolitana di Cagliari, interagendo direttamente con gli attori protagonisti. Infatti parte importante della metodologia seguita è stata la conduzione di interviste dirette previa realizzazione di un questionario semi-strutturato, a specifiche categorie: venditori informali locali, venditori informali stranieri, venditori formali.

Dai dati raccolti è emerso un quadro di problematiche che influisce non solo sulla tipologia dei rapporti tra attori dell'economia informale e dell'economia formale ma anche sull' occupazione dello spazio urbano.

2 INTRODUZIONE

L'attività del commercio ambulante ha svolto un ruolo fondamentale nella storia della definizione concettuale dell'economia informale.

Con il termine economia informale si intendono quegli aspetti dell'economia del Paese che, seppur a fini legali, non vengono dichiarati, in tutto o in parte, ai pubblici poteri. L'economia informale rappresenta una sorta di ammortizzatore sociale per i problemi legati alla disoccupazione e una possibilità di sopravvivenza per quella parte della popolazione più vulnerabili o già in condizioni di povertà (Zurru,2005).

Sia chi si occupa di paesi in via di sviluppo che di paesi in paesi a capitalismo maturo, descrive il commercio ambulante come un meccanismo fondamentale di sussistenza per le persone senza alcuna possibilità di guadagnarsi un posto negli spazi formali dell'economia o come uno strumento di contrasto contro le logiche dominanti del sistema capitalistico moderno.

Il commercio ambulante ha quindi la peculiarità di risultare quel settore escluso dall'economia formale; in termini di capitale è caratterizzato da basse barriere all'entrata, la conduzione è prevalentemente familiare con livelli tecnologici quasi totalmente inesistenti (Bellanca,2008).

L'immagine immediata che può suscitare la vendita ambulante è quella di un mondo caotico, animato da un numero difficilmente stimabile di attori. Questi, fondamentalmente mossi dal forte bisogno, decidono di vendere qualcosa per strada, in competizione con gli altri attori, per conquistarsi qualsiasi spazio urbano che possa garantire la possibilità di racimolare le risorse utili alla propria sopravvivenza giornaliera. Al fine della sopravvivenza uno spazio di vendita vale l'altro per qualsiasi ambulante. Ciò comporta una disposizione caotica degli attori nello spazio urbano ed una forma complessiva dello spazio fisico occupato che riflette la capacità dei singoli attori di gestire al meglio le proprie risorse.

In passato gran parte degli spazi dove avvenivano le transazioni erano subordinati a rigorosi controlli istituzionali, e gran parte della letteratura storica fa rimandi continui alla centralità e specificità degli spazi fisici per l'attuazione delle transazioni economiche, definendo i meccanismi di limitazione che forze sociali e politiche comportavano per la libera azione economica dei singoli.

La localizzazione fisica del mercato appare un elemento intimamente legato alla sua esistenza: i mercatini locali posti alle porte della città e le fiere rappresentano le prime forme di localizzazione fisica del mercato; quando raggiungevano un certo livello di importanza, venivano contrassegnate anche dall'identità temporale, con la definizione di una precisa cadenza periodica per le vendite. L'elemento chiave di questo processo diviene così il luogo in cui avvengono le transazioni: lo spazio urbano (Bagnasco, 1988).

In questo lavoro si analizzerà il settore del commercio ambulante nella città di Cagliari dando particolare attenzione alla dimensione dello spazio urbano.

I temi dell'indagine sono stati trattati con metodologia qualitativa in due momenti: nella prima fase esplorativa e di ricostruzione del contesto, tramite una mappatura del fenomeno in città e la conduzione di interviste agli attori chiave; nella seconda fase come approfondimento dei risultati più complessi e problematici emersi dal questionario. Nei paragrafi che seguiranno verrà spiegata nello specifico la metodologia adottata. Il censimento degli street vendors di frutta e verdura principalmente, ha consentito di disegnare la disposizione spaziale quotidiana degli ambulanti e la forma urbana complessiva di questo mercato irregolare, come pure alcune caratteristiche socio anagrafiche degli attori protagonisti (Angioni, 1982).

La continuità temporale delle transazioni economiche irregolari viene concepita in questo paper come problematica, privilegiando un tipo di analisi orientata all'ottenimento del dato spaziale: il luogo di lavoro diviene infatti uno spazio urbano occupato in modo irregolare per la vendita irregolare.

3 EVOLUZIONE DEL COMMERCIO AMBULANTE

3.1 Il mercato alimentare storico

Lo scambio delle merci è stato da sempre uno degli elementi essenziali del processo evolutivo umano, ne sono state testimonianza le più antiche civiltà. Successivamente l'agricoltura, sistema produttivo primario, ha innescato il processo di passaggio dal nomadismo alla stanzialità e, con esso, ha messo in evidenza le variegate esigenze legate alla conservazione dei prodotti eccedenti, a quelli da consumare e a quelli destinati allo scambio di altri beni (Roma, 2001).

Da tale primitiva organizzazione è scaturita la necessità di strutture per il deposito delle merci e di spazi atti a contenerle per essere successivamente utilizzate, barattate con altre o vendute. Queste esigenze hanno dato vita ai mercati e ai primi commercianti: i mercanti.

Il mercato ha sempre rappresentato un punto di riferimento per quel ruolo di relazione e di scambio che ne costituisce dalle origini il substrato portante, imponendosi come simbolo non solo del commercio dei prodotti, ma anche come spazio di relazione e di scambio delle diverse culture locali (Anderson, 1996).

Nonostante l'evoluzione dei tempi e gli inesorabili processi di cambiamento e di trasformazione che hanno mano a mano interessato le città, il mercato ha continuato a vivere, adattandosi e modellandosi secondo le esigenze imposte dai moderni ritmi di vita.

3.2 Il commercio ambulante nella società post-moderna

Pur essendo specificatamente regolata dalla legge, la gran parte della vendita per strada di beni quali quelli alimentari, frutta e verdura, si svolge in città in modo abusivo. Ma a differenza di tante altre attività sommerse, per poter svolgere normalmente la loro attività, gli attori necessitano di ampia visibilità per la domanda, generando nei confronti delle istituzioni tese al controllo e alla repressione dei fenomeni di irregolarità. A fronte di questa enorme possibilità repressiva è evidente che un commercio ambulante abusivo viene istituzionalizzato nella vita sociale della città, quale mercato che si è affermato come spazio quotidiano di relazioni contraddistinto da proprie regole specifiche.

Il commercio ha quindi creato spazi che generano nuovi rapporti sociali secondo un modello sempre più avulso da quello diretto che un tempo intratteneva il "consumatore-cliente e il venditore-amico", basato essenzialmente su un rapporto personale e di fiducia, caratterizzato da un approccio del tutto impersonale che riflette la diversa organizzazione commerciale: ieri per ramo merceologico, tipico dei negozi specializzati a conduzione familiare, oggi con un assortimento vario riposto negli scaffali dei moderni complessi commerciali.

In tale nuovo contesto gli Enti Locali sono chiamati a risolvere i problemi relativi alla convivenza del dualismo commerciale attraverso una politica volta allo sviluppo delle medie strutture di vendita e alla qualificazione del commercio ambulante.

L'esistenza di questo mercato irregolare è possibile in città grazie al controllo dello spazio di vendita. La spazialità delle aree di mercato è contenuta all'interno di particolari quartieri, vie e piazza, ed è regolata da norme informali, prodotto di relazioni sia tra i diversi attori economici, sia tra questi e quelli politico/organizzativi. (Bagnasco, 1986)

L'estrema facilità di intraprendere l'attività di vendita e i bassi costi iniziali ne fanno un ambito frequentatissimo. Ma se l'ingresso al settore appare abbastanza semplice, non possiamo dire la stessa cosa riguardo la permanenza al suo interno. Questo perché l'occupazione dello spazio non è una condizione che può dirsi definita una volta per tutte; i decisori politici infatti garantiscono l'uso della superficie di vendita agli ambulanti per la loro sopravvivenza tramite una concessione elastica, vincolata da strutture normative informali abbastanza rigide ed utilizzata "strumentalmente" come merce di scambio per ottenere consenso politico; ne consegue che certi spazi vengono concessi e altri negati perché ciò che è in gioco sono i diritti degli altri cittadini e il decoro della città (Roma,2001).

L'immagine che gli attori politici vogliono fornire alla città, influenza anche l'operato degli organismi che devono tradurre operativamente questo elemento: la Polizia Municipale. In tal caso, alla forza del diritto alla sopravvivenza, quale elemento che orienta l'azione dei vigili urbani, si affianca il deficit organizzativo interno, che limita l'applicazione letterale della legge e consente un uso illegale degli spazi agli ambulanti.

4 LA FORMA URBANA DEL MERCATO IRREGOLARE

La vendita di prodotti e oggettistica varia che avviene per la strada, è un fatto talmente quotidiano da apparire normale e quindi parte integrante della vita quotidiana della città. La presenza degli ambulanti diventa quindi una cosa utile e scontata e capace di soddisfare i bisogni economici di una vasta clientela (Bagnasco, 1988).

Nonostante questa attività possa essere svolta in modo regolare, in spazi e tempi ben definiti, l'esperienza di qualsiasi cittadino richiama la presenza diffusa in diverse zone della città di street vendors abusivi.

Così, per la mancanza di autorizzazione di vendita, per il mancato pagamento della concessione del suolo, per la vendita di prodotti non previsti dalla tavola merceologica comunale e per la mancanza di rilascio al cliente di qualsiasi ricevuta fiscali, un numero considerevole di street vendors viene tagliato fuori dal sistema di regole che disciplina l'attività.

Altro problema da non sottovalutare sono le continue proteste e lamentele dei negozianti stanziali nei confronti degli abusivi, visti come concorrenti sleali.

La particolarità del commercio ambulante è che, a differenza di altre attività irregolari, per esercitare la propria attività hanno bisogno di visibilità. Esporre i propri prodotti in uno spazio pubblico, come marciapiedi strade e piazze è la condizione primaria per poter lavorare: la visibilità della postazione deve quindi essere massima(Zurru, 2005).

Come verrà ben esposto nel paragrafo che segue, nella città di Cagliari questo tipo di vendita si effettua nei giorni feriali in spazi bene delimitati e circoscritti all'area dei mercati rionali; nei giorni festivi invece le piazze e una quota rilevante del quartiere di Sant'Elia vengono occupate dalla vendita di beni alimentari.

Per cui ogni tipologia di street vendors è definito un singolo spazio e quindi un proprio angolo di visuale. Le mappe che seguiranno consentiranno di capire meglio la complessità spaziale del fenomeno.

5 METODOLOGIA ADOTTATA E MAGGIORI RISULTATI OTTENUTI

Dall'analisi bibliografica del fenomeno, e dalla sua proiezione nel contesto metropolitano di Cagliari, sono emerse una serie di zone caratterizzate dalla presenza degli ambulanti, che hanno mutato nel tempo la loro forma: per esempio, alcune aree in cui prima si riscontrava la presenza degli street vendors ora risultano essere non occupate, altre che prima erano caratterizzate da una disposizione lineare e continua dei venditori ambulanti ora risultano averla frammentata, altre ancora invece sono di recente occupazione.

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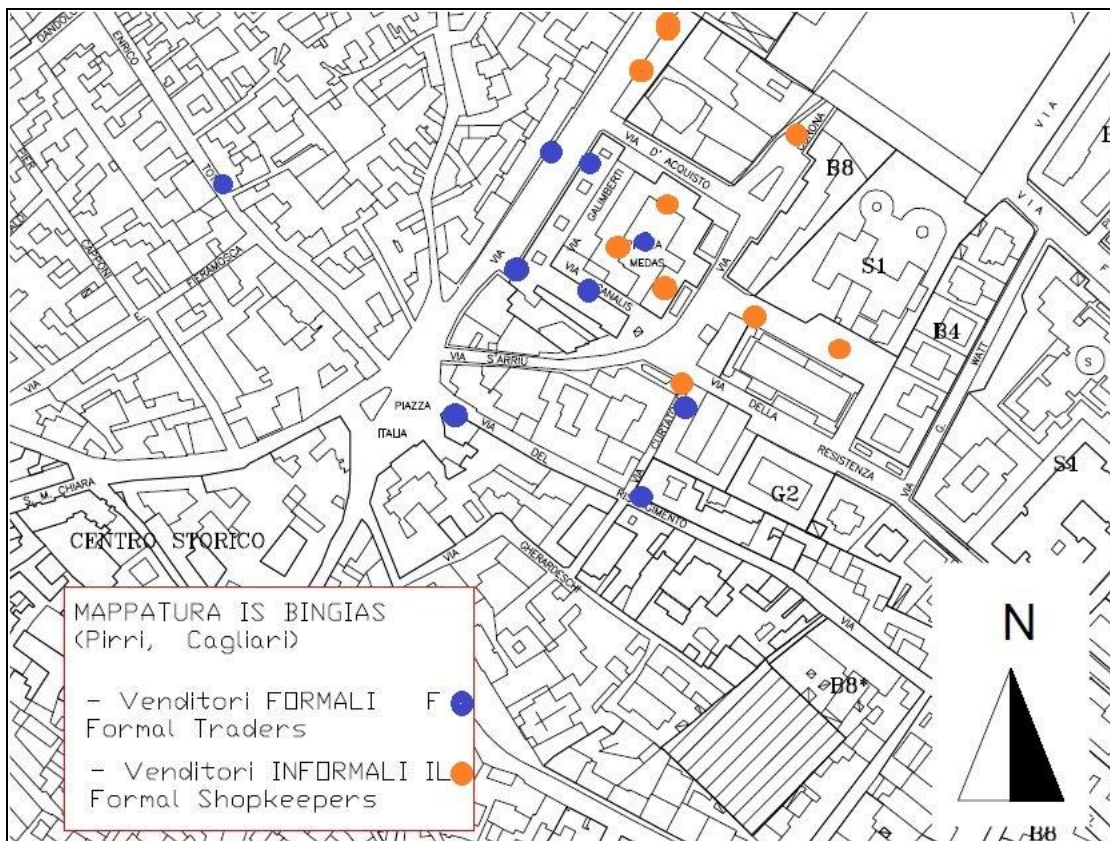
Fig. 1: Mappatura venditori formali e informali intervistati.

Fig. 2: Mappatura venditori informali internazionali intervistati e foto.

Ciò mostra come tali aree siano in continua evoluzione sia per il cambiamento di scelta sul dove svolgere l'attività da parte dei venditori, sia per l'intervento del Comune al fine di salvaguardare l'immagine e il funzionamento di alcuni aspetti cittadini quali ad esempio il decoro e la circolazione fluida delle auto.

Per avere un resoconto, almeno parziale, dell'evoluzione delle aree interessate dalla presenza di venditori ambulanti, la prima parte della metodologia è stata quella della mappatura del fenomeno in alcune zone dalla posizione urbana favorevole allo sviluppo di tali attività informali (Zurru, 2005).

Una è l'area di Piazza San Michele – Is Mirrionis, uno dei quartieri popolari di Cagliari, un'altra è quella della Località Is Bingias, in prossimità del mercato civico di Pirri e infine quella del quartiere della Marina, nel centro storico della città, e del Centro Commerciale "Le Vele", sito nel comune di Quartu Sant'Elena.

In prima istanza la mappatura mirava a identificare la disposizione spaziale dei venditori ambulanti ed è stata completata mediante un'analisi visiva e fotografica supportata delle seguenti informazioni reperite:

- l'età approssimativa e genere del venditore;
- la tipologia di merce venduta,
- il grado di complessità tecnologica (complessità attrezzatura) a supporto della vendita;
- il numero di addetti alla vendita.

A titolo esemplificativo si riportano qui sotto due tra le mappe realizzate; la Figura 1 mostra la posizione occupata dai venditori informali e formali intervistati nell'area di Is Bingias, la Figura 2 rappresenta la mappatura dei venditori informali intervistati nell'area di San Michele con alcune foto esplicative.

Al fine di ottenere risultati il più possibile realistici, parte integrante della metodologia è stata l'elaborazione di due differenti questionari semistrutturati: uno per la categoria dei venditori informali locali e stranieri, e uno per quella dei venditori formali (Zurru, 2005).

Obiettivo principale del questionario era quello di ottenere informazioni riguardanti i benefici economici del lavoro svolto, il rapporto tra questo e l'area in cui esso viene esercitato, nonché eventuali variazioni logistiche e tipologiche dell'attività svolta e le esigenze lavorative di tali venditori.

Per quanto riguarda invece i venditori formali locali, è stata condotta un'intervista con l'intento di individuare: gli impatti che la presenza di venditori informali nelle vicinanze delle attività formalizzate può determinare sui guadagni nonchè sull'immagine di tali attività, gli impatti sulla città, ed eventuali situazioni problematiche. Sono stati intervistati 9 venditori informali e 9 venditori formali locali nella zona di San Michele, altrettanti nella zona di Is Bingias, mentre nei quartieri di Marina, del Poetto, di San Benedetto e del centro commerciale "Le Vele" sono stati intervistati 28 ambulanti internazionali. Complessivamente sono state condotte 64 interviste.

6 DATI REPERITI

6.1 Tipologia delle merci vendute e grado di tecnologia adottato

Per quanto riguarda le interviste condotte ai venditori informali locali e ai venditori formali è utile considerare i dati separatamente per le due aree di San Michele e Is Bingias, dato che si tratta di aree molto differenti per posizione occupata. I risultati ottenuti complessivamente sono i seguenti:

Venditori informali		
	Area Is Bingias (Tot. Intervistati 9)	Area San Michele (Tot. Intervistati 9)
Genere	Donne 5 Uomini 4	Donne 3 Uomini 6
Età	Tra i 35 e i 54 anni 7 Superiore ai 54 anni 2	Tra i 25 e i 34 anni 1 Tra i 35 e i 54 anni 5 Superiore ai 54 anni 3
Numero addetti alla vendita	Un addetto 8 Due addetti 1	Un addetto 7 Due addetti 2
Tecnologia usata per la vendita	Furgone e bancarella 4 Macchina e bancarella 2 Ape Piaggio 3	Furgone e bancarella 2 Macchina e teloni 2 Ape Piaggio e teloni 3 Bagagliaio auto 1 Tavole e cassette 1
Tipologia merce venduta	Frutta e verdura 3 Abbigliamento e calzature 3 Piante 2 Biancheria per la casa 1	Frutta e verdura 3 Abbigliamento e calzature 3 Oggettistica varia 2 Pupazzi e libri 1
Provenienza merce venduta	Italia Cina Olanda Belgio	Italia Cina
Clienti abituali	Residenti del quartiere Passanti Turisti	Residenti del quartiere Passanti Turisti

Vantaggi	Vicinanza al mercato civico Brevi distanze dalla propria abitazione Quartiere residenziale Centralità della zona	Zona di passaggio Quartiere popolare Brevi distanze dalla propria abitazione
Svantaggi	Assenza di parcheggi Assenza di vigilanza	Assenza di servizi (parcheggi, acqua corrente)

Table 1: Risultati interviste ai venditori informali locali

Venditori formali		
	Area Is Bingias (Tot. Intervistati 9)	Area San Michele (Tot. Intervistati 9)
Genere	Donne 5 Uomini 4	Donne 4 Uomini 5
Età	Tra i 25 e i 34 anni 1 Tra i 35 e i 54 anni 7 Superiore ai 55 anni 1	Tra i 35 e i 54 anni 7 Superiore ai 55 anni 2
Merci	Alimentari 2 Cartoleria 1 Abbigliamento 3 Articoli da regalo 1 Gioielleria e bigiotteria 2	Alimentari 3 Cartoleria 1 Abbigliamento 2 Articoli da regalo 1 Ferramenta 2
Clienti abituali	Residenti del quartiere Passanti Turisti Venditori ambulanti Altri negozianti	Residenti del quartiere Passanti Turisti Venditori ambulanti
Vantaggi	Centralità della zona Vicinanza ai venditori informali locali	Ambiente tranquillo (pacifica convivenza)
Svantaggi	Assenza di parcheggi Problema della vigilanza	Disordine Cattivo aspetto della zona Intralcio del passaggio nelle vie principali

Table 2: Risultati interviste ai venditori formali

Per quanto riguarda i risultati delle interviste ai venditori internazionali, la tabella che segue mostra quelli complessivi:

Venditori Informali internazionali	
	Viale Marconi – San benedetto – Marina – Stampace (Tot. Intervistati 28)
Genere	Donne 1 Uomini 27
Età	Minore di 18 anni 1 Tra i 18 e i 24 anni 9 Tra i 25 e i 34 anni 13 Tra i 35 e i 54 anni 5 Superiore ai 55 anni 0
Nazionalità	Senegal 18 Bangladesh 9 Ghana 1
Merci	Accendini Fazzoletti Cd Abbigliamento e calzature contraffatte Oggettistica (Cover telefoni, occhiali da sole, souvenirs) Bigiotteria
Provenienza merci	Cina Italia Bangladesh Africa Nessuna risposta India
Piano di lavoro	Macchina Buste/borsoni Teli Cartone e cassette Tavole di compensato
Clienti abituali	Passanti Turisti Parcheggiatori Residenti del quartiere Altri venditori ambulanti Negozianti
Vantaggi	Passaggio di persone
Svantaggi	Fenomeni di razzismo Assenza servizi

Table 3: Risultati interviste ai venditori informali internazionali

L'analisi visiva e fotografica, nonché quella svolta mediante la somministrazione del questionario semi-strutturato ha permesso di ottenere una serie di dati che vengono riassunti qui di seguito. Per quanto riguarda i venditori informali locali dell'area di Is Bingias, essi hanno un'età media di 50 anni, leggermente superiore a quella dei venditori di San Michele (45 – 50 anni), ma di molto più elevata rispetto a quella dei venditori informali stranieri (25 – 28 anni). A Is Bingias è presente una buona rappresentanza femminile, superiore a quella della zona di San Michele, rappresentanza che risulta annullarsi quasi completamente tra i venditori informali internazionali.

Per quanto riguarda le merci vendute, in entrambe le aree di local street vending troviamo frutta e verdura, abbigliamento e calzature. A Is Bingias si vende anche biancheria per la casa e piante, mentre nella zona di San Michele oggettistica varia, pupazzi e libri. I venditori stranieri invece si limitano alla vendita di oggetti e di abbigliamento. La provenienza delle merci è all'incirca la stessa per i venditori locali: principalmente da Cina e Italia.

Per i venditori internazionali è più varia e come ci potremo aspettare in parte proviene dall'Africa e dall'India. Come attrezzatura a supporto della vendita, a Is Bingias solitamente per il trasporto usano o il furgone o l'Ape Piaggio o la macchina, mentre per la vendita allestiscono delle bancarelle con tavole.

A San Michele si possono riscontrare gli stessi mezzi di trasporto, mentre per l'esposizione della merce si usano metodi, oltre alle bancarelle, meno tecnologici tipo teloni e cassette per terra, o addirittura direttamente il bagagliaio dell'auto.

Per i venditori stranieri la tecnologia di vendita è ancora meno avanzata di quella già menzionata in quanto caratterizzata principalmente da teli e buste e solo qualcuno dispone di una macchina per il trasporto. I clienti abituali sono solitamente residenti del quartiere, passanti e turisti, per tutti i venditori informali, ma per i venditori stranieri possono essere annoverati tra i clienti anche i parcheggiatori .

Per quanto riguarda i venditori formali, essi presentano caratteristiche simili nelle due aree considerate: il numero di donne e uomini all'incirca si equivale, l'età media è compresa tra i 35 e i 54 anni.

Le merci vendute sono abbastanza varie; il maggior numero di attività è rappresentato da negozi alimentari e di abbigliamento, da cartolerie, da articoli da regalo, da gioiellerie e da ferramenta. I clienti abituali sono principalmente, come per i venditori informali, residenti del quartiere, passanti e turisti, ma anche venditori ambulanti e altri negozianti.

6.2 Gli impatti riscontrati

Ulteriori dati ricavati hanno permesso di individuare una serie di elementi importanti che hanno permesso di comprendere meglio la complessità del fenomeno. Quasi sempre quello del venditore ambulante è l'unica fonte di sostentamento della famiglia, infatti gran parte delle persone intervistate e/o osservate svolgevano la loro attività singolarmente.

La disposizione spaziale in cui viene svolta l'attività di vendita viene leggitimata seppur con le dovute restrizioni e in certi casi tollerata dalle Autorità e dalle Amministrazioni Locali. Essa innesca una serie di situazioni che hanno immediata ripercussione in termini di vendita. La maggior parte dei venditori locali intervistati, la ritiene strategica nonchè la migliore in cui possano vendere, in quanto, si trovandosi in quartieri abitati principalmente da persone di ceto basso o medio-basso, la clientela non manca mai e costantemente acquista prodotti a prezzi più accessibili.

Rappresentando essenzialmente dei luoghi di passaggio o luoghi in prossimità di attrattori come importanti attività commerciali, per coloro che dall'hinterland cagliaritano si spostano verso il centro della città e viceversa diviene più facile fermarsi per acquistare qualcosa.

Tra gli aspetti negativi conseguenti l'occupazione di spazi urbani per la vendita informale il problema più sentito è sicuramente la scarsa presenza di parcheggio nelle immediate vicinanze, che determina necessariamente una clientela inferiore rispetto a quella che si avrebbe qualora gli automobilisti potessero sostare più facilmente.

Altro problema è la scarsa presenza di servizi igienici sia per i venditori sia quelli necessari per ripulire la zona occupata, dopo lo svolgimento dell'attività.

In ultima istanza, per quanto riguarda le relazioni tra i venditori informali locali e i venditori formali, molto spesso si manifesta una sorta di collaborazione indiretta tra essi e inoltre dalle interviste è emerso come i

negozianti regolari considerino un vantaggio avere nelle vicinanze venditori informali che svolgono la loro attività in quanto essi attraggono una maggiore clientela.

7   CONCLUSIONI E POSSIBILI INTERVENTI DI MITIGAZIONE

La vendita ambulante abusiva appare un settore economico strutturale nella nostra soictà, in quanto piena dimostrazione della rivendicazione del diritto di sopravvivenza reclamabile da qualsiasi cittadino. Il diritto alla sopravvivenza degli street vendors viene riconosciuto non tanto come diritto civile ma come diritto umano.

É proprio il tentativo di salvaguardare i diritti di tutti, in concorrenza tra loro (quelli degli ambulanti, dei cittadini e dei negozianti) che orienta il comportamento politico e organizzativo, in una sorta di concessione elastica all'esercizio di vendita: alcuni luoghi vengono concessi altri proibiti.. anche in quei luoghi che vengono concessi il diritto alla vendita informale non è un scontatoma strettamente dipendente dalla policy altalenante.(Zurru,2005)

In questo spazio irregolare tutte le relazioni sono messe in gioco giorno per giorno, tutto è altalenante, ma nonstante la sua precarietà la struttura dell'informale regge oramai da diversi anni; gli ambulanti continuano ad occupare certi spazi e a caratterizzare certi luoghi urbani e a tessere startegie relazionali che consentono la persistenza del mercato sommerso nella sua fisicità.

Nei paragrafi precedenti è emerso come il coinvolgimento degli attori chiave ha avuto innanzitutto un'utilità strumentale, perché ha permesso di ottenere informazioni sul contesto locale e definire alcuni punti di intervento di intervento. Inoltre il coinvolgimento della comunità dei venditori abulanti e non ha avuto anche un ruolo costruttivo, perché ha permesso agli attori di decidere autonomamente secondo quali priorità verranno gestiti i processi di trasformazione territoriale dello spazio urbano che gli riguarda e di appropriarsi di una strategia di intervento.

Le possibili soluzioni, emerse dal confronto diretto con gli attori protagonisti sono le seguenti:

- L'aumento dei controlli da parte delle autorità vigilanti in modo che non vengano occupati senza nessuna autorizzazione ulteriori spazi pubblici ed eventuale modifica degli spazi attualmente concessi, al fine di evitare un ulteriore aggravamento del problema dell'intralcio del passaggio delle auto e del disordine. Sarebbe opportuno che tutti i venditori possedessero una licenza di vendita e dichiarassero ai fini fiscali i propri guadagni; questo porterebbe la maggior parte dei venditori a cessare con la propria attività in quanto, posti dinnanzi all'obbligo di una regolarizzazione, non riuscirebbero a sopravvivere, rappresentando questa l'unica fonte di guadagno familiare.

- La creazione di spazi appositi per i venditori informali con annessi sevizi igienici, contribuire a migliorare l'aspetto delle zone considerate: dalle interviste infatti è emerso tale deficit e la realizzazione di questi servizi potrebbe contribuire a migliorare l'aspetto delle zone considerate, permettendo agli ambulanti stessi di ripulire e tenere ordinata l'area al termine della giornata di vendita.

- la Creazione di nuovi parcheggi o concessione di aree per svolgere l'attività di vendita che siano servite da parcheggi, in modo tale che coloro che intendono acquistare prodotti dai venditori informali possano sostare tranquillamente, riducendo di conseguenza il problema del traffico veicolare.

La pianificazione urbana, all'interno di un contesto postmoderno deve essere fondata sulla conoscenza del fenomeno e capire chi tenere in considerazione quale soggetto che conosce. La conoscenza viene socialmente costriuta e richiede la validazione di una comunità di soggetti che conoscono. I processi politici e culturali fanno parte del costituirsi di quella comunità.

L'approccio consiste nella necessità di una negoziazione che sia specifica rispetto al contesto. Negoziare significa che tutti i protagonisti del processo di pianificazione, siano essi decisori o beneficiari delle strategie, conoscano una varietà di modi di conoscere e cominucare. Un modello basato sulla pianificazione esperta, che definisce l'interesse pubblico attraverso una deliberazione nazionale non è adatto ai nuovi contesti multculturali (Sandercock, 2004). Una pianificazione più democratica e culturalmente inclusiva deve attingere a molti modi di conoscere e deve sviluppare una sensibilità che sia in grado di individuare quali siano i modi più utili per conoscere e in quali circostanze metterli in atto.

Dall'esperienza sintetizzata in questo paper, emerge come le conoscenze siano state acquisite verso il dialogo, attraverso il confronto con l'esperienza dei veri attori protagonisti e con la lettura specifica delle testimonianze concrete.

8 REFERENCES

AA.VV, "Controversy: on the hidden economy", The Economic Journal, 109, 335-389. (1999)

N. ANDERSON,"Hobo.Sociologia dell'uomo senza dimora", Donzelli, Roma (1996)

G.ANGIONI, "Rapporti di produzione ecultura subalterna", Edes, Cagliari (1982)

A.BAGNASCO,"L'altra metà dell'economia: la ricerca internazionale sull'economia informale", Liguori, Genova (1986)

A.BAGNASCO,"La costruzione sociale del mercat. Studi sullo sviluppo di piccola impresa d'Italia", il Mulino, Bologna, (1988)

N. BELLANCA, "Le forme dell'economia informale. Percorsi di costruzione sociale dell'attività economica", in M.PAVANELLO – N.BELLANCA – M.BIGGERI – R.LIBANORA, Le forme in economia e l'economia informale, Editori Riuniti, Roma, (2008).

EUROPEAN COMMISSION "Communication of the Commission on undeclared work", Brussels, COM(98) – 219. (1998)

M.MERELLI, M.RUGGERINI, "Le paure degli «altri» sicurezza e insicurezza urbana nell'esperienza migratoria", LeNove, studi e ricerche sociali, Roma

G. ROMA, "L'economia sommersa", Editori Laterza, Bari. (2001)

L. SANDERCOCK, "Verso cosmopolis: città multiculturali e pianificazione urbana" Edizioni Dedalo, Bari (2004)

M. ZURRU ,"L'economia sommersa. Il gioco del formale e dell'informale", Franco Angeli, Milano, (2005).

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Metrics of Assessing Affordable Living

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1 ABSTRACT

Providing good-quality, appropraiate and affordable housing for all in most of urban places around the world is a major challenge. Politcal leaders such as mayors, governors and other politicians struggle to develop mechanisms to satisfy the requirements for even basic provisions in both developed and developing countries. The problem is global but the answers are very culturally specific and the types and locations of new dwellings shapes our cities. While choices are made with the intention to alleviate poverty and improve quality of life, outcomes observed suggest that some solutions drive occupants even futher away from affordable life.

2 INTRODUCTION

A city is a direct reflection of its inhabitants, where the design directly influences the living conditions of the people. Modernist urban strategies call for cities to be disassembled into detailed component parts, where each part is optimised for a specific purpose (Geertman & Stillwell, 2002). Such strategies promote separation and segregation; this in turn has led to remoteness and loneliness of many inhabitants, detracting from the quality of urban life.

Master plans are a feature of a modernist planning approach (Sandercock, 1990). Typically, master plans are a description of a resolved city in which change is not part of the picture. The rigidity of this approach fails to respond to the dynamic evolution of the context. Consequently, a move away from prescriptive master plans has been observed (Riddell, 2003). In place of plans based on geometric properties (zones), performance specifications encapsulating observed or desired behaviours have been described resulting in a variety of outcomes (Hopkins, 2012). However, there is an urgent need to investigate new forms of description, prediction, and intervention in the design process particularly for affordable social housing. What is required is a different mind-set by architects and urban planners.

It is important to point out that when designing affordable social housing the focus should not be limited to the provision of affordable housing, but rather the provision of affordable living. Usually, we understand affordability as "inexpensive; reasonable priced," which is the definition in the Oxford Dictionary as illustrated with the sample phrase in this source as "affordable home." An etymological dictionary will show that "affordability" derives from "forward, onward, to put forth, to contribute, advance, accomplish." Therefore, the notion of enabling outcomes and creating opportunity could be a guiding characteristic of design.

3 AFFORDABLE LIVING AND THE HOUSE WE CAN AFFORD

We all need housing and we prepared to pay a significant proportion of our income towards it. But what we desire and what we can afford are two very different things. Each time we start looking for the place to live, disregarding our social status, we very soon come to realization that we cannot afford, what we want. We need to compromise and translate our wishes to wishes that we can afford. We make decision base on elimination of features that we can live without, constantly checking if what 'I want' is the same as what 'I need'. We make choices by ranking what is important to us. Far too often we realize that we are not in control of our decision on where and how to live. Homes located near opportunities for work, entertainment or good schools all seems to be too expensive, and we need to decide whether is better to have smaller house or live further out and commute. And the tighter is our budget the smaller amount of choices, and therefore those who are poor often have no choice at all. Most of them will end up in housing, which is affordable, but the living is not. Since this housing types will be located at the periphery of the city or in more central areas but economically devastated where work, schooling and even safety are chronically limited. Far too often affordable housing is very far from opportunity. And the reason behind it maybe that housing is most of the time treated in isolation. And this does not only refers to affordable, or social housing, developers, architects, planners, and politicians treat housing as separate element to other part of the city.

Housing is undoubtably the most important component of a city and therefore should not be treated in isolation. Furthermore affordable housing should be approached not as a product to house the poor or a container for undesirable elements, but as a framework for enabling social processes of complexity facilitated by the adaptability of a particular form. And this is what this paper is all about.

3.1 Market Feedback

In November 2011 the Grattan Institute issued a report on "Getting the housing we want", written by Jane-Frances Kelly, director of Cities Program at the Grattan Institute. The report clearly identified a mismatch between the housing Australian say they want and the housing that is provided. The report tested a hypothesis that housing demand and housing stock do not align. The Grattan Institute interviewed 700 residents of Melbourne and Sydney in order to identify their housing preferences. The results are very surprising, not because it is very clear from the report that housing in Australian cities do not match the choices and trade-offs that people would make if they could, but because it illuminates the choices and compromises people make when selecting their homes.

The data from the survey illustrated a substantial shortage of semi detached houses and apartments. In the introduction to the report we read:

New supply is not reducing the mismatch, and there are barriers to delivering more of the housing people say they want. These include difficulty of land assembly and preparation, the risk and uncertainty of planning systems, and the cost of materials and labour for building over three storeys. Indeed, the incentives facing developers and builders are skewed away from infield development, and towards building more detached houses at the edge of our cities" (Kelly et al, 2011b).

The biggest problem with infield development is that developers are unable to provide the type of housing, which people want for the price that they can afford, without loosing all possible profits. The opportunities to make profit at the edge of the city, by developing greenfield sites are to strong to be rejected by developers and the sprawl continues together with unaffordable life styles.

New developments at the edge of the cities require new infrastructure, roads, utilities, etc. Most of the time the densities of these developments cannot support public transport, schools, and commercial activities and therefore residents are force to commute and drive in order to reach shops, utilities, schools, clinics, etc. The time, energy, cost of fuel and car maintenance are often forgotten when calculating initial cost of new home they choose to live. Most of the time, we all look at the price of the house and not the cost of living there.

The Grattan Report states that the average cost of commuting from outer-suburbs in Melbourne is more than $500 a week and $300 a week for inner-suburbs. For people living in the CBD areas of Melbourne is anything between $0-50 (BITRE, 2011). A simple mortgage calculation for what you need to pay for the loan of $300 000, at interest rate at 7.5 % for the loan period of 25 years is equal to $511 per week, which means that one can spend extra $ 300 000 to buy accommodation which does not require commuting. The challenge is to identify how commuting can be afforded at $500 a week, yet the threshold of a higher down payment on the more expensive home is beyond many, hence the trap of higher ongoing costs.

The 2008 Housing Affordability Report from the Australian Conservation Foundation and the Victorian Council of Social Service we read that on average, low-income earners spend greater proportion of total weekly household budget on energy, water and transport, 8.44 percent, than wealthier households 5.99 per cent. Dodson and Sipe (2005) show that oil and mortgage vulnerability is worsening each year. People on low incomes are therefore forced to live in outer-suburbs where they are more vulnerable to increasing petrol prices and hence to increases in interest rates or rental prices.

The question is why people choose to live in outer-suburbs where the life is most of the time unaffordable? What are the main drivers in decision-making processes? Can they choose to move to the inner suburbs instead and live more affordable lives? The answer most likely will be "no".

3.2 Problems with inner suburbs

One of the biggest problems with increasing development of housing within inner suburbs is the resistance of existing residents and their fear of change. The residents in established inner-suburbs are extremely resistant to change. Any suggestion of population growth or increase of density brings anxiety and fear to the community. Even people who understand benefits and necessity of population growth they want all the

benefits without making any changes to the way they live. And most of the people cannot see any benefits from having more households in their neighbourhoods. Therefore any new developments within inner suburbs are very problematic.

But there is another problem in inner suburbs related to residential mobility. Australian Bureau of Statistics 2008 suggests that residents who own their homes are almost 30 % less likely to move compared with private tenants. Furthermore, those with mortgage over 20 % are also less likely to move (Andrews, 2011). There are many barriers that prevent people from moving and therefore utilizing existing housing stock more efficiently. The most cited factors are usually transaction costs, the amount of choices available within the same area, real estate commissions, and preferential treatment for home ownership in asset tests for welfare (Leigh, 2011). People often choose to stay in their original property even if down-sizing, or reduction in commuting time due to different job opportunity, would have been good enough reason too move (Henry, 2009). Leigh (2011) believes that a 10 % reduction in stamp duty would possible increase people mobility by over 2 %. This in turn may increase house prices by 1.6 %. Henry (2009) suggests that stamp duties should be replaced by land-tax based on the value rather than size of holding. The same idea is repeated in Australians for Affordable Housing (HousingStressed.org.au) publication titled: Addressing Housing Affordability in Australia: A 4 point plan for the next 5 years (2012). Unfortunately stamp duties are part of Australian tax system and are very unlikely to be abolished. The stamp duties in Victoria (Melbourne) reached 5 % in 2011 (Larocca, 2011). What is also unfortunate that the first paragraph in Addressing Housing Affordability in Australia we read:

Australians for Affordable Housing are proposing a four point plan that will deliver 30,000 new affordable housing units each year and lift 250,000 households out of housing stress (HousingStress.org.au, 2012)

In the same report we read about how we can increase the supply of affordable rental housing and build more affordable housing through an Affordable Housing Growth Fund. Affordable Growth Fund is proposed as "banded" model. The three bands are described below.

- Band A provides a deep subsidy to ensure rents are set below 25 % of household income and provide secure tendencies, similar to current public housing model.

- Band B provides a mid level subsidy to secure dwellings at least 20 % below market rent, for example further investment in the National Rental Affordability Scheme or programs that assist households in private rental market to secure long term leases with stable rents.

- Band C includes funding to enable low cost home purchase schemes for low to moderate income households, for example shared equity schemes and community land trusts (National Affordable Housing Summit Group, 2008).

The report ends with a suggestion that $3.5 billion over 5 years should be spent to build a minimum of 150, 000 new properties and to assist over a quarter of a million households move out of housing stress. Unfortunately if implemented this scheme will provide housing at the peripheries, since land at affordable prices is only available at the edge of the city and therefore poor people will become poorer and vulnerable people will become more vulnerable. To sum it up one may say that as long as we keep on solving problems of affordable housing in isolation, we will be creating more problems and instead of bringing people out of poverty, we will be putting them in poverty again and again.

4 A DEFINITION OF AFFORDABILITY

Until 2006 the definition of Affordable Housing was rather limited. Definition used by the Victorian Government in response to the Melbourne 2030 Audit did not take into account indirect cost of assessing access to employment, services and facilities as well as household expenditure on utilities such as water, gas, and electricity. In 2006, however, a paper prepared by the National Affordable Housing Forum defines affordable housing as housing which is reasonably adequate in standard and location for lower or middle income household and does not cost so much that a household is unlikely to be able to meet other basic living costs on sustainable basis. It goes further to suggest the requirements for reasonable accessibility to work opportunities, services, and facilities. It also includes consideration of cost of transport. In 2008 Housing Affordability Report, there is also strong suggestion to the Victorian Government to consider index of housing affordability that includes the broader concept of affordable living. If Government adapts this

definition of affordable living as a guiding principle in delivering affordable housing, than affordable housing will no longer be able to end up at the city edge, the periphery.

5 THE HOUSING WE WANT

In another report from the Grattan Institute, The housing we'd choose, we find illuminating data that suggests that, in addition to the problem on having mismatch of the housing we want and the housing we have, we also have very strong ideas about how we want to live, which could make provision of affordable housing in Australia close to impossible (Kelly et al, 2011a). The report suggests that the dream of owning your own home is still automatically associated with detached house on the big plot of land:

We're born and bred in Australia – we're ingrained and conditioned to have that attitude towards detached home.

At the same time, people very clearly describe their concerns about apartments. Most of Australian see apartments as the way of housing people who cannot afford to live in the house. The fear of not owning the land on which your household is located is probably one of the major reasons why apartments are still not considered as first choice. The problems associated with them include: lack of outdoor space, proximity of neighbours (next door, below and above), privacy, overlooking, overhearing, and lost of control. All of the above are preconceptions, which are impossible to get rid of. Furthermore it is impossible to suggest that you may have less noise and less overlooking and in some cases plenty of outdoor spaces if you decide to live in apartment.

One of the most interesting finding from in Grattan report was answer to the question posed to 706 people: What matters most when you choose housing? The survey included 57 variables, divided into four broad categories and presented in groups of eight. Each participant of the survey was asked to identify one variable that matter most and one that mattered least to their housing choice from the group of 8. The four categories were: dwelling features (number of rooms, presence of a garage, whether house was detached), safety and security (safety for people and property, secure parking, away from jails), convenience and access (near family and friends, proximity to work, access to health and services), attractiveness of environment (near the park, a particularly clean and unpolluted area, a natural environment that is attractive).

The most popular answer to the question: What matters most when you choose housing? was the number of rooms. Little traffic congestion in the area came as the least important feature. Proximity to work, school or facilities did not rank highly, indicating that people assume that they are going to drive in order to satisfy their daily living requirements. Safety for people and property came as second most important variable. It will be interesting to find out how people visualize this "safety". Do they prefer to live in gated communities, with guards at the gate, or behind tall fences, with secure locks on the doors, or apartments with security guards?

Most interviewed people preferred large dwellings, and as mentioned before detached houses were the most popular, followed by semi-detached (not commonly available in Melbourne). People valued proximity to the city and most prefered to be closer to the center rather than far away. But if the choice was between living in the city in an apartment and living in a big house away from the city, most of the respondents chose a house.

It is therefore not surprising that 74 % of Australia's housing stock is in detached houses. This has changed very little in the past 30 years; in 1976, detached houses comprised 78 % of the stock. Melbourne's built area has nearly doubled in the past 30 years and may double again in near future; as with many citeis, we cannot afford or sustain the horizontal expansion. The cost of infrastructure associated with development of detached houses, the cost of road building and provision of facilities, utilities, schools, nurseries, and jobs cannot be achieved without making dramatic changes to the way we choose to want to live. If we don't change the affordable housing will be put even further away and will make lives very unaffordable. If we try to provide affordable living instead of affordable housing we will need to not only change the perception of what is desirable but also the structure of land allocation. The problem we are now facing is that we don't have exciting alternatives. It is the time we come up with some new ideas, which will allow people to dream about better futures.

5.1 Detroit versus Medellin

There are many lessons that we could learn from countries around the world. Over past 50 years developing countries were always looking to the West for ideas and inspiration and examples of better quality of life. But this is changing now and the best lessons we can learn are no longer from the West but rather from developing countries.

In the first half of the 20th century a very large, poor workforce was attracted to the US city of Detroit to support the boom of automobile industry. These workers came from the South looking for a better quality of life, but since they were the lowest paid workers housing them became significant problem. There was no affordable housing to accommodate them. Landlords saw opportunity for business and started to subdivide apartments into small units, providing minimum spaces and getting maximum profit. Most of the migrant population from the South was black. Most of the original population was white and did not welcome blacks into their neighbourhoods. The moment black people move in to the area the white population started to move out. The prices of the housing stock started to go down but this did not stop landlords to keep on increasing the rent values. And since there was never a shortage of people willing to rent, the landlords didn't bother with maintenance and upkeep. The tenants themselves preferred to send their money back home where they came from to secure their future when they returned. As a result, the areas where the migrant population lived slowly degenerated. Those who had a little extra money moved out to more desirable areas, to be replaced by more who had none. Within few years the areas of town previously occupied by middle classes and considered, as desirable places to live became the places to be avoided. After the automobile industry collapsed, huge parts of Detroit became deserted. Today land value in these areas is close to zero (Brugmann, 2010).

With an opportunity to benefit from improvements made, residents will respond differently. We can contrast Detroit with the example seen in developing countries in South America, where the value of land in favelas rises the moment a migrant worker claims a piece of land for a shelter. Favela dwellers typically cannot afford to construct anything significant at the start, but slowly and gradually they are able to build their capital. If they start earning some money by running small business or scavenging, they invest it in their house and in their business. Often they will latter extend their house in order to accommodate tenants, supplementing income that is again used to improve their house or to invest in business. Through this slow evolution is observed the incremental development and improvement in such areas of informal housing. This is very different to the conditions we observed in Detroit. In Detroit the moment the first migrant worker moved in, the value of the land decreased. In favela the moment the migrant worker moves in the value of the land increases. There is another substantial different between the two. As oppose to Detroit favelas do not offer affordable housing, they offer affordable living. Residents of favelas run their businesses from their homes, the work, shop, entertain each other in the same place. Their quality of life may be very poor but they can see opportunities and the way out of poverty. And what we can observe over and over again in favelas in places in Colomboa such as Medellin and Bogota as well as in other cities in South America where action brings people out of the poverty; meanwhile in the developed world, we still follow the same trap of putting people into poverty.

We can not only observe the phenomenon of people being housed in so called affordable house but not being able to afford to commute to work, or even in some cases to afford to come for the interview. We can also observed how inner city areas next to social housing and consider less desirable to live in. it is obvious that we have to rethink our affordable housing models on many levels.

6   AFFORDABLE FUTURES

Renzo Piano noted in an interview with Peter Buchanan:

What architecture and planning suffer from is a desperate lack of imagination. We need to think about more alternatives and where we might be going, and of new paradigms. We have all sorts of possibilities open to us, and we don't have the imagination to conceive of and use them. What we need now is brainstorm and dream: to stop trashing the world we need culture that is more deeply satisfying. […] There's terrible dearth of real imagination in thinking about the environment. Most ideas are not exciting. And we are not going to stop people trashing the world unless they are exciting about the alternative. That's the problem. People are not dreaming up sufficiently exciting alternatives." (Piano, 1999, pp 71-72)

Profound societal change has happened in recent history. At the beginning of the twentieth century, when the effects of the Industrial Revolution were choking cities and the solution was identified of encouraging people to move out of cities, into the new idea of suburbs, London Underground came up with series of posters advertising all the advantages of suburban life. Ebenezer Howard's Hampstead Garden Suburb offered people the luxury of dreaming about better futures away from pollution of the industrial city. Railways offered a means to move easily back and forth from suburb to workplace. Yet the public had to be introduced to the idea and convinced of its benefit. An advertising campaign sold the message and sold the dream.

It is important that we can inspire people once again and allow them to dream about alternative futures. Ebenzer Howard managed to sell the idea of the suburban house very well but this was over 100 years ago. It is time we came up with ideas for the 21st century and leave behind models which are not sustainable and which lead us to unaffordable life styles. So what might these new alternatives be?

If we seek an alternative to building affordable housing in the areas where the consequence will be unaffordable living, we will have to look for an alternative aprroach. This approach could start with re-conceptualization of affordability. If affordability is to be considered as the opportunity for a better quality of life, then we may want to start with looking for sites not at the edge of the city but closer to the center. In the first instance, this may seem impossible to achieve since the land prices in Central Melbourne, as in may cities, are unaffordable and unavailable, if we look a little bit harder and slightly out of the box, the reality is different and full of opportunities. Central Melbourne has substantial pockets of land created by two different grid systems intersecting, creating odd and triangulated sectors of land that are either used by car parks, planted with struggling shrubs or just left as traffic islands. There is no curent perceived value to these pockets sites, they are seen as elements of the road structure.

We propose that such left over land can be reconceptualised. In our proposal, we illustrate how such remaindered land can benefit the surrounding areas, bring better road structure and specific benefits to the local communities, by creating opportunities to create affordable housing in the middle of the city that will have all ingredients of affordable living. There are other opportunities related to mix use and, air rights and mix-price housing, where rich and poor can live together in the same location. We have numerous examples from the past. It has been done in ancient Rome, in 18th and 19th century Paris and London, manifesting a range of different forms and configurations. We seek to terminate approaches that keep repeating our 20th century mistakes instead of looking for new 21st century ideas, which can bring back our cities to the new century full of hope, dreams, and opportunities and therefore affordable lives for all.

7   REFERENCES

Andrews, D., A. Caldera Sanchez and A. Johansson (2011) Housing markets and structural policies in OECD countries. OECD Economics Department Working Papers No.836.

Barros J. (2005), Simulating Urban Dynamics in Latin American Cities. In Atkinson, P., Foody, G., Darby, S. and Wu, F.(eds.), GeoDynamics, pp. 313-328. CRC Press, Boca Raton, FL.

BITRE, (2011) Bureau of Infrastructure Transport and Regional Economics Report

Brugman, J. (2010) Welcome to the urban revolution: How Cities are Changing the World. London: Bloomsbury Press.

Dodson, J. and N. Snipe (2005). Oil Vulnerability in the Australian city, Urban Research Program, Research Paper 6, December

Geertman, S., & Stillwell, J. C. H. (2002). Planning support systems in practice. New York: Springer. Harris, G. P. (2007). Seeking sustainability in an age of complexity. Cambridge: Cambridge University Press.

Henry, K. (2009). Australia's future tax system. Canberra, Commonwealth Treasury.

Hopkins, L. D. (2012). Plan assessment: Making and using plans well. In R. Weber & R. Crane (Eds.), The Oxford handbook of urban planning (pp. 803-821). Oxford: Oxford University Press.

Kelly, J.F., Weidmann, B., and Walsh, M., (2011a), The Housing We'd Choose, Grattan Institute, Melbourne

Kelly, J-F., Breadon, P. and Reichl, J., (2011b), Getting the housing we want, Grattan Institute, Melbourne, 14 November, 2011

Larocca, R. (2011).Higher land tax is not the solution to more affordable housing. Real Estate Institute of Victoria http://www.reiv.com.au/News_Publications/News %20Archive.aspx?newsID= %7B2D1F1638-D854-48EF-94E9-39CA3BEC2937 %7D&title=Higher %20land %20tax %20is %20not %20the %20solution %20to %20more %20affordable %20housing

Leigh, A. (2011). How do stamp duties affect the housing market? Real Estate Institute of Victoria http://people.anu.edu.au/andrew.leigh/pdf/StampDuty.pdf

National Affordable Housing Summit Group, (2008). Background papers on National Affordable Housing Agreement, August 2008

Piano, R. (1999). Buiding Workshop: complete Work, Volume 4. London: Phaidon Press

Sandercock, L. (1990). Property, politics and urban planning : a history of Australian city planning, 1890-1990 (2nd ed.).New Brunswick and London: Transaction Publishers.

Sobreira, F. (2005). Modelling Favelas: Heuristic agent based models for squatter settlements growth and consolidation. In E. Schrenk (Ed.), 10th International conference on information & communication technologies (ICT) in urban planning and spatial development and impacts of ICT on physical space (pp. 289–295).

Mobile Embedded Climate Sensing 2.0

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1 ABSTRACT

Mobile technologies and communication techniques are developing rapidly. Mobile information systems offer access to information resources and services via "end-user terminals," which are mobile (e.g. cellphones, netbooks, notebooks, PDAs, etc.) and can work in nearly every location. These techniques have a huge influence on the relationship of time and space. We are more and more surrounded by computers which we do not even notice anymore. While driving we are e.g. assisted by a brake assist system, or by intelligent trash cans. These small computers which are built into everyday items are called "embedded computers" and are often interconnected with each other. In literature they are also called "ubiquitous computing" and "pervasive computing". These "embedded computers" can be used to gain knowledge and gather data. Because of the amount of the individual measurement stations it would be possible to gain exceptionally precise and special data without ignoring the valid concerns for information privacy. Cellphones are widespread in the population. These mobile devices already have various sensors. For example, most cellphones have sensors for location, temperature, speed and acceleration, brightness, and many more. Furthermore, it is possible to save permanently various data. Additionally, it is possible to connect a computer or microcontroller in order to increase the amount of sensors or to design them individually. Dreams, as they are presented to us by science fiction literature, like the "Tricoder" (Star Trek 1966), are already realizable.

The aim of this paper is to present the possibilities of smartphones for climate research. It should offer the notable capabilities of smartphones to gather climate data only by using the standard built-in equipment and sensors, which applications can handle these data and how the data can be processed further. Besides, it will be demonstrated how smartphones can be enhanced with the help of microcontrollers in order to create various "sensing scenarios." So a prototype of a microcontroller will be introduced, which was especially developed and adjusted to gather data of the urban climate. Additionally, the accuracy and validity of the data gathered by these microcontrollers will be compared to the data from common measurement instruments in order to analyze how useable they are.

2 INTRODUCTION

The climate, the weather, the city, and the human organism are complex interconnected systems. Though, research is required to analyze the relation between the city, the climate, and the physical health of human beings. Various single measurements try to establish a connection between the influencing factors. "Urban sensing" and crowdsourcing are means to gather various novel and special data. "Urban Sensing" as a new type of measurement could be a very good method of observation for planners. The individual human being or his or her carried equipment can be used as a measurement instrument for "Urban Sensing." A combination of stationary and mobile sensors is also possible [cf. Campell 2006]. "Urban Sensing" in combination with Web 2.0 or Web 3.0 respectively, is a new possibility to gather and analyse data. These data, which can be determined actively as well as passively, have a yet an unpredictable value for urban design and climatology. The possible usage could be separated into three fields: personal scenarios, social scenarios, and public scenarios. A personal scenario could be the monitoring and analysis of one's own vital functions. In a social scenario, data of a fixed group of people could be gathered and handled by social networks like "Flickr". In a public scenario, there is not be any limit and the whole population could take part of it [cf. Srivastava; et al., 2006:1F]. One advantage of this data collection is the possibility of monitoring huge areas over a long period of time [cf. Hof, 2007:1]. Mostly, out of financial reasons, this is not possible with the classical methodology of counting or measuring. Also the already existing ubiquiority of mobile devices is important for the accuracy of data [cf. Goldman; et al., 2009:4FF]. Several microclimatic factors could influence the well being of the people and out of this reasons they are an important basis for urban planning. Numerical simulations such like "ENVI-met" coould help to gain a better understanding of microclimate. It allows to analyze and anticipate various planning scenarios and their

consequences for the microclimatological aspect. Data required for the simulations are mainly determined by means of field surveys and measurements at certain locations by various individuals. Out of this reason, data collection of an urban area is expensive as well as time consuming [cf. HELDENS; HEIDEN, 2010:170F].

Nowadays, cartography and planning is widely influenced by the internet. The users as well as the creators of maps are affected. The net-based cartographical data processing is only just developing and can be regarded as the beginning of a new era in the field of cartography [cf. HERMANN; ASCHE, 2001:3FF]. In 2006 a new trend emerged: Neogeography. Typical areas of this new geography are the geotagging of videos and photos, e.g. by uploading them to "Flickr", and the "Open Streetmap Project." The radical change in cartography is supported by the absolute availability of the technologies, the possibility to include geodata of various sources, user participation following the Web 2.0 idea, and grassroots and free democratic geodata [cf. Unigis, 2010]. New technologies like smartphones, mobile internet, embedded systems, and augmented reality (AR) offer an enormous potential for this kind of monitoring. The gathered data can be digitalized and processed, e.g. by a Geographic Information System (GIS), and new types of maps could be created. Augmented reality (AR) can also be used for urban sensing. Exemplarily, the diploma thesis "Augmented City Kaiserslautern" by ALLBACH (2010) describes how virtual tags can be blended into the real world as an information carrier. The active tagging of objects in the real world offers a comprehensive database for planners and scientists. New projects and their acceptance can be analyzed. Nuisances like noise, dirt, heat, problems with a special type of ground covering, or insufficient accessibility could be identified in a new way and through the uploading of pictures and voice recordings be further documented [cf. ALLBACH 2010, 2011]. A lot of different phenomena, e.g. the rising emission of carbon dioxide and its effects on the global climatic system or the distructive consequences for the ozone layer due to the anthropogenic emission of FCKW, are only discovered after new measurement techniques have been field-tested. Furthermore, weather and climate monitoring has probably been established just as long as humankind. It has constantly developed alongside with other technologies and the human society. Because of the importance, climate monitoring must always be adapted to the current state of technology.

So, a next step in this development is using the availability of mobile phones and tablet computers for the climate monitoring. Due to the low costs of the so-called microcontrollers, it is possible to improve one's own devices or even develop completely new ones.

3 SMARTPHONES AS SENSOR UNITS

Depending on the technological area, new products are developed and updated at a very high level. We are surrounded by computers which support and guide us. And because of a permanently increasing processing power the barrier, which was again and again prophesized by Moore's Law, was never met up to now. Every year the producers of smartphones create new devices and the scope of operation of these is steadily increasing. Networks and clouds have a huge significance, but have not yet reached the peak of their development. For instance, the changes in the Middle East (Arab Spring) had shown the power and potential of Web 2.0/Web 3.0. As an example, "Facebook" was used as a kind of navigator device for the revolution. The Tunisian online activist "FOETUS" stated in an interview for Technology Review that a revolution always takes place on the street, and the street offers a huge potential in combination with "Facebook" [STIELER, 2011].

Though, it could be interesting to measure and monitor the environment with daily carried gadgets. One of these gadgets is a mobile phone or a smartphone respectively. These modern phones have a variety of sensors. They can be used to monitor the movement of the users (tracking), which is done via GPS or wireless LAN. Additionally, there are sensors for acceleration and absolute positioning as well as a compass and they can determine the altitude via GPS. User can save pictures, audio recordings, and texts and enhance them with their current position (GeoTagging). Since ambient noises can be recorded it is possible to conduct noise measurements. There are already projects which try to use "Urban Sensing" and indicate what can already be done by smartphones. "Noisetube" (http://noisetube.net) is a system for the monitoring of noise. "Waze" (www.waze.com) is a mixture of crowdsourcing, geotagging, traffic information system, and real time map. Users are enabled to inform each other about traffic jams, accidents, and other problems. Because data could be collected in real time and it is also possible to send the data directly to the system, this program is interesting for planners. Another aspect which might be fascinating for planners is the possibility to monitor areas like nature protection areas or new development sites. Many new phones offer the possibility

to adapt the brightness of the screen automatically to their surrounding. This sensor could be used to measure brightness. In combination with the absolute position sensor it is possible to identify how the phone is positioned and why a certain amount of light is registered by the sensor. After the nuclear catastrophe of Fukushima, Japan, the company SoftBanks developed a smartphone with an integrated Geiger tube (Pantone 5 Softbank 107SH). The camera and the included sensor is also an interesting device and it was already attempted to create a Geiger tube by using this sensor. Since the light consists of photons and since gamma rays are photons which have a higher energetic value, the sensor in the camera can detect them if one covers the lens with black adhesive tape. The application "Thermos" (http://www.thermos-app.com/) makes it possible to measure the air temperature by covering the lens. It might also be possible to use the internal temperature sensors of the cell phone measuring the air temperature. At the moment, producers consider to add an infrared sensor next to the camera sensor which could make various tasks possible, e.g. taking someone's temperature.

Following a concluding research it is verified that nearly all included sensors can be activated and read-out. Partly, this is prevented by the producers and has to be bypassed. However, smartphones lack crucial sensors for the complete measurements of climate parameters. Additional devices have to be connected via USB, Bluetooth, or wireless LAN. But these additional devices allow the execution of new sensing scenarios in order to measure the local climate. Even human biovital functions and medical conditions could be measured, e.g. blood sugar level, pulse rate, temperature, blood oxygen, air humidity, and skin temperature. Since 2012, the company Netatmo advertises the development of the first personal weather station application which includes a sensor for air quality (www.netatmo.com). This includes various climate sensors and connects them to a smartphone which allows a rudimentary urban sensing. However, this product has different flaws and a multitude of needed sensors are missing. A huge flaw of the available products is that measurements cannot be conducted simultaneously and the sensors are not interconnected. Most of the available "single sensing solutions" do not offer the possibility to access the measured data. Out of this reason, it is not possible to merge the data with the data measured by additional devices and process them in a single application. At present most producers favor their own closed system. It is not possible to combine the single devices into one specific system. Meanwhile, it is detectable that the sharing of crowdsourcing or biovital data in social media networks is appealing to the users (e.g. covered distance, energy consumption, time needed, overcome altitude). Nevertheless, it would be desirable that the producers enhance their closed systems for the possibility of exporting data.

4   A MICROCONTROLLER AS A CENTRAL UNIT FOR CLIMATE MONITORING

In order to overcome the described weaknesses of the available products, especially for the measuring climate parameters, the idea for the development of a new measurement device was born. Basicly, this will be a microcontroller and the various sensors, connected to it. Of course, the idea for a stationary weather station in combination with a microcontroller and sensors is not really new. There are a lot of projects [e.g. HAAKE-ERFURT.DE; CAMPBELL SCIENTIFIC; PRODATA] monitoring the weather. Commercial weather stations are using sensors and some kind of microcontrollers measuring the meteorological conditions. However, the weakness of all products is that they lack at least in monitoring the urban environment or special sensors are missing and cannot be connected to the base unit of the controller. These requirements are: simultaneous measurements of different weather values and biovital functions at the same time, transportable, battery powered, low cost/affordable, modular built and expandable. This is why a a new measurement device is still needed for a urban climate monitoring and for analysing the relationship between the urban area, the climate, and the physical health of human beings. If it could be possible to create one device which measures all climate data and biofital function at the same time, this would lead to a faster, more accurate, cheaper, and easier way for monitoring the connections of the urban ecosystems complex. The measuring of climate conditions and immediate bodily reactions could lead to new insights into the complex urban ecosystem which might change the planning process.

So two alternatives emerged: How should the device be constructed and how could data be stored and processed controlled?

The smartphone will be the central unit, controling and regulating the single sensors as well as the storage of the data and its localization. Furthermore, it should transmit and visualize the data. An application will be

created to serve as a graphical interface. This system must be regarded as cost-effective, because the storage unit, data connection, and sensors are already part of a smartphone.

The other possibility is that a microcontroller could be the central unit and the different sensors will directly be connected to it. Likewise, the microcontroller is responsible for the storage of the data. By means of various enhancements the microcontroller will be able to send the data to a smartphone, to another system, or the possibility for an upload to the internet. A SD card could be used as a storage unit and data could be exported to a GIS. Of course, the usage of a microcontroller as the central unit does not exclude the usage of a smartphone for the controlling and storage of the data.

The prototype of the climate measurement instrument will follow the second possibility and uses a microcontroller as a central unit. The main function of this new device is measuring climate data (figure 1). Additionally, it will be able to record various biovital functions. This combination of detecting climate as well as biovital data could help to analyze the urban ecosystem more precisely. Because the weather ist permanently changing, it is hardly possible to process and present these data statistically correct and to gain how far these are influencing the human body. Important data of the body are the age, the adaptability of the organism, illnesses, gender, and stamina. Both, the human body and the climate system are so complex that it is complicated to conduct a scientific researches of them [cf. TRENKLE, 1992:21].
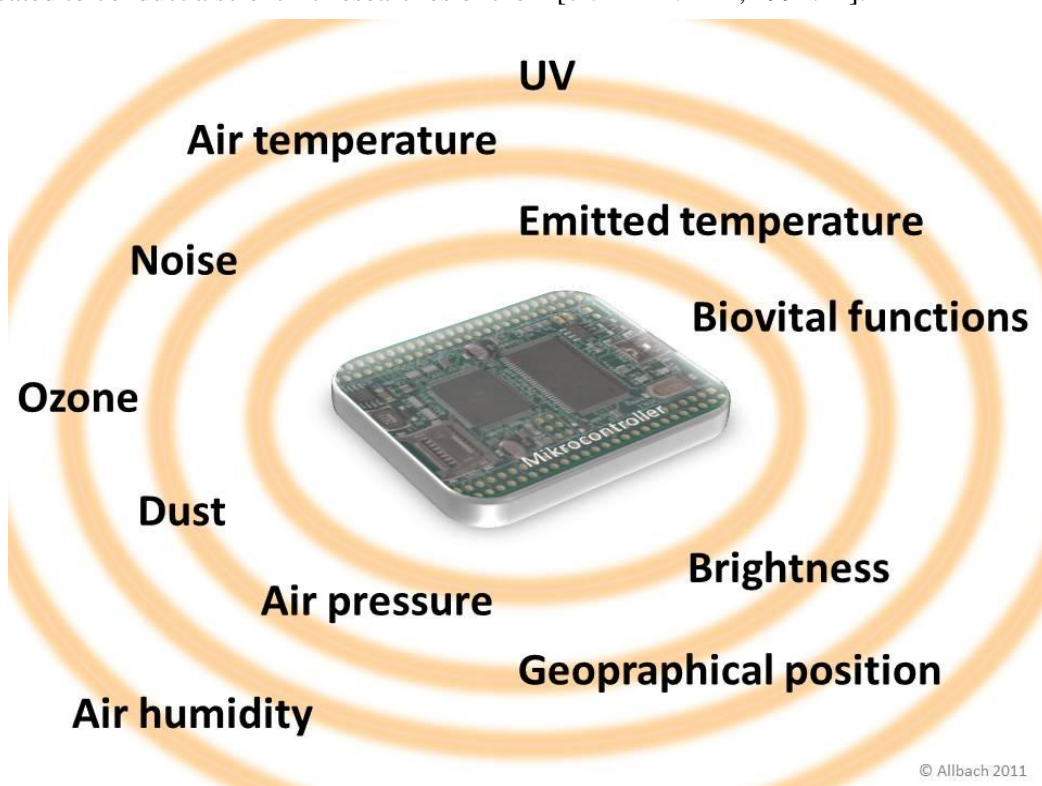
Fig. 1: Microcontroller as central unit.

5 BIOCLIMATOLOGICAL COMPLEXES

In order to have a better understanding of the aspects, which are going to be measured by the microcontroller, a brief description of the humanbiometeorological complexes is given. There are four bioclimatic complexes, which control the function of the human organism and influence the thermal regulation:

1. Thermal complex

2. Photo-actinic complex

3. Air chemical complex

4. Neurotropic complex

The thermal complex deals with the influence of daily and annual impulses (e.g. heat and cold) on the organism and its ability to regulate its temperature independently from outside influences. Physical (blood circulation, perspiration) and chemical (basal energy rate) processes adapt the temperature to the surrounding

environment. The thermal regulation of the body is influenced, for instance, by clothes, activity, shade, wind, and indoor air conditioning. Based on the comfort equation by FANGER (1972) a bioclimatic model was developed by JENDRITZKY (so-called Klima-Michel-Modell). This model describes the thermal environment conditions which are important for the human being and includes influences like clothes, activity, heat emission and absorption. A model for the calculation of the body temperature was developed by HÖPPE in 1984 [cf. TRENKLE, 1992:21FF].

The actinic or photo-actinic complex describes the influence the radiation of the sun on the human organism. We can confirm that the visible light, about 46 % of the total radiation, influences our psyche. It influences our activity, efficiency, and mood and is also important for our apperception, our hormonal balance, metabolism, and furthermore influences our biorhythm. Ultraviolet radiation is of crucial biological importance. Ultraviolet radiation can be divided into UVA radiation (315 – 380 nm), UVB radiation (280 – 315 nm), and UVC radiation (100 -280 nm). UVA radiation can lead to a change of the melanin in our skin. For instance, this can be used medically as a cure for psoriasis. UVB radiation also influences the melanin in our skin, but over a longer period of time. It is also responsible for erythema and it has a lethal effect on bacteria. UVC radiation has also a lethal effect on bacteria. However, it also causes skin cancer and the destruction of cells. Infrared radiation only reaches the biosphere with a low intensity with less biological influence.

The air chemical complex analyzes the influence and reaction of natural and anthropogenic air pollution on the human organism. Various noble gasses and micro elements are part of the natural air quality components. Carbon hydrate (CH_4), carbon monoxide (CO), nitric oxide (NOx), ammonia (NH_3), and hydrogen sulfide (SH_2) can be emitted during the decay of organic substances. During natural incidents like volcanic eruptions or huge forest fires, the emission of sulfur dioxide (SO_2), nitric oxides (NO_x) and other solid and liquid aerosols reaching the atmosphere. There are also airborne particles emitted by the flora, which can influence the human organism (e.g. pollen can lead to allergic reactions) [cf. TRENKLE, 1992:32FF]. Anthropogenic air pollution like dust, soot, and the waste products of the industry (sulfur dioxide (SO_2), carbon monoxide (CO), nitric oxides (NO_X)) as well as traffic exhaust of carbon monoxide, hydrocarbons, and mainly nitric oxides effect the air quality negatively. The consequences and the duration of the harmful substances within the atmosphere depends upon their physical qualities, disposition to undergo a chemical reaction, concentration, and the atmospheric terms of exchange. For instance, soot absorbs various carcinogenic and toxic substances. Pure sulfur dioxide, if absorbed by the mucosa, complicates the expiration of phlegm, which leads to a narrowing of the bronchia, which, in return, causes tussive irritation. Nitric oxides can also narrow the bronchia and cause nausea, headaches, and exhaustion. Additionally, viruses and bacteria more easily cause illnesses when the defense mechanisms of the organism are weakened due to a limited oxygen supply. Ozone, and other photooxidates can cause headaches and attack the mucosa and complicate the breathing. If during clear and calm weather conditions the air exchange is hindered this results in an accumulation of noxious substances, which lead to serious respiratory and cardiovascular diseases, [cf. TRENKLE, 1992:36FF].

The neurotropic complex analyzes the influence of different climate and weather situations on the human organism. Such influences could lead to neurotropic reactions. All humans are affected by weather stimuli, but only a healthy and adapted organism automatically is able to adjust the metabolism, the temperature, and the circulation to them. The sympathetic and the parasympathetic nervous system are keeping the nervous system in the interbrain in balance. For a long time, physicians have observed that e.g. neuritic or rheumatic are prone to hurt during special weather conditions and it was detectable that under certain conditions physiological and biological reactions were taking place. [cf. TRENKLE, 1992:47FF].

6 MICROCONTROLLER AND SENSORS TO ANALYZE THE BIOCLIMATOLOGICL COMPLEXES

All these complex relations could be analyzed with one device and therefore we defined the following requirements for the device:

- Modular structure and portable format
- Recording of the location of the measurement
- Detecting of local climate data

- Measuring biovital functions
- Selective and constant measurement during movements

Relevant climate parameters are air temperature, air pressure, air humidity, surface temperature, including the distance from the ground, emitted heat to the left and to the right of the device, including the distance to the emitting surface, UV value, brightness (LUX), ozone (O_3), carbon dioxide (CO_2), sulfur dioxide (SO_2), carbon monoxide (CO), nitric oxide (NO_x), and particulate matters ($PM_{2.5}$ and PM_{10}). Relevant data for the biovital functions are pulse and heart rate, airflow, temperature, oxygen level in the blood, and skin resistance. Due to the modular structure and additional sensors it is possible to gather various data in the future. The listed sensors will allow us to create a kind of 'ambient atmosphere'/'ambient climate' which is recorded at a specific geographical position. Because the emission of heat from constructions is of importance in the urban environment, the device will not only measure the emitted heat from the ground, but also from its nearby surroundings. This could be enhanced by measurements to the front and to the back of the device. The measurement of the emitted surface temperature will be enhanced by a sensor to locate the distance to the surface object from where the heat is emitted (Figure 2).
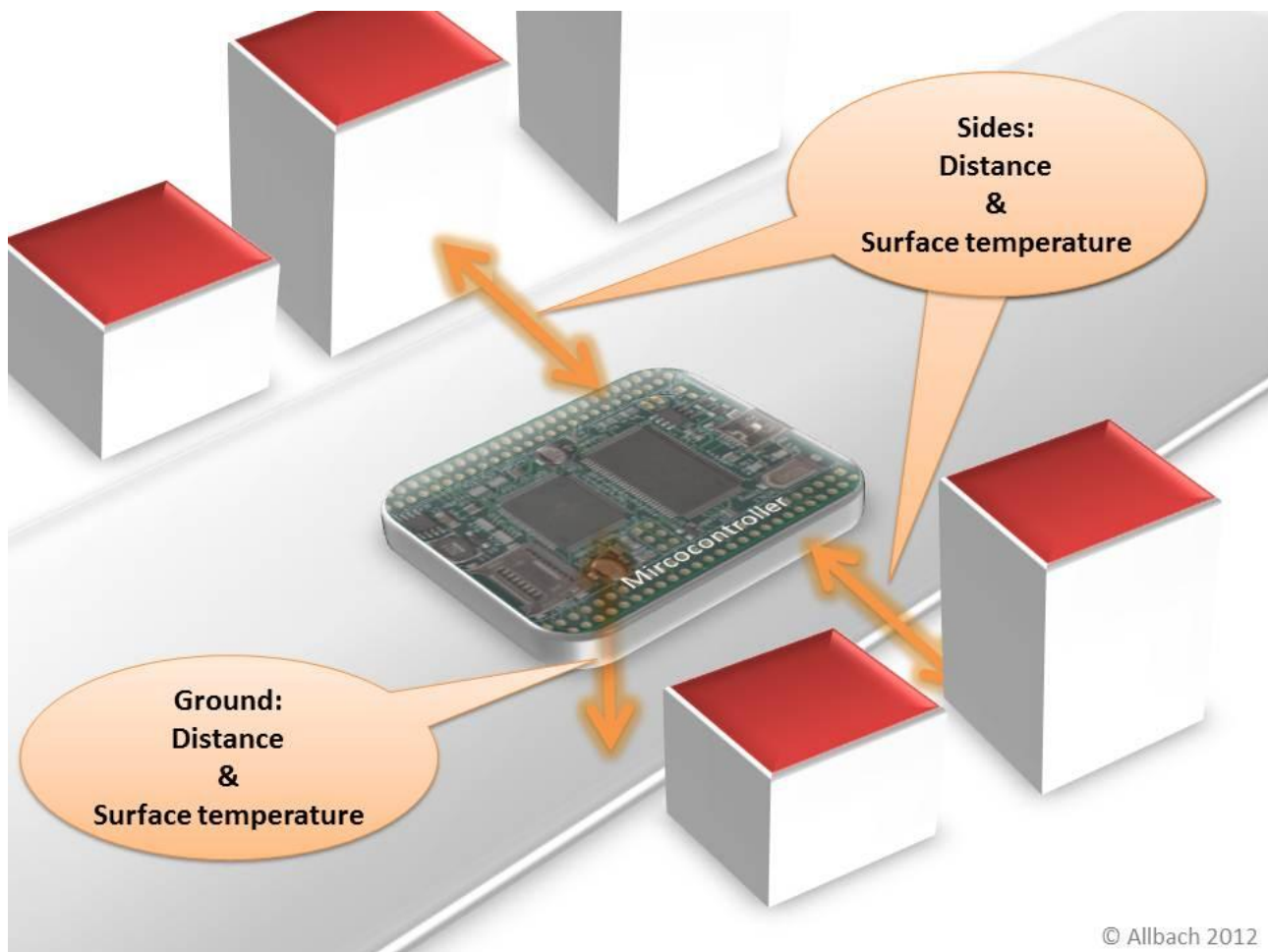
Fig. 2: Microcontroller measurement of the emitted temperature and distance to the surface by the microcontroller.

7 EMBEDDED SENSING – PROTOTYPE

While developing the prototype various models were conceived:

(1) Developer model

(2) Hand held model

(3) Belt

(4) Backpack

(5) Integrated into the clothes

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Fig. 3: Model of the various measurement devices.

The developer model is a connection of microcontrollers and sensors. The second model is a hand held device similar to a remote control or the "Tricoder" from Star Trek. In the future, the hand held model could be used in schools, projects, and workshops in the field of natural sciences. Pupils could be able to discover their environment with such an device and could experience and record nature and the weather conditions as well. The third model is placed in a belly bag. The forth model is carried in a backpack. The fifth model is an integration of the devices into the clothes in order to create a kind of wearable computer. However, also a smartphone and a backpack could be described as wearable. But the best solution would be to integrate all sensors complete and invisible into the clothes. The measurements will be individualized, inconspicuous, discreet, and permanent. As a result, the instruments can offer the most pristine "ambient-climate"/"ambient atmosphere" data. Partly, the equipment even adapts to the shape of body, can be washed and bended. But of course, this model is the most expensive one.

The first measurements with the microcontroller had demonstrated that it can compete with the common measurement instruments (Figure 4). The laggardness of the sensors has to be taken into account just like in any other measurement of the climate. More precise measurements have to be conducted and the spread for standard factory models has to be considered.

All models have their advantages and disadvantages: e.g. costs, portability, and accurateness of the measurement. The belly pack and the backpack are very similar, but the backpack has a higher contact area with the body which could lead to increased sweating at the back and to measureable bodily reaction. A hand held model could also lead to problems during longer measurements, because this might wear out the muscles of the arm.

Problems all models share are the dependence of a power source and the reaction time of the sensors. Some problems are specific for certain sensors. The anemometer, for instance, must record wind speed during a constant movement, but the measurement can be distorted by the movement and the reaction time of the sensors. Though, it might be able that an ultrasonic sound anemometer or a heat wire anemometer could be

used to solve this problem. Last but not least, measurements of precipitation cannot be done out of technical reasons.

A major test of the hardware is done during "Projekttage für Schülerinnen" at the University of Applied Science, Kaiserslautern, Germany. For two days, pupils tried to create a simplified weather station out of microcontrollers with identical wiring and sensors. The used sensors are: barometer, light sensor, water sensor, sound sensor, and a combination of air humidity and air temperature sensor [cf. THEATO 2013]. The procedure, programming, electric circuit, management of the individual parts, and wiring was predetermined by the author. The test or workshop, respectively, confirmed that the sensors already work accuratly (even if they are rather cheap and not labeled as very precisely).
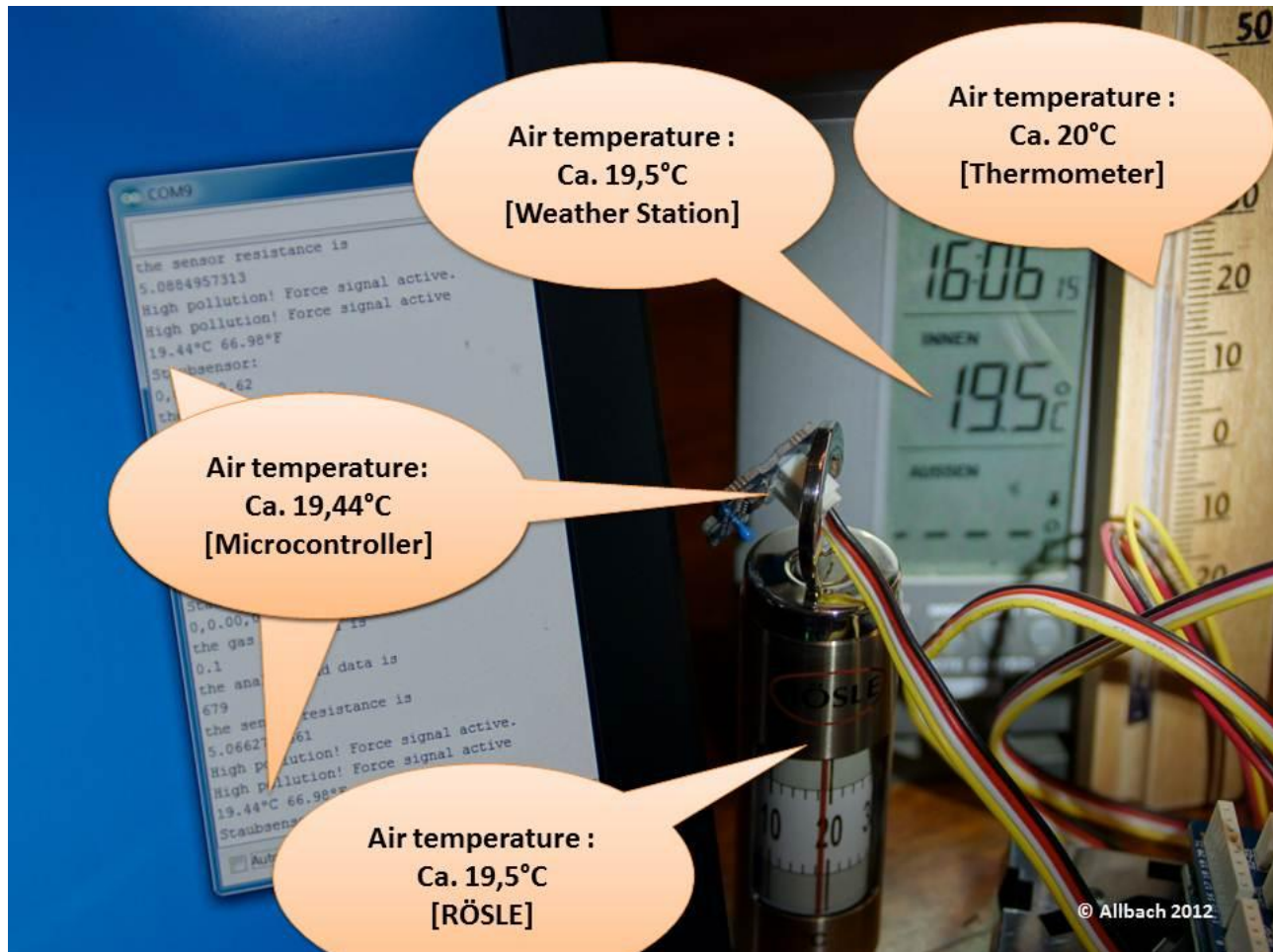
Fig. 4: First measurement results of the air temperature and a comparison to common measurement devices.

8 CONCLUSION

Smartphones, urban sensing, and other new technologies are becoming part of climate monitoring. However, these technologies are still under development and are confronted with various problems and the current measurement results must be regarded with suspicion. Nevertheless, since we have to assume that there will be plenty of measurement stations in the future, it might be possible that the sheer amount of measurements will result in kind of "wisdom of crowds." Especially, the approach monitoring the climate bottom-up is an interesting alternative to the generally known top down monitoring. It follows the principal of "we are all affected by climate and weather, so we will monitor it together." At the moment, smartphones are limited in their use as measurement instruments due to the lack of important sensors. But this will change in future. It is already possible to conduct amazing measurements (e.g. the cell phone as a Geiger tube). If the sensors of the smartphone do not suffice, they can be expanded by a microcontroller and its sensors. The new generation of microcontrollers follows the idea of Web 2.0 and appeals to new users due to its improved handling. The new technologies make is possible that a prototype can be created which can easily be expanded and adapted to special purposes, due to its modular design. This device is rather cheap and will allow us to conduct new forms of climate measurement and urban sensing. For instance, the urban area could

be explored by groups of people and the gathered data could be analyzed with regard to climate and biovital values. A new possiblity of monitoring climatological effects within inhomogeneous urban structures is using mobile measurements devices. The advantage of this type of methodology is a high density of measurements, which could be mapped spatially. Although, mobile air temperature and air humidity measurements had been practiced for a long time, especially in the field of applied urban climatology. However, most of the mobile measurements are performed by using individual mobile measurement instruments and the results have to be written down manually. Other methods like a special car, which is able to gather various climate values, is very expensive and is also not able to gather biovital functions. A new devise, based on microcontroller, could help planners and scientists. It could close the gap between various single measurements and an expensive professional car. This device uses a new approach to research the interconnections between climate, city, and human beings and might offer new insights, showing us new interdependencies, but it does not replace the traditional measurement methods!

9 REFERENCES

ALLBACH, Benjamin; MEMMEL, Martin; ZEILE, Peter, STREICH, Bernd: Mobile Augmented City – New methods for urban analysis and urban design processes by using mobile augmented reality services, in: Schrenk, M.; Popovich, V.; Zeile, P.: Proceedings of RealCORP 2011, Essen, Wien, 2011. [Internet: http://www.corp.at/archive/CORP2011_66.pdf].

ALLBACH, Benjamin: Augmented City Kaiserslautern – Web-basiertes Wissensmanagement in Mixed Reality Umgebungen. Kaiserslautern, 2010. [Internet: http://cpe.arubi.uni-kl.de/wp-content/uploads/2010/11/Allbach_Augmented_City_Kaiserslautern.pdf].

BLANK, Hans Joachim: Das Embedded PC-Handbuch – Vom Sensor bis ins Internet. Poing, 2000.

CAMPBEL A.T., EISENMAN S.B., LANE N.D., MILUZZO E., PETERSON R.A.: People-centric urban sensing. In: Proceedings of the 2nd annual international workshop on Wireless internet. ACM; 2006 p. 18, Boston, Massachusetts, 2006.

CAMPELL SCIENTIFIC: Data Loggers, Sensors and Weather Stations – for Industry & Research. Shepshed, 2012. [Internet: http://www.campbellsci.co.uk/].

GOLDMAN, Jeffrey; SHILTON, Katie; BURKE, Jeff; ESTRIN, Deborah; HANSENH, Mark; RAMANATHAN, Nithya; REDDY, Sasank; SAMANTA, Vids; SRIVASTAVA, Mani; WEST, Ruth: Participatory Sensing. Washington, 2009. [Internet: http://wilsoncenter.org/topics/docs/participatory_sensing.pdf].

HAAKE-ERFURT.DE: AVR Webserver für Wetterstation WS2300. Apfelstädt, 2013. [Internet: http://www.haake-erfurt.de/wetterstation/10-avr-webserver-fuer-wetterstation-ws2300].

HELDENS, W.; HEIDEN, U.:Analyse stadtklimatischer Aspekte auf Basis von Hyperspektraldaten. In: TAUBENBÖCK, Hannes; DECH, Stefan: Fernerkundung im Urbanen Raum. Darmstadt, 2010.

HENNINGER, Sascha: Stadtökologie – Bausteine des Ökosystems Stadt. Paderborn, 2011.

HERMANN, Christian; ASCHE, Hartmut: Web.Mapping 1. Heidelberg, 2001.

HOF, Hans-Joachim: Applications of Sensor Networks. In: Lecture Notes in Computer Science, Volume 4621, pp. 1-20, Berlin, 2007.

KAPPAS, Martin: Klimatologie – Klimaforschung im 21. Jahrhundert – Herausforderung für Natur und Sozialwissenschaften. Heidelberg, 2009.

KUTTLER, Wilhelm: Klimatologie. Paderborn, 2009.

PRODATA: Weather stations for scientific monitoring. Littleport, 2012. [Interent: http://www.weatherstations.co.uk/remotefield.htm].

STIELER, Wolfgang: Facebook war "Navigationssystem" für arabische Revolution. Internet, 2011 [Internet: http://www.heise.de/newsticker/meldung/Facebook-war-Navigationssystem-fuer-arabische-Revolution-1351335.html].

THEATO, Doris: Logistik mit Legopyramiden – Kaiserslauterer Fachhochschule veranstaltet Projekttage für Neunt- und Zehntklässlerinnen. In: Die Rheinpfalz – Nr. 66, Page: 15, Kaiserslautern 2013.

TRENKLE, Hermann: Klima und Krankheit. Darmstadt, 1992.

UNIGIS, Salzburg: Visualisierung in GIS. Internet, 2010. [Internet: http://www.unigis.at/temp/karto/modul_kartographie/html/lektion1/index.htm]

ZMARSLY, Ewald; KUTTLER, Wilhelm; PETHE, Hermann: Meteorologisch-klimatologisches Grundwissen – Eine Einführung mit Übungen, Aufgaben und Lösungen. Stuttgart, 2007.

Modernity and Collage of City Non-Core Area: the Case of Suzhou River Area in Shanghai

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1 ABSTRACT

Modernity is not only the theme of the world development,but also the main feature of China's development nearly 100 years. It have contributed to the economic development, as well as formed an unstable system of internal city, especially on non-core area of city. The modern process constantly changes the driving force of development, rather than continues as a linear, with different interpretation of the modernity in different periods. On the spatial dimensions, the non-core area reflected different modern characters from core area that have enormous influence and powerful attraction. It changed from the original stable structure to a kind of mosaic state as the collage. With the influence of industrialization and information, the non-core area has always been formed by the changing economic and political power. Important here in this context is that the urban system is viewed not as a static structure ,but as a system in flux, characterized by interdependencies and uncertainties about the nature and the direction of change. This creates a doubt that emphasis on the factors what promote the unending changing of Non-core area and made it became a kind of unstable space.

To demonstrate the reality of the modernity of non-core city area, we choose one special area of shanghai— Suzhou River area, which has a synchronous development history of Shanghai but has not became the core area still now, to explore the inner force what promote the reform and the reconstruction of here. Under the power and economical influence, the both side of Suzhou River was enveloped by increasing intensity, to meet the need of modernity. This changing have also made this area lost its natural scene bit by bit, like the never stop flow of the river.

At the beginning of this paper, we introduce the general features of modernity, which displays the different characteristics on the spatial dimension and temporal process. Then, through the case study of the Suzhou River area, we present a real scene of the modernity in china. It reflected the stable and flowing characteristic of non-core areas which do not have enough developmental potential to prevent the unending change. The history has been divided into three periods, we analyse the background of the politics & economy, main forces and promoters of development, the specificality of spatial character and social situation on each period. Obviously, when we talk about modernity, we should not only pay attention to its present, but also look back upon history and look forward to future.

2 MODERNITY

2.1 The characteristic of modernity

'Modernity', 'The painter of modern life is the transient, the fleeting, the contingent; it is the one half of art, the other being the eternal and the immutable.' Baudelaire wrote in his essay. similarly, Berman's description: There is a mode of vital experience – experience of space and time, of the self and others, of life's possibilities and perils – that is shared by men and women all over the world today. I will call this body of experience 'modernity'. To be modern is to find ourselves in an environment that promises adventure, power, joy, growth, transformation of ourselves and the world – and, at the same time, that threatens to destroy everything we have, everything we know, everything we are. We shall leave aside the question why modern life might be characterized by this, but that the condition of modernity is not generally disputed.

If modern life is indeed so suffused with the sense of the fleeting, the ephemeral, the fragmentary, and the contingent, then a number of profound consequences follow. To begin with, modernity can have no respect even for its own past, let alone that of any pre-modern social order. The transitoriness of things makes it difficult to preserve any sense of historical continuity. If there is any meaning to history, then that meaning has to be discovered and defined from within the maelstrom of change.Modernity, therefore, not only entails

a ruthless break with any or all preceding historical conditions, but is characterized by a never ending process of internal ruptures and fragmentations within itself.

Raban describes an essential aspect of urban life as 'Aesthetic practices and judgements fragmented into that kind of 'maniacal scrapbook filled with colourful entries that have no relation to each other, no determining, rational, or economic scheme,'. Where, in all of this, could we look for some sense of coherence, let alone say something cogent about the 'eternal and immutable' that was supposed to lurk within this maelstrom of social change in space and time?

But what promote the modernity change all the time .Marx provides one of the earliest and most complete accounts of capitalist modernization.Marx insists, there is a single unitary principle at work that underpins and frames all of this revolutionary upheaval, fragmentation, and perpetual insecurity. The principle resides in what he calls, most abstractly, 'value in motion' or, more simply, the circulation of capital restlessly and perpetually seeking new ways to garner profits. By the same token, there are higher-order co-ordinating systems that seem to have the power – though in the end Marx will insist that this power is itself transitory and illusory – to bring order to all this chaos and set the path of capitalist modernization on a more stable terrain.

2.2 Modernity on the time process and spatial dimension

On the time process, modenity Show the different game rules at different periods. The development of modernity is not a liner process. The change from Fordism to flexible accumulation trigger the transform from industry to post-industry development. The more flexible motion of capital emphasizes the new, fleeting, ephemeral, fugitive, and contingent style in modern life, rather than the solid values implanted under Fordism. To the degree that collective action was thereby made more difficult – and it was indeed a central aim of the drive for enhanced labour control to render it thus – so rampant individualism fits into place as a necessary, though not a sufficient, condition for the transition from Fordism to flexible accumulation.

And on the spatial dimension, it also has different characters of modernity between core area and non-core area. On Non-core area, the lack of original stable social elite system and capital accumulation system leads to their constantly changing status.Capital investment here will not face many obstacles for infringing upon the interests of other elite groups. So non-core areas are usually

2.3 China's situation

International and Globalization have had direct or indirect impacts on China's economic and urbantransformations. From the global perspective, China's economic reform is more than simply a transition from central planning to a "market economy with Chinese characteristics" as Deng Xiaoping envisioned, although this trend has been clearly evident. On the other hand, socialist countries' shift away from state socialism can be seen as part of the massive global change in the mode of regulation and the regime of accumulation that began in the advanced capitalist states. Viewed on this way, China's urban transformation involves not just one but several global processes occurring simultaneously that have affected the production of space, urban consumption and the circulation of capital, people and technology.

Each of these shifts has strongly impacted one or more aspects of the social, economicand spatial structures of the Chinese city. The consequences of such restructuring processes are manifested in new urban realities that together constitute a new urban mosaic and spatiality for China which, despite lingering elements of the past, is visibly very different from that of the pre-reform era. The new urban realities have been created by the transfer of massive amounts of global and domestic capital to the built environment. The sunken capital is spatially fixed, and as usual, the spatial fixity of the newly reconfigured urban elements ensures their existence for at least decades to come until they become dilapidated, dated or are otherwise rendered unfit for the city. As long as it exists, the existing spatiality of the city will have reciprocal effect on the forces of economic and urban transformation that created it in the first place.

3   THE MODERNITY HISTORY OF SUZHOU RIVER DISTRICT

Shanghai,as China's earliest open port city,establishes and led the development of China's modern industry, in the frontier of the China's modernization. Among this city, there is a river, winding flow over 5000 yearsr, breed almost more than half of the ancient Shanghai.Then, she spend 100 years "build" the initial frame of

international metropolis of modern ShangHai. It's the Suzhou River, the downstream of WuSongJiang, flows through Shanghai downtown reach into the Huangpu River. It also be called "Suzhou Creek" by British and American who find its superior geographical position very suitable for a inland shipping port. Due to Shanghai's role as trade port, the coast of suzhou river started her urbanization process，with the expansion of the foreign settlement, from the the east mouth to the west gradually. Since the 1930s,Suzhou Creek became an important shipping route. For more than one hundred years, the process of urban rapid development together with human influence have controlled this area. It covered by the need of social and economic structure change. The modernity history of suzhou river district reflect the moderniazation of Shanghai, it also became the typical representative of the course of Chinese modernity.

Fig. 1: The position of the Suzhou River and the area for research.

Suzhou river area is located on non-core areas of city, although some part of it adjacent to the downtown area of Shanghai , it reflect the unrest and unending redevelopment condition that different with core area which always have the stable capital accumulation and elite relationship. In the push of modernity，the region has experienced several evolution.On early period,the colonial economy,national industrial economy and warehousing on both sides of Suzhou river estuary area created the suzhou river coast's early brilliant. After the funding of china , Industry, Shipping and Business get further development,sustained the economy property of both side of river. It became the important areas for Shanghai to expend mordern industrial development. But at the end of last century, the shipping commerce and industry along Suzhou River receded. With relocation of the industry in Shanghai city center to the suburb, the economic hollow phenomenon of Suzhou River region after withdrawing from industrialization is conspicuous. Plus the water pollution, Suzhou River region declines. But at the turn of this century as the river water and the nearby areas underwent comprehensive treatment along with the rise of creative industry and the redevelopment, Suzhou River region will be hot cake once more. Below is a brief account and analysis of the development background in three periods, the driving force, changes of spatial and social structures, which reflect the features of modernization in Suzhou River region.

3.1 The early stage

The development along the bank of Suzhou River started from the land to the southwest of the junction of Suzhou River and Huangpu River. After the Opium War, George Balfour, consul of the British Consulate in Shanghai, thought highly of this land, which was not far from Shanghai and which served as a strategically important rear. Upon being taken as the British concession, this area started the construction of economic facilities, with various foreign firms making investment here. With the Bund being the center, the construction extended westward.   Based on the spatial pattern, cultural, recreational, and public facilities were gradually established, making this area a comprehensive business residential zone. In the 1930s, the area between the Garden Bridge of Shanghai and the north bank of Henan Road developed into a sophisticated business and residential area. The area along the eastern section of Suzhou River thus became a cluster area of foreigners and businessmen in Shanghai.

However, with Henan Road as a boundary, there appeared two situations along the bank of Suzhou River, particularly the area in the southern bank: in the east stood tall and spacious western buildings; in the east lied low and clustering Chinese constructions. There was a massive flow of refugees due to the war. The concession took the opportunity to build a large number of houses and sell them to the Chinese. As a result,

the concession gradually turned to a place where the Chinese and foreigners lived together, showing an evident divergence in the spatial pattern.

In the 1920s and 1930s, a great number of quay sheds emerged along the riverbank. After Shanghai opened its ports, British businessmen stopped opium trafficking and focused on the trading of raw silk and tea. The light industrial products produced in the upper reaches of Suzhou River were also transported here for storage. As a result, lots of transit sheds and warehouses were built in the 1920s. When it comes to the 1930s and 1940s, numerous Chinese and western banks built frame-structured capped warehouses made of reinforced concrete and without girders, at the back of which the old lanes were renovated into the new-style Shikumen (literally "stone gate") houses.

Fig. 2: The old Suzhou Greek as a hustling trade port

During this process, there formed three obvious sections along Suzhou River: the first section is the Bund between the estuary and the bridge of Henan Road, which is a "golden district" with foreign consulates, parks, foreign banks, churches, post offices, etc.; the second section is the quay between Henan Road and the present Shimen Road, which is a "storehouse business zone" with numerous transit sheds and warehouses; the third section is the "storehouse industrial zone" in the west of Shimen Road with a cluster of large enterprises.

It cannot be denied that Suzhou River area is developed with a capitalistic promotion. External capital inflow changed the original farming culture, and attracted many nonlocal population, and changed the social environment here. Though it's the beginning of the one-hundred history of Suzhou River, similar stories happened from then on.

3.2 The Industry period

3.2.1 The background of Industry development

The formation of Shanghai modern industrial, originated from the first opium war of china, is push forward by Treaty of Nanjing , which signed to western country,that Shanghai was forced to open the treaty port. After the treaty, the Western Imperial Powers made Shanghai as the center to achieve the trade aggression of China, this is the fisrt important cause that accelerateShanghai modern industrial development. The other cause is the power from the China's national entrepreneurs. These entrepreneurs hope to increase the comprehensive national strength of China through the development of industry. So such industrial development has been the support by the national patriotic groups and the government of at that time.

From 1860s, foreign businessmen began to open factories in China, mainly north to Suzhou River and west to Huangpu River. It stimulated people of insight to develop national industries. With the ideal of "saving the nation by engaging in industry", national capital in Shanghai started. With shipping advantage connecting rivers, seas and the mainland, Suzhou River became an earlier national industry center of China. Along the river west to Xizang Road, many factories were built. By 1920s, there were dozens of big spinning mills, flour mills, oil pressing mills, and engineering works along the banks; according to statistics, in the 21 flour mills of the city, 18 flour mills along Suzhou river produced 90 % flour of the industry. Big chemical companies and 70 % of small and medium-sized dye works located along Suzhou River. By 1949, there were 1914 factories and companies in Huxi Industrial Zone, and many of them are important in their industries in China. By the reform and opening-up, Huxi Industrial Zone was an important old industrial zone and the

most important textile industry center of Shanghai. Therefore, Suzhou River is the birth place of Shanghai's national industries.

Almost one hundrend years, Shanghai modern industral development bit by bit, began with the passive pushof the war, go through the main construction after the founding of new China, then undergo the rapid development after since the reform and opening-up of china. Then shanghai became the main industrial cente of china.among.

The industrialization development of Suzhou river area was supported by the government, and here both private and state-owned collective economics seeks the benefits of industrialization development. At this time, the development of Suzhou River was promoted jointly by the government and private enterprises.

3.2.2   The specificality of spatial character & social situation

Industrial expansion caused heavy environmental pollution

After the founding of the nation, Shanghai gradually changed to a single industrial center city. By expanding existing factories and building new factories, the industry developed faster, especially after the great leap forward in 1958. According to the investigation in 1936, there were more than 2200 factories in Shanghai, and in the 2039 factories in urban area, there were 1186 factories in midstream and downstream area of Suzhou River, accounting 58 % of the urban factories. These factories were administrated by seven bureaus including textile, machine and electricity, light industry, metallurgy, chemical industry, instrument, and manual, and especially the chemical industry, metallurgy and machine and electricity account more significant of the urban factories.

The industrialization along the river developed with more poor-efficiency, high-energy, high-pollution and water-consuming papermaking, chemical and casting companies, at the same time, as a poor area of Shanghai, Suzhou river area has the most immigrate population. Emission of industrial waste and sanitary sewage made Suzhou River heavily polluted. With more reeling mills, flour mills, iron factories and paper mills, Shanghai's industries and commerce grew. As freight volume increased, then function of Suzhou

River as inland transportation was enhanced, and many timber docks, fruit docks, rice docks and rubbish docks were built along the river. Soon, the river became black and smelly, fish and shrimp disappeared, and Suzhou River became a stinking river.

In 1930s, a reporter Dong Ping wrote in his book Interviews of the Slum: Suzhou river of Shanghai rotted like a dead snake. From Caojiadu to Fanwangdu, the erosion was too heavier too be recognized that the water polluted by sludge became terribly black and stinking.

Fig. 3: The early factories and river pollution after industrial boom

A lot of shanty towns

Textile mills and textile machinery factories spread along the Suzhou River in Shanghai. Women from other cities worked in textile mills while men in the textile machinery factories. They came batches after batches with fellow villagers and relatives, then slowly gathered and built private houses which are now villages. Consequently on the wastelands, ruins, cemeteries, garbage sites and places including both sides of the Suzhou River and other river banks, there appeared a variety of shanty towns. And during the Anti-Japanese War, a large number of civil houses were destroyed in Shanghai eastern downtown area   and batches of displaced refugees poured into the shanty towns, setting up rows of houses on the remaining empty lands.

According to then social bureau's incomplete statistics, shacks totaled 50000. After the civil war, ruined peasants from the rural war zones swarmed into Shanghai for survival, thus shanty towns saw another large expansion of residents.

Till the 1940s, Shanghai traditional shanty towns basically formed: by referring to then social bureau's incomplete statistics, poor migrants and refugees especially from Jianghuai watershed built or rent cheap shacks on the north shore of Suzhou River, both sides of railways and the surrounding wild wastelands, which gathered and later became urban slums besieging Chinese downtown   and concession inside Shanghai. And the reason why these refugees crowded here was because on the one hand the Chinese downtown's protection, on the other the industrialization here can provide lots of jobs. Shanghai municipal authorities once tried to control the spread of shanty towns, but the clearing and settlement measures   cannot stop the influx of refugees as well as the their demands and determinations of building shacks.
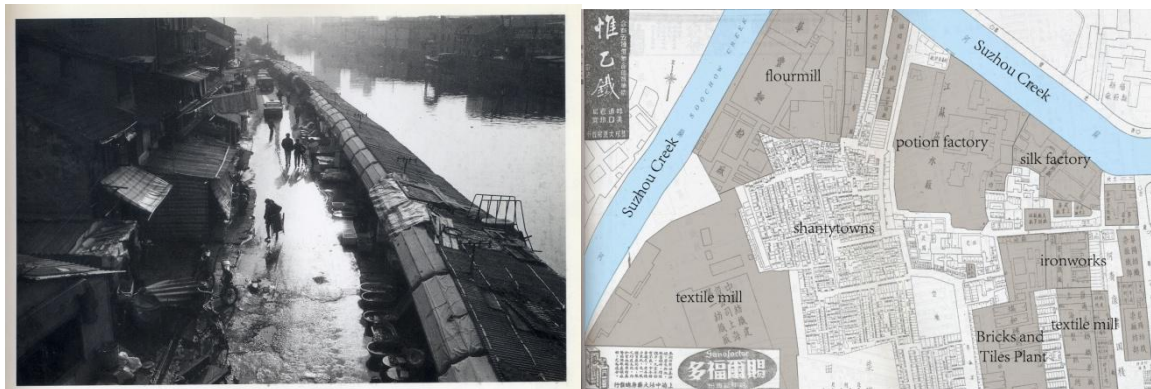
Fig. 4:. A lot of shanty towns packaged by industrial plant

3.2.3   The influence of modernity on Industrial period

Industrialization is considered to be the contributor to the progress of modernity. In the period of industrial prosperity, a large amount of capitals flood into the Suzhou River Area and many people are attracted to live here, which rapidly boost the modernization progress in this region. This is also one of the important approaches for China and other cities in the world to advance their modernity. In addition, what else does industrialization leave for cities? The previous farmlands are replaced by factories in a flash. The original social system of agricultural civilization is gradually disappearing, instead, there are full of workers from different regions and of different backgrounds. They care neither the history of this land nor the continuity of such history. Just like the capitalists making investment and development here, they are also interest-oriented. Therefore, these lead to the region's unstable future. The industrial recession and serious environmental pollution will reduce the value generating by the region. Bothe investors and workers hope to seek better living space without any attachment. It is just this kind of industrial modernity that separate people from space and become independent to each other.

Obviously, it is capitals that promote all the reforms in the boom period of the Suzhou River Area. Since Suzhou River is located at the edge of the core zone, plenty of land is the foundation for the concentration of industrial factories, and sparse farmlands serve as the unstoppable social basis for the rapid development of industrial agglomeration. Generally speaking, capital investment here will not face many obstacles for infringing upon the interests of other elite groups. This explains why non-core zones are usually more unstable compared with core zones in the modernization process.

The essence of capital lies in its pursuit of maximized interests. The intervention of capital turns agricultural civilization into industrial civilization. The pursuit of capital without any control has completely ignored the ecological environmental value, which turned the Suzhou River into a heavily polluted black river. Moreover, the large population introduced for the purpose of industrial construction has also upgraded the social and space structure in this region. A large number of shanty towns are scattered among the factories, which is a problem for future urban development.

3.3 The Post-Industry period

3.3.1   The background of redevelopment

Around 1995, Shanghai started a strategy of withdrawing from the secondary industry and progressing into the tertiary industry. It replaced contaminative manufacturing industry with service sectors. With the changes of history, a large number of flour mills, paper mills and old warehouses built in the industrial age near Suzhou River were abandoned. The once bustling industrial space gradually silenced. On the other hand, the cleaning of heavily polluted Suzhou River gained the government's attention and support to improve the overall image of the city and develop urban waterfront areas. Thus, the city space near Suzhou River stepped into a new stage of development.

By analyzing the region's early development after withdrawing from industrialization, spontaneity and chance could be clearly found in the early agglomeration. During this period, the water quality was poor and surrounding environment terrible, while the main reasons why creation practitioners concentrated could be attributed to the charm of architectural art for architects, the intrinsic history of buildings, laid-back environment as well as cheap rent. The agglomeration contributed to the spontaneous concentration of art warehouses, communities along Suzhou River, which gradually developed to a scale.

With the later startup of environmental renovation project, this place became the hot cake for a new round of real estate investment. Of the real estate along Suzhou River from 1998 to 2002, the western section was originally industrial land later turned into residential land while the middle section was originally storehouse land converted into residential land and renovated. After reconstruction in several early years of new century, old warehouses and factory buildings along the banks were demolished to a large extent.

Because the overall cost of the Suzhou River renovation project was huge, Shanghai municipal government could not depend only on the government finance to appropriate such a large sum of money. Therefore, the capital for the treatment of Suzhou River could only be obtained through attracting investments from developers. There was nothing wrong in inviting outside investment and let capital involve in the renovation of Suzhou River. When the water became clearer, and small swimming fishes reappeared in the river, from the government and media to the residents living near Suzhou River all cheered for it. However, with the proceeding of the investment attraction job and the constant involvement of capital and power, new contradictions started to appear. First, eager for quick success and instant benefits, and haunted by political achievement consciousness, local government approved some of the projects that even themselves felt inappropriate. Second, the planning of Suzhou River lagged, but the real estate development along the river were proved before the planning, which led to a disordered state.

Although the land redevelopment of the region along the Suzhou River had started, its pace significantly lagged behind the water body treatment and lagged behind the other parts of the city. The reason was that under the condition of market economy, the major force that drove the development and construction of the city was real estate developers. And the success or failure was the key factor for the developers to make decisions about development activities. Even the redevelopment of common areas had the problems of high cost and complicated implementation links and operating procedures which make the success or failure of development difficult to predict, the riverside areas had more odious environmental conditions (including black and dirty river water and unpleasant smell.) which could not be solved with the power of individual developers. Because of the huge risks, most of the developers took a wait-and-see attitude and did not dare to rashly get involved in. The government, on the other hand, did not have enough capital, which led to the lag of land redevelopment of the riverside areas. Therefore, in the nearly 20 years of development after 1995, the Suzhou River Area did not form a unified development pattern. Instead, bits and pieces of creative industrial development zone and high-grade residential areas appeared.

3.3.2   The specificality of spatial character & social situation

Creative Industry Development along Suzhou River

Along Suzhou River, creative industry agglomeration forms a creative industry band along the river gathering area, like pearls threaded into one string. In early times, Suzhou River banks attracted a lot of artists and creative personnel to engage in creative activity. Along the Suzhou River from west to east, influential creative industry parks listed by the Shanghai government are concentrated here such as Zhoujia Bridge creative center, M50 and Laosihang warehouse. This creative industry band spans several

administrative regions, forms a group of creative industries feature design, animation, games, media and advertising, and reflects the integration of warehouse culture and riverside culture. Creative activities with creative personnel as the main body gather along the river. The historic buildings rent for self use initially by the artists and creative personnel are gradually leased to other studios. Creative cluster areas form through large-scale investment and creative enterprises settle down as a result of friends' or clients' introductions, so this tightens the social network relationship between enterprises. Therefore, Suzhou River region constitutes the synonym for creative industry as well as culture and art industry, also a must for foreign visitors to hunt for old Shanghai's culture.

Fig. 5: The distribution of the creative industry along Suzhou river area

High-grade Close Residential

The profit-chasing of capital is quite manifesting in the coastal development of Suzhou River. With the constant listing of new houses in market, the Suzhou River area has been divided into blocks by land agents. Property developers lose no time to hang out the banner of Private Garden, the intention of which is quite obvious. They want to take possession of Suzhou River which belongs to the public by themselves. At the same time, most of the new districts alongside the Suzhou River are characterized by Two High and One Low, namely high density, high volume rate and low greening rate. The motivation of property developers is to maximize profit, so they are constantly decreasing the distance between the building and Suzhou River and increasing the height of buildings. Suzhou River will become the Building Canyon in city.

Fig. 6: The image of High-grade Close Residengtial along the riverside that made the river landscape into private

At the same time, independent high-grade residential districts cut off social connections between areas and turn them into groups with no relationship with each other. The high-grade residential and the hardly developed shantytowns around turn up alternatively. Fraternization of social structure and privatization of riverside space become the new social space characteristics alongside the Suzhou River. People who have lived there for half of their life have to move. The public life involving turning coal ball furnace, cooking, eating, chatting, bowl washing and playing cards has also been dissolved.

3.3.3 The influence of modernity on Post-Industrial period

The industrial transformation in Shanghai has brought an end to the era of capital accumulation when industrial mass production was prevalent. What come as a consequence are land economy and a kind of production method that lay emphasis on individuals, diversity and flexibility. As a result, real estate development and creation industry come to the historical stage of a new round of modernization development. Without stopping for a rest after the industrial era, the Suzhou River area sees large amounts of capitals flooding into the area again. With the success in wastewater treatment several years ago, bulldozers are approaching to the old warehouses and factories along the bank of the river. This area once again becomes an ideal destination for investment pursued by estate agents. The development of upscale closed regions and the establishment of creation studios have turned today's Suzhou River area into a place that is combined with private possessions and architectural canyon. Located in Shanghai, the River is affiliated to the capital rather than Shanghai residents.

The intervention of capital separates not only the Suzhou River area alone, but also the old residents living along the bank of the river. The comprehensive improvement of the Suzhou River also involves the relocation of tens of thousands of residents. The social structure of original residents is crumbled. This is another great change of space and social structure in this region pushed by the capital. The stable essence that capital pursues profits in this region has not been fundamentally changed, while the characteristics of modernity such as transience, flowage and separation are still on the stage in this region. In the post-industrial era, the capital accumulation methods have been changed to a new round of flexible capital investment, which separate this region into many independent capital territories and further result in a fragmented urban space.

3.4 Stable and flowing of Suzhou River area

The development of the Suzhou River area is a continuously upgrading history. From commodity logistics in the colonial period, to the large scale modern industrial development, and to the post-industrial upgrading, the Suzhou River area has seen great changes in its space and social structure. The earliest colonial banks, warehouses and ports were transformed into factories with fumes everywhere in short period of time. The banks of the river were filled with large numbers of factories and scattered shanty towns. But industrialization cannot keep its story going. With Shanghai's industrial development becoming a history, Suzhou River used to be abandoned due to the heavy pollution. But later, with the post-industrial development, it becomes hotbed for the creation industry, informal economies and a new round of estate development. At the same time, people here are changing along with the ups and downs of capital investment. Located in the non-core zone, it lacks the strong and stable society root and capital accumulation. Therefore, the area located at the edge of the core zone is, on the one hand, an ideal destination for investment, and the most volatile region on the other.
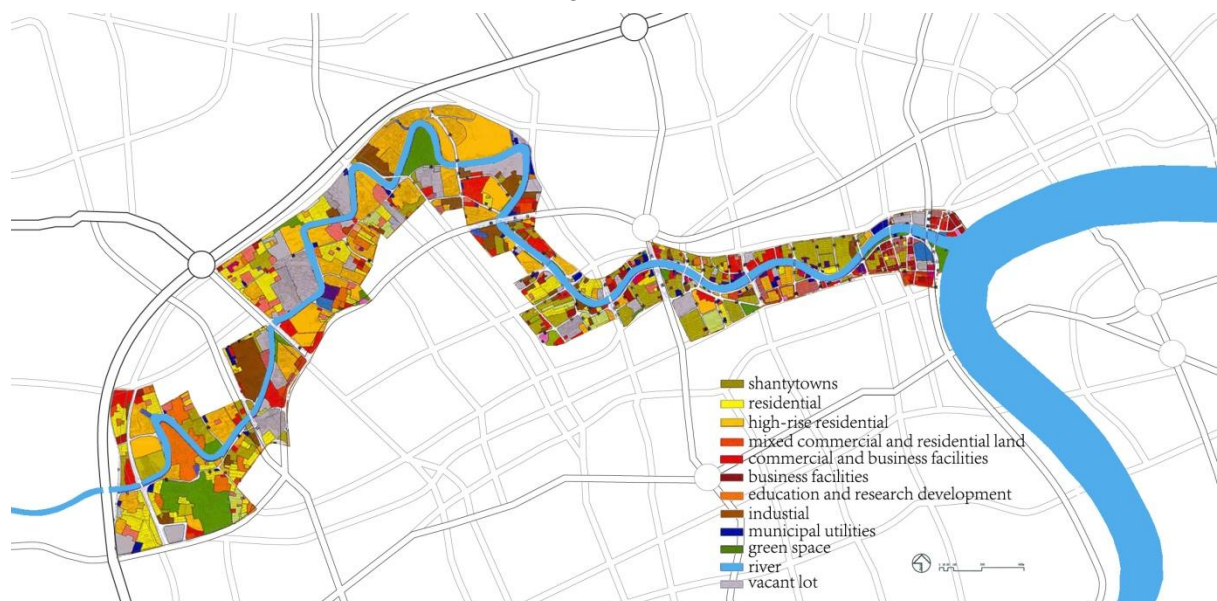
Fig. 7: The fragmentatized land use of suzhou creek area

In all the transience, flowage, separation and accidents, the only stable thing is the continuously emerging impetus of capital. Both the colonial investment and the later alliance of government and estate agencies are the powerful alliance of political and capital elites who deem urban space as the capital growth machine. Finally, under the continuous stimulation and erosion of capital, urban space becomes an aggregate for value investment. Independent urban functions and closed residential apartments form a fragmented collage here.

4 CONCLUSION

Modernity shows the features of transience, flowage, separation and accidents. "Change" becomes the everlasting element of modernity. In the pursuit of modernity, cities are faced with constant changes. People and space are separated into two mobile entities. The location sense of space has been greatly removed. It is the essence of profit pursuit that pushes the city's constant change and become the only stable thing in all the changes.

The each stages of China's modernization are influenced by the push from capitals from different kinds of promoters. From the earliest foreign colonial capital flooding, to the national capitals and the later state-owned collective capitals, then to the combination of post-industrial national investment and private investment, all these show the impetus of the alliance of capital and political elites acting on modernization progress. On this process, the daily living space of common people was placed at an inferior position. This is also one of the essential characteristics of modernity development.

The development of Suzhou River is a special but typical case represented a common phenomenon in the modernization of non-core urban zones. The lack of original stable social elite system and capital accumulation system leads to their constantly changing status. This district was firstly opened up by the foreign capital, and then achieved rapid urbanization and population accumulation with the development of industrialization. But as the value decline of this kind of scale accumulation, the original investment capital and population began to flee. Then the new capital will get involved to find scattered investment values on the wasteland. Neither the government nor capitalists are capable of carrying out an all-round large-scale reform. Therefore the city is transferred into a fragmented state becoming a piece of collage. This is described as a post-modernity, which is only a new round of modernity "change", a continuity of its stable essence of "profit pursuit".

5 REFERENCES

Charles Baudelaire: Sämtliche Werke, Briefe: in acht Bänden. Les fleurs du mal, 3 , Hanser, 1975
Marshall Berman,All That Is Solid Melts Into Air: The Experience of Modernity, Penguin Books, 1982
David Harvey : Consciousness and the urban experience: studies in the history and theory of capitalist urbanization, John Hopkins University , 1985
David Harvey :The Urbanization of Capital. Oxford:Blackwel1985
David Harvey :The Condition of Postmodernity：An Enquiry into the Origins of Cultural Change，Wiley, 1989
Laurence J.C. Ma, Fulong Wu：Restructuring the Chinese City: Changing Society, Economy and Space，Taylor & Francis, 2004
C. Cindy Fan：China on the Move: Migration, the State, and the Household，Routledge, 2008
WANG wanli : Suzhou Creek's Pollution and Governance Since Modern Times : Shanghai Normal University. Shanghai, China, 2012
GAO Feng : A Study on Mechanism of Development of Creative Industry along Suzhou Creek in Shanghai : Shanghai Normal University. Shanghai, China, 2009
LOU Chenghao, XUE Shunsheng: Millennium Suzhou Creek. Shanghai, China, 2012
XIE Ruixin, LI Jingsheng, LI Gang: Discussion on the Comprehensive Environment Renovation Planning in Suzhou River in Shanghai : Urban Planning Review, 2000/03, pp.52-55. Shanghai, China, 2000
ZHANG Kaixuan, WANG Rui, DA liangjun : Regeneration Planning of Urban Waterfront in Shanghai: A Case Study of Suzhou Creek Planning : Modern Urban Research, 2010/01, pp.40-46. Shanghai, China, 2010
Hou Fangwei, Li Zhitao: Architectural Study of "Loft" Phenomenon ——Case of Suzhou Creek, New Architecture, Issue 5, pp. 23-24. NanJin, 2009.

Morgenstadt: CityInsights. A Research Approach for Systems Research in Urban Development

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1 ABSTRACT

The biggest part of economic activity worldwide is already happening in cities, and the share of urban dwellers is rising continuously: by 2030 almost 5 billion people will be living in cities. Prof. Hans-Jörg Bullinger, the former president of the Fraunhofer Society said: "Cities are responsible for up to eighty percent of global greenhouse gas emissions. Whoever is the first to find the key to Morgenstadt [future cities], in other words a system approach to redesigning existing and newly emerging cities that are sustainable and enhances the quality of life, will chart the way for what may be the largest future market for the next few decades."

To tackle the this challenge, the Fraunhofer Society launched an innovation network called Morgenstadt: City Insights. For this system research initiative, 12 Fraunhofer institutes work together to analyze innovative solutions for a sustainable city. For this goal we developed a holistic research approach to analyze the city system in its interdependent structure. The following paper is an extract of the Morgenstadt: City Insights project description and the general research desig (Schatzinger et al. 2012; Fraunhofer-Institut für Arbeitswirtschaft und Organisation IAO 2012). We will describe in this paper the need for a systematic and holistic approach in city analysis and illustrate a possible research approach to do so.

2 INTRODUCTION

The urban knowledge economy is facing a tremendous transformation that will affect our society technologically, organisationally and systemically. Not only will individual technological sectors, such as energy or mobility, be affected but because the implementation of these sectors were highly cross linked, especially in cities and urban regions, the change in one sector will affect all others and the urban system itself as well. Particularly with regard to the reconstruction of the energy supplies, a holistic and systematic analysis of the city as the central anthroposphere of the modern society will be a critical success factor for future development. The challenge for a liveable and sustainable city will be the upcoming decisions regarding the long-term strategic orientation in the city. To achieve this goal it is essential to consider the interdependence of the involved sectors, as well as discernible trends, and adjust flexibly to future variances.

The trends that are essential for future city development towards a sustainable city and can already be seen today are: urbanization, rising resource consumption, demographic change, climate change, mobility, information and communicatio technologies, and civic participatio (Bundesregierung Deutschland 2012). Since 2007 more than 50 % of the world population live in an urban area. The urbanization process will lead to more than 70 % of urban residences in the next three decades (Heilig 2012). Together with the increase of the world population to 9.2 billion people, the population shift from the rural to urban areas will double the need for urban living space. The demographic change in the western civilizations will change the urban structure to a more elderly friendly city that requires new regulation and accommodation concepts. Even in a shrinking society such as Germany, the resource consumption of our growth oriented economy will lead to a higher consumption per capita. The climate change will force the society to rethink this growth strategy. Here the urban regions are the problem and the solution at the same time (Glaeser 2012). Today the urban regions are responsible for about 80 % of the CO_2 emissions (WWF 2010). but one can already see the potential of these regions to be an important part of the solution because of the scaling effects. In highly urbanized countries the metropolitan areas have a lower CO_2 balance per capita than the rural areas. One of the many reasons is the change in the mobility system. The traffic collapse in cities like London and New York, but also the rethinking process of more and more young people who don't see a car as a status symbol, leads to an increased demand for public transportation systems. These systems are especially profitable in high density areas where enough people use the system. The public transportation systems as well as vehicle sharing models and electro mobility will change the way we travel in the next decade to a more sustainable mobility. This will require new urban structures that have the potential to change the city to provide more

quality of life in the city. A lot of these trends require more sophisticated information and communication technologies. The increasing digitalization of our habitat by mobile internet and spatial cross linking of real time information allows an intelligent reconstruction of existing systems and offers the opportunities to create new approaches. These new approaches for a Smart City will already be developed in numerous research projects, but the potential according to sustainable urban development are still unexploited. One of the new opportunities is increased civic participation. Major projects in urban areas provoke socio-political discussions of a more and more informed population that wants to be part of the political process. Information and communication technologies can be an option to gain a sustainable consensus through population

If we take a look at these enormous change dynamics while taking the low adaption rate of the cities into consideration, then it becomes clear that a singular change of single fields of action and planning areas can't be a solution according to the challenges the urban areas are facing. To tackle long-term sustainable strategies we have to synchronize the long-term and short-term innovation cycles, which are still developed independently (e.g. the fast development of the ICT sector versus the long-term life cycles of the transport infrastructure). Therefore, Fraunhofer launched the research initiative Morgenstadt – Future City with the goal to develop a consistent model for a sustainable urban development strategy that takes not just one sector into account but all, especially interdependent connections between the sectors. We understand Morgenstadt as a vision of a sustainable and liveable city. Therefore, we do not address only an urban center, but future cities will be more an interrelated structure of the city with their urban surrounding region.

The strategic focus of this project lies in discovering systemic approaches that successfully respond to the increasing problems of the selected technology fields in leading cities (see Figure 1). By detecting and analyzing innovative but already field-tested approaches, we evaluate their feasibility for new and complex environments and demands for an urban future. To verify this we pool expertise to develop smart and individually customized strategies together with our network partners, aiming at the future requirements for further concepts' efficient implementations. Adapted to distinct functions and consumers, unique but holistic and trans-sectoral solutions should be anticipated to meet future urban challenges and shape tomorrow's sustainable cities.

Figure 1: Exemplary overview on existing global best practices for sustainable city solutions

3 PROJECT APPROACH

The goal of the Morgenstadt: City Insights project is to identify the status quo and establish a starting point for the research and development of innovations for urban systems. For this we will develop a systematic understanding of the investigated cities and describe a generalized fundamental model of the urban city system based on the investigated cities.

In the past, one of the greatest challenges in researching cities has been how to manage the high level of complexity inherent to urban systems. Sector-specific analyses conducted by experts of various disciplines allows for in-depth research into specific individual areas of interest. This type of research results in highly specialized solutions for individual areas of application within the city, which represent only isolated solutions within specific fields that do not fit into the city system context as a whole. Innovative facades, local energy production via solar panels, electric vehicles and the ubiquitous availability of information via smart phones are impressive examples of such an approach, and have undoubtedly been successful. In order to analyze and shape sustainable city systems, however, a detailed inspection of individual sectors as well as a systematic analysis of the city as a whole is necessary. Therefore, the project structure is defined by three work packages. The first preliminary research module is the preparation of a global survey on existing urban solutions and detailed studies on future cities. This is followed by a second in-field research module covering in-depth studies in the jointly identified leading cities worldwide. The project will be completed by a third research module compiling the results, comparing the cities and developing a prototype model of an urban system. To achieve this, the project analyzes the following eight most important technology sectors of the city of tomorrow with respect to best practices, ground-breaking pathways and existing challenges and innovation barriers that have to be overcome. As facilitator to the organization of city-systems, governance represents a key-scope of the analysis. In addition, the field of security, representing a genuinely cross-sectional system of importance for all other sectors, will be analyzed in detail.

Mobility

How can the masses of people in tomorrow's cities be moved most effectively while at the same time assuring quality of life and zero impact on the environment? Highly efficient mass transit systems, like in Hong Kong, or emission free mobility-on-demand solutions represent some of the ground-breaking solutions to be analyzed and developed further.

Energy

The future city will not depend on fossil energy. Renewable energies, energy efficient technologies and communicating energy grids will become the drive-train of tomorrow's cities. But where will the energy be produced? Today, energy-plus-houses already produce more green energy than they need. Integrated community energy solutions that link houses, wind- and solar parks, biomass sites and electric vehicles can be a starting point for an integrated urban energy system of the future.

Communications

Technologies already exist that enable communication between devices, buildings, vehicles and people. Geographic information processing, wireless internet and smart-phone technology possess almost infinite potential for the development of smart solutions for urban systems. Some cities like Qatar or Mannheim already try to make use of this potential and thereby provide the framework for innovative business- logistic- and transportation processes.

Buildings

There are several ground-breaking technologies that allow buildings to communicate with their environment, to produce more energy than they consume and to work with light, biomass and air from the local environment. In a future city these technologies will be integrated into systems that allow groups of buildings to create closed cycles of energy- and material flows and to shape the micro climate of a city.

Production and Logistics

The big challenge of future urban systems is the smart and sustainable use of resources. Full integration of advanced recycling, recovery and reuse techniques into urban material flows and the holistic use of cradle-to-cradle systems for production, services and consumption will be imperative for the sustainable megacity of tomorrow. This also implies innovations in product design with a highest possible share of biodegradable

materials or recyclable product concepts. Smart city logistics complete a resource efficient production chain for sustainable distribution of goods within our cities.

Governance

A new urban paradigm needs efficient governance concepts that enable participation and acknowledge the complexity of systems innovation. Frontrunners like Zurich, Copenhagen, Amsterdam or Sydney are already working with systems that integrate citizens into decision structures and create smart collaborations between city administrations, innovative companies and research institutes.

Security

The resilient city of the future will integrate security concepts and systems at the design stage of urban planning and policy implementation, therefore ensuring the capability to identify and dominate emerging risks as well as to effectively manage catastrophic situations and quickly return to normal status. New smart and multifunctional protection technologies and materials complemented by sophisticated planning tools will ensure the security of the future urban system while not affecting the civil liberties of its citizens.

Urban Water Infrastructure

Full integration of advanced water treatment, recovery and reuse techniques into urban systems will be imperative for the sustainable city of tomorrow. This implies innovations in the water supply and sanitation sector with a highest possible share of recovery of energy, water and nutrients and interlinkage to other sectors for most efficient resource reuse.
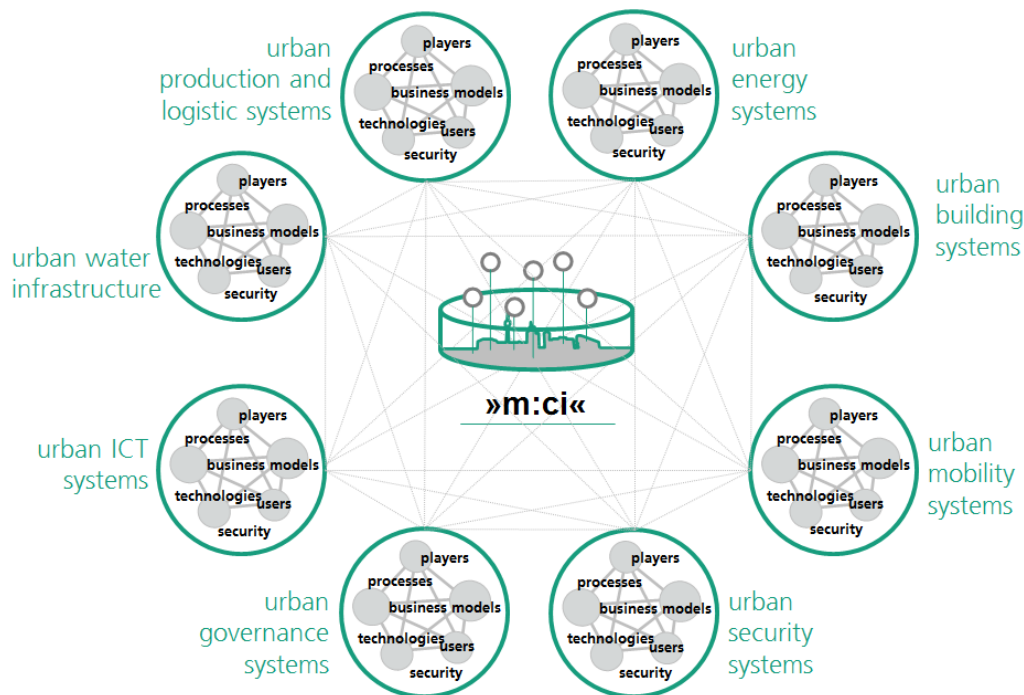
Figure 2: Determination of the main urban systems as relevant drivers for sustainable cities.

In addition, both the research design and the data collection need to establish the foundation that will enable the transfer of solutions such as future system innovations. In order to achieve this, we developed an approach entitled City Insights Engineering (CIE) at Fraunhofer. In four consecutive steps, based on the analysis of currently existing urban system solutions, this approach is designed to generate exemplary processes for the transfer of successful solutions, as well as to facilitate the development of additional solutions for the sustainable transformation of cities.

City Insights Engineering is a long-term concept which aims to systematically build on the data collected within the Morgenstadt: City Insights project. Morgenstadt: City Insights thus represents the starting point for a long-term, systematic research of cities. In Phase I (analyze) the focus will be the analysis of the current situation in the city as well as the holistic and sector-overlapping analysis of existing Best Practice examples in the according city. In Phase II (explore) we analyze the prospective development of each Best Practice Example with the sector specific scientific methods. We further assess the frame conditions of the according

field of application for each best practice example. Both phases take place before and during the particular field trips in the according cities. In Phase III (design) we will focus on the definition of requirements for the analyzed best practice examples. For this we will perform a multi level analysis of actors, business models and use processes. A very important aspect will also be the interdependent interrelation of the individual players in the different sectors. In the last phase, Phase IV (transfer), we analyze the city's independent systematic relationships and effects.
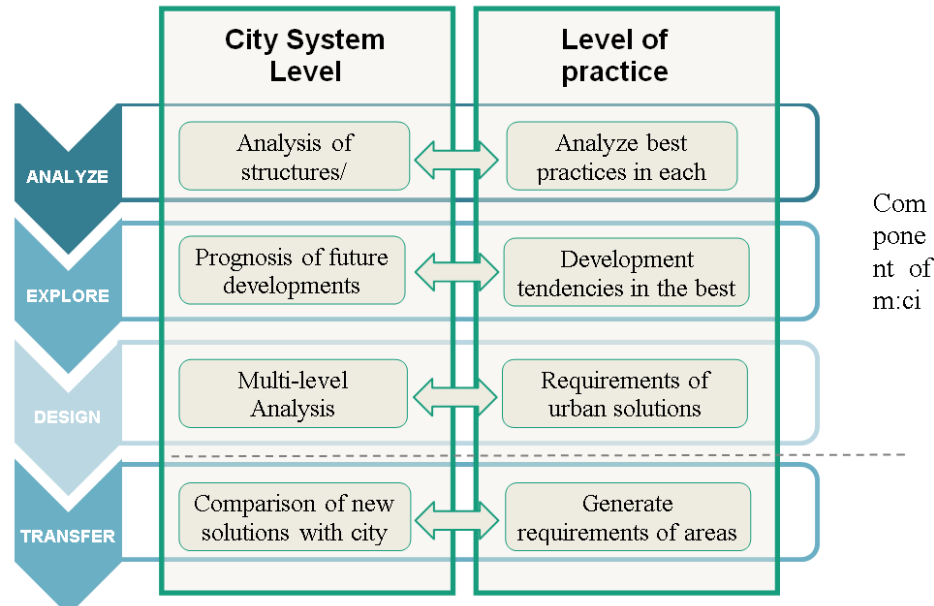
Figure 3: Application of the research approach to both levels
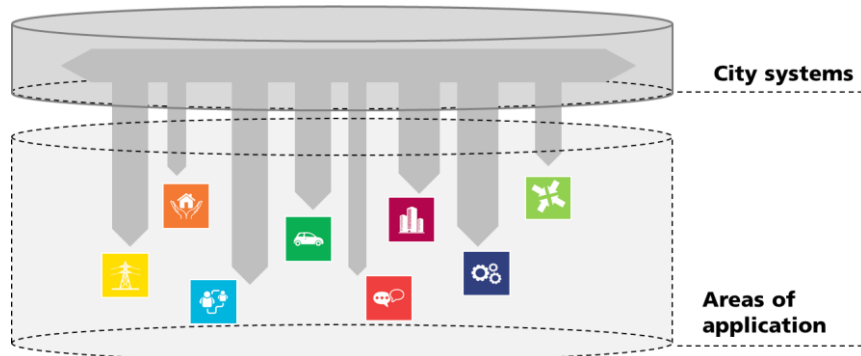
Figure 4: System analysis of cities on two levels

To link the data and information, which are generated on both levels, a transdisciplinary research approach is necessary. With such an approach, relevant actors on the city level, processes and structures, as well as general drivers of the city system as a whole can be identified, analyzed and described. Alongside a continual dialogue between the transdisciplinary City-Team, two workshops (the so called Morgenstadt Labs in each of the investigated cities) represent the most important transdisciplinary element within the Morgenstadt: City Insights project. These are transdisciplinary workshops in which Fraunhofer researchers analyze, reflect upon and transform their findings and hypotheses into additional research questions.

3.1 From sectors to areas of applications

To achieve the set goals of the Morgenstadt: City Insights project we have to come from the individual sectors to a comprehensive model of the city with all its subsystems and components. For this we divide the research process into seven phases which are shown in Figure 5. By taking apart and interpreting existing practice examples and exemplary sustainable solutions, the research design shown in this figure attempts to recognize and describe systemic interconnections between various key drivers. While at first different sectors such as mobility, energy or ICT are still considered individually to make an initial structuring of the current practice examples possible, the final result of the current research phase will present new multidisciplinary areas of application which can provide valuable information on promising technologies, industrial markets,

forms of cooperation, implementation processes and business models. The research process within the CIS model is shown in Figure 6.
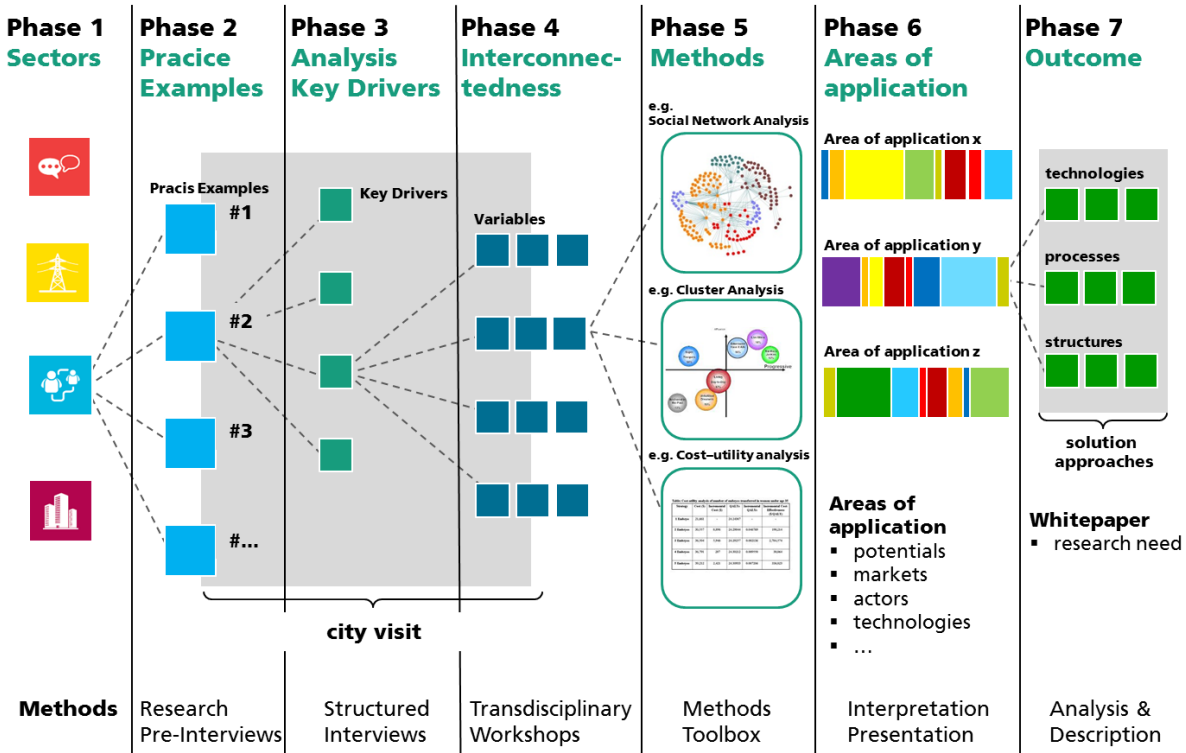
Figure 5: Overview of the research process from sectors to areas of application

The two-week research stay in the cities themselves provides the opportunity to analyze the practice examples in a transdisciplinary and coherent manner and to understand each within its particular context. The practice examples will be broken down into key drivers which, in a joint venture with additional experts, will be evaluated regarding their future effects (for example technical, process-related, regulatory or other changes in the future) and then compiled into new areas of application in regards to the entire city system. This will be done with the help of appropriate scientific methods such as Social Network Analysis, Cluster analysis, SWOT Analysis, or cost-utility analysis.
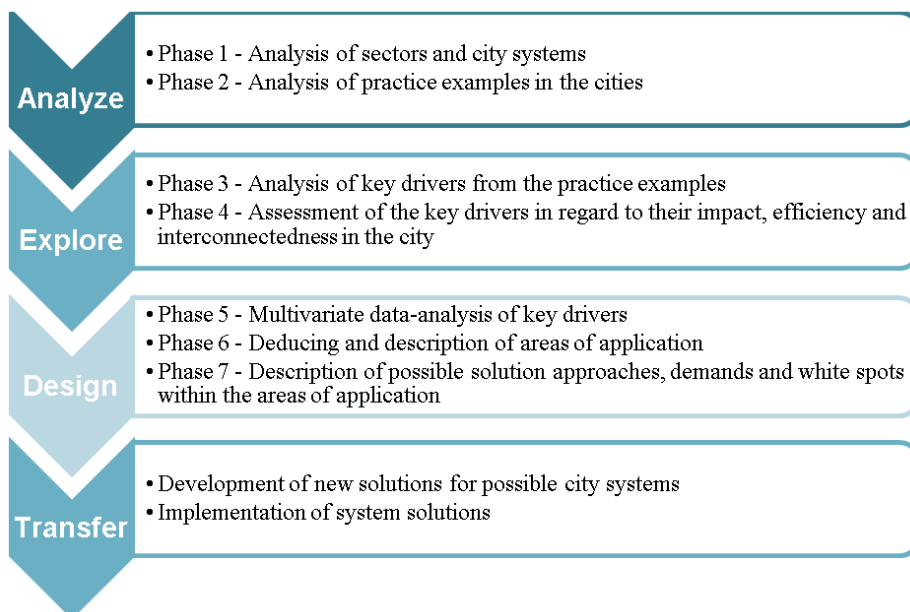
Figure 6: City Insights Engineering model with integrated research process

3.2 Structure of the research stays within the cities

After the preparatory phase, a team of Fraunhofer experts (the City Team) will travel to the city, to spend at least two weeks on-site answering and developing upon the existing research questions.

In the first week, each City Team member will interview experts from within their particular sector, analyze practice examples and outstanding sustainable solutions within that sector, and document and interpret the data collected. Interviews can be conducted individually, however, researchers aim at conducting them in a two-person team. At the same time, each City Team member will formulate hypotheses regarding the current and future suitability of the solutions they are researching. Near the end of the first week, the entire City Team will participate in a joint one-day workshop: the Morgenstadt Lab I. The purpose of this workshop is to discuss and verify the insights and hypotheses gained during the first week with the other Fraunhofer experts looking at different sectors. The goal is to analyze and describe success factors that are relevant to all sectors on a city level. Patterns and structures at work within the city can thus be understood.

The second week is dedicated to deepening the data collection phase. Using the insights resulting from the Morgenstadt Lab I, additional interviews, analyses, and observations will be conducted within each of the sectors. The interviewees may include new individuals; however, the goal is primarily to deepen the questions and to consult the original interviewees on these questions as well. All data collected will be documented immediately. The Morgenstadt Lab II is scheduled for the end for the research stay. The same procedure will be applied as in the Morgenstadt Lab I. In addition, previously defined urban framework conditions will be discussed in terms of their relevance to the city in question. The goal is to capture and document the most important key drivers on a city level.

4 NEXT STEPS

The first work package of the Morgenstadt: City Insights project consists of the research of global best practices and the definition of leading cities in the field of urban sustainability. With the desktop research, we evaluated more than 50 cities and extracted 80 best practices. The result is a catalog of existing approaches towards improving urban sustainability (Fraunhofer IAO et al. 2012). The aim of this research was not only to identify inspiring and trendsetting solutions for future cities, but also to find examples of cities that are already performing extraordinarily well in terms of linking sustainable solutions from various fields and thereby creating a systemic approach towards becoming a sustainable city. Many of the solutions under analysis were shown to be relevant not only for one specific sector but also for the city system as a whole, featuring several important cross-linkages with other sectors. Trendsetting energy solutions often rely on innovative ICT systems, as do mobility systems that aim to reduce emissions and enhance traffic flow. Building standards, transport regulations or carbon finance approaches cannot function without sound governance and long term planning reliability.
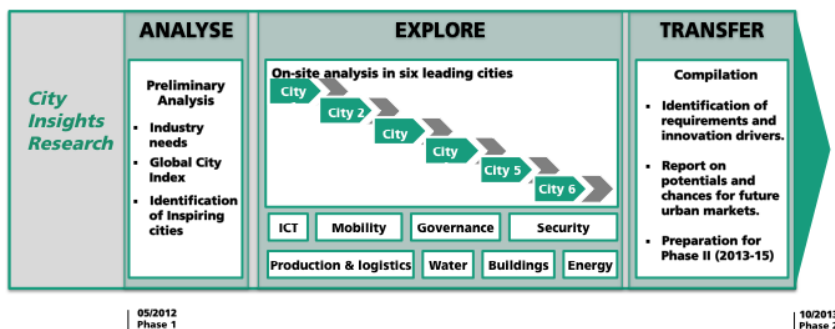
Figure 7: Morgenstadt: City Insights research process

We therefore selected 12 cities by more than 26 quantitative and qualitative indicators with 35 trendsetting solutions that were comprehensively described in the catalog. From these 12 cities we selected, together with our partners, six cities (Freiburg, Berlin, Copenhagen, New York, Tokyo and Singapore) that will be analyzed in field excursions by Fraunhofer researchers in the next six months. In the field excursions, a Fraunhofer expert from the according sector will do narrative expert interviews with experts from the to be examined best practices and the government in the according city. With these interviews, we assess the essential frame conditions and key actors at the city level and relate them to the project level. Each practice example will than be analyzed within a holistic framework, researching data on finances, resources,

technologies, processes, structures and outcomes. Therefore, each practice example is assessed with the same extensive template. Because each researcher comes from a different science sector, the transdisciplinary labs are very important. The environment where we bring together all the results from the interviews in the different sectors and analyze them together in a hypothesis generating process is the Morgenstadt Lab, which is based on the collaborative consulting methodology.

We further define one to three essential indicators per practice example that clearly show us the success of the practice example in terms of enhanced sustainability. The indicators are defined with reference to our Morgenstadt definition of sustainability. These indicators will be assessed based on quantitative data that corresponds to the indicators. Success factors can be certain financial innovations, organizational structures, strategies, single actors, etc. Each success factor is assessed with the same template. The most important success factors for each practice example will then be correlated on a time-scale with the defined indicators. In order to find out about greater leverage points for each city, all success factors of all practice examples in one city will then be related to each other. Finally we will analyze the success factors and frame conditions for each city and bring them into an interdependent model. The comparative analysis will then relate all data assessed within the 6 cities with each other by applying a variety of mathematical, logical and statistical methods.

The first city, Freiburg, was already investigated in February. We are going to analyze the adaptability of our research concept before we start the other city investigations. We expect the first results of the field trips in June 2013 and the final results by December 2013.

5 REFERENCES

Bundesregierung Deutschland. 2012. Die CO2-Neutrale, Energieeffiziente Und Klimaangepasste Stadt. Berlin: Bundesministerium für Bildung und Forschung.
Fraunhofer IAO, Fraunhofer IBP, Fraunhofer ISE, Fraunhofer FOKUS, Fraunhofer IFF, Fraunhofer AISEC, Fraunhofer IPA, et al. 2012. Morgenstadt: Best Practice Catalouge. 0(null) ed. Stuttgart: Fraunhofer-Institut für Arbeitswirtschaft und Organisation IAO.
Fraunhofer-Institut für Arbeitswirtschaft und Organisation IAO. 2012. Morgenstadt: City Insights. Stuttgart: Fraunhofer-Institut für Arbeitswirtschaft und Organisation IAO.
Glaeser, Edward. 2012. Triumph of the City. New York: Penguin Group.
Heilig, Gerhard. 2012. World Urbanization Prospects. Ed. United Nations. United Nations.
Schatzinger, Susanne, Dominik P H Kalisch, Alanus von Radecki, and Steffen Braun. 2012. Innovation Network "Morgenstadt: City Insights." 0(null) ed. Stuttgart: Fraunhofer-Institut für Arbeitswirtschaft und Organisation IAO.
WWF. 2010. Reinventing the City. World Wide Fund For Nature.

Neighbourhoods' Future Created by Combined Stakeholder Engagement

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1 ABSTRACT

Spaces in cities are manifold. Of particular interest for quality of life are neighborhoods. Blighted local areas undergo enhancement processes in various ways, which differ in success and sustainability of enhancement. This is often based on the stakeholder structure supporting the process. Different models display various levels of governmental as well as non-governmental involvement and collaboration of both groups often bears difficulties. How both can be useful and what model would combine the different stakeholders most effectively, is analyzed in the present work. The U.S. approach of Community Development Corporations (CDCs) displays advantages by gaining private funding and partners. Whereas, the German model guarantees enhancement processes even in areas where bottom-up initiatives and engaged nonprofit organizations are missing. In the interest of the neighborhood and the whole city, collaboration would be the best way; however, it seems that local actors have to take a leading part as experts of the local situation. The named results can also be transferred to the city context as they are neither limited to the neighborhood area nor to the studied countries.

2 GOVERNMENTAL AND NON-GOVERNMENTAL NEIGHBORHOOD ENHANCEMENT

Approaches for enhancement of distressed neighborhoods exist in almost every industrialized country. Programs differ, however can be divided into governmental-based and non-governmental-based approaches.

Governmental-based approaches are based on governmental created, lead, and funded programs. Local stakeholders take part as supporter on the neighborhood level, following the government's rules. In contrast, non-governmental approaches are bottom-up processes, getting started by local citizens, nonprofits or other area stakeholders. They define their own rules and goals and work on the enhancement of their neighborhood. Nevertheless, additional governmental funding is used during the non-governmental approach as well, which leads to the part-adaption of local goals according to governmental regulations.

Dissatisfying results often evolve from merely governmental programs sustained with governmental funding and tailored to governmental objectives and measures often using the same mission for every neighborhood that is part of the program. Such an overall program hinders covering local needs with adequate measures. Hence, local stakeholders do only play a minor role in the government's game. Participation processes exist, but are limited to strongly regulated procedures where citizens and other participants have to match with. Particular needs or desires are tough to cover while following the governmental based program.

In addition, governmental support is often limited in terms of time and money. Due to the goal of fair distribution of enhancement measures governments often limit their time and money budget. This way allows the approach to cover as many areas as possible since funding, that ends in one area will be available to another area afterwards. Time restriction often follows the idea of activating local potentials. Time restricted provision of money combined with the goal of building self-supporting structures is seen as adequate approach by the government for gaining local support and independent structures. The idea of long-term support without local contribution has to get avoided.

Therefore, the local community should get involved at an earlier time point and take over after the governmental incentives end. An example of such missing self-supporting structures after the governmental funding period is the German 'Soziale Stadt' ('Socially Integrative City') program. Being a successful enhancement program in general, the 'Soziale Stadt' program struggles by gaining necessary local support during the funding period, which leads to the end of most of the projects after the governmental funding ends. Short term extra time does not lead to long-term achievement yet.[1]

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[1] Söpper, 2012.

3   EXAMPLES OF EXISTING RELATIONSHIPS

Based on research on two examples of redevelopment approaches, the following results could be gained. The two examples are: the 'Soziale Stadt' program in Germany and Community Development Corporations (CDCs) in the United States of America (U.S.). The German program is governmental-based and currently struggling due to governmental funding cutbacks. New instruments and methods for more self-supporting neighborhood enhancement, even with reduced governmental funding are needed. Therefore, CDCs were chosen as second example. This approach is initiated by local stakeholders and follows a local mission. Governmental funding exists as well, however it is seen as additional in contrast to the initiative funding.

Both examples are based on collaboration processes, but they are generated from two different ends of the stakeholder spectrum.

3.1 Collaboration Generated by Governmental Stakeholders – 'Soziale Stadt'

The German federal program 'Soziale Stadt' is part of the main urban development promotion program. The program consists of local, mainly investive projects in clearly defined neighborhoods and is funded by the government. The combined funding model consists of one-third federal and two-thirds 'Länder' and municipality support. Local redevelopment offices and their professional staff are the center of the local engagement. The time frame of five to ten years yields the challenge of building self-supporting structures and the sustainment of successful projects.[2]

The German model 'Soziale Stadt' can be described as collaboration generated by governmental stakeholders. The following table displays some advantage as well as disadvantages evolving from this kind of collaboration structure.

advantage	disadvantage
reliable funding (governmental share)	cutbacks due to governmental financial situation
distinctive program regulations	minor flexibility, due to governmental regulations
long history of redevelopment efforts	same program for every neighborhood
even neighborhoods without local initiatives get supported	time-restriction versus long term effort
local redevelopment offices as strong local stakeholders and starting point for local network building	governmental funding can hinder private funding engagement
local initiative can apply for governmental program	reliable partners for time after governmental funding cannot be found in time
	imbalance is particularly problematic once the government starts to retreat from the enhancement process
	local businesses do not feel attracted by program
	local nonprofits contribute but do not lead
	missing acceptance of local actors as partners
	regulations and rules come one-sided
	power as well as resources are alloted to one partner only
	common goals are missing

Table 1: Advantages and disadvantages of 'Soziale Stadt'

The reliable governmental funding is one of the biggest advantages of the German model 'Soziale Stadt'. However, governmental funding faces cutbacks as well, the governmental share can be seen as important starting point for local initiatives. This governmental first step also allows distressed neighborhoods without initiatives to get an enhancement process started. Would these neighborhoods rely on a local leading private partner there might be no partner strong enough to take the first step. Due to the long history of redevelopment efforts in Germany, the approach is proven to be reliable and even successful. The process was reviewed as well as adapted over time. The core instruments of the 'Soziale Stadt' program are

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[2] BMVBS 2012; Centre for Knowledge Transfer 'Social City' 2008; Franke 2011; Franke 2005; Lahner, Zimmermann 2005

'Quartiersmanagements' meaning local neighborhood offices. These offices are paid by the government and build the local hubs for every activity. These low key meeting places are often successful in gaining partners for redevelopment efforts (even if their contribution might be time-restricted). Moreover, the German program also includes the chance for local initiatives to apply for the governmental funding if there was a initiative build by the neighborhood without governmental support at first.

The German model displays disadvantages as well. Recent cutbacks of the governmental funding hit the project areas hard, since they cannot cover this shortfall by private funds. Moreover, the governmental money comes with regulations attached, which means minor flexibility for local projects. Therefore, every neighborhood receives governmental money following the same rules and the same enhancement program, due to the federal regulations. Local singularities cannot be covered. Although the neighborhood revitalization has to be seen as long term effort, the governmental funding program is time restricted. Private engagement often is discouraged by the governmental regulations which can hinder private funding support. The largest challenge for the 'Soziale Stadt' program is gaining long term private partners. These local non-governmental partners are necessary for continuing the redevelopment effort after the governmental funding ends. However, due to the one-sided activities lead and paid by the government, they feel as participants more than as partners. In particular, local businesses do not feel attracted by the governmental lead program and miss flexibility. Local nonprofits contribute to the efforts started by the program but are no leading partner. In general, common goals for redevelopment combining governmental and non-governmental stakeholders are missing.

As shown above, German redevelopment efforts depend on governmental funding as starting point for neighborhood enhancement. This is based on the German understanding of the state and the role of the particular citizen as well as existing legal structures. In Germany, redevelopment of local areas is part of the so called 'Fürsorgestaat' (welfare state) and its measures have to be coordinated and paid for by the government. Local citizens do not feel personally responsible for their neighborhoods compared to U.S. neighborhood citizens. Therefore, governmental funding will still remain a necessary component of redevelopment efforts in future times.[3]

advantage	disadvantage
governmental and private funding is used in a combined way right from the beginning of the community development effort	first steps have to take place without governmental support at all
government is an important partner as sponsor	(economical) weak neighborhoods might not be able to get initiatives started on their own
no substantial dependency on governmental funding	more powerful actors might overrule silent inhabitants
stakeholders act as partners in a mutual undertaking	
designated long-term mission	
local projects are conducted by local people	
closer connection of the projects to the neighborhood since goals are based on neighborhood demands	
activation processes have to be intense, due to dependence on private money	
more long-lasting projects may be realized and funded	

Table 2: Advantages and disadvantages of Community Development Corporations

3.2 Collaboration Generated by Non-governmental Stakeholders – 'Community Development Corporations'

Alternatively, neighborhood enhancement can start on the local level and involve local stakeholders as leading part. This is the case in U.S. Community Development Collaborations (CDCs), which are founded by the neighborhood itself and additional funding is provided proportionally by the government.

Crucial for Community Development Corporations (CDCs) is their founding process, which takes place without governmental influence, but with local stakeholders only (citizens, businesses, nonprofits, etc.).

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[3] Franke 2011; Schönig 2011

Professionals as well as local people without respective professional background work at the installed local offices. Local projects take place in collaboration with local partners (citizens, shop owners, large businesses, banks, nonprofits, etc.). Even funding is organized locally, supported by donations, and complemented by governmental funding (grants, etc.). No time restriction exists for CDCs, since they work with five-year plans and a long-term mission. This model has several advantages over the model described above.[4]

Community Development Corporations gain sufficient support from neighborhood citizens, nonprofits, foundations, banks, and local businesses, in particular since they are established by stakeholders from the neighborhood itself and part of its staff also comes from the area. First steps have to take place without governmental support at all. Locals are partners right from the beginning and additional governmental funding is combined with private local funds. Collaborations on the local level have to be built, and common projects have to be phrased prior to applying for governmental support. Nevertheless, the government is an important funding partner, but no one-sided independency evolves. The program follows a designated long-term mission and local projects are conducted and mainly paid by local stakeholders. These locally based and funded initiatives know local problems better and are closer to their neighborhood and residents, as well as participants and collaborators. Therefore, the program creates a closer connection to the neighborhood as well as an intense participation and activation process, since the money has to be collected from local partners. This leads to more long-lasting projects in the neighborhoods and all involved stakeholders act as partners in a mutual undertaking.

Disadvantages can be named for this program as well, since it can also be problematic that the first steps of the enhancement process have to be taken without governmental support at all. Thereby, (economical) weak neighborhoods might not be able to get initiatives started on their own. Moreover, more active participants might hinder other (more silent) potential partners from getting heard and getting involved.

3.3 Collaborations

It has to be stated that the paper focuses on the way the collaboration was generated, meaning who indicated the collaboration process. Of course, way and intensity of collaborations differ independent from their initiation process. Much good and fruitful collaborations exist in the 'Soziale Stadt' areas in Germany as well as in CDC neighborhoods in the U.S.; same with unsuccessful enhancement processes in both countries.

As result of the conducted research above, the following main goals for successful collaboration are stated: combined governmental and non-governmental funding, partnership instead of participation, long term collaboration, local based projects.

3.3.1   Combined governmental and non-governmental funding

As the examples show, the combination of governmental and non-governmental funding makes neighborhood enhancement efforts strong and reliable. The mutual contribution to redevelopment efforts prevents from one-sided dependency and one-sided goals. Reliable governmental funding shares should be combined with a share of private funding. The private part should be gained through partnership instead of participation (see below). This common funding model displays the common approach as well as the common responsibilities all partners share. Depending on the cultural background of the country the leading partner can be private or governmental.

Using the U.S. and German example combined funding means: U.S. redevelopment approaches like Community Development Corporations (CDCs) avoid one-sided dependency by the combined use of governmental and private funds. Governmental money is only provided, if private funds are present, too. Thereby, projects only come to life if the private share (up to 50 %) is guaranteed, as well. Such an approach could also be useful for German redevelopment, instead of providing governmental money for projects that lack private funding. This method would be helpful to make projects more self-supporting and stop one-sided dependency on governmental money. Moreover, the search for private funding support could be an important part of the activation strategies in the neighborhood. Existent project funding should not comprise only the building or installation of the project, but also include maintenance and service periods in the future,

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[4] Accordino 2007; Brophy, Shabecoff 2001; DeFilippis 2008; Grogan, Proscio 2000; Peterman 2000; Rubin 2000

as it is the case in the U.S. model. Such an approach would prevent projects from taking place, for which no budget for future maintenance exists, as has happened in German 'Soziale Stadt' projects sometimes.

3.3.2 Partnership instead of participation

Gaining partners for the common undertaking of enhancement is crucial. Following the combined funding model, local actors should be seen as partners instead of participants. The difference between these two ways of collaboration lies in the guiding role. If local stakeholders only participate on the governmental effort, they are not responsible for the outcome and most important they are not able to influence the goals of the undertaking. Obtaining a participant brings support for the already existent project. Obtaining a partner brings someone in who shares the same idea and the same level of responsibility for the project. Partners in redevelopment define their common goals together and contribute in the same way. This seems the more promising way of neighborhood enhancement than the one-sided German model.

Regarding the 'Soziale Stadt' approach and U.S. CDCs partnership means: In the U.S., citizens are perceived not only as participants, but also as funding partners. Local inhabitants should be asked for support (money or manpower) if governmental money has to be complemented. Working with a combination of governmental money and private funds forces CDCs to get local stakeholders on board early and to build partnerships with the residents. Incentives are given for people to donate time and money by providing them influence on the decision making process and on implemented projects, which they pay or work for. Such more interactive participation processes and the building of partnerships rather than hierarchical structures between the office and the neighborhood including more co-determination for the people would most likely improve German approaches, as well.

3.3.3 Long term collaboration

Moreover, the collaboration should follow long term goals. Since neighborhood enhancement is a long term challenge and improvement cannot be reached during a few years, the collaboration needs to phrase long term goals together. Working together on future projects brings in more commitment by the singular partner. Reliable planning horizons attract private partners most. In addition, governmental partner need to be interested in a sustainable enhancement of their city areas instead of short term success, which is fading away after the redevelopment program left.

The German redevelopment program shows how problematic situations can get, if the governmental money is withdrawn from the area before sustainable enhancement took place. In contrast, the U.S. approach never sets a deadline, but uses long-term missions combined with 5-year implementation plans.

3.3.4 Local based projects

Working on the city and neighborhood level always comes with particular challenges and situations. These situations differ from area to area. Therefore, it is very important to be aware of different challenges and particular needs existent in the neighborhood. This particular situation can be understood best by working with local stakeholders and obtaining local partners. The goal of redevelopment efforts needs to be, establishing local projects, based on local ideas, and (partly) funded by local partners. Neighborhood stakeholders are manifold, beginning with inhabitants, businesses, nonprofits and so on. The more local input the project consists of the more likely it will be successful.

German 'Quartiersmanagements' contribute to a local view on projects and are able to gather local ideas. Nevertheless, the U.S. local redevelopment offices are more active in gaining local partners and in getting in touch with as many local stakeholders as possible. In particular business and nonprofit partners need to be contacted more in Germany. Common projects will lead to a common effort on local enhancement.

4 NEW RELATIONSHIPS

The question about the neighborhoods future and the role combined stakeholder engagement plays on this behalf was answered for the local level using the example of neighborhood enhancement. However, this research results can also be transferred to the city level as well as an to an international context.

4.1 Neighborhood Enhancement by Different Relationships

The chosen examples show that neighborhood enhancement always depends on the general understanding of the role of a country's government. Strong dependence on the government comes along with comprehensive governmentally lead support programs for the neighborhoods, whereas more individualistic societies do not depend as strongly on the government.[5] Thus, no model fits every country since the context has to be taken into account. Nevertheless, neighborhood enhancement has to take place between partners. Neither can the government improve the situation on its own, nor can the local area start projects entirely without governmental support. Consequently, new relationships have to be built. Ideas and engagement have to be contributed by the neighborhood, whereas organizational and monetary support has to be provided by the government and the local partners alike. Eventually, the neighborhood – accompanied by the government – decides about its future. Non-governmental stakeholders could and should play an important role in redevelopment efforts in the future, if they are seen as partners and provided with necessary power and responsibility. In addition, the engagement of citizens and business has to receive more appreciation.

4.2 Ways of Stakeholder Engagement and their Importance on the Future of Cities

The presented research used redevelopment as an example and manageable research area, but its results are important for the city context as well. Many cities of the world face increasing numbers of challenges combined with a decreasing amount of governmental money available. Accompanied by the newly established understanding of citizen and private stakeholder engagement this should lead to a new way of dealing with the cities' challenges.

City governments will not be able to create their future on their own. Many new stakeholders are about to claim their share of the city and its future. Although, the government will still play an important role in securing the common good and fair living conditions for every inhabitant, planning projects will be shared ventures in future times. How collaboration between these stakeholders can take place and what needs to be aimed at has been described above.

If the cities' future will be based on shared efforts of all city stakeholders using combined governmental and non-governmental funding, if it is build upon partnership instead of participation, if it reaches for long term collaboration, and if it works on local based projects, the future challenges might not be that frightening anymore.

5 REFERENCES

ACCORDINO, John: Revitalizing Neighborhoods through Civil Society Partnerships: The Richmond Neighborhoods in Bloom Program. In: Altrock, Uwe; Hoffmann, Heike; Schönig, Barbara (eds): Hoffnungsträger Zivilgesellschaft? Governance, Nonprofits und Stadtentwicklung in den Metropolenregionen der USA. Kassel, 2007.

ALTROCK, Uwe; HOFFMANN, Heike; SCHÖNIG, Barbara (eds): Hoffnungsträger Zivilgesellschaft? Governance, Nonprofits und Stadtentwicklung in den Metropolenregionen der USA. Kassel, 2007.

BROPHY, Paul C.; SHABECOFF, Alice: A guide to careers in community development. Washington D.C., 2001.

BUNDESMINISTERIUM FÜR VERKEHR, BAU UND STADTENTWICKLUNG DEUTSCHLAND (BMVBS) (Federal Ministry of Transport, Building and Urban Development): Soziale Stadt. Zukunftsfähige Entwicklung benachteiligter Stadtquartiere. Berlin, 2012. [http://www.bmvbs.de/SharedDocs/DE/Artikel/SW/soziale-stadt.html, last checked April 22, 2012].

CENTRE FOR KNOWLEDGE TRANSFER 'SOCIAL CITY' (BUNDESTRANSFERSTELLE SOZIALE STADT): Status Report The Programme "Social City" (Soziale Stadt). Summary. Bundesministerium für Verkehr, Bau und Stadtentwicklung Deutschland (Federal Ministry of Transport, Building and Urban Development). Berlin, 2008.

DEFILIPPIS, James: Community Control and Development. The long view. In: DeFilippis, James; Saegert, Susan (eds): The community development reader. New York, 2008.

DEFILIPPIS, James; SAEGERT, Susan (eds): The community development reader. New York, 2008.

FRANKE, Thomas: Auswirkungen der Mittelkürzungen im Programm Soziale Stadt. Sind die Entwicklung benachteiligter Stadtteile und lokale Integrationsprozesse gefährdet? Bonn, 2011.

FRANKE, Thomas: Quartiermanagement im Spannungsfeld zwischen Politik, Verwaltung, Markt, Drittem Sektor und „Zivilgesellschaft". In: Greiffenhagen, Sylvia; Neller, Katja (eds): Praxis ohne Theorie? Wissenschaftliche Diskurse zum Bund-Länder-Programm „Stadtteile mit besonderem Entwicklungsbedarf – die soziale Stadt". Wiesbaden, 2005.

GROGAN, Paul S.; PROSCIO, Tony: Comeback cities. A blueprint for urban neighborhood revival. Boulder, 2000.

HOLLAND, Thomas P.; RITVO, Roger A.: Nonprofit organizations. Principles and practices. New York, 2008.

LAHNER, Marion; ZIMMERMANN, Karsten: Integrierte Stadtteilentwicklung: Bedeutung, Zusammenhang und Grenzen von Place-Making, Sozialkapital und neuen Formen der Local Governance. In: Greiffenhagen, Sylvia; Neller, Katja (eds): Praxis ohne Theorie? Wissenschaftliche Diskurse zum Bund-Länder-Programm „Stadtteile mit besonderem Entwicklungsbedarf – die Soziale Stadt". Wiesbaden, 2005.

---

[5] Peterman 2000

PETERMAN, William: Neighborhood planning and community-based development. The potential and limits of grassroots action. Thousand Oaks, CA, 2000.

PHILLIPS, Rhonda; PITTMAN, Robert H. (eds): An introduction to community development. London/ New York, 2009.

RUBIN, Herbert J.: Renewing hope within neighborhoods of despair. The community-based development model. Albany, NY, 2000.

SCHÖNIG, Barbara: Pragmatische Visionäre. Stadtplanung und zivilgesellschaftliches Engagement in den USA. Frankfurt am Main, 2011.

SÖPPER, Katharina: Mobilizing More than Governmental Support for Distressed Neighborhoods. U.S. Redevelopment Approaches and Instruments Can Demonstrate New Ways of Private and Nonprofit Sector Support for German Neighborhood Redevelopment. Dissertation. Vienna, 2012.

Neoliberal Challenges and Practices of Urban Regeneration Projects in Istanbul

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1 ABSTRACT

Like in many other developing countries under globalization and structural change processes, Turkey has experiencing great deal of changes in its urban structures fort the last two decades. Among them urban regeneration is one of the highly debated planning issues in the last decade. In addition to major structural changes like integration of urban fringe to the core, de-industrialization, urban sprawl and re-invention of the city center as cultural domain; planning issues such as renewal of historical areas, disaster mitigation planning in risk prone zones, and re-development of brown field areas have put a complex agenda in urban planning practice.

In the recent decade, the central government in Turkey has issued several legal planning tools to enable urban regeneration projects in Istanbul and in many other cities. However, in many cases these legal arrangements were acted as ad-hoc solutions for case-specific urban regeneration projects and the empowerment of some central state organizations such as State Housing Authority (TOKI) and Privatization Authority (OIB) in plan making process have caused fragmentation in urban planning process in Turkey.

In this paper some selected urban regeneration cases will be scrutinized in order to explain the current actors and their roles in plan making process. An assessment will be made on the effects of Neo-liberal approaches to current planning issues in Istanbul and a discussion will follow about the possible outcomes of fragmentation in urban planning practices.

2 CONCEPT OF URBAN TRANSFORMATION

During recent years, like in many other countries, there have been several discussions in Turkey on the phenomenon of urban transformation. Urban transformation varies between nations with respect to proposed vision, objective, strategies and employed methods. The focal point of discussions is that urban transformation cannot be restricted with the transformation of a physical space but needs to embody cultural, social, economical and environmental aspects as well.

Within this framework urban transformation is acknowledged to be a comprehensive vision and action that aims to provide permanent solutions for the economical, physical, social and environmental urban problems witnessed in a transformed region (Thomas, 2003).

Urban transformation is basically conducted to reintegrate outdated, battered, bedraggled, nonfunctional and economically worn-out regions within the large texture of city. It refers to the whole set of strategies and actions followed to improve economical, social, physical and environmental urban conditions via implementing comprehensive and integrated approaches.

In a different saying, it implies re-improvement and regeneration of an outdated economical activity, revitalizing of a nonoperational social function; in ostracized regions enabling reintegration with larger society; reestablishing the harmony in regions where environmental quality or balance is lost (Roberts, 2000).

2.1 Concept of Urban Transformation during post-1980

A closer look at the historical development of urban transformation reveals that the breaking point of this phenomenon coincides with the 1980s. A definition of the phenomenon of urban transformation calls for a better grasp of globalization, competition and sustainability concepts that collectively impacted planning strategy as of the 1980s.

Having existed and acknowledged before the 1980s urban transformation first referred to transformation of unsanitary urban conditions of laborers in major European cities particularly after the Industrial Revolution as well as physical transformation of cities wrecked in the aftermath of the First and Second World Wars. It was perceived as rehabilitation of unsanitary urban conditions or restructuring of battered urban textures. In

the preceding years of 1980s urban transformation in the narrowest sense implied a transformation of physical space; however in subsequent years it gained new dimensions by virtue of changes from traditional marketing strategy towards strategic spatial planning.

Context and meaning of transformation changed in a way to encompass transition to information technologies, urban competition, sustainability, governance, social facts, social belonging, localness and ecological features.

As a consequence, phenomenon of urban transformation initiated by Industrial Revolution and extended till the 1980s was defined as reconsidering physical battering caused in urban land by rapid urbanization, spatial change in the city, population density in urban lands and relevant factors. However in the aftermath of 1980s it has been dealt within a conceptual structure in which the union of physical, economical, social, environmental and technological relations has been questioned and transformation has been analyzed within the framework of this interrogation.

2.1.1   Different Dimensions of Urban Transformation

Urban transformation includes in itself four key dimensions which all complement one another; planning of physical space, social facts, economical features and legal/administrative structure. Physical space dimension relates to transportation connections of the region in which urban transformation is implemented, housing stock it preserves, technical substructure and social equipment capacities and environmental problems. Planning dimension involves spatial plan, development and change of transformation zone. Social dimension embodies access to public services such as health and education, crime, social exclusion, public and private sector partnership, participation of locals and volunteers. Economical dimension implies boosting the quantity and quality of employment opportunities and created added value in selected region and its vicinity (Kokturk, 2007). Legal/administrative dimension integrates structure of local decision mechanisms, relations with local community, participation of interest groups and actors playing role throughout the process.

2.1.2   Targets of Urban Transformation

By definition concept of transformation has effect on the structure of city and physical, environmental, social and economical future of urban settlers. Hence in all planning activities, a multidisciplinary approach that integrates sociologists, planners, architects, engineers, economists, legal practitioners, historians, landscape architects should be adopted. Treating qualified lands as merely transformation of physical space brings about the rise of problems throughout the implementation of project which in turn delays the completion of project or even causes an annulment.

From this point of view, urban transformation is required to be planned to serve five key objectives (Roberts, 2000).

A direct relation should be established between physical conditions of the city and social problems. One of the most influential factors in the dilapidation of urban lands is social deterioration or societal collapse. Urban transformation projects should prioritize the underlying reasons behind social deterioration and propose preventive suggestions against societal collapse.

Urban transformation should meet continuous, physical change need of many elements constituting urban texture. In other terms urban transformation project should enable re-improvement of urban components in accordance with new physical, social, environmental and infrastructural needs emerging in the rapidly enlarging texture of city.

It should hold a local economical development approach boosting urban welfare and life quality.

Aside from physical and social deterioration, one of the most significant reasons wrecking urban lands is the loss of economical vitality in these regions. Urban transformation projects are required to develop strategies that shall revitalize economical flourish in urban components that are in the form of physical and social wrack. In these projects employment opportunities and increase in added value should be sine qua non condition to prioritize.

Strategies that enable the most effective use of urban lands and prevent undesired urban sprawl should be implemented. Urban growth should promote compact city.

Urban transformation projects should possess one or several of these targets in accordance with the problems, threats, opportunities and potentials of particular urban region.

2.2 Relation between Urban Transformation and Urban Projects

Activities directed towards the actualization of targets identified with urban transformation should be treated as a process. In that case the process in urban transformation projects are;

in line with Urban Development Vision

within the framework of Strategic Spatial Planning approaches

identified by Urban Project

defined by Implementation Program and Tools.

What is the focal point in present research is that urban projects are crucial toolsin urban transformation projects. However it would be a misleading and incorrect approach to claim that phenomenon of urban project is merely a reorganization of physical space. It is required to integrate with the project throughout different stages the multi disciplines that encompass different dimensions of urban transformation. Urban projects mostly focus on urban components that have been discriminated by industrial city and become nonfunctional under current conditions. Urban projects also can take stage in a wide range of domains such as recovery of old industrial and port areas in idle status; building of techno-parks, amusement parks, housing zones demanding modern technological infrastructure and international capital; polishing old urban housing zones by adding new prestige. Hence in urban interventions, urban projects act as crucial planning and design tools. Urban components constituting the subject of urban projects can posses "public space" or "private space" quality. Urban projects of which main objects are public and private space can thus initiate with itself a process of urban transformation. Therefore it is a must not to reduce urban projects to merely physical space but handle it collectively with the other components of space.

In its modern sense concept of urban transformation refers to a comprehensive restructuring approach directed towards overcoming social, economical and spatial wracks triggered in cities by the dynamics of post-Fordist era in particular and problems of post industrial period developmental stages (Sökmen, 2003). What deserves particular attention at this point is the kind of planning approach urban transformation concept and subsequent urban project approach are associated with.

2.2.1 Implementation Forms of Urban Transformation

Urban transformation is a wide-scope concept including in itself the implementations aimed towards renewal of present urban structure. Different forms of implementation enclosed in urban transformation are as outlined below:

Renewal: Urban renewal activity takes stage according to the needs of urban spaces having passed to deterioration and wrecking process because of the development and change of urban functions and socio-economic structuring. Renewal is defined as restructuring after demolishing some or all buildings in areas of which living and sanitary conditions cannot be improved because of both settlement design and status of existing structures.

Urban Renaissance: Urban renaissance basically focuses on the process witnessed in the transformation of London in Britain. It generally advocates establishing harmony amidst economical competition, minimizing social exclusion and environmental protection (Gibson&Kocabas, 2001).

Rehabilitation: Rehabilitation is rehabilitating via rearrangement a wrecked building or set of buildings of which density has increased due to several recent additions and modifications but of which original quality is still preserved. It implies reopening to use of old urban texture and wreckage lands by making use of partial renewal.

Preservation-conservation: Preventing the loss of physical structure that reflects a society's ancient social and economic conditions and cultural values because of the experienced changes and developments (Erden, 2003). Union of urban texture with modern life is defined as rehabilitating cultural assets by virtue of economical and functional conditions beneficial for society. The concept involves two kinds of approaches; preservation with the original quality or conservation with limited changes.

Revitalization: Urban revitalization is by eliminating social, economical and physical impacts triggering deterioration in urban regions passing to period of collapse to re-strengthen and revitalize the land via reintegration with the urban system.

Redevelopment: Developing within a new planning design the urban textures of which economical and structural qualities are too deteriorated to conduct renewal.

Improvement: A public action type aimed towards unplanned development of a whole or part of city; manipulating development to gain societal benefit and establish relation between functions and land use.

Clearance: Defined as removal of unsanitary conditions in houses and other buildings within regions in which low-income groups are densely populated. The process is described as "Slum-Clearance" in Western world.

Brownfield development: Joining new activities and structures into an existing structure in any region.

Refurbishment: Indicates revitalization of historical lands by using landscape components and urban furniture that play crucial role in the acquisition of urban image and character.

Aside from above defined implementation forms of urban transformation projects, there are several implementation forms known by different names or formed by the combination of several of the ones above. Selection of implementation forms within an urban transformation project varies with respect to physical, social and economic structure of particular region and legal framework effective on the treatment of particular issue.

3 URBAN TRANSFORMATION PROJECTS IN TURKEY

Urban transformation phenomenon in Turkey though bears similarities to developed Western states, also exhibits substantial divergences which stem from economical and political facts surrounding Turkey as well as historical past and social and cultural structure of the nation.

In the West a set of intervention methods has been developed so as to deal with a variety of urban transformation problems. In Turkey on the other hand the most emphasized dimension in urban transformation is change of informally developing housing zones (slums etc.) (Türel 2005). In Turkey, State Housing Authority (TOKI) acts on behalf of general public during urban transformation processes and fuels the transformation in these domains. Presently TOKI is the most powerful and effective central government authority in urban transformation within Turkey. Other participating public actors are Ministry of Environment and Urban Planning, Ministry of Culture and Tourism and Municipalities. Additionally in recent years projects implemented by real-estate development agencies have been seated in the first rows on public agenda. In relation to the quality and location of urban transformation, international organizations and agencies such as UNESCO, ICOMOS can also play role in urban transformation projects within Turkey (Kocabas, 2006, Dincer&Enlil&Evren, 2009).

Modern cities in Turkey face several urban transformation problems ranging from developing earthquake-resistant urban spaces, conservation of natural, historical and cultural heritage, legalizing and rehabilitating informal and low quality of life in urban lands. In Turkey urban transformation is generally reduced to merely transformation of physical space thus social, economical and environmental dimensions of transformation have been neglected. In Turkey response to urban transformation problems have been, rather than political interventions within the scope of a definite plan and program, based on market conditions; 'ad-hoc' solutions of community; mutual interactions between central and local administrations.

In Turkey urban transformation projects implemented during post- 1980 in particular have received much criticism on accounts of being allegedly the kind of projects creating uncontrolled urban sprawl, deterioration of cultural, historical and natural assets, non-industrialization, ignoring environmental sustainability, reflecting non-local features, climbing social inequality, social exclusion and polarization, providing a limited spatial quality (Ercan, 2011).

3.1 Legal Dimension of Urban Transformation in Turkey

In Turkey, cities have been transformed in this framework of urbanization problems; however the introduction of urban renewal concept in urbanization and planning practice in Turkey coincides with the 1970s and its utilization as an implementation tool in planning corresponds to the 1980s.

Regulations and practices concerning urban transformation have for a long time been conducted within the framework of effective legislations and legal provisions (Genc, 2008). Therefore unlike Western states which adopted multi-dimensional, comprehensive political practices, techniques and methods, corporate and financial structure there have been ad-hoc solutions and practices that are nonrelated and developed by different administrative units only when a necessity emerged. In its current form it can be argued that there is a fragmented structuring within the relevant legislation.

In addition to these developments, fueled by EU membership process too, there have been major legal regulations involving urban transformation issue as of year 2000 in certain public administrative reforms. Amongst them the most fore grounded regulations are;

Date	Law No	Law Title* *(in abbreviated format)	Scope with respect to Urban Transformation
1966	775	Illegal Housing Prevention Law	Preventing unplanned structuring via illegal housing prevention
1984	2981	Law on Buildings Violating Construction and Illegal Housing Prevention Law	Indirect implementation of urban transformation projects via Improvement plan
1984	2985	Mass Housing Law	Regulations to meet housing demands
1985	3194	Construction Law	Regulations on Construction Plan preparation and approval
1994	4046	Privatization Law (Article 41)	Amendment in Article 9 of Construction Law, granting planning and approval authority to Privatization Administration
1997	4232	Privatization Law (Article 4)	Amendment in Article 9 of Construction Law,
2004	5104	North Ankara Transit Urban Transformation Project Law	Legal regulations on private project lands
2004	5162	Amendment in Mass Housing Law	Amendment in Article 4, in transformation lands granting planning and approval authority to TOKI
2004	5226	Amendment in Cultural and Natural Heritage Conservation Law	Definition of Renewal Land and renewal projects
2005	5393	Municipality Law	Pursuant to Article 73 of the Law urban transformation and development projects are approved.
2005	5366	Law on Battered Historical and Cultural Real Estate	Selecting the neighborhoods dominated with battered historical and cultural assets as renewal zones,
2010	5998	Amendment in Municipality Law	Amendment in Article 73, Scope of urban transformation and development project is widened.
2011	644	Body and Missions of the Ministry of Environment and Urbanism	Pursuant to Cabinet decree, authority to plan and approve for all the lands under the rule of central administration, authority to identify the procedures and principles concerning urban transformation practices
2012	6306	Law on Transforming Disaster Risk Zones & Regulation on implementation of Transforming Disaster Risk Zones	Identification, planning and setting implementation procedures for disaster risk zones, -Identification of Risk Buildings in an Earthquake Risk Report, -Pursuant to Cabinet Decree identification as **risk zone**

Table 1: In Turkey Major Legal Regulations involving Urban Transformation issue

Main factors influential in the emergence of legal regulations aimed so far to direct urban transformation in Turkey throughout historical process can be listed as below;

Illegal Housing Prevention Zones:

Squatter houses (illegal houses, slums) refer to the housing style addressing to low income groups of which residential demands could not be met through legal methods. In Turkey the system basically addressed to the former rural settlers that migrated to cities in the aftermath of rapid urbanization process witnessed in post Second World War era. In Istanbul, Illegal Housing Prevention Zones practices were developed in Sarıgöl – Yenidoğan and Tozkoparan districts by Municipalities of Gaziosmanpaşa and Güngören pursuant to 775 no Law in addition to Ayazma and Kayabaşı Mass Housing Zone applications within the borders of Başakşehir Municipality are the most significant samples. The objective of this law is to prevent unorganized public housing that emerge due to rapid urbanization on public urban lands and providing organized housing areas for the needy citizens via mass housing practices in the selected zones. Nonetheless the positive outcomes obtained by these practices have been confined to total urban development phenomenon witnessed in Turkey during the last four decades. In years squatter housing has turned into a way of grabbing advantage-though informally- from urban development rents thus owners of squatter houses rejected to be involved in such formal arrangements.

Renewal Zones:

In renewal zones proclaimed pursuant to 5366 no Law, the aim is to plan the neighborhoods in which historical and cultural assets are densely populated. Publicly known as Tarlabaşı Project, Sulukule Project, Fener Balat Project these projects are the leading examples of renewal lands within the borders of Istanbul. Basically these are the regions situated in city center and favored by middle and low income groups till recent times on accounts of their proximity to former industrial zones and its subsequent connection with city center afterwards. However the new objective is to renew these regions in accordance with non-industrialization phenomenon experienced gradually in the central zones in Istanbul and at the same parallel to the rediscovery of cultural, touristic and aesthetic identities in particular spots within city center. This legal regulation aiming to improve urban standards of particular zones through physical renewal and life quality of settlers failed to envisage an intervention with the accompanying social and economical processes. Consequently former inhabitants in the course of time migrated from their original settlements (gentrification) as they failed to adopt new economical and social conditions (Ergun, 2004; Uysal, 2012). In the course of time this movement has turned into a tool aiming to present for the taste of new urban middle class and global tourism investors through aestheticization of historical urban identity elements in particular regions reflecting historical identity of the city.

Cabinet Decree	Official Gazette No	Official Gazette Date	Renewal Land
2006/10172	26122	28.03.2006	Beyoğlu (Cezayir Blind and its vicinity, Tophane District, Galata Tower neighborhood, Beyoğlu Municipality Building and its vicinity, Bedrettin Neighborhood)
2006/10299	26147	22.04.2006	Fatih (Fatih – Kürkçübaşı Area Bulgurpalas, Atikmustafapaşa Neighborhoods, Fatih Balat Karabaş – Tahta Minare Neighborhoods, Hatice Sultan – Neslişah Neighborhoods)
2006/10455	26186	02.06.2006	Tuzla (Tuzla Köyiçi)
2006/10501	26206	22.06.2006	Eminönü (Süleymaniye, Hacıkadın, Kalenderhane, Mollahüsrev, Hoca Gıyaseddin, Sarıemir, Yavuz Sinan, Demirtaş Neighborhoods)
2006/10502	26207	23.06.2006	Zeytinburnu (Zeytinburnu Wall Isolation Band)
2006/10961	26318	13.10.2006	Fatih (Haraççi Kara Mehmet, Yali, Küçük Mustafa Paşa, Hüsambey, Kasap İlyas, Haci Hüseyin Ağa, İmrahor, Arpa Emini, Şeyh Resmi , Hatice Sultan, Ereğli, Kürkçübaşi, Cerrahpaşa , Davut Paşa, Atik Mustafa Paşa, Fatma Sultan, Çakirağa, Kirkçeşme, Neslişah , Haci Evhattin, Haci Hamza, Canbaziye, Balat Karabaş, Tahta Minare, Abdi Subaşi, Veledi Karabaş, Beyazitağa, Molla Aşki, Sancaktar Hayrettin Neighborhoods)
2007/12375	26588	20.07.2007	Eminönü (Nişanca, Sultanahmet)
2007/12429	26597	29.07.2007	Fatih (On İmrahor Neighborhood 2384 No Block previous parcel no "11" has been changed as "L")
2007/12893	26737	25.12.2007	Eminönü (Old Bazaar and its Neighborhood)
2008/14349	27074	04.12.2008	Tuzla (İçmeler, Kamil Abduş Lake and its Neighborhood)
2010/405	27586	20.05.2010	Eyüp (Nişanca, Cezrikasım Neighborhoods)

Table 2: Renewal Lands Proclaimed in Istanbul

- Law on the Transformation of Disaster Risk Zones:

As a natural consequence of unorganized and uncontrolled urbanization natural disasters, mostly earthquakes, bring about even greater damages. In cities devastating effects of earthquakes become even deeper due to population boost, land use, defects in structures, insufficiency of substructure and services, environmental problems. Pursuant to 6306 no Law it has been aimed to consolidate risky structures or demolish then reconstruct an earthquake-resistant building (Ozcevik, 2007). As stipulated under this law loan supports are provided for the house owners in risky structures and contractor's in-charge.

A substantial portion of Turkey is situated in first degree seismic belt. As an outcome of the rapid urbanization process witnessed during the last four decades not only the emergence of comparatively low-quality urban settlements has been observed but also the emergence of zones with dense housing textures that are non-resistant to earthquakes. This legal regulation not only aims to minimize the losses in the face of a potential earthquake but also to improve unorganized settlings. Nonetheless at this point a market-centered political approach which ignores the fact that urban physical improvement's basic aim is to create safe urban lands -which in fact is the inherent mission of ruling government- is once again utilized. Thus through

reallocation of urban rents, settlement density in these zones is multiplied to create new demands of houses/trade zones. In that case urban land improvement which is theoretically true in legal regulation fails to be valid in practice. Because of market-centered approach selected as the tool, it remains under the shadow of problems concerning more permanent infrastructure and urban equipment zone standards that emerge parallel to the rise in urban density.

Cabinet Decree	Official Gazette Nr.	Official Gazette Date	Disaster Risk Zones
2012/3791	28434	7 October 2012	Esenler (Atışalan Airport and Atışalan Tuna Neighborhoods)
2012/3786	28457	4 November 2012	Beyoğlu (Örnektepe and Sütlüce Neighborhoods)
2012/3901	28457	4 November 2012	Beyoğlu (İstiklal Neighborhood)
2012/4125	28534	20 January 2013	Sarıyer (Fatih Sultan Mehmet Neighborhood -Armutlu)
2012/4163	28538	24 January 2013	Sarıyer (Çamlıtepe-Derbent Neighborhood)
2012/4160	28539	25 January 2013	Zeytinburnu (Sümer Neighborhood)
2012/4099	28540	26 January 2013	Gaziosmanpaşa (Merkez Neighborhood)
2013/4254	28551	06 February 2013	Sultangazi (Cumhuriyet Neighborhood)
2013/4258	28551	06 February 2013	Küçükçekmece (Kanarya Neighborhood)
2013/4257	28552	7 February 2013	Küçükçekmece (Fatih Neighborhood)

Table 3: Proclaimed Risk Zones in Istanbul

- Urban Transformation Zone

Pursuant to Article 73 of Municipality Law in proclaimed urban transformation zones such as Sumer Neighborhood (Zeytinburnu, Istanbul) the objective is to construct new living spaces fulfilling demands of modern way of life. However in the regulations sticking to Municipality Law municipality's approach on transformation zones is the determinant force.

- Regulations conducted within the scope of 3194 no Law

Master and tentative plans conducted within the scope of Construction Law and applications conducted via increasing structuring density in housing lands and introducing minimum parcel size are within this framework. Transformation phenomenon experienced in former villages that were once part of rural land but became an integrated part of urban settlement parallel to the expansion of cities is best illustrated in Mahmutbey Village (Bağcılar). Another critical zone on public agenda is Fikirtepe (Kadıköy) urban transformation project. Fikirtepe is situated in a location that was once in the periphery of city but became an integrated part of urban settlement and gained increasing land ratings. In addition there are various urban transformations depending on construction parceling plans. İstinye, Ferahevler (Sarıyer) can be given as an example to these zones but it should be analyzed in a more comprehensive study. Aside from housing transformation practices, in construction plans aimed towards industrial zones, resolutions for industrial transformation are also taken. An example for industrial zone transformation projects is Kartal Sub Center Urban Transformation Project designed by well known architect Zaha Hadid. This project also brought about with itself a good deal of public controversies.

- Zone-Specific Laws:

Urban transformation projects can also be implemented via laws released specific to transformation zone and scope. In addition to the earliest 2004-dated regulation released specific to city of Ankara, 2012-dated projects of Kazım Karabekir, Inkılap, Hekimbaşı Neigborhoods (Ümraniye, Istanbul) and Şerifali Farm (Ataşehir, Istanbul) are such laws. Aside from that as regards transformation of port areas regulations on Galata Port and Haydarpaşa Port are particularly noteworthy.

	Illegal Housing Prevention Zones	Renewal Zones	Disaster-Risky Zones	Urban Transformation Zones (Article 73)	3194 Nr. Law	Zone-Specific Law
Cabinet		•	•	•		•
Ministry of Environment and Urbanism	•		•		•	
Ministry of Culture and Tourism		•			•	
State Housing Authority- TOKI	•	•	•	•	•	•
Privatization Administration					•	•
Municipalities	•	•	•	•	•	•
Real Estate and Construction Companies & Emlak Housing	•	•	•	•	•	•

Table 4: In Turkey Major Actors in Urban Transformation Zones and Scope of Urban Transformation

As clearly evidenced in the tables above, after 2005 in particular, within the framework of neoliberal policies, a significant fragmentation has been experienced in urban planning system. One of the most significant indicators is that Cabinet which is the most authorized executive board of central government holds determinant role in the identification of urban transformation zones (Lovering&Turkmen, 2013). Another salient indicator is that compared to municipalities, central government agencies are more effective in urban transformation.

4 CONCLUSION

In the light of all above-given explanations and investigations it is feasible to outline key outputs and problems concerning urban transformation practices in Turkey as below;

- In Turkey there is an absence of definite legal framework outlining urban transformation. Instead, legal regulations are released merely specific to individual conditions. Provisions on regulations are identified pursuant to Cabinet Decree issued in Official Gazette that characterizes them as legal tools of central government. However, in many cases, there need to be location-specific regulations, which must developed by local governments to enable public support in urban areas with different problems.

- There are no clear-cut standards in the detection of Urban Transformation Zones. The scientific criteria followed in the identification of border are ambiguous. Political and economical choices play role in the emergence of this ambiguity.

- Other than the building regulations on earthquake prevention there are no definite implementation guidelines / implementation tools in the preparation of Urban transformation projects. There is no adequate and applicable planning tool concerning construction activities in built-up area.

- Urban transformation projects basically focus on the development of physical space and estimated rise in land value. Revenue sharing contracts of TOKI have become a component of project process in particular. However, as the main objects of urban renewal, risk reducing in earthquake zones and developing new urban public facilities to increase spatial standards were ignored in many cases to rise the value of urban land.

- In urban transformation process there is an approach that fails to fully integrate and even excludes current social structure in the transformation zone. Since urban transformation is treated outside the scope of issues such as taxing policies, it embodies features that rise social inequality.

- In the relocations of industrial areas etc. within urban transformation zones, the required socio-economic measures are missing. A process that particularly fails to get integrated with employment opportunities and created added value is experienced.

- The urban transformation process merely focuses on building generation and marketing; however in addition to buildings, employment opportunities, transportation, urban service areas should also be collectively treated.

- Central and local politics play dominant role in urban transformation projects. Central government authorities such as TOKI have gained further strength with legal regulations; thus local administrations constituted by elected representatives and bearing great potential in creating urban transformation models within a participatory process have fallen backwards.

5 REFERENCES

DINCER, I. & ENLIL, Z. & EVREN, Y., An Overview of Istanbul's Conservation Sites, MEGARON Vol. 4(1) p. 5-15, Istanbul, 2009

ERCAN, M. A., Challenges and Conflicts in Achieving Sustainable Communities In Historic Neighbourhoods Of Istanbul, Habitat International Vol. 35 p.295-306, 2011

ERDEN, D., Kentsel Yenileşmede Bir Araç Olarak Dönüşüm Projeleri, Doktora Tezi, MSGSÜ, Fen Bilimleri Enstitüsü, 2003

ERGUN, N. Gentrification in Istanbul, Cities, Vol. 21, No. 5, p. 391–405, UK, 2004

GENC, F., Türkiye'de Kentsel Dönüsüm: Mevzuat ve Uygulamaların Genel Görünümü, Yönetim ve Ekonomi, Vol.15/1 Celal Bayar Üniversitesi IIBF, Manisa, 2008

GIBSON M., & KOCABAS A., London: Sustainable Regeneration – Challenge And Response, Urban Design and Local Specifities in The Process of Globalization, International Urban Design Meeting, MSU, Istanbul, 2001

KOCABAS, A., Kentsel Dönüşüm (Yenileş(tir)me): İngiltere Deneyimi ve Türkiye'deki Beklentiler, Literatür Yayınları. Istaqnbul, 2006

KOKTURK, E., Türkiye'de Kentsel Dönüşüm ve Almanya Deneyimi, 11. Türkiye Harita Bilimsel ve Teknik Kurultayı, TMMOB Harita ve Kadastro Mühendisleri Odası, Ankara, 2007.

LOVERING, j. & TURKMEN, H., Bulldozer Neo-liberalism in Istanbul: The State-led Construction of Property Markets, and the Displacement of the Urban Poor, International Planning Studies, Vol. 16, No. 1, 73–96, February 2011

OZCEVIK, O, İstanbul'da Deprem Odaklı Dönüşüm Projesinin Ana Bileşenlerinin Analizi: İETT Blokları Örneği, ITÜdergisi/a Mimarlık, Planlama, Tasarım, Vol.6/1, p.81-94, Istanbul, 2007

OZDEN, P., Belediyelerin Sosyal Programları ve Kentsel Yenileme, Yerel Yönetimler Üzerine Güncel Yazılar: 197–225, (ed. M. Kösecik, H. Özgür), Nobel Yayın, Ankara. 2007

ROBERTS, P., The Evolution, Definition and Purpose of Urban Regeneration, Urban Regeneration. London, Thousand Oaks, New Delhi, Sage Publications. p. 9-36, 2000

ROGERS, R., Towards A Strong Urban Renaissance, Urban Task Force, London, 2005

SOKMEN P., Kentsel Dönüşüm İçin Kaynak Yaratıcı Sürdürülebilir Bir Planlama Çerçevesi, Kentsel Dönüşüm Sempozyumu, Yıldız Teknik Universitesi, Istanbul, 2003

THOMAS, S., A Glossary of Regeneration and Local Economic Development, Manchester: Local Economic Strategy Center, UK, 2003

TUREL, A., İstanbul Eylem Planlamasına Yönelik Mekânsal Gelişme Stratejileri Araştırma ve Model Geliştirme Çalışmaları. METU, Ankara, 2005

UYSAL, U.E., An Urban Social Movement Challenging Urban Regeneration: The Case of Sulukule, Istanbul, Cities, Vol.29 p.12–22, UK, 2012

Neue Instrumente der Partizipation: Vergleich von mobiler Augmented Reality und Perspektivskizzen im Rahmen des Shared-Space-Projektes Alleegasse in Hartberg

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1 ABSTRACT

Welche Chancen bieten mobile Augmented-Reality-Anwendungen (AR), die vor Ort virtuelle Objekte – hier eine Straßenraumgestaltung – in eine reale Umgebung proji¬zieren, um Partizipationsprozesse, beispielsweise bei der Planung eines Shared Space, zu verbessern? Im Vergleich zu herkömmlichen Perspektivskizzen fehlen bislang umfangreiche Erfahrungen zum Partizipationsprozess mit betroffenen Bürgerinnen und Bürgern. Eine empirische Untersuchung des Shared-Space-Projektes „Alleegasse" in Hartberg liefert erste Ergebnisse hierzu, welche im Zuge des Projekts „Zielgruppenspezifischer Einsatz von Augmented Reality und Web 2.0 in partizipativen Verkehrsplanungsprozessen" gewonnenen wurden. Gefördert wird dieses Projekt vom Bundesministerium für Verkehr, Innovation und Technologie (3. Programmlinie von „ways2go"). Der Mehrwert dieser empirischen Untersuchung besteht darin, dass konkrete Praxiserfahrungen im bürgernahen Umgang mit beiden Darstellungsmethoden gemacht werden. Die Einsatzmöglichkeiten von mobilen AR-Anwendungen und Perspektivskizzen werden im Zuge von Beteiligungs¬prozessen untersucht und Handlungs-empfehlungen abgeleitet.

2 EINLEITUNG

2.1 Ausgangslage

Planungsprozesse werden zunehmend komplexer: Einerseits äußern Betroffene, deren Unterschiedlichkeit sich in der Vielfalt der Gesellschaft widerspiegelt, ihre Anliegen, Wünsche und Meinungen zunehmend vehementer, und andererseits nimmt die Bedeutung der Privatwirtschaft mit einem unternehmerischen Kalkül bei vielen Investitionen zu. Relevante Akteure weisen somit sowohl unterschiedliche Ziele, Interessen, Erwartungen, Motive etc. als auch ein unterschiedlich profundes Planungswissen auf. Somit steigen die Kommunikationserfordernisse in Planungsprozessen, um Konflikte zu versachlichen, festgefahrene Debatten wieder in Gang zu setzen und einen Konsens zu erzielen. Mit innovativen Visualisierungstechnologien, wie z.B. mobiler Augmented Reality („erweiterte Realität", lat.: augeo: vergrößern) kann es gelingen, Beteiligungsverfahren zeitgemäß auszurichten, um Planungsqualität und Akzeptanz von Straßenraumgestaltungen durch bürgerschaftliche Partizipation zu steigern. Die Informationsvermittlung mit AR-Anwendungen kombiniert Methoden der Visualisierung und e-Partizipation. Die visuelle Aufbereitung und Präsentation von heterogenen Planungsdaten, die Erstellung von 3D-Stadtmodellen und die Möglichkeit, diese mit externen Informationssystemen zu verknüpfen, eröffnet eine Vielzahl an Möglichkeiten von neuer Wissensgenerierung (vgl. Zeile 2010).

Gerade zu Planungsbeginn, wo planungsrelevantes (Vor-)Wissen ge¬sammelt wird, sollte der Bürger bzw. die Bürgerin verstärkt bei der Ideenfindung, beim Sammeln von Informationen, Evaluierungen von Alter¬nativen einbezogen werden. Die steigenden Partizipationswünsche der Bürgerinnen und Bürger können somit erfüllt werden, was letztlich die Sicher¬heit, Legitimität und Transparenz der Planung erhöht (vgl. Märker 2005). Die Verbreitung von mobilen AR-Anwendungen als unterstützende Visualisierungsmethode in Bürgerbeteiligungprozessen wird durch die rasche Weiterentwicklung von neuen Informations- und Kommunikationstechnologien, wie z.B. Smartphones und Tablet-Computern, forciert. Mit AR wird die Synthese von Realität und Virtualität beschrieben, wobei die reale Umgebung mit virtuellen Elementen überlagert wird. Azuma 1997 nennt die drei Charakteristika von AR:

- Kombination von realer und virtueller Welt,
- Informationen stehen dreidimensional zueinander in Bezug,
- Darstellung der Informationen in Echtzeit.

Die besondere Stärke von mobilen AR-Anwendungen liegt neben der Möglichkeit, komplexe und umfangreiche Inhalte zielgruppengerecht und flexibel darzustellen, vor allem in der besserern Begreifbarkeit und Erlebbarkeit von Information vor Ort, beispielsweise im Rahmen von gemeinsamen Begehungen von Bürgerinnen und Bürgern, Planerinnen und Planern sowie Politikerinnen und Politikern.

AR-Visualisierungen sollen Barrieren der Informati¬onsübermittlung und -aufnahme vermindern. Gerade in der Straßenraumgestaltung, wo üblicherweise komplexe Inhalte einem sehr hetero¬genen Publikum in unterschiedlichen Planungsphasen und mit unterschiedlichen Zielsetzungen vermittelt werden müssen, eignet sich diese neue, flexible und ergänzende Form der Partizipation zur leichten Wissensvermittlung, wodurch die Legitimität und Transparenz in der Straßengestaltung gesteigert wird (vgl. Nash 2010, Zeile 2010, Hagen 2006).

2.2 Fragestellungen und Zielsetzungen

Welche Chancen bieten mobile Augmented-Reality-Anwendungen (AR), die vor Ort virtuelle Objekte – hier eine Straßenraumgestaltung – auf eine reale Umgebung proji¬zieren, um Partizipationsprozesse verbessern? Es fehlen im Vergleich zu herkömmlichen Perspektivskizzen bislang umfangreiche Erfahrungen zum Partizipationsprozess mit betroffenen Bürgerinnen und Bürgern. Eine empirische Untersuchung[1] im Rahmen des Shared-Space-Projektes „Alleegasse" in Hartberg liefert erste Ergebnisse. Verglichen werden die Darstellungsarten AR und Perspektivskizzen als unterstützende Werkzeuge im Partizipationsprozess, wobei sich folgende Fragen stellen:

- Welche Personen präferieren AR oder Perspektivskizzen?
- Wie werden AR und Perspektivskizzen im Zuge einer Informationsveranstaltung von den Bürgerinnen und Bürgern beurteilt?
- Wie gut eignen sich mobile AR-Visualisierungen und Perspektivskizzen zur Wissensvermittlung?
- Wie nehmen unterschiedliche Verkehrsteilnehmerinnen und Verkehrsteilnehmer (Fußgänger, Pkw-, ÖV-Nutzerinnen und ÖV-Nutzer) relevante Planungsinhalte (z. B. Parkplatzangebot, Fahrradweg, Abmessungen) wahr?

2.3 Anlass und Situation in Hartberg

Das Stadtzentrum bzw. der historische Altstadtbereich von Hartberg zeichnet sich durch die hohe Qualität seiner baulichen Struktur und den geschlossenen, dichten Charakter des öffentlichen Raums aus. Bemerkenswert ist die architektonisch in wesentlichen Teilen geschlossen erhaltene Gebäudekulisse, die durch hochwertige moderne Ergänzungen bereichert ist und sich durch die Veränderung des Lebens über mehrere Jahrhunderte das Potenzial erhalten hat, unterschiedliche Funktionen aufzunehmen und der Stadt eine unverwechselbare Identität zu geben. Dies drückt sich auch darin aus, dass Hartberg den Titel einer citta slow (=langsamen Stadt) führt.

Hartberg erscheint als vitales Zentrum, dessen intakte Ortsstruktur mit beachtlichem touristischem Wert bis heute wichtige Handelsfunktionen sowie ein reiches gastronomisches Angebot im Stadtkern vereinigt. Hier spielt die günstige Erreichbarkeit für Bürger und Gäste eine wichtige Rolle. Von der Hartberger Bevölkerungen teilweise als problematisch wahrgenommen wird die Rolle des motorisierten Verkehrs im Ortszentrum. Auch die Frage des ruhenden Verkehrs muss aufmerksam betrachtet werden, um – im Einklang mit den zeitgemäßen Wünschen der Bürgerschaft – den öffentlichen Raum im Stadtzentrum immer mehr als Raum für Begegnungen, den Aufenthalt und das alltägliche Leben vor Ort in Erscheinung treten zu lassen und so die Lebensqualität im Stadtzentrum von Hartberg weiter zu steigern.

Um den Raum neu beleben und inszenieren zu können, bedarf es einer neuen Planungskultur, die eine möglichst konsequente Form von Partizipation entwickelt. Damit Bürger vor Ort den Raum neu beleben können, müssen sie sich untereinander darüber verständigen, welches Leben sie vor Ort führen wollen. Erst auf der Basis eines derart entwickelten sozialen Leitbildes kann dann der räumliche Entwurf entstehen, und erst dann wird in den gestalteten Raum der Verkehr integriert. Bei der Übertragung des sozialen Leitbildes in

den räumlichen Entwurf ist es wichtig, über Bilder des neuen Raums eine präzise Verständigung zwischen Laien (Bürgern, als Experten vor Ort) und Planern (Architektinnen und Architekten, Stadt- und Verkehrsplaner, als Experten für die Raumwirkung) zu erzielen. Dabei können unterschiedliche Methoden verwendet werden, von der perspektivischen Handskizze, die eine präzise Andeutung des Entwurfs im Raum gibt, bis zur computerunterstützten Simulation, die sich der Technik der mobilen Augmented Reality bedient. Welche Methode verschafft dem Laien den bessern Zugang zum Planungsprozess bzw. zur Planung?

3   TESTFALL HARTBERG „ALLEEGASSE"

Das Projekt Alleegasse zielt auf die Ausbildung einer neuen Altstadtkante im Bereich der Alleegasse ab. Als Konzept zur Schaffung von Parkmöglichkeiten am Rande der Altstadt leistet es einen wichtigen Beitrag zur Altstadterneuerung und -erweiterung. Das Projekt integriert das Verkehrsgeschehen in die Struktur des Stadtraumes unter Berücksichtigung der sozialen Lebensverhältnisse. Neben Parkflächen soll ein attraktiver öffentlicher Raum entstehen, der so lebendig gestaltet ist, dass er von allen Bürgern gern genutzt wird und ein ausgewogenes Nutzungsverhältnis aller Verkehrsteilnehmer zulässt.

3.1 Vorgehensweise

Am 9.11.2012 fand von 10:00 bis ca. 17:00 Uhr der Testfall Hartberg statt. Unmittelbar neben dem Projektgebiet wurden in der Fußgängerzone Passantinnen und Passanten angesprochen, ob Sie an einer Projekteinführung interessiert sind und eine Vorstellung des Entwurfs wünschen. Die Testpersonen konnten – mit Ausnahme einer Schulklasse – selbst wählen, ob Ihnen der Entwurf mittels AR oder anhand von konventionellen Perspektivskizzen erläutert werden soll. Die Perspektivskizzen sind auf einer Schaufensterscheibe befestigt, wobei die Teilnehmerinnen und Teilnehmer ausschließlich dort Projektinformationen erhielten. Demgegenüber liefen die Teilnehmerinnen und Teilnehmer der AR-Gruppe mit Tablet-Computer eine vorgegebene Route unter Verwendung der AR-Anwendung ab. Beide Testgruppen erhielten zum Projekt die gleichen Inhalte in gleichem Umfang präsentiert, nur das Visualisierungsmedium variierte. Abschließend füllten die Testpersonen einen Fragebogen aus, der neben soziodemographischen Merkmalen (Alter, Geschlecht, Bildungsstand etc.), das eigene Mobilitätsverhalten und insbesondere die Beurteilung der vorgestellten Darstellungsmethoden erfasst (siehe Abbildung 1).
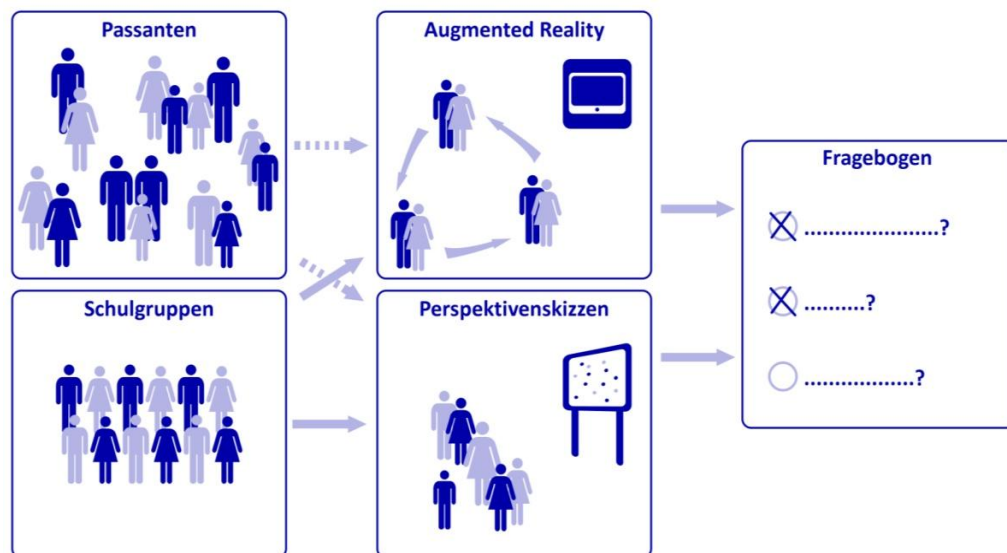
Abbildung 1: Ablauf des Testfalls

Folgende Rahmenbedingungen sind bei der Auswertung sowie Interpretation der Ergebnisse zu berücksichtigen:

- Zufällig arbeiten und/oder wohnen alle Testpersonen in der Stadt Hartberg.

- Aufgrund des kühlen, nebligen, jedoch niederschlagsfreien Wetters traten keine starken Blendeffekte am Display der Tablet-Computer durch Sonneneinstrahlung auf. Die Begehungsroute war so festgelegt, dass Bauarbeiten nicht behindert wurden und dennoch ein guter Überblick des Bauvorhabens gewährleistet war.

- Durch die vordefinierte Auswahl des Info-Standortes (Fußgängerzone unmittelbar neben Projektgebiet) und der Begehungsroute kam es zu keinen Kommunikationseinschränkungen z.B. durch Verkehr, Baulärm etc.

- Aufgrund der Größe der Stadtgemeinde Hartberg wurde davon ausgegangen, dass die Beteiligten in der Regel das Projektgebiet kennen. Bisher hat es keine präzisen Informationen über den aktuellen Projektstand für die Bevölkerung gegeben. Mit Ausnahme von einigen Mitarbeitern der Stadtgemeinde wurde also allen Testpersonen etwas Neues und teilweise Überraschendes vermittelt. Diese „Ein-Weg-Kommunikation" zwischen Planern und Bürgern verfolgte somit hauptsächlich das Ziel der Projektvorstellung.

3.2 Spezifizierung der beiden Darstellungsmethoden

Tabelle 1 spezifiziert die beiden im Testfall zur Anwendung kommenden Darstellungs¬methoden und zeigt einen beispielhaften Auszug der Darstellungen. Die Erläuterung des Planungsvorhabens erfolgte für die AR-Gruppenteilnehmerinnen und Gruppenteilnehmer mit einer 3-D-Visualisierung am Tablet-PC und für die Gruppe mit herkömmlichen Planungsdarstellungen mittels eines Grundrisses und fünf Perspektivskizzen. Beim Vergleich beider Darstellungsmethoden ist festzustellen, dass die AR-Visualisierung einen geringeren Level of Detail (LOD) aufweist als die Perspektivskizzen.
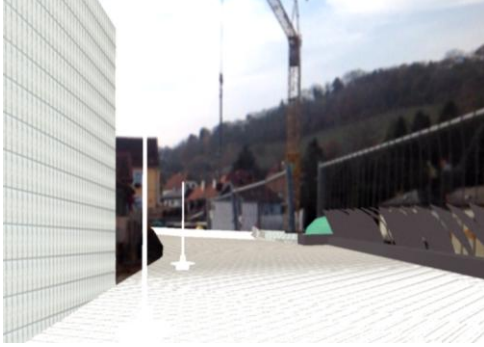
	Mobile Augmented Reality	Perspektivskizzen
Darstellungs-grundlagen	3-D-Visualisierung[2]	1 Grundriss 5 Perspektivskizzen
Level of Detail (LOD)[3]	ca. 1-2	ca. 3
Ortsbezug	Begehung auf vorgegebener Route	fixer Standort
Dauer der Informierung	ca. 10 min	ca. 10 min
Projekt-beschreibung		
Darstellung (Auszug)		

Tabelle 1: Spezifizierung beider Darstellungsmethoden

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[2] Reinwald, Schober und Damyanovic beschreiben im CORP-paper „From plan to augmented reality – workflow for successful implementation of AR solutions in planning and participation processes" den Workflow für die Entwicklung einer AR-Visualisierung.

[3] vgl. Zeile 2010

4 ERGEBNISSE

4.1 Stichprobenzusammensetzung

Tabelle 2 zeigt, die Zusammensetzung der Stichprobe hinsichtlich Geschlecht, Alter und Bildung. Es nahmen überwiegend jüngere Personen mit geringer bzw. noch nicht abgeschlossener Ausbildung am Testfall teil.

	Absolute (relative) Häufigkeiten
Geschlecht	
männlich	39 (54 %)
weiblich	33 (46 %)
Alter	
≤ 18 Jahre	45 (62 %)
19 – 30 Jahre	5 (7 %)
31 – 45 Jahre	7 (10 %)
46 – 65 Jahre	12 (17 %)
≥ 66 Jahre	3 (4 %)
Ausbildung	
VS od. HS	45 (62 %)
Lehrabschluss	10 (14 %)
Matura	11 (15 %)
FH	4 (6 %)
Uni	2 (3 %)
Gesamt	72 (100 %)

Tabelle 2: Stichprobenzusammensetzung (gerundete relative Häufigkeiten)

4.2 Teilnahmegründe

Abbildung 2 zeigt, dass mehr als die Hälfte der Probanden (59 %) Veränderungen in ihrem Umfeld interessant finden. Dieses starke Interesse stellt eine wichtige Voraussetzung für Partizipation dar und ist umso beeindruckender, da nur 19 % selbst vom Planungsvorhaben, z.B. als Anrainer, betroffen sind. Für den Einsatz von neuen innovativen Darstellungsmethoden zur Vermittlung der Planungsinhalte spricht, dass ca. ein Drittel der Probanden (32 %) den Einsatz neuer Technologien wie Augmented Reality interessant finden. 24 % der Teilnehmerinnen und Teilnehmer arbeiten in der Gegend, haben ein prinzipielles Interesse an Beteiligungen oder nehmen am Testfall im Zuge ihrer Ausbildungen (Schulklasse) teil.
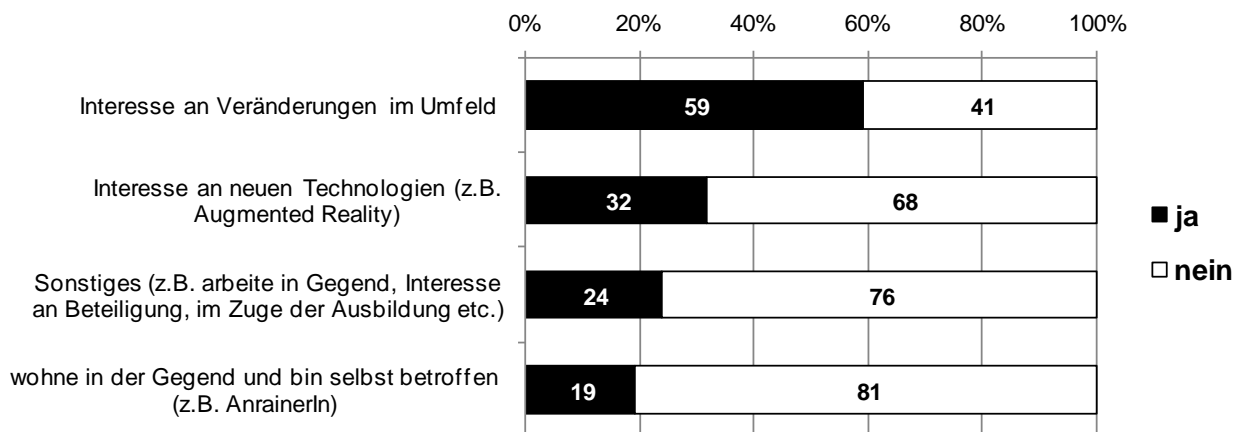
Abbildung 2: Gründe für die Teilnahme an der Begehung (n=72)

4.3 Aktivierung der Teilnehmerinnen und Teilnehmer

Den teilnehmenden Passanten stand es mit Ausnahme einer Schulklasse mit 13 Schülerinnen und Schülern frei, auszuwählen mit welcher Darstellungsmethode sie über das Projekt informiert werden wollen. Im Falle der wahlfreien Teilnehmerinnen und Teilnehmer wird untersucht, ob sich die beiden Gruppen hinsichtlich soziodemographischer Merkmale (z.B. Geschlecht, Alter, Ausbildung etc.) unterscheiden.

Tabelle 3 fasst die Zusammensetzung der beiden Gruppen hinsichtlich Geschlecht, Alter und Ausbildung zusammen. Augmented Reality spricht vor allem männliche Personen bis 30 Jahre an. Hingegen können mit Perspektivskizzen vorwiegend Personen über 30 Jahren aktiviert werden.

Zwischen Bildung und Auswahl der Darstellungsmethode ist kein eindeutiger Zusammenhang erkennbar. Die geringen Gruppenunterschiede sind vermutlich auf die Alterszusammensetzung der Teilnehmerinnen und Teilnehmer zurückzuführen.

Planungsrelevantes Vorwissen bzw. die Auseinandersetzung mit 3-D-Visualisierungen der Teilnehmerinnen und Teilnehmer wird erhoben, indem befragt wurde wie häufig die Personen mit 3-D-Planung und 3-D-animierten Computerspielen (Autorennen, Stadtsimulationen etc.) zu tun haben. Es zeigt sich, dass Personen, die häufig mit 3-D-Planung zu tun haben, stärker in der Gruppe „Perspektivskizzen" vertreten sind. Andererseits präferieren Personen, die häufig 3-D-Computerspiele spielen, die Augmented-Reality-Visualisierung für die Erklärung des Planungsvorhabens. Erwähnenswert ist der relativ hohe Anteil (56 %) von häufigen 3-D-Computerspielerinnen in der Schulgruppe und deren geringes Vorwissen (15 %) bezüglich 3-D-Planung.

	wahlfreie Teilnehmerinnen und Teilnehmer		gebundene Teilnehmerinnen und Teilnehmer (Schulklasse)
Aktivierung nach…	Augmented-Reality	Perspektivskizze	Augmented-Reality und Perspektivskizze
Geschlecht männlich weiblich	59 % 41 %	50 % 50 %	54 % 46 %
Alter <= 30 Jahre > 30 Jahre	90 % 10 %	37 % 63 %	100 %
Ausbildung Volks-, Hauptschule od. Lehrabschluss Matura, FH od. Uni	76 % 24 %	67 % 33 %	100 %
Gesamt	n=29	n=30	n=13

Tabelle 3: Zusammensetzung der beiden Gruppen (gerundete Häufigkeiten)

4.4 Stellenwert von Partizipation

Es zeigt sich: Aktive Beteiligung in Form von Mitmachen, Diskutieren und Mitgestalten ist weniger wichtig im Vergleich zum passiven Informationsgewinn über die Gestaltung von Straßen und Plätzen. Nur 53 % im Vergleich zu 71 % messen der aktiven Beteiligung eine hohe bzw. sehr hohe Bedeutung zu (siehe Abbildung 3). Zurückzuführen ist dies wahrscheinlich darauf, dass eine aktive Beteiligung einen höheren persönlichen Aufwand und Einsatz erfordert. Insgesamt ist das Interesse der Teilnehmerinnen und Teilnehmer für Partizipation jedoch hoch.

Beim Gruppenvergleich beider Darstellungsmethoden zeigt sich, dass für die Teilnehmerinnen und Teilnehmer der Gruppe „Perspektivskizzen" das Mitmachen, Diskutieren und Mitgestalten bedeutsamer (64 % sehr hohe und hohe Bedeutung) als die Teilnehmerinnen und Teilnehmer der Gruppe „Augmented Reality" (36 % sehr hohe und hohe Bedeutung) wahrnehmen.
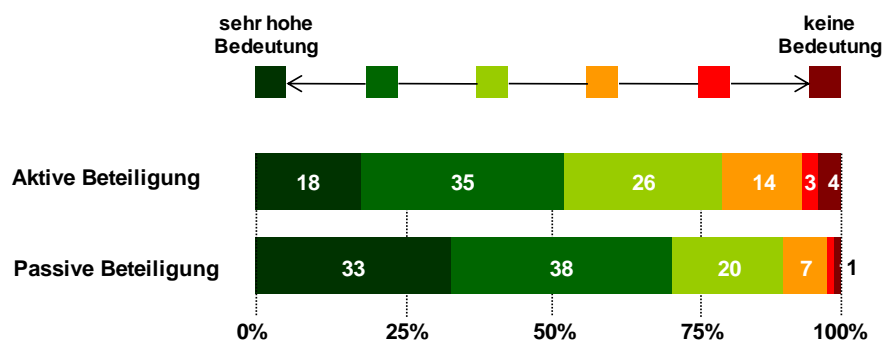
Abbildung 3: Bedeutung von aktiver Beteiligung und passiver Innformation zur Gestaltung von Plätzen und Straßen (n=72)

4.5 Vergleich von AR und Perspektivskizzen

4.5.1 Mittelwertvergleich

Zur Beurteilung der beiden Darstellungsmethoden werden die Mittelwerte einzelner, vorab festgelegter Beurteilungskriterien verglichen. Die Beurteilungskriterien weisen ein Antwortspektrum von 1 bis 6 auf, wobei 1 eine sehr positive Beurteilung und 6 eine sehr negative Beurteilung bedeutet. Dementsprechend signalisieren niedrige Mittelwerte Defizite und hohe Mittelwerte Stärken der Planungsmethoden. Die Frage, ob signifikante Unterschiede zwischen den Planungsmethoden auftreten, wird statistisch mittels „t-Test" beantwortet.

Statistisch können keine signifikanten Mittelwerteunterschiede nachgewiesen werden, wobei die Gründe hierfür offen bleiben müssen. Methodisch betrachtet können eine zu geringe Stichprobengröße und/ oder eine zu grobe Skalierung der Antwortmöglichkeiten zu nichtsignifikanten Ergebnissen führen. Trotzdem sind aus den Ergebnissen qualitative Hinweise ableitbar, welche Kriterien besser bzw. schlechter beurteilt werden.

Abbildung 4 zeigt, dass sowohl Augmented Reality als auch Perspektivskizzen sich für partizipative Planungsprozesse eignen, was sich durch die durchwegs positive Beurteilung der Kriterien bestätigt. Die Mittelwerte einzelner Beurteilungskriterien variieren zwischen Augmented Reality und Perspektivskizzen kaum. Über alle Bewertungskriterien ergibt sich für Augmented Reality ein Gesamtmittelwert von 2,1 und für Perspektivskizzen von 2,0. Für eine niederschwellige Vermittlung von Planungsinhalten spricht, dass beide Darstellungsmethoden sehr verständlich sind und die Teilnehmerinnen und Teilnehmer kaum überfordern.

Teilnehmerinnen und Teilnehmer beider Darstellungsmethoden wünschen sich vor allem ergänzenden Visualisierungsmethoden (z. B. Karten, Skizzen oder Modelle) und weiteren Details bzw. Informationen zum Projekt. Dies trifft vor allem auf die Gruppe „Augmented Reality" zu. Zusätzlich fällt es den Teilnehmern – im Vergleich zu den weiteren Kriterien – schwerer, anderen Personen (z. B. Familienmitglieder, Freunde) das Projekt zu erklären. Die geringere Realitätsnähe von AR im Vergleich zu den Perspektivskizzen erklärt sich u.a. durch den geringeren Level of Detail dieser Darstellungsmethode.
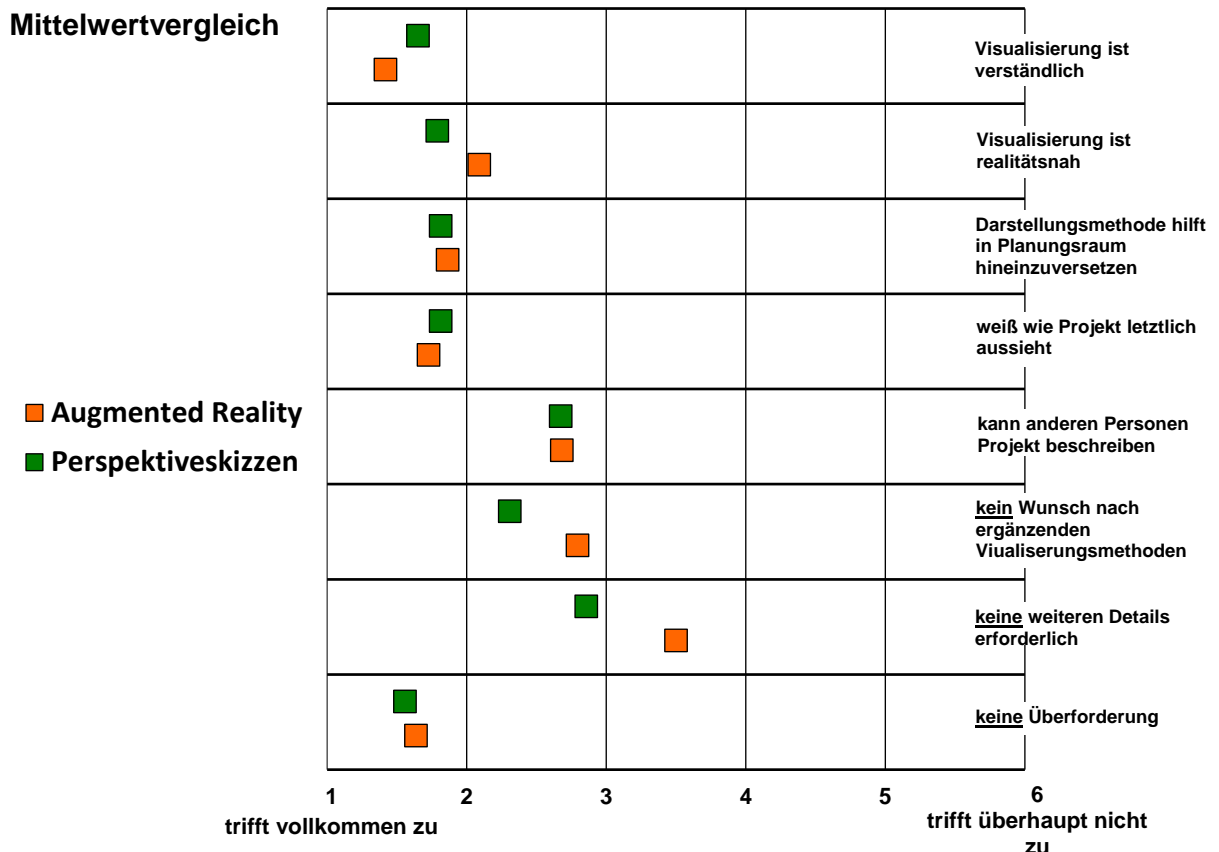
Abbildung 4: Mittelwerte von Beurteilungskriterien differenziert nach AR und Perspektivenskizzen (n=85)

4.5.2   Vermittlung von Wissen

Des Weiteren wird untersucht, ob sich die beiden Darstellungsmethoden hinsichtlich der Vermittlung von Wissen eignen. Hierzu erfolgt eine subjektive und objektive Beurteilung.

Subjektive Beurteilung: Abbildung 5 zeigt, wie die Teilnehmerinnen und Teilnehmer subjektiv ihre Wissenserweiterung beurteilen. Der Großteil aller Teilnehmerinnen und Teilnehmer gab an, neues Wissen über das Planungsvorhaben gewonnen zu haben. 52 % der Teilnehmerinnen und Teilnehmer der Gruppe „AR" und 43 % in der Gruppe „Perspektivskizzen" erweiterten ihr Wissen stark.
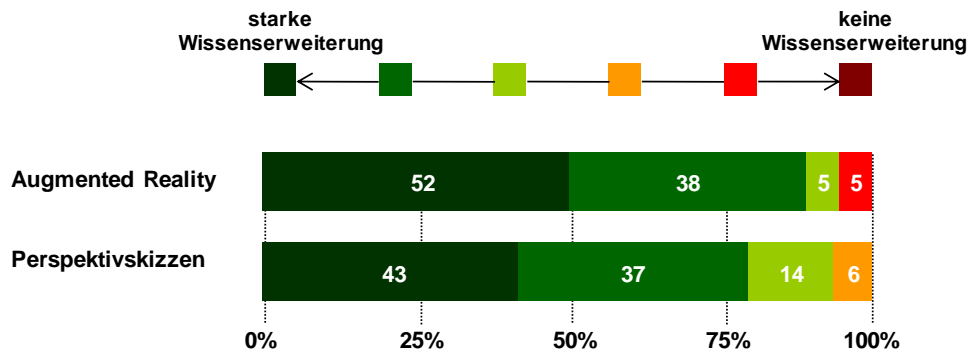
Abbildung 5: Subjektive Beurteilung der Wissenserweiterung für AR (n = 36) und Perspektivskizzen (n = 36)

Objektive Beurteilung: Zusätzlich zur subjektiven Einschätzung der Teilnehmerinnen und Teilnehmer werden mit Hilfe eines „Wissenstests" beide Darstellungsmethoden objektiv hinsichtlich der Anzahl richtiger Antworten beurteilt. Mit projektspezifischen Fragen wurde festgestellt, inwiefern planungsrelevantes Wissen in Abhängigkeit der beiden Darstellungsmethoden vermittelt wird. Zuvor wurde jedoch noch ein Toleranzbereich für die einzelnen Fragen festgelegt, innerhalb dessen die Antworten   „richtig" sind. Informationen z. B. zur Parkplatzverfügbarkeit und der Anzahl der Bäume waren zum einen in beiden Darstellungsmethoden ersichtlich, zum anderen wurde bei der Projektbeschreibung verbal darauf hingewiesen. Tabelle 4 zeigt die richtigen Antworten der Teilnehmerinnen und Teilnehmer je Wissenfrage. Generell zeigt sich, dass mit zunehmender Konkretisierung und bei Fragestellungen mit keinen vorgegebenen Antwortmöglichkeiten der Anteil richtiger Antworten drastisch sinkt. Die Einschätzung der Längen- und Breiten des Bauvorhabens sowie der genauen Anzahl von geplanten Park¬plätzen und Bäumen fielen den Befragten schwer. Grundlegendere Planungsinhalte werden jedoch von mehr als vier Fünftel der Teilnehmerinnen und Teilnehmer richtig beurteilt. Im Unterschied zur subjektiven Beurteilung der Wissens-erweiterung (siehe Abbildung 5) schneiden Teilnehmerinnen und Teilnehmer in der Gruppe „Perspektivskizzen" etwas besser ab.

Fragestellung	Augmented Reality	Perspektivskizzen	Toleranzbereich
Beim Planungsvorhaben handelt es sich um… …eine Fußgängerzone *…ein für alle ein Verkehrsteilnehme gemeinsam genutzten Raum* …Durchfahrtsstraße	richtige Antwort: 84 % weiß nicht: 2 %	richtige Antwort: 91 % weiß nicht: 7 %	siehe kursive Antwortmöglichkeit
Ist Parkplatz für Autos vorgesehen? *...ja* …nein	richtige Antwort: 93 % weiß nicht: 2 %	richtige Antwort: 98 % weiß nicht: 0 %	siehe kursive Antwortmöglichkeit
wenn ja → Wieviele Parkplätze sind vorgesehen? (offene Frage)	richtige Antwort: 8 % weiß nicht: 0 %	richtige Antwort: 17 % weiß nicht: 0 %	40 bis 60 Parkplätze
Wie viele Bäume sind geplant? (offene Frage)	richtige Antwort: 7 % weiß nicht: 18 %	richtige Antwort: 7 % weiß nicht: 16 %	7 bis 9 Bäume
Wie lange groß schätzen Sie die Abmessungen (Länge und Breite) der Bebauungsfläche ein? (offene Frage)	richtige Antwort: 14 % weiß nicht: 5 %	richtige Antwort: 25 % weiß nicht: 38 %	Länge: 150 bis 250 m Briete: 15 bis 25 m

Tabelle 4: Wissenstest differenziert nach AR und Perspektivskizzen und Toleranzbereich richtiger Antworten (n=72)

Für den Testfall Hartberg konnte nicht nachgewiesen werden, dass unterschiedliche Verkehrsteilnehmer (z. B. Fußgänger, Radfahrer, ÖV-Fahrgäste, Auto-Fahrer) auf Planungsinhalte fokussieren, die ihr eigenes Mobilitätsverhalten betreffen. Beispielsweise kann nicht bestätigt werden, dass Autofahrerinnen und Autofahrer im Vergleich zu Radfahrerinnen und Radfahrern, Fußgängerinnen und ÖV-Fahrgästen die Parkplatzsituation realistischer einschätzen.

5 FAZIT UND AUSBLICK

Der Mehrwert dieser empirischen Untersuchung anhand des Testfalls Shared-Space Hartberg besteht darin, dass konkrete Praxiserfahrungen in Planungs- und Beteiligungs¬prozessen zu den Darstellungsmethoden mobile Augmented Reality und Perspektivskizzen gewonnen werden. Es zeigt sich, dass

- sich die Beteiligten für Veränderungen in ihrem Umfeld interessieren und insbesondere Diskutieren, Mitgestalten und Mitmachen eine hohe Bedeutung für sie hat,
- überwiegend jüngere und männliche Teilnehmer AR-Darstellungen favorisieren und damit als Zielgruppe besser angesprochen werden können,
- beide Darstellungsarten AR und Perspektivskizzen für Partizipationsprozesse grundsätzlich geeignet sind, wobei sich die Ergebnisse in der Wahrnehmung des Entwurfsprojekts Shared Space „Alleegasse" bei beiden Darstellungsarten nur geringfügig unterscheiden und
- für die Informationsvermittlung am Projektbeginn ein geringer Detailierungsgrad der Darstellungen (Level of Detail) ausreicht.

Unabhängig von der Darstellungsmethode zeigten sich überwiegend positive Reaktionen darauf, dass überhaupt informiert wird sowie über die erkennbare Qualität des Gestaltungsentwurfs. Am Rande der Projektvorstellung entstanden spontan Diskussionen unter Bürgern von Hartberg.

Zukünftig sollten mobile AR-Anwendungen im Bereich der Partizipation vor Ort dahingehend weiterentwickelt werden, dass

- diese einfach, nutzerfreundlich und somit selbständig zu bedienen,
- zusätzliche Informationen abrufbar und
- die zugrundeliegenden 3-D-Visualiserungen modifizierbar sind.

6 REFERENCES

Azuma, R. (1997): „A Survey of Augmented Reality; in: Presence: Teleoperators and Virtual Environments 6, 4 (August 1997), S. 356

Hagen (2006) zit in: I. Wietzel (2007): „Augmented Reality und immersive Szenarien in der Stadtplanung". Proceedings REAL CORP 2007, Wien, S 969.

Märker, O. (2005): Online-Mediation als Instrument für eine nachhaltige Stadt- und Regionalplanung. Eine qualitative Untersuchung zur internen und externen Relevanz online-mediierter Verfahren, Fraunhofer Series in Information and Communication Technology, Bd. 2/2005. Aachen, Shaker Verlag, S.128.

Nash, A.: Web 2.0 Applications for Collaborative Transport Planning. Schrenk, M., Popvich V., Zeile, P., (Hrsg.): Proceedings Real Corp 2010. Vienna.

Reinwald, F.; Schober, Ch.; Damyanovic, D.: From plan to augmented reality – workflow for successful implementation of AR solutions in planning and participation processes. Schrenk, M., Popvich V., Zeile, P., (Hrsg.): Proceedings Real Corp 2013, Rom.

Zeile, P. (2010): Echtzeitplanung: Die Fortentwicklung der Simulations- und Visualisierungsmethoden für die städtebauliche Gestaltungsplanung. Dissertation im Fachbereich Architektur / Raum- und Umweltplanung / Bauingenieurwesen der Technischen Universität Kaiserslautern.

New Geographies of Self-Organisation

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1 ABSTRACT

Moving from both contradictions in EU policies between territorial cohesion and competitiveness, and the comparision between different conceptualisations of territory, and in the light of the ongoing territorial and political rescaling processes, notions such as "autonomy", "self-organisation", "active territoriality" and "territorial heritage" as a common good are introduced, in order to propose a general rethinking of the concept of "marginality", and to suggest a possible way in which non-paternalistic but really shared sustainability can effectively be achieved at the local level.

2 RESCALING AS A PROCESS OF RE-TERRITORIALISATION

2.1 Actually existing neo-liberalism, and the (assumption of) "local trap"

Although (officially) guided by a political process rather than by market forces, the EU construction is part of the broader phenomenon of globalisation. In this sense, EU territorial policies can be interpreted as a local compensation for global neo-liberalism (Allmendinger, 2000), i.e.: the redistributive tool used in advanced capitalist societies. An example is given by EU agricultural policies – a clear example of protectionist (non-liberalist) policy – that can be seen as a form of mitigation of unbalances due to neo-liberal strategies, whose principles, however, remain undiscussed, as shown by decisions on communications, airlines or energy (Marshall, 2012), which highlight a trend towards an increasing polarisation. As EU policies focus on cities as nodes and high-speed railways as inter-connections, such trend towards polarisation clearly mirrors the dominant representation given by the network metaphor (Castells, 1996) that has emerged from the deep structural changes occurred in Western economies/societies since the end of the 70s as „a powerful and pervasive image within which framing every interpretation of contemporary complexity/territory" (Scoppetta, 2009), so that networking, together with governance and rescaling (often interrelated), has been one the main path explored in various and converging research fields (Scoppetta, 2012).

A tendence in summarising the three interrelated issues – networking, governance and rescaling – by using the generic term "globalisation" exists, and this does not offer a fruitful insight into the ongoing re-articulation of politics at different spatial level as described by Brenner (1999; 2000) since it inevitably ends to fail focusing on territory (on its social/historical/political/economic complexity), without which the phenomenon of rescaling (Swyngedouw, 1997; Brenner, 2000; 2001; 2004; Brenner & Theodore, 2002b; Gualini, 2006) cannot be understood at all. In other words, Badie's „death of territory" (1995), due to de-territorialised flows of globalisation, seems to be nothing but a fashonable narrative which, in the reality, has no substantive truth (Elden, 2005). Even governance, if detached from territorial specificity and „path-dependence" (Brenner et al., 2010b), ends to be the Offe's (2008) „empty signifier", as it does not allow to understand the distinctive ways in which the „actually existing neo-liberalism" (Brenner & Theodore, 2002a) is translated at the local level, i.e.: the real local changes it produces in terms of public policies and discourses, emerging spatial configurations, social impacts and economic outcomes, democratic processes, and power coalitions (see: Brenner et al., 2010a; 2010b; Peck et al., 2009; Brenner & Theodore, 2002a; on certain aspects of the Italian specificity, see: Tocci, 2009; Cremaschi, 2007). Therefore, if detached from territory (i.e.: from the local), neo-liberalism itself – „a keyword for the "prevailing pattern of market-oriented, market-disciplinary regulatory restructuring",, (Peck et al., 2009 in: Brenner, 2010b) – remains nothing but a „rascal" concept (Brenner et al., 2010a; 2010b) leading to a temptation to assess localised territorial policy developments as conforming to international trends through the assumption of power asymmetries in terms of weakness of local governments (or local social actors) in the face of „external and more powerful actors" (Robinson, 2011), such as corporations, NGOs and other transnational organisations.

Such a homogenising idea of an uniform „smooth space [not territory] of Empire „ – which, differently from the „striated space of modernity", can be intended as an „ou-topia, or really a non place", where there is „no place of power" as „it is both everywhere and nowhere" (Hardt & Negri, 2000; 2004) – tends to hide the varieties of local forms, hybrids and peculiarities of neo-liberalism at different sites and scales as well as the particular and contextualised ways in which scale itself consists of the product of political struggles (i.e:

exactly the reason for which the issue of territorial rescaling needs a deeper critical inquiry to be necessarily focused on territorial differences). It is not a coincidence, however, that one of the hallmarks of neo-liberal politics themselves is the appeal to supposed external constraints of the global economy, which are generally represented as being objective, abstract, and quasi-natural forces that are autonomous from political decisions and independent from human control.

2.2 Territorial differences, and different approaches to territory

In this sense, what Brown and Purcell (2005) advocates as the „local trap", contrasting the idea of a more sustainable environment as an outcome of more localised policies, mirrors the Agnew's urging (1994) in trascending the „territorial trap" as a problematic and intellettually constraining assumption. As well-known, such viewpoint is strictly connected to the Anglo-Saxon political-economy and economic-geography tradition, according to which the territory is interpreted as the spatial expression of the modern national state. But, as scholars such as Cox (1991) and Agnew and Corbridge (1995; more recently, also: Brenner, 2004) observed, such equivalence of territory and state is highly questionable, and reasons to believe that the mainstream political and legal conception of territory as the passive spatial recipient of the state is the fruit of a modernist discourse can be easily found in the fact that the state can never fully reach total exclusion of others spatial functions and practices.

Furthermore, differences and specificities can be found in the construction and in the meaning itself of the European modern national states, especially in countries, such as Italy, with a long foreign domination in which power was legitimised from outside. In particular, in certain regions (such as Sicily or, more generally, the South of Italy), power was historically intended as costantly negotiated between the central (often perceived as an enemy) and the local level, the latter constituted by a small elite of landowners whose key-role was given by a feudal pyramidal model of power relation based on submission and violence that paved the way to the emerging of criminal organisation, such as the Sicilian mafia, as (violent) intermediator between a strong local power based on land ownership and an inevitably weak national state. In the Italian case, the latter, in fact, could not promote a land reform untill 1950 (Lupo, 1993). Thus, the Sicilian example challenges the mainstream view of territory as the hard fact which merely provides the visible support for invisible social ties as it clearly shows how territory rather is precisely the effect of a specific pattern of social and power relations. Territory, therefore, can be thought not simply as a bouded space, but as the political form of the type of conceptualisation of space that makes boundaries possible. Then, the Westphalian state – which is very different, for example, from the Italian unitary state emerging from struggles for Independence – is only a variant within an existing spatial-political configuration, rather than the ontological shape that is often presumed to be. In these sense, the demise of one specific historical territorial configuration does not means the end of territory as such, but rather an evolution.

Different approaches, sources and traditions in studies on territory exist, such as the French or Italian human geography. Raffestin (1980), for example, has developed his conception of territory as space mediated through power, in which "space" is a pre-existing reality that becomes "territory" through various political mechanisms, strategies, interventions and representations, and the state itself – as also Lefebvre (1980) notes – is only one actor among the others, since territory is social relation produced and transformed through continual struggle, a site of contested processes. As argued by Soja (1989), each concrete spatiality is an arena of struggle.

Sereni's studies on the Italian landscape (1961) constitute an example of a broad Braudelian approach coming from a Marxist tradition, which considers territory as the result of „the inter-relation between history and nature" becoming „also aestetically perceiveble" through landscape (Calzolari, 1999). Introducing nature in discourses on territory means underlining the ways in which nature itself is worked and collectively transformed into a social construct. The Italian (federalist) patriot and philosopher Carlo Cattaneo (1925) in 1840 describes the Val Padana (the wide Po Plain) as a „by-product" of human activities, practices, strategy and „projects" (Corboz, 1983) – an archive of inhabitants' daily life – rather than a gift from nature: „since human fate has been to live by working hard, each civilised region can be distinguished from wild ones by the fact it becomes an immense repository of human labour. It is for the reason that nine-tenths of our country is not derived from nature, but from our own hands: ours is an artificial homeland". According to such non-Anglo-Saxon approaches, the territory is something different from the static, fixed and ossified object of the Anglo Saxon literature. On the contrary, it implies a different idea of territory as a highly

complex product of a co-evolution of both people and places, the result of a long standing process of civilisation (Magnaghi, 2000, 2001; see also: Dematteis, 1985), a collective product/construct that can be rather expressed through the Deleuze's and Guattari's (1980) cyclic movements of de-territorialisation and re-territorialisation defining the relationship between the territoire and the milieu (or Umwelt) it territorialises.

Thus, if framed within an idea of „active territoriality" (Dematteis, 2001; Dematteis & Governa, 2005; Governa, 2007) territory – as space constantly crossed by de-territorialising and re-territorialising tendencies – may be intended as aimed at a (self)sustainable and durable local development, where identity consists of sharing a common project and landscape is „a manner of seeing" (Farinelli, 1992), the Humboldtian "haze" describing not „what exists", but making possible „what could be" (id.), what „could allow for the unexpected, that could promote change, even revolution" (id.).

3 EU TERRITORIAL POLICIES BETWEEN COHESION AND COMPETITIVENESS

3.1 Territorialising the European social model

A further result of introducing nature in discourses on territory consists of the possibility of better separate the latter from the rigid idea of modern national state since environmental features are congenitally uncomfortable with boundaries. Furthermore, environmental issues seem to be usefully able to both summarise the three main elements – networking, governance, and rescaling – of the (apparently) de-territorialising metaphor and re-connect them to the territory. A river, for example, undoubtedly constitutes a network that can be intended as both physical and immaterial, given the social, economic, cultural relationships between opposite banks. Controlling its floods or building dams or bridges implies a certain degree of governance, at least in the form of coordination. Considering a river basin instead of different national states implies a territorial rescaling. It is not a coincidence, therefore, that the environment is one of the major pillars of EU policies, as the entire EU project has always been defined, although indirectly (Scoppetta, 2012), by space and territory because its primary intent is to override boundaries, be they legal or physical impediments to the free movement of good, people, services, and capital.

Such territorial dimension of EU policies is expressed by the concept of "territorial cohesion" as well as by the development of a non-binding programme – the ESDP, European Spatial Development Perspective – that mirrors the EU understanding of spatial planning. The subtitle of the ESDP, „Towards Balanced and Sustainable Development of the Territory of Europe" (CSD, 1999), clearly illustrates the importance attached the pursuit of balance – i.e: alleviating spatial differentiation among EU territory – in order to ensure that „the three fundamental goals of European policy", identified as economic and social cohesion, conservation and management of natural resources and cultural heritage and more balanced competitiveness, „are achieved equally in all the Regions of the EU" (id.). In fact, „people should not be disadvantaged by wherever they happen to live or work in the Union" (CEC, 2004). Such approach is aimed to give „a territorial dimension of the European social model" (CEC, 2009), by expressing the latter into spatial form and incorporating concerns about spatial protection by calling for „a just distribution of opportunities in space" (Faludi, 2007; see also: Davoudi, 2005). In political terms, such European social model – based „beyond the diversity of the Member States' social systems, on a common core of values" (Council of the EU, 2000b) – can be referred to the Delors's European vision, expressed in both the 1994 White Paper on Social Policy (CEC, 1994) and the Lisbon Presidency conclusions (Council of the EU, 2000a) before being more fully articulated in an annex to the Presidency Conclusions in Nice in 2000 as „characterised in particular by systems that offer a high level of social protection, by the importance of social dialogue and by services of general interest covering activities vital for social cohesion" (Council of the EU, 2000a).

Therefore, the concept of territorial cohesion implies an integrated and holistic approach that clearly demonstrates key cultural concerns. On the one hand, a key contribution of the German Government to the ESDP (Faludi, 2001) consists of the concept of "quality of life" that can be translated into " equivalent living conditions" to be achieved through spatial planning as a regional act. On the other hand, the focus on access to services of general interest reflects the French "aménagement du territoire", i.e.: the interest in pursuing redistributive policies within a regional context. Anyway, „Europeans", Faludi argues (2006), „are rooted in the soil […]. In their desire to live where they have for generations they deserve public support". Furthermore, territorial cohesion should also include a visionary element, since spatial visions „must

conceive of town and cities and regions, indeed of the territory of the EU as a whole, as more than places of production". Territories, in fact, „need to be conceptualised as cohesive […]. People should want to attach themselves to territories. Indeed, where the process is conducted in transparent fashion, the very act of visioning territories and their future can contribute to this feeling of attachement" (Faludi, 2007).

Thus, although undoubtedly European planning traditions are diverse (CEC, 1997; Nadin & Stead, 2008) and proponents have offered no explanations of how the social model itself is affected by concrete practices in spatial planning (Gualini, 2008), territorial cohesion permeates EU spatial policies at least as a normative claim that the European social model should encompass a core of shared values, which, when spatialised, would promote spatial justice. An example is given by the European Landscape Convention – whose surprising emphasised spreading within the Italian academic context appears as particularly suspicious, since landscape is a particularly negletted issues within the Italian territorial context… – focusing on a strong place-based approach in order to enlarge participation and governance, to re-built social relationships, sense of community and local identity, and to strenghten legitimacy, democratisation, and social justice.

3.2 Cohesion vs. competitiveness?

But, in the light of the current dominant network metaphor, the major aim of the Lisbon Agenda – developed in 2005 after the 2000 Lisbon Strategy was perceived to have run out of steam – consists of competitiveness and growth of the economic and productive system through the enforcement of strategic and innovative sectors by focusing on the so-called "territorial excellences". This means that cohesion funds are currently the financial incentives of the "jobs and growth" Lisbon Agenda that focuses on inter-urban competitiveness as a primary virtue in the context of neo-liberal development, and on a growth-first perspective based on the naturalisation of market logics that implies a "locking-in" in terms of an austere public sector, and funding provision on the basis of economic potential rather than social needs (Peck & Tickell, 2002).

This re-packaging takes place within the broader context of sustainable development (CEC, 2005) characterising the EU Sustainble Development Strategy (CEC, 2001; Council of the EU, 2006) as a long-term complement to Lisbon's medium-term goals. This means that cohesion and sustainability are indicated as tools for the achievement of growth-oriented objectives, so that the decrease of regional differences, that constitutes the main indicators of imbalances, become crucial in the achievement of cohesion. The latter, in turn, is seen as a tool for competitiveness. Therefore, the idea of "balanced development" – proposed in documents such as the ESPD or the Amsterdam Treaty – still remains, but such vision is interpreted as functional for global competitiveness: in other words, without levellig richness and accessibility (to infrastructures, to knowledge) it is impossible to compete on the global market. Despite the focus on economic development and growth, this broader framework enables territorial cohesion to maintain ist grasp on balance, co-ordination and sustainability, even while economic development seems to be in explicit ascendancy.

Both the spatial planning and the cohesion strand continue to be reflected in policy documents, and the contested definition reflects the political and cultural investments of different actors in the debate. The 2009 Sixth Report on Economic and Social Cohesion, for example, summarised the Commission's interpretation as „the goal of territorial cohesion is to encourage the harmonious and sustainable development of all territories by building on their territorial characteristics and resources" (CEC, 2009). This satisfies both strands: it refers to „harmonious and sustainable development", which can be understood to entail balance and coordination – and, consequently, the ESDP – while the reference to „building on territorial characteristics and resources" refers to the liberal economic paradigm's use of territorial endogenous advantages to promote economic development (CEC, 2008). By relying on the idea of territory to try to resolve the dissonance between competitiveness and redistribution, the Commission echoes OECD policy by emphasising the role of place-based policy approaches in capitalising on territorial assetts and locational advantages such as knowledge, skills, specialisation, and proximity between economic agents.

Thus, a contraddiction is to be highlighted here, and the crucial question concerns the ways in which such divergence between competitiveness and cohesion is tackled. Undoubtedly, a strategy focusing on territorial excellences risks to weaken and further marginalise those territories that are already considered as spatially or economically peripheral. Territorial development, indeed, is not a neutral process, as it involves interests and strategies that can also be conflicting, and the implementation of development policies can paradoxically generate further and different imbalances.

4 RETHINKING PERIPHERAL TERRITORIES

4.1 Marginality

"Marginality" has been a key-term for the conceptualisation of the Italian territory. Both the partition between mountains and non-mountains regions, given by the physical geography (see: Becchi et al., 1989), and the North/South dichotomy – given by historical reasons and originated by a vast literature on the so-called "questione meridionale" ("Southern question"), which comprised seminal works by Giustino Fortunato, Saverio Nitti, and Antonio Gramsci – have constituted the typical representation of the Italian territory (see: Lanzani, 1996) and the main approach to regional development in the decades from the formation of the national state (1861) until the Fifties. Backwardness and regional unbalances became dominant in public and scientific discourse and, especially in the case of the Southern Italy, the latter was fully mirrored in (mainly top-down) public policies that, in turn, paradoxically ended reproducing precisely those problems they were aimed to contrast, as once the Cassa per il Mezzogiorno – the first development agency introduced in Italy following the political and social debate on the agrarian reform – had been established, the territorial disparity came to be seen as a matter of the fact. In fact, its ambitious top-down regional development plan was explicitly devoted to the South of Italy as an entire homogeneous "backward region". As marginality was intended in terms of lack of both capital stock and spatial accessibility, the Cassa per il Mezzogiorno systematically addressed the question of both infrastructure provision and re-distribution of resources without any reference to the economic effects of allocation choice and to possible endogenous entrepreneurial actors and activities. Furthermore, as within the rigid North/South dichotomy the development model was given by big firms (e.g.: FIAT) of the industrial North, a number of "poles of industrialisation" were established in order to stop the massive internal and external emigration.

In a certain sense, the quantitative and economic criteria used for the allocation of EU structural funds – population, density, age structure, GDP, employment, education, spatial accessibility, and so on – mirror the rigid and static concept of marginality that was at the basis of the Italian development policies of the Fifties. What results is a too simplified image, which is inadaquate to effectively represent the real articulation of contemporary European local contexts, as it cannot capture the profound transformations occurred in the relationships and inter-dependences between urban and rural areas as well as the new territorial hierarchies given by the broader rescaling due to the phenomenon of globalisation. Thus, a more complex and dynamic approach to peripheral territories and to development issues seems to be needed.

In this sense, interesting suggestions are given by the Italian case. In the late Seventies the innovative and more articulated territorial representation of the so-called "Third Italy" (Bagnasco, 1977), comprising the regions of Central and North-Eastern Italy and mirroring an emerging economic landscape, was introduced by social scientists. This stimulated a profound theoretical change that led to the subsequent shift to the category of "local systems" as the manifestation of original local trajectories of industrialisation, and, therefore, as units for analysing territorial performance. This, in turn, led to formulate the concept of "industrial district" (Becattini, 1979; 1987; 1989; 1990; 1991; 2000) as spatially bounded relational density arising at the local level both directly (through deliberate exchange of matter and information) and indirectly (through external economies, spillovers and spin-offs) thanks to local cultural features and learning mechanisms given by a cognitive proximity.

Such advancements clearly showed the inadequacy of the previous representations of marginality, based on terms such as "depressed areas", "rural areas", "inner areas", "forgotten areas", "inactivity", "inability to adapt", "resistance against changing" (see: Becchi et al., 1989). These terms, in the reality, describe the features of a large part of the Italian territory, as it is largely maden by mountain areas and by small municipalities with a population of 5.000 or less (70,4 % of the total Italian municipalities) that are currently experiencing a progressive out-migration leading the total resident population to decrease (from 10.590.728 in 2001 to 10.349.962 in 2011 according to ANCI, 2011). And these are precisely the features that, in the long-run, have allowed the permanence of what Magnaghi (2000) calls „territorial heritage", and that may now not only find an economic use (Calafati, 2004; 2006) but also constitute the basis for conceptualising an interesting alternative "slower" development pattern.

4.2 Autonomy, and slowness

Despite marginal local systems – even though their contribution to the GDP may be negligible – perform a fundamental role in the social and ecological stabilisation of the territory, their distinctive features are little studied, and the need of a broad rethinking of marginality still remains neglected and undervaluated. The proposed reformulation of the issue – through the identification of new and more effective interpretative categories – would allow the abandonment of a restrictive concept of "unbalance", unidirectionally centred on the idea of economic growth, and would favour the construction of more complex, dynamic and pluralistic geographies of development, within which marginal territories may actively participate (and not merely survive) by usefully suggesting a possible alternative perspective.

The proposed rethinking of the role of marginality within development processes is to be framed within the recent trend towards the so-called „decroissance" (Grinevald, 1979; Latouche, 2005, 2008), also due to the ongoing global economic crisis, which includes the search for innovative parameters for measuring development such as the Hicksian income (maximum sustainable consumption), MEW (Measure of Economic Welfare), HDI (Human Development Index), GNH (Gross National Happiness) (see: Brooks, 2008), GPI (Genuine Progress Indicator) (Daly & Cobb, 1994), ISEW (Index of Sustainable Economic Welfare) (ibid.). Beyond the „natural capital", the latter considers inequal distribution of income, unpaid houseworks, costs for education, health, commuting, car accidents, pollution, loss of rural areas or wetlands, long-term environmental damages, distruction of non-renewable resources, and so on. Further transversal indicators refer to the relationships between human settlements and environment (e.g.: the carbon or entropy estimation), or to a shift of lifestyles, such as in the case of the justice estimation (in which the way of consuming is referred to justice for future generations). Participation, genre, and inter-generational estimations are to be added. All these parameters highlight the inadequacy of traditional categories, but they still remain linked to an economic approach to well-being, while further indicators focusing on territory seem to be more effective: from carrying capacity to ecological footprint; from „environmental space" (or „ecospace" or „environmental utilisation space") to concepts such as „resilience", „emergy", „exergy" (see: Pareglio, 2010). Finally, we also have an indicator for measuring „happiness per hectare" (Kucharek, 2006): in fact, as several recent innovative studies underline (e.g.: Sampson, 2003; Haybron, 2011; Layard, 1980; 2006, etc.), an innovative parameter for measuring the quality of life can be found in happiness, whereas the latter is referred to the social and environmental context (Helliwell & Putnam, 2004) rather than to individuals, and differs from a product-based well-being (it is rather closer to an access-based concept).

Anyway, such approaches move from the idea that sustainability can be really achievable if referred to the local dimension, in which a greater accessibility to informations implies an effective control on both production and exclusion processes. In fact, the autonomy of the economic system from the social and political sphere clearly leads to the question of the concrete possibilities of democratic control, as the latter tends to decrease with the growth of the financial, technical and bureaucratic apparatus (and with a larger and low-cost supply of goods).

Thus, the transition from the concept of inter-dependence, which is at the basis of the network metaphor, to the idea of autonomy is connected to the need of enlarging participation in decision-making (especially as regards the management of resources), and of awarenessly rescaling down. In fact, the myth that the market would define, through self-regulating dynamics, the optimal scale for developing economic and productive processes is quite misleading, as it only happens in the short term in response to price changes, while in the long-run it rather tends to support its self-expansion, with the predominance of trends towards aggregation. On the contrary, shifting the centre of gravity of economic processes closer to the level of political participation could mean an increased responsibility on how and what can be produced in a certain territory, e.g.: with the possible establishment of environmentally and socially sustainable agricultural or self-managed energy systems (Scoppetta, 2009).

Interesting suggestions come from the interpretation of certain Italian marginal territories as „slow territories" (Lancerini, 2005; Lanzani, 2007), whereas slowness is not synonimous with backwardness, but indicates a different and slower trajectory towards sustainable development, which requires time in order to allow collective learning processes. In this sense, autonomy and slowness mean assigning centrality to marginality, as the latter can be intended as a sort of "litmus test" for sustainable development policies, and it can effectively play a specific role in the construction/reformulation of European territorial scenarios.

4.3 Measuring the re-territorialising potential of slow territories

An interesting research field is highlighted here, and it concerns the search for new analytical and interpretative categories that could offer useful insights into such innovative concept of marginality. Moving from a definition of "territory" as the result of long-standing evolutionary processes between human settlements as local milieaus and the environment, such more complex and dynamic parameters to be defined have to refer to the concept of social capital, even if it is not an unambiguous notion, as it include a „dark side" (Cremaschi, 2007), i.e.: when it is not intended as pure public good, whose individual consumption does not reduce the use by the others, but rather, being the result of utilitarian strategies, is „capitalised for rent seeking by particularistic social networks „ (id.), so that complexity (of social relations, but also institutional) ends becoming a factor of „disorder" (Donolo, 2001).

In this sense, Putnam (1993) distinguishes between „horizontal" and „vertical social capital": the latter concerning „inequal agents in asymmetric relations of hierarchy and dependence", while the former is able to generate trust and cooperation, strenghthening reciprocity rules, and facilitating the flow of informations about the credibility of the involved actors. A further distinction concerns „bridging" and „bonding" social capital (Putnam, 2000): the latter characterised by a tendency to reinforce exclusive identities and homogeneous groups and based on „strong ties" (Granowetter, 1983) – in the case of marginality and marginalisation, a tactical response to hostile conditions, as „strong networks seem to be linked to both economic insecurity and lack of social services" (id.) – by both contributing to the fragmentation of communities, and perpetuating the condition of marginality itself. Therefore, one could talk about social capital as „social support" and not as „social leverage" (De Souza Briggs, 1998), being the former intended as an aid in addressing the needs of everyday life (which are particularly acute under economic deprivation), while the latter is aimed at supporting subjects in the broadest sense, by facilitating access and changes of opportunity structures. Finally, the distinction between social capital as „embeddedness" or „autonomy" (Woolcock, 1998) stresses the importance of building links with the outside, and seems to be particularly interesting as it does not refer to an idea of "assimilation" of marginal territories to hegemonic visions and values, but rather to the construction of a critical relationship between "slow" (with their specificities) and "speed" territories, i.e.: to the construction of an innovative more pluralistic way of thinking the concept of "development".

Therefore, the search for innovative categories for measuring the re-territorialising potential of the proposed slow territories can only move from a concept of social capital which, unlike other forms of capital, is understood as a constantly used public good, i.e.: whose possible decay does not depend on its excessive use, but rather on its non-use, as its iteration, and the progressive expansion of social relations, constitute the key-factor for its accumulation. Such iteration is ensured and facilitated by trust, as the latter „lubrificates cooperation" (Putnam, 1993).

The capacity of a territory in terms of planning, cooperation, and networking can then be identified as a parameter in order to measure its re-territorialising potential as well as the ability in self-constructing from below alternative ideas of development. A further parameter may be the way in which power is given to weak actors, and how this is used to support a shared place-based spatial strategy. In this sense, a relevant reference is the transposition of the concept of „capacitation", introduced by Sen (1999), from the individual to the collective dimension of territories, whereas theit are conceived as being able to acquire an autonomous capacity to express different development models, in which not only economic but also social, environmental, historical and institutional factors are included. Anyway, autonomy seems to be a key-category, and it does not simply means decentralised power, but rather self-regulation of territories, i.e.: the ability in developing individual and collective preferences towards sustainability through non-paternalistic strategies (i.e.: making sustainable development concretely desirable).

Activism of marginal territories – i.e.: the greater or lesser recurrence with which they construct (or participate to) spatial strategies – constitutes a further element, and such criterion can be also used in negative, in order to evaluate the level of weakness in planning. But it is worth noting that planning cannot be a criterion in itself: in fact, it cannot be seen as the only parameter of self-sustainable local development, but rather as a necessary condition. What is more important is the way in which marginal territories are able to (re)define their own identity around a project through the construction of a shared territorial imaginary that allows the persistence of ties and the establishment of interiorised values and methods beyond the project itself. In this sense, the evaluation of results and outcomes of such projects is to be intended in

immaterial terms of process, rather than of material achievements (an infrastructure, a building, etc.). In this sense, slowness alludes to an evolutionary process, where a longer time – although short-term indirect and unexpected outcomes, however, are not to be excluded – is required by the cognitive dimension of the collective cultural construction aimed at the co-evolution of people and places. Thus, the spatial strategy may be understand as a construct rather than as a product, and it consists of the re-production of common goods, which constitute the basis and the most qualitative element of development, by giving a stronger sense to the concept of "social cohesion", and allowing a non-contradictory approach to the notion of "development".

4.4 Networking slowness

On the background of territorial and political rescaling occurring in the European space, a relevant issues for slow territories concerns their ability in constructing larger networks. In this sense, what becomes crucial is the inter-municipal dimension, which may not correspond to any existing administrative entity, as it can be conceived as a result of sharing actions over time. Such spontaneous forms of inter-municipality define an intermediate level at which projects, strategies and agreements towards local sustainable development can be effectively and fruitfully established and implemented.

In this sense, an example is given by the French experiences of the so-called "Pays" (Santangelo, 2003): in fact, the Law LOADDT (1999) enable the inhabitants of a cluster of municipalities to form a legally recognised "Pays", based on mutual consent and defined in terms of territorial identity. For historical reasons, Italy appears as one of the countries which has more largely exploited the potential of inter-municipal cooperation, and public spending "cuts", and proposals for reorganising local government (both due to the current economic crisis) are currently highlighting the emerging phenomenon of the "Unioni di Comuni" ("Union of Municipalities") due to legislative changes initiated from the Law n.142/1990. Such territorial clusters have become a relevant reality (313 Unions), which includes 1.500 municipalities and a total population of about 6 million people, i.e.: 9,5 % of national population, which corresponds to that of all the metropolitan cities with the exception of Rome (ANCI, 2011). A wide range of clustering and cooperative instruments is used, and their variety is likely to have few equals in the European context. (Hulst & Van Montfort 2007). Furthermore, it is worth noting that the phenomenon cannot simply be pushed in the conceptual framework concerning very small municipalities, which are forced to join for purely financial reasons. Although there is a strong trend towards clustering by "dust municipalities", the "small only" is not the unique pattern, as we also have a "satellite" (a number of little municipalities around one or two larger centres), a "big only" (two or three larger centres), and a "couple" model (and, obviously, mixed forms). And, even if such new aggregations often move from the need of answering the growing demand for public services, once cooperation has been established in certain policy areas, there may be a positive spill-over effect towards further sectors.

Therefore, the proposed innovative categories can be fruitfully used for measuring the potentials of such territorial re-organisation that emerge from below, by drawing alternative geographies of development.

5   REFERENCES

AGNEW, J., CORBRIDGE, S.: Mastering Space: Hegemony, Territory and International Political Economy. Routledge, London, 1995.
AGNEW, J.: The Territorial Trap: The Geographical Assumptions of International Relations Theory. In: Review of International Political Economy, Vol.1, Issue 1, pp. 53-80, 1994.
ALLMENDINGER, Ph.: Planning in Postmodern Times. Spon, London, 2000.
ANCI: Atlante dei piccoli comuni 2011, 2011.
BADIE, B.: La Fin des territoires: essai sur le désordre international et sur l'utilité sociale du respect. Fayard, Paris, 1995.
BAGNASCO, A.: Tre Italie. il Mulino, Bologna, 1977.
BECATTINI, G.: Dal settore industriale al distretto industriale. Alcune considerazioni sull'unità di indagine dell'economia industriale. In: Rivista di Economia e Politica Industriale, Vol.V, Issue 1, pp.7-21, 1979 – Engl. ed.: Sectors and/or Districts: some Remarks on the Conceptual Foundations of Industrial Economics. In: GOODMAN, E., BAMFORD, J. (eds.): Small Firms and Industrial Districts in Italy. Routledge, London, pp.123-35, 1989.
BECATTINI, G. (ed.): Mercato e forze locali: il distretto industriale. Il Mulino. Bologna, 1987.
BECATTINI, G. (ed.): Modelli locali di sviluppo. Il Mulino, Bologna, 1989.
BECATTINI, G.: The Marshallian Industrial District as a Socio-economic Notion. In: PYKE, F., BECATTINI, G., SENGENBERGER, W. (eds.): Industrial Districts and Inter-firm Co-operation in Italy. International Institute of Labour Studies, Geneva, pp.37-51, 1990.
BECATTINI, G.: The Industrial District as a Creative Milieu. In: Benko, G., Dunford, M. (eds.): Industrial Change and Regional Development. Belhaven, London, pp.102-114, 1991.
BECATTINI, G.: Dal distretto industriale allo sviluppo locale. Bollati Boringhieri, Torino, 2000.

BECCHI COLLIDÀ, A., CICCIOTTI, E., MELA, A. (eds.): Aree interne, tutela del territorio e valorizzazione delle risorse. Franco Angeli, Milano. 1989.

BRENNER, N., PECK, J., THEODORE, N.: After neoliberalization?. In: Globalizations, Vol.7, Issue 3, Special Issue: Global Ideologies and Urban Landscapes, pp.327-345, 2010a.

BRENNER, N., PECK, J., THEODORE, N.: Variegated neoliberalisation: geographies, modalities, pathways. In: Global Networks, Vol.10, Issue 2, pp.182-222, 2010b.

BRENNER, N., THEODORE N. (eds.): Spaces of Neoliberalism. Urban restructuring in North America and Western Europe. Blackwell, Oxford and Boston, 2002b.

BRENNER, N., THEODORE, N.: Cities and Geographies of 'Actually Existing Neoliberalism'. In: BRENNER, N., THEODORE, N. (eds.): Spaces of Neoliberalism: Urban restructuring in North America and Western Europe. Blackwell, Oxford, pp.2-32, 2002a.

BRENNER, N.: Globalization as reterritorialization: the rescaling of urban governance in the European Union. In: Urban Studies, Vol.36, Issue 3, pp.431-451, 1999.

BRENNER, N.: New State Spaces: Urban Governance and the Rescaling of Statehood. Oxford University Press, Oxford and New York, 2004.

BRENNER, N.: The limits to scale? Methodological reflections on scalar structuration, In: Progress in Human Geography, Vol.25, Issue 4, pp.591-614, 2001.

BRENNER, N.: The Urban Question as a Scale Question: Reflections on Henri Lefebvre, Urban Theory and the Politics of Scale. In: International Journal of Urban and Regional Research, Vol.24, Issue 2, pp.361-378, 2000.

BROOKS, A.C.: Gross National Happiness. Basic Books, New York, 2008.

BROWN, C., PURCELL, M.: There's nothing about scale: political ecology, the local trap, and the politics of development in the Brazilian Amazon, In: Geoforum, Vol.36, pp.607-624, 2005.

CALAFATI, A.G.: 'Traditional Knowledge' and Local Development Trajectories, In: European Planning Studies, Vol.14, Issue 5, pp.631-639, 2006.

CALAFATI, A.G.: Conservazione e sviluppo locale nei parchi naturali: un'agenda di ricerca. In: Rivista Geografica Italiana, Vol.111, Issue 1, pp.29-52, 2004.

CALZOLARI, V. (ed.): Storia e natura come sistema. Un progetto per il territorio libero dell'area romana. Argos, Roma, 1999.

CASTELLS, M.: The Rise of the Network Society, The Information Age: Economy, Society and Culture, Vol. I. Blackwell, Oxford-Cambridge, 1996.

CATTANEO, C.: Agricoltura e morale. In: Notizie naturali e civili su la Lombardia e altri scritti su l'agricoltura. Edizioni Risorgimento, Milano, 1925.

CEC: Social White Paper European Social Policy. A Way Forward for the Union. A White Paper. COM (94) 333 final, 1994.

CEC: The EU Compendium of Spatial Planning Systems and Policies. Regional Development Studies, Office for Official Publications of the European Communities, Luxembourg, 1997.

CEC: A Sustainable Europe for a Better World: A European Union Strategy for Sustainable Development. COM (2001) 264 final, 2001.

CEC: Third Report on Economic and Social Cohesion: A New Partnership for Cohesion: Convergence, Competitiveness and Cooperation. COM (2004) 107 final, 2004.

CEC: Communication to the Spring European Council: Working together for growth and jobs, A new start for the Lisbon Strategy. COM (2005) 24, 2005.

CEC: Fifth progress report on economic and social cohesion Growing regions, growing Europe. COM(2008) 371 final, 2008.

CEC (Commission of the EC): Sixth Progress Report on Economic and Social Cohesion. COM (2009) 295 final, 2009.

CORBOZ A.: Le territoire comme palimpseste. In: Diogène, Vol.121, Janvier-Mars, 1983.

COUNCIL OF THE EU: Presidency Conclusions. 7-9 December, Lisbon, 2000a.

COUNCIL OF THE EU: Presidency Conclusions: European Social Agenda. 7-9 December, Nice, 2000b.

COUNCIL OF THE EU: Renewed Sustainable Development Strategy. (2006 10917/06), 2006.

COX, K.: Redefining "Territory". In: Political Geography Quarterly, Vol.10, Issue 1, pp.5-7, 1991.

CREMASCHI, M.: The Dark Side of Social Capital: Organised Crime and Illegal Development in Southern Italy. Paper presented at the XXI Aesop Conference, Naples, 2007.

CSD: European Spatial Development Perspective. Towards Balanced and Sustainable Development of the Territory of the European Union (ESDP). Presented at the Informal Meeting of Ministers Responsible for Spatial Planning of the Member States of the EU, Potsdam 10/11 May 1999.

DALY, H., COBB, J.: For the Common Good, Beacon Press, Boston, 1994.

DAVOUDI, S.: Understanding Territorial Cohesion. In: Planning, Practice & Research, Vol.20, Issue 4, pp.433-441, 2005.

DE SOUZA BRIGGS, X.: Brown kids in white suburbs: Housing mobility and the many faces of social capital. In: Housing Policy Debate, Vol.9, pp.177-221, 1998.

DELEUZE, G., GUATTARI, F.: Capitalisme et schizophrénie 2: Mille plateaux. Éditions de Minuit, Paris, 1980.

DEMATTEIS, G., GOVERNA, F. (eds.): Territorialità, sviluppo locale, sostenibilità: il modello SLoT. Franco Angeli, Milano, 2005.

DEMATTEIS, G.: Le metafore della Terra. La geografia umana tra mito e scienza. Feltrinelli, Milano, 1985.

DEMATTEIS, G.: Per una geografia della territorialità attiva e dei valori territoriali. In SLOT, quaderno 1, ed. Baskerville, Bologna, 2001.

DONOLO, C.: Disordine. L'economia criminale e le strategie della sfiducia. Donzelli, Roma, 2001.

ELDEN, S.: Missing the Point: Globalization, Deterritorialization and the Space of the World, In: Transactions of the Institute of British Geographers, Vol.8, pp.8-19, 2005.

FALUDI, A.: The German Role in the ESDP Process. In: Built Environment, Vol.27, Issue 4, pp.269-277, 2001.

FALUDI, A.: From European Spatial Development to Territorial Cohesion Policy. In: Regional Studies, Vol.40, Issue 6, pp.667-678, 2006.

FALUDI, A.: Territorial Cohesion Policy and the European Model of Society. In: European Planning Studies, Vol.15, Issue 4, p. 567, 2007.

FARINELLI, F.: I segni del mondo. Immagine cartografica e discorso geografico in età moderna. La Nuova Italia, Firenze, 1992.

GOVERNA, F.: Territorialità e azione collettiva. Una riflessione critica sulle teorie e le pratiche di sviluppo locale. In: Rivista Geografica Italiana, Vol.114, pp.335-361, 2007.

GRANOVETTER, M.: The strength of the weak ties: a network theory revisited. In: Sociological theory, Vol.1, 1983.

GRINEVALD , J.: Demain la decroissance. Lusanne, Favre, 1979.

GUALINI, E.: The rescaling of Governance in Europe: New Spatial and Institutional Rationales. In: European Planning Studies, Vol.14, Issue 7, pp.881-904, 2006.

GUALINI, E.: 'Territorial cohesion' as a category of agency: the missing dimension in the EU spatial policy debate. In: European Journal of Spatial Development, Vol.28, pp.1-22, 2008.

HARDT, M., NEGRI, A.: Empire. Harvard UP, Cambridge, 2000.

HARDT, M., NEGRI, A.: Multitude: War and Democracy in the Age of Empire. The Penguin Press, New York, 2004.

HAYBRON, D.M.: Central Park: Nature, Context, and Human Wellbeing. In: International Journal of Wellbeing, Vol.1, Issue 2, pp.235-254, 2011.

HELLIWELL, J.F., PUTNAM, R.D.: The Social Context of Well-Being. In: Philosophical Transactions of The Royal Society B, Vol. 359, pp.1435-1446, 2004.

HULST, R., VAN MONTFORT, A. (eds.): Inter-Municipal Cooperation in Europe, Springer, Dordrecht, 2007.

KUCHAREK, J.C.: Happiness per Hectare. In: RIBA Journal, May, 2006.

LANCERINI, E.: Territori lenti: contributi per una nuova geografia dei paesaggi abitati italiani. In: Territorio, Vol.34, 2005.

LANZANI, A.: Sviluppo e turismo nei "territori lenti". In: Quaderni IReR, Vol. 6, 2007.

LANZANI, A.: Immagini del territorio e idee di piano 1943-1963. Franco angeli, Milano, 1996.

LATOUCHE, S.: Breve trattato sulla decrescita serena. Bollati Boringhieri, Milano, 2008.

LATOUCHE, S.: Come sopravvivere allo sviluppo. Dalla decolonizzazione dell'immaginario economico alla costruzione di una società alternativa. Bollati Boringhieri, Milano, 2005.

LAYARD, R.: Happiness and public policy: a challenge to the profession. In: The Economic Journal, Vol.116, pp. C24-C33, 2006.

LAYARD, R.: Human satisfactions and public policy. In: Economic Journal, Vol.90, pp.737-750, 1980.

LEFEBVRE, H.: De l'État. Une pensée devenue monde: Faut-il abandonner Marx?. Paris, Fayard, 1980.

LUPO, S.: Storia della mafia dalle origini ai nostri giorni. Donzelli, Roma, 1993 (1° ed.; Engl. transl. by A. Shugaar: History of the mafia, Columbia University Press, New York, 2009).

MAGNAGHI, A. (ed.): Rappresentare i luoghi. Metodi e ricerche. Alinea, Firenze, 2001.

MAGNAGHI, A.: Il progetto locale. Bollati Boringhieri, Torino (1° ed.), 2000.

MARSHALL, T.: The European Union and Major Infrastructure Policies: The reforms of the TENs programmes and the implications for spatial planning. Paper presented at the Aesop Conference 2012, Ankara, 11-15/6/2012.

NADIN, V., STEAD, D.: European Spatial Planning Systems, Social Models and Learning. In: disP, Vol.1, 2008.

OFFE, C.: Governance. Empty signifier oder sozialwissenschaftliches Forschungsprogramm? In: SCHUPPERT, G.F., ZURN, M. (eds.): Governance in einer sich wandelnden Welt. VS Verlag fur Sozialwissenschaften, Wiesbaden, 2008.

PAREGLIO, S.: Dottrina economica e sostenibilità ambientale: appunti per il governo del territorio. In: PERRONE, C., ZETTI, I. (eds.): Il valore della terra, Angeli, Milano, pp. 230-231, 2010.

PECK, J., THEODORE, N., BRENNER, N.: Neoliberal Urbanism: Models, Moments, Mutations. In: SAIS Review, Vol.29, Issue 1, 2009.

PECK, J., TICKELL, A.: Neoliberalizing space. In: Antipode, Vol.34, Issue 3, pp.380-404, 2002.

PUTNAM, R.: Bowling alone. The collapse and revival of American community. Simon and Shuster, New York, 2000.

PUTNAM, R.: Making Democracy Work. Princeton University Press, Princeton, 1993.

RAFFESTIN, C.: Pour une géographie du pouvoir. Libraires Techniques, Paris, 1980.

ROBINSON, J.: The Spaces of Circulating Knowledge: City Strategies and Global Urban Governmentality. In: MCCANN, E., WARD, K. (eds.): Mobile Urbanism: Cities and Policymaking in a Global Age. University of Minnesota Press, Minneapolis, pp.15-40, 2011.

SAMPSON, R.J.: The Neighborhood Context of Well-Being. In: Perspectives in Biology and Medicine, Vol.46, Issue 3, pp.53-64, 2003.

SANTANGELO, M.: I Pays francesi: un modello istituzionale di formazione di SloT. In: IMARISIO, C., ROSSIGNOLO, C. (eds.): SLoT quaderno3. Una geografia dei luoghi per lo sviluppo locale. Baskerville, Bologna, 2003.

SEN, A.: Development as Freedom. Oxford University Press, Oxford, 1999.

SERENI, E.: Storia del paesaggio agrario italiano. Laterza, Roma-Bari, 1961 (1° ed.; Engl. Ed.: History of the Italian Agricultural Landscape. Princeton University Press, Princeton, 1995).

SCOPPETTA, C.: Immaginare la metropoli della transizione. La città come living machine. Campisano, Roma, 2009.

SCOPPETTA, C.: The Baltic Sea Macro Region. A soft synaptic space within European rescaling process. In: Smart planning per le citta' gateway in europa. Connettere popoli, economie e luoghi. Atti della IX Biennale delle Città e degli Urbanisti Europei, Genova, 14-17 September 2011, INU Edizioni, Roma, 2012.

SOJA, E.W.: Postmodern Geographies: The Reassertion of Space in Critical Social Theory. Verso, London, 1989.

SWYNGEDOUW, E.: Neither global nor local: glocalization and the politics of scale. In: COX K. (ed.): Spaces of Globalization: Reasserting the Power of the Local. Guilford, New York, pp.137-166, 1997.

TOCCI, W.: L'insostenibile ascesa della rendita urbana. In: Democrazia e Diritto, Vol.1, pp.17-59, 2009.

WOOLCOCK, M.: Social capital and economic development: toward a theoretical synthesis and policy framework. In: Theory and Society, Vol.27, Issue 2, 1998.

New Methods of Climate Monitoring

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1 ABSTRACT

The atmosphere is a crucial ecological factor which could strongly influence the human being, the community, and nature by local weather conditions. One part of this ecosystem is the city in which anthropogenic factors (traffic, industry, housing complexes) and natural factors (water, soil, air) interact in a tight space. The interconnection of the various factors creates a highly complex urban ecosystem. One of the most important reasons for the intensive research in the field of urban ecosystem is the realization that physical and meteorological processes are at work within the climate of these agglomerations and the local climate, which influences the human being. However, humans are also unconsciously influencing this climate. Urban design and other artificial changes in the terrain also create anthropogenic climate modifications. This can have positive as well as negative consequences. Since the climatology is ever more developing from a descriptive science toa global, interdisciplinary system science which has an increasing social position, because of energetic processes of transformation that can be displayed more and more accurately. Especially, the anthropogenic influenced climate and its ecological systems and processes are in the focus of numerous disciplines. Some of these disciplines are geography, urban design, architecture, environmental design, medicine, and agriculture. This paper wants to show how micro scale climate measuring could be performed in habitats nowadays in a new way. The most important climatological measurement units will be introduced. Furthermore, it will be described how currently manual measurements are performed by the use of individual devices. Subsequently, it will be explained why these classical measurement units are not adequate to describe an urban ecosystem. The question should be answered, which indicators must be gathered, in order to optimize the analysis of the influence of the urban climate on the human well-being and how adequate data and information infrastructure could look like? It will be discussed which additional data and methods of climate monitoring are necessary to describe the urban ecosystem more accurately. Finally, new concepts will be introduced how the urban ecosystem can be explored by a new innovative combination of psychological, physical, and climate data. In the process, bio-vital functions, crowd sourcing as well as emotional data will be gathered additionally to climatological data.

2 INTRODUCTION

The atmosphere extents up to a height of 1000 km. Especially, in its lower sections it is an factor for the environment. The climate and the weather are important for the nature and the society. The climate describes the condition of the atmosphere at a certain location over a long period of time.The weather, on the opposite, describes the perceivable short term conditions of the atmosphere at a certain location [cf. KUTTLER, 2006:1]. Meteorology has its roots in the Greek language and means the science of the celestrial phenomenons, and is therefore a part of geoscience. It deals with the physical and chemical phenomenons and processes of the atmosphere as well as reactions with solar radiation and the surface of the earth. In a time-space relation, its interest includes everything between microturbolences and climatology, for instance the local weather. The research field of climatology is, because of its interdisciplinarity, than the one of the meteorology [cf. Brockhaus, 2009:218FF]. Meteorology can be seperated into the dynamic or theoretical meteorology, synoptic metrology, and the experimental metrology (physics of the atmosphere) [cf. Brockhaus, 2009:218FF]. One basis of the observation of the weather is a constant recording of it. By using current data and taking the condition of the atmosphere into account, a weather forecast can be created. Amongst others, the measureable data consists of the air temperature, air pressure, and precipitation. Furthermore, parameters like wind direction, cloudiness, layer of snow, hours of sunshine, special weather phenomenons (e.g. hail, thunderstorms, fog), the behavior of animals, and the phases of the vegetation is being analyzed [cf. Brockhaus, 2009:40FF]. Climatology is the science of the climate, the change of climate and its consequences. Climatology is a part of meteorology as well as of geography. It has connections to biology, chemistry, physics, glaciology and geology. Climatology can contentwise be subdivided into climatological aquisation of information, climate diagnostics, climate modelling, and the research of climate

effects. Because of the complex and manifold processes of the climate system, a special, physical climatology arises, which primarily uses physical climate modelling. It is regarded as impossible to understand climatological processes completely in the foreseebale future. Additionally, applied climatology is important for the engery industry (usage of wind, water, and solar energy), agriculture (bioclimatology), the public health sector (humanbiometeorology), and water economy (hydrometeorology) [cf. Brockhaus, 2009:183].

As a result, it can be concluded that climate effects are cumulative and have consequences on human beings. These consequences occur spatially very in different ways. Resarch to increase our understanding of the connection between the global climate change and health is strongly needed [cf. Kappas, 2009:223].

Nowadays, the applied urban climatology has gained importance beyond the controversy of the global climate change. Most scenarios for developments of the climate in the next decades point towards an increasing global temperature. Extrem weather conditions will increase, especially in urban areas will be an intensification because of local climatological and air quality factors. The applied urban climatology deals with climate and air quality modifications. There is not only observating and analysing the climate and air quality, but also the analysis of the consequences for the biotic and abiotic factors of the urban ecosystem. The applied urban climatology can be considered as a link between climatology and urban design. Knowledge, gained out of urban climatological analysis, is transcribed by analytical climate maps and planning reference maps respectively. By now, humanbiometeorology is a constant part of urban climate. Human biometeorology analyzes, amongst others, the effect of the urban climate on the well-being of humans [cf. HENNINGER, 2011:89F].

Various micro, meso, and macro factors are shaping the urban climate. For instance, latitude, landscape, height above sea level, the distance to major oceans or sees, the size of the city, the population, the type of rural and urban land use, the topographical, rural and urban structures, the rate of sealed areas, source of emission and the perceivable and latent rejected heat of technical processes [cf. KUTTLER, 2006:372F].

3 MEASUREMENT PROCESSES

3.1 General Measurement Processes

Different measurement processes are suited differently well for various situations. Therefore, it is regarded as reasonable to formulate definitions and declarations of the measured area. Afterwards, the measurement precision, the scale, and the measurement duration have to be determined. Depending on the stage of development and the standartization of the measurement methodology, these preconditions can vary. It has to be differenciated between stationary measurement, remote sensing methods, additional methods and mobile measurement.

3.2 Stationary Measurements

The stationary measurement is often executed in measurement networks. Established networks in Germany are the synoptic-climatologic measurement and observation network, and the extraofficial climate and precipitation measurement network of the German Weather Service (DWD). However, these measurement networks were not meant for the data aquiring in an urban climatological context. These networks are for the weather forecast. The major problem is that the spatial density of the individual measurement stations is too wide for an analysis of the urban climate. Nevertheless, measurement stations near an urban area can be used as reference. Stationary measurement processes are well suited for observations over a long period of time [cf. OTTE, 1999:289FF]. Professional measurements are conducted in a Stevenson screen, what means that a box is attached at the top of a two meter high frame. The relevant measuring instruments are inside the box. The box protects the sensible instruments from damage as well as outside influences which could distort the measurements. Blinds secure an undisturbed air circulation. Another type of measurement stations are the various small and semi professional private stations. The basis for a private measurement station is a thermometer, a hygrometer, and a barometer. Additionally, one can add a rain gauge and an anemometer. All these instruments can be found seperatly or as a single measurement instrument. Private stations can be distortet because of inaccurate measurement technique and frequently wrong locations.

3.3 Remote Sensing Methods

Remote sensing methods like, for instance, RADAR, LIDAR, and SODAR are mostly ground based methods, but an exploration via airplane and satellite is also possible. Thereby, the atmosphere is explored by radio, light and sonic waves. The development of drones ("anmanned air vehicle" (UAV) or "unmanned air system" (UAS)) has increased in the past few years. Nowadays, drones are mainly used by the military. However, a civil or private usage is possible. Drones would offer new possibilities for the climate observation and landscape monitoring. Due to low costs for aquisation and maintance, a multitude of data can be gathered with these unmanned helpers. Unlike ballons and airplanes, drones would allow to monitor the climate and the weather in street canyons and close above buildings. This could be done at a fixed position as well as over a distinct transect. A more precise horizontal observation of the urban boundary layer would be possible. Also a theoretical determination of the urban canopy layer and urban turbulent layer respectively is possible. Another idea could be to follow individual persons in the city from a "birds eye view". The person could be observed with an infared camera to gain new insights into the reaction between the human organism and the urban structure (if it is not against the law).

3.4 Additional Methods

Phenological obervations are part of the additional methods. The vegetation offers information related to the climatological advantages and disadvantages. However, often various different factors are playing a role, for instance soil quality [cf. OTTE, 1999:299]. One example of additional methods would be the project "Klimabiene" (www.klimabiene.de). By spreading out researchers over a wide area, questions about correlations between weather, the development of the vegetation, and flock events could be answered.

3.5 Mobile Measurement

Another possibility detecting the inhomogeneous urban structure is using mobile measurements. The advantage of this type of methodology is the high density of measurements, which could be mapped spatially. Although, especially in the applied urban climatology, the methodology of mobile measurements to detect data of air temperature and air humidity has been practiced for a long time, mobile air quality measurements do not have quite a long tradition. Already in the 1920´s, mobile air temperature measurements were made by Schmidt and Peppler. The first ones were semi-mobile, but in the course of the time the technological development allowed to measure continuously from the beginning to the end of the transect [cf. Henninger, 2011]. At the department of Physical Geography at the University of Kaiserslautern, such measurements are carried out by the students regularly. The climate data are gathered by individual portable measuring instruments and e.g. the results are written down manually. Exemplarily, the measurement devices record air temperature, air humidity, surface temperature, lighting conditions, and the wind speed. Later on, the gathered data can be copied into a Geographic Information System (GIS) and can be analyzed. The GIS makes it possible to show the relation between the different types of soil-coverage and air temperature. For example, the air above the natural surface is colder than the one above the asphalt (Fig. 1).

Fig. 1: Mobile measurement – Map of the air temperature – Group project – GSP&Stadtklimatologie 2009

However, it is easier if the data could automatically be determined and recorded. Hence, another method of climate monitoring is an electronic and mobile field book.

It is desireable to include smartphones as mobile measurement devices. Beside localization via GPS, smartphones have various sensors which can be used to collect environmental data. Furthermore, smartphones allow data transfer (e.g. UMTS, LTE) and the possibility to store, amongst others, digital documents, pictures, and audio recordings in a database.These functions enable smartphones to be used as electronical field books.
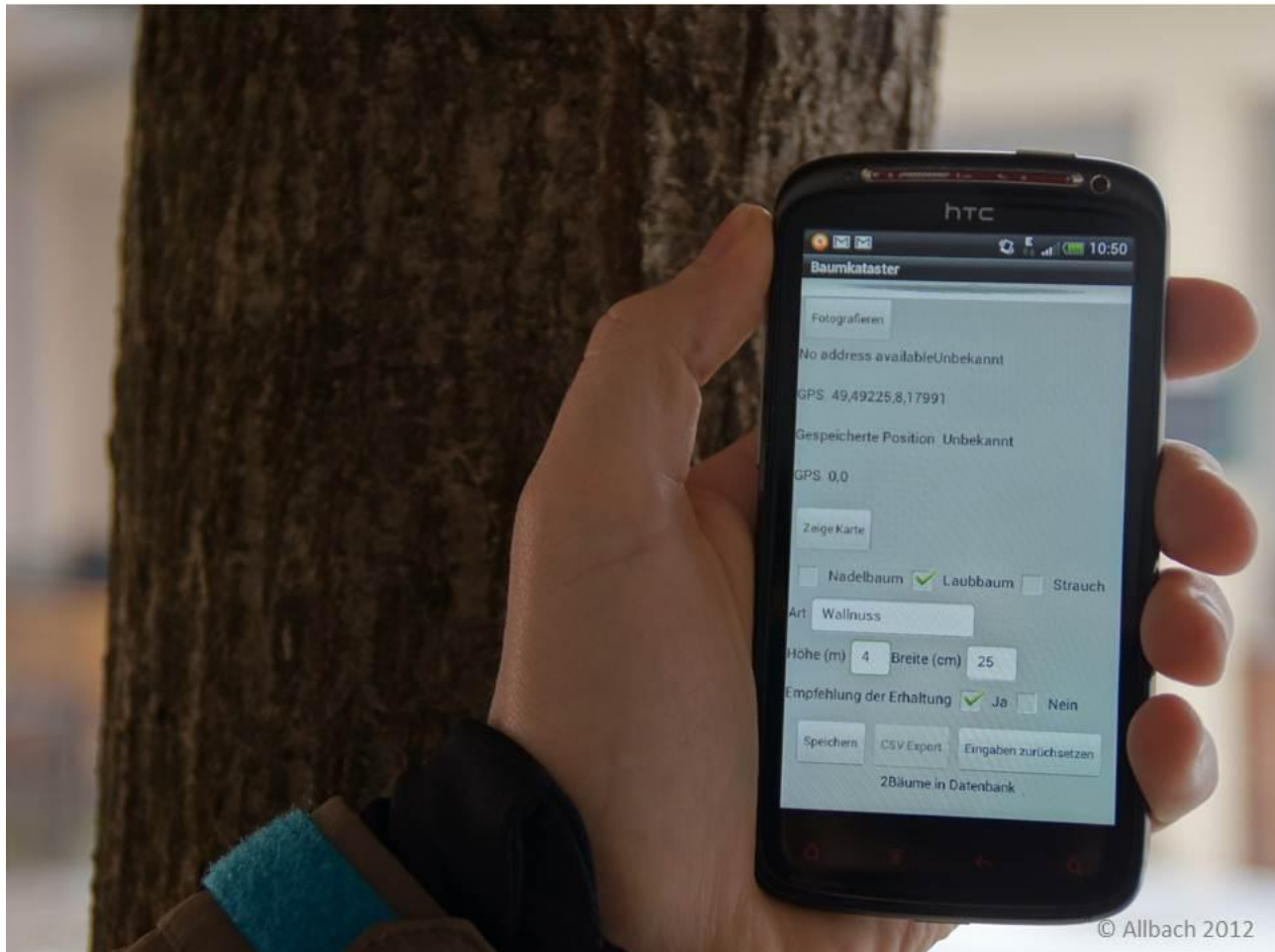
Fig. 2: App: „Baumkataster" – Recording position & data of a tree

The self-developed (ALLBACH, GERMANN) mobile tree app ("Baumkataster") is an example for an electronic field book (Fig.2). It is possible to store the location of a tree as well as to determine it according to its classification. Some meta data, such as the height and the circumference of the tree, can also be stored. Afterwards, the data can easily be edited on the computer.

Another way of mobile measurement of the climate is done by car. A monitoring car can continually gather stationary, as well as mobile meteorological and air quality data. In Essen it was possible to show the connection between an average CO_2 emission and various types of land use [cf. HENNINGER, 2005, 2011]. Tracer and drift smoke experiments are also mobile measurement techniques. They are especially suited for the phenomenological and visual proof of air movement near the ground. They can be used to measure nightly cold air flow under autochthonous weather conditions. Tracer experiments use easily managable chemical tracers such as sulfurhexafluoride (SF_6). This gas can be measured short after it was emitted in the investigation area. By this, it is possible to gain knowledge about the penetration depth and the volumetric flow rate [cf. KUTTLER, 1996] [cf. OTTE, 1999:289].

3.6 Urban Sensing

A new type of measurement could be the so-called 'urban sensing.' The individual human being or his or her carried equipment can be used as a measurement instrument for 'urban sensing.' A combination of stationary

and mobile sensors is possible [cf. Campell 2006]. Urban sensing in combination with the 'Web 2.0/ Web 3.0' is a new possibility to gather and analyze data. These data, which can be gathered actively as well as passively, have a yet unpredictable value for urban design and climatology. It might be necessary to develop new algorithms and programs, which are able to do more than simply process physical input, in order to make this new data source complete accessable. The possible usage could be separated into three fields: personal scenarios, social scenarios, and public scenarios. A personal scenario could be the monitoring and analysis of one's own vital functions. In a social scenario data of a fixed group of people could be gathered and handled by social networks like Flickr. In a public scenario there would not be any limit and the whole population could take part in it [cf. Srivastava; et al., 2006:1F]. One advantage of this kind of data collection is the possibility of monitoring huge areas over a long period of time [cf. Hof, 2007:1]. Out of financial reasons, this is mostly not possible with the classic methods like couting and measuring. Also the already existing ubiquiority of mobile devices is important for the accuracy of the data [cf. Goldman; et al., 2009:4FF]. There are already projects which try to use urban sensing. Noisetube (http://noisetube.net) is a system for the monitoring of noise. Waze (www.waze.com) is a mixture of crowdsourcing, geotagging, traffic information system, and real time map. Users are able to inform each other about traffic jams, accidents, and other problems. They can even use it for mapping a city on their own. Because data could be collected in real time and it is also possible to send the data directly to the system, this program is interesting for planners. Another aspect which might be interesting for planners is the possibility to monitor areas like nature protection areas or new development sites. A combination with an augmented reality technique might even increase the popularity of urban sensing [cf. Allbach, 2010]. A simple use of urban sensing was the project tracking people of CPE at the TU Kaiserslautern. During this project the movement, activities, way of locomotion, and various other metadata of students was manually gathered and analyzed around-the-clock over a longer period of time. Additionally to the aspects of covered distance and way of transportation, it is also possible to analyze the availability of parking spots at certain locations, the demand for public transportation and the availability of electronic vehicle networks. Furthermore, it is possible to gather climatological data directly and indirectly. The metadata can also be used to draw even more conclusions. The average movement speed, the rate of emission of each person or in a specific area can be calculated. It is possible to compare the influence of the development of the temperature in a certain time frame. Which ways of transportation are selected during a specific season or temperature? How long does a certain group of people expose themselves to the weather? These are questions which could be answered through urban sensing.

Fig. 3: Tracking People 2.0: – Presentation oft the routes and frequency taken by car – [Allbach, Fabisch 2009]

This, of course, very simple system could be automated and expanded with state of the art technology. Updated and expanded information content could lead to the development of new theories which could base upon new statistical facts and new combinations of data.

The data could be used to identify the monitored area and select the required measurement techniques as described in the introduction about measuring methods. In figure 3 the transects of the students taken by car can be seen, sorted by frequency. At the red marked main routes it might be possible to measure extreme

magnitudes of e.g. emissions. These data can also be helpful to select and postion suitable measurement instruments. Connections between the way of usage and climatological and medical metrologcal data could be discovered. Additionally, it is possible to create special subgroups through the metadata, e.g. male, female, student, pupil, senior citizen, allergic subject, etc..

Another type of urban sensing is called tagging. Thereby, information is connected to a geographical position, e.g. uploading pictures to google maps. In the field of urban design, tagging is used in the two dimensional space in the study "A New Urban Sensing and Monitoring Approach: Tagging the City with the RADAR SENSING App" (Zeile, Memmel, Exner 2012), the "Sensing the City" project (Bergner, Exner, Zeile, Rumberg 2012), and "Mobile Digitalisierung von Baulücken – Baulückenerfassung mit GIS, iPad und Geoweb" (Biwer, Broschart, Höffken). Especially the plattforms ALOE and RADAR, which were developed by Martin Memmel at the German Research Center for Artificial Intelligence (DFKI), offer various possibilities how urban sensing scenarios could be realized.

Fig. 4: Tagging with augmented reality – Emotinal Maps & Partizipation – Allbach 2010

New technologies like augemented reality (AR) can be used for urban sensing. The diploma thesis "Augmented City Kaiserslautern" (ALLBACH 2010) explains how virtual tags, as an information carrier, can be blended into the real world. For planners, the active tagging of objects in the real world offers an comprehensive database. How a project is accepted by the puplic can be analyzed. Nuisances like noice, dirt, problems with a typ of ground covering, or insufficient accessability could be identified in a new way and through the uploading of pictures and voice recordings be further documented [cf. ALLBACH 2010, 2011].

The project „Emomap" of CPE of the TU Kaiserslautern tries to discover in how far it is possible to gather and analyze georeferent emotions with the prototype of a 'smartband' (developed by Dr. Papastefanou at the GESIS – Leibniz-Institute for the Social Sciences) and a GPS logger. Another similar and interesting project was called "Biomapping". It is a puplic project which is analysing the perception of puplic areas.
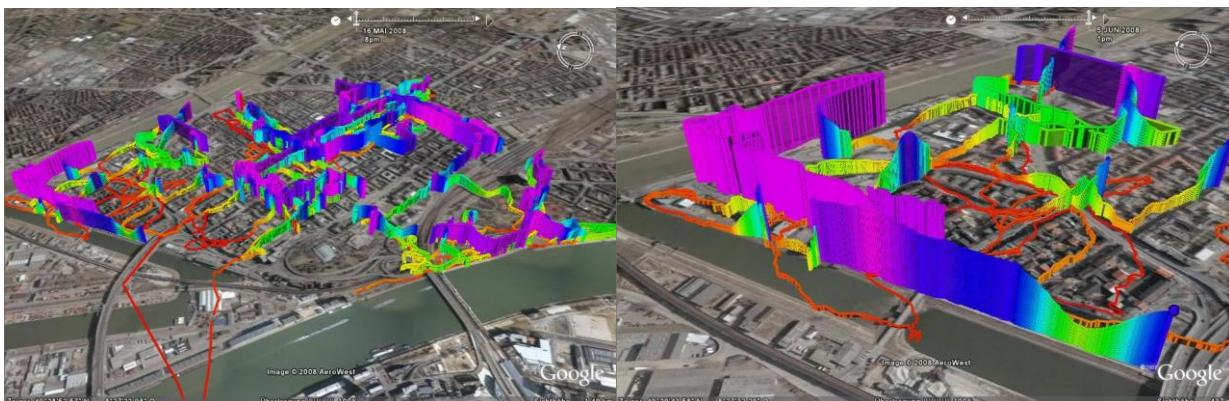
Fig. 5: Emomap: Analysis of the results of all groups – Allbach et al. 2008

Figure 5 shows the different routes which were used in the urban area of Mannheim. The "emotions" are depicted by the height of the graphs. It is striking that in some areas of the city higher amplitudes can be seen. Already during the experimentit could be realized that the emotional mapping of a city is hardy possible out of various reasons. It was not possible to explain definitly what caused the emotions or the psychophysiological processes. However, they supposed that climatolocigal or bioclimatological aspects could have been the reason for the reactions, for instance a shadily park as seen in figure 6. A certain statistically conection between temperature, stress and emotions could be proven. It has to be noted that the prototypical test procedure as well as the insturments are error-prone.

Fig.5: Emomap: Possible interconnection of climate & "emotions" – Allbach et al. 2008
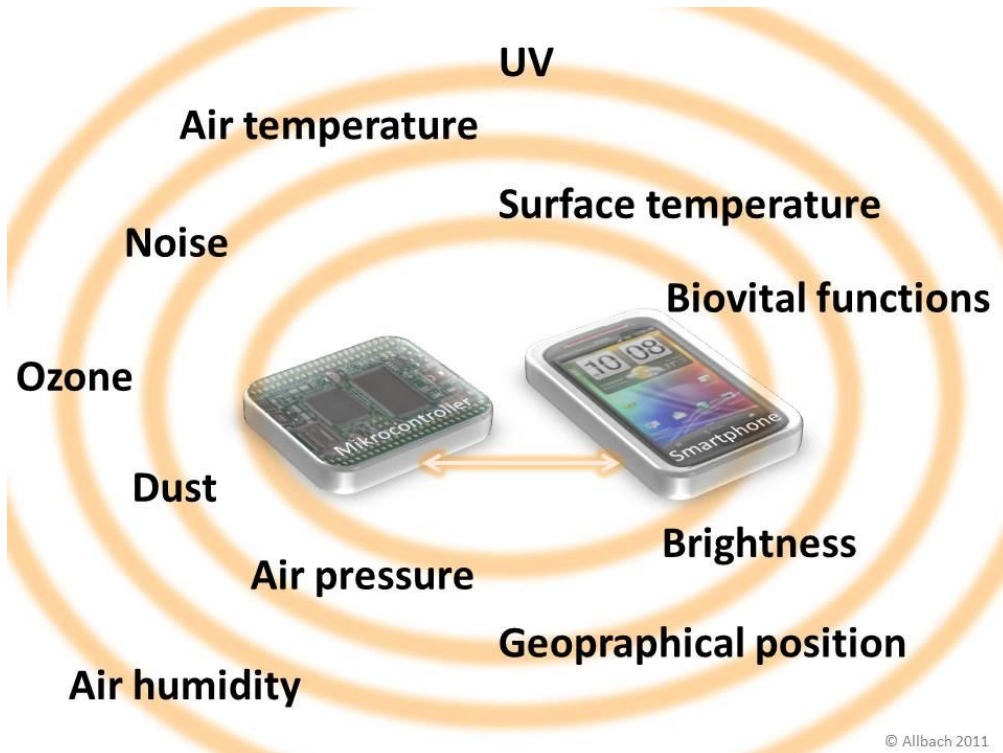
Fig. 7: Embedded Urban Sensing – Example for the measured data

4 DEVELOPMENT OF A WEB BASED SYSTEM TO STORE CLIMATE DATA

A multitude of biovital functions could be recorded by the sensors. For instance, heart rate, airflow, temperature, level of blood oxygen and skin resistance will be recorded, but much more is possible. The climate indicators depicted in figure 6 shall be linked with the biovital functions. Unfortunately, it is not possible to measure all biovital functions at present. It would be revealing to measure blood counts of various probands. This has already been tested by companies such as Medisana, Withings, and Sanofi-Aventis, but it is not possible to combine all existing single sensing instruments into an all-in-one gadget. Also, most instruments do not offer the possibility to access the data since most producers favour closed systems. However, it is detectable that the publication of various crowdsourcing applications, which monitor the biovital functions, in the context of social media plattforms, are appealing to the users. For instance, the sharing of covered distance, energy consumption, time needed, and covered difference in altitude with friends in Facebook. This might pressure the producers of E-Health-plattforms to create an open system.

The various sensors gather a multitude of different data. They have a highly differentiated quality and conformity. A method must be found to connect and blend them which one another, since this is an important aspect. It has to be considered that data is available in various different formats and that it has to be brought into a compliant format later on. Especially time and geopraphical position are critical values and can lead to severe misinterpretations, if they are imprecisely measured. If the data is to be saved in a system, standards have to be defined in order to make the data compareable. Measurement units, names, spelling, and units have to be defined, too.

Since as much as possible data should be gathered, it seems to be reasonable to keep the maximum amount of attributes of the data unlimited. At the same time, the collected data has to offer a certain amount of information content. This content has to be at least date, value, unit, and the precise geopraphical position of the measurement.

The processing of the data will be done by a centralized system. A GIS seems to be the most suitable way to gather, analyze, and publish the "Complex-Urban-Sensing-Daten." Questing, whether it makes sense to intermingle the data, and if they are in some way connected, is also an important aspect of the work. The project requires not only knowledge of the subject, but also creativity. Especially this creative process can at the moment hardly be done by machines or an artificial intelligence (AI). At this point it must be alluded to Pachube, which continuously developed further in the past years. Meanwhile, the Pachube project has be sold and renamed to Cosm. Many of the described functions can partly be achieved by Cosm. However, the dewwelopment, availability, and the interests of a company can not be predicted [cf. MACMANUS 2011].

This short description illustraits it and a complex system is needed in order to gather the complete data. Out of this reason we want to define a minimum of the essential requirements.
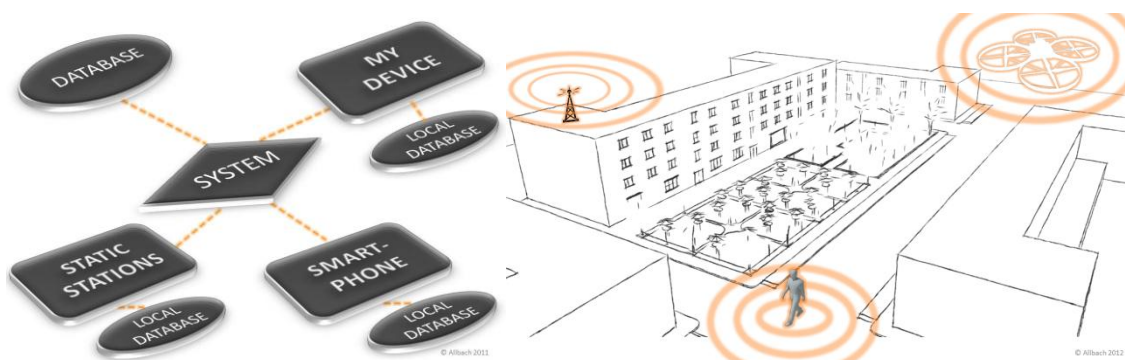
Fig. 8: Structure of the System (KUSS – CUSS) – various measurements in the city

Requirements

-       Availability
-       Connectivity
-       Handling of heterogenic data
-       Stability and performance
-       Storage capacity

- Capability to analyze
- Open source and expandability
- User profiles and scenario instances
- Usability
- Additional values for the user

There are various requirements for an all-encompasing sensing plattform. Ideally, it should be accessable world wide. However, this will not be possible in the early stages because of language differences and lacking accessability of data connections.The system has to have a high connectivity, which means the ability to connect as many as possible sensor devices of various sorts as well as to spread the gathered data to other plattforms. Furthermore, it must be able to export and import the gathered data. This allows the processing of specialized local data as offered by GOSOL and ENVI-met and the uploading of additional information about the urban and natural structure, for instance urban ground composition. Another linkage could be a connection to a social media network.

The system has to be able to store various heterogenic data. But this is problematic. An example could be the temperature at a certain place, but also the information about the height of a tree. The potential data and its information content are wide spread. The "Semantic Web" technique might be helpful to achieve this goal. Another requiement is the stability and perforemance of the system. The system has to be able to handle the amount of quickly succeeding measured data, which can consist of large mounds of data, e.g. pictures, and which can be used by various users simultaneously in real time. The system has to be failsafe and independent of any company which might shut it down or sell it. It has to offer enough storage capacity, secure the data, and guarantee that data are unmodified. Furthermore, it has to be possible to import data directly and manually. The system should have at least a rudimentary ability to analyze the data. Expandability and being open source are important features of the platform. In order to impliment new functions and develop it further, it would be helpful if the system was built up in a modular way. User profils and scenario instances will help to order and filter the data in the system. It could be possible to create spezialized user groups like allergic subjects or pupils which are effected more by certain factors. Usability is important since users prefer a simple and easy system. Furthermore, it should not be ignored that older people and people without technical knowledge must be able to use the system. For the administrators it could be helpful if the system was easily manageable and developable. The plattform should offer something to the user. It would be possible to include an alarm function for special weather conditions, dangerous measurement results, and advices for the user.

5 CONCLUSION – AND FUTURE WORK

Climate and weather are complicated and complex. Likewise is the heterogenuous structure of an urban area. Research is required in order to gain a better understanding of the connections between an urban area, climate, human beings and their health. Out of the single topics and fields a new system science will arise. The presented methods and techniques will allow it to observe and analyze climatological data and data which are relevant for urban desgin. A multitude of individual measurements try to establish a connection between the climate, the city and human beings. The use of crowdsourcing and urban sensing will allow to gather novel and specific data. Even scenarios which include the complete population could be realizeable. New techniques like smartphones, mobile internet, embedded systems, and AR offer a new potential for the monitoring. The gathered data can be digitalized and further processed, for instance in a GIS and new kinds of maps could be created. Climate data are often defined by thresholds and guidelines which are based on long term basic and empirical research. A direct and complex research within the urban ecosystem would be remarkable. The presented standard climate measurement methods are mostly directed at special fields of climate research. Manual measurements are often required. Missing or inconsitant measurement results are mathematically calculated. The presented possibilities of crowdsourcing, urban sensing, and Web 2.0 plattforms should be used in climate research. A new form of climate monitoring is coming into existance, one which not only supplies the planner with pure measurements result, but also with human biovital functions and other metadata of the urban population. This should be done by a centralized system ("Complex-Urban-Sensing-System" CUSS) (Fig. 8). The recording of immitiate bodily reactions could lead to new insights into the complex urban ecosystem which might change the planning process and offer a new

way of monitoring. These new observations should be done by daily carried gadgets and stationary measurement stations as well as a new developed sensing instruments. Out of this reason, the authors want to point to their other paper "Mobile Embedded Climate Sensing 2.0" in which, amongst others, this instrument will be introduced in detail.

A basis for the system could be geographic information system, which in connection with a database can be used for analytical purposes. Also the WEB 2.0 / Web 3.0 can be used for the realization of an urban sensing system. It is our intention to develop a system which is qualified for the storage of climate data. Our expanded measurements of the climate will start with the first autochthonous weather situation of 2013. At present we are also analysing climate accessibility (www.klimabarrierefreiheit.de) and we hope to present our results in 2014.

6 REFERENCES

ALLBACH, Benjamin; MEMMEL, Martin; ZEILE, Peter, STREICH, Bernd: Mobile Augmented City – New methods for urban analysis and urban design processes by using mobile augmented reality services, in: Schrenk, M.; Popovich, V.; Zeile, P.: Proceedings of RealCORP 2011, Essen, Wien, 2011. [Online: http://www.corp.at/archive/CORP2011_66.pdf].

ALLBACH, Benjamin: Augmented City Kaiserslautern – Web-basiertes Wissensmanagement in Mixed Reality Umgebungen. Kaiserslautern, 2010. [Online: http://cpe.arubi.uni-kl.de/wp-content/uploads/2010/11/Allbach_Augmented_City_Kaiserslautern.pdf].

BROCKHAUS: Der Brockhaus Wetter und Klima. Mannheim, 2009.

CAMPBEL A.T., EISENMAN S.B., LANE N.D., MILUZZO E., PETERSON R.A.: People-centric urban sensing. In: Proceedings of the 2nd annual international workshop on Wireless internet. ACM; 2006 p. 18, Boston, Massachusetts, 2006.

GOLDMAN, Jeffrey; SHILTON, Katie; BURKE, Jeff; ESTRIN, Deborah; HANSENH, Mark; RAMANATHAN, Nithya; REDDY, Sasank; SAMANTA, Vids; SRIVASTAVA, Mani; WEST, Ruth: Participatory Sensing. Washington, 2009. [Internet: http://wilsoncenter.org/topics/docs/participatory_sensing.pdf].

HENNINGER, Sascha: A mobile measuring methodology to determine near surface carbon dioxide within urban areas. In: Mazzeo, N. [Hrsg.]: Air Quality – Models and Applications, pp. 173-194, 2011.

HENNINGER, Sascha: Stadtökologie – Bausteine des Ökosystems Stadt. Paderborn, 2011.

HENNINGER, Sascha: Analyse der atmosphärischen CO_2-Konzentrationen am Beispiel der Stadt Essen. Essener Ökologische Schriften Band 23, Westarp-Verlag, Hohenwarsleben, 192 S. , Essen, 2005.

HOF, Hans-Joachim: Applications of Sensor Networks. In: Lecture Notes in Computer Science, Volume 4621, pp. 1-20, Berlin, 2007.

HUPFER, Peter; KUTTLER, Wilhelm [Hrsg.]: Witterung und Klima. Eine Einführung in die Meteorologie und Klimatologie. 12., überarbeitete Auflage, Teubner, Stuttgart, Leipzig, 2006.

KAPPAS, Martin: Klimatologie – Klimaforschung im 21. Jahrhundert – Herausforderung für Natur und Sozialwissenschaften. Heidelberg, 2009.

KUTTLER, Wilhelm: Klimatologie. Paderborn, 2009.

MACMANUS, Richard: Pachube Acquired: Why Did It Sell So Early?, 2011. [Internet: http://readwrite.com/2011/07/20/pachube_acquired].

OTTE, U.:Meßnetze, Meßverfahren. In: KERSCHGENS, Michael [Hrsg.]:Stadtklima und Luftreinhaltung. Berlin, 1999.

PERNICI, B.: Mobile Information Systems, Springer-Verlag, Berlin, Heidelberg.2006.

ZMARSLY, Ewald; KUTTLER, Wilhelm; PETHE, Hermann: Meteorologisch-klimatologisches Grundwissen – Eine Einführung mit Übungen, Aufgaben und Lösungen. Stuttgart, 2007.

New Public Open Spaces and Old Prejudices: Public Space Uses in the Centre of Medellín

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1 ABSTRACT

Since the beginning of the 2000s, Medellín/Colombia has undergone a well-publicised urban transformation, both in the city centre and in the peripheral informal settlements, turning the city from one of the most dangerous hotspots of a drug-related armed conflict into a showcase for inclusive urban upgrading. This change has not only benefitted the city's inhabitants but also improved Medellín position as tourist attraction and target for international investment. Successive mayors and their administrations have invested in the iconic design and upgrading of public spaces, mobility infrastructure as well as educational facilities. Combining participatory practices, trans-institutional collaboration and transparency with high-quality design has been an emphasis in the upgrading strategy. The "recuperation" and "reinterpretation" of public space as a "safe space for all" have been another focal point in the transformation process. Educational performances, celebrations and events in the newly establishes public spaces are used to promote and anchor these goals, to establish use in formerly neglected areas and to define "apropriate" behaviour in public space.

The Feria de las Flores, Medellín's most important traditional festival dating back to the 1950s, has started to play a central role in the municipal government's strategy to transform public space not only through material interventions but also through a process of re-signification.

Comparing the everyday use of the spaces where the Feria de las Flores takes places with the official promotion of the festival and the uses in these spaces during the events, this paper describes how the Feria de las Flores is used to define and publicise desired practices of public space use, and how it – despite a portrayal to the contrary – adds to an exclusionary experience for the most vulnerable inhabitants of the city, who depend on public spaces and the informal economy for their livelyhoods.

2 MEDELLÍN'S PUBLIC SPACE IN THE CONTEXT OF SOCIAL INEQUALITY

Medellin, the capital of the department of Antioquia is located at about 1500 m in the central Andes, and is Colombia's second largest city after Bogotá, the capital of the country. It covers a surface of 380,64 km². The average population density is at about 6000 persons/km², with only 60 p/km² in the rich southern districts (comunas) and more than 20.000 p/km² in the poor northern neighbourhoods.

Urbanization for a long time followed the Spanish rectangular pattern (and legislation) and progressed without any bigger changes or adaptations until the 1930 – 1940, when processes of rapid industrialization and population growth changed the city's face (Schnitter 2006, Romero 3rd edition 2007).

In the year 1938 168.000 people lived in the city, in 2011 there are almost 2.4 million (Alcaldía de Medellín 2011: 19). This population growth has been driven not only by industrialization and the impoverishment of the rural population, but also by the armed conflict between guerrillas, paramilitary, military and drug traffickers in the country[1] which has lasted for over 60 years and has caused massive forced displacement. In 2010, for example 30,099 desplazados[2] came to Medellin (Personería de Medellin 2010: 21) to start a new life.

Neither the modernist urban development plans of 1948, 1970 and 1985, which contributed to the social segregation of the city and to the impoverishment of public space (Avendaño Vasquez 1998: 89pp) nor social housing initiatives were able to cope with this increase in population and so from the 1950s on (Betancur 2007), but increasingly since the the 1970s (Schnitter 2005) self-build settlements formed on the slopes surrounding the city centre. For the city, a degree of informality of 22 % has been diagnosed (Werthmann 2011), meaning that 22 % of all residential buildings have been erected informally by self-build

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[1] This conflict is one of the longest running armed conflicts in the world. The beginning of the conflict between guerrillas and military is usually specified with the mid-1940s. From the late 1970s on, criminal gangs contribute heavily to the increase in urban violence in the poor neighbourhoods of the city (Canos, Gallo, Zuluaga (ed.) (2008): Dinámicas de guerra y construcción de paz. 17 et seqq.).

[2] This is the highest number of newly arriving refugees for 10 years, most of them settled in Comuna 13 in the northwest of the city.

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initiatives. Furthermore, for the job sector, the informality rate is at about 50 %.[3] 50 % of the city's population is living[4] in housing considered informal – a clear physical sign for the pronounced inequality of society, which influences all aspects of human well-being, like education, income, health and security issues.

For long, violence has characterized Medellín's image (Torrejon 2009) and life and since the end-1980s the government has invested massively in a fight again crime. Due to major military interventions and a policy of disarmament and re-integration of former gang members, Medellín's death toll has taken a significant and much applauded dip until 2006. More recently, the vacuum that was left after the destruction of the major drug cartels in the early 1990s has resulted in increased fights for territory and power in the drug business, especially in the poor peripheral comunas and the death toll has encountered a new peak. While robberies and kidnappings can happen all over the city, the numbers of deaths and injuries as a result of armed conflicts in the peripheral districts are exceptionally high (Medellín, cómo vamos 2010: 31 pp).
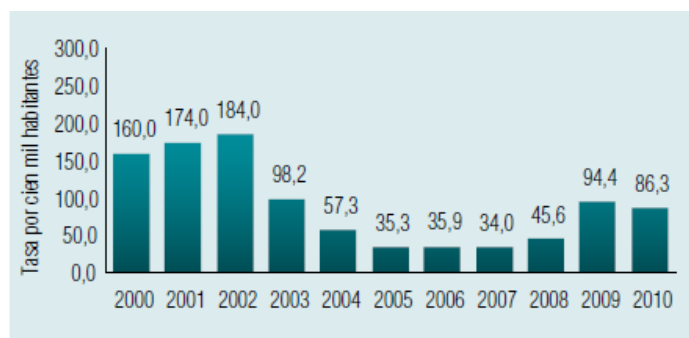
Fig. 1: Annual rate of homicides, per 100.000 inhabitants. Source: Medellín Cómo vamos (2011): 30

This situation of constant threat had and still has a massive impact on the lives of people in the city: public space has been perceived as a threat and was therefore rejected;[5] the city was experienced segmented by invisible borders. Since the mid-1990s, politicians and administration alike recognized that improving Medellín's security situation was the basis for improving the quality of life of all residents and for a successful redefinition of the city, which they based to a large extent on a reinterpretation of public space and an increased focus on social equality.

This was in accordance with the new Colombian Constitution from 1991, which the Colombian government drafted to overcome its crisis of legitimacy of the late 1980s. The 1991 Constitution emphasises citizens' participation and grants their co-governance in legislative, judicial, electoral and fiscal initiatives while at the same time making place for strict neo-liberal policies and decentralisation (Hunt 2009: 333). Public space became central is this context as the "privileged space of citizen communication" and "the necessity of offering spaces of coexistence and the democratic exercise of citizenship" was recognized (PMEP 2005: 2; POT 2000: 13 cited in Hunt 2009: 333).

This combination of neo-liberal politics and governance through spatial interventions is occurring in various countries around the world (Anjaria 2013, Schwab/Garcia 2012) and the practice has entailed criticism: Some take issue with urban policy and state that "(…) because cities are under increasing pressure to be competitive in the global economy, they have turned away from democratic governance, which is seen to be inefficient and uncompetitive" (Purcell 2003: 12), while others try to raise awareness of the potentially exclusionary power of urban space production (Zukin: 1996).

On a different note, many publications stress the importance of public space in projects of urban transformation in countries with high levels of inequality. Enrique Peñalosa, former Mayor of Bogotá, sees in public space an important equalizing factor towards a more inclusive society and stresses its role for the

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[3] http://www.inura.org/NMM_Posters_PDF/INURA11_Medellin.pdf

[4] The residential areas of the city are divided into 6 estratos; the classification is based on a survey of the quality of infrastructure and provision of municipal services, the building and the public spaces. Depending on the assignment, the tax burden of an apartment or a house is calculated. 50 % of residents are living in the 2 lower estratos in informal settlements, which are mainly concentrated in the northeast and northwest of the city on the slopes. Another 30 % live in estrato 3 (bajo medio) in districts that often arose from consolidated informal settlements (Departamento Administrativo de Planeación 2010).

[5] The city's poor public space ratio per inhabitant at 4 m² is a physical indicator for that process.

development of civil society (Peñalosa: 2007), and Gouverneur and Grauer argue that "public spaces working as urban connectors can play a key role in achieving integration, minimizing inequality, and fighting violence and resentment" (Gouveneur/Grauer 2008: 30). The unquestioned celebration of the all-transformative power of (good) design (Roy 2004: 308) may have given way to the more realistic evaluation that public spaces are important actors in the shift towards a more equal society, but that they are of little help if socioeconomic progress for marginalized groups is absent (Gouveneur/Grauer 2008: 29).

3 METHODOLOGYCAL CONSIDERATIONS

This article presents work from my PhD Thesis on the role of public space and socio-spatial justice in the upgrading of self-build settlements in Latin America and comprises research undertaken in Medellín between July 2011 and January 2012. The work is set within the tradition of Qualitative Research. For this paper, primary data extracted from user analysis through participant observation as well as from document analysis through qualitative analysis of content is presented in a case study of the Feria de las Flores festival and one of its venues, the Parque de los Pies Descalzos. A Literatur Review provides the context for the findings obtained during fieldwork. As will become apparent in this article, the city government avoids putting its urban transformation process into the context of critical deliberation. It is my intent to offer a reflective context by discussing my findings in the light of the two major points of criticism and screening them for structural similarities.

Participant Observation was carried out to analyse the use of six selected spaces, three in the centre of town, three in the poor comunas on the periphery. The sites were observed on 7 occasions throughout the week and at different times during the day (weekday mid-morning, midday, afternoon and evening; weekend mid-morning, afternoon and evening), lasting for 30 minutes each. These 7 observational moments were distributed throughout a timespan of about a month. Through colour and sign codes, activity and users were categorized into three categories of activity (pedestrian traffic, activity, observation) and eight user groups (male/female kids from 1 – 12 years of age, male/female teenagers from 13 – 20 years, male/female adults from 21 – 65 years of age as well as male/female elders above 65). In a later step, the results of these observations were transferred into digital maps and also collated in tables.

Document Analysis was conducted on diverse print and video documents, such as the Municipality's Urban Development Plans (2004 – 2007 and 2008 – 2011), official communication by the mayor's office on issues surrounding the urban transformation process, municipal reports on quality of life aspects in Medellín (Medellín, cómo vamos), plans and planning documents as provided by the Planning Department and the architects. Special importance was put on assessing the document's author, the context and purpose of the document's creation, the intended audience and the document's significance in the context of the on-going transformation process. It was my aim to capture hidden meaning and ambiguity and to discern the ways in which realities were socially constructed with a political agenda.

4 FINDINGS: MEDELLÍN'S RECENT URBAN TRANSFORMATION

4.1 First Steps towards a redefinition of the city

In 1993 first projects for the upgrading of peripheral informal settlements started under the PRIMED programme[6] (Programa Integral de Mejoramiento de Barrios Informales – Integral program for the upgrading of informal settlements), which followed a new logic and methodology: instead of erasing whole neighbourhoods with bulldozers and relocating the inhabitants in social housing, the project invested in the physical and social improvement of the barrios with the aim to keep social structures intact[7] (Betancur 2007). Around the same time, after nearly 15-years of planning and construction, the first metro-line was inaugurated in 1995. It provided efficient public transport from the city's poor north to the rich south and made getting to work for many inhabitants of the northern comunas considerably easier and cheaper.

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[6] Funded by the German government through the German Federal Ministry for Economic Cooperation and Development (BMZ) and the bank KfW (Reconstruction Loan Corporation).

[7] PRIMED objectives: establishment of appropriate planning and implementation mechanisms, expansion of civic participation, physical improvement of neighbourhoods, physical improvement of houses (resettlement, faute de mieux); awarding tenure; mitigation of geological risks in the areas of Pan de Azucar, Picacho and Nuevos Conquistadores.

Long before the Metro began operations, an educational campaign called "Cultura Metro" was launched. Lectures, artistic interventions, street festivals and social work were used to instil understanding and pride for the new means of transport. Cleanliness, social control, non-violence and tolerance were key themes of the campaign. For many, the metro was the beginning of a discourse about public space. The Cultura Metro campaign can also be understood as the beginning of a new kind of political and administrational communication which combines educational and regulatory measures with fun and entertainment to define and enforce desired behaviour.

4.2 Medellín presents itself as exemplary laboratory for urban transformation

In accordance with the Urban Development Plan 2004 – 2007 which was geared towards new governance, social inclusion and the creation of new jobs as well as positioning Medellín globally,[8] in 2004 the Urbanismo Social programme was established by the then-mayor Sergio Fajardo with the aim to reduce the long-lasting social inequality.[9] Good design, public participation and communication, as well as inter-institutional cooperation and transparency were defined as main means to reach this goal. Through this programme, the "historic debt" against the poor should be paid and a city with "public spaces for all" should be created. Other much-used, albeit ambiguous terms in the discourse are the "recovery of public space for the encounter of citizens" and "the establishment of an adequate use of public space" (Alcaldía de Medellín 2011). The programme focused on a comprehensive approach to upgrade the whole city and invested in the upgrading of peripheral settlements through infrastructure improvement and the construction of stunning educational facilities and the upgrading of the rundown and depleted city centre through emblematic (public space) projects. In these projects, iconic architecture is used to create attractions of city-wide significance (ibid.: 137 et seqq.) to help reinterpret public space positively and to demonstrate Fajardo's slogan "The most beautiful for the most humble"[10]. The Parque de los Deseos and Parque Explora, the Parque de los Pies Descalzos, the Parque de las Luces are some of the public spaces, which are presented as successful urban interventions of high quality design and as central space for all user groups (Martignoni 2008).

Fig. 2: Annual quality of live index for Medellín, 2004 – 2010 and variations of the GDP. Source: Departamento Administrativo de Planeación (2011): without page reference
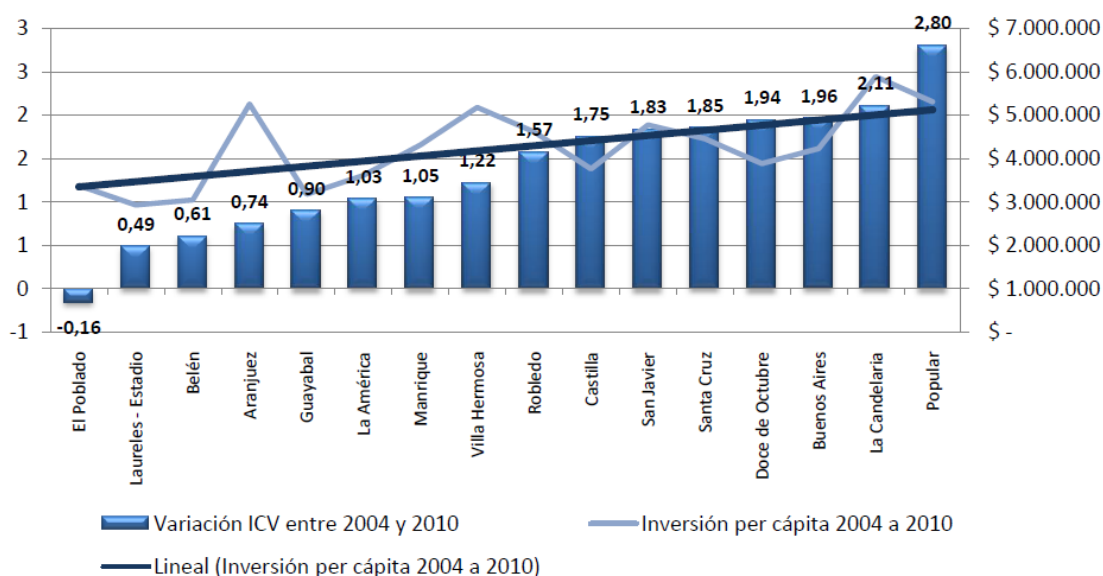
Fig. 3: Development of the quality of live index 2004 – 2010 per barrio and municipal inversion per capita. Source: Departamento Administrativo de Planeación (2011): without page reference
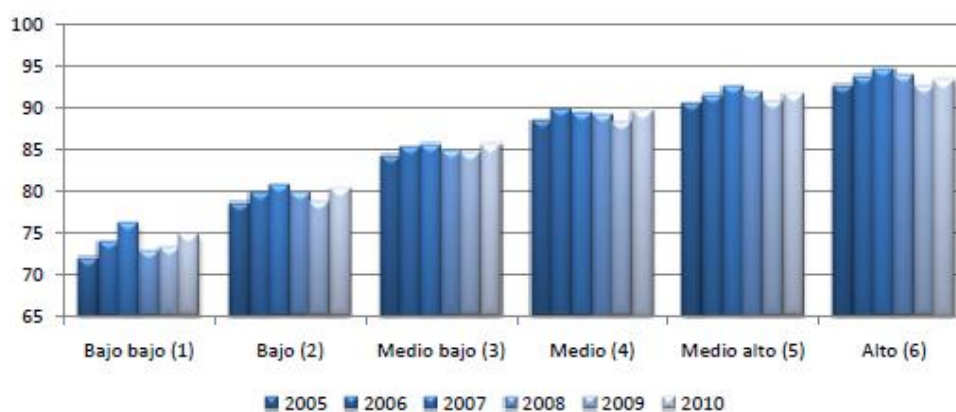
Fig. 4: Development of the quality of live index 2004 – 2010 per estrato. Source: Departamento Administrativo de Planeación (2011): without page reference

4.3 Points of Criticism

While the methodology of the Urbanismo Social has established a break with the municipality's decades-long neglect of the peripheral poor neighbourhoods, and the city government and the Urban Development Department have been awarded international recognition and accolade,[11] a growing group of academic critics is gaining attention. Two main points of criticism can be distinguished:

4.3.1 Questionable Reduction of Poverty and Inequality

Recent research suggests that despite the highly visible political communication of the successes of urban transformation efforts in Medellín, it remains unclear if sustainable economic improvement for the inhabitants of the poor comunas could be fostered through the interventions. In the immediate vicinity of the new project, increased small scale economic activity (much of it informal) can be observed and housing prices and rents show some stimulation, outside these small areas however, the benefit is a lot less evident

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[11] Both the mentioned spaces as well as the interventions in the barrios populares have won many international architecture prizes and recognitions by the UN (amongst others) (Alcaldía de Medellín 2011: 224) and serve the city as advertising for their improvement strategy (ibid.:13f). It is the government's goal to establish its methodology as best practice and to pass on the knowledge to other cities around the world and especially delegations of other Latin American governments have been known to pilgrimage to Medellin.

(Brand, Dávila 2011: 655). Furthermore, the same authors estimate that less than 10 % of the inhabitants of the poor comunas use the newly built infrastructure, public buildings and open spaces and point out that "the social impact of specific projects remains somewhat unclear". Additionally, both the quality of life index and the human development index have increased along the same percentage as the whole city (MacNamara, 2009; Blanco and Kobayashi, 2009; Cañón, 2010; Quinchía, 2011 cited in Brand, Dávila 2011: 656 – 658). What is more, the poor estratos suffered proportionally more from the negative effects of macroeconomic developments, pointing to the fact that inequality is higher among poor estratos (Departemento Administrativo de Planeación 2011). Brand and Dávila also point to the fact that participatory practices have diminished and/or been turned into token participation and that the architecture of the projects has been criticised for "ostentation" and "lack of originality". Other urbanists in Medellín describe the projects as imitations of Barcelona ignoring Colombian tradition and reality (Schwab 2011: 15). They conclude that "[A]gainst all prima facie visual evidence, a quick-fix approach motivated by short-term political impact and publicity-conscious gain are unlikely to be successful (Brand, Dávila 2011: 659). Along the same line, Leibler and Musset determine that the biggest impact of the transformation process has been a change of self-esteem and national and international representation, which "result from massive promotion of the ideals of social justice in the project through intensive political communication" (Leibler, Musset 2010; my own translation)

4.3.2   Continuing Depreciation and Exclusion of People in the Informal Labour Market

Hunt draws attention to the fact that it is a widespread phenomenon in the recuperation and recovery of public space that the informal sector is blamed for its invasion and derelict state, and that street vendors are demonised through ascribing them a "culture of informality" and portraying them as violent, filthy, illegal tax evaders who live an easy live. Despite this common assumption, mainly illegally parked cars, private constructions and formal businesses can be made responsible for their self-serving appropriation of public space, while informal street vendors occupy less than 10 % of public space through their selling activity. Even so, as the same author demonstrates for the case of Bogotá, in political communication and public perception, street vendors are made culpable for bringing chaos to public space and should be removed in order to recuperate it for the use of all citizens, thus creating a dual logic of legitimate and illegitimate citizens or noncitizens (Hunt 2009: 334). The increase of work in the informal sector in Medellín[12] sheds an ambiguous light on the effects of the recent governmental and economic restructuring, because "the reality of the invasion of public space by ambulant vendors is linked to processes of economic restructuring that have generated severe unemployment, aggravated by the agrarian crisis and the internal conflict in the country with the resulting displacement of the rural population" (FVP 2005: 2 in Hunt 2009: 336f).

Furthermore, and quite contrary to the idea of the street vendors' easy life, statistics "reveal vendors' severe poverty, as well as the gruelling hours they must endure to eke out a living. Some 81 % of street vendors work every day of the week, and 60 % work more than 40 hours per week, with the average workday consisting of 10 hours. Despite labouring more hours per day and more days per week than any other working group, the state reports that the vast majority of street vendors (76.2 %) earn at most the minimum wage, while 40.1 % earn less than half the minimum wage. Of these workers 95 % don't have pensions to care for them in old age" (Hunt 2009: 336f). Given the widespread interventions against street vendors in the new policies to reinterpret public space, it results especially interesting to know that "Constitutional Court decision T-772 of 2003 established that anyone whose basic needs are not met by the state has the right to utilize public space for income-generating activities" (Hunt 2009: 338). This not only questions the social and moral aspects of the interventions against street vendors, it also puts them into a negative light juridically.

4.4 The role of Animación Urbana in the reinterpretation of the city

As was already the case with the „Cultura Metro" campaign, the government's official communication and education strategy play an essential role in the transformation process. „Animación Urbana" alludes to all those activities by the mayor's office, the planning departments or municipal social services in public spaces which are meant to provide entertainment for the population and simultaneously perform an educational task by encouraging a new vision and use of public space. The official goal of Animación Urbana activities is to

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[12] http://www.inura.org/NMM_Posters_PDF/INURA11_Medellin.pdf

contribute to the reinterpretation of public space in order to promote a new urban identity, which is based on a new understanding of communal live and social justice.[13] Animación Urbana activities often take place in the above mentioned new central open spaces and try to use established formats like festivals and celebrations to transport their message.

The "Feria de las Flores" is one of Medellín's most traditional festivals. It was created in 1957 to uphold the traditional customs of flower growing and arranging and to serve as a folkloristic tourist attraction. In the five decades of its existence, the Feria de las Flores has become a major cultural reference point for Medellín and Antioquia, and today offers a complete spectacle with about 150 different events over a 10 day period. During this time, the tourism sector boasts a hotel occupancy rate of over 80 % (Radio Caracol 2011: 15). Throughout the Feria the city vibrates with live, more people than usually are walking in the streets after dark, and also the presence of the police and the military is more obvious than throughout normal times. In addition to the parks and squares of the city, especially the shopping malls act as venues for the various events. It allows a deeper understanding of the idea of public space in Medellín, which is influenced by concerns for security, order and social distinction, to know that half of the events take place in shopping malls and to read the mayor's introduction to the Feria, where he describes the importance of the festival for public space, as during the Feria "the citizens, united as a family, flock to the streets" (ibid.: 5).

Nowadays, the Feria is not only a tourist attraction but plays an important role in terms of the above mentioned Animación Urbana and the construction of identity: as a collective celebration as well as staging of the (apparently) peaceful coexistence it receives huge media coverage already weeks before the starting date. The theme song and the accompanying video play an essential role in this. In 2011, two different groups were selected to interpret the song: the rappers laberinto elc, who describe life in the poor neighbourhoods of the city with critical songs and the boy's band Piso 21, well known for smooth faces and catchy pop rhythms perform "Feria en mi casa" and conjure up the idea of everybody being part of the Feria. The accompanying video[14] shows the boys singing in the streets of the barrios populares on the periphery of the city, in the newly created public open space, at the market and on the construction site. This official presentation of the city shows the major projects of the urban transformation process and presents Medellín as a place of happy, proud, working class people who willingly accept informality, who make the best of their situation by celebrating and singing together. Seen from the perspective of the city's development plans, one can state that the video accomplishes two tasks: it helps to improve Medellín's image and to position the city globally as the exemplary laboratory of urban change, but more than that it takes effect as internal representation and mobilization in the sense of Animación Urbana, and as a marketing tool for the transformation processes in the city,[15] and thus serves a political purpose. Also during the various events of the Feria, self-representation and Animación Urbana take a prominent position in the event.

4.5 The role of the new public spaces in the reinterpretation of the city

The newly created public spaces not only serve the community through new equipment and new spatial offers, they are also used for the representation of the city' positive change. They serve as stage for local TV shows, backdrop for business commercials and as venues for open air concerts. I will focus on one space here, the Parque de los Pies Descalzos, which is exemplary for the new public space developments in the centre of Medellín.

4.5.1 Parque de los Pies Descalzos

Parque de los Pies Descalzos (Barefoot Park) is situated in the administrative centre of the city, with the town hall and the district government of Antioquia, the convention centre and the Teatro Metropolitano just a short walk away and is surrounded by administrative and representative buildings of Empresas Públicas de Medellín (EPM).[16] The park lies on a little urban island formed by the busy multi-lane main roads of the city,

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[13] http://urbanismosocialmedellin.universia.net.co/galerias/familia1c2.jsp

[14] http://www.youtube.com/watch?v=CCic0YTgBb4

[15] Some of the comments on youtube indicate how striking it is that almost all of the video was shot in poor districts.

[16] EPM is a public utility service company, providing water, sanitation, energy, gas and telecommunications. It was founded in 1955 and initially served only the city of Medellín and its inhabitants. Nowadays, it is one of the biggest companies of Colombia, providing 1/5 of Colombia's inhabitants with energy and one of the biggest energy providers in whole Latin America. The Municipality of Medellín is its 100 % owner. Since the year 2000, EPM (90 % sponsor)

San Juan (calle 44), carrera 57 and 63 and the motorway called La Regional. These roads on the one hand create important barriers towards the park and make approach difficult for those who walk. On the other hand, the mentioned roads are frequented by almost every public transport bus that connects to the town centre and therefore makes the park readily accessible for those using public transport. Apart from the buses, Metro stops Alpujarra and Cisneros are within a 15 minutes walking distance and supervised car parking is available just next to the park.

Parque de los Pies Descalzos was opened for the public on the 7th December 1999. When EPM approached LAUR (Laboratorío de Arquitectura y Urbanismo de la Universidad Pontificia Bolivariana) for an integrated design of their parking spaces, LAUR came up with the idea to counter the negative influences of the modernist urban plans from the earlier years on the administrative centre of town by upgrading public space. A central quality of the area was to be a public park that would represent EPM but equally bring them to show "social commitment" and "give back to the community" (personal interview with the architects), while all their initial requirements for parking and accessibility would be met. The park was to offer a central public space that would express EPM's role as provider of hydroelectric energy and offer a ludic yet educational space for the inhabitants of Medellín to create awareness for natural resources. The park was constructed on a plot of land that belonges to EPM, and paid for by EPM. It was then turned over to the municipality after its completion. Obras Públicas[17] is now responsible for general maintenance issues in the park, but EPM provide maintenance to all the water and sand surfaces and they employ park "rangers" who are responsible of the educational programmes and contact with the users. They also contract the private security firm that surveys the park 24 hours a day, 7 days a week. This fact has entailed critique from within Medellín's academe and some practicing urbanists, as it endangers the space's publicness (personal interviews).

The park's name has symbolic and evocative qualities alike: It makes reference to the many children of the city living in poverty who have to walk barefoot and who are invited to enjoy the park's attractions. On the other hand, it invites visitors to take off their shoes and use the water and sand areas to contemplate and stimulate their senses. Some of the zones are only accessible without shoes.

Before the construction of the park and the surrounding EPM facilities, the area was taken up by former industrial storage space and waste land. The centric part of the city suffered from neglect and showed all the known problems of depleted inner cities. The park was the first big public space development after years of neglect of the topic, so it marks a turning point in peoples' consciousness and the city's public space politics (personal interview with the architects).

4.5.2 Analysis of use in Parque de los Pies Descalzos

On working days, it is a diverse space mainly for people who are connected to EPM in one way or the other, as customers or employees. People are crossing the square to and from EPM. During lunch break, the employees divide into two groups and occupy different spaces. While the executives go and have lunch in one of the nearby restaurants, the common employees like the cleaning ladies and secretaries sit in the park and eat their packed lunch. Sometimes, kids and their parents are using the water attractions. Through the observation, it has become obvious that the park has been awarded the status of an important tourist attraction as various groups of Colombian and foreign tourists take guided tours through the park. During the week, slightly more men use the park than women, especially at times when there is a lot of pedestrian traffic by EPM executives. On workdays, the number of users varies between 101 and 132.

In difference to results from participant observation in other central spaces in Medellín, street vendors are significantly underrepresented and consumption is reserved to the cafés and restaurants in the adjacent building. This is striking, especially during lunch time;[18] only 2 or 3 vendors are to be found on the streets

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and recognised educational institutions in Medellín formed the Fundación EPM, which performs educational activities in the public spaces of the city and offers an important number of student grants to disadvantaged young people.
http://www.fundacionepm.org.co/site/index.php?option=com_content&view=article&id=107&Itemid=75 (last accessed 22.01.2013)

[17] Secretaría de Obras Públicas is a municipal entity responsible for the design, construction and maintenance of public infrastructure, as well as the city's buildings and installations.

[18] If there is such a thing as culture of informality, it is that of buying from street vendors.

surrounding the park. It can be assumed that this is in consequence of the security guards controlling the space.

The picture presented above changes drastically during the weekends, when families use the park with their children and the site turns into a major recreational facility in the city centre. Around 250 people can be observed during a Sunday afternoon. As during the week, the better-off frequent the restaurants, while the others enjoy their picnic on one of the wooden platforms or the benches. Working class people from the barrios populares are clearly overrepresented. The kids mingle at the water features and the park rangers are busy explaining the different attractions. During the evening, the space is frequented by young couples, both homo- and heterosexual. The few homosexual couples tend to sit in more secluded spaces, while the others freely show their affection to the world. There are a few more ambulant vendors to be observed, they are trying to maintain a low profile while offering snacks and fruit or services like photo taking. In comparison to other spaces, their number is still relatively minor. But it shows a common logic, namely that ambulant vendors are to be found when there is a crowd and that they hope to find better working conditions with more people around. All in all, the park offers various subspaces that are used by a diverse clientele, so that the Parque de los Pies Descalzos can be described as a space that represents the diversity and multiplicity of urban life in Medellín. On the other hand, it is a more regulated space than other comparable spaces through the influence of private security guards and the park rangers, which are to upkeep EPM's clean image.

During the festival, the site was the venue for a series of events called Parque Cultural Nocturno (Nightly Cultural Park), which presented concerts in different musical styles from Acid Jazz to Vallenato. Between 2000 and 10,000 people attended the free performances by popular artists. Before the concert, between performances and after the show, the time was used by two presenters to create a positive vibe for the on-going urban transformation. New project were explained, the use of tax revenues was demonstrated, and interviews with sponsors were conducted. Special emphasis was put on presenting the good conviviality of all citizens through references to the events of the day, which portrayed success stories of inclusion and improved lives. Those present were commended on the one hand for their "adequate" behaviour, on the other hand urged to continue to show their "buena cultura" (= good education, sophistication), eg to not get drunk and to leave the venue in an ordered manner, to have "healthy" fun and to support the security guards in their important work of keeping order. Private security guards and the festival supervision ensured compliance with the standards of behaviour. In accordance with the types of music presented, the size and the composition of the crowd varied. Working class people were less represented than usually, and most people arrived in cars to the concerts.[19] It is interesting to note in this context that street vendors who were present during the normal times and who were so ubiquitous at the other festival venues, were prevented to enter the park in order to sell their goods and only stands by the festival's official sponsors were allowed to offer drinks and food (at a much higher price than the informal vendors who made it past the controls).

5 CONCLUSION

Structural similarities with the two main points of criticism can be detected in the results from the investigation of this case. The Feria de las Flores on the one hand can be seen as a traditionally important celebration of public space and diverse cultural practices that fulfils an essential function in a city like Medellin, where public space has been historically equated with danger. The use of the long-established Feria as a tool for the re-interpretation of public space shows the administration's intention to see urban transformation not only as a task of architects and planners, but to understand it as well as a process of production of space by the citizens. The objectives of the new policy are not only to physically improve but to reach a shift of meaning of public space and an increased self-confidence of the residents in the participation in and the use of public space. To achieve this, Animación Urbana increasingly uses mass media, places of consumption and spectacles to reach the population and transport its message.

On the other hand, the exclusion of informal vendors is not only contrary to the experience of daily life in the city where street vendors offer and sell merchandise from vegetables to snacks to single cigarettes, it is also contrary to the celebration of informality which is conveyed through the video. This ambiguity and contradiction raises awareness to the danger that informality is made into an image of "favela chic" devoid of

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[19] Only 15 % of Medellín's inhabitants own cars or mopeds, so this is a clear indicator for the social composition of the group of visitors (Medellín, Cómo vamos 2010: 66).

the everyday problems people have to face and that the city capitalizes (culturally, socially and economically) from marketing a particular life situation while at the same time aggravating it. The use of the festival for political communication fits the prototypical description of spectacularization of neoliberal urban governance which is to develop both external and internal effects.

It is to be regarded as highly critical that the city administration postulates "adequate" behaviour in public space at an event which is stylized as "open for all" and through the video appears especially geared towards lower income groups, since the required "adequate" behaviour reproduces hegemonic perspectives on space and society, and denies them their use rights and thus their earning potential.

The use of the word "cultura" in this context makes it easy to overlook the structural imbalance in the demand for adequate behaviour, because it turns diverse ways of behaving into people's personal responsibility and choice and neglects inequalities. Despite the obvious good-humoured nature of these animación urbana activities, Hunt (2009: 332) emphasizes that "civic education [is] a noncoercive technology of governance that both empowers and subjugates". In the case of the street vendors, the latter is obvious. It is equally obvious that the urban transformation processes and the recuperation of public space in Medellín has led to a reallocation of resources, an intensification of the marginalization of certain populations and thus to "the exacerbation of inequality" (Hunt 2009: 345) for the poorest inhabitants.

Without wanting to downplay the far-reaching changes in the lives of the inhabitants that programmes like Urbanismo Social have accomplished, which have contributed to both structural improvements and a new sense of the public, one must not forget everyday life in Medellín which is affected by an continued social inequality in all its manifestations, such as unemployment, lack of education, and violence. The obvious danger is that in this attempt to turn Medellin into a formal city and a destination for international tourism and investment structural inequalities persist or are even intensified. Thus the fact that during the events of the Feria social hierarchies and exclusionary settings were reproduced casts severe doubt about "the city for all".

6 REFERENCES

ALCALDÍA DE MEDELLÍN (2008): Plan de Desarrollo 2008 – 20011. "Medellín es solidaria y competitiva"

ALCALDÍA DE MEDELLÍN (Ed.)(2011): Laboratorio Medellín – Catálogo de diez prácticas vivas. Medellín, Mesa Editores

ANJARIA, Jonathan (2013): Is there a Culture of the Indian Street? In: Dérive – Zeitschrift für Stadtforschung, Nr 50, January 2013

AVENDAÑO VÀSQUEZ, Claudia (1998): Desarrollo urbano de Medellín en el siglo XX. In: Pensamiento Humanista 4/1998, pp. 81-92,

BETANCUR, John J.(2007); Approaches to the Regularization of Informal Settlements: The Case of PRIMED in Medellín, Colombia. In: Global Urban Development Magazine, Vol. 3, Iss. 1, 2007.
http://www.globalurban.org/GUDMag07Vol3Iss1/Betancur.htm (2011-09-08)

BRAND, Peter; DÁVILA, Julio D.(2011): Mobility innovation at the urban margins. In: City. Analysis of urban trends, culture, theory, policy, action, 15:6, pp. 647-661

CONSEJO DE MEDELLIN (2004): Plan de Desarrollo 2004 – 2007. "Medellín, compromiso de toda la ciudadanía"

DÁVILA, Julio D (2011): Can local governments reduce urban poverty? The case of Medellín, Colombia. Presentation at the Informality: Re-Viewing Latin American Cities Conference, Department of Architecture, University of Cambridge, 17-19 February 2011

DEPARTAMENTO ADMINISTRATIVO DE PLANEACIÓN (2011): Indicador de Calidad de Vida Medellín 2004 – 2010.

GOUVERNEUR, David; GRAUER, Oscar (2008): Urban Connectors. In: Harvard Design Magazine, 28, pp. 24-30
307 – 319.

HUNT, Stacey (2009): Citizenship's place: the state's creation of public space and street vendors' culture of informality in Bogota, Colombia. In: Environment and Planning D: Society and Space 2009, volume 27, pp 331 – 351

LEIBLER, Laure; MUSSET, Alain (2010): ¿Un Transporte hacia la Justicia Espacial? El caso del Metrocable de Medellín. Scripta Nova. Revista Electrónica de Geografía y Ciencias Sociales. [En línea]. Barcelona: Universidad de Barcelona, 1 de agosto de 2010, vol. XIV, n° 331 (48). <http://www.ub.es/geocrit/sn/sn-331/sn-331-48.htm>. [ISSN: 1138-9788].

MARTIGNONI, Maria Jimena (2008): Strategies for Medellín. In: Topos – International Review of Landscape Architecture and Urban Design. Nr.64/2008, pp. 18 – 23

MEDELLÍN, CÒMO VAMOS (Ed.): Informe de calidad de vida de Medellín 2010 – Seguridad ciudadana.
http://www.medellincomovamos.org/seguridad-y-convivencia (2011-09-08)

MEDELLÍN, CÒMO VAMOS (Ed.): Informe de calidad de vida de Medellín, 2010 – Movilidad vial y espacio público.

PEÑALOSA, E., 2007. Politics, Power, Cities. In: R. Burdett and D. Sudjic, eds. The Endless City. London Phaidon, 2007,

PERSONERÍA de MEDELLÍN (Ed.)(2010): Situación de los derechos humanos en Medellín 2010.
http://www.personeriamedellin.gov.co/index.php?option=com_jdownloads&view=viewcategory&catid=155&Itemid=139 (2011-09-08)

PURCELL, Mark (2001): Globalization, Urban Enfranchisement, and the Right to the City: Towards an Urban Politics of the Inhabitant. In: D. Wastl-Walter, et al., eds. Rights to the city. Rome, Società Geografica Italiana (IGU-Home of Geography Publication Series, III), 2001, pp. 11-24.RADIO CARACOL (Ed.) (2011): Guia Feria de las Flores 2011. Medellín

ROMERO, José Luis (2007): Latinoamérica. Las ciudades y las ideas. 1st edition 1976. 3rd edition 2007, Siglo XXI Editors Argentina S.A., Buenos Aires.

ROY, Ananya (2004): Transnational Trespassings: The Geopolitics of Urban Informality. In: A. Roy and N. AlSayyad, eds. Urban Informality: Transnational Perspectives from the Middle East, Latin America and South Asia. Lanham, Lexington Books, 2004, pp. 289-318.

SCHNITTER, Patrizia (2005): Construcción fragmentaria, característica del crecimiento metropolitano de la ciudad de Medellín, Colombia. Lectura cartográfica de tres momentos significativos.In: Scripta Nova – Revista electrónica de geografía y ciecias sociales Vol. IX, núm. 194 (103) 2005. Verfügbar unter: http://www.ub.edu/geocrit/sn/sn-194-103.htm (Stand 2011-09-08)

SCHNITTER, Patricia; Giraldo, Martha Lía; Patiño Juan Manuel (2006): La ocupación del territorio en el proceso de urbanisación del area metroplitana del valle de Aburrá, Colombia. In: Scripta Nova. Revista electronica de geografía y ciencias sociales. Vol. X, núm. 218 (83), 1 de agosto de 2006. Universidad de Barcelona, Barcelona. http://www.ub.edu/geocrit/sn/sn-218-83.htm (last accessed 2013-02-11)

SCHWAB, Eva (2011): Flower Power für Medellín: Die Feria de las Flores. Ein Instrument zur Rückeroberung des öffentlichen Raums? In: Dérive – Zeitschrift für Stadtforschung, Nr 45, October 2011

SCHWAB, Eva y Ariel Garcia (2012). "Espacio público: entre visiones antagónicas y políticas estatales". Ponencia presentada al Seminario Internacional "Desafíos de las políticas del Espacio Público. Prácticas Culturales e Innovación Social, Movimientos, Dinámicas y Mecanismos". Organizado por el Centro de Estudios Urbanos y Regionales (CEUR-CONICET) el 9 de abril de 2012. Buenos Aires.

TORREJON CARDONA, Eryka Yuvelyre (2009): "La Plasticidad del Espacio: Lugar y estigma en la imagen internacional de Medellín (1990-2007)" Universidad Autónoma de Barcelona Editoriales, España 2009

WERTHMANN, Christian (2011): Metropolis Nonformal – Vortrag vom 26.7.2011. http://www.eafit.edu.co/minisitios/ambientesurbanos/Documents/6_ChristianWerthman.pdf (2011-09-08)

ZUKIN, Sharon (1996): Cultural Strategies of Economic Development and the Hegemony of Vision. In: A. Merrifield and E. Swyngedouw, eds. The Urbanization of Injustice. London, Lawrence & Wishart, 1996, pp. 223-243.

ol. 47, Issue 5, pp. 123-456. Vienna, 2009.

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New Quality of Public Spaces as a Stimulant for Socio-Economic Development – the Specificity of Medium-Sized Towns

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1 ABSTRACT[1]

Compared to Europe, Poland is a country with a relatively low rate of urbanization. The main pillars of economic development are in emerging metropolitan areas. However, the majority of the population live outside the largest cities.

Medium-sized towns have been affected by the adverse effects of political and economic transformation more drastically than large multifunctional centers. But even in the conditions of low budgets and limited interest from private investors, smaller municipal centers turned out to be much more determined than large cities in implementing projects aimed at improving the physical quality of their public spaces. First major projects were initiated in the 1990s, but a significant increase in this type of investment came along with availability of the EU Structural Funds.

We can distinguish several phases in the investment in public spaces. At the initial stage, the main motive for changes was to create a new town image, attractive for both tourists and investors. Later, as integrated revitalization programs were promoted and the municipalities themselves experienced first negative symptoms of gentrification, more attention was paid to the everyday needs of local communities. A change of attitude could be seen at the level of institutions in charge of defining the distribution of the Structural Funds as well as in the municipalities themselves.

The paper presents the evolution of strategies for small and medium-sized towns – including the expected impact of the new EU programming period.

2 INTRODUCTION

Beside the evident advantages, the democratic breakthrough of the early 90s in the region of Central Europe brought along also a series of transformation shocks related to the need to adapt quickly to the new rules of state organization and new economic conditions.

As the region's largest country and the first one to be subjected to the said transformations, Poland is an interesting example for observing these adaptation processes. After 45 years of a centrally planned economy, we could still see regional differences that were the effect of the partition of the country that lasted throughout the 19th century (the present territory of Poland was divided among Prussia, Russia and Austria) and migrations after World War II (differences between the parts inhabited by the original native populations and the so-called recovered territories). The differences were manifested in various aspects and scales: from the development of settlement networks, through economic standards to the residents' self-identity and approach to the heritage of the space around them (SAMSONOWICZ & TAZBIR 2002).

The administrative systems of the countries of the Eastern Block were strongly centralized, based on the principle of the primacy of ministry-level structures (HIRT & STANILOV 2009) This state of affairs virtually made it impossible to pursue social, economic or spatial policies in a rational way, taking into account the local specificity, which seemed crucial with regard to the above-mentioned regional differences. The inefficiency of that system of managing the country became particularly evident when juxtaposed with the system of developed Western countries, where the managerial revolution that had started in industries was transposed also to the public administration (KULESZA 2000).

In 1990, the first significant step was taken in Poland towards decentralizing the state management: the establishment of self-governing communes. The process of changes was launched in many institutions and areas of managing public affairs, such as education, welfare, public order protection. The chief tools for spatial planning were, too, given over into the communes' hands. This is how a state based on civil society

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[1] For the purpose of the present paper, "medium-sized towns" are understood as those with populations between 10,000 and 100,000, in accordance with the term as it is defined in the National Spatial Development Plan of 2005. This rather broad term includes also, with regard to their functions, also smaller towns that are the capitals of poviat districts.

was to begin functioning (KULESZA, 2000). The giving over of the previously centrally supervised tasks to the communes was related to the need to provide to the local governments funds for running development programs – especially by establishing a participation in the tax revenues and by communalizing the estate resources. These mechanisms were being merely shaped in the first half of the 90s (REGULSKI 2000). Accordingly, the first full-fledged communal development strategies could appear only after the situation had stabilized.

The experience showed to us that those new entities did not yet possess a sufficient institutional capability to shoulder the new challenges in this respect. In fact, as the free-market principle started to replace the old order rather abruptly, the system of spatial planning found itself in a deep crisis (KOCHANOWSKI 2004, JĘDRASZKO 2005). The effects of that crisis exerted a strong impact on the quality of public spaces – that element of the urban tissue that did not generate any direct financial benefit. Owned by "nobody", the public spaces were often appropriated for parking or retail purposes.

One specific element of this complex settlement system was the medium-sized town. Despite the rapid urbanization taking place in the world, the majority of the country's population still live outsides the largest cities. Theoretically, medium-sized towns, as an intermediate link in this arrangement, should provide to their residents access to translocal services and innovations. Such was one of the assumptions of the second phase of the territorial reform (1999), which resulted in the establishment of poviats (ZWIĄZEK POWIATÓW POLSKICH 2013). Practically, strengthening the role of translocal centers turned out to be difficult because the poviats' capitals were on their own in coping with local problems and the fact that a given town was the poviat's capital was not a sufficient factor in attracting private capital.

Despite their limited funds, the development strategies of medium-sized towns show a stronger co-relation between implementing development strategies and improving the quality of public spaces than it is in the case of cities with a metropolitan potential.

3   MEDIUM-SIZED TOWNS IN THE NEW REALITY

In orderto better understand the situation of smaller urban centers at the threshold of democratic transformations, we should examine more closely the political and economic factors of the 20th century. In the time of rapid civilization changes, the original role of such centers – servicing the surrounding rural areas, turned out to be too modest an offer. The need to diversify the economic offer of small and medium-sized towns was understood already in the times of real socialism, but the ministerial rule was largely restricted to locating new state-owned industrial enterprises instead of promoting the urban development processes. Naturally, this way of development could not be successful everywhere (KOLIPINSKI 1973). What seemed to be a "lottery win" in the 60s and 70s turned out to be a curse at the threshold of the market economy. Sudden collapses of "breadwinning" enterprises deprived of state subsidies – enterprises providing both work and an educational-cultural-and-sport offer – led not only to unemployment but also to frustration of individuals and a crisis of the collective identity.

	Year			
	1995	**2000**	**2005**	**2010**
Population of Poland in total	38,609,399	38,253,955	38,157,055	38,200,037
Urban population	23,876,667	23,659,690	23,423,740	23,264,383
Ratio	61.84 %	61.85 %	61.39 %	60.90 %
Population of cities > 100.000	11,275,064	11,204,400	11,059.584	10,940.879
Ratio to population in total	29.20 %	29.29 %	28.98 %	28.64 %
Ratio to urban population	47.22 %	47.36 %	47.22 %	47.03 %
Population of medium-sized towns	10,662,853	10,432,343	10,350,202	10,270,558
Ratio to population in total	27.62 %	27.27 %	27.13 %	26.89 %
Ratio to urban population	44.66 %	44.09 %	44.19 %	44.15 %

Tab. 1. Share of urban population in the country's population. Source: Own summary based on Local Data Bank (2012)

The economic situation affected the demographic one. Medium-sized towns, considered in a strictly demographic context, are home to almost 27 % of Polish population counted in total, and more than 44 % of

urban population. Taking into account the statistical average from years 1995-2010, this group of towns was affected by population loss (Tab. 1). However, the ratio of population in comparison to general population of Poland or urban population in total remains stable. Basing on criteria of population change, medium-sized towns can be divided into three types of categories:

- towns affected by rapid loss – caused by unemployment and low quality of life or, on the contrary, gentrification

- stable towns – in which the falling industry was replaced by new business, usually small and medium-sized enterprises

- fast growing towns – located on the outskirts of large cities or connected to them with frequent rail connection (GOLĘDZINOWSKA 2012).

3.1 Specificity of public spaces in medium-sized towns

Describing the condition of the public space at the threshold of the Polish transition to democracy, we can claim that the Polish towns were affected by the effects of the solutions reducing their significance similar to those that could be seen in other countries of Europe. The phenomena such as the establishment of mono-functional districts stripped of public space, spatial expansion of towns, extensive use of new residential functions and primacy of road traffic were accompanied by a lack of sufficient care for the condition of shared spaces characteristic of the Eastern Bloc, and, which resulted from the political situation of the time, lack of positive connotations with regard to co-participation in the public space. In the mid 90s, competition emerged for the degraded public-access spaces: multifunctional retail-and-entertainment centers, which led nearly to extinction of historical market places and boulevards in many towns.

First discussions about the need for individualization of spatial solutions and return to the development of residential projects of a smaller scale conducive to the residents' association with the surrounding space arose in Poland most probably already in the 1980s, but the true renaissance of this way of thinking came took place only after the decentralization of the spatial planning system of the 90s – so as long as 30 years after the process had been completed in Western Europe. The irony of the situation is that large cities became the subject of intensive development by a new group of interest holders: private developers, who saw a business opportunity in addressing the problem of insufficient housing. They provided a range of housing options in smaller residential complexes but without providing any connection with the system of public spaces. Many of those residential complexes were fenced off the surrounding area, because such were the expectations of atomized society. Another factor contributing to the degradation of public spaces was the growing availability of the thus-far luxurious article: the car. In fact, many public spaces were converted to serve parking purposes.

The smaller towns stand out against this background. Here, the traditional places of the residents' everyday integration largely retained their social functions, despite their predominant wear and poor aesthetics. It is related to a smaller interest on the part of private investors in developing facilities that would be competitive to the public space and or in any investment whatsoever. Consequently, the public authorities remain here the creators of the socio-economic policy to a larger extent than it is in larger centers. We should observe also that in smaller towns and in more compact urban systems smaller distances to a large number of destinations made them more conveniently accessible on foot.

In the context of the contemporary tiredness with uniformity and the demand for uniqueness and authenticity of experience, the livability of the public spaces in medium-sized towns was certainly perceived as their advantage. It may become the foundation for creating a new image, especially in the degraded post-industrial towns, and a boost for the development of tourist and urban functions.

T. Markowski confirms that it is the physical attributes of smaller towns' public spaces that played a larger role in shaping their competitive image than such factors as innovations or a knowledge-based economy (2006). The phenomenon is confirmed by the observed consistency of the local authorities in such towns in applying for funds with a view to upgrading their public spaces. The purpose of the work carried out in medium-sized towns is usually to improve the technical condition and the functional features of the public space. Unfortunately, in the majority of cases little attention is paid to the architectural qualities of the work – the applied solutions are often average-quality, cheap or historicist.

Over the past 20 years we can distinguish certain trends concerning investment in public spaces, largely subject to the process of integration followed by functioning within the structures of the European Union. The matter concerns not only availability of external funds but rather the adoption of a certain culture in managing the urban development.

3.2 Formal conditions coming from the Polish law

To understand the role and context of the quality of public space in the development policies of Polish communes (towns), it is important to become familiar with the chief related formal-legal conditions.

The Constitution of the Republic of Poland (1997) provides that the state "shall ensure the freedoms and rights of persons and citizens, the security of the citizens, safeguard the national heritage and shall ensure the protection of the natural environment pursuant to the principles of sustainable growth," and it "shall provide conditions for the people's equal access to the products of culture which are the source of the Nation's identity, continuity and development," while the citizen's function is to care for "the common good", among other duties.

Despite the Constitution's emphasis on the values related to the functioning of public space, a definition of the "territory of public space" first appeared as late as in the Act of 23 March 2003 concerning spatial planning and development, where the term was defined as "a territory of special significance for the needs of the residents, improvement of their quality of life and conducive to establishing social contacts with regard to its location and functional-spatial features, determined in the study of conditions and spatial development objectives of the commune." The requirement to determine in a study of conditions and spatial development objectives territories of such great importance for the residents' quality of life seems justified but further provisions of the Act stipulate an immediate need to draw up a relevant local plan. This obligation causes that the matter of shaping a system of public space is often omitted in the communes' plans for fear of the need to provide for it financially. However, lack of such a declaration does not mean that public space does not exist in a given commune (town). Squares and streets are often presented as traffic space while parks and other similar places of leisure are referred to as green areas or places of the provision of services. Their proper function is quoted only at the moment of drawing up a local development plan or even later while applying for a specific construction permit. As much as a spatial policy pursued this way secures the existence of public spaces in the structure of the town, it does not guarantee that the venues' features determining their values will be preserved – values including the spatial continuity and cohesion as well as thought-out interactions with the area around it.

Nevertheless, activities aimed at developing good public spaces often occupy an important place among the provisions of other programming documents which are not related in any direct way to the Act on spatial planning and development. These documents include, above all, general strategies for the commune's (town's) development and local revitalization programs. Noteworthy, the inclusion of provisions on public spaces in these documents are a voluntary initiative of local governments assuming that an improved quality of public spaces can help in resolving diagnosed problems or achieving the adopted development objectives.

As it was already mentioned, the first such documents were drawn up in the mid 1990s, but they became more widespread at the beginning of the new century, as part of the preparations for the functioning in EU structures. Defining a development strategy and local revitalization programs, even if not required by the Polish law, was to create opportunities for the town of applying for external funding.

3.3 Financing the transitions in public spaces

Since the financial opportunities related to Poland's accession of the European Union were first made available, we have seen a steady growth in the number of projects aimed at creating new or renovating old public spaces. One of the factors that have led to the surge in the investments can be found in the access of Polish local governments to the resource of good practices from other European countries. However, the key factor for the decision-makers seems to be the fact that public space, as public good, improves the competitiveness of the whole region without favoring any particular entities, and so without violating the balance of competition.[2]

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[2] "A company which receives government support obtains an advantage over its competitors. Therefore, the EC Treaty generally prohibits State aid unless it is justified by reasons of general economic development."

Considering the accessibility of the funds and principles of allocating them to Polish self-governments, we can distinguish three basic periods:

- pre-accession period,
- programming period 2004-2006,
- programming period 2007-2013.

Financial support in the pre-accession period was available from the year 2000. At this stage of support, with regard for the delay in the development of the basic infrastructure there was no question yet of financing integrated programs of renovating the urban space.

Taking into account the increasing competence of the relatively new, democratically elected local governments, we should mention also the assistance programs related to the transfer of good practices from the EU member states and from the United States (e.g. USAID, KnowHowFund), initiated already in the 1990s. On the wave of those projects, in the 90s first development strategies were being drawn up to revitalize degraded residential districts (MILCZYŃSKA-HAJDA 2007). Interestingly, the innovative solutions were first applied in smaller urban centers such as Sopot, with a population of 40 thousand at the time, or Dzierżoniów, with 35 thousand inhabitants.

Voivodeship	Differentiation of revitalization projects depending on the town's population or its administrative function
Dolnośląskie	Individual priorities: 1) up to 10,000, 2) above 10,000
Kujawsko-Pomorskie	Individual competitions within a single priority: 1) from 5,000 to 10,000, 2) towns from 10,000 to 15,000, 3) from 15,000 to 20,000, 4) above 20,000, 5) sub-regional towns, 6) nodal cities of the voivodeship's capital agglomerate area
Lubelskie	Not applicable – open to all urban districts meeting the criterion of degraded area
Lubuskie	Not applicable – open to all urban and rural areas meeting the criterion of degraded area
Łódzkie	Not applicable – open to all urban districts meeting the criterion of degraded area
Małopolskie	Not applicable – open to all urban districts meeting the criterion of degraded area
Mazowieckie	Scoring preference for town with populations above 5,000
Opolskie	Not applicable – open to all urban districts meeting the criterion of degraded area
Podkarpackie	Not applicable – open to all urban districts meeting the criterion of degraded area
Podlaskie	Not applicable – the program does not cover comprehensive revitalization of urban areas
Pomorskie	**Separate priorities: 1) Development of local basic infrastructure up to 35,000 inhabitants, 2) comprehensive revitalization programmes above 35,000 inhabitants (separate competitions for towns with a poviat role and others)**
Śląskie	Separate operations: 1) up to 50,000 inhabitants, 2) above 50,000 inhabitants
Świętokrzyskie	Separate operations: 1) growth centers: voivodeship's capital and capitals of poviats, 2) other urban centers
Warmińsko-Mazurskie	Not applicable – an indicative list of towns of various sizes
Wielkopolskie	Within the same priority: 1) comprehensive revitalization of urban areas (in town up to 50,000), 2) revitalization of degraded urban areas (integrated projects in town above 50,000 residents, combine with projects improving the housing infrastructure).
Zachodniopomorskie	Separate priorities: 1) up to 5,000, 2) Szczecin Metropolitan Area

Tab.2. Criteria of size and function of towns applied in Poland's 16 Regional Operating Programs. Source: Own study

The programming period of 2004-2006 was the first period in which Polish towns could benefit from the European Regional Development Fund. As a shortened period (for the old member states the period stretched from 2000 to 2006), it was largely the time of adaptation to the new conditions and the time of building institutional capabilities to develop policies of regional development. For all the Polish voivodeships, a common Integrated Operating Program of Regional Development was adopted.

source: http://ec.europa.eu/competition/state_aid/overview/what_is_state_aid.html

Financial assistance for the renovation and shaping new public spaces was directed first of all within the operation "Degraded urban, post-industrial and post-military spaces". In order to qualify for financing within this program, towns had to first adopt the said local revitalization programs, which required analyzing the purposefulness and objectives of the planned projects. Moreover, support was available only in what were believed to be the so-called degraded areas – delimited on the basis of criteria modeled after those adopted for the Joint Programming Initiative URBAN.

Support for the modernization of local road infrastructure and local cultural and tourist facilities was possible in turn within the operation entitled "Areas qualified for restructuring" – here, the supported territory was delimited in the poviat scale, and much simpler criteria were applied. In practice, it meant a possibility of supporting public space renovation projects in most territories outside the largest urban centers.

In the programming period of 2007-2013, the integrated program was replaced with 16 Regional Operating Programs (ROP). All these documents provide for the possibility to support projects related to renovating public space, but in different ways, as determined by the voivodeship's authorities on the basis of the region's specific features. In 15 out of 16 voivodeships, there was a possibility to co-finance the implementation of comprehensive revitalizing projects, but in as many as 8 voivodeships separate provisions were incorporated depending on the size of the particular center and its role in the settlement structure. 5 voivodeships provided for the possibility to extend repayable assistance for urban revitalization within the JESSICA Initiative,[3] but no project relating to public space has been carried out through this program so far.

In the case of the Pomorskie Voivodeship, which will be examined in detail further in the present article, "Comprehensive Revitalization Projects" were reserved for towns with populations above 35,000. Smaller towns could obtain co-financing for simpler projects concerning the development of "Local Basic Infrastructure". In the latter case, simpler procedures were used; the applicants were not required to have an Local Revitalization Program or to delimit a degraded area on the basis of predefined criteria. However, preference was given to the so-called structurally weak areas. In the Pomorskie Voivodeship also smaller projects improving the quality of degraded historical downtown districts could receive support within the priority axis "Tourism and Cultural Heritage".

4 PUBLIC SPACES IN DEVELOPMENT POLICY – A CASE STYDY BASED ON THE EXAMPLE OF THE POMORSKIE VOIVODESHIP

The Pomorskie Voivodeship has been selected for the purpose of an in-depth analysis. The region is characterized by a very diversified settlement pattern. The group of towns meet the "medium-sized" criterion includes 22 places, 16 of which are capitals of poviats or towns with poviat rights. The population of the biggest town in this group in 2011 amounted to 9676 inhabitants (Sztum). Population changes in years 1995-2011 varied from 27.78 % growth rate (Reda) to 14.25 % decrease (Sopot). What is interesting, both of the extreme examples are situated within so called Tricity Metropolitan Area (Tab. 3).

The area is characterized by historic Polish (i.e. Tczew) or Kashubian[4] towns (i.e. Kartuzy, Kościerzyna, Wejherowo) as well as towns dominated by settlers moved there after the Second World War (i.e. Pruszcz Gdański, Nowy Dwór Gdański, Słupsk). Considering the economic base and its changes, the division may be more detailed, towns afflicted by a bankruptcy of a significant production company (for instance Tczew, Starogard Gdański, Ustka), service providers which try to adapt their offer to current needs and towns within so called Tricity Metropolitan Area, which want to ensure competitive conditions for a housing market rivalling with the central parts of the metropolis. When it comes to public space development as a part of urban composition, the most interesting examples are new towns deprived of historical centres, located in the Metropolitan Area: Rumia, Reda and Pruszcz Gdański.

Several spectacular examples of transformation of public space from the pre-accession period may be found in the Pomorskie Voivodeship. They are often highlighted in literature of the subject as examples of good practices. A forerunner of restoration of the cityscape was Sopot. This historic health resort, which is located in the very centre of the Tricity Metropolitan Area, had its local revitalisation program designed in cooperation with local inhabitants. From 1997, renovation of consecutive historic quarters is being supported. Projects are executed mostly thanks to subsidies offered by town authorities to tenants'

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[3] Joint European Support for Sustainable Investment in City Areas.
[4] Slavic autochtonic group in Pomorskie region

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associations, but a central fragment of the town, which had been devastated during the war, was redeveloped thanks to one of the first examples of public-private partnership in Poland. Another example is renovation of the Old Market Square in Chojnice. Here, town authorities developed the market square and provided support to owners of the tenement houses located nearby, providing financial support as well as executing elevation restoration works. Thanks to its new and attractive image, this historic center reported significant development of services and the town became a major centre in the south-western part of this voivodeship. During this time, works on the new centre in rapidly developing Pruszcz Gdański were initiated. The majority of works was completed only in 2006 but it was the crowning of the process initiated by an architectural contest from 1996. In this case, again, the project was conducted with use of no external means.

Town	Population		Spatial features		Change of development strategy		Most important project in public spaces		
	In 2011	Change 1995-2011 (%)	Part of larger agglomeration	Historic centre	Economic base before 1989 (state driven)	Current strategy	Pre-accesio	2004-2006	2007-2013
Słupsk (p)	96655	-6,15		+	I/S	I/S		so	so
Tczew (p)	60152	-0,77	+	+	I	I/S/T		so so	so
Starogard Gdański (p)	48185	-5,22		+	I	I/S			
Wejherowo(p)	47794	0,44	+	+	S	S/T		t	so
Rumia	46107	12,70	+		I/R	R			
Chojnice (p)	39919	0,12		+	I/S	I/S/T	so/t	so t	t t
Kwidzyn (p)	38296	-2,57		+	I	I/S/T		so	
Malbork (p)	38278	-4,99		+	I/T	S/T		t	t
Sopot (p)	38141	-14,25	+	+	S/T	S/T	so	so t	t
Lębork (p)	34581	-5,02		+	I/S	I/S/T			t so
Pruszcz Gdański (p)	26834	20,56	+		I/R	R/S/Te	so	so t	so
Kościerzyna (p)	23138	-0,16		+	S/T	S/T			t/so
Reda	20959	27,78	+		I/R	R/S			so
Bytów (p)	16650	-5,44		+	S	S/T			t/so
Ustka	16062	-7,17	+	+	I/T	T		t	t
Władysławowo	15111	4,51			I/T	T			
Kartuzy (p)	14922	-8,08		+	S/T	S/T			t
Człuchów (p)	14189	-8,37		+	I	S/Te			t
Puck (p)	11249	-2,90		+	T	T			t/so
Miastko	10695	-11,17		+	S	S			so
Nowy Dwór Gdański (p)	9904	-4,33		+	I/S	S/T			t/so
Sztum (p)	9676	-13,14		+	I/S	I/S/T			t
Town: (p) – capital of poviat or individual status of poviat Change of development strategy: I – industry, S – services, T – tourism, R – development of residential areas (assigned to the cities in order of importance) Most important project in public spaces: s – local society oriented, t – tourism oriented; so t – financed within the cohesion policy									

Tab. 3. Characteristics of medium-sized towns in the Pomorskie Voivodeship. Source: Own study on the basis of Local Data Bank, local strategic documents and intervievs (2012).

As it was already mentioned, during the period 2004-2006, it was possible to finance integrated revitalization projects in degraded areas, selected within the URBAN Initiative methodology. Within the probed group of towns, only Chojnice managed to execute the project of transformation of a hospital, located in the town centre, into a culture-and-social complex. Ustka managed to execute the first stage of its revitalization program within 'restructuring areas' action. Tczew currently faces the consequences of restructuring railway infrastructure. It managed to create Exhibition and Regional Centre for lower Vistula river and created recreational space along the river banks. Thus a gap of lost identity of this railway town was filled with the new clear image of a river town.

In the years 2007-2013 the biggest urban space renovation projects were to be financed through 'comprehensive revitalisation projects'section of the Pomorskie ROP – combining infrastructural, social and economic objectives for towns exceeding 35 thousand inhabitants. Contrary to the URBAN Initiative, a high culture value was not among the priorities of this program. However, beneficiaries residing in the territories meeting the criteria of "degraded areas" opted for those projects which played a key role for the town's identity. An important element of almost all the projects submitted to financing within this program was to elevate public spaces located in historic centers (Słupsk, Tczew, Starogard Gdański, Wejherowo, Lębork). An example was Rumia, which planned to create a completely new town centre based on few remaining historic relics of an old Kashubian village.[5] Interestingly, the regional leader, Sopot, did not decide to take part in this contest. It does not mean that it stopped procuring means for its revitalization program; numerous smaller projects were successfully implemented from the means dedicated to improving tourism attractiveness. A similar procedure took place in Malbork and Chojnice. Smaller towns from this group were willing to take advantage of the simplified procedures on shaping so-called "local basic infrastructure". Thanks to this kind of support, public spaces in Kościerzyna, Bytów, Puck and Nowy Dwór Gdański were renovated and upgraded. All those projects are to elevate the tourism features of those places. Nowy Dwór Gdański also adapted the 19th century dairy into Żuławski Historic Park,[6] a transformation that was not only to increase the general attractiveness of the place but also to shape common identity in the town dominated by immigrants. Miastko had its historic park renovated and Reda created a new park in the central part of the town, with a plan to create a green center for the town which it never had in the past. Ustka has been investing in its spa image for years. Sztum and Człuchów, which have Teutonic castles located in the centers, carried out projects on public space, within a tourism propagation section.

Several different models of support have been available for medium-sized towns in the Pomorskie Voivodeship so far. During the last period of the program, there were two models divided by the demarcation line of population size (complex revitalization and basic infrastructure development) and one optional model available to all communes (tourism propagation). Despite the fact that the EU policy shows increased expectations concerning public space renovation in the context of social problems solution, town authorities in medium-sized towns in Pomorskie region seem to combine those processes with the strengthening of their competitive position, attracting more tourists and new inhabitants. This is confirmed by the majority of projects financed from their own means as well as certain moderation when it comes to procuring funds for comprehensive revitalization programs.

5   CONCLUSION AND OUTLOOK

Assessing the significance of the quality of public space in medium-sized towns from the European perspective, we should emphasize that the current strategy Europe 2020 promotes inclusive growth and sustainable growth, as opposed to the Lisbon Agenda that promoted improving competitiveness of the European economy in relation to the largest economies of the world. Therefore, we may assume that the role of translocal centers providing access to services and social integration opportunities will continue to grow.

The policy of the Polish state as it has been expressed recently – to a large extent an adaptation of the European policy to the Polish conditions – lets us expect another seven more active years of investing in the space of small and medium-sized towns. In the present economic situation the government is departing from the previously promoted policy of focusing on development through metropolises, as the largest urban centers can more easily depend on private capital. The National Development Strategy 2020 adopted in September 2012 emphasizes among its objectives "creating conditions for the development of regional, sub-regional and local centers and for strengthening the potential of rural areas".

The EU policy for the future programming period, too, seems conducive to the development of a "local Poland". By the decision of the European Council of February 2013, Poland is to remain the largest beneficiary of the cohesion policy in the 2014-2020 period – despite the overall cuts – receiving EUR 72.9 billion for the purpose, up 6 per cent from the budgetary period of 2007-2013. In the time of the crisis and falling prices for construction services, it indicates an opportunity of a larger number of viable projects.

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[5] This project did not obtain financing as it was decided that the proposed solutions do not significantly contribute to social and economic problems issues.
[6] Żuławy is a cultural micro region located in the Vistula delta.

What is more, the concentration principle was introduced saying that a minimum of 5 per cent of funds in the Europea Regional Development Fund is to be used for sustainable growth of urban areas. In the context of the above-mentioned plans of Poland we may expect that the small and medium-sized towns will participate generously in this amount.

However, the open question is whether or not the quality of the public space remains an attractive instrument for achieving development objectives defined this way. The inclination to invest in public-access spaces – by nature not generating any profit – may be largely subject to the following issues: difficulty in providing own contribution to particular projects, communal debt[7] and availability of non-repayable grants related to the predicted larger contribution of repayable assistance (JESSICA, above all) in the cohesion policy. In effect of the change in the paradigms of development we should expect departure from supporting projects related to tourism or other "leisure industries" to the benefit of community-building projects. However, in this case we should expect a growing importance of the so-called "soft projects".

The experience of the Pomorskie Voivodeship shows that the most spectacular projects of transforming the existing or shaping new public spaces were carried out without assistance from EU funds. The cause of this situation lies in the wide time span of the investment and its character reaching beyond the framework of support defined in seven-year programming periods. And so the optimal way for development may be to keep the quality of the public space infrastructure in the hands of self-governments as own tasks, shifting efforts to supporting social functions that make it possible to take the best advantage of the transformed landscape.

6 ACKNOWLEDGEMENT

7 REFERENCES

GOLĘDZIOWSKA A.: Public Space in Medium-sized Town – Role in Development Policy. Source: http://www.isocarp.net/Data/case_studies/2223.pdf, Perm, 2012.
HIRT S. & STANILOV K.: Twenty Years of Transition: The Evolution of Urban Planning in Eastern Europe and the Former Soviet Union, 1989-2009. Nairobi, 2009.
KOCHANOWSKI M.: Miasto – wspólne dobro i zbiorowy obowiązek. In: Miasto – wspólne dobro i zbiorowy obowiązek, Materiały I Kongresu Urbanistyki Polskiej, pp. 5-6. Warsaw, 2004.
KOLIPINSKI J.: Podstawy ekonomicze rozwoju małych miast. In: Architektura, vol. 11, pp. 419-420. Warsaw, 1973.
LOCAL DATA BANK. source: www.stat.gov.pl, 2012.
JĘDRASZKO A: Zagospodarównanie przestrzenne w Polsce — drorgi i bezdroża regulacji ustawowych. Warsaw, 2005.
KULESZA M.: Transformacja ustroju administracyjnego Polski (1990-2000). In: STUDIA IURIDICA, vol. XXXVIII, pp. 79-86. Warsaw, 2000
MILCZYŃSKA-HAJDA D.: Rewitalizacja polskich miast – potrzeby, prognozy i perspektywy. source: www.fr.org.pl.
MARKOWSKI T.: Marketing miasta. I: Marketing terytorialny, Studia PAN KPZK, vol. CXII, pp. Warsaw, 2006.
REGULSKI J.: Samorząd III Rzeczypospolitej: koncepcje i realizacja.Warsaw, 2000.
STANILOV K.: The Post-Socialist City. In: Urban Form and Space Transformations in Central and Eastern Europe after Socialism, Human Settlements Global Dialogue Series, No. 5., Nairobi, 2007.
SAMSONOWICZ H. & TAZBIR J.: Tysiącletnie dzieje. Wroclaw, 2002.
ZWIĄZEK POWIATÓW POLSKICH: Samorząd powiatowy w Polsce – raport. Source: http://www.terespol.ug.gov.pl/downloads/raportzpp.pdf, 2013.

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[7] Under the Polish law, communes' debt may not exceed 60 per cent of their budgets.

Nuove strategie sociali, economiche, urbane e architettoniche per il social housing

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1 ABSTRACT

La questione dell'alloggio popolare diventa particolarmente complessa quando è costretta ad occuparsi sia di fascie sociali con gravi disagi, sia di famiglie con un reddito leggermente superiore a quello stabilito per avere diritto all'alloggio, ma nello stesso momento non sufficiente per confrontarsi con gli affitti dettati dal libero mercato. Un nuovo approccio alla questione del Social Housing riparte da una rilettura critica della questione esistenziale di una fascia di popolazione che non ha lavoro, lo ha perso e non riesce a reimpiegarsi, non riesce a socializzare o quanto meno non riesce a sentirsi parte di una comunità dove sia possibile crescere e migliorare la propria condizione economica, culturale e umana. Si tratta in pratica di lavorare sull'idea di trasformare il 'tempo lavoro' in 'valore denaro' utilizzabile per il reinserimento sociale. Il futuro del Social Housing dovrà attuarsi attraverso l'occupazione lavorativa che in ambito commerciale si chiama 'ripresa dei lavori effettuati'. Se una cittadinanza risana, con una opportuna e necessaria manutenzione, i propri alloggi e il verde in cui vive, migliorando la qualità della vita e dello spazio urbano "questo deve essere riconosciuto". La questione estetica e formale dell'architettura dovrà essere rifondata, quindi, su nuovi parametri di ordine sociale. Una delle esperienze più interessanti in tal senso è il lavoro di Patrick Bouchain in Francia. Altre realtà in Italia si stanno adeguendo, con fatica, a questa nuova strategia insediativa che sembra l'unica seriamente perseguibile per scardinare un sistema sclerotizzato e speculativo.

2 NUOVE STRATEGIE SOCIALI, ECONOMICHE, URBANE E ARCHITETTONICHE PER IL SOCIAL HOUSING

In Italia, come in molti altri Paesi europei, la questione dell'alloggio popolare diventa particolarmente complessa quando è costretta a interessarsi di una fascia sociale veramente povera, o posta ai margini della società, che arriva a non essere categorizzabile perché non possiede documenti o i requisiti minimi per rientrare in liste di attesa normate dallo Stato.

Paradossalmente esiste un'altra fascia sociale che ha dei punti in comune con la precedente. Esistono delle famiglie con un reddito leggermente superiore a quello stabilito per avere diritto all'alloggio sociale ma nello stesso momento non sufficiente per confrontarsi con gli affitti dettati dal libero mercato. Nonostante la situazione francese non sia grave come quella italiana esiste un serio problema nel soddisfare le richieste di queste due classi sociali che sembrano diventare sempre più numerose. Patrick Bouchain in Francia, occupandosi principalmente di chi ha una condizione estremamente disagiata, parte da una rilettura critica della società contemporanea per proporre un nuovo approccio alla questione dell'alloggio popolare. Non si tratta di realizzare fisicamente quattro mura per dare protezione a chi ne ha bisogno ma risolvere un problema più ampio che ha a che fare con la questione esistenziale di una fascia di popolazione che non ha lavoro, lo ha perso e non riesce a reimpiegarsi, non riesce a socializzare o quanto meno non riesce a sentirsi parte di una comunità dove sia possibile crescere e migliorare la propria condizione economica, culturale e umana. Sostanzialmente si ripropone l'idea di una 'autocostruzione' che non sia nostalgica della situazione postbellica o di quella utopica degli anni '70 ma che tenga conto di una realtà sociale che non troverà mai il pieno impiego. Non solo, in alcune aree la disoccupazione raggiunge livelli di allarme sociale, ma sono sempre di più quelle persone che perdono il posto di lavoro e non riescono a trovare una nuova occupazione. Oltre a questo punto di osservazione ve n'è un altro che si occupa del recupero dei materiale generati dalle discariche e di realizzare dei componenti costruttivi che siano trasformabili e reimpiegabili ciclicamente.

Inoltre si ha anche l'idea di trasformare il 'tempo lavoro' in 'valore denaro' utilizzabile per il reinserimento sociale. Tutte le esperienza nate da questo programma, sia in Francia, sia in altre parti del mondo, sono state ideate e realizzate senza l'intervento della politica, proprio alla quale vogliono dimostrare che questa non può risolvere tutto.

La prima tappa per questi alloggi sociali 'un po' differenti' risiede nell'accordo con il sindaco nel considerare che questa operazione sia indispensabile. A oggi sono stati realizzati quattro insediamenti nelle città di Tourcoing (2009-2011 Le Grand Ensemble à Tourcoing : Réhabilitations et habitations neuves – Zac

de l'Union), Boulogne (Le Grand Ensemble à Boulogne: Réhabilitations de 60 maisons locative avec les habitants), Beaumont en Ardèche (2010-2011 Le Grand Ensemble à Beaumont en Ardèche : Etude pour la Construction de 8 maisons en accession) e Marsiglia (Le Grand Ensemble à Marseille : Etude pour la réalisation de Logements collectifs – Friche de la belle de mai).

Si tratta di tre contesti completamente differenti con particolari situazioni da adattare ai vari siti. Inoltre si sottolinea che questi lavori devono essere svolti nella tranquillità e nell'urgenza. Si deve avere il tempo di collaborare con più ambiti disciplinari. Nell'università che potrebbe attivarsi e contribuire in ogni luogo dove è presente una facoltà e dove s'istituisce un nuovo centro di autocostruzione. Negli istituti tecnici di formazione professionale e di reinserimento. Gli studenti di architettura potrebbero partecipare sotto forma di specializzazione o formazione durante il corso degli studi, ma anche come stage per l'esame di Stato. Insomma, una collaborazione su più fronti che possa innescare un circolo virtuoso utile a tutti i soggetti che intendono partecipare. Si collabora con dei piccoli uffici HLM secondo i casi, o dei promotori filantropici che vogliono condurre questa esperienza di costruzione a costo ridotto nella speranza di trovare il modo di creare degli affitti sempre più bassi. Per il terreno di Marsiglia è stata realizzata una società cooperativa di produzione (SCOP) con l'intento di creare una società di interesse collettivo (SCIC) di cui Patrick Bouchain è il presidente e il direttore generale.

Nella Friche (terreno abbandonato – zona industriale dismessa) La belle de Mai a Marsiglia, ottenuto con 45 anni di battaglie, gli abitanti possiedono un terreno due volte più grande rispetto alle loro necessità. Patrick Bouchain gli ha proposto allora di diventare azionisti della SCIC e anche agenti culturali aprendo il loro terreno alla realizzazione di alloggi sociali, favorendo la mixité sociale, economica e culturale. Ogni inserimento di alloggi sociali dovrà essere un intervento di natura contestuale e non globalizzante. Infine uno dei punti chiave prevede cha ogni persona che ha vissuto in uno di questi alloggi apportando delle migliorie sia nell'abitazione che nell'urbano di pertinenza gli debba essere riconosciuta la possibilità di alloggiare i propri cari anziani. In un affitto commerciale questo si chiama la 'ripresa dei lavori effettuati'. Se una cittadinanza migliora i propri alloggi con manutenzione all'occorrenza, con una migliore qualità della vita e dello spazio urbano, con una migliore organizzazione questo deve essere riconosciuto. In pratica l'architettura e la sua costruzione devono passare attraverso l'occupazione lavorativa. L'architetto sarà una figura professionale altamente qualificata che affiancherà il cittadino nei sistemi di co-generazione della città. Un crescente e libero accesso ai sistemi informativi globalizzati, ai nuovi sistemi crossmediali, aiuterà a raggiungere una più equa compensazione economica, fiscale, legislativa e tecnica; aiuterà la formazione di una coscienza abitativa più efficiente, una coscienza urbana che porterà alla realizzazione di nuove smart cities dal basso, dal fondo di una condizione umana e sociale non più sostenibile.

3 CONCLUSION

Argomento incontestabile di speculazione, e unico affare per gli specialisti, l'atto di costruire la città non implica mai i primi soggetti: i suoi abitanti. Quelli a cui l'habitat è destinato sono esclusi dal processo che lo genera. Passivi, subiscono il loro alloggio come una fatalità. Partendo da questa constatazione allarmante sono in atto diversi studi per reinventare la produzione e la gestione dell'habitat sociale, una nuova riflessione sull'azzeramento di una gran parte delle norme e delle abitudini che frenano oggi una crescita sostenibile della città. Riattualizzare le norme e i metodi per renderle compatibili con la società e con l'ambiente è diventato ormai un obiettivo prioritario. Coinvolgere l'abitante nella realizzazione e nella gestione del suo luogo di vita significa ridefinire lo spazio abitativo e nello stesso tempo reinventare lo spazio pubblico. L'habitat e la sua costruzione possono ridiventare la matrice di un nuovo civismo, di un nuovo esercizio della democrazia. Si tratta di reinventare la responsabilità collettiva grazie alla costruzione dell'habitat e di riconsiderare una maniera superata e improduttica di generale gli spazi in cui l'uomo vive.

4 REFERENCES

Renato Rizzo, "Intervento al Convegno Europeo Autocostruzione e autorecupero. Forme e politiche di un nuovo servizio pubblico per l'alloggio sociale", Roma 2007.
Yann Maury, "Intervento al Convegno Europeo Autocostruzione e autorecupero. Forme e politiche di un nuovo servizio pubblico per l'alloggio sociale", Roma 2007.
Alessandra Ruggero , Esperienze di cittadinanza comune: l'autorecupero, in: Paper for the Espanet Conference "Innovare il welfare. Percorsi di trasformazione in Italia e in Europa", Milano 2011.
Construire ensemble le Grand Ensemble, in : http://www.legrandensemble.com/pages/Construire_cest_habiter-1729687.html
P.L. Crosta, Pratiche. Il territorio "è l'uso che se ne fa", Franco Angeli, Milano 2010.

Objektorientierte Landbedeckungsklassifikation von Graz (Österreich) unter besonderer Berücksichtigung der dritten Dimension

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1 ABSTRACT

Der Beitrag beschäftigt sich mit der Erstellung von Landbedeckungsklassifikationen aus sehr hochauflösenden, digitalen ULTRACAM Luftbilddaten aus den Jahren 2007 und 2011 für das Stadtgebiet von Graz (Österreich). Am Beginn dieser Arbeit steht ein Überblick über die in der Literatur dokumentierten Forschungsarbeiten, welche sich mit thematisch ähnlichen Fragstellungen, oder ähnlichem Datenmaterial beschäftigen. Danach werden die verwendeten Datengrundlagen, die Datenvorverarbeitung, sowie das Untersuchungsgebiet kurz beschrieben. Der zentrale Teil der Arbeit dokumentiert die praktische Umsetzung der Landbedeckungsklassifikation von Graz in unterschiedlichen Ausarbeitungsstufen und zu zwei unterschiedlichen Befliegungsterminen (2007 und 2011). Zentraler Teil der vorgestellten Projektarbeit ist die Erstellung der Regelsätze der objektbasierten Klassifikation und der Umgang mit datenbezogenen Problemen wie etwa der abgeschatteten Bildareale in den Bilddaten von 2007. Die Legende bzw. die Landbedeckungsklassen wurden in Zusammenarbeit mit der Abteilung für Grünraum und Gewässer der Stadt Graz und dem Referat für Photogrammetrie des Vermessungsamtes Graz erarbeitet. Ziel war es hier, Planungsgrundlagen für die Stadtplanung und Stadtentwicklung bzw. für die Abteilung für Grünraum und Gewässer der Stadtverwaltung Graz zu generieren. Anhand von Testgebieten, die die unterschiedlichen Stadtstrukturen repräsentieren, wurden die Regelwerke entwickelt und getestet. Ferner wurden die Klassifikationsergebnisse unter Einbindung der jeweiligen Höhenmodelle (LiDAR und Photogrammetrie) miteinander verglichen. Das Ziel dieses Arbeitsschrittes war es, ein möglichst repräsentatives Regelwerk für die gesamte Stadt Graz zu entwickeln. Die generierten Regelwerke wurden in einem weiteren Schritt für das gesamte Stadtgebiet von Graz an den Luftbilddaten von 2007 umgesetzt und anschließend evaluiert. Es zeigte sich, dass für eine flächenhafte Umsetzung nur geringe Adaptierungen notwendig waren. Durch die in dieser Arbeit untersuchte Möglichkeit der Höhenabstufung der Vegetation allgemein und im Speziellen der Waldklasse wird u.a. eine neue Betrachtungsweise der Waldgebiete der Stadt Graz ermöglicht. Besonders durch die Repräsentation von annähernden Einzelbaumsegmenten ist diese Darstellung als sehr realitätsnahe zu bezeichnen. Dieser Themenbereich wurde im Rahmen dieser Arbeit auch mit separaten Einzelkarten dargestellt, um die Interpretierbarkeit zu erhöhen. Im letzten Teil der Arbeiten wurde das Gesamtregelwerk auf die Luftbilddaten 2011 angewandt. Durch den unterschiedlichen Aufnahmezeitpunkt (September und Juni) bzw. durch die unterschiedliche geometrische und radiometrische Auflösung der Daten ergaben sich neue Herausforderungen für die Klassifikation. Schließlich zielt das Gesamtprojekt auf die Entwicklung einer allgemein gültigen Auswertemethodik für zukünftige Befliegungsprojekte der Stadtvermessung Graz hin, um den Auswerteaufwand (Adaptierung der Regelwerke) möglichst niedrig zu halten und zu automatisieren. Den Abschluss der Arbeit bilden eine generelle Ergebnisdiskussion der erhaltenen Resultate, sowie ein Ausblick über weitere Analyse- und Verwendungsmöglichkeiten der gesammelten Erkenntnisse und eine Beschreibung der zur Anwendung gebrachten „best of" Methode.

2 EINLEITUNG UND PROBLEMSTELLUNG

Für unterschiedlichste Aufgabenszenarien der Stadtplanung im Bereich der fernerkundungsgestützten Analyse stehen eine Vielzahl an Sensoren und Aufnahmeplattformen zur Verfügung. Die stetige Entwicklung von neuen Sensoren und der damit verbundenen Steigerung der geometrischen, spektralen, radiometrischen und multitemporalen Auflösungsqualität erfordern im Laufe der Zeit auch die Entwicklung neuer Analysemethoden (WENG 2012, PATINO and DUQUE 2013). Die kombinierte Nutzung von Höheninformation und optischen Daten stellt auch bei der Generierung von Landbedeckungsklassifikationen eine praktikable Herangehensweise dar. Durch die fortschreitende Steigerung der Verfügbarkeit von sehr hochauflösenden und multispektralen Daten, wie auch von LiDAR Daten, ist ein Trend in Richtung dieser Kombination durchaus feststellbar.

Die Fragestellung dieser Arbeit lautet, in wie weit die Integration von Höheninformation in den Vorgang der objektbasierten Klassifizierung zu einer Verbesserung der Genauigkeit führt und ob durch diese zusätzliche Informationsquelle auch weitere neue Klassen über s.g. Höhenfeatures stabil abgeleitet werden können. Die Hypothese besteht darin, hochauflösende ULTRACAM Bilder mit zweierlei Höheninformation zu fusionieren, um so neue Informationen und Klassen zu generieren. Erreicht werden sollen hochgenaue Klassifikationsergebnisse bzw. Klassen unter Einbindung der Höheninformation. Außerdem soll die Auswirkung der Einbindung verschiedener Höheninformationsquellen auf die Klassifikation qualitativ beschrieben werden. Ebenfalls ein Ziel dieser Arbeit ist die Erstellung von Regelsätzen an nur drei Testgebieten innerhalb der Stadt Graz, die dann für das gesamte Stadtgebiet angewandt werden sollen. Darauf aufbauend zielt das Projekt auf eine umfassende, wiederholbare „Best of" Methodik für eine Landbedeckungsklassifikation des Grazer Stadtgebietes ab. Die Ergebnisse werden von verschiedenen Ämtern des Magistrats Graz in ihre Planungsprozesse eingebunden.

Die hier vorgestellten Arbeiten sind Teil eines langfristigen Kooperationsprojektes (seit 2004) mit der Stadt Graz bzw. dem Amt der Steiermärkischen Landesregierung, bei dem Fragen des Stadtklimas bzw. der Stadtentwicklung laufend behandelt werden (LAZAR und PODESSER 2009, SULZER und KERN 2008 und 2009, SULZER et.al 2009).

3   DIE KOMBINATION VON LIDAR DATEN MIT OPTISCHEN FERNERKUNDUNGSBILD-DATEN

Die Erfassung von flächendeckenden LiDAR Daten wird von vielen regionalen und überregionalen Verwaltungsorganen durchgeführt. Die so erstellten hochauflösenden Höhenmodelle der LiDAR Befliegungen werden mit optischen Fernerkundungsbilddaten (flugzeug- und satellitengestützt) kombiniert und für unterschiedlichste Fragestellungen analysiert.

Eine in der Literatur sehr häufig dokumentierte Kombination von LiDAR mit optischen Daten ist jene der Ableitung von forstlichen Parametern. Besondere Beachtung wird dabei auf die Klassifizierung von verschiedenen Baumspezies auf Einzelbaumniveau geschenkt. Diese Anwendungen basieren häufig auf der Nutzung von hochauflösenden Luftbildkameras oder Zeilenscanner in Verbindung mit Digitalen Oberflächenmodellen (DOM's) (HIRSCHMUGL et al. 2007, WASER et al. 2010, CHEN et al. 2008, HALL et. al 2011). Die Verbindung von optischen Bilddaten mit 3D Daten erzielt in der Regel bessere Ergebnisse, als Anwendungen, welche eine solitäre Datenquelle verwenden (WASER et al. 2010, RAFIEYAN et al. 2009). Die Detektion von Einzelbäumen ist ein sehr komplexer Sachverhalt. Die Klassifikation verschiedener Spezies kann auf der Basis der Intensität der LiDAR Punkte (ORKA et al. 2007), mit Hilfe von Trainingsgebieten (RAFIEYAN et al. 2009) oder mit der statistischen Analyse der LiDAR Punktwolke (HOLLAUS et. al 2009, HÖFLE et al. 2012) selbst durchgeführt werden.

Ein weiteres Themenfeld, welches durch die Kombination von optischen Bilddaten mit 3D Daten bearbeitet werden kann, ist die Charakterisierung von Dachflächen. Diese, zur urbanen Fernerkundung zählende Anwendung, nutzt meist Hyperspektraldaten, um einen möglichst großen Teil des elektromagnetischen Spektrums zu nutzen. Unterschiedliche Dachmaterialien besitzen charakteristische Reflexionseigenschaften in bestimmten Bereichen des Spektrums und benötigen daher für derartige Analysen, Systeme mit einer enorm hohen spektralen Auflösung. Die LiDAR Daten ermöglichen in erster Linie eine geometrische Einteilung in unterschiedliche Dachtypen (LEMP und WEIDNER 2005). Eine der Hauptaufgaben liegt in der Auswahl der entsprechenden Kanäle, welche das zu klassifizierende Material bestmöglich charakterisieren. Am Beispiel des AVIRIS (Airborne Visible/Infrared Imaging Spektrometer) Systems, welches über 224 Kanäle verfügt (AVIRIS Homepage 2011), wird klar, dass das Vorhandensein von spektralen Kurven der Materialien für eine detaillierte Analyse notwendig ist. Aufgrund der hohen Veränderungsrate in urbanen Gebieten sind zudem Informationen über die Gebäudestruktur von zunehmendem Interesse (ALEXANDER et al. 2009, HEIDENA et al. 2012). Anwendungen, die solche Datengrundlagen benötigen, sind unter anderem Städteplanung und Städtedesign, Niederschlagsabflussmodellierungen, Telekommunikationsuntersuchungen, Lärmsimulationen, Mikro-klimauntersuchungen (ZHOU et al. 2009). Für die Durchführung solcher Analysen gehören die Derivate von Digitalen Oberflächenmodellen (DOM's), wie zum Beispiel die Gebäudehöhe, die Dachneigung sowie die Ausrichtung des Gebäudes (ALEXANDER et al. 2009, ZHOU and NEUMANN 2012). In diesem Zusammenhang muss auch die Erstellung von Solarkataster angeführt werden, bei der aus LiDAR bzw. aus

photogrammetrischen Oberflächenmodellen die Neigung sowie die Ausrichtungen der Dächer berechnet werden. Kombiniert mit der Modellierung des Sonnenverlaufes können so Klassen erstellt werden, welche die Effizienz von Dachflächen hinsichtlich ihrer Nutzung für Solarkollektoren beschreiben. Das Magistrat Graz hat in den letzten Jahren einen solchen Kataster erstellt (http://www.geoportal.graz.at/cms/ziel/4515589/DE/).

Auf eine korrekte Trennung und richtige Verwendung der Begriffe Landbedeckung und Landnutzung sollte vor allem bei der Zusammenarbeit mit Kunden und Projektpartner geachtet werden. Bei Projektpartnern, die in die Thematik der Fernerkundung und Geoinformatik nicht tief eingearbeitet sind, kann es oft und leicht zu Verwechslungen kommen. Dass diese Trennung innerhalb von Projekten nicht so leicht realisierbar ist, zeigt das Beispiel von Ackerflächen bzw. landwirtschaftlich genutzten Flächen. Denn stringent betrachtet dürfte diese Klasse eigentlich nicht existieren, da im Sinne einer Landbedeckungsklassifikation die potenziellen Flächen normalerweise entweder der Klasse „Grünfläche" oder der Klasse „Offener Boden" zugeordnet werden müsste. Trotzdem erscheinen Klassen wie zum Beispiel „Äcker" oder „landwirtschaftlich genutzte Flächen", in vielen Projekten bzw. in Forschungsberichten. Allgemein können Landbedeckungs-klassifikationen auf verschiedene Art und Weise erstellt werden:

- Pixelbasierte, solitäre Sensornutzung: Pixelbasierte Klassifikation des Datenbestandes, welche nur aus einem Fernerkundungssensor z.B. LANDSAT TM besteht.

- Pixelbasierte, integrative Datennutzung: Pixelbasierte Klassifikation des Datenbestandes, welche neben dem Primärsensor noch weitere Informationen wie z.B. die Exposition, die Hangneigung, oder die Geländehöhe nutzt.

- Objektbasierte, solitäre Sensornutzung: Objektbasierte Klassifikation des Datenbestandes, welche nur aus einem Fernerkundungssensor z.B. LANDSAT TM besteht.

- Objektbasierte, integrative Datennutzung: Objektbasierte Klassifikation des Datenbestandes, welche neben dem Primärsensor noch weitere Informationen wie z.B. die Exposition, die Hangneigung, oder die Geländehöhe nutzt (MUICK 2011).

In Anbetracht des thematischen Hintergrundes dieser Arbeit wird der Fokus nur auf die objektbasierte, integrative Datennutzung gerichtet. Ähnlich wie in den zuvor beschriebenen Ansätzen ist die kombinierte Nutzung von Höheninformation und optischen Bilddaten auch bei der Generierung von Landbedeckungsklassifikationen eine praktikable Herangehensweise.

Im Besonderen ist die Kombination von LiDAR Datensätzen mit QUICKBIRD oder IKONOS Daten ein in der Literatur weit verbreiteter Ansatz (ARROYO et al. 2009, CHEN et al. 2008, WUEST and ZHANG 2008, KE et. al 2010). Durch die fortschreitende Steigerung der Verfügbarkeit von sehr hochauflösenden multispektralen Daten, wie auch von LiDAR Daten, ist ein Trend in Richtung dieser Kombination durchaus feststellbar. Eine Vielzahl von jüngeren Anwendungen wurde mit einer objektbasierten Methode umgesetzt. Zum einen haben Vergleiche bewiesen, dass objektorientierte Ansätze besser geeignet sind, sehr hochauflösende Daten zu verarbeiten (ZHOU and TROY 2008), zum anderen ist die Integration von zusätzlichen Datenquellen und dem Expertenwissen des Bearbeiters deutlich einfacher.

4 DAS FALLBEISPIEL GRAZ

4.1 Das Untersuchungsgebiet

Das Untersuchungsgebiet der vorliegenden Arbeit ist im Wesentlichen begrenzt durch die Stadt Graz (ca. 128km2). Die steirische Landeshauptstadt Graz ist mit rund 270.000 Einwohnern die zweitgrößte Stadt von Österreich und liegt im nördlichen Teil des Grazer Feldes auf einer Seehöhe von 351m (Grazer Hauptplatz) und wird im Norden und Westen der Stadt vom Steirischen Randgebirge umschlossen (Fig. 1). Die höchste Erhebung der Stadt befindet sich hier mit 763m im Westen der Stadt auf dem Plabutsch mit steil abfallenden Hängen. Der Osten ist geprägt von hügeligen Ausläufern des Oststeirischen Riedellandes mit seinen lang gezogenen, sanften Hügeln und Rücken und zerschnittenen Tälern. Ein weiteres charakteristisches Merkmal ist das markante Durchbruchstal der Mur bei Weinzödl im Nordwesten der Stadt. Im Zentrum der Stadt bildet der Schlossberg mit 474m Seehöhe eine wichtige Landmarke, in Richtung Süden weitet sich das Grazer Feld.

Die Testgebiete sind räumlich so verteilt, dass alle Landnutzungsklassen der Stadt Graz bestmöglich erfasst werden bzw. repräsentative Regelsätze erstellt werden können. Im Bezirk Innere Stadt liegt Testgebiet (1), welches den urbanen, innerstädtischen Charakter repräsentiert. Testgebiet (2) liegt im Bezirk Mariatrost und stellt die Übergangszone zwischen der dicht verbauten Innenstadt zum lockerer verbauten Gebiet (hoher Grünflächenanteil mit geschlossenen Waldflächen) dar. Testgebiet (3), das sich den Bezirken Liebenau und Puntigam befindet, spiegelt den locker verbauten Typus wider, jedoch im Gegensatz zu Testgebiet (2) in Mariatrost, sind hier auch großflächige landwirtschaftliche Flächen eingestreut.
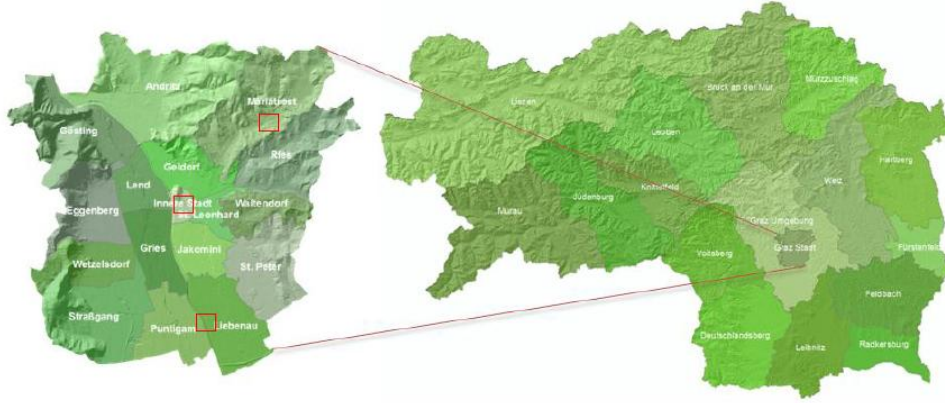
Fig. 1: Die Lage des Untersuchungsgebietes innerhalb der Steiermark (Österreich), die Bezirke der Stadt Graz und die Lage der Testgebiete (MUICK 2011)

4.2 Datengrundlagen

Die zentrale Datenbasis für die Landbedeckungsklassifikation besteht aus zwei ULTRACAM-X (SCHNEIDER und GRUBER 2008, GRUBER et. al 2009) Befliegungen (B, G, R und NIR) vom September 2007 (8 Bit) und Juni 2011 (16 Bit) mit einer (heruntergerechneten) geometrischen Auflösung von 25cm (die Originalbilddaten von 2011 besitzen 7cm Auflösung). Aus diesen Befliegungen wurden True Orthofotos sowie Digitale Oberflächenmodelle erstellt (BISCHOF 2011) und vom Magistrat Graz (Referat für Photogrammetrie des Vermessungsamtes) bereitgestellt. Ebenso kamen LiDAR Daten von 2009 im originalen „las Format" zum Einsatz. Die LiDAR Daten wurden vom Amt der Steiermärkischen Landesregierung in einer Auflösung von 0,25 Metern zur Verfügung gestellt.

Bei der Datenvorverarbeitung für die drei Testgebiete wurden aus den LAS Files die Layer Intensität, Returnnumber und ein DOM abgeleitet. Ferner wurde der NDVI aus den ULTRACAM Daten berechnet und auch NDSM's (LiDAR und ULTRACAM) wurden berechnet. Für die Anwendung auf das gesamte Stadtgebiet von Graz war es auf Grund der softwareseitigen Einschränkungen notwendig, einzelne Teilblöcke für die Klassifikationsberechnung zu erstellen.
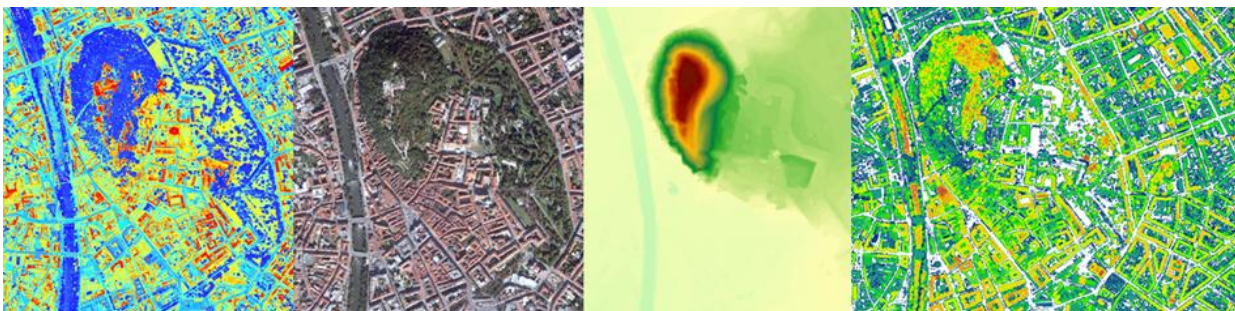
Fig. 2: Die Datengrundlagen: INTENSITÄTSBILD (LiDAR) – ULTRACAM – DGM – NDSM (von links nach rechts).

4.3 Methodik

Für die Umsetzung der Landbedeckungsklassifikation wurde ein objektbasierter Klassifikationsansatz gewählt. Wie im vorigen Kapitel erwähnt, sind gerade objektbasierte Ansätze bei sehr hochauflösenden Daten und der Integration komplexen Datenstrukturen im Vorteil (ZHOU et al. 2008, BLASCHKE et. al 2008, BLASCHKE 2010). Die Erstellung der Legende (Fig. 3) erfolgte in enger Zusammenarbeit mit der Abteilung für Grünraum und Gewässer der Stadt Graz und dem Referat für Photogrammetrie des Vermessungsamtes Graz, um so eine optimale Folgenutzung der Ergebnisse zu gewährleisten.

Legende: Grünflächen, versiegelte Flächen, Laub- und Nadelbäume, Strauchschicht, Gebäude, Gewässer, Sportanlagen und landwirtschaftliche Nutzflächen. Die Erstellung der Regelsätze basierte auf drei repräsentativen Testgebieten, welche über sämtliche städtische Nutzungscharakteristika verfügten. Für die erste Segmentierung kam eine Multiresolution Segmentierung zum Einsatz. An dieser Stelle sei erwähnt, dass die durch direkte Einbindung des NDVI bereits in der Segmentierungsphase zusammen mit der spektralen Information und dem photogrammetrischen ULTRACAM NDSM gute Ergebnisse erzielt werden konnten.
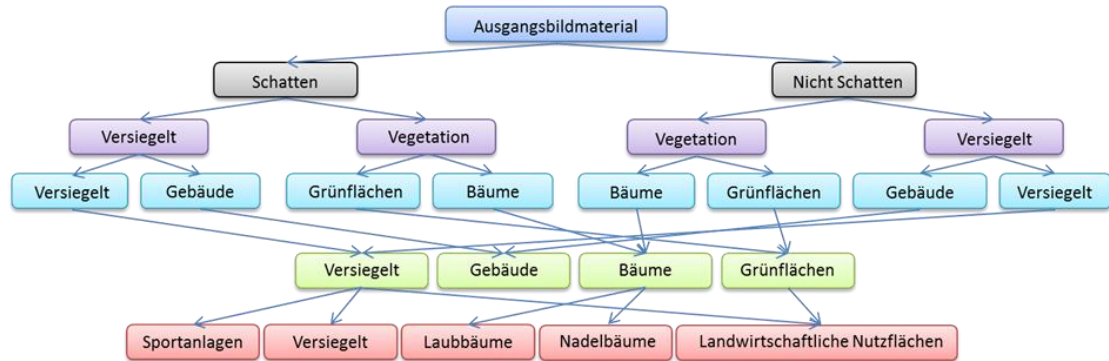
Fig. 3: Prozessierungskette für die Klassifizierung der ULTRACAM Daten (MUICK 2011).

Ein großes Problemfeld stellen abgeschattete Flächen in urbanen Gebieten dar. Gerade in Altstadtkernen mit sehr engen Gassen und Innenhöfen sind Schatten meist durch Gebäude induziert. In den Übergangszonen vom städtischen zum ländlichen Verbauungstyp ist anteilig auch der Schattenwurf von mittlerer bis hoher Vegetation nicht zu unterschätzen. Eine besondere Herausforderung stellen aber die Innenhöfe dar, welche in einigen Fällen sogar komplett abgeschattet sind. Diese totale Abschattung kann auch durch moderne Verfahren der digitalen Bildverarbeitung und durch den Einsatz von höher radiometrisch auflösenden ULTRACAM Daten (2011 mit 16bit, reel mit 12bit) nicht zur Gänze kompensiert werden. Natürlich lassen sich Schattenbereiche aufhellen oder anpassen. Der Grad dieser Anpassung ist aber sehr stark vom Datenmaterial selbst abhängig. In den ULTRACAM Daten von 2007 (8bit) nehmen Schattenflächen einen Flächenanteil von ca. 30 % ein. Bei der Klassifikation von abgeschatteten Bereichen kommt es verstärkt zu Fehlzuweisungen. Die ausgewählte Methodik zielt darauf ab, zuerst die Schattenflächen anhand ihrer „Brightness" innerhalb eines hierarchischen Algorithmus zu klassifizieren. Durch diese Vorgangsweise eröffnet sich die Möglichkeit, differenzierte Klassifikationsalgorithmen einzusetzen. Im Anschluss wurden die jeweiligen Schatten- und Nichtschattenklassen wieder zusammengeführt, um die klassifizierten Features wie z.B. Gebäude anhand ihrer Proportionen (aera, lenght to with, rel. border usw.) noch besser zuweisen zu können. Diese Methodik wurde bereits von ZHOU et al. (2009) im Vergleich mit zwei weiters angeführten Schattenkorrekturmethoden erprobt und lieferte sehr gute Ergebnisse.

Bei der Erstellung der Regelsätze wurden auch auf die sensorgeometrischen Eigenschaften des Datensatzes Rücksicht genommen. Die LiDAR Daten waren insbesonders in stark abgeschatteten Bereichen eingebunden, in denen eine Klassenzuweisung nur basierend auf 8bit ULTRACAM Daten (2007) zu große Fehler produziert hatte. Hier bot der Einsatz der „Intensität" eine wertvolle zusätzliche Entscheidungshilfe. Die Detektion von Einzelbäumen stellt eine komplexe Herausforderung bei der Klassifikation dar. Die Lösung zielt darauf ab, zuerst potenzielle Baumspitzen (seeds) zu finden, aus welchen dann Segmente wachsen sollen (CHEN et al. 2008, HIRSCHMUGL et al. 2007). Für das Auffinden der seeds werden meist „lokale Maximum Filterverfahren" verwendet. Die Erfolgsquote hängt zum einen von den Filterparametern ab und zum anderen auch von der Kronendachstruktur, dem Abstand der Bäume und vom Datenmaterial. Diese Herangehensweise wurde im Rahmen dieser Arbeit leicht adaptiert durchgeführt. Der erste Schritt lag in der Detektion von Schattenflächen innerhalb der Waldklasse. So konnte für die abgeschatteten Bereiche das LiDAR NDSM zum Einsatz kommen. Das Auffinden der lokalen Maxima wurde zweistufig durchgeführt. Nach einer Reihe von verschiedenen Parametertests des Maximum Filters wurden nun die Basis seeds klassifiziert. Darauf aufbauend erfolgte eine Plausibilitätsprüfung der Maxima anhand ihrer Distanz zueinander und zu anderen Klassen. Dadurch konnte die Qualität der seeds weiter verbessert werden. Grundsätzlich ist an dieser Stelle festzuhalten, dass besonders geschlossene Kronendächer in Laubwäldern, aufgrund ihrer im Vergleich zu Nadelwäldern eher ebenmäßiger Oberflächenbeschaffenheit, Probleme beim

Auffinden der lokalen Maxima bereiten. Da eine Ableitung forstlicher Parameter von Einzelbäumen nicht das Ziel dieser Arbeit darstellte, sondern eine möglichst realitätsnahe Darstellung von Laub- und Nadelwäldern sowie eine Einteilung der Waldklasse in Höhenstufen, ist der verwendete Ansatz als äußerst erfolgreich zu bewerten. Die Aufteilung der Waldklasse erfolgte mehrstufig. Dabei kamen Werte des NIR, der Intensität und Formparameter zum Einsatz. Lediglich für sehr stark abgeschattete Waldgebiete konnte auf Grund der fehlenden spektralen Informationen keine weitere Aufteilung der Waldklasse erfolgen.

Die Kombination der spektralen Informationen mit Ratiobildungen wie dem NDVI sowie der Einsatz von Höheninformation und Intensitätswerten ermöglichte eine Entwicklung dreier sehr gut angepasster Regelsätze. Für die Anwendung auf das gesamte Stadtgebiet ist natürlich eine Fusionierung und Adaption der Regelsätze notwendig. Im Rahmen dieser Fusionierung wurde deutlich, dass der Regelsatz des urbanen Testgebiets den mit Abstand geringsten Einfluss auf das resultierende Regelwerk hatte. Auf dieser Basis wurden sämtliche Bildblöcke prozessiert, einer minimalen manuellen Korrektur unterzogen und im Anschluss mosaikiert.

Fig. 4: Das unterschiedliche Auftreten von Schatten 2007 (links) und 2011 (rechts).

Für die Erstellung der Landbedeckungsklassifikation 2011 konnten bereits einige Erfahrungswerte der Klassifizierung der 2007er Daten in der Datenaufnahme umgesetzt werden. So wurden die ULTRACAM Daten mit 16 bit an das Referat für Photogrammetrie des Vermessungsamtes Graz geliefert, und auch der Befliegungszeitpunkt wurde auf Juni verschoben. Daraus resultierten im Besonderen zwei Vorteile: Die nun kleineren Schattenflächen (Fig. 4) konnten ohne die zusätzlich Nutzung der Intensitätswerte sehr gut klassifiziert werden und auch die spektralen Unterschiede innerhalb der Waldklassen wurden so deutlich gesteigert, sodass hier auf die Einbindung von Zusatzinformation verzichtet werden konnte. Auf Grund der Steigerung der radiometrischen Auflösung auf 16 bit und der damit einhergehende Verzicht auf die Nutzung der Intensität und des LiDAR NDSM's mussten einige Teilbereiche des Regelwerkes abgeändert werden. Von diesen Änderungen waren vorrangig sämtliche Schwellwerte der Schatten- und die Baumklassifikation betroffen.

5 ERGEBNISDISKUSSION UND AUSBLICK

Die Ergebnisse der vorliegenden Arbeit zeigen deutlich, dass die Erstellung von Regelsätzen für die Klassifikation des gesamten Stadtgebietes (Fig. 5) anhand repräsentativer Testgebiete möglich ist (Fig. 6 und Fig. 7). Diese Einschätzung basiert auf den Ergebnissen von qualitativen und quantitativen Genauigkeitsuntersuchungen. Für die quantitative Abschätzung der Ergebnisse kam für beide Zeitpunkte eine Fehlermatrix zum Einsatz. Diese ergaben eine Gesamtgenauigkeit von 92,3 % für das Klassifikationsergebnis 2007 und 94,0 % für 2011. Die höchste Fehleranfälligkeit wiesen die Klassen Nadelbäume und Laubbäume auf, welche bei beiden Zeitpunkten eine Genauigkeit um 84 – 87 % erreichten. Damit liegt das Ergebnis quantitativ im Vergleich mit CHEN et al. 2008 oder ARROYO et al. 2009 auf einem sehr ähnlichen Niveau. Dennoch ist ein quantitativer Vergleich auf Grund der unterschiedlichen Datengrundlagen als wenig sinnvoll zu bezeichnen. Ein qualitatives Indiz, welches sich auch auf der quantitativen Ebene wiederspiegelt, ist der geringere Anteil der Schattenflächen in den Daten von 2011. Durch den vier Monate früheren Befliegungszeitpunkt konnte der Anteil der Schattenflächen in etwa halbiert werden (ca. 15 % statt 30 %, Fig.4). Aufgrund der Reduktion der Anzahl der Inputlayer und die Weiterentwicklung der verwendeten Software war es darüber hinaus möglich, die Schattenflächen 2011 noch feiner zu segmentieren als dies 2007 möglich war. Diese Methodik der separaten, feineren Segmentierung von Problemstellen wurde ebenfalls für die Klasse der Gebäude verwendet. Diese Herangehensweise ermöglichte eine nochmalige Verbesserung des Klassifikationsergebnisses. Im Vergleich der NDSM's,

welche aus LiDAR Daten bzw. photogrammetrisch abgeleitet wurden, lässt sich festhalten, dass der Einsatz von photogrammetrischen NDSM's deutlich bessere Ergebnisse liefert. Dies lässt sich durch die unterschiedliche geometrische Auflösung der LiDAR Höheninformation zu den ULTRACAM Daten erklären. Denn im Besonderen die Lagerichtigkeit der Höheninformation hat entscheidenden Einfluss auf die Güte eines auf objektbasiertem Wege erstellten Klassifikationsergebnisses. Speziell bei der Klassifikation von Gebäuden tritt diese Bedingung zu Tage. Dies liegt vor allem in den Formparametern der Gebäude begründet, welche sich in urbaner Umgebung durch lange scharf abgegrenzte Kannten äußern.
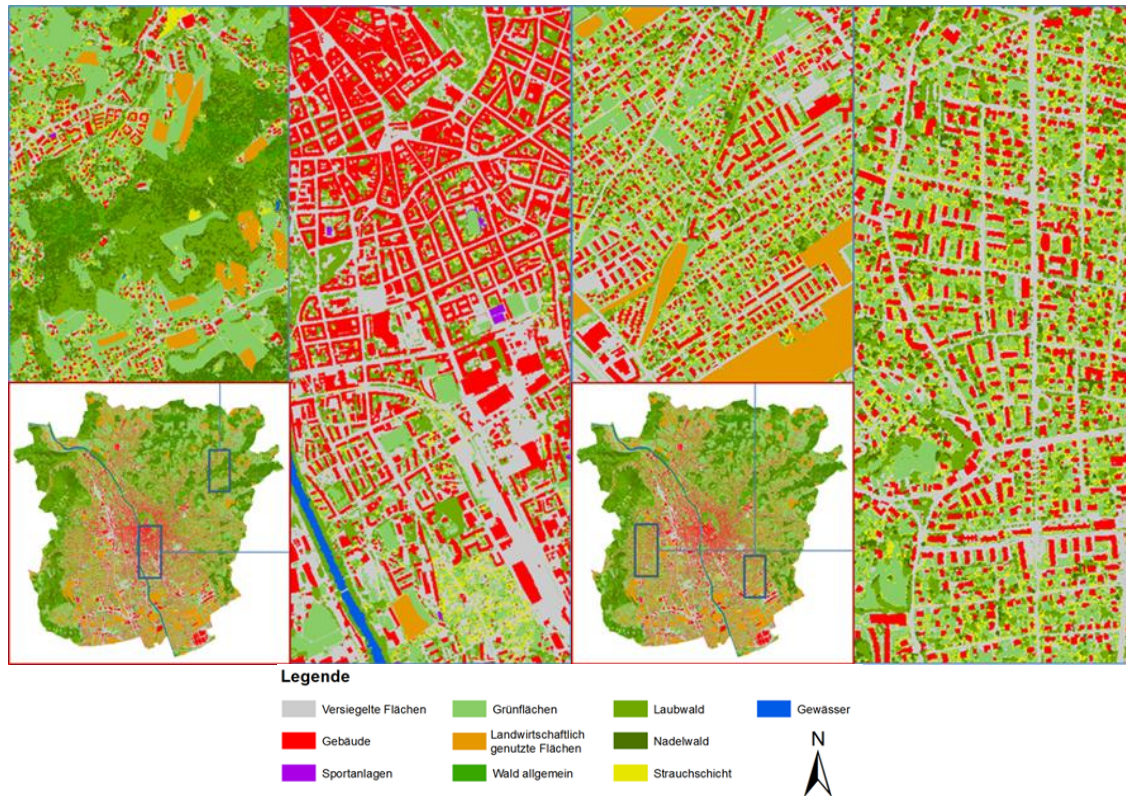
Fig.5: Die Ergebnisse der Landnutzungsklassifikation für das Stadtgebiet von Graz 2007 (links) und 2011 (rechts).

Die Ergebnisse dieser Arbeit verdeutlichen, dass durch die Integration von Oberflächenmodellen in den objektbasierten Klassifikationsvorgang eine Fülle von neuen Möglichkeiten entstehen. Zum einen können aufgrund der Höheninformation neue Klassen abgeleitet werden, die ohne diese zusätzliche Information nur sehr schwer oder gar nicht klassifizierbar wären. Weiters können aber auch Klassen, welche im Rahmen der Erstellung von Landbedeckungsklassifikationen bereits als Standard zu bezeichnen sind, schneller und genauer erfasst werden. Als Beispiel sei hier die Trennung von Wald- und Grünflächen angeführt. Diese werden im Normalfall über spektrale Merkmale oder Texturen klassifiziert. Mit der Nutzung der Oberflächenmodelle können diese Klassen einfach, schnell und korrekt klassifiziert werden. Die Zeitersparnis bei der Erstellung der Regelsätze durch die integrative Datennutzung ist deutlich feststellbar. Auch die Länge der Regelsätze lässt sich auf gleiche Weise reduzieren. Aber auch die Kombination der unterschiedlichen Oberflächenmodelle steigert die Qualität des Ergebnisses. Auf Grund der differenzierten Entstehungsweise der genutzten Oberflächenmodelle wurde versucht, die jeweiligen Stärken bestmöglich in den Klassifikationsvorgang einzubinden. Die größte Stärke des photogrammetrisch erzeugten Oberflächenmodelles liegt in seiner sehr guten geometrischen Übereinstimmung mit den ULTRACAM Daten, was besonders für den Vorgang der Segmentierung von Nutzen ist. Die Stärken der LiDAR Daten liegen zum einen im aktiven Aufnahmeprinzip, was sich besonders bei abgeschatteten Bildbereichen bemerkbar macht, und zum anderen in den vielen zusätzlichen Informationen, welche sich im LAS File verbergen. Dennoch ergeben sich nicht nur neue Möglichkeiten und Verbesserungen, sondern es treten bei der Nutzung der Oberflächenmodelle auch neue Schwierigkeiten bzw. Fehlerquellen auf. Die meisten Probleme resultierten aus Lagefehlern der Oberflächenmodelle.
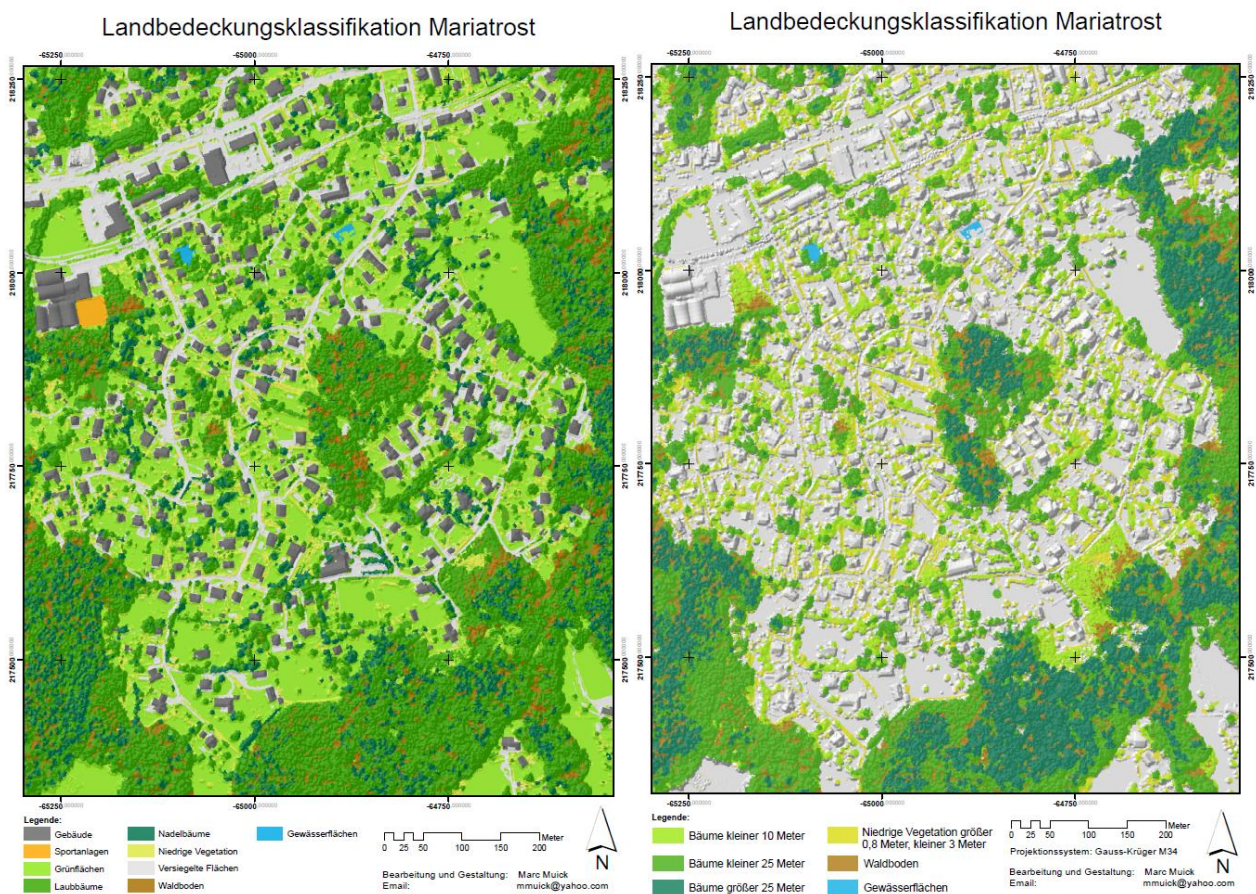
Fig.6: Die Landnutzungsklassifikation (links) und Höhenabstufung der Vegetationsstruktur (rechts) im Testgebiet Mariatrost (MUICK 2011).
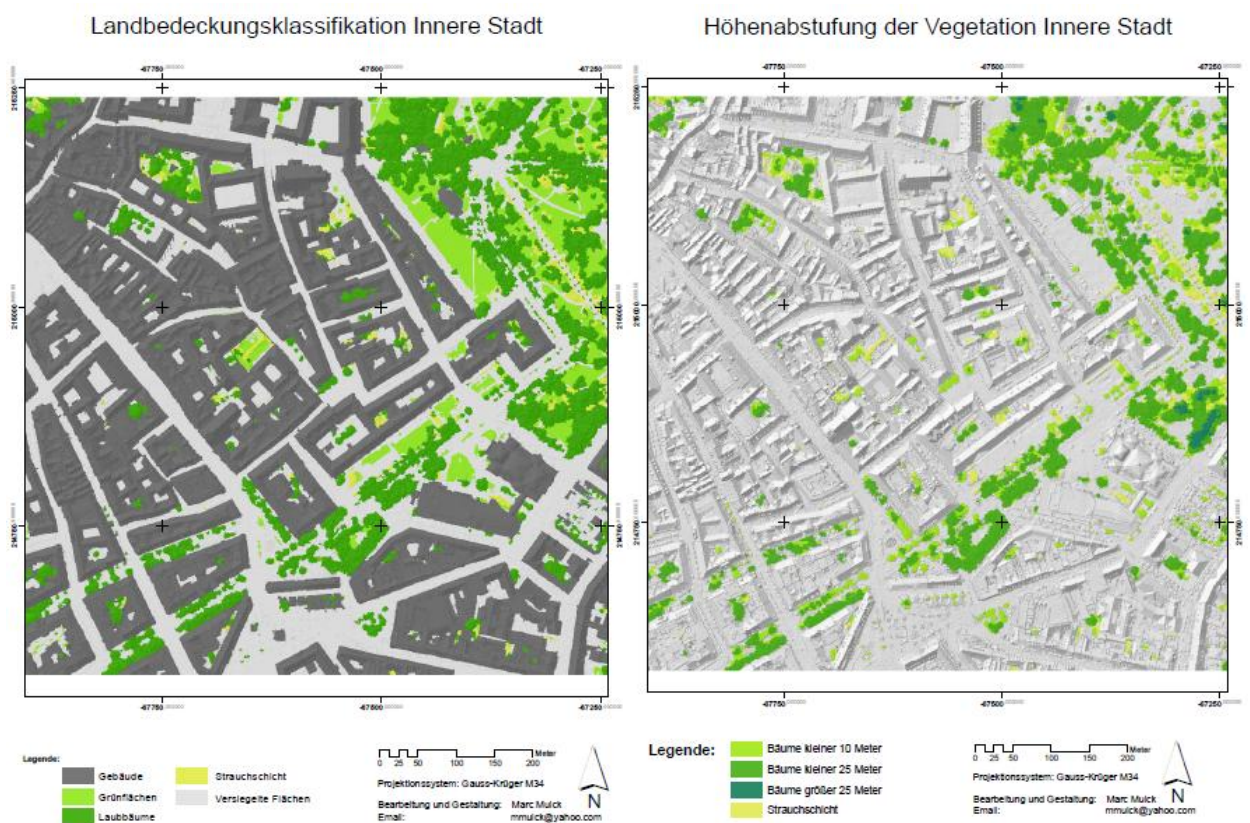
Fig.7: Die Landnutzungsklassifikation (links) und Höhenabstufung der Vegetationsstruktur (rechts) im Testgebiet Innere Stadt (MUICK 2011).

Für das Projekt LISA (Landinformationssystem für Österreich) spielen die geometrischen Vorgaben für die jeweiligen Klassen eine entscheidende Rolle. Während die MVU (minimum validation unit) jene Mindestobjektgröße spezifiziert, ab welcher die Qualitätskontrolle durchgeführt wird, wird durch die MMU (minimum mapping unit, Mindestkartiergröße) definiert, ab welcher Größe Objekte erfasst werden dürfen (WEICHSELBAUM et al. 2009; GRILLMAYER et al. 2010; STEINNOCHER et al. 2011). Da die Mindestkartierungsgröße für das LISA Projekt allgemein bei 25-50m2 liegt, ist die bei LISA angewandte Analysemethodik mit der hier vorgestellten Methodik nicht unmittelbar vergleichbar. Auch wenn für sämtliche Klassen in LISA Attributinformationen aufgenommen werden, wie zum Beispiel die Gebäudehöhe oder die durchschnittliche Höhe verholzter Flächen, so wird für Graz ein höhere räumliche Auflösung von 20-25cm angestrebt bzw. die Höheninformationen aus den photogrammetrischen Höhenmodellen bzw. aus den LiDAR Daten direkt eingebunden.

Fig. 8: Ergebnisausschnitt 2007 (links) und 2011 (rechts); grau: Landwirtschaftliche und versiegelte Flächen.

In einem Folgeprojekt werden die Datensätze der ULTRACAM Befliegungen von 2007 und 2011 mit Change Detection Verfahren für das Stadtgebiet von Graz analysiert (SALENTINIG 2012). Ziel ist es hier einerseits, verschiedene Verfahren auf ihre Güte und Anwendbarkeit zu untersuchen bzw. andererseits konkrete Bearbeitungsabläufe zu generieren, die bei zukünftigen Befliegungen angewandt werden können. Ein Ansatz bietet sich mit einem „Postklassifikationsansatz", bei dem die Ergebnisse zweier getrennt durchgeführter Klassifikationen auf Basis getrennt durchgeführter Klassifikationen der ULTRACAM Daten verglichen werden (Fig. 8). Der zweite Ansatz fokussiert alleinig auf die Erkennung von Änderungen in Ausdehnung, Nutzung und Höhe von Landnutzungsklassen.

6 REFERENCES

ALEXANDER, C., SMITH-VOYSEY, S., JARVIS, C., TANSEY, K.: Integrating building footprints and LiDAR data to classify roof structures and visualise buildings. In: Computers, Environment and Urban Systems 33 (2009), pp. 285-292, 2009.

ARROYO, L.A., JOHANSEN, K., ARMSTON, J., PHINN, S.: Integration of LiDAR and QuickBird imagery for mapping biophysical parameters and land cover types in Australian tropical savannas. In: Forest Ecology and Management, Vol.259, pp. 598-606, 2009.

BISCHOF, H.: Bildflug Graz 2007 und Forschungsbericht zum Bildflug 2007, unpublizierter Befliegungs- und Entzerrungsbericht, o.S., 2011.

BLASCHKE, T.: Object based image analysis for remote sensing. In: ISPRS Journal of Photogrammetry and Remote Sensing, Vol. 65 (2010), pp. 2-16, 2010.

BLASCHKE, T., LANG, S., HAY, G.J.: Object-Based Image Analysis – Spatial Concepts for Knowledge Driven Remote Sensing Applications, Springer Verlag, p. 817, 2008.

CHEN, Y., SU, W., LI, J., SUN, Z.: Hierarchical object oriented classification using very high resolution imagery and LiDAR data over urban areas. In: Advances in Space Research, Vol. 43, pp. 1101-1110, 2008.

GRILLMAYER, R., BANKO, G., SCHOLZ, J., PERGER, C., STEINNOCHER, K., WALLI, A., WEICHSELBAUM, J.: Land Information System Austria (LISA) – Objektorientiertes Datenmodell zur Abbildung der Landbedeckung und Landnutzung. In: STROBL, J. BLASCHKE, T. & GRIESEBNER, H. (Hrsg.): Angewandte Geoinformatik 2010 – Beiträge zum 22. AGIT-Symposium, Salzburg. Wichmann, Berlin/Offenbach, S. 616-621, 2010.

GRUBER, M., WIECHERT, A., LADSTÄDTER, R.: UltraCam – digitale Luftbildkameras für alle Fälle. In: Vermessung & Geoinformation, Issue 3, pp. 353 – 358, 2009.

HALL, F.G., BERGEN, K., BLAIR J.B., DUBAYAH, R., HOUGHTEN, R., HURTT G., KELLNDORFER, J., LEFSKY, M., RANSON, J., SAATCHI, S., SHUGART, H.H., WICKLAND, D.: Characterizing 3D vegetation structure from space: Mission requirements. In: Remote Sensing of Environment, Vol. 115, pp. 2753–2775, 2011.

HEIDENA, U., HELDENSA, W., ROESSNER, S., SEGLB, K., ESCHA, T., MUELLERA, A.: Urban structure type characterization using hyperspectral remote sensing and height information. In: Landscape and Urban Planning, Vol. 105, pp. 361– 375, 2012.

HIRSCHMUGL, M., OFNER, M., RAGGAM, J., SCHARDT, M.: Single tree detection in very high resolution remote sensing data. In: Remote Sensing of the Environment, Vol. 110, pp. 533-544, 2007.

HÖFLE, B., HOLLAUS, M., HAGENAUER, J.: Urban vegetation detection using radiometrically calibrated small-footprint full-waveform airborne LiDAR data.In: ISPRS Journal of Photogrammetry and Remote Sensing, Vol. 67, pp. 134–147, 2012.

HOLLAUS, M., MÜCKE, W., HÖFLE, B., DORIGO,W., PFEIFER, N., WAGNER, W., BAUERHANSL, C., REGNER, B.: Tree species classification based on full waveform airborne laser scanning data, Silvilaser 2009, October 14-16, 2009, College Station Texas, 2009.

KE, Y., QUACKENBUSH, L.J., IM, J.: Synergistc use of QuickBird multispectral imagery and LiDAR data for object-based forest species classification. In: Remote Sensing of the Environment, Vol. 114, pp.1141-1154, 2010.

LAZAR, R., PODESSER, A. (1999): An urban climate analysis of Graz and its significance for urban planning in the tributary valleys east of Graz (Austria). In: Atmospheric Environment, Vol. 33, pp. 4195–4209, 1999.

LEMP, D., WEIDNER, U.: Improvements of roof surface classification using hyperspectral and laser scanning data. In: Proceedings of the URBAN 2005 Workshop, Arizona, 2005.

MUICK, M.: Objektorientierte Landbedeckungsklassifikation unter besonderer Berücksichtigung der dritten Dimension Am Beispiel dreier Testgebiete innerhalb der Stadt Graz. Unveröff. Masterarbeit am Institut für Geographie und Raumforschung, Universität Graz, Graz, p.86, 2011.

ORKA, H.O., NAESSET, E., BOLLANDSAS, O.M.: Utilizing airborne laser intensity for tree species classification. In: ISPRS Workshop on Laser Scanning 2007 and SilvilLaser 2007, Espoo, September 12-14, Finland, 2007.

PATINO, J.E., DUQUE, J.C.: A review of regional science applications of satellite remote sensing in urban settings. In: Computers, Environment and Urban Systems, Vol. 37, pp. 1–17, 2013.

RAFIEYAN, O., DARVISHSEFAT, A. A., BABAII, S., MATAJI, A.: Object based classification using Ultracam-D Images for tree species discrimination (Case study: Hyrcanian Forrest Iran). In: The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, Vol. XXXVIII-4/C7, 2009.

SALENTINIG, A.: Remote sensing change detection in urban environments with very high resolution Ultracam data. Unveröff. Masterarbeit am Institut für Geographie und Raumforschung, Universität Graz, Graz, p.112, 2012.

SCHNEIDER S., GRUBER M.: Radiometric quality of Ultracam – X images. In: The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, Vol. 37, Beijing 2008, pp. 539 – 544, 2008.

STEINNOCHER K., BANKO G., WEICHSELBAUM J.: Planungsrelevante Datengrundlagen für Österreich: LISA – Land Information System Austria. In: Schrenk M., Popovich V., Zeile P. (Eds.): REAL CORP 2011. Change for Stability – Lifecycles of Cities and Regions.The role and possibilities of foresighted planning in transformation processes. Proceedings of 16th International Conference on Urban Planning, Regional Development and Information Society, pp.707-714, 2011.

SULZER, W., KERN, K.: High resolution airborne scanner data for multitemporal sealing maps of Graz – and their applicability in town planning. Remote Sensing – New Challenges of High Resolution. EARSeL Joint Workshop Bochum, March 5-7, 2008. Selbstverlag des Geographischen Instituts für Geographie der Ruhr Universität Bochum, pp. 265-274, 2008.

SULZER, W., KERN, K., EICHBERGER, St.: Urban change extraction from aerial photographs and multispectral scanner – an applied study from Graz/Austria. Remote Sensing for a Changing Europe, Proceedings of the 28th Symposium of European Association of Remote Sensing Laboratories, Istanbul, Turkey, 2-5 June 2008, pp. 551-557, 2009.

SULZER, W., KERN, K.: Derivation of multi-temporal soil sealing maps using high resolution Airborne Thematic Mapper (ATM) imagery and an examination of their usefulness in town planning. EARSeL eProceedings, Vol. 8, No. 1, pp. 1-10, 2009.

WASER, L.T., GINZLER, C., KUECHLER, M., BALTSAVIAS, E., HURNI, L.: Semi-automatic classification of tree species in different forest ecosystems by spectral and geometric values derived from Airborne Digital Sensor (ADS40) and RC30 data. In: Remote Sensing of the Environment, 2010.

WENG, Q.: Remote sensing of impervious surfaces in the urban areas: Requirements, methods, and trends. In: Remote Sensing of Environment, Vol. 117, pp. 34–49, 2012.

WEICHSELBAUM, J. BANKO, G., HOFFMANN, C., RIEDL, M., SCHARDT, M., STEINNOCHER, K., WAGNER, W., WALLI, A.: Land Information System Austria (LISA): Bedarfsgerechte Landnutzungsinformationen für die öffentliche Verwaltung. In: STROBL, J. BLASCHKE, T. & GRIESEBNER, H. (Hrsg.): Angewandte Geoinformatik 2009 – Beiträge zum 21. AGIT-Symposium, Salzburg. Wichmann, Berlin/Offenbach, S. 492-497, 2009.

WUEST, B., ZHANG, Y.: Region based segmentation of QuickBird multispectral imagery through band ratios and fuzzy comparision. In: ISPRS Journal of Photogrammetry and Remote Sensing, Vol. 64, pp. 55-64, 2008.

ZHOU, W., TROY, A.: An object-oriented approach for analysing and characterizing urban landscape at the parcel level. In: International Journal of Remote Sensing, Vol. 11, Issue 5, pp.3119-3135, 2008.

ZHOU, W., HUANG, G., TROY, A., CADENASSO, M. L.: Object based land cover classification of shaded areas in high spatial resolution imagery of urban areas: A comparison study. In: Remote Sensing of the Environment, Vol. 113, pp. 1769-1777, 2009.

ZHOU, Q.-Y., NEUMANN, U.: Complete residential urban area reconstruction from dense aerial LiDAR point clouds. Graphical Models, in press, 2012.

Open Space for Social Housing – between Social Benefit and Marketing Asset?

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1 ABSTRACT

The liberal reorientation of the Vienna governance structure in the 1990s also brought about a fundamental change in urban planning (cf. Novy et al., 2001) and in the housing policy. The involvement of private sector stakeholders caused a shift towards market considerations in the housing sector. Exploitation logics took precedence.

Ever since the 1920s, decent, affordable housing was provided in the tradition of public-funded, municipal housing schemes, owned by the city. At the outset, these traditional municipal residential buildings boasted of generous open spaces that played important social functions and were part of the supply and maintenance facilities in the buildings.

Upon reorganisation of the housing sector in Vienna, execution and planning processes were confronted with new challenges that are at the fault line between market and exploitation needs of private commercial stakeholders and quality requirements imposed by the public sector as the provider of funding. The research project 'freiWERT'[1] examined the role which open spaces play in the marketing and exploitation process of housing complexes and how a high quality of open spaces could be ensured in new housing developments.

The interdisciplinary team of landscape architecture of the Vienna University of Natural Resources and Life Sciences and urban sociology of the Vienna University of Technology analysed and evaluated the actual open space qualities of selected Viennese case studies from a design and socio-spatial perspective. These results were juxtaposed with the image generated in the course of the marketing process. Having regard to the decision-making processes in the planning and construction phases, it was possible to show the reasons for deviations and discrepancies.

The results permit us to draw the conclusion that the quality and the provision of open spaces as part of housing complexes are essential elements in the marketing of subsidised housing. However, in the further course of the process, this standing is significantly reduced by inadequate quality assurance and lacking prioritisation. The fact that open spaces in housing complexes only indirectly generate revenue is a relevant factor in the decision-making processes. Hence, measures for ensuring social and open-space related quality despite its limited ability to generate revenue have to be taken into account when carrying out construction projects and must be raised in the strategic-political debate and anchored in governance structures.

2 OPEN SPACES IN SOCIAL HOUSING PROJECTS IN VIENNA

2.1 Historical review

The exemplary social housing developments in Vienna are mostly associated with the achievements of the housing policies during the interwar period. 'Red Vienna' laid the foundations for the provision of social housing by means of a large-scale housing programme for the construction of 64,000 apartments in the period from 1919 to 1934. At that time, these major construction projects commissioned by the City also served to counteract the crisis in the construction industry (cf. Eigner, page 74 et seq.). The architecture department of the City of Vienna, the municipal construction authority, was soon not able to handle the ambitious construction programme by itself, and resorted to freelance architects (cf. Blau 1999, 147). One quarter of the buildings were planned by the city's own architects in the municipal construction authority; leading external architects were commissioned to design the remaining three quarters of the buildings (cf. Bernard 1999, 21). Numerous architects of these residential buildings were students of Otto Wagner (cf.

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[1] Licka, L., Dlabaja, C., Grimm-Pretner, D, Papst, S., Rode, P., Witthöft, G. Wück, R.: FreiWERT – Examination of the quality and value of open spaces in inner-city new building projects and presentation of innovative solutions, financed as part of the House of the Future of the Federal Ministry for Transport, Innovation and Technology, Vienna 2012.

Krippner 2004), such as Karl Ehn, the author of the most famous example, the 'Karl-Marx-Hof". They were also responsible creating the open spaces of the complexes. In many cases, green courtyards were provided. In the 'New Vienna Building Regulations', which entered into force in 1930, a minimum light incidence was prescribed for the first time for living areas; this in turn required larger open spaces (cf. Weihsmann 2004, 128 et seqq.). In the professional debate about the proper concept and structure of the housing programme, ranging from proposals for residential settlements inspired by the English garden city movement and urban multi-storey flats, priority was eventually given to so-called "superblocks", in other words, large compact urban residential structures. Frequent urban residential solutions consisted of more or less closed perimeter blocks with garden courtyards. Their design was often fairly simple, functional and made do with limited resources. Open spaces served as playgrounds, for recreational purposes and as symbols of social progress (ibid.). The execution of the construction works, and most likely the landscaping of the open spaces in particular, was carried out by the municipal garden authority (cf. Kratochwjle 1931).

The construction density was generally lower than with contemporary residential developments. The built up area of the Karl Marx Hof, for example, accounts for 31 %. 'The total surface of the garden space as such amounts to 24,187 m².' (Kratochwjle 1931, 52). The floor space ratio was 1.35 (Kleindienst 1989, 10 et seq.). According to Viennese municipal policy, the green spaces and open spaces were generally an important aspect of the infrastructure provided for inhabitants (cf. Kratochwijle 1925). Hence, also in the case of 'The establishment of municipal housing complexes [...] consideration was given to hygienic living conditions and gardening requirements or requirements of urban landscaping. In the case of new buildings, as a rule only 50 % of the site surface was built on, and the remainder was earmarked for garden spaces in courtyard form.' (Weihsmann 2002, 39). The gardens were established on naturally developed soil, without subterranean constructions.

With a few exceptions, the architects were also responsible for the basic design of the open spaces as part of the housing complex. In annual programmes, the construction programme including social infrastructure and the supply facility were drafted in cooperation with various municipal departments and politically adopted by the city council before the planning was undertaken in the various individual construction projects. The municipal planning authority was closely involved in the realisation of the projects, during the planning stage as well as a supervising authority, even though the actual planning was done by freelance architects (cf. Blau 1999, 147). Compliance with the requirements for the structure and organisation of open spaces to ensure light, air and multiple usability was monitored by the municipal construction department during the entire development process, from the first drawing through to the detailed plans (1999 Blau ibid.). Drawings including perspectives (1:200) and execution plans (1:100 to 1:1) had to be submitted with a detailed description of the design of the façades and all external and inside architectural details as well as a model (in wood or cardboard 1:360) and plans and detailed drawings of the landscape design of the entire complex (Blau 1999). The architects were also commissioned to carry out the artistic supervision of works. Much of the construction materials came from municipal businesses, and the construction companies were commissioned by the municipal planning authority as well (Blau 1999).

The gardens in the courtyards enhanced the value of the apartments overlooking the courtyards and improved conditions for supervising children from the apartment. 'Enhancing the quality of apartments overlooking the courtyard which previously were feared [due to the bad light conditions and lack of social contact — Authors' note] resulted mainly from the garden design and the creation of playgrounds for children and rest and relaxation areas for adults.' (Weihsmann 2002, 39).

A balance between the public green spaces as recreational areas and the gardens of the municipal housing complex was created in two directions: Landscape architect Fritz Kratochwjle, head of the municipal landscape authority, wrote in 1931: "No major municipal housing complex now lacks a garden, playgrounds or a paddling pool. These facilities naturally provide significant relief for public facilities, since the children of the families who live there do not need to make use of such facilities or even play on the street." (Kratochwjle 1931, 58). On the other hand, the 'large garden areas' of, e.g. the Karl Marx Hofwere accessible to the inhabitants of the surrounding settlements as well and [offered] sufficient space for rest and recreation for everyone. In addition to planting trees, flowerbeds were created as well, for perennials and summer flowers, lending the complex colour and movement.' (Kratochwjle 1931, 52).

REAL CORP

In the time when social housing was established in Vienna, the responsibility for planning, programme, execution and supervision were thus concentrated at the municipality itself and very closely linked with the socio-political programme. Furthermore, a direct interaction was established between public policy regarding green spaces and providing open spaces for housing complexes.

2.2 Reorientation of the housing policy

The housing policy of the City of Vienna underwent structural and strategic reorientation since the 1980s. The reason for this lies in a crisis of the fordist economic model, which manifested itself in Vienna in the form of an internal market-oriented system with corporatist and clientelist networks. The reorientation started already in 1982 on a national level with a deregulation of tenancy law, which led, in conjunction with other measures, to recommodification of housing. As of the 1990s, the increased presence of private-sector developers and housing companies is apparent. (cf. Novy et al: 2001, 136).

At the same time, these trends also became evident in the market for small-scale rehabilitation and new construction: As of the 1980s, a significantly increased presence of private-sector stakeholders has emerged, whose activities concentrated primarily on development projects with a strong emphasis on structural infill and rehabilitation activities. The result of these activities is apparent in the concentration of the owner structure and in the proliferation of condominium. In the case of the actually realised projects, the focus was on increasing the usable space and on increasing the rent and sales prices by creating high-quality residential and office space. In the open space, the privately used share was pushed — e.g. terraces, balconies or private gardens — as these were directly value-enhancing features (cf. Grimm-Pretner / Rode 2002).

The urban development project 'Donau City' may serve as a model for large-scale new construction projects. This example illustrates a change or reorientation of the corporatist network: The municipality no longer acted as an active stakeholder, but transferred instead the operative component to the development company, WED (Vienna development corporation for the Donau area), whose owners have clear links to the social democratic movement. The ensuing public-private partnership could be directly or indirectly controlled by the municipality and was bale operate for profit at the same time (cf. Novy et al 2001: 133). This change in paradigms — the retreat of the municipality as an active stakeholder from the construction sector (the last municipal housing complex was constructed in 2004) while strengthening at the same time private-sector institutions and networks connected to the municipality or its funds through ownership structures — seems to have taken place in the subsidised housing sector as well. The corporatist elements of the previous regime were thus developed and adapted under the auspices of a municipality acting as an entrepreneur — a process of outsourcing and privatisation while maintaining direct or indirect control through the ownership structure.

These changes in the structure of stakeholders also required changes in the urban planning department as a formalised regulatory authority. Up to that time, the public or semi-public stakeholders were the main recipients of urban development measures as well as of land destination plans and land use plans as far as the social housing sector was concerned. New governance forms had to be established in order to regulate the interaction between private and public stakeholders. The institutional setting comprises the Expert Advisory Board (reorganised in 1987 as part of the amendment of the building regulation code and endowed with new areas of responsibility), the Land Advisory Board (Grundstücksbeirat — established in 1989) as well as of the two decentralised planning institutions, the Vienna Business Agency (Wirtschaftsagentur — established in 1982 as the Vienna Business Promotion Fund, WWFF) and the Housing Fund (Wohnfonds: established in 1984 as the Vienna Land Procurement and Urban Renewal Fund — Wiener Bodenbereitstellungs- und Stadterneuerungsfonds). Its objectives are to manage the real estate assets and to organise the cooperation between the urban planning department and the private-sector real estate developers (cf. Novy et al: 2001, 138). The Land Advisory Board as well as developer competitions (since 1995 — cf. Knolll 2009) were established for quality assurance. Until 2008, regard was laid to the three columns (architecture, ecology and economy) for the purpose of evaluating the submitted projects, in which cases the open spaces as part of the housing complex mainly served ecological purposes or, in matters of maintenance, formed part of the economic considerations.In 2009, the fourth column of social sustainability introduced an open list of criteria, where barrier-free and anxiety-free design, everyday practicality, multiple use and integration options are being discussed especially in regard to open spaces as part of the housing complex. Once the Land Advisory Board or the jury of a developer competition has granted approval of a project or acknowledged its eligibility for funding, the submission to the building inspection department during the

design or submission planning (M 1:200 – M 1:100) represents the next supervisory level. In this stage, the focus is primarily on technical issues; in regard to open spaces, this means compliance with the provisions stipulated in the Building Regulations (site topography, guardrails, subterranean structures, playgrounds for small children, sealed surfaces, etc.). A final verification step only takes place after completion of the construction works, following acceptance by the building inspection department or review by the Housing Fund. At this stage, open spaces play a subordinate role.

In a study undertaken on behalf of the Housing Fund, Knoll / Moser (2009) reviewed if the plans for the open spaces of housing development projects submitted to the Land Advisory Board and acknowledged by that body as basis for funding have been implemented in fact. For 60 projects, the descriptions submitted to the Land Advisory Council were compared to the actually implemented project. 12 projects (amounting to roughly 20 %) were found to have a very high level of open space quality (cf. Knoll / Moser 2009). These projects were published on the homepage of the Housing Fund, while the assessment of the remaining 48 projects does not appear. In these cases, the requirements of the Land Advisory Board were not completely met. This may require significant action in terms of quality assurance and quality control.

In summary it can be said that the Viennese public housing policy has been a field for interaction between public and private stakeholders since the 1980s. In this period, a retreat of the public sector as an active stakeholder can be observed in the production process as well as in municipal real estate policy. This structural change is in line with the overall approach of an entrepreneurial city, which regulates the process of creating subsidised housing by means of decentralised and external institutions. This occurred against the backdrop of the interplay between exploitation-oriented interests of private sector developers and quality demands of the public sector. In this situation, the realisation of high structural density is in conflict with an adequate supply of open space. In the development of quality assurance instruments, increased attention to differentiated qualities and functions of the open space is apparent. Private sector stakeholders have also recognised the value of open spaces (for private use) in marketing their projects.

However, it remains unclear how the conflict of the built density and adequate supply of open space is to be dealt with, to which extent also open spaces for common use are to be taken into consideration in the housing projects and how open space as part of a housing complex is to take the role of a social space. The question to which extent the realised open spaces correlate to the marketing images and resident satisfaction was examined in this research project.

3   EMPIRICAL EXAMINATION OF THE ROLE OF OPEN SPACES

The selected case studies reflect the types of residential buildings currently constructed in Vienna. The integrated design and social space analysis reveals the correlations between structural and functional conditions on the one hand, and social conditions on the other. These analysis results are included in the Post Occupancy Evaluation (POE). The production processes of open spaces are illustrated in a process and policy analysis, evaluating the strategic positioning of the construction projects within the company as well as the effective public presentation of the company and the construction project. As primary data, landscape architectural surveys of the open spaces in the settlement, planning documents and meeting minutes from different phases of the planning and execution process, interviews with the commissioned landscape architects and the developer´s project managers, marketing documents of the housing developers as well as questionnaires, discussions and documented inspection visits with the residents of the apartment buildings were used.

The results of the research dimensions are brought together by representing the design-analytical and use-related evaluation of the POE as the result of the process of creating the open spaces.

4   RESULTS

In the following section, the evaluation results of two case studies examined as part of the FreiWERT project will be presented. They reflect tendencies of the contemporary practice of creating and quality of housing-related open spaces in subsidised housing in Vienna.

4.1 Housing complex on Breitenfurter Straße, 1230 Vienna

4.1.1 Brief description

The housing complex located in the southern Viennese district of Liesing was built by MIGRA GmbH,[2] Gemeinnützige Bau- und Siedlungsgesellschaft (non-profit construction and housing company) and Wiener Heim Wohnbau GmbH in the period from 2003 to 2005. The decision to purchase was taken on the basis of a schematic urban development analysis as well as a first calculation of the expected floor space by the developer, which presented binding parameters for the planners and project developers in the course of the entire project. The construction of the residential complex was funded in part through the housing subsidy WWFSG 89,[3] in part with funding obtained on the open market in cooperation between the two developers without a tender procedure.

For overall planning, a hand-drawn sketch from the acquisition phase served as a guideline, defining the built form, the achievable floor space, the integration of existing trees and the requirement for noise protection. Planning and construction meetings organised by the developer were a key element ensuring cost and quality control. In doing so, general quality and furnishing standards were defined for the open space. 45 % of the land area of 10,451 m² were built up with multi-storey buildings comprising 158 apartments and a floor space ratio of 1.5. The complex consists of four-storey buildings on the street that are integrated in the perimeter block construction style of the Breitenfurter Straße, two recessed central-core high-rise blocks with six storeys each as well as three detached rows of buildings with six storeys each at the core of the block. The rear buildings follow the concept of a 'stacked rowhouse complex' and are designed in such a way that each residential unit has its own open space for private use and the site is used optimally.

The open space is zoned into private spaces, common spaces and transitional spaces as well as with two playgrounds for children. 70 % of the open space is earmarked for common use, which are separated from the terrace gardens for private use between the rows of houses by hornbeam hedges. Prohibition signs prevent walking or playing on most parts of the lawns. The design makes do with few elements and materials. Land development facilities and the legally required infant playgrounds are functionally arranged, yet not integrated in form, position and dimension into the spatial concept. The simple landscaping concept consists of existing trees, shrubs, lawns and hedges.

Fig. 1: Function and zoning of the residential complex on Breitenfurter Straße

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[2] The Fund for the Advice and Support of Immigrants was founded by the City of Vienna and the social partners, and holds a 45 % stake in MIGRA GmbH. 25 % are held by ARWAG Holding AG, which is in this way, as well as through personal connections, closely linked to MIGRA GmbH.

[3] The Act promoting the construction of new residential buildings and rehabilitating resid̄ential buildings as well as granting residential subsidies (Vienna Residential Building Promotion and Residential Building Rehabilitation Act — WWFSG 89) governs the funding of housing and requires that the overall construction costs be reasonable, the development costs be economically feasible and that the prices for rental apartments or condominiums are reasonable (cf. WWFSG 89 in the applicable version).

4.1.2 Results of multilevel analysis

The analysis of the open spaces and social environment comes to a similar conclusion: With the exception of spaces reserved for private use, the quality of the open spaces is rated mediocre to poor. The process and policy analysis reflects a contradictory consideration of the open space in the course of the construction process.

Design of open spaces In the perception of the residents, the aesthetic composition recedes into the background, and an analysis of the design shows that not much attention was paid to it and that the design focused primarily on urban planning considerations regulated in the building code. In the planning process, the landscape design of the area played a subordinate role: No professional landscape architectural planning was commissioned, instead, this service was provided by the architect. As a result of delayed decisions in the planning process (i.a. in order to expand the built-up area in the ground floor), lack of planning content (e.g. topographic planning, insufficient information in the site foreman's plan) and lacking technical expertise, the open spaces were not developed in a clear and consistent manner. Certain decisions were not discussed and agreed in the proper planning and execution meetings, but instead directly on site with the executing contractors (e.g. layout pattern of tile flagging, detailed topographic planning). The process analysis reveals a certain disregard for the professional contribution of landscape architects, expressed in part directly in the decisions, but also by simply not dealing with specific issues. Thus the project ended up with merely a minimum standard of open spaces.

For marketing purposes, open spaces play a significant role in the presentation of the project. The slogan of 'stacked rowhouse complex' evokes the image of owning a home with a garden. Since the built-up volume (three to five storeys) and the construction type (rows of buildings) do not correspond to the image evoked, the open spaces play a key role in creating and transporting the image. Though the limited landscape architectural design and lack of prioritisation of open space contradict the part these spaces play in the marketing and exploitation process, they reflect the current market approach and need to recoup expenses, thus requiring a maximum of floor space and a reduction of costs that are not directly recoverable such as expenses for qualitative open spaces..

Open spaces for private use: The open spaces for private use are considered by residents to be of particular importance and are used for recreational purposes. In the 'stacked rowhouse complex', the private open spaces have been conceived from the outset for peaceful relaxation and recreation and are presented as such for marketing purposes.

The images generated as part of the marketing process correspond to the 'urban village' concept, furnished with various types of open spaces for private use (own gardens, loggias, roof terraces) and promising a combination of secluded private dwelling in suburbia with urban quality of life. The illustration of functional borders (chain link fencing) in the renderings give an impression of a privately-owned home with a garden. This emphasis on private open spaces as part of the marketing strategy is reflected in the project concept, but was lost during the planning and execution process and reduced in size and furnishing as part of decisions to cut costs.

Common open spaces: The quality of the open spaces for common use is rated as low by the design analysis. Undifferentiated design, a lack of meeting points and retreats, recreational facilities limited to standardized infant playgrounds as well as restrictions of use by prohibitions characterise the open spaces earmarked for common use. Most residents consider these open spaces to be mere visual effects, and active use mainly concentrates on the public recreational areas in the vicinity — Wienerberg and the Liesing brook — while use of the courtyards is very limited. The overall recreational offer in the vicinity was an important aspect already in the early stages of the project and for establishing the image for marketing purposes. Residents appreciate the existing trees on the property. The existing trees were already taken into account during the acquisition phase and integrated from the start into the project planning. In the project management, the design, furnishing and use of the open spaces for common use were inadequately reflected. Quality standards for the open spaces were rather vague. To prevent conflict, the use of common spaces has been actively reduced. In the planning phases, the decision was taken to erect a fence to separate the construction sites; the maintenance phase is characterised by prohibition signs and a lack of means of residents to participate in the decision¬making process or to make changes. Some attempts to appropriate the gardens are still visible in scarce plantings. However, they were merely tolerated if not restricted by the housing adminsitration.

The low use and acceptance rate is in conflict with the marketing strategy, which focuses on widespread use in particular of the common spaces. The renderings for marketing purposes highlight the common areas in a very prominent fashion and show many people using these facilities.

4.2 Housing complex on Troststraße, 1100 Vienna

4.2.1   Brief description

The housing complex in the Viennese municipal district of Favoriten was planned in 2002 to 2004 by a consortium of architects in collaboration with a landscape architect as part of a property developer competition on behalf of a non-profit housing and construction company, GESIBA Gemeinnützige Siedlungs- und Bau AG.[4] Entitled a 'multigenerational residence', the project focused on assisted living facilities for senior citizens, which was the topic of the competition together with the theme of 'planning housing for everyday life and gender neutral'. GESIBA acquired the property from the Vienna Land Procurement and Urban Renewal Fund. The housing complex was built with funding from the housing subsidy WWFSG 89 (see supra).

The competition brief defined the key strategic decisions for the course of the project: Visual and audio contact between the apartments and the open spaces, the creation of private outdoor areas and terraces for common use, as much sunlit areas in the courtyard as possible, a varied range of offers for the different needs and ecological quality. The assessment of the jury highlighted the concept for developing the property and the design of the open spaces and established specific parameters for the construction and furnishing of the open spaces (for example, a furnishable design of the private spaces was required). Continuity in the construction process was to be ensured by a smooth transition from the project manager to the construction manager and by regular consultations between the landscape architect and the architects. Nevertheless, the expert planners had to respond repeatedly to changes that occurred partly even in the execution phase.

Covering an area of 4,655 m2, with 64 % of the property was built-up with five to nine-storey buildings, which resulted in a total of 140 apartments and 42 senior citizen apartments at a floor space ratio of 2.59. In line with the urban structure of the surrounding area, the buildings were constructed as a perimeter block development and includes a central open space at the inside of the block.

The open space is divided into areas for private use, for common use, transitional areas, an infant playground and recreational areas. Approximately 90,6 % of the open spaces are classified as areas for common uses and spans across nearly the entire inner courtyard. Two apartments have a private terrace garden in the inner courtyard, the other private open spaces are balconies. The spatial structure is provided using the topography. The courtyard is clearly visible and divided into different segments. The shapes and materials create a discrete and consistent overall appearance. The landscaping design underlines the functional and spatial sequence of the segments.
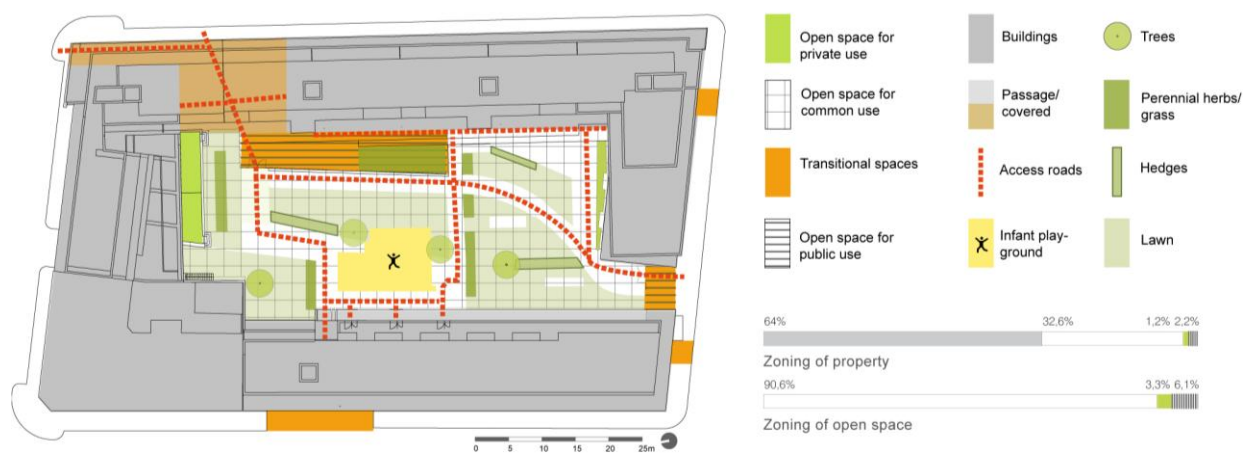
Fig. 2: Function and zoning of the housing complex on Troststraße

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[4] GESIBA Gemeinnützige Siedlungs- u Bau AG is managed on behalf of the City of Vienna by Wien Holding GmbH, which holds 99.97 % of the shares in GESIBA AG.

4.2.2   Results of multilevel analysis

The open space and social evironment analysis for this housing complex arrives at a similar conclusion: The quality of the open spaces — with the exception of areas for private use —- is rated mediocre to poor despite the ambitious open sapce design. The conclusions are very much related to the lack of space, to the walls needed for the sloping terrain and to conflicts of usesThe process and policy analysis shows that open spaces played a subordinate role during the construction process.

Design of open spaces The open space in the housing complex is characterised by a high density of buildings and is classified as mediocre. The courtyard situation on the narrow construction site is dominated, but at the same time protected, by the high buildings. The design analysis assesses the spatial structure overall as positive. Many residents consider the design of the open spaces to be aesthetically attractive, even though the parents of small children tend to feel that the topography and concrete borders pose a risk and do not consider the open spaces to be inviting. In the planning process, the open space concept submitted to the competition was adapted, according to the landscape architect, to the actual conditions on site and to reduced quality demands. Especially the subordinate role of the common area and poor execution and maintenance weakened the result.

For marketing purposes, the emphasis was especially on reducing floor space in favour for a sun-filled courtyard. This strategic decision has contributed significantly to winning the competition. In the early stages of marketing, the dovetailing of the ground floor uses with the open spaces was emphasised; yet in the course of the project, this aspect was lost due to changes in the use of those areas and related access.

Open spaces for private use: The open spaces for private use are considered to be positive, both from a design and a socio-spatial perspective. The balconies are adequately dimensioned and overlook the courtyard. For many residents, these private step-out facilities are an important feature. Parents can communicate with their children from this vantage point, and especially elderly residents are able to avoid conflicts in the common areas. At the same time, the use of these private areas is restricted by the soundscape in the courtyard.

In marketing materials, the open spaces for private use were mentioned in addition to the common outdoor areas, but were not emphasised.

Common open spaces: The open space for common use is too small for the large number of residents and is overall deemed to be mediocre. Though an orderly spatial structure and a variety of use options are offered on the limited area available, there are only few opportunities inviting an extended stay. At the same time, a high level of social control and acoustic incidence restrict the usability of the courtyard. 30 % of the residents — mostly children and their parents — use the common area on a regular basis. In general, the courtyard is not perceived by residents to be an intergeneration communication area. During the construction process unforeseen expenses in civil engineering imposed pressure to reduce costs in the landscape architectural features and necessitated changes in the post-tender stages. This had an impact especially on the quality of the materials and the design.

In marketing the housing complex, special focus was on the open space intended for common use. A clear structure, social control, variety of usages, peace and tranquillity, were emphasised in the project descriptions as well as illustrations. The intention was to provide as many different options for using the open space as possible to appeal to different user groups. The social character of the shared housing concept was emphasised and suggested conflict-free coexistence between the residents. The marketing materials used the verbal image of 'peaceful coexistence' in the 'tranquil recreational and leisure area' of the courtyard. This image contrasts with the assessment of residents who note the conflict potentials of using the common spaces in particular.

5   DETERMINATION OF FIELDS OF ACTION

By capitalising the Viennese real estate sector, the activities of the private sector stakeholders have increased. Since the 1980s, a new regime of regulation in the form of an 'entrepreneurial city' was created through the establishment of funding institutions and the setting up of advisory boards and quality assurance instruments. In the reorientation process, corporatist elements were incorporated and transformed into the new regime. For example, the structural and political proximity of some non-profit property developers with the City of Vienna is striking. The entrepreneurial city is manifested in the area of subsidised housing by

outsourcing the operative business to stakeholders acting as private sector companies while establishing at the same time a control system through shareholdings and means to participate indirectly in the decision-making processes.

Due to the outsourcing of the construction process, the aspect of exploitation and marketing has become more important, resulting in a stronger emphasis on cost and pricing aspects. These arguments give rise to a greater structural density, which significantly restricts the spatial configuration and even further the usability of the open spaces earmarked for residential purposes. Furthermore, the consideration given to open spaces in the projects continues to be inadequate, which is manifested i.a. in the shifting and reallocation of costs in the overall project. This considerably curtails the work performed on the open spaces, being the last in line, even though a good quality of design and materials is important especially in the case of high density.

The functional interaction between superordinate and housing-related open spaces continues to exist, yet an imbalance is discernible. While the concept of public superordinate open spaces are used by the property developers as appealing location factors for marketing purposes, the housing-related open spaces do not offer the corresponding value due to poor quality or lack of quantitative features. Usage and usability reflect this imbalance. From a professional perspective, a matching compensation (quality-wise, quantity-wise or financial) is required.

Open spaces are used to a considerable extent for marketing on all levels, in other words as superordinate public open areas, as common areas of housing complexes and in particular open spaces for private use, the latter are seen to be directly and financially realisable marketing factors. The results of the case studies show that there are significant deficits from an urban development, design and use-related perspective especially in regard to commonly used open areas. Open spaces as a marketing argument are only treated consistently as far as privately used open spaces are concerned. For the common areas, the short-term profit orientation and the compliance of construction costs seem to have a quality reducing impact, causing a discrepancy between the marketing image and reality of usage. Positive knock-on effects are not taken into account in the operational cost-benefit calculations or in quality assurance considerations.

While certain standards have been introduced and expanded by the regulations and quality assurance instruments of property developer competitions, the role of landscape architecture in the overall planning and construction process has remained weak. A strengthening of this position may be achieved by means of continuous professional support through all phases of the process and by taking the characteristics of landscape architectural design in to account, e.g. the dependence of the usability on the available space and spatial configuration, interactivity of design and usage at the ground floor levels, a procedural development in general as well as implementation subsequent to the overground construction works. Yet the case studies reveal standardised procedures and a moderate interest in creating high-quality open spaces. The perception of an independent professional quality should be reflected in the structure of the construction budget as well in the quality assessment and monitoring for the purposes of housing subsidies.

It is apparent, moreover, that the property developers have a rather limited interest in small-scale care, maintenance and adaptation of commonly used open spaces. It appears that the input required for care and adaptation is too uneconomical and difficult to calculate. Yet this fact too shows how important it is to strengthen the focus on open spaces and their function as social areas in the process. The professional support of development, use and appropriation processes is urgently needed if social sustainability is understood to be more than the installation of prohibition signs in the Viennese tradition of preventing conflict.

This raises the question of whether new stakeholders and instruments should be engaged in this field. Just like 'Red Vienna' formulated specific strategies and supported them in their implementation, it appears to be also necessary in regard to open spaces earmarked for common use to support and develop a clear programme in all stages of the planning and construction process. The reorientation of the governance structure offers the possibility of liberalisation while professionalising the planning and construction process at the same time. But also the inclusion of civil society elements such as participation and self organised processes is necessary to entrench the dimension of responsible behaviour, co-determination and the concept of social space in the final instance.

6 ACKNOWLEDGEMENTS

7 REFERENCES

BERNARD, E., FELLER, B.: Amt macht Stadt Das Wiener Stadtbauamt. in: Architekturzentrum Wien/Vienna Architechture Centre (Ed.): Amt macht Stadt, Erich Leischner und das Wiener Stadtbauamt, pages 7-29, Salzburg 1999.

BLAU, E.: The Architecture of Red Vienna 1919-1934 Massachusetts 1999.

EIGNER, P., RESCH, A.: Stadtplanung, Politik und Bauwirtschaft. in: Architekturzentrum Wien/Vienna Architechture Centre (Ed.): Amt macht Stadt, Erich Leischner und das Wiener Stadtbauamt, pages 72-87, Salzburg 1999.

GRIMM-PRETNER, D., RODE, P.: Die dichte Stadt – Nachverdichtung, Aufwertungsprozesse und soziale Folgewirkungen in gründerzeitlichen Stadtgebieten, Vienna Chamber for Labourers and Employees, Department of Municipal Policy, Abteilung Kommunalpolitik (Ed.), Vienna 2002.

KNOLL, T., MOSER, K.: Evaluierung von Freiflächen im geförderten Wohnbau. i.A. Wohnfonds Wien, Vienna 2009. Download at: www.wohnfonds.wien.at [24/02/2013].

KRATOCHWJLE F.: Von der Grünflächenpolitik der Wiener Stadtgemeinde. in: Die Gartenkunst, Vol. 11, pages 161-164. 1925.

KRATOCHWJLE F.: Die städtischen Gärten Wiens, Vienna 1931.

KRIPPNER, U., LIČKA, L.: The Gardens of Viennese Social Housing, paper delivered in the thematic session of the 57th annual meeting of the Society of Architectural Historians in Providence, Rhode Island 14-17 April 2004. See Journal of the Society of Architectural Historians Volume 63, number 3, pages 408-412, University of California Press Berkeley 2004.

LIČKA, L., DLABAJA, C., GRIMM_PRETNER, D, PAPST, S., RODE, P., WITTHÖFT, G. WÜCK, R.: FreiWERT – Examination of the quality and valued of open spaces in inner-city new construction projects and illustration of innovative solutions, funded as part of the House of Future programme of the Federal Ministry for Transport, Innovation and Technology, Vienna 2012.

MUNICIPAL COUNCIL OF THE CITY OF VIENNA, Municipal Council Department 18 — Urban Development and Planning (Ed.) 2004: Strategieplan Wien im erweiterten Europa, Vienna 2004.

NOVY, A., REDAK, V., JAEGER, J., HAMEDINGER, A. (2001): The End of Red Vienna: Recent Ruptures and Continuities in Urban Governance. European Urban and Regional Studies, Vol. 8, No. 2, pages 131-144, 2001.

WEIHSMANN, H.: Das rote Wien, Sozialdemokratische Architektur und Kommunalpolitik 1919-1934, Vienna 2002.

WWFSG 1989 Vienna Housing Subsidies and Housing Rehabilitation Act, in the version of 7 July 2011, online at: http://www.wien.gv.at/recht/landesrecht-wien/rechtsvorschriften/html/b6300000.htm [21.2.2013].

Opportunities for the Development of the Latvian Property Tax Administration System through Improvements in the Property Registration System and the Implementation of European Union Requirements for Geospatial Information

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1 ABSTRACT

Nowadays modern, geospatial information system (GIS) based, integrated property data systems (infrastructures) are used for increasing the performance of the public sector and decreasing the administrative burden on society with regard to real estate, spatial planning, also in property tax administration and property mass appraisal. [2]

The real property tax is a strong source of local incomes and essentially demands highly effective administration and functioning of the property tax system and enhances public confidence in local governments. [18]

The recent fiscal crisis has stimulated interest in new revenue sources of local governments, including capturing immovable property price increments [3]. This challenge in 2008 led the responsible authorities to revise the current property tax and mass appraisal systems in the Republic of Latvia (Latvia) with the purpose of developing and implementing a new strategy for fair real estate tax policy. One of the purposes was also to make more efficient the functioning and use of property related data information systems on for better real estate tax administration and use in mass valuation.

Within implementation of the Communities action plan for setting environmental policy (Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007, establishing the Infrastructure for Spatial Information in the European Community – the INSPIRE directive), since 2009 the implementation of several important large scale projects for the development of GIS have also been started in Latvia with the purpose of improving the property related spatial and descriptive data and statistics spatial data processing, maintenance and sharing.[7]

The benefit from the three planned large scale information systems: "Development of the State Land Service's Geospatial Data Geospatial Information System" (SLS GIS), "Information System for Administration and Supervision of Territorial Development Planning of Local Governments, Infrastructure and Immovable Properties", which is more widely known as Territorial Development Planning Information System (TDPIS) and Building Data Information System (BIS), also will contribute to improve the functioning of the property taxation system and property mass valuation in Latvia.

This paper will describe suggested possible proposals for the improvement of real property tax administration and mass valuation system, because new implementations are only on the development phases now: there are no completed and functioning solutions yet regarding of new approach of property related data registration and sharing, as well as use in the property taxation administration and mass valuation.

Key words: real property tax, property mass valuation, spatial planning, GIS, INSPIRE directive

2 GENERAL FACTS ABOUT LATVIA

Latvia is the central of the three Baltic States and renewed its independence in 1991 after collapse of the Soviet Union.

The area of the country is 64,589 sq. km: the length of the border – 1,862 km. In accordance with the 2011 Census, 2 067 887 people lived in Latvia in 2011. [17]

The Administrative Territorial Reform of 2009 has improved administrative capacity of local governments, moving from almost 600 administrative units with 28 regions to 119 counties (local governments), 9 republican cities and 5 planning regions. [17]

Latvia's political, economic and culture centre is the capital city of Riga, where almost one third part of Latvia's population (707 thousand) lives and works. [16] Latvia is a member of the United Nations (1991), the World Trade Organization (1998), NATO (2004) and EU (2004).

Latvia's national currency is "the lats" (LVL). 1 LVL is equivalent 0,702804 Euros. In 2014 Latvia will be presiding over the EU, as well as plans to join European Monetary Union.

The dominant sectors of Latvia's economy are trade (16.9 % of GDP), production (19.1 % of GDP), financial services (3.8 % of GDP), construction (6.1 % of GDP), real property operations (7.6 % of GDP), and agriculture and forestry (4.5 % of GDP). GDP increased most rapidly immediately after Latvia's accession to the EU, reaching its highest growth in comparative prices in 2007: 12.14 billion Euros, but at the same time the budget deficit reached 22 % of GDP. [6]

During past two decades Latvia gradually established its property right and data registration system (Unified Computerized Land Register), developed the modern digital National Cadastre Information System (Cadastre IS) with integrated market value based property mass valuation as well as developed property taxation system.

Latvian land reform is almost completed: 64.6 % of all of Latvia's territory belongs to private and legal entities, 4.7 % – to municipalities, 30.7 % – to the state (including public waters and state forest land). There were about 5.7 million objects registered in Cadastre IS, which is maintained by the State Land Service (SLS), on 01.01.2012: of them 1 million were land parcels (with territory coverage of 100 %) and 1.4 million buildings (with the territory coverage 96 %). [15] Almost 96 % of real properties are secured in the Unified Computerized Land Register (2013). [16] The State Address Register contains 1,346,139 addresses (2011). The total stock of assessed property values on 01.01.2013 was 25.9 billion Euros. [16]

Latvia has a traditional three level spatial planning system with 100 % area coverage ofthe entire country. All municipalities have local territorial plans, which is the basic document for stated current and planned land use within their area of jurisdiction.

The global economic crisis hit Latvia in early 2008. In order to overcome the impact of the economic crisis on the national budget, Latvia was granted a 7.5 billion Euro loan from the International Monetary Fund (IMF) and European Commission (EC) at the end of 2008, bearing a lender's oversight on urged reforms within three years period. [6]

The real GDP contracted by18 % and the unemployment rate reached almost 20 % in 2009. Positive GDP growth returned only in the last quarter of 2010, and then followed by an increase in average of 5 % or 10.15 billion Euros in 2011. [6]

3   THE CONTEXT OF THE SINGLE EUROPEAN INFORMATION SPACE

The Establishment of The Single European Information Space of European Community is the one of three pillars defined by the European Commission (EC) i2010 strategy (2005), whose objectives are to offer high, bandwidth communication, rich content and digital services with a market oriented regulatory framework for all users in European Community with regard to spatial information, including property related information. [7]

The concept includes geodesy and cartography as the essence and mutual connection of geospatial infrastructure elements (see Fig.1). [5]

In 2007 the INSPIRE directive laid down general rules for establishing an infrastructure for spatial information in the entire Community that is the basis of support for the Community's policies and for the fulfillment of the requirements of environmental issues around Europe. [7]

To ensure that the spatial data infrastructures of the Member States are compatible and usable in a Community and trans boundary context, the INSPIRE directive requires that common Implementation Rules are adopted in a number of specific areas: metadata, data specifications, network services, network services and technologies; licenses on sharing, access and use; and coordination and monitoring mechanisms, processes and procedures, established, operated or made available in accordance with the INSPIRE directive requirements. [7]
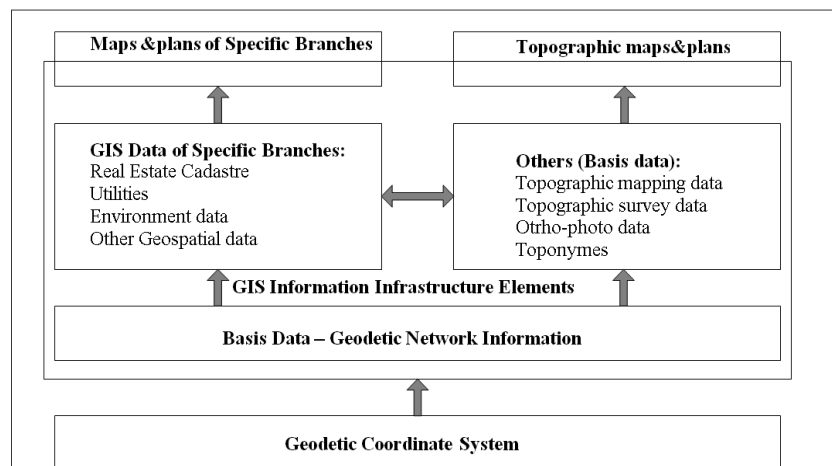
Fig. 1: Geospatial information elements. [5]

The INSPIRE directive should be based on the developed infrastructure for spatial information of Member States and does not require new data collection system. The Member States must ensure that this infrastructure is compatible, interoperable and usable on the national level, as well as in the Community trans-boundary context. The Member States' duty is also to develop and launch national Geo-portals which will be integrated in the European Geo-portal and via that the data and services required by the INSPIRE directive will be available in the national and trans-boundary context. [7]

The three annexes of the INSPIRE directive list 34 spatial data themes [subjects?], including land use, land cover, addresses, cadastral parcels and buildings, administrative borders, etc. maintained by public sector for what Member States must provide specified set of spatial data storing, maintenance, availability and share in the most appropriate level with the possibility to combine spatial data from different sources across the Community. The INSPIRE directive's common Implementing Rules require each Member State to implement INSPIRE directive's requirements into their own legislative systems. The Member States are also therefore engaged in implementing the appropriate technologies, policies and institutional arrangements that will form the basis for their INSPIRE compliant systems. [7]

The development and implementation of the INSPIRE directive will follow a work schedule consisting of three phases: the Preparatory Phase (2005-2006), the Transposition Phase (2007-2009) and the Implementation Phase (2009-2019). [7]

In order to quicken the implementation of its digitally based and customer oriented strategies, the EC lunched several programs (such as e-Content and e-Content Plus programs) on behalf of Community's Member States to develop GIS related infrastructure, testing and launching new e-services and sharing related national experiences and best practices. It is well known that GIS as a computer system will be capable of creating, storing, managing, analyzing, and displaying geographically referenced information. GIS will allow one to understand, question, interpret and visualize data in many ways that reveal relationships, patterns, and trends in the form of maps, globes, reports, and charts. [13]

4 THE INSPIRE DIRECTIVE IMPLEMENTATION INITIATIVE IN LATVIA

The INSPIRE Directive has been adapted in Latvia's legislation by the adoption of the Spatial Planning System Development Concept (2009) and the passage of the Geospatial Information Act in 2009. [8]

The concept included geodesy and cartography at its essence and the mutual connection of geospatial infrastructure elements intended to eliminate the overlapping of spatial planning documents, creating a new legal framework to enable the new administrative and territorial reform by local governments (counties), the effectiveness and quality of the planning of its development, the definition of the appropriate planning documents, expertise, provision a number of new laws and regulations for its development. Geospatial Information Act set the role of the institution, the degree of responsibility in information maintenance and information exchange among institutions regarding annexes of the INSPIRE directive. [8]

The implementation of the INSPIRE directive with regard its data themes is split among the number of Latvian authorities emphasizing common cooperation, actions and data sharing with regard to the progress of the implementation of directive. The Ministry of Defence has granted supervision of overall processes and

reporting duty about the progress of implementation of INSPIRE. Latvia's Regional Development Agency (LRDA) is the responsible authority for development of Latvia's National Geo-portal where information (metadata) requested by the INSPIRE directive will be accessible by everyone. [8]

From 2009 several of Latvia's public authorities have started to develop their GIS systems (such as TDPIS, BIS, SLS GIS, etc.) using funding from the European Regional Development Fund for the purpose of complying with the requirements of the INSPIRE directive and to solve problems that have emerged in the public sector, such as insufficient development of information systems and their interoperability and lack of integration; undeveloped technical basis for the introduction of e-services and the decrease of administrative burden for entrepreneurs and citizens.

5 THE PROPERTY TAX AND ITS ADMINISTRATION SYSTEM

The real property tax is a so-called "ad-valorem tax" or "unit based tax" and is directly connected with geographic location. Land and other immovable features (human made improvements on land, such as buildings and structures) are usually visible, immovable, have geographic location and coordinates, specific use, physical parameters, the owner or user, and the value, so it is difficult to taxpayer to escape the tax as easily they can avoid other levies. [2]

In almost all countries around the world, also in Latvia property tax administration is a duty of local governments. Income from real property tax is a strong and considerable source for local governments, and all revenue from real property taxation goes to the budget of the local government where the specific real property is located. [18] For example in 2011 Latvia's local governments were collected 165 million euros (15 % from local tax revenues) from real property tax. [12] The revenue basis from property tax usually dependent on three politically sensitive variables: tax base (the taxable objects), tax rate (how much taxpayers will pay) and estimated revenue from taxes (requested income). The property tax collection is a complicated duty for local governments because of necessity to manage a large number of different taxation objects (real estates), as well as subjects (property owners and users). Setting of property tax requires use of special knowledge and capacity to work with variable data and data basis which very often is a challenge for small in size municipalities. Failure to establish a creditable tax base usually erodes taxpayer confidence; dampers compliance rates, and limits revenue performance [2]

The Law on Immovable Property Tax in Latvia was adopted in 1997, setting the basic principles of property taxation, taxable objects, tax relief, valuation, and information to be used, etc. [9]

In 2006 with adoption of Law on Cadastre valuation, issues were separated from general taxation legislation. Currently The Law On Immovable Property Tax also assigns local governments limited power for setting taxation policy within their jurisdiction with regard to taxation rate (from 2013) and objects of taxation (for imposing tax on auxiliary buildings of residential real estates), as well as allows the granting of relief for separate categories of taxpayers based on regulations issued by each municipality (such as for pensioners, the poor, repressed persons). The real property tax examines management capacity of local administrations and requires strong cooperation between involved partners, maintenance of the relevant tax (taxpayers) administration system and an appropriate data basis containing property related information. There are no unified property tax administration principles in Latvia. Local governments manage property taxation issues in accordance with their administrative capacity.

There are four main partners involved in the implementation of property tax in Latvia:

- The Ministry of Finance sets general principles and proposes appropriate legislative initiatives with respect to taxation);
- Ministry of Justice sets general principles and proposes appropriate legislative initiatives with respect to property valuation, property cadastre, as well as ownership registration (maintenance of the Unified Computerized Land Register);
- The SLS – Cadastre IS is responsible for the maintenance and performance of real estate mass valuation.

Local governments are responsible for the administration of property tax and revenue collection in their jurisdiction, development of local spatial planning documents and issuing building permits. It is also the duty of the local governments to determine land uses (land uses types) for taxation purposes. The determination of

land use types is based on permitted current land use in a relevant local territorial (spatial) plan or legally permitted use of the property. There is no unified developed classification of land uses for spatial planning in Latvia; otherwise the SLS uses their own classification code system (unified approach) for managing of land use types with regard of mass assessment in the Cadastre IS.

Due to crucial effect of spatial planning on real estate development, cooperation with the spatial planning policy setting authority in the Ministry of Environment and Regional Development and the construction process supervision authority in the Ministry of Economy also is required.

6 THE CURRENT PROPERTY MASS VALUATION SYSTEM AND PROPERTY RELATED DATA REGISTRATION SYSTEM; ITS CONNECTION WITH PROPERTY TAXATION

In Latvia property valuation was established along with the restoration of property rights and the development of a property data recording system. Market value based real estate valuation was gradually introduced from 1998 with the passage of the Law on Immovable Property Tax. Mass valuation is one of the responsibilities of the SLS along with the maintenance of Cadastre IS.

The basis for the setting of property tax is assessed values of real estate entered in official real estate data recording system – cadastre. The basis of value assessment is real property sales data. The establishing of property value for taxation also requires appropriate administrative resources; management, cooperation and an effective property related data system (see Fig.2). [2]
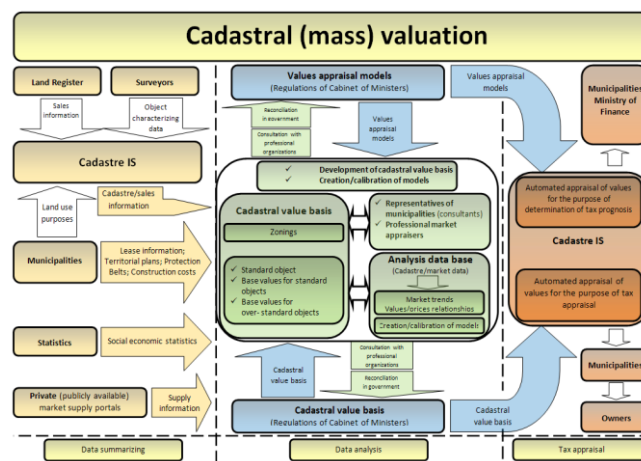
Fig. 2: Mass valuation performance in Latvia. [17]

The development of the mass valuation system demands continual improvements to achieve maximum quality with an efficient use of available resources.

The quality of the property assessment system is also determined by term accuracy, uniformity, equity, reliability, and a "low per-parcel cost system". [2] [4] Incomplete or obsolete property data in the registers is the main obstacle for accurate valuation performance or the introduction of improvements in mass valuation models. The three basic functions of a mass valuation system are revaluation, data maintenance, and value updates. [2]

Nowadays the functioning of the mass valuation system depends on the degree of automatization of the three interdependent subsystems:

- an administrative system;
- data management and system;
- data analysis and valuation system. [2]

The Computer Assisted Mass Appraisal (CAMA) system is commonly used for real estate valuation for tax estimation purposes in many countries around the world, since the use of computers and IT technologies became ordinary for performance of duties in large scale planning and data evaluation. CAMA is a generic term of any software package used by property assessment authority with regard to establishing real estate valuation for tax estimation purpose. The use of CAMA allows for the application of a systemic (automatic)

approach of appraisal to groups of properties at a given date using standardized procedures and statistical testing and analysis methods. [13]

CAMA approach is the most effective tool to perform mass valuation in the most efficient way in the complete sense of the term „efficiency". The use of CAMA ensures the performance of annual mass valuation and the update of properties values at the same tame on large number of the objects (usually on properties registered in the data base – cadastre) using common evaluation approaches (models), ensuring values accuracy, as well as "low per parcel" costs.

The Mass valuation system consists of mass appraisal applications of valuation models to real estate value. The spatial model and automated sales analysis are part of the modern property valuation system. The integration of GIS and CAMA enables the mass assessment function to be concurrent with relevant updated spatial data and supports the creation and maintenance of an accurate single property data repository with respect to each land parcel's geometry and descriptive data supporting workflow, updates, and mass appraisal input. GIS adds value to CAMA systems, such as an appraisal model, which can place added value on property that has, for example, a building located on coastline. If the parcel's description and spatial data are maintained in a geodatabase, location impact calculation is simple and easy using the spatial intelligence of GIS. [13]

CAMA or automatic (mass) valuation modules have been integrated into the Cadastre IS since 2001: mass assessment applies to all cadastral objects (land, buildings, engineering structures, premises) using accumulated cadastral information on specific property annually or whether data update takes place in the Cadastre IS. The source of cadastral information is land and building surveying cases.

The SLS for mass valuation purposes develops and updates the value (zoning) maps, determines value models for land and buildings, value bands (levels), and model parameters. GIS applications for value zonings are not developed yet, although GIS is the basis for the cadastral map in matters of property information.

Accurate valuation requires the SLS to keep strong cooperation with local governments, appropriate actual social economic statistics, reliable market data base, accurate data on encumbrances and property use, etc. The catalogue system is used in the Cadastre IS for the classification of land and building use types and encumbrances. The cadastre is often used by local tax administration authorities for setting of property tax, responses on complain, determination of land use for taxation purpose (land use type). Local building boards are use cadastre information as a basis for the development of local territorial plans and detail plans.

Since 1998 improvements in Latvia's valuation system have occurred several times. The most important changes to affect accuracy and low per-parcel costs have been connected with the development of appropriate software for valuation. In order to improve assessment accuracy and integrity, the valuation model has been improved several times taking into account the accumulated data in the Cadastre IS.
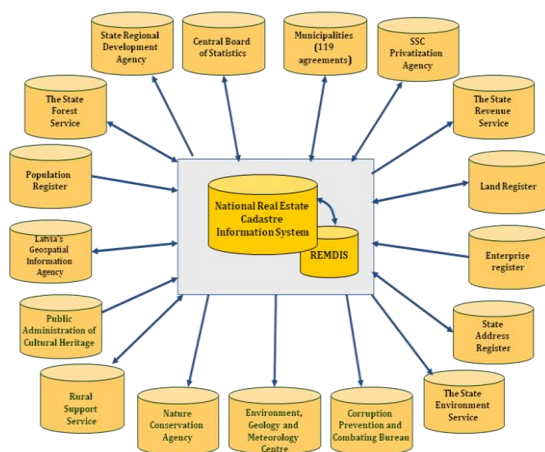
Fig. 3: Cadastre IS and its data exchange partners. [17]

In Latvia the Cadastre IS and the ownership register (the Unified Computerized Land Register) is maintained separately by different authorities – the SLS and the Latvian Court Administration. All real estate shall be

entered into the Cadastre IS – it is mandatory due to the fiscal function of the Cadastre IS. Securing of ownership can take place only after completion of cadastral activities in the Cadastre IS. Electronic information exchange takes place daily between the Cadastre IS and the Unified Computerized Land Register in regard to delivering actual sales prices for the maintenance of The Real Estate Market Data Information System. This system is the property market information (sales data) source for setting of mass value basis [10]

The assessment of values used for tax estimation and the cadastral surveying of buildings is the function of the SLS which maintains the largest state information system – Cadastre IS. Almost all Latvian registries are linked with the Cadatre IS [see Fig. 3].

The maintenance of an effective property tax administration and mass valuation system requires the efficient acquisition of information from several large-scale state maintained information systems, which contain property related technical and legal data such as:

- The Cadastre IS – land parcel and building spatial and descriptive data, surveying information, building valuation files, land and building use types, land value zonings, base values, the Real Estate Market Data Information System, encumbrances, etc.;

- The Unified Computerized Land Register – ownership and real estate market information;

- The State Address Register of the SLS – addresses, administrative units, administrative boarders;

- The State Forest Service Data Base – forest surveying data;

- The Rural Support Service Data Base – cultivated areas of arable land, etc.

Property mass assessment also requires local, regional and national social-economic statistics maintained by local governments and the Central Statistical Board of Latvia. Mass valuation system requires actual (permitted) land uses from local territorial plans maintained by local governments. Permitted land use types shall be entered in the Cadastre IS. The type of use has a decisive effect on the assessed value: base values used in assessment differ among different property uses within one valuation zone and can be considerable. Local governments also are responsible for assigning of adresses (names of administrative units, streets and estates) and the numeration of buildings. Address information shall be entered in State Address Register of the SLS.

The local municipal tax authority uses almost all information from Cadastre IS and from its cooperation partners for setting of property tax. These systems operate separately and require extra resources (time and work) from local municipalities for the purpose of obtaining necessary data and use this information for the input in tax administration. For example:

- the estimation of the volume of tax for each taxable real estate, local tax authorities use current mass assessment in the Cadastre IS;

- the list of taxpayers is maintained using actual residence data from the State Address Register and the Population Register with regard to the names of taxpayers and the addresses of legal entities from the Enterprise Register. Tax notices have been sent to the residences or entrepreneurship addresses of all relevant taxpayers at the beginning of each taxation year;

- tax reliefs request additional information about taxpayers that might be stored by other entities (such as the State Revenue Service), etc.

In order to better determine municipal administrative capacity, the Joint Municipal Information System has been developed, but this system is not in complete use yet.

In current the information exchange and circulation among registers is slow: technical information overlapped and registers very often contained similar records and inaccurate data. The Law on Cadastre obliges property owners to update information in the cadastre when changes to property take place (for example, building renovation impact on building cadastral information), but due to the complexity and costs of the process, this responsibility has not been completely completed.

The applied system requires an efficient system for taxpayers to receive actual information about properties and their values. Required cadastral data as well as assessed mass values are available for costumers in the data distribution portal of the SLS www.kadastrs.lv for a small fee. Several fee-free e-services, like "My data

in Cadastre", are available in the Latvian national portal www.latvia.lv. The information for clients also is provided at the regional offices of the SLS. [17]

7 THE PROPERTY RELATED DATA SYSTEM AND ITS CONNECTION TO PROPERTY TAXATION AND MASS VALUATION

The recent fiscal crisis has stimulated interest in new sources of revenue, including capturing immovable property price increments, and the improvements of property taxation in connection with mass valuation and cadastral information update were among highly recommended reforms of international lenders for the purpose to set better, fair taxation policy and to increase of municipal incomes in the recent economic crises context. [3]

With the implementation of common GIS solutions, many countries around the world have successfully performed integration of specific functions in information systems with real property registration and management to ensure efficient data use in various economic sectors and to reduce costs for data acquisition and maintenance. GIS solutions will focus on the exploration of new sources of information that would provide property data actuality and completeness, security, as well as to not increase registry maintenance costs. GIS applications implementation has shown a rapid increase in the use of spatial data in many countries (Denmark, Finland).

It is suggested that the INSPIRE directive implementation activities also be used in order to better property taxation and mass valuation performance.

In accordance with the INSPIRE directive, 34 data themes shall be covered and integrated into a new GIS system: almost all economic branches, professionals, entrepreneurs, researchers, tax authorities, property developers and managers, property owners and citizens will benefit from these new developments and will make spatial data more accessible for all users.

In Latvia two separate strategies were developed for the improvement of property tax policy and mass assessment, emphasizing better data accumulation, integrity and exchange among registers. The newly developed concept of mass valuation (2012) plans massive reforms in property related data management system for the purpose of improvement of valuation models and better performance of real property tax in near years. The new principles (directions) shall be implemented for the future development of mass valuation system and solving problems which disturbs the current system for full functioning; for example new solutions for:

- building information collection and update – the use of registration of building (structures) data from project (design) documents for new constructions and reconstructions in BIS and the use of self-assessment (owners declarations);

- determination of land use for property taxation purpose – the use combination information of TAPIS with Cadastre IS graphical (spatial) part for each land unit (indicating permitted land use, building intensity and density); use of building code (building classification) for determination of land use for built-up land units from the Cadastre IS textual (descriptive) data; connection of descriptive and spatial information for determination of multiple land use of land parcel;

- new data collection for the purpose of perfection of valuation of commercial properties – rental information collection in the market data base of Cadastre IS.

Consequently all of mentioned above solutions, the concept will require also strong cooperation among involved parties and early informing of society about coming improvements and their obligations with regards of data update in the registers. [1]

The three large-scale planned information systems will contribute to better the performance of mass valuation, resulting in better taxation policy, transparency of the system and cooperation among partners:

- The TDPIS will focus on requested standardized land use information from local territorial plans for mass valuation;

- The BIS will ensure the accumulation and updating of building data;

- SLS GIS will concentrate on cadastral data accuracy and interoperability with other information systems, integrated valuation models; appropriate analysis tools (local, national statistics, market data, etc.) for mass valuation performance, etc.

8 THE DEVELOPMENT OF THE STATE LAND SERVICE'S GEOSPATIAL DATA GEOSPATIAL INFORMATION SYSTEM

The aim of "The Development of the State Land Service's Geospatial Data Geospatial Information System" (SLS GIS) is:

to develop a joint system for the entry, storage and processing of SLS's geospatial information, by ensuring migration of geospatial information already stored in the SLS into the new system;

- to modernize SLS data distribution system;

- to ensure e-services to the society related with SLS geospatial data;

- to ensure information services to other organizations for the transfer of SLS geospatial data needed in order to fulfill their functions. [17]

With the development of the SLS GIS, the requirements of INSPIRE directive in the sphere of cadastral information, addresses, boundaries and buildings has been also implemented. [15]

It is planned within the frameworks of SLS GIS to develop new, centralized object oriented information system for SLS geospatial data, in which a joint spatial data base owned by the SLS will be logically integrated and stored: spatial data of the cadastre (including, the land value zonings, building cadastral surveying data); spatial data of the State Address Register; spatial data of administrative borders; topographical data on the scale of 1:500; data on protection zones from documents regarding the planning of territory; other data available for SLS. It is planned to integrate 6 data modules; to develop their meta-data module within SLS GIS. (see Fig.4)
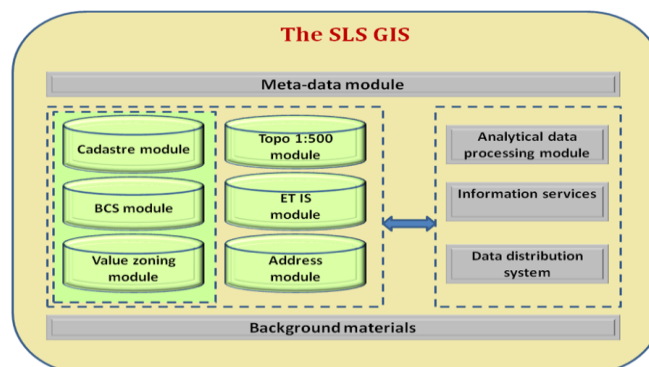
Topo 500 module – Topographic information in scale 1:500 module BCS module – Building cadastral surveing module ET IS module – Encumbred Territories IS module Fig.4: SLS GIS structure. [17]

The background materials for maps will be ortho-photo maps; topographical data in scale of 1:2000 and 1:10 000; satellite maps and thematic maps owned by the SLS.

Data integration will be ensured by mutual linkage and integration in both the descriptive and spatial data of the SLS.

The two modules: the Value zoning module and the Building cadastral surveying module will be very important for better mass valuation performance and for improvement of CAMA. Other modules will also be important in matters of cadastral data and its quality (data used for mass valuation of real estates).

The Value zoning module will ensure connection of base value information with value zoning maps; the tool for correction of zoning maps using cadastral map elements; analysis features and development of thematic maps.

All land uses for valuation purposes will be obtained from TDPIS. For this and spatial planning purpose the unified classification of land uses will be developed and integrated within the system.

The building cadastral surveying module will allow:

- for the mutual exchange of building data with the future BIS;

- automatic creation of a building data file in the Cadastre IS and its storage within future digital archive system

- drawing of building layouts in connection with coordinate system and use of standardized modules, data control and correction and the automatic obtaining of cadastral descriptive data, etc. [17]

It is planned to launch SLS GIS in 2015. All customers of the SLS will receive benefits from this integrated approach, like a availability to new spatial data sets, a centralized high resolution topographic data base, information about encumbrances, single customers derived services (e-services and information services) and a data distribution system, analysis features, information services, availability of cadastral information in the national portal www.latvija.lv , e-services for cadastral surveying professionals with regard to the updating of thematic maps and the electronic ordering of services and information.

9   THE TERRITORIAL DEVELOPMENT PLANNING INFORMATION SYSTEM

The aim of future TDPIS is to create modern, GIS based systems for transparent spatial planning information storage, processing and sharing, territorial development and real estate and infrastructure management for the entire territory of Latvia in lieu of the current, autonomous, unconnected with actual property information planning systems of local municipalities. [14]

Within TDPIS the framework of the infrastructure system has been created that will include a spatial development module for the purpose of local territorial planning of local municipalities, where local land use graphic and descriptive data (information on current and planned land use, including development restrictions and encumbrances) will be stored.

TDPIS will contribute also to cover all territories of local municipalities and all property related information in the performance of municipalities' duties.

TDPIS will contain all of Latvia's planning system (national, regional, municipal plans, also detail plans and local plans), functional zonings, and all documentation on planning initiatives, activities and normative regulation.

There will be two stages to the implementation of the TDPIS:

(1) The first stage will cover a survey of the current situation and the development of requirements for future systems, development of the basic functionality of TDPIS module and the implementation of it as a pilot project in 5 municipalities to test TDPIS integration with other information systems, development of security and test requirements and the testing of the newly developed e-service „Information about legal land use of the real estate in accordance of local territorial plan". Currently, this stage is in its completion phase;

(2) The second stage will include TDPIS technical development, introduction, integration, software purchasing and users training; introduction of the module of monitoring and evaluation of regional development indicators and e-services on current land use, a land use plan browser, electronic certificates on the permitted use of land parcels, detail planning and use restrictions of properties as well as digitization of information resources.

Within TDPIS the unified land use classification will be developed and introduced for both spatial planning and property mass valuation purposes and will be used from the catalogue in both systems – TDPIS and SLS GIS. The Module of Indicators of Regional Development will be developed and integrated with TDPIS for the providing of actual statistics concerning selected territory and will be very usable for the SLS in evaluation of territories within determination of mass value basis (evaluation of social economic factors for mutual comparison of the territories). It is planned to lunch TDPIS in 2015 with other systems: SLS GIS and BIS. [14]

10 THE BUILDING INFORMATION SYSTEM

The BIS is among those Latvian GIS projects which will be implemented in close cooperation with SLS GIS, TDPIS and SRDA (the responsible institution for developing Latvia's national geo-portal) and local building authorities (such as Riga City Building Board). The purpose of the future BIS is to provide future electronic circulation, standardized collection and use spatial and descriptive information about constructions, it's planning and documentation, which in present is collected, maintained and used separately by different public and local authorities.

Through BIS access will be provided to information on professional organizations: the Construction Merchant Register, Builders and Architect Practice Certificate Registry, Register of Energy Auditors, Building Energy Efficiency Performance Certificates Register, Residential Housing Manager Registry, Building Inspectors registry, etc.

The BIS will provide the following significant interfaces to The National Information System Integrator, Geospatial Data Integrator, Population Register, Business Register, Cadastre IS of the SLS, State Address Register of the SLS, TDPIS, Unified Computerized Land Register and Joint Municipal Information System. Four new e-services will be developed and launched:

(1) Construction project (initiative) review;

(2) Issuing of building permission;

(3) Reconciliation of simplified reconstruction or renovation and Construction commissioning.

The development of construction monitoring functionality is also planned, including mobile application, reporting module, use of e-signature, use of branch statistics and normative documents, e-service features and on-line payment options, as well as the performance of industrial research – BIS implementation and testing of at least 30 local construction boards before the launching of its operation. [11]

It is planned to lunch the BIS also until 2015 with the TDPIS and SLS GIS. The introduction of BIS will be step forward to make access to the building process and its documentation transparent for all parties involved: public and municipal authorities; process supervisors; entrepreneurs and costumers. All documents and communication among clients and data exchange partners will be provided only in electronic form with the purpose of decreasing the existing administrative burden in dealing with building information from the issuing of planning permission to the registration of a newly developed building.

11 CONCLUTIONS

The implementation of qualitatively new national spatial data system is a great challenge for the enforcement of the design of Latvia's national spatial data infrastructure (national GIS), as well as for planned massive reforms in property taxation administration, mass valuation and the fast updating and registration of data in the Cadastre IS, which will lead to improvement in the quality of valuation and taxation of property. The enforced reforms in the development of Latvia's national spatial data infrastructure are in the early stage and will be completed only in the next few years.

In practice GIS creates new opportunities for updating spatial and descriptive data and for making the system transparent (clear) and interoperable. GIS solutions will focus on the exploration of new sources of information that will provide property data actuality, completeness and security without increasing registry maintenance costs.

In order to improve the situation and to prevent an unsatisfactory and inadequate state of the modern technology that provides opportunities in the sphere of geospatial information, it is necessary to work out the binding normative acts for all involved institutions, to standardize the acquisition, treatment and exchange processes of geospatial data, as well as to ensure distribution of geospatial data and to improve legislation. [5]

The implementation of INSPIRE is a great opportunity for Latvia to develop its large interoperable information GIS in accordance of required data structures of the directive, as well as to provide this systems interoperable in cross-border context through Europe.

The impact of the new GIS developments on the property tax administration system and property mass valuation can be estimated as:

(1) improved property data structure and determination of the land use (SLS GIS and TDPIS);

(2) better property valuation models using GIS modeling capabilities (SLS GIS, TDPIS, BIS);

(3) better transparency and public information (the property values, and its characteristic data in the Cadastre IS will be easy accessible online: valuations zones with attributed spatial and descriptive data, market information and statistics etc.).

The data accuracy and complete coverage in the registers will provide better performance of property taxation: accurate real estate values and faire taxes; more accurate taxable object data base (more accurate taxable building data); better informing of taxpayers, etc.

At the same time main contributions in the improvement of the SLS GIS will also contribute to the development of the largest IS based data base covering property spatial and descriptive data in the entire country; TDPIS will contribute to the storage of authorized information concerning planned and current land uses in each municipality, but BIS will provide a complete overview of every building construction process from project application to the construction operation, even includingfurther building improvements and other changes.

It is planned to provide within SLS GIS also cleavage (section) of different graphical data: cadastral maps with topographic information; remote sensing data – LIDAR and ortho-photo maps with the purpose to observe changes in land use structure. Recent tests have shown that the first (pilot) section cadastral map with topographic information allowed to determine almost 80 000 new building objects which had not previously been recorded in the Cadastre IS and might be earlier unidentified objects of taxation.

12 ACKNOWLEDGEMENT

13 REFERENCES

[1] Cabinet of Ministers, order No. 462: Concept on Improvement of Cadastral Valuation System and Cadastral Data Update, 2012. [Online] Available: http://www.likumi.lv/doc.php?id=251895 [Accessed: March 03, 2013],

[2] G.E.Thimgan: Property Assesment Valuation, 3rd edition, Kansas City, Missouri, 2010, pp. 1-8,

[3] G.K.Ingram, Yu-Hung Hong: Value Capture and Land Policies, Cambridge, Massachusets, 2012, pp. 3-18,

[4] International Association of Assessing Officials: Standard on Mass Appraisal of Real Property, Kansas City, Missouri, 2012. pp. 22. [Online] Available: http://www.iaao.org/uploads/standardonmassappraisal.pdf [Accessed: March 03, 2013],

[5] I.Berzina: The Zemgale Planning Region Geoportal – Experience for Rural Development. In: Scientific Jornal of Riga Technical University. 14. Issue, Sustainable Development, Vol.2, pp. 72.-80. Riga, 2011.

[6] International Monetary Fund: Republic of Latvia: Ex Post Evaluation of Exceptional Access Under the 2008 Stand-By Arrangement; Public Information Notice on the Executive Board Discussion; and Statement by the Executive Director for the Republic of Latvia, Vashington D.C., 2013, pp.49 [Online]. Available: http://www.imf.org/external/pubs/ft/scr/2013/cr1330.pdf [Accessed: Feb.27, 2013],

[7] K.Charvat, M.Alberts, S.Horakova. INSPIRE, GMES and GEOSS Activities, Methods and Tools towards a Single Information Space in Europe for the Environment, Riga, 2009, pp.4-29,

[8] Parliament of the Republic of Latvia: Geospatial Information Law, 2010. pp. 18. [Online] Available: http://www.vvc.gov.lv/export/sites/default/docs/LRTA/Likumi/Geospatial_Information_Law.doc [Accessed: Feb.27, 2013],

[9] Parliament of the Republic of Latvia: Law on Immovable Property Tax, 1997. pp. 21. [Online] Available: http://www.vvc.gov.lv/export/sites/default/docs/LRTA/Likumi/Immovable_Property_Tax.doc [Accessed: March 03, 2013],

[10] Parliament of the Republic of Latvia: National Real Estate Cadastre Law, 2006. pp. 27. [Online] Available: http://www.vvc.gov.lv/export/sites/default/docs/LRTA/Likumi/Immovable_Property_State_Cadastre_Law.doc [Accessed: Feb.27, 2013],

[11] Source: http://www.em.gov.lv/em/2nd/?cat=30371,

[12]Source: http://www.kase.gov.lv/uploaded_files/Parskati/Gada %20p %C4 %81rskats/2011.gada %20p %C4 %81rskats/2011.gada %203.sejums/FMInfp21_290612.pdf,

[13] Source: http://www.co.union.nc.us/PropertyServices/GISMaps/tabid/82/Default.aspx,

[14] Source: http://www.vraa.gov.lv/lv/e-serviss/tis/,

[15] Source: http://www.vzd.gov.lv/sakums/eiropas-savieniba/eraf-projekti/,

[16] Source: http://www.vzd.gov.lv/faili/LELDE/SLS_public_report_2011_final.pdf,

[17] Permanent Committee of Cadastre in the Europen Union International Monetary Fund: "Cadastral Information System: a resource for the EU policies" (PART. IV). Overview on the Cadastral Systems of the EU member States, (Part. IV), pp.79-105. [Online]. Available: http://www.eurocadastre.org/pdf/cadastral_systems_IV_2010.pdf [Accessed: Feb.26, 2013],

[18] R.Bahl, J. Martinez-Vazquez, J.Youngman: Making the Property Tax Work, Experiances in Devlopomg and Transition Countries, Cambridge, Massachusets, 2008, pp. 3-16.

Optimizing Public Participation through ICT and Social Networks: Questions and Challenges

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1 ABSTRACT

Since the 90's, urban planning education, integrated with information communication technologies (ICT), has attributed great importance to training using communicative approaches, producing great enthusiasm which has been manifested in many experiences (Mitchell 1998; Talen 2000; Batty et al. 2003; Steinman et al. 2005). For the supporters of this experimentation (Kwan 2002; Sieber 2004) and increasingly strong scepticism (Angotti 2011; Craig et al. 2002; Esnard et al. 2004; Harris et al., 1998; Pickles 1995; Warren 2004), the issue of citizens e-participation in decision-making still remains topical. While the participatory dimension can be banalized or seen as "supporting" one-way communication aimed exclusively at the capture of consensus, on the other hand it can be consolidated by going beyond the web, thus developing the first virtual interactions, and only then belonging to the local communities, thus activating potentially virtuous dynamics. Starting from this position, the paper highlights (1) the importance of how the net is used, (2) how the transfer of online communication in local civic action can occur also with social networking, (3) how this can be evaluated, creating a prototype to quantify participation in social networks. The objective of this work is to identify opportunities and problems of participatory planning through new technologies offering possible solutions through a "discussed" use of ICT and the drafting of guidelines to enhance the sharing of knowledge between the different actors in the planning process.

2 INTRODUCTION

In today's society, civic participation in its various forms, has become not only more sought after in regulations, but increasingly necessary in order to find the promised certainties in the resolution of common problems (D'Ambrosi, 2011). In literature such resolutions are synthesised in two main ways: either they are conflitual or collaborative. In the first case, the community provides the impetus for the involvement in public decision making with the decision makers. These decision makers may be more or less receptive in carrying out their role, but in general the participative dynamic goes from the outside to the inside: the policy makers must demand a role in the decision making process (Arnstein 1969; Friedmann 1987; Reardon 1998; Beard 2003). Another aspect of this same model describes experts who, within the government, act on behlf of the citizens. Among the most important are the advocacy planners (Davidoff 1965), the equity planners (Altschuler 1965; Krumholz et al. 1990; Krumholz et al. 1994), and also the progressive planners (Clavel 2010, Angotti 2011). They use their professional expertise to deal with the problems of marginalized groups.

The second case, which since the 90s has been pushed more and more, sees the relationship between policy makers, citizens and public opinion as a process with great collaborative potential to develop. Within this process, on the one hand there is strong individuality, but on the other hand cooperation becomes fundamental both to sharing the responsibility and to trying out new ways of planning more suited to globalisation.

These reflections allow consideration of the concept of planning and participation, which, while maintaining the social and civic characteristics have led to a broader meaning: today we talk about interactive planning thanks to collaborative governance which allows for the creation and implementation of inclusive policies on an urban or regional scale (Innes 1995; Healey 1997; Forester 1999; Abers 2000; Fung, Wright 2003, Innes et al. 2003; Delli Carpini, Cook, Jacobs 2004, Crosby et al. 2005; O'Leary et al. 2009; Feldman, Khademian 2007; Briggs 2008).

On the one hand the concept of "interactive planning" is evocative of a flow of information which increases the knowledge of the various equal users spread accross the web's "Magnum sea", on the other hand, its combination with ICT results in the invention of political strategies based on reticular rather than homogenous logic. Recent researchers have underlined collaboration inside the network which includes both public and private actors (Kettl 2002; Booher et al. 2002; Hajer et al. 2003, Goldsmith et al. 2004; Agranoff 2007; Sandfort et al. 2008).

The drive towards paradigms imprinted on new cultural models has tried to construct a path that would integrate the classic path with the new theoretical models not only in local contexts.

However, if today there is consensus in recognising the importance of participatory processes, often there is obvious discontent in the absence of agreement or the adamant position taken on the issues in question or even in the degree of effectiveness perceived or measured in the inclusive process.

Based on these considerations, the collective process in which the content and forms of democracy are reconsidered is evident, giving particular significance to community participation. It is a process that today affects not only scholars and the institutional forms of government, but also groups, movements that express themselves in unconventional forms, thanks to web 2.0. However, the literature agrees that participatory processes must be structured and permanent (continuous not occasional); hence the need to construct contexts where the comparison of points of view might be the same for all matters of collective interest. The network can do much in this direction. In fact, it allows interation which, in various forms – for istance: Participatory Planning GIS (Garau, 2012); 3D models (Hudson-Smith, 2005); platforms and computer games; integrated portals with augmented reality, etc. (Hanzl, 2007) – also lets young people propose and share ideas, but also atypical forms of association.

3 THE IMPORTANCE OF THE NETWORK IN URBAN PARTICIPATORY PLANNING

The web is an interface for information about and the promotion of planning in progress. This is often a necessary tool for the sharing of experiences, coordination and organisation of actvities and events. There is a vast amount of literature about citizen participation through the internet. Weber believes, for example that the inclusive actions on the web exert positive influences on participation policies, independent of the civic participation (Weber et al., 2003). Conroy and Gordon found that technological approaches in public meetings increased the level of satisfaction compared to traditional public meetings (Conroy et al. 2004). But there are also those who argue the opposite: it becomes a problem accepting the validity of the interface technology which the citizen might not know how to manage. To this point the citizen may feel manipulated (Innes 2005).

Today, an active participatory environment that uses internet has great potential to engage the public. Just consider how the latest generation technology allows you to raise the public debate even to young people through new participatory forms and practices. This occurs, for example, with virtual communities and social networks which, more and more, interact asynchronously with each other, creating a multitude of interactive environments in which people socialise (Facebook, Twitter), share content (Flickr, YouTube, Stumbleupon, Digg, blogs) and skills (Wikipedia, Linkedin).

The use of these tools allows integrated forms of communication, encouraging the expressive dynamics of mobilisation; individual and collective spheres converge transforming the lack of transparancy of individual relationships, making them transparent, potentially able to activate civic actions in different public areas (Boccia Artieri, 2011).

Furthermore, it is important to note that also on the web, the instruments used in an inclusive process depend largely on the level of participation that wants to be attained. The International Association for Public Participation (IAP2), relying on the scale of participation proposed by Arnstein (1969), has articulated five levels of public participation (inform, consult, involve, collaborate, empower) each successive level allows a greater impact on the overall process. Low levels of participation (inform, consult) involve the use of information tools such as interactive websites, public meetings or focus groups. Higher levels of participation (involve, collaborate, empower) allow feedback and the consequent practical implementation of community projects, through tools which go beyond a mere expression of willingness by those involved.

In order to understand which participatory process might be more suitable, Schlossberg and Shuford, suggested a matrix with various types of "users" along one axis and various levels of "participation" along the other. According to the authors, the understanding of the place in which the participation occurs is essential for its greater credibility and effectiveness. In their model, for example, the web pages are only sufficient to inform and consult the netizens. Consequently, the choice of tools to facilitate effective participation should be dictated also by the constraints of the web and by the characteristics of the actors involved in the participatory process (Schlossberg et al. 2003).

The new online communications and in particular social networks allow three main actions that enable participation: educational or informative action; relational action and finally organised action.

It starts from an initial approach in which the actors involved use the virtual spaces to create and disseminate information about the phenomena in question (the interaction in this phase is conversational and the degree of participation is emphasised by, for example, the "likes" on facebook or on blogs and by the sharing of this information with other parties involved), and then use the technology as an active part in the creation of connections between many individuals, developing a sense of gathering and community (the interaction in this phase is marked by the individual will to express their opinions, inputting skills, experience and personal opinions). It can also arrive at a level in which the virtual space can influence forms of participation for collective mobilisation (the interaction in this phase reaches the most advanced levels and is designed to eliminate digital boarders, i.e. the dynamics constructed on the web become real, through heterogenous participatory actions which can be carried out in practice because they are put into the daily life of the city).

4 E-PARTICIPATION AS A SOCIAL ACTIVATOR IN LOCAL CIVIC ACTION

Virtual-real interaction is so powerful, above all for young people, that some researchers have underlined how for example social networks have assumed a relational role that has a direct impact on their lives (Leyts 2011, Valtat 2011).

However these relational forms have major problems: many virtual movements, drivers of local civic action, do not have any continuity. In fact, more often than not they reach a "relational" peak which coincides with certain events of public interest and only last as long as is required for that activity. Online exchanges between contacts and updates end as soon as the event or action is no longer a priority for public discussion.

Therefore, if on the one hand the online tools help to organise civic action in a decentralised way, on the other hand, they are not able to guarantee stability and continuity, if not near specific emerging events (Kavada 2010, p. 117). The power of the web appears evident and it would be desirable to be able to exploit the initial enthusiasm in order to succeed in creating live and permanent relational processes (continuous not occasional) taking care to maintain the communicative architecture of the web, assuming common long-term projects.

One way to do this, could be a "quantitative and qualitative assessment" of the results which measure the contribution citizens want to give to ensure that decision-makers work better. It is possible, for example, to create indicators to monitor the cultural, social, intellectual and political growth of the participants during and after participatory processes. This could be published from time to time online, monitoring and updating the data, creating a greater sense of civic belonging to those who are part of that movement.

In this way, estimates could be produced of the perception that the drivers of the group "support" not only their interests but also the online community's. The increased desire in wanting to participate in decision-making could be analysed because it gives confidence and credibility to the participatory process.

Public awareness on the issues and policies in the long term can allow an effective assessment of the results of the initiative. In fact, the effectiveness of a participatory process is associated with the coherence of objectives and instruments adopted. Often this fails because it is given at an early stage when expectations are not consistent with the objectives or the time set (Laino 2012).

In the whirl of discussions regarding this debate it is fundamental to focus on the original objectives and resulting criteria that have led to inclusive planning practice (these criteria can include, for example: data and information circulating, respecting the schedule and working to short, medium and long-term deadlines, effects and assessments of the participatory process, etc.). However, over the course of time it is not easy to keep up the commitment to building cooperation and adapting such practices into society.

5 THE CONSTRUCTION OF A MATRIX TO MONITOR THE DEGREE OF PARTICIPATION

When thinking about the preparation of a methodology to monitor the users' degree of participation, it has been suggested that an interpretation matrix is set up which, on the basis of indicators related to the concept of participation in social networks, allows the evaluation of forms, activation and effects. The analysis is inspired by the ladder of citizen participation introduced by Arnstein (1969), then developed by Schlossberg et al. (2003) and by Bailey et al. (2011) to then put it into the world of social networks.

Once the blogs, forums and generic pages have been chosen to monitor, it is necessary to evaluate two important criteria in the first phase: the level of interaction (ranging from simple dissemination of information to the interaction itself) and the level of interest (which goes from involvement to the autonomous participation of other users), both structured by the same parameters but following different logic. In particular for the first (interaction):

- activities – how often they are updated;
- intensity – intensity of the conversations, tone of voice, etc.;
- credibility – level of dissemination among "influencers" in the various reference areas
- impact – willingness to change an idea, propensities etc., in relation to the objectives set

For the second (interest):

- activities – number of comments (total and average) in each post; number of daily comments etc..
- intensity – speed of dissemination: once a new post is written, the time it takes for the other users to read it is evaluated;
- credibility – level of confidence in the drivers of the movement
- impact – conversations, actions, directly measurable, in relation to the objectives.

In this way for each blog or forum selected, a first approximation can be made with a methodological grid to assess the current situation of the level of influence (1 = low, 2 = medium, 3 = high) based on the interaction and interest taken (Table 1 and Table 2).

Example A	LEVEL OF INTERACTION		LEVEL OF INTEREST	
	Information	Interaction	Involvement	Autonomy
ACTIVITY		3		2
INTENSITY		3	2	
CREDIBILITY		3		3
IMPACT		3		1

Table 1. Example of evaluation of degree of participation in a generic blog in social networks

Example B	LEVEL OF INTERACTION		LEVEL OF INTEREST	
	Information	Interaction	Involvement	Autonomy
ACTIVITY		2	3	
INTENSITY	3		2	
CREDIBILITY	2		2	
IMPACT		1	1	

Table 2. Example of evaluation of the degree of participation in a generic blog in social networks

In order to allow comparison between more movements, the average of the sub-parameters is taken (activity – intensity – credibility – impact) so that there is a single numerical value for the level of interaction and interest. This numeric parameter will measure the degree of participation (Figure 1).
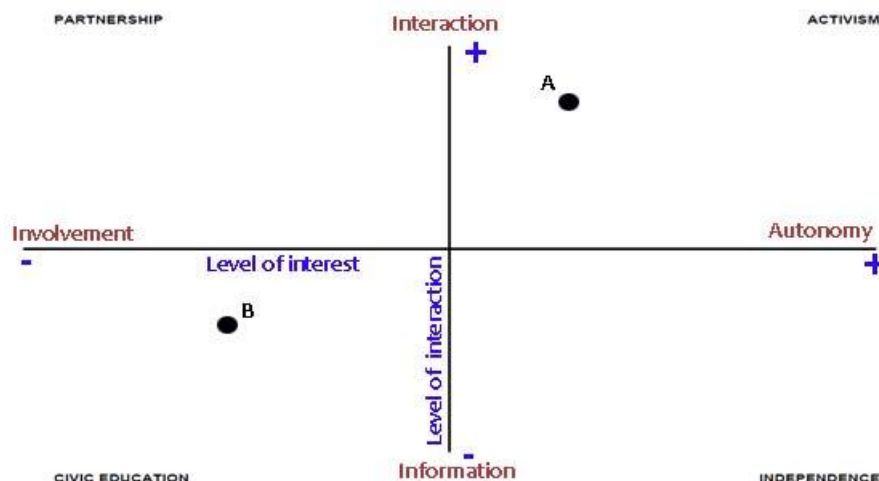
Fig. 1. Comparison of level of participation of generic blogs in social networks

The two axes (formed by the level of interaction and interest respectively) identify four areas where, in each one the partipatory valence changes: the first is the so called civic education, equipped with a low level of interaction (one way comunication) and a low level of interest among participants. The second, partnership connects a low level of interest with a significant level of participant interaction. In the third area, activism combines a high level of interaction with a high level of participant interest in terms of autonomy of the other users interacting in the blog. The last area, independence, links a high level of interest with a low level of of interaction.

It has been noted that the success or failure of a blog depends on a set of merits, causes and indiscretions in which roles, competences, duties and responsibilities are monitored continuously. With this in mind, this tool is anticipated as a prototype to help measure participation in online environments which are difficult to quantify.

6 CONCLUSION

Public participation has been a constant of the planning process, especially since the nineties. Every generation has made its unique contribution in an attempt to bring improvements to interactivity between citizens, government and policy makers. And while it woud seem that planning might not have an apparent need for the support of the social media, in some way, it has to seize its great potential. On this subject Christ (2005) was a pioneer, anticipating the concept that the social media would have led to a rethinking in the way to deal with the communicative and relational approach with the people involved.

Today one cannot underestimate the fact that on the one hand there is great technological progress which improves the quality of life of the individual, but on the other hand the model of development inevitably produces a social polarization in which users at different levels with the city "have to adapt in a constant and flexible way" (Castells et al. 2002, p. 82). This strong compromission of the city with the digital technology is evident in relation to globalisation (Sassen 2003); cities are in fact the result of a process of the redefinition of their structure, in which two complementary tendencies play a key role: on the one hand there is the push towards decentralization and territorial dispersion by the new information and communication technology (Barbieri 2010); on the other hand there is the tendency towards "global cities" acting as nodes in a network. It is important not to exasperate the research in seeking to engage the user in an almost surreal way, until it gets to a point in which it wants to make as real as possible what, in fact, is not real.

7   REFERENCES

ABERS R.: Inventing local democracy: Grassroots politics in Brazil, Lynne Reinner, Boulder, 2000.
AGRANOFF R.: Managing within networks: Adding value to public organizations. Georgetown University Press, Washington, 2007.
ALTSCHULER A. A.: The city planning process: A political analysis, Cornell University Press, Ithaca, 1965.
ANGOTTI T.: New York for sale. L'urbanistica partecipata affronta il mercato immobiliare mondiale, ED.IT, Firenze, Catania, 2011.
ARNSTEIN S. R.: A ladder of citizen participation. In Journal of American Institute of Planners, pp. 216-224, 1969.

BAILEY K, BLANDFORD B, GROSSARDT T, RIPY J.: Planning, technology, and legitimacy: structured public involvement in integrated transportation and land-use planning in the United States. In Environment and Planning B: Planning and Design 38(3), pp. 447 – 467, 2011.

BARBIERI P.: È successo qualcosa alla città: manuale di antropologia urbana, Manuale Roma, 2010.

BEARD V. A.: Learning radical planning: The power of collective action. In Planning Theory 2 (1), pp. 13-35, 2003.

BRIGGS X. S.: Democracy as problem solving: Civic capacity in communities across the globe. Cambridge: MIT Press, 2008.

CRAIG W. J., HARRIS T. M., WEINER D.: Community participation and geographic information systems, Taylor and Francis Group, London, 2002.

BATTY M., BATTY S., EVANS S., HUDSON-SMITH A.: Experiments in Web-based PPGIS: Multimedia in urban regeneration. In P. Longley, M. Batty, a cura di, Advanced Spatial Analysis, ESRI, Redlands, California, pp. 369-390, 2003.

BOCCIA ARTIERI G., Connessi in pubblico: sfera pubblica e civic engagement tra mainstream media, blog e siti di social network. In: Comunicazione e civic engagement. Istituzioni, cittadini e spazi pubblici nella postmodernità, Pic-Ais, 2011. Available at: http://cdn.ais-sociologia.it/uploads/2011/09/pic-2011-Boccia-Artieri1.pdf

CASTELLS M., BORJA J.: La città globale, De Agostini, Novara, 2002.

CHRIST P.: Internet technologies and trends transforming public relations. In Journal of Website Promotion, 1(4), pp. 3–14, 2005.

CLAVEL P.: Activists in city hall: The progressive response to the Reagan era in Boston and Chicago. Cornell University Press. Ithaca, 2010.

COHEN J.: Deliberation and democratic legitimacy. In Matravers D., Pike J., Debates in contemporary political philosophy. An anthology, Routledge in association with the Open University, London, pp. 342–360, 2003.

CONROY M., GORDON S.: Utility of interactive computer-based materials for enhancing public participation. In Journal of Environmental Planning and Management, 47, pp. 19-33, 2004.

CROSBY B. C., BRYSON J. M.: Leadership for the common good: Tackling problems in a shared-power world. Jossey-Bass San Francisco, 2005.

D'AMBROSI L.: Giovani che si attivano: dinamiche espressive e spazi di dialogo nelle politiche pubbliche. Rivista di Autonomie Locali e Servizi Sociali, 2, pp. 213-230, 2011.

DAVIDOFF P.: Advocacy and pluralism in planning. In Journal of the American Institute of Planners 31, 4, pp. 331-38, 1965.

ESNARD A., GELOBTER M., MORALES X.: Environmental justice, GIS, and pedagogy. In Cartographica, 2004, 38, 3/4, pp. 53-61.

DELLICARPINI M. X., COOK F. L., JACOBS L. R.: Public deliberation, discursive participation, and citizen engagement: A review of the empirical literature. In Annual Review of Political Science 7, pp. 315-44, 2004.

FELDMAN M. S., KHADEMIAN A. M.: The role of the public manager in inclusion: Creating communities of participation. Governance 20, pp. 305-24, 2007.

FORESTER J. 1999. The deliberative practitioner: Encouraging par- ticipatory planning processes. Cambridge: MIT Press.

FRIEDMANN J. 1987. Planning in the public domain: From knowl- edge to power. Princeton, NJ: Princeton University Press.

FUNG A., WRIGHT E. O.: Deepening democracy: Insti- tutional innovations in empowered participatory governance. Verso Books, NY, 2003.

GARAU C.; Focus on citizens: public engagement with online and face-to-face participation – A case study. In Future Internet, 2012, 4(2), pp. 592-606, ISSN: 1999-5903

GARRAMONE V.: Comunità parlanti. Esercizi e spazi di democrazia non gerarchica ma aperta e popolare. In Garramone V., Aicardi M., a cura di, Democrazia partecipata ed Electronic Town Meeting. Incontri ravvicinati del terzo tipo, Franco Angeli, Milano, 2011.

GOLDSMITH S., EGGERS W. D.: Governing by network: The new shape of the public sector., Brookings Institution, Washington, 2004.

HANZL M.: Information technology as a tool for public participation in urban planning: a review of experiments and potentials. In Design Studies 2007, 28 (3), pp. 289-307.

HAJER M. A., WAGENAAR H.: Deliberative policy analysis: Understanding governance in the network society. Cambridge University Press, London, 2003.

HARRIS T., WEINER D.: Empowerment, marginalization and community-oriented GIS. In Cartography and Geographic Information Systems, 1998, 25,2, pp. 67-76.

HEALEY P.: Collaborative planning: Shaping places in fragmented societies. University of British Columbia Press, Vancouver 1997.

HUDSON-SMITH A., EVANS S., BATTY M.: Knowledge and Policy Building the virtual city: Public participation through e-democracy, 2005; 18,1, pp. 62-85.

INNES J. E.: Planning theory's emerging paradigm: communicative action and interactive practice. In Journal of Planning Education and Research, Vol.14, 1995, pp. 183-189.

INNES J. E.: Information in Communicative Planning. In Journal of the American Planning Association, Vol. 64, 1, pp. 52-63, 1998.

INNES J. E.: Living in the house of our predecessors: The demand for new institutions for public participation. In Planning Theory and Practice, 6, 3, pp. 431–435, 2005.

INNES J. E., BOOHER D. E.: Public Participation in Planning: New Strategies for the 21st Century, Working Paper 2000-07, I.U.R.D., University of California Berkeley, 2001.

INNES J. E., BOOHER D. E.: Collaborative policymaking: Governance through dialogue. In Deliberative policy analysis: Understanding governance in the network society, ed. Hajer M. A., Wagenaar H., pp. 33-59. Cambridge University Press, London, 2003.

KAVADA A.: Activism transforms digital: the social movement perspective. In M. Joyce, ed. Digital activism decoded. The new mechanics of change. Idebate Press, New York, pp. 101-18, 2010.

KETTL D.: The transformation of governance: Public adminis- tration for twenty-first America. Johns Hopkins University Press, Baltimore, 2002.

KRUMHOLZ N., CLAVEL P.: Reinventing cities: Equity planners tell their stories. Temple University Press, Philadelphia, 1994.

KRUMHOLZ N., FORESTER J.: Making equity planning work: Leadership in the public sector. Temple University Press, Philadelphia, 1990.

KWAN M.: Feminist visualization: re-envisioning GIS as a method in feminist geography research. In Annals of the Association of American Geographers, 2002, 92, 4, pp. 645–661.

LAINO G.: Il fuoco nel cuore, il diavolo in corpo. La partecipazione come attivazione sociale, Franco Angeli, Milano, 2012.

LEYTS M.: Connecting with young people through social networks. In Share your voice. Second European Conference on Public Communication. Brussels, 19-20 October, 2011.

MITCHELL A.: Zeroing In: Geographic Information Systems at work in the community. In ESRI press, Redlands, CA, 1997.

O'LEARY R., BINGHAM L. B.: The collaborative public manager: New ideas for the twenty-first century. Georgetown University Press, Washington, 2009.

PICKLES J.: Ground Truth: the Social Implications of Geographic Information Systems, Guilford Press, New York, 1995.

REARDON K. M.: Enhancing the capacity of community-based organizations in East St. Louis. In Journal of Planning Education and Research 17: 323-33, 1998.

SANDERS L. M.: Against deliberation, in Political Theory, vol. 25, 3, 1997, pp. 347-376.

SANDFORT, J. R., MILWARD H. B.: Collaborative service provision in the public sector. In Cropper S., Ebers M., Huxham C., Smith P.: Ring, The Oxford handbook of interorganizational relations, pp. 147-74. Oxford University Press, Oxford. 2008.

SASSEN S.: La città nell'economia globale, Il Mulino, Bologna, 2003.

SAWARD M.: Democratic innovation: deliberation, representation and association, Routledge, London – New York, 2000.

SCHLOSSBERG M., SHUFORD E.: Delineating "Public" and "Participation" in PPGIS. In URISA Journal 27, 2003, pp. 15–26.

STEINMAN R., KREK A., BLASCHKE T.: Can online map-based applications improve citizen participation? In Boehlen, M.; Gamper, J.; Polasek, W.; E-Government: Towards Electronic Democracy, TCGOV 2005, Bozen, Italy: Lecture Notes. In Computer Science, Springer Verlag, Berlin, 2005, pp. 25–35.

TALEN E.: Bottom-up GIS: a new tool for individual and group expression in participatory planning. In Journal of the American Planning Association, 66, 3, 2000, pp. 279-294STEINMAN R., KREK A., BLASCHKE T., Can online map-based applications improve citizen participation? In M. Boehlen, J. Gamper, W. Polasek, E-Government: Towards Electronic Democracy, TCGOV 2005, Bozen, Italy: Lecture Notes in Computer Science, Springer Verlag, Berlin, 2005, pp. 25–35.

SIEBER R.: Rewiring for a GIS/2. In Cartographica, 2004, 39, 1, pp. 25-40.

YOUNG I. M.: Activist challenges to deliberative democracy. In Political Theory, 2001, vol. 29, 5, pp. 670-690.

VALTAT A.: Mind the gap – the pitfalls of networking with EU citizens on social media. In Share your voice. Second European Conference on Public Communication. Brussels, 19-20 October, 2011.

WARREN S.: The utopian potential of GIS. In Cartographica, 2004, 39, 1, pp. 5-15.

WEBER L., LOUMAKIS A., BERMAN J.: 'Who participates and why? An analysis of citizens on the Internet and the mass public, Social Science Computer Review vol. 21 pp. 26-42, 2003.

Planning in Fragile Sites in Turkey: in Case of Hasankeyf

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1 ABSTRACT

Hasankeyf is a small town in the Batman Province in southeastern part of Turkey, and located along the Tigris River. Hasankeyf is an ancient city and is rich in history. It hosted many different cultures like Byzantine Empire, Atudiks, Ayyubids, Ottoman Empire and contains more than 300 important archeological monuments like The Old Tigris Brige, The Citadel, Small Palace, Ulu Mosque, Süleymaniye Mosque etc., also thousands of caves exist in the cliffs in the city. Along these, it has a very sensitive and unique ecosystem. It has been declared a natural and cultural conservation area the Turkish government in 1978. Specialists and scientific researchers claim that Hasankeyf meets the criteria defined by the UNESCO-World Heritage Center and should be added to the World Heritage List.

However, the Ilısu Dam Project seriously threatens Hasankeyf, the potential World Heritage Site. This project was prepared many years ago without the evaluation of Environment Impact Assessment Report and without consideration of the unique heritage qualities of Hasankeyf. Ilısu Dam Project was designed to be the second biggest dam and the 4th highest power and energy production plant in Turkey and planned as one of the most important investments in GAP-Southeastern Anatolia Project, which is the primary element of the long-run regional development plans of the southeast of Turkey. There were even international supporters at the beginning such as Austria, Germany and Switzerland. Even though there were so many objections and protests by Non-governmental organizations, the project has not been canceled yet. This site will be inundated, and the identity and memory of the Hasankeyf will be lost if the construction of hydroelectric Ilısu Dam Project comes to an end. As a solution, they plan to transfer all the settlements lay on that area to another place in the same region.

This paper aims to discuss the critical situation of planning in fragile sites in Turkey with regards to the case of Hasankeyf in context defined by the following question: How to plan for a 'unique' potential World Heritage Site (WHS) whilst taking into account, both past history and future development possibilities? In this context of the paper, suggestions are made in relation to the planning regulations and organizational structure for the sustainability of conservation areas.

2 GENERAL CHARACTERISTICS OF HASANKEYF SITE

Hasankeyf is a historical place located near the Tigris River in the southeastern Turkey, north to the Mesopotamia (see figure 1). With the advantages of Tigris River, which is rich in water resources, the region had hosted more than twenty civilizations including Rome, Byzantine and Seljuk, and survived until today. Due to the water resources, it had been strategically important in every period of history as well as an economically active site due to being on the historical Silk Road and accordingly with its traditional architectural buildings, such as inns, caravanserai etc. in the course of history. It is a well-known fact that this historical city and its surrounding attract a great number of local and foreign tourist each year.

The exact date of the establishment of Hasankeyf has remained in dark so far; due to the insufficient data and information in hand, the opinions on its establishment have been nothing but a possibility. The geopolitical location of the city, its importance as well as many caverns occupied for settlement purposes indicate that Hasankeyf is a very old settlement. The history of the Hasankeyf dates back to the ancient age. The name of the city which is Hısnkeyfa is translated as 'Kayahisarı'. It had been stated that these words mean a place 'which is easy to defend' in the old history and by tribes. Since the fortress is massive stone, Hasankeyf means 'Stone Fortress' in various languages (Hasankeyf Town Governorship). Unique quality of buildings in the site and ruins embodying the basic settlement characteristics of a Middle Age Islam city as well as its unique landscaping make Hasankeyf a WHS which must be protected with care. The genuine Middle Age city texture of the site, worth-to-see artifacts and the co-existence of nature and history dramatically spellbound the visitors. With its natural elements, cultural landscape, high quality work of arts, first-class architectural buildings and engineering structures, Hasankeyf is not only important for its region but also for the world (Ahunbay & Özge, 2010, p:1).

Figure1. Location of Hasankeyf, the WHS in Turkey. Source: http://maps.google.com/

This unique and sensitive historical place is declared as first degree Conservation Area (CA) by the Republic of Turkey Ministry of Culture in 1978. Since then the 2005 United Nations Education, Science and Cultural Organization (UNESCO) Operation Guidelines set out the generic key qualities of the unique World Heritage Sites which are also valid for the Hasankeyf CA. The function of UNESCO is to protect and preserve the cultural and natural heritage properties which were developed by different cultures and civilizations through the human history and enlighten the different phases, stages, richness and differences of this common past, by drawing attention on the fact that these properties are increasingly in danger due to not only conventional destruction but also the changing social and economic conditions.

Figure 2: Settlements of Hasankeyf. Source: http://www.dogadernegi.org.

UNESCO evaluates the natural and cultural heritages in the world according to 10 criteria. Hasankeyf fulfills the 9 of these criteria which are set out below as follows:

1. To represent a masterpiece of human creative genius.

Hasankey is an outstandingly valuable site with its masterpieces such as the tomb of Zeynel Bey, Sultan Süleyman Mosque and Bridge and Citadel towering above the waters of Tigris River. In particular, the doors of the fortress and bridge design are unique artifacts.

2. To display an important exchange of human values, over a certain period of history or cultural area, on developments in architecture or technology, monumental arts, town planning or landscape design.

With several examples, Hasankeyf was a source of inspiration to its visitors and persons who had an influence on their own culture by carrying their experience with them. Hasankeyf had hosted many persons through the centuries and had been the melting pot of many rich and interesting experiences. For instance, Iranian architect of the tomb of Zeynel Bey was the person who introduced the glazed brick to this city which has a very solid background in stonemasonry. The architectural structure of the tomb is also new for the site; a style which born in Samarkand, the capital of Greater Timur Empire, and crossed beyond the Iran reaching up to this city. A trip towards east or west to the Hasankeyf reveals that such kinds of structures also reach up to Istanbul. As another example, Hasankeyf Bridge is famous with its 40 meters central arch. The remnants of the bridge give an idea about the exquisite details of its design. The tradition of building bridges with single span on the great rivers is repeated around the 16th century by Architect Hayreddin who constructed the Mastar Bridge, which is today inscribed on the World Heritage List.

3. To bear a unique or exceptional testimony to a cultural tradition, living or disappeared civilization.

The attributes which make Hasankeyf unique are its exceptional location on the Tigris River and urban elements survived until today. In the recent excavations, interesting findings which belong to Roman age and previous ages are brought to the light, which gives us the hint on the deep-rooted history of the city. Site is geographically under the influence of Syria and Iran architecture. Also the modernization waves of 19th and 20th centuries has not destroyed city, which makes the site more important as a rare ruin.

4. To be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history.

Hasankeyf is a host which welcomes very rare architectural types of Anatolian-Turkish architecture. The building called as Kızlar Mosque is an interesting example of the tomb architecture. With its cylindirical walls ornamented with the glazed bricks and double-wall dome, Tomb of Zeynel Bey is the only mausoleum under the influence of Timur period. Göreme, located in the Cappadocia and one of the World Heritage sites is a World Heritage protected area with its churches carved into the rocks and underground cities. Also in Hasankeyf, many house, religious and business buildings are carved into the rocks. These traditions provide us important historical and aesthetic data on the civilizations existed near the Tigris River for very long years.

5. To be an outstanding example of an human settlement, land use or sea use, in particular, this example should have not lost its durability under the impact of irreversible change.

Taking its special position and uniqueness, this historical settlement which conserved the traditional living spaces carved into the rocks is an extraordinary protected area with its reputable Middle Age buildings. The city water supply system, caverns, stone houses and the store complex carved into the rocks on the road rising above the Fortress illustrate a thousand years of art and mastership as well as skills and cultural tradition of the residents. In the recent period, traditional lifestyles of the residents have changed dramatically; in 20th century, they moved from the caverns to the Down Town. Today, the dam project, pressures of change due to the contemporary lifestyles as well as tourism expectations are the risks with which this Middle Age town faces.

6. To contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance.

Hasankeyf is located in the north to the Tigris River, one of the two great rivers making up the Mesopotamia. The river is the most basic potable water resource and for hundred thousands of years everything in the site has been shaped according to the river flow. This also includes the human settlements dating back around 10.000 years. The riverbed is alone a unprecedented natural miracle, since in its flow direction from Turkey to the Persian Gulf, it created a unique system of geological formations and a wide range of riverbank systems. This system of geological formations includes deep canyons, moist gallery forests, sandy places just a few meter to the half-deserted sites and calcareous steps occupying a very wide area. Also human history which developed monumental civilizations contributes in the natural geography of the Tigris River.

7. To be outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features.

The section of Tigris River in the territory of Turkey is in the south to the collision zone of the Arabia and Anatolia continental planes. It deeply digs the bed of the Tigris River especially around Hasankeyf and continues to flow towards the south. It seems that most of the Valley of Botan Creek (Uluçay) springing from Siirt and emptying into Tigris will remain under the water after the launch of Ilısu Dam. This valley which is shaped as a result of massive tectonic elevations is a sort of Great Canyon of Turkey. The slopes of the Tigris Valley are full of with the limestone which is easy to dissolve when contacted with the water. This attribute allows for the formation of natural caverns which had been used as a house by the residents in the past.

8. To be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals.

Following the rapid destruction of the river and canyon ecosystems in the Euphrates basin, Tigris Valley remains the sole and last example which has these attributes in the southeastern Turkey. The uniqueness and irreplaceable of the site can also be understood from the number of types of migratory birds sensitive and in danger and the sizes of the biological diversity specific to this basin (Welch 2004; Eken et al. 2006). Eken et al (2006) identified five Important Natural Sites (INS; globally significant sites in order to protect the biodiversity) in relation with the section of Tigris River in the territory of Turkey. In addition to these INSs, Welch talks about five 'Priority Sites' which compose of one single and complete ecosystem along the Tigris Valley (Ahunbay & Özge, 2010, p:2-8). All the freshwater aquatic species in the area are the species irreplaceably specific to that region. The section of Tigris in the territory of Turkey is still a river part which is protected and untouched.

9. To contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.

As it will be conceived by the existence of five difference INSs within the territory, this stream system is very important in terms of natural habitats and threatened species. 1. INSs of the Tigris River can be listed as Bismil lowland, Tigris Valley, Küpeli Mount, Eruh Mountains and Cizre Silopi NSI. Under the influence of Mediterranean, step and desert climates, Tigris Valley is a very wide biodiversity area for many endemic species which are extremely in danger and have the priority of protection such as Cicer Echinosperium. The cliffs dominating the Site are the habitat of species such as Hiertus Fasciatus, Falco Naumanni, Nephron Percnopterus and Gyps Fulvus, which are globally in danger. Steep and arid sandy hills are important reproduction habitat for rare bird species such as Apus Affinis, Emberiza Cineracea and Ceryle Rudis. Rafetus Euphraticus is endemic specie living in the Tigris and Euphrates stream systems. This turtle specie lays their eggs in the sands around the riverbank of Tigris. Capra Aegarus uses the rocky cliffs and steep canyons of the Tigris Valley. Hyaena Hyaena living in the caves and caverns of the Site is one of the priority mammal species in INSs (Ahunbay & Özge, 2010, p:2-8). However, the CA universally is a 'World Heritage Site' due to housing natural and cultural remnants of various ages.

In order to protect Hasankeyf and Tigris Valley, which is under the large urban development pressures in the context of current changing social and economic conditions and which must absolutely be protected as a WHS, the Turkish Government must apply UNESCO to enlist the Site as an official World Heritage Site.

3 ILISU DAM PROJECT AND ITS IMPACT ON THE HASANKEYF CONSERVATİON AREA

Designed in 1950s and approved in1980s, Ilısu Dam Project is currently being constructed on the Tigris River as a part of Southeastern Anatolia Project (GAP). It is a multi-sector, integrated regional development project launched in the region of Southeastern Anatolia, one of the relatively less developed regions in the country, comprising 9 administrative provinces (Adiyaman, Batman, Diyarbakir, Gaziantep, Kilis, Mardin, Siirt, Sanliurfa and Sirnak) in the basins of the Euphrates and Tigris and in Upper Mesopotamia. The GAP had been planned in the 70s consisting of projects for irrigation and hydraulic energy production on the Euphrates and Tigris, but transformed into a multi-sector social and economic development program for the region in the 80s. Social processes have become important for environmentally resilient planning and resource management. The basic strategies of the project include fairness in development, participation, environmental protection, employment generation, spatial planning and infrastructure development.

Its basic objectives include the improvement of living standards and income levels of people so as to eliminate regional development disparities and contributing to such national goals as social stability and economic growth by enhancing productivity and employment opportunities in the rural sector. As an integrated project, it goes beyond physical investments in such facilities as dams, power plants and irrigation schemes and encompasses activities and investments, in a coordinated manner, in many diverse fields including agricultural development, industry, rural and urban infrastructure, communication, education, health, culture, tourism and other social services.

State Water Authority which operates the project on behalf of the ex-Ministry of Environment and Forest describes the purpose of Ilısu Project as follows; 'Ilısu Dam Project will contribute to the development of Southeastern Anatolia Region, notably of provinces of Diyarbakır, Batman, Mardin, Siirt and Şırnak. When completed, it will provide an annual added value of 400 million US Dollar in our economy with the annual average energy generation of 3,833 billion kWh. Ilısu Dam and Hydroelectric Power Plant (HPP) is the Second Largest dam and HPP in terms of water volume and the Second Largest in terms of installed power and the largest dam and HPP on the Tigris River and when completed, it will provide an annual added value of 400 million US Dollar just in terms of electricity generation. It impacts 144 settlements, including 1 town, 101 villages and 42 arable fields and a total of 37100 citizens living on the project boundaries. A new settlement area is created named ' New Ilısu Village' as an alternative to the citizens living in these settlements under impact of Project. Tigris River is the last river of which ecosystem has not been intervened by such as dam etc. on the Southeastern Anatolia. However, with the construction of the Ilısu Dam, Tigris River will lose this attribute and the historical Hasankeyf settlement will remain under the water.

On the grounds of Dam construction which began before 1993, it is legally exempted from requirement of issuing Environmental Impact Assessment. Pursuant to the Environmental Impact Assessment Regulation published in Official Journal No 26939 dated July 17, 2008, Environmental Impact Assessment (EIA): defined as the identification of positive or adverse impacts of the projects planned on the environment; of the measurements which will be taken in order to minimize or eliminate the adverse impacts on the environment, of the works which will be executed in the monitoring and control of the project implementations as well as of the evaluation of the alternatives to the project sites and technologies to be adopted. However, pursuant to the provisional article of this regulation; provisions of the Environmental Impact Assessment Regulation are not applicable on the exempted projects which are started before publication of the Regulation in Official Journal No 21489 dated February 7, 1993.

It is certain that the impacts of the Ilısu Dam will cause the irreparable consequences. Ilısu Dam, at the same time, does not fulfill the Environmental Impact Assessment, Water Framework Directive, Habitat and Bird Directives, Strategic Environmental Analysis Directive of the European Union, EU Human Rights standards and World Bank standards Bern Convention, World Bank Committee principles, which are undersigned by Turkey. The Environmental Report issued by three European companies in 2005 was very poor and insufficient work and adopted the approach which ignores the consequent fact of Hasankeyf remaining under the water and resulting damages on the ecosystem.

As indicated in the working report 'Evaluation of the Ilısu Dam Environmental Impact Assessment Report' published in 2006 for the Ilısu Dam and Hydroelectric Power Plant (Ilısu Project) by Doğa Association;

(1) Ilısu Project will cause a great environmental impact since it will change and deteriorate irrecoverably the critical natural habitats.

(2) The impacts which will be caused by the project are not explicitly stated in the Evaluation of the Ilısu Dam Environmental Impact Assessment Report, the measurements required for alleviating the impacts of the project and World Bank's OP 4.01 Environmental Assessment and OP 4.04 Natural Habitats Implementation Policies, which are among the international conditions Environmental Action Plan (EAP) of the project are not fulfilled. Thus, the measurements for minimizing the adverse impacts of the project suggested by the project are not capable of offsetting the biological diversity to be lost due to the project.

(3) Evaluation of the Ilısu Dam Environmental Impact Assessment Report does not suggest other alternatives of the project at a sufficient level.

(4) The activities which must be performed for the public participation and public opinion pooling at the start and during the Evaluation of the Ilısu Dam Environmental Impact Assessment process were not fulfilled comprehensively at the level required by OP 4.01.

In addition, Evaluation of the Ilısu Dam Environmental Impact Assessment Report is intended to fulfill the standards of Work Bank, it shortly mentioned on the publication 'World Bank Environmental Resource Book' (1999). Particularly 8th and 10th sections of this resource book provide suggestions on the 'Dams and reservoirs' and 'Hydroelectric projects'. Although the 2nd Section of the 'World Bank Resource Book and Environmental Assessment Resource Book Version No. 12 (October 1997) and the book Biological Diversity and Environmental Assessment Tools (March 2000) are relevant to the issue, surprisingly enough even their names are not mentioned in the Evaluation of the Ilısu Dam Environmental Impact Assessment Report (Doğa Association, 2006, p: 14).
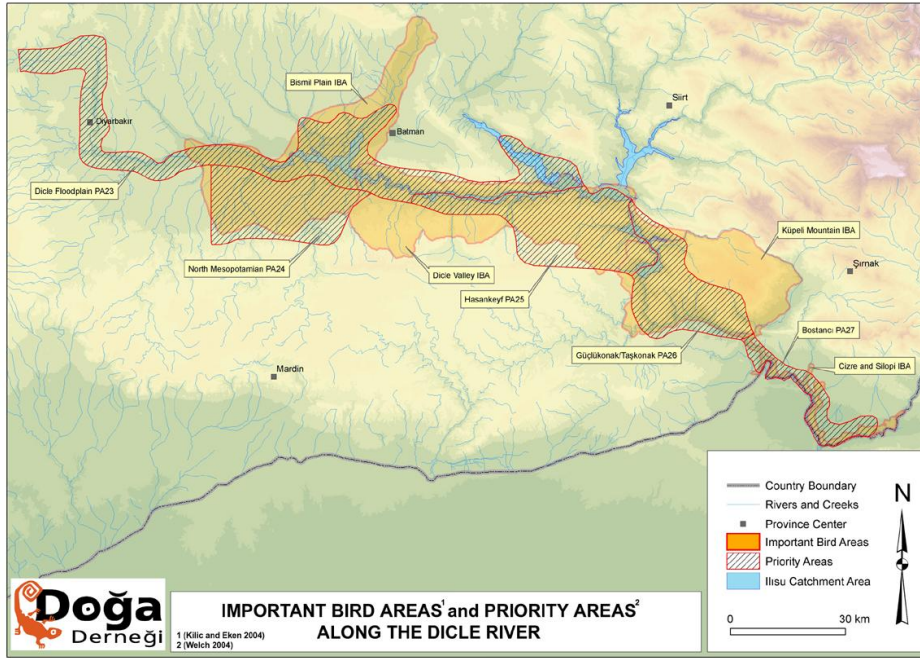
Figure 3: Important Bird Habitats and Priority Sites along the Tigris River. Source: Doğa Association, 2006, p:10.

Notably of Doğa Association, many non-governmental agencies, academicians, intelligentsia and public take initiatives for many times to inscribe the Hasankeyf on the World Heritage List and brought the issue to the world agenda and found supports from the international arena. Nevertheless, Turkish Government has not given up this project and has not applied UNESCO for inscription of the Hasankeyf on World Heritage List.

Despite of worldwide protests, Germany, Austria and Switzerland agreed on the project with Turkey in 2007. As a result, European companies are incorporated in the Ilısu Project. However, three European countries demanded the fulfillment of the 153 criteria for the development of the project. The Project was required to meet to the World Bank Standards. However, during the time, Turkish Government did not perform the demands in order to fulfill the standards, Germany, Austria and Switzerland cancelled the agreement they made with Turkey in 2009 and withdrew their loans (Doğa Association Publications, 2010). Nevertheless, Ministry of Environment and Forest which insisted on the implementation of the project, procures financing from two local banks. When the Ilısu Dam Projects is brought into life, it will have irrecoverable damages on the natural and cultural values of Tigris Valley and Hasankeyf as well as tourism industry, which is important for the region as well as the country.

4   EVALUATION OF THE PLANNING PROCESS OF THE SITE

While the resolutions concerning the preservation of the natural, historical and cultural structure of the region are incorporated in the Report on the 'Environmental Plan (Scale: 1/100.000) for the Region encompassing Mardin, Batman, Siirt and Hakkari Provinces' (uncorfimed) issued by the Ministry of Environment and Urban Development, the Ilısu Dam is accepted as a postulate under the title of projects and investments which govern the plan decisions, which is in contrary to these resolutions adopted. In the Report: it is stated that there are dam, HPS, Airport, Railroad and Industrial investments which will support the development of the Region. The transportation projects increase the accessibility of the plan region and open the gate for new suggestions. By benefiting from the water potentials in the region, the launch of Dam and HPS projects will play an important role in the meeting the irrigation and electricity need. The

evaluation process of the HPS projects of which applications made by the private sector should be facilitated and pave the way for the investments and 23 HPS Projects are estimated. Among them, Ilısu Dam which will be one of the largest dams of Turkey is legally exempted from the requirement of preparation of Environmental Impact Assessment due to the fact that its construction began before 1993. This is very mistaken attitude. In the recent years, the establishment of the HPSs of which adverse impacts on the natural cycles and ecosystem are very well-known has become widespread under the privatization scopes, the number of which has been increasing in an uncontrolled manner.

Again in the same Report of Environmental Plan; although it is said that concerning the protected areas 'this areas shall be subjected to the Law on Protection of Culture and Natural Properties No 2863 and relevant regulations as well as relevant resolutions of the boards', and without considering the 'protected area' attribute of Hasankeyf and most probably without consulting the Protection Board, new plan resolutions are brought about the settlement. Since the Hasankeyf will remain under the water as a result of Ilısu Dam Project, it is intended to change the settlement site. In the Report it is stated that 'Especially, Ilısu Dam will have important effects on the region. The dam which will cause the historical values to remain under the water will contribute in the region in terms of agricultural and electricity generation..... By resolving on the Sub-Zone Development plan of Ilısu Dam Lake Surrounding; Hasankeyf has an important historical and cultural potential at the intersection of the civilizations. However, since the settlement will remain under the waters of Ilısu Dam of which construction started in 2006, it will be moved to the area which is proposed by the Mass Housing Administration to the north of Kuru Neighborhood across the Tigris River".

The public who was still living in the rock caverns according to the climatic characteristics which is generally hot and arid and warm in the winter, are expelled from the caverns without pooling the public opinion and compelled to live in reinforced concrete houses planned new under the name of modern settlement area during the 1970s. Again with this project, despite of all protests, relocation is planned without pooling the public opinion and participation.
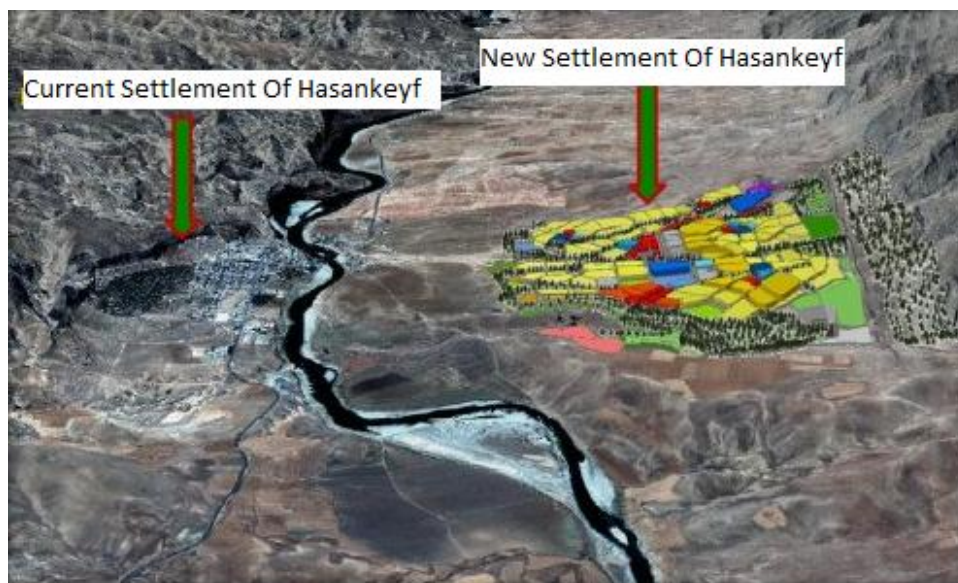
Figure 4: Current Settlement of Hasankeyf &New Settlement of Hasankeyf in Ilısu Dam Project Plan. Source: DSI.

Under the resettlement works to be carried out in New Hasankeyf Town, the 1st Phase infrastructure tender is completed in 2010 under the Development Plan works with the budget transferred by DSI General Directorate to TOKİ Administration. It is claimed that the new settlement will be a modern town with its 58 houses, technical infrastructure, school, government office, municipality service building and green areas etc. and an attraction for water sports and tourism. According to the Ilısu Dam project plan, certain monuments of the cultural and historical importance will be demounted and rebuilt in an 'Archeological Park' in a new zone to be constructed near the dam reservoir. New area which is 10 km to the current Hasankeyf is at the hills of Raman Mount. Although feasibility and archeological diggings has not been completed in the Hasankeyf, specialists emphasize that demounting of these monuments from their places is technically impossible. Furthermore, the genuine texture of the Hasankeyf, the nested togetherness of the natural and cultural values, rock caverns, tumulus etc. will be destroyed irrecoverably. Council of State adjudicated on

the imposition of the EIA requirement on the Ilısu Dam Project and suspension of the execution thereof in the course of action filed by TMMOB Chamber of Architectures and Chamber of Landscape Architectures in relation with the Project which will submerge Hasankeyf town in the waters and has adverse impacts on the ecosystem of Tigris Valley on7th Januar 2013.

Area Status	New Hasankeyf	Current Hasankeyf	Increase
Settlement Area (Hectare)	294.86	50.82	6 times
Green area (Hectare)	78.7	0.87	90 times
Green Area (Ratio)	27 %	2 %	14 times

Table1: Comparison of Current Settlement and New Settlement of Hasankeyf in Ilısu Dam Project Plan. Source: DSI..

5 CONCLUSIONS

Each town/region in Turkey houses very unique and rich history, cultural and natural values. However, due to the lack of awareness both of these values as well as of protection of them, very sensitive, fragile and important CAs are adversely affected. Despite of the increasing awareness on the values attached to the historic areas and their protection in the recent years, actions taken are insufficient. Tigris Valley which houses Hasankeyf is the home of both natural and historical and cultural values which must be preserved. The settlement which has the attributes of the World Heritage is threatened to be remained under water once the Ilısu Dam Project is completed. When Hasankeyf case is considered in terms of planning, two issues are apparent: firstly, preservation of the Tigris River is essential and secondly protection of the natural and historical cultural structure of the Hasankeyf is essential. Ti6gris River is one of the most important rivers and the most sensitive ecosystems of the world in terms of water resources. In this respect, regional strategic planning approach is required to protect this exclusive structure of the Tigris River and valley to ensure its sustainable development.

Today, urban developments pressures on natural environment present problems. Planning ad management perception that is sensitive to 'water' resources respecting nature and taking sensitive ecological thresholds in to consideration intended for providing sustainability and also resiliency is gain importance. This approach, which is based on the ecologically centered planning, is directed beyond the planning of the water sources towards the integrated planning and management, which evaluates the natural systems and the social, economic and cultural systems all together. Basins become important as a strategic planning unit in ensuring the balance between protection-utilization and protection from the natural disasters/risks. In this context, innovative basin planning and administration approaches needed to ensure sustainable development in CAs. Today, in Turkey the function of planning and administration of the water resources is mainly delegated to the State Water Authority the moreover, uncoordinated and conflicting decisions between authorities may results in fayour of development in CAs; (such as in the Hasankeyf example, development of the Ilısu Dam Project of DSI despite of the protected area decision of the Ministry of Culture and Tourism).

Development of an integrated planning and coordinated administration approach at the Basin-scale would enable various actors both at central and local levels to work as a team. In addition such a transparent and innovative organizational structure would enable participation of the local actors who will consider the sensitive ecosystem of the basin. This restructuring will pave the way for the creation of the inventory of genuine ecosystems of the basin, analyses of the environmental impact assessment of the plans and projects designed and an integrated assessment of them. Moreover, all the residents, workers etc in the basin would receive awareness trainings whilst contributing the planning processes. In this context, legislation must be amended to include the establishment of the 'Basin Agencies' as well as issuance of the 'Basin Management Plans'. Basin Management Plans which would provide a roadmap at the regional scale must also be in compliance with the decisions on sub-scale areas of protection inside the basin (natural, historical and archeological protected areas etc). The natural, historical and cultural values of region should be protected and its tourism potential should be improved.

Although Hasankeyf is declared as a protected area, it does not have a Conservation Plan. The protection plans must be prepared for the area for the immovable cultural properties and artifacts in the CA. As stated by Article 20 of Law on Protection of Culture and Natural Properties No 2863 'The in-situ protection of the immovable cultural properties and artifacts is an essential principle'.

Moreover, with the 1992 Valetta/Malta European Treaty on Protection of Archeological Heritage to which Turkey is a party, Parties to the Treaty have to take necessary measurements to protect the archeological heritage, to take archeological research activities under the scientific assurance, to ensure preferably in-situ protection and care of the archeological heritage. Turkish Government must apply to the UNESCO for inscription of the Hasankeyf on the World Cultural Heritage List by preparing CA Plans.

Turkey inscribed 2 mixed (cultural/natural) and 35 cultural, a total of 37 properties on the UNESCO World Heritage List since 1994, its first inscription. The requirements on 'Area Administration' and preparation of 'Area Management Plan' which are defined by UNESCO as the indispensable elements for the protection of the Heritage Sites/ Conservation Areas just began appearing in our national legislation. Site administration is a unit which brings the authorities and agencies together and enables all the works to be performed with collaborative and participative processes by identifying goal-oriented protection policies under the main principles. There are number of Area Management Plans prepared for relevant sites in example Edirne, Istanbul, Çatalhöyük. In this respect, 'Area Management Plans' can be prepared for Hasankeyf under the current legislative framework.

The main Regulation governing the protection of CAs is on the 'Law on Protection of Cultural and Natural Properties' No 2863. Article 2 of the legislation state that; 'The scope of this regulation is the procedures and principles concerning the identification of the functions, authorities and responsibilities of the advisory board, site president, coordination and audit board which will take charge in the identification of the administration sites of the protected areas, archeological ruins and interchange field and junctions, the preparation, approval, implementation and audit of the administration plans as well as execution of the site administration'. In the Regulation, the targets of the site administration are to ensure following;

a) the accurate identification of the site borders, its interaction zones in an integrated historical, social, cultural, geographical, natural, artistic perspective and the junction points with which it is related due to the historical, cultural, social, geographical and artistic reasons in terms of protection, development and assessment of the site,

b) indication in the administration plan of the ways to create an appropriate balance between protection, accessibility, sustainable economic development needs and local community,

c) the development of the general strategies, methods and tools to raise the value of the site up to the international level, determination and creation of the financial resources for such purposes,

d) The establishment of an activity network which will create an international collaboration and exchange in order to develop the cultural tourism,

e) the development of implementation plans in order to improve the regional cultural systems in the protected areas having the potential to create an industry by associating them with each other within a certain region,

f) the cooperation between local community and public authorities and agencies, non-governmental organizations, persons with ownership rights in the site, voluntary legal or real persons in protection and evaluation of the administration sites,

g) Care, repair, restoration, restitutions of protected areas and archeological ruins as well as interaction fields. The identification of the utilization and development principles and limits as well as keeping it alive by preservation under the international protection principles and provisions of treaty in line with the site administration goals together with the display, organization and landscaping,

h) Adoption of high standards in the administration of the cultural properties, conservation area, design and implementation, professions and equipments.

Given the current legislative framework, it is possible to prepare an 'Area Management Plan" for Hasankeyf would have a paramount importance in order to ensure balance between protection in the region with a view to sustainable overall development complying with the upper scale plan decisions.

6 REFERENCES:

Ahunbay, Zeynep,& Özge, Belkız (2010): Great Universal Value of Hasankeyf and Tigris Valley, Doğa Association's Publication, available at http://www.dogadernegi.org.

Cekül Foundation- Foundation of Protection and Promotion of Environmental and Cultural Values available at http://www.cekulvakfi.org.tr.

Doğa Association's Publication (2006): 'Evaluation of Ilısu Dam Environmental Impact Assessment Repor'", Ankara, Turkey, available at http://www.dogadernegi.org.

Doğa Association's Publication (2010): 'Stop Ilısu Dam, Save Hasankeyf', available at http://www.dogadernegi.org.

Doğa Association Istanbul Office, Interviews with Derya Engin (2013).

DSI-State Water Authority, Official Website of State Water Authority, 'Ilısu Project', available at http://www.ilisuprojesi.com.

Eken G., Bozdoğan M, İsfendiyaroğulu S., Kılıç D.T., Lise Y. (editors) (2006): 'Important Natural Sites of Turkey', Doğa Association, Ankara, (in Ahunbay Z& Belkız Ö., 2010).

Google Maps; available at: http: maps.google.com.

GAP – The Southeastern Anatolia Project 2013, Official Website, available at: http://www.gap.gov.tr.

General Directorate of Legislation Development and Publication, Official Website, available at http://www.mevzuat.gov.tr.

Hasankeyf Town Governorship, Official Website of Hasankeyf Town Governorship, available at http://www.hasankeyf.gov.tr.

'Mardin- Batman- Siirt- Şırnak- Hakkari Region 1/100 000 Scale Environmental Report' (uncorfirmed), Ministry of Environment and Urban Development, General Directorate of Spatial Planning, 2011.

UNESCO, Türkish National Commisssion for United Nations Educational, Scientific and Cultural Organizations, available at: http://www.unesco.org.tr.

UNESCO (2005) WH Sites Operational Guidelines, available at http://www.unesco.org.

World Cultural Heritage of Turkey, Official Website, available at http://www.dunyakulturmirasi.com.

7 ABBREVIATIONS:

CA: Conservation Areas
DSI: State Water Authority
EAP: Environmental Action Plan
EIA: Environmental Impact Assessment
EU: European Union
HPP: Hydroelectric Power Plant
INS: Important Natural Site
OP:Operational Policy of the World Bank.
TOKI: Housing Development Administration of Turkey
UNESCO: United Nations Educational, Scientific and Cultural Organization
WHS: World Heritage Sites

Planning Times of the City: an Overview on Urban Time Policies

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1 ABSTRACT

Urban and social time emerged as a theme of public policy and in Italy it has been translated into public actions at the end of the 1980s. Its significant focus was centred on the coordination of urban timetables, particularly those of public and private services, in order to make daily life easier. In Italy, hundreds of municipalities, few metropolitan cities and networks of small and medium towns are involved to promote these kinds of policies. The time-space approach has been disseminated also in other countries of the European Union and recently the Congress of Local and Regional Authorities of the Council of Europe has adopted a recommendation in order to foster local time policies.

This paper analyzes the development of urban time policies in Italy after the implementation of the national law (Act 53/2000) and, in particular, its relation with the regional legislation. From this point of view, it is possible to appreciate the "trespassing" of these policies on gender's equal opportunities, social welfare policies and urban planning (for this one with not constant and difficult interactions). Secondly, the paper reviews what happened about the implementation of urban time policies at regional level, both in Northern and Southern Italy, where the increase of local time policies is also a consequence of the allocation of regional and national funds. In conclusion, the paper proposes a classification of the towns' experiences in their specific relation with urban planning (urban time policies, time oriented urbanism and a spillover of planning tools at different territorial levels) and represents an opportunity to discuss weakness and opportunity (specific field of public policies and toolbox to enrich other policies) of the "trespassing" of these policies.

2 INTRODUCTION

Time is a fundamental component of social interaction. Every single behaviour takes place in time and in space. The urban and metropolitan life has made the relationships more complex and the management and coordination of social time and programs, in particular in the urban contexts, became a planning and design issue. After the crisis of the modern city these themes have been periodically take into consideration in Europe. In the Seventies, in France, the radical experiments of social time's re-organization (Chiesi, 1989: 15) were not adequately implemented and they quickly failed (Échange et projets, 1980). At the end of the 1980s, in Italy, were launched the urban time policies. Their significant focus was centred on the coordination of urban timetables, particularly those of public and private services, in order to make daily life easier. "It soon became clear that working on the time schedules of public services means influencing individual relationships, mobility of people and the real possibility to enjoy the city as a collective property and common good" (Italian Environment Ministry, 1999: 50).

In this way, urban and social time emerged as a theme of public policy and it has been translated into public actions. On the basis of previous spontaneous and ground-breaking experiences, local time policies, with the implementation of the national law (Act 53/2000), have become a "duty" for the Italian municipalities.[1] This law concerns family care and parental leaves and makes definition and implementation of the "Territorial Timetable Plan" or TTP (Piano territoriale degli orari) compulsory for the municipalities with more than 30.000 inhabitants. This legislative tool, highlights the importance of time in public actions, and it is even more important today, in the context of the global crisis, because of the increasing flexibility and precariousness of the labour market.

In 2000, it was affirmed that 170 municipalities had been involved in time-oriented projects, in timetable plans, or in studies concerning urban social time. After the implementation of the national law, the dissemination of these projects started to be more connected to the role played by the regions and the municipalities. At the moment, hundreds of municipalities, few metropolitan cities and networks of municipalities of small and medium towns are involved to promote these kinds of policies.

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[1] Disposizioni per il sostegno della maternità e della paternità, per il diritto alla cura e alla formazione e per il coordinamento dei tempi della città, Act 53/2000 (Dispositions to support motherhood and fatherhood, for the right for care and education and for the co-ordination of the times of the city).

The time-space approach, that has a clear Italian origin (Mückenberger, 2011: 241), has been disseminated in other countries of the European Union (Boulin & Mückenberger, 1999; Mareggi & Bonfiglioli, 2004). Nowadays, it has been experimented by French cities (companies and territories) and by few German and Spanish cities. In France, a long process of social animation produced national non-legislative initiatives and local interventions in municipalities that, after, decided to set up a national association.[2] Some cities, like Lyon, Paris, Belfort and Poitiers, implemented specific time policies; some other cities (Dijon) introduced some aspects of these specific policies in the urban planning and design practices (Boulin, 2008; Rochman &Tremblay, 2011). In Germany, the planning of the town schedules is mainly an opportunity to trigger a buttom-up approach to new projects and to develop specific initiatives in few cities, like Bremen, that copied the Italian idea of setting up a specific office in the municipalities to develop projects and ideas for social animation (Mückenberger, 1998; Eberling & Henckel, 1998). In Spain only few cities, like Barcelona, promote communication campaigns and local policies to reduce the problems of life-work balance in the family context. On the contrary, in the Netherlands, from 1998 to 2002, the State has been promoting an important program about "Daily routine (Dagindeling)" organizing a big national communication campaign and 140 projects about town schedules and life-work balance (Dijst, Karsten & Breedveld, 2002; Tummers 2007). Unfortunately, this successful initiative suddenly ended. It was all about a limited dissemination of explicit time policies, and a big production of implicit time policies dealing with work-family life's reconciliation (labor, welfare, gender and family policies) widespread all over the European member states. Recently, the Congress of Local and Regional Authorities of the Council of Europe adopted a recommendation (Rec 295/2010) and a resolution (Res 313/2010) – named "Social time, leisure time: which local time planning policy?" – addressed to the 47 member states in order to foster local time policies.

This paper analyzes the development of urban time policies in Italy after the implementation of the national law (Act 53/2000) and, in particular, its relation with the regional legislation and the allocation of grants to the municipalities that, in Italy, are the main institutions that play a real role in the management of the urban and social schedules. Secondly, the paper reviews what happened about the implementation of urban time policies at regional level, both in Northern (Lombardy, Veneto, Emilia-Romagna and Piedmont) and Southern (Apulia and Abruzzi) Italy, where the increase of local time policies is also a consequence of the allocation of regional and national funds. In conclusion, the paper proposes a classification of the towns' experiences in their specific relation with urban planning (Italian middle-size cities with a long experience in planning and implementing time policies, network of towns and European metropolitan cities ongoing experiences) and represents an opportunity to discuss weakness and opportunity of the "trespassing" of urban time policies in other public policies.

3 TWO GENERATIONS OF REGIONAL ACTS

The national law Act 53/2000 entrusts the municipalities with the task of implementing the policies of harmonization and coordination of the times of the city, recognizing the promotion role they played in the previous decade. The same law entrusts the regions with the task of issuing laws in this sector in order to allocate grants. This role is getting more and more important because the regions can support and spur the action of the local institutions. The regions, moreover, ensure the continuity of the Municipal Time Offices, especially now that the global crisis is extremely strong.

According to a survey carried out in 2008 (Mareggi 2010), the number of regions that have regulations about urban time policies is quite high. Only 4 regions in the Centre-South of Italy and one region in the North of Italy cannot count on specific regulations in this sector (Fig. 1).

The survey identifies two different generations of regulations concerning the cities' Territorial Time Plan. These two kinds of regulations have both proposed ideas and allocated grants.

The first generation of regional laws, in the Nineties, involved the North and the Centre of Italy. Only 9 regions issued laws to implement the guidelines contained in the national law that reformed the local institutions and entrusted the mayor with the task of coordinating the urban schedules (art. 36, Act 142/1990). These laws:

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[2] The network "Tempo Territorial" (http://tempoterritorial.free.fr/) was funded in 2004 and now, in 2011, it is made up of the Municipal Time Offices (and similar offices) of more or less twenty cities/provinces/regions.

Fig. 1: Italian Regions that have regulations and bills about time policies (Mareggi, 2010: 38). Some regions present different normative tools indicated with over-lapped symbols.

- fostered social and time policies concerning public and private offices, social services, public transportation and commercial/tourist/leisure/cultural services;

- proposed criteria for the organization (and sometimes even the regulation) of the opening hours of the public and private services, to improve accessibility and usability (intended as the possibility to combine personal needs with the fixed opening hours of the services);

- contributed to renew the government's agenda, increasing the importance of the public action and answering the citizens' daily problems;

- supported preliminary surveys to write down the Territorial Timetable Plan (this practice was often not efficient enough).

These laws aim at coordinating and regulating the time schedules. They propose a clear definition of the intervention' sectors. But, sometimes, the local actions implemented on the basis of these laws are not organic and not suitable for the territorial contexts and their local actors (Mareggi & Bonfiglioli 1997).

These different laws – in their chronological sequence – express an evolution of the sector, able to create and offer visibility to a political, social and scientific united community considered as an issue network that becomes policy community (Heclo, 1978; Balducci, 1991: 102).

At the end of the Nineties, only the Tuscany Region felt the necessity to propose a second law about these topics (l.r. 38/1998). This was a ground-breaking action that represented a change and an interesting example for the government of the cities, also intended in the physical sense. Moreover, this law supports the implementation of new interventions and it recognized that only mixing knowledge and practices you can support policies and make them more meaningful, as local policies have demonstrated. Then, it proposes the approval at the same time of the TTP and of the Land Use Plan, fostering the inclusion of the time policies in the urban planning (exactly through the regional laws). Last but not least, it makes clear that people (subjects of different age, gender, origin and culture) are the mirrors of the changes that take place in the space and time of daily life.

The second generation of regional laws implement the content of the Act 53/2000. It involves the entire national territory and even the South of Italy. Some regions prepared specific laws or updated the previous ones while, in the second half of the first decade of the century, other regions included these contents in some laws concerning equal opportunities and social policies or urban planning policies (with ambiguous value). These laws:

- allocate the state grants of the Fund for the Harmonization of the Times of the City that was opened with the Act 53/2000 and distributed through calls for proposals according to the European model;

- support the implementation of actions (but also surveys and feasibility studies) carried out by the municipalities or by networks of municipalities;

- support actions to improve the quality of daily life and harmonize the work/life balance, the personal relationships, the training opportunities and the personal time of all the people who live, even temporarily, on a territory; and also actions to ensure equal opportunities for men and women;

- taking into consideration the experiences of the municipalities and of the universities that have studied these topics, the laws propose new goals and guidelines;

- foster integrated policies to reconcile life/work, flexibility of the working hours, revitalization of the urban, economic and social life, provision of services and sustainable mobility (coordination of the transportation hours, alternative mobility reducing the use of cars and the emissions of polluting gases in the sector of transportation).

In this way, urban time policies enlarge their fields of interventions, over their traditional sectors. The practices seem to exploit the new possibilities offered (with uncertain results) by the new laws. However, some experts underline that the constant attention to side-results, like for example the reduction of pollution and of the car traffic, has weakened the main goals of the Act 53/2000 that was designed to foster the harmonization of the working, care, training and social time. In this way, the reasons which are at the basis of the production of the TTP are searched in other sectors, far from the original motivations that produced the temporal policies as a tool to work on the town and increase the liberated time in the society.

This search of justifications "somewhere else" demonstrates a will (or a weakness) that seems to anticipate the loss of a specific sector. The laws for the TTPs changed the focus about urban planning (in Tuscany differently than in Basilicata), or are used for the development of policies in favour of gender's equal opportunities (in Apulia and Liguria); somewhere else, they are included in the social or family policies (in Piedmont and Friuli Venezia Giulia, while in Abruzzi and Emilia Romagna also offer support to the companies), or they become a tool to implement the "Zone Social Plans" (Piano sociale di zona) for a better social welfare (in Campania and Apulia). The fact that the Fund for the Harmonization of the Times of the City became a part of the National Fund for the Social Policies contributed to the creation of the general framework explained here above.

It is possible to divide the trends for the definition of the public action in this sector in three different categories, starting from the regional laws. In the first category are included the specific policies (Lombardy and Abruzzi); in the second are included those time policies which are considered side-policies of other public policies considered priorities in the agendas of the regional governments (Apulia, Liguria and Campania); in the third are included the policies that are not well-defined and do not have specific aspects.

This variety of laws underlines a wider characterization of the centers for the development of the time policies and, in contrast with the previous decade, it reveals the lack of a united and recognizable political and scientific community. The general framework is twofold: on one side, the regional laws introduce in the government agendas a social necessity and they give it the same importance of a public policy; on the other side, the variety of the local interventions seem to produce a great variety of disharmonious practices.

4 A REVIEW OF URBAN TIME POLICIES IN THE DIFFERENT REGIONS

It is interesting, at this point, to change the perspective and focus on local practices. In this paragraph they are still considered from the point of view of the different regional watchdogs that tried to analyze from the quantity point of view if the municipalities have accepted the (economic) proposals of the laws and the directions of their interventions. This is an overview of the synthetic outcomes produced in some regions of the North and South of Italy. This analysis is the result of an original research about the regional documents (that cannot boast a specific literature) carried out by the writer of this paper.

From 1997 to 2009 in Piedmont 174 municipalities (out of 1.206) approved a coordination plan of urban times (17 of them have a population of more than 30.000 inhabitants and, for this reason, they are obliged to do it by the law), but only 14 of them have implemented a project. The money allocated are more or less 1,8 billions of Euros distributed through 12 calls for proposals. Few municipalities, from 1997 and 2001, demonstrated their interest. Then there was a peak in 2002 and the trend was kept constant till 2007 (Bocco,

2012: 158). Turin, on the contrary, has recently (2008-2011) carried out some integrated space-time interventions in the districts, winning a public-private foundation's grants.

The Region Emilia Romagna, thanks to the first generation of laws, promoted TTPs integrated with the urban tools in order to improve the services' network, the public facilities, the commercial services and the mobility infrastructures. After the national law, on the other side, it has oriented the local action towards the services for children and the flexibility of the working hours. Through specific regional calls for proposals, from 1995 to 2000, have been allocated some regional grants: the interest of the municipalities has not been constant and it has decreased. According to some managers of the public administration, this situation was provoked by the small amount of money available for the single institutions (less than 50.000 Euros for the projects' implementation). On the other hand, this situation was probably related to the high quality of the region welfare that ensures a high level of women employment. Only in 2004 the Region decided to open a new call for proposals to foster future actions concerning the TTPs or agreements between the companies and the trade unions about new flexible working hours (projects for childhood, adolescence and family). 14 interventions were carried out and they produced a great variety of results. Recently, because of the reduction of the amount of money transferred by the State to the territorial institutions, the Region has decided to allocate the resources of the national fund in a different way.[3]

In Veneto, after the approval of the national law, only two regional calls for proposals were opened for the definition of the TTPs. 1,1 billions of Euros were totally allocated, equally distributed between the first call for proposals in 2004 that gave money to 6 municipalities with more than 30.000 inhabitants, and the second (2011-2012) that gave money to 24 small and medium municipalities (from 5.000 to 40.000 inhabitants) for projects concerning local plans for the reconciliation of life and work. The first call for proposals was financed by the National Fund for the Harmonization of the Times of the City, the second used the resources allocated by the Department of Equal Opportunities of the Italian Government for interventions to improve the reconciliation of private and working life. It was implemented a new set of public policies in several sectors to support families, the inclusion of women in the labor market and to ensure a work for them. In these two calls for proposals, the focus of the actions is the support to families and their time organization with services destined to parents who work and have children (easy access to services and helpdesks) creating a friendly social context.[4]

From 2003 to 2011, Region Abruzzi has opened 4 calls for proposals investing 340.000 Euros and allocating money, in some cases even a small amount (less than 10.000 Euros) to each institution. Totally were involved 3 capital cities and 5 networks of municipalities who cooperate in the social sector, for a total of 52 (out of 305) municipalities that have presented the TTPs. Only 2 municipalities and a network of municipalities implemented the planned projects. The main issues of the plans were: harmonization of the timetables of public and private services with the working hours; accessibility of the information helpdesks and of the services of public administration (helpdesks, cultural services and quality of the social services); work on mobility that can contribute to reduce the emissions of polluting gases in the sector of public transportation. As the mountains characterize the territory's inner part, the actions were mainly destined to answer the necessities of young families/tourists of small villages. The theme of the equal opportunities was not adequately analyzed. Especially the first experiences were mainly focused on co-design and participation and not on implementation.[5]

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[3] REGIONE EMILIA ROMAGNA: Finanziamenti per la realizzazione di azioni e interventi volti alla armonizzazione dei tempi di vita e di lavoro in attuazione della delibera del Consiglio Regionale n. 514/2003. Prima sperimentazione. Deliberazione di Giunta Regionale n. 1228. Bologna, 28 June 2004.

[4] REGIONE VENETO: Bando per la predisposizione dei Piani territoriali degli orari per il coordinamento dei tempi di funzionamento della città. Deliberazione di Giunta Regionale n. 2343. Venezia, 30 July 2004. REGIONE VENETO: Realizzazione di un sistema regionale integrato di interventi per favorire la conciliazione dei tempi di vita e di lavoro, in attuazione a quanto previsto con Dgr n. 3311 del 21/12/2010. Interventi a 3) Implementazione "Madri di giorno", b 1) e d 1) Incentivi ad aziende Family friendly, d 2) Programmi locali dei tempi e degli orari. Criteri e modalità di concessione contributi. Deliberazione di Giunta Regionale n. 2516. Venezia, 29 December 2011. REGIONE VENETO: Conciliazione tempi vita-lavoro. Assessore Sernagiotto: "Approvato provvedimento che assegna a 24 comuni contributi 540 mila € per programmi locali tempi e orari". Comunicato stampa. 3 October 2012. http://www.regione.veneto.it/web/guest/comunicati-stampa/dettaglio-comunicati?_spp_detailId=341566

[5] REGIONE ABRUZZO: Attuazione delle politiche regionali dei tempi (l.r. 40/2005, art. 8, comma 3). Relazione informativa. March 2009.
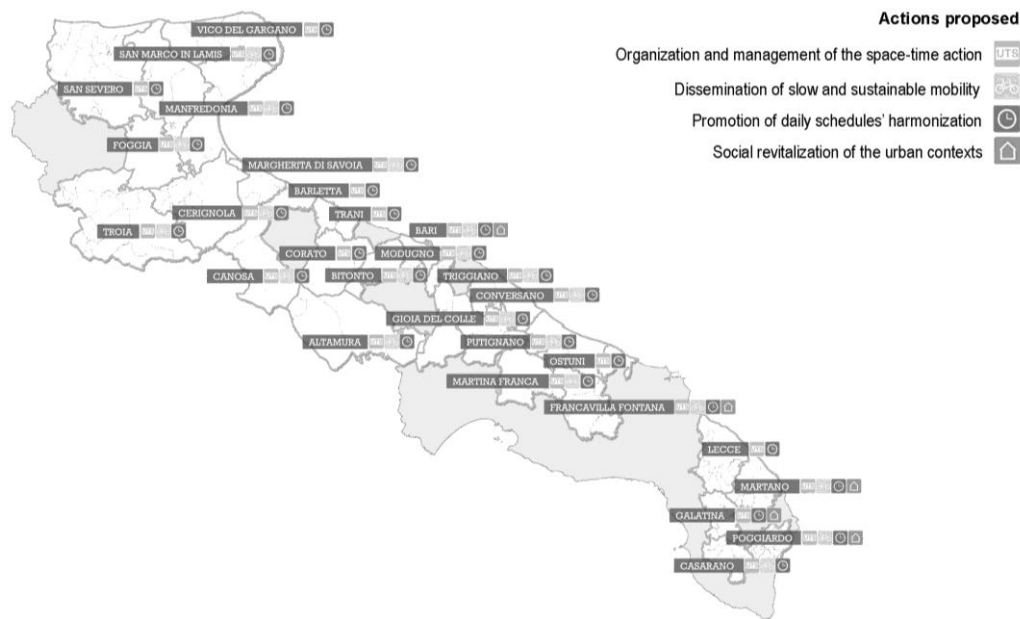
Fig. 2: Territorial areas of Apulia Region that have participated to a call for proposal 2009-2011 in order to carry out a feasibility study for the Territorial Timetable Plan (Source: Region Puglia, 2012).

In 2007, the Region Apulia started to implement urban time policies. The law for equal opportunities (Regional Act 7/2007), in fact, introduced rules for the coordination of the hours, timetables and places of the town. The general intervention's criteria and the different kinds of projects present original and characteristic aspects of the territorial context but also, in general, of the policies concerning social life and equal opportunities: new services for depopulating areas and a new organization of the school timetables to fight drop-out and prevent social unease; promotion of participation and renovation works in suburban areas by children, seniors and families; creation of "work/life balance centres". Moreover, with a significant change in comparison with the most important Italian experiences, Apulia law is characterized by a strong connection between TTP and the "Zone Social Plan". With the call for proposals 2009-2011 were approved 26 feasibility studies for the TTPs of municipalities associated in territorial areas[6] that proposed the goals of their actions (Fig. 2). The total amount of money allocated was 3 millions of Euros. Then, the region decided to allocate a grant of 35.000 Euros for each of the 17 territorial districts that, in February 2013, start experimental actions for the implementation of the TTP and will set up an Inter-Municipal Time Office. The feasibility studies aim at improving the social welfare: the harmonization services for the families who have children (school extra curricular activities, school-house transportation also with public means of transport), services for seniors who live in rural areas (home care, increase of shops in the neighborhoods, transportation to daily centres for seniors, slow mobility), on-line services that make easier the access to institutions. In some experimentations are planned even some actions to change the calendar of the school-weeks (5 days per week) in primary and secondary schools (experimentation in Lecce for some weeks).[7]

The Region Lombardy approved a law about these issues only in 2004, even if, in the previous years, several social actors (university, trade unions, chamber of commerce and other organizations) and some other municipalities had implemented concrete actions concerning the urban time policies and had decided to set up Time Offices dedicated to these issues. Five cities had already approved the TTP. The law (Regional Act 28/2004) introduced the key themes and questions that mark the second generation of laws described above. In implementing this law, the region reaffirmed some necessities that characterize this public policy: a specific municipal department/office dedicated to these themes; the joint implementation of experimental actions and the definition of the TTP. In nine years, Region Lombardy has launched 4 calls for proposals (one is ongoing) and 10 cooperation agreements with the municipalities with more than 30.000 inhabitants

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[6] These municipalities associated in territorial areas are similar to the inter-municipal management of some health-social services organized in Italy through Social Zone Plans.

[7] REGIONE PUGLIA, PRESIDENZA DEL CONSIGLIO DEI MINISTRI-DIPARTIMENTO PER LE PARI OPPORTUNITÀ: Studi di piani di fattibilità per i Piani dei Tempi e degli Spazi. Bari, Foggia, Lecce, 2011. REGIONE PUGLIA: Vedo rosa. L'energia delle donne, la forza della Puglia. Bari. 8 March 2012. REGIONE PUGLIA: Piano Territoriale dei Tempi e degli Spazi. 2013. http://www.regione.puglia.it/index.php?page=prg&opz=display&id=275.

that in 2008 still did not have a TTP. The total amount of money allocated by the Region was 10 million of Euros. The municipalities that received a grant were totally 129 (out of 1.544) and 46 of them received money from different calls for proposals for the implementation of the initiatives (Fig. 3). In this way, 49 cities and 11 networks of municipalities approved a Territorial Timetable Plan and carried out specific policies/actions. The actions focused on several themes:

- synchronization/de-synchronization of school timetables (extra school activities, harmonization of school calendars, family care during holidays);

- coordination of the shops' opening hours (night/Sundays opening with festivals in the public space, changes in the opening hours);

- cooperation with the Zone Social Plans and with the urban tools for the definition of the services' system;

- telecommuting;

- urban renewal also through participation planning with the inhabitants of the areas;

- harmonization of the events' calendar;

- coordination of the services destined to tourists and visitors (environmental-friendly means of transport for tourists, tourist services);

- sustainable mobility for the reduction of pollution provoked by means of transport (collective cabs, environmental-friendly shuttle buses, on-demand transportation, pedibus and bicibus, night transportation to discos, bike sharing, house-school transportation);

- accessibility and hours' usability of the services mainly of the public offices (changes in the opening hours, night opening, helpdesks in the commercial centers, temporary helpdesks, "one-stop services", "Citizen's Day") also on-line (certificates' service, booking and payment).

The on-going call for proposal fosters the implementation of actions in the last two sectors.
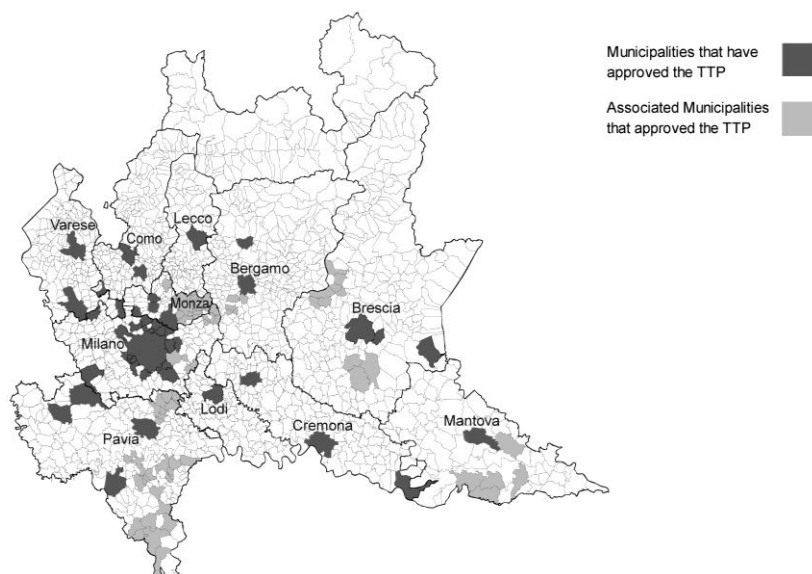
Fig. 3: Municipalities of Lombardy Region that have approved the Territorial Timetable Plan of the City (Data Source: Region Lombardy, 2012).

Lombardy Region has decided to take actions involving the municipalities as they are the institutions destined to the implementation of urban time policies. The Region, however, has also decided to foster inter-sectoriality and to include explicit references to this public policy in tools and laws concerning the services' planning, the quality of the environment, the opening hours of the shops, the sustainable mobility, the local transportation, the Zone Social Plan and the tools for companies' competitiveness.[8]

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[8] REGIONE LOMBARDIA: Tempi delle città in Lombardia. Politiche regionali per il coordinamento e l'amministrazione dei tempi delle città. Attuazione e risultati della legge n. 28/2004 risposta alla clausola valutativa. Milano, May 2011. REGIONE LOMBARDIA: Politiche temporali urbane in Lombardia. Le pratiche dei comuni.

On the other hand, it is necessary to underline the will of the Lombardy municipalities to act in this sector even independently from the regional support. This is demonstrated by the work of some municipal Time Offices or by the independent interest to revitalize Milan's Time Office in the last year.

In this overview are not analyzed some regions in which were promoted urban time policies before and after the approval of the Act 53/2000 like Tuscany, Liguria and Marche (for these regions were not carried out researches).

According to the results of this analysis, the regional institutions are promoting and demonstrating an interest (even if it is not constant) for these themes. There are big differences in the economic resources invested by the regions and in the grants available for the municipalities, with a decrease in the amount of money allocated in the last years. It is important to underline that in 2002 the Fund for the Harmonization of the Time of the City (art. 28, Act. 53/2000) was included in the National Fund for the Social Policies that does not specify the distribution of the money destined to urban time policies. The decision about the amount of money to be destined to the TTPs is a task of the regional government (done only by some of them). It is possible, however, to collect more money through other national grants. In 2011, for example, Region Veneto has decided to include the time policies in the framework of some projects designed to improve women's employment.

Even if the recent laws have fostered the institutionalization of the management tools and the concrete implementation of the actions, in several regions it's still quite evident the trend to spur the design projects, plans and feasibility studies without particular attention to the set up of the Time Office or to the actions carried out and their results. Lombardy Region is an exception in this context.

From the point of view of the definition of the projects' main issues, the implementation of the regional calls for proposals confirmed an increase in the number of themes treated and in the arguments to justify them, but also a strong connection with the tradition of previous practices. These initiatives are not well-integrated with the urban context and do not involve some subjects, even if the actions – when they are implemented – seem to face specific problems and time needs and timetables (finding proper and feasible solutions).

5 CITIES' EXPERIENCES

At this point, the paper focuses on the actions implemented by the towns to plan their urban timetables. This is the main point of view that has been used for years for the surveys in this policies and research sector.

Starting from the city means recognizing that the projects are not only related to state and regional calls for proposals, as it demonstrated by Bozen with its 20 years-experience in this sector, or by Turin in the last years or by Milan (more recently). The cities and the social actors that promote time policies in Italy act not for a "duty" or for a strong legislative reasons. The decision of implementing urban time policies is generally a political choice of some administrations that decide to promote innovative projects, setting up Time Offices and managing social arenas.

For the classification of these policies have been considered: the dimensions of the cities involved, the main issues of the projects (Bonfiglioli, 1997; Belloni, 1997; Paolucci, 1998), the methodologic organization of the Territorial Timetable Plan (Chiesi, 1997) and the characteristics of the public action (Mareggi 2002). In this paper I want to propose a different analysis, mainly focusing on the relation with urban planning. During the last twenty-five years, in Italy, the analysis of the "times of the city" and the "reflections on actions" have developed in three fields of intervention.

The first field of intervention – that is the biggest one – is urban time policies produced by municipalities with private/public partners. These policies are widespread in Italy, as it is demonstrated also at legislative level. Urban time policies are public policies that intervene in the time schedules and time organization that regulate human relationships at urban level. These local policies become a specific field of intervention of the public actions/policies and they are implemented with a variety of approaches. The actions are carried out with the involvement of local partners and in a cross-sectorial way involving different departments of the municipality that is, generally, the promoter. The policies produced have different relevance regarding services (school, commerce, transport, tourism, public administrations, safety, public spaces), an urban area

or the entire city and have different impacts on citizens and the organization of services. The brief analysis presented for Region Lombardy presents an overview of the experiences. Several Italian municipalities have approved a Timetable Territorial Plan, as it was said in the previous paragraph. It is not clear the continuity over time of this sector of public policies, because it is characterized by strong contradictions: above all in the public administration these urban time policies are managed as sectorial actions, but the nature of time schedules and of social times is intrinsically transversal.

The second field of intervention is time oriented urbanism. At the beginning the promoters have the ambition to create a new approach of land use planning. Few experimental cases are promoted by the university world and municipalities, as in Bergamo where the TTP is part of the town planning and the municipal Time Office develops integrated actions for the space-time management and provides a set of new ideas for the Land Use Plan and for the planning of the services (Zambianchi 2010). Other experiences that use time as a component of the urban plan are detected in Tuscany, where it has been compulsory till 2005. The few cases in the literature do not testify particular characterization and performing skills. Limited experiences are implemented in France, for example in Dijon, but also in this case they are not related to a specific public policy or a set of specific projects. Time is recognized as a resource (exactly as space, water and energy) necessary to make the town more attractive and pleasant. (Trouwborst 2012).

The third field of intervention is a spillover of planning tools at different territorial levels, implemented by public administrations in Italy (and Europe). Introducing in this way time oriented variables in preliminary studies and analysis, and tools to define strategies and renewal policies and projects. There are several examples. The new TTP of Rozzano (2012), a municipality near Milan, collaborates with the Land Use Planning of Services to test usability and accessibility of open spaces, both for the description and for the potentialities after the implementation of the new Land Use Plan (Mareggi 2013). Some urban projects are focused on daily time intended as slow mobility (for example Ancona) or as quality of the urban space and housing (for example San Donato Milanese) or, to improve the "habitability" profile of the city (like in Bologna). The life in different seasons in the territories is the topic of several analysis, like for example the Adriatic Coast (with dynamic or traditional techniques of analysis or studying the mobile telephones' data) and in excellent cases of Land Use Plan like in Urbino in 1990-94 or to design strategic pictures of the territorial regional plan of Emilia-Romagna. The temporary uses are a fundamental element of the strategic document for Berlin 2020 and of experimental geographical studies in Gorizia and Nova Gorica. Stable and moving populations (and their calendars) renew the traditional studies for mobility in some large scale planning tools (Mareggi 2011).

Defining these three fields of interventions is a way to recognize that, also starting from the city, the planning possibilities of the urban times changed from a public specific and characteristic action (that remains the main field, urban time policies) towards interventions in other sectors, in this case analyzed in relation with urban planning. In this movement toward other sectors, in the best practices, the urban times become opportunities to change the focus of the projects and move it towards contexts. On the other sides, methodological tools, that have been developed and tested in the urban time policies, are implemented and often enriched.

6 CONCLUSION

The path presented in the paper starting form the regions offers an original point of view about the researches concerning these topics that are generally analyzed taking into consideration the action carried out by the cities. Moreover, it underlines a specific characteristic of the Italian approach to this public policy that mixes top-down behaviors of the central and regional governments with the bottom-up action of local institutions and actors. Their mixture has probably ensured a quite constant presence of these themes in the agendas of the government, even if they still have a second-level position.

The three points of view presented in the paper (the regional rules, the implementation in the regions, the experiences of the cities) recognize a specific thematic field of public policies (Drewe 2005) even if this theme is considered in a wider way in comparison with the original goal of "setting the time free for everybody". At legislative level, the trend is towards gender's equal opportunities, social welfare policies and family policies and towards urban planning (for this one with not constant and difficult interactions). For the implementation in the regions, it is reaffirmed the will of increasing the number of topics that are at the basis of the interventions, while the panel of actions are traditional. The actions tend to face time problems

and needs finding proper and feasible solutions. The cities' experiences seem to have detected (or oriented?) the increase in the fields of intervention that the new laws allow and support and, moreover, they use in different sectors the methodological and operative toolbox offered by the space-time oriented approach.

This "trespassing" represents a weakness and an opportunity.

The search somewhere else for strong motivations and the lack of a specific characterization are a weakness of a sectorial public action because it reduces its appeal and its capacity to attract economic and human resources. Perhaps it has also been reduced the social interest that was at the basis of these policies but it has not been reduced the complexity of the urban and metropolitan life that the global crisis has worsened for families and single subjects. Moreover, a competition among the sectors of the public action, for example among the equal opportunities policies (that work on the subjects and mainly with the companies) and the urban time policies (that work on the city and mainly starting from the municipalities), can reduce the strength of them both. In the same way, the relationship with the urban planning policies is even weaker and less important.

The "trespassing", however, could be an opportunity as they could open two scenarios (not in mutual contrast and not in competition) that can trigger on one side urban time policies intended as a specific public policy (with the specific weakness of the sector that become part of the action), and on the other side the use of methodological and operating space-time oriented tools to enrich other social and urban policies (that use technical and methodological expertise as a significant and collaborative contribution but not exclusive or dominant). Perhaps this work in specific and respected fences (both in political and research sector) can improve knowledge and savoir faire about the city's and citizens' time.

7 REFERENCES

BALDUCCI, Alessandro: Disegnare il futuro. Bologna, 1991.
BELLONI, Maria Carmen & BIMBI, Franca: Microfisica della cittadinanza. Città, genere, politiche dei tempi. Milano, 1997.
BOCCO, Andrea (ed.): Qui è ora. Macerata, 2012.
BONFIGLIOLI, Sandra: Le politiche dei tempi urbani. In: UrbanisticaQuaderni, Vol. 12, pp. 9-13. Roma, 1997.
BONFIGLIOLI, Sandra & MAREGGI, Marco (ed.): Il tempo e la città tra natura e storia. Atlante di progetti sui tempi della città. In: UrbanisticaQuaderni, Vol. 12, pp. 1-336. Roma, 1997.
BOULIN, Jean-Yve; Villes et politiques temporelles. Paris, 2008
BOULIN, Jean-Yve & MÜCKENBERGER, Ulrich: Time in the City and Quality of Life in Europe. In: Best. European Studies on Time, Vol. 1. Dublin, 1999.
CHIESI, Antonio Maria: Sincronismi sociali. Bologna, 1989.
CHIESI, Antonio Maria: Alcune dimensioni costanti dei Pro. In: UrbanisticaQuaderni, Vol. 12, pp. 51-54. Roma, 1997.
DIJST, Martin, KARSTEN, Lia & BREEDVELD, Koen: Modification des rythmes de vie dans les villes néerlandaises. In: Territoire 2020, Vol. 6, pp. 73-86. Paris, 2002.
DREWE, Paul: What about time in urban planning & design in the ICT age?. In: CORP 2005 & Geomultimedia, Vol. 5. 2005
EBERLING, Matthias & HENCKEL, Dietrich: Kommunale Zeitpolitik. Berlino, 1998.
ÉCHANGE ET PROJETS: La révolution du temps choisi. Paris, 1980.
HECLO, Hugh: Issue Network and the Executive Establishment. In KING, A. (ed.), The New American Political System, Washington D.C., 1978.
ITALIAN ENVIRONMENT MINISTRY: Relazione sullo stato dell'ambiente delle aree urbane in Italia. Roma, 1999.
MAREGGI, Marco: Innovation in Urban Policy: the Experience of Italian Urban Time Policies. In: Planning Theory & Practice, Vol. 3, pp. 173-194, London, 2002.
MAREGGI, Marco: Politiche dei tempi urbani: comparazione della legislazione regionale. In: REGIONE LOMBARDIA: Politiche temporali urbane in Lombardia. Le pratiche dei comuni, pp. 37-67. Milano, 2010.
MAREGGI, Marco: Ritmi urbani. Sant'Arcangelo di Romagna, 2011.
MAREGGI, Marco: Urban rhythms in the contemporary city. In HENKEL, Dietrich et al. (ed.): Space Time Design of the Public City, pp. 21-39. London-New York, 2013.
MAREGGI, Marco & BONFIGLIOLI, Sandra (ed.): Nuovi tempi della città per la qualità della vita. Milano, 2004.
MÜCKENBERGER, Ulrich (ed.): Zeiten der Stadt. Brema, 1998.
MÜCKENBERGER, Ulrich: Local time policies in Europe. In: Time & Society, Vol. 20, Issue 2, pp. 241-273. 2011.
PAOLUCCI, Gabriella (ed.): La città macchina del tempo. Politiche del tempo urbano in Italia. Milano, 1998.
ROCHMAN, Juliette & TREMBLAY, Diane-Gabrielle: Politique temporelles et bureaux des temps: dèfis et potentiels pour les territoires. In: Canadian Journal of Regional Science/Revue canadienne des sciences règionales, Vol. 34(1), pp. 9-18. 2011.
TROUWBORST, Chantal: La rete "Tempo Territorial". In: BOCCO, Andrea (ed.): op.cit., pp. 145-150. Macerata, 2012.
TUMMERS, Lidewij: What can time-based planning contribute to diversity and change? Paper presented at Leuven, 2007. 2007.
ZAMBIANCHI, Marina: Il progetto della nuova città pubblica: dai bisogni alle azioni. In: Urbanistica, Vol. 144, pp. 59-66. Roma, 2010.

Polish Suburban Landscape Made of Entrepreneurial Tissue

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1   ABSTRACT

The last two decades in Poland has been a period of expansive growth of small businesses, and dynamic transformations of the space around the city. The development of these two phenomena occurred in a period of economic transformation after year 1989. Dynamic changes of the spaces surrounding the cities based on movement of people and enterprises from the central city into the suburbs are nowadays the main field of interdisciplinary scientific research on the topic of the city. It seems that the characteristic element of the Polish suburban landscape is a large number of SME sector businesses located there.

The research team expresses the opinion the reason for locating SME businesses in the suburban areas is not only the lower cost of conducting business compared to the city centers. Decision about location are dependant on many various factors of spatial and social character.

The main aim of the article is to examine the level of interaction between the process of suburbanization and the development of the SME sector in selected suburban areas on the example of the Tricity Metropolitan Area (TMA).

2   THE BACKGROUND OF DEVELOPMENT OF THE TWO PHENOMENA

2.1 The genesis of the polish suburbanization

The American term urban sprawl is strongly associated with the lack of consistency in terms of morphology. It is characterized by the fact that the location of objects is spatially dispersed and unrelated . In addition, this form begins to take over the functions of the central city as more and more come here shopping centers, new public spaces and so-called business parks . There is lack of traditional compact building area and relationships between the different parts are quite random and also appear inefficient transport network and system of media technical infrastructure. However, the scale of suburbanization is different in different countries (Fig. 1). Disciution abut the problem of the suburbanization shoud also add the issue of the scale and than investigate if the proceess are the same and differ only about the sacle.

Tri – City Metropolis	Tri – City and New York Metropolis – comparison	14x Tri – City = New York
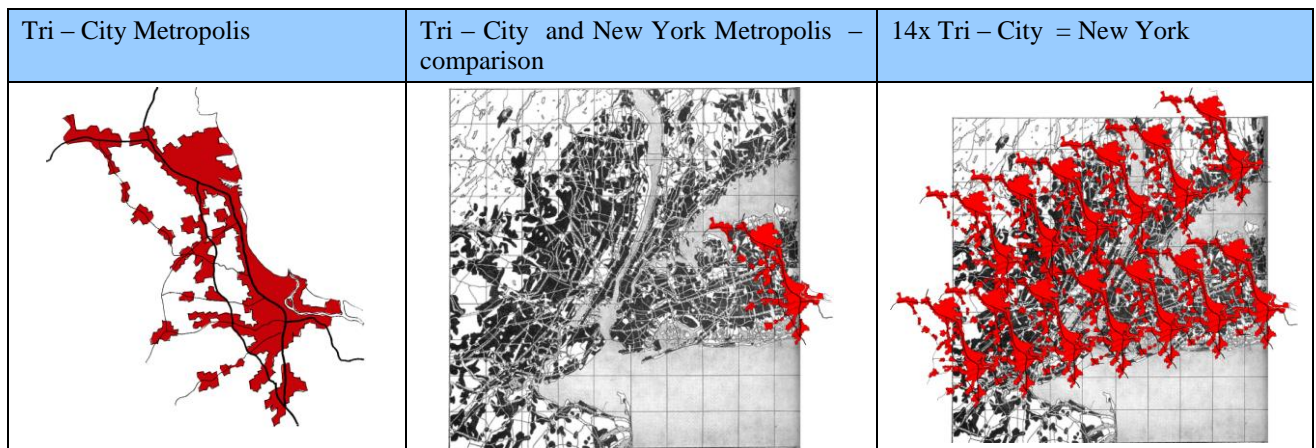
Fig. 1 : Suburbanization in the metropolitan area of Tri-City and New York – a comparison. Source: own study based on J. Martyniuk-Peczek, American Dream and Polish matter: Polish and American context of urbanization, P. Lorenz (Eds.) The problem of urbanization. Warsaw: Urbanista, pp. 103-112

However in polish landscape not only the scale differs. The genesis is also a bit differed. The polish process of suburbanization is linked strongly with the change of the political system after 1989. Completely different than it have been in the Western Europe or the U.S., where the processes has began with ideas healing of industrial city and new movement of garden city. When after the the Second World War the processes of suburbanization have been particularly strongly developed in the United States, Poland was at that time in a completely different model of planning – central planning. In 1945 decree "of the planned spatial

development of the country" was introduced.[1] This decree, including the next decrees, like "the state investment plan" of 1946 and "a planned national economy" in 1947 established the general rule, introduced after the Second World War, the so-called. "Socialist planned economy system." An important element of the system created the Polish People's Republic (PRL), was taken over by the state of basic means of production, and as a consequence – take control of the central principles of development. The consequence of such treatment was short-term economic planning, and the planning was in isolation from the economic condition of the country. Social planning turned out to be an illusion. Any attempt to bring the private sector to extensive urban development is typically ended takeover of private owners of significant field surfaces. The legal bases for expropriation were local zoning plans. In this respect they were primarily used as a tool for limiting the private sector of the economy. The owners used the various legal and illegal ways to build over their lands. (for example, sold for "supposed relatives"). The consequence was the practice of the various methods of private investment, which departed from the principles of planning time spatial order logic. As a result of the abolition of ground rent, reducing the functioning of the real estate market and the expulsion of private property in the PRL has been to deform the structure of spatial planning, the devastation of the visual landscape, as well as the formation of a typical "urban fallow land," or undeveloped areas in attractive locations. At the same time, however, PRL has left millions of newly built apartments, all modern in concept districts and numerous public buildings (schools, hospitals, offices, etc.).

The reform of the political system in1898, resulted in the introduction of the Land Use Act, but only after 1994. Until then apply Starna detailed plans yet. Spatial Development Act of 1994 abolished the central and hierarchical system of spatial planning, equipping municipalities' ultimately decisive power largely on land use throughout the country. It was a change in the system consisting of the departure of creative and comprehensive planning, supported by legislative and planning the transition to a regulatory nature, which is to take into account, inter alia, the right to property. From that moment there was a very intense and expansive process of urban sprawl. The community determined the rules and allocation of the land. Municipalities want to grow try to attract new taxpayers. The flexible development policy was introduced. In practice, it looked that the former agricultural lands were chaotically transformed the development areas. The process is relatively young – only two decades but very strongly growth.

The consequence of this process is nowadays suburban polish landspe made of the amorphous structure of the urban periphery, where relics of agricultural activities and focus of intense economic activity penetrate the frail structures extensivei housing and wasteland areas. There are no strict regulations allowing space in the initial phase of intensive economic development of the suburban zone which later formed the basis of conflicts and barriers to development, determining the functional capacity of the weakening economy in the mature stage of development. In metropolitan areas, where the observed trend of increased sprawl and suburban sprawl often comes to the creation of "a new form of in-between-city" , the city distributed network of the city, the fuzzy, functionally strongly connected, but devoid of the spatial compactness of traditional and non-traditional canons spatial order.

2.2 The rise of SME sector in Poland

Entrepreneurship, as a social phenomenon, is a very complicated process causing many problems regarding the analysis of its nature. It is known that entrepreneurship creates economic growth and social development, but it is unclear how it happens. People establishing business activities have various motives – from economic and social to the will of accomplishment. However, it is unknown what configuration of motives has the greatest influence on the success of an undertaking. Finally, it is obvious that enterprising employees are valuable to their employers. However, methods of making the most of their potential are still searched for .According to the GEM Report, the countries are divided into:

- factor-driven economies,
- efficiency-driven economies
- innovation-driven economies.

The GEM survey classified Poland in the second group .

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[1] Tölle A., Wdowicka M., 2012

Although the SME sector is stimulating the development of the national economy, the Polish entrepreneurs in the years 1947 – 1989, the period of the planned economy dominated by the state sector, faced many difficulties in running their own businesses. However, the problems were not a result of reduced demand for the products and services, but the reason were actions of the state to discourage SME's economic activity (Figure 1).
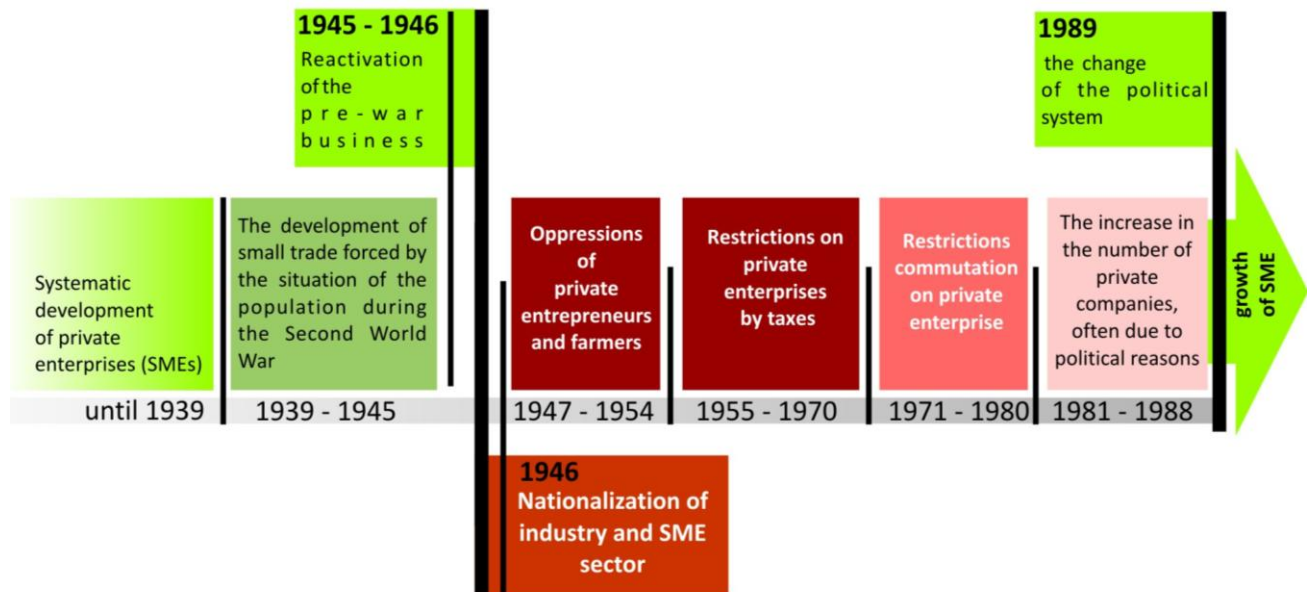
Fig. 2 The development of the SME sector in Poland in the years 1939 – 1988. Source: J.Martyniuk-Pęczek, O.Martyniuk, XXX

On 23 December 1988, the Sejm (Lower House) of the People's Republic of Poland passes the law on business activity. This time, the changes are revolutionary – the law, in fact, breaks away with the entire previous economic order, making private enterprise equal in legal terms with the activity of the state.

That act along with the later ones (unification of the tax system, admitting free trade in foreign currencies) results in the starting up of many SMEs. To learn how to run a company at that time, it was enough to read a few acts: the Commercial Code, Tax Law, Customs Law, and Labour Code .

There were tens of thousands of people in Poland at that time who set up a small business, and let's get down to work. Work and mental powers were the only things which counted. It was the time of Polish economy transformation, from the centrally planned one to a free market economy. There are three phases of SME sector development in Poland druing this period.

First phase had began before the market economy was introduced and was named the preliminary phase of business development. The second phase is the period from 1989 to 1994. It is characterized by a rapid increase in the number of SME businesses. In recent years there has been a more than twofold increase in the number of small entities, which in large part was due to the economic recession. The SME sector has become a place to work for people who have lost their jobs in large state-owned enterprises. In the phase of market self-regulation, after 1995 the number of SME continues to grow, but the growth rate began to stabilize. This was due to the elimination of the weakest economic enterprises that have failed because of an increasingly mature and competitive market. Other causes of SME establishment in Poland were the need for self-realization, liberation or the desire to scratch the entrepreneurial independence.
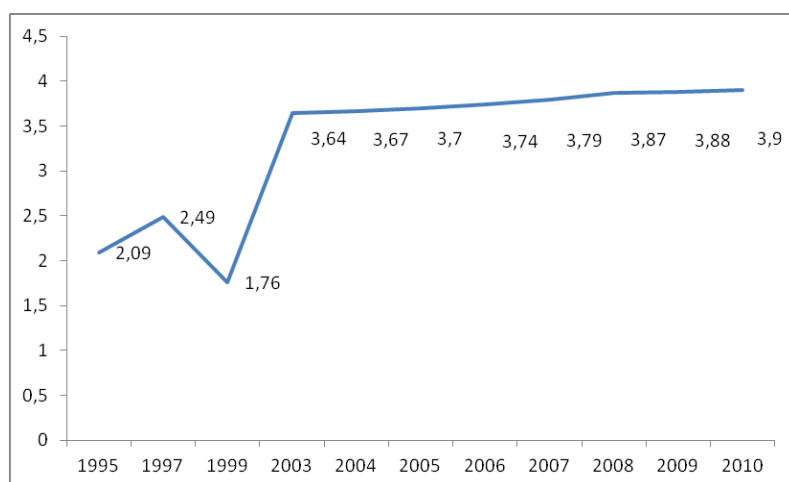
Fig 3 – The development of the SME sector in Poland in the years 1995 – 2010, Source: own study based on data from PARP

At present, when the free market is already mature, there are other reasons why people start their own businesses. As the GEM Report shows, Poland belongs to the countries with the most disadvantageous structure of entrepreneurial motivation. The number of businesses established due to will to seize an opportunity is only slightly higher than the number of enterprises started up out of necessity. It might be evidence of a low development potential of Polish enterprises. A more disadvantageous ratio of the opportunity-driven entrepreneurship to the necessity-driven entrepreneurship can be found only in Bosnia and Herzegovina, Iran and Pakistan.[2] Unfortunately, value of the indicator of people perceiving business opportunities for Poland is low.[3] In Poland, slightly more than one-third (33.1 %) of people perceive business opportunities.[4] Fear of failure is an important factor that limits the level of entrepreneurship at the national level. Despite an identified opportunity and the will to use it, and despite of positively perceived capabilities, some entrepreneurs give up the establishment of a business as a result of fear of failure. In Poland, the fear of failure is much higher than in the comparable countries and it might be an essential factor that hinders the entrepreneurship. Over 56 % of Poles think that fear of failure can prevent them from starting up a business.[5] The above demonstrates a high level of uncertainty about the pursuing a business.[6] However, at present, SME companies are up 99.9 % of all companies in Poland. In 2010 number of people working in this sector in total amounted 60,3 %. Additionally the SME sector in 2010 produced 47,6 % of Polish GDP, including micro enterprises (29.6 %), small (7.7 %) and medium (10.4 %).[7]

In Poland, in contrast to the global trend, small businesses have a very low share in the industries belonging to high-tech industries. In most developed countries, small firms dominate the industry of IT, automation, specialized chemistry. In Poland, however, these companies dominate in the repair, manufacture and construction.

The SME sector has a full range of functions, not only economic, but also an important social ones. The primary social function performed by the SME sector in Poland is the formation of an economically independent middle class. It is commonly believed that the prosperity of the state and the smooth functioning of the market mechanism depend on the degree of development of the middle class in the society. Additionally, efficient business processes are created because of the propensity of SMEs to the use of local

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[2] P.Zbierowski, D.Węcławska, A.Tarnawa, P.Zadura – Lichota, M.Bratnicki, Global Entrepreneurship Monitor – Poland, PARP, Warszawa 2012, s.27

[3] It is measured by the percentage of persons who claim that there are good conditions for business start-up in their neighbourhood within the next six months. That rate also falls as the economic development decreases – the average for factor-driven economies amounts to 53.6 %, in the case of efficiency-driven economies it is 40.3 %, and in the case of innovation-driven economies it is 34.9 %.

[4] P.Zbierowski, D.Węcławska, A.Tarnawa, P.Zadura – Lichota, M.Bratnicki, Global Entrepreneurship Monitor – Poland, PARP, Warszawa 2012, s.17

[5] This indicator is higher only in three countries (Thailand – 60.5 %, Bangladesh – 63.1 % and Greece 67.6 %).

[6] P.Zbierowski, D.Węcławska, A.Tarnawa, P.Zadura – Lichota, M.Bratnicki, Global Entrepreneurship Monitor – Poland, PARP, Warszawa 2012, s.18

[7] Raport o stanie sektora małych i średnich przedsiębiorstw w Polsce w latach 2010 – 2011, PARP, Warszawa 2012, s. 18 – 21

resources and the ease with which these resources are able to use, increasing affluence in the region, changing lifestyles owners and employees based on the free market choices, economic freedom and effective enterprise. The social function of Polish SME is also reducing social costs and to alleviate social tensions associated with economic transformation.

3 THE INTERACTIONS OF THE TWO PROCESSES

However we could find in polish suburbans landscape the characteristic element which is a large number of SME sector businesses located there. The analysis of the literature describing the process of suburbanization in Poland, the authors characterize it often cite examples of European or American [Radziejowski 2006], except for Polish economic conditions – social. Analyzing the causes of the process of suburbanization shows include: Polish-specific phenomenon:

- "lack of tradition" efficient "use of land;
- Lack of tradition, local practices and standards for use of space;
- weakness of planning, mainly in the local scale, manifesting itself arbitrariness spatial development plans and easy alterations "[Fogel, 2012].

It seems that the specificity of Polish suburban areas is also high economic activity, boost in the last 20 years. As evident from the observations and preliminary research statistics on selected suburban areas of Gdansk, the number of inhabitants per one registered company in suburban areas (Chwaszczyno, Straszyn) and Gdansk is much lower. This means that residents of higher economic activity in some areas compared to suburban residents of Danzig [Martyniuk-Pęczek, Martyniuk 2012]. You can think about the reason for this significant difference in activity in the central city system – suburban areas and diagnose the cause of entrepreneurship residents of suburban areas. In Poland 64, 7 % of new businesses to the project of choice (opportunity enterpreneurship) and 35, 3 % of the projects undertaken by necessity (necessity enterpreneurship).

3.1 Characteristics of selected central city and its suburban areas

Tri-City Metropolitan Area (TOM) is an important part of the functional and spatial Pomeranian, and the most important economic and social center of the Southern Baltic Sea. Gdańsk, Gdynia and Sopot are an urban center. Functional area of TOM are – Pruszcz Gdanski, Rumia, Reda, Wejherowo, Tczew, urban-rural and rural communities Żukowo – Pruszcz Gdansk, Kolbudy, Szemud, Wejherowo, Kosakowo.

Selected for survey suburban areas are:

- Chwaszczyno – the part of urban – rural community Żukowo (district Kartuzy),
- Straszyn – the part of Pruszcz Gdanski – the rural municipality of Gdansk (Gdansk district)
- Kolbudy – the part of Kolbudy rural comunity (Gdansk district)
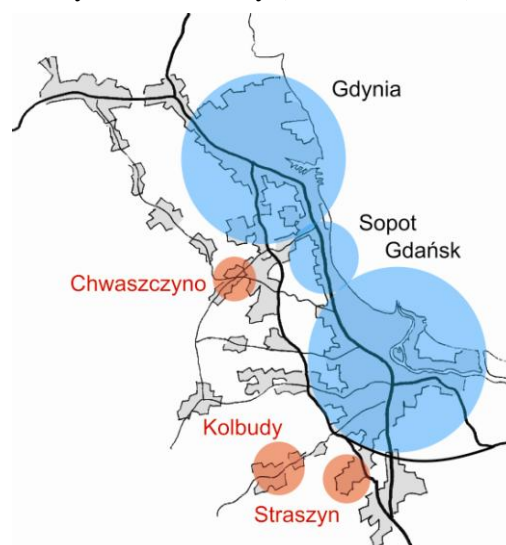
Fig 4 – Gdańsk, Chwaszczyno, Straszyn, Kolbudy – a system of spatial relations; Source: own study

As can be seen from the Pomorskie Development Plan, urban center (Gdańsk, Gdynia, Sopot) is the area include: the highest concentration of population in the labor market. It does not provide an affordable and attractive offer of investment areas and new housing stock. These cities, including Gdańsk, exhibit diverse growth of population and housing, but as a whole Tri-City loses population. The population of Gdansk amounts now 460.5 thousand.,

(in 2000 and 1990 the number of people amounted to 463 000, 465.100). Decline in population does not inhibit the development of new housing on large areas (Gdańsk South). Gdańsk reduces the number of people, often losing the wealthiest and most active group of people who search of a higher standard of resident, move to suburban communities.

On the contrary, the functional urban area (ring municipalities) shows both the demographic and investment dynamics. Migration rate in 2010 amounted :

- the county Kartuzy, where Chwaszczyno is located + 1017, (population of Chwaszczyno – 2678)
- the district of Gdansk, where Straszyn is located + 1873, (population of Straszyn – 1782),
    - The commune Kolbudy, where Kolbudy is located + 330 (population of Kolbudy – 3557)
    - The commune Szemud, where Koleczkowo is located +388 (population of Koleczkowo – 1261)
- the city of Gdańsk – 112 (population of Gdańsk – 460 517).

There is a growing area of land invested in both residential as well as commercial for services and manufacturing. Improving the quality of residence is parallel to the process of spontaneous development of new housing stock. Dynamic processes of urbanization are mostly "spontaneous" or even "chaotic", not full-fledged shaping the spatial structure . This is due to:

- transport accessibility and the price of land;
- the supply of building land in response to the demand – the owners are trying to sell all the land area that can find potential buyers.

Spatial development is very little efforts of the local authorities activities which do not prepare ahead of time investment areas (there is no urban and infrastructure plans).

Urban tissue sterilization is the reason of shifting economic activity outside urban areas or on the periphery, manufactures and service companies with their headquarters are moved to suburban areas and do not appear new companies offering higher order services.

In order to describe the economic activity in the studied areas, authors use following criteria of SME classification:

- the number of employees,
- the year of company establishment,
- the type of business.

All surveyed areas are dominated by micro and small enterprises (nearly 100 % of all businesses).(Table 2).

Enterprise size/ Number of employees	Gdańsk (%)	Kolbudy (%)	Chwaszczyno (%)	Straszyn (%)	Koleczkowo (%)
micro (2 – 9)	55	55	49	46	52
small (10-49)	35	35	40	41	36
medium (50-249)	8	11	10	9	12
large (powyżej 250)	2	0	1	3	0

Tab. 2 – The structure of the SME sector in selected areas, Source: own study based on statistical data

The period of development of the SME sector in the studied areas is presented in Table 3. The data indicate a rapid development of SMEs in the years 1989 – 1995 and 2002 – 2007 in Gdansk, Chwaszczyno, Kolbudy and Koleczkowo. In Straszyn, the number of start-ups increased throughout the period from 1989 to 2007. It is associated with the development of the southern districts of Gdańsk (Gdańsk South), which is in the near of Straszyn. The other reason is an intensive development of road infrastructure there.

Established	before 1989 (%)	1989- 1995 (%)	1996-2001 (%)	2002-2007 (%)	after 2008 (%)
Gdańsk	6	31	25	28	10
Kolbudy	6	36	22	19	17
Chwaszczyno	7	38	15	27	13
Straszyn	6	22	25	35	13
Koleczkowo	0	34	24	24	18

Tab.3 – The year of campany establishment in Gdańsk, Kolbudy, Chwaszczyno, Straszyn, Koleczkowo in (%); Source: own study

After 2008 the number of newly established enterprises significantly decreased. It is a period in which there was a sharp increase in single companies (so-called self-employment).

In the suburban areas we can also observe the great increase in the number of single activity raised, in comparison to the years 2002 – 2007, respectively:

- in Kolbudy + 40 %[8]
- in Chwaszczyno + 500 %,
- in Straszyn + 700 %
- in Koleczkowo +80 %.[9]

This could mean that the migration of people from Gdansk concerned in large part more active people, more likely to take risks. They are probably in large part freelancers, managers or specialists because such people often turned a contract of employment to self-employment.

By analyzing the type of business carried out by operators in Gdansk, Kolbudy, Chwaszczyno, Straszyn and Koleczkowo should be noted that most companies operate in the construction industry. In suburban areas other group companies are dominant actors in industry and manufacturing. These are often activities that require the production area. In the case of higher-order service (medicine and health, law, education, and education) companies in Gdansk, these industries account for 20 % of the total, while in the case of suburban areas it amounts about 10 %. Often these services are perceived as higher quality if they are provided in the city center due to the proximity of universities, public health specialists, the courts. This opinion is supported by the lack of firms that provide legal services in suburbs.

3.2 The economic activity of residents in suburban areas and the city center

In this part of article will be made a comparison of statistics on population and the number of registered businesses in the central city (Gdansk) and suburban areas (Chwaszczyno, Straszyn, Kolbudy, Koleczkowo) in order to determine the economic activity of residents. The results of the analysis are presented in Table 4.

Place	Population (persons)	The number of SMEs[10]	Activitie	
			population (person per SME)	families[11] (family per SME)
Gdańsk	460 517	8 019	57	14
Kolbudy	3 557	133	27	7
Chwaszczyno	2 678	149	18	4
Straszyn	1 782	206	9	2
Koleczkowo	1 261	50	25	6

Tab. 4 The economic activity of residents of Gdansk, Kolbudy, Chwaszczyno, Straszyn, Koleczkowo. Source: own study

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[8] The greatest incerase in this enterprises category was in 1989 -1995 + 1 000 %

[9] The greatest incerase in this enterprises category was in 1996 – 2001 + 300 %.

[10] Without sole proprietorships.

[11] Average is four persons.

The presented data shows a much more higher population economic activity in suburban areas compared to residents of the central city. One company is conducted by:

- Every 57 citizen of Gdansk,
- Every 27 citizen of Kolbudy,
- Every 18 citizen of Chwaszczyno,
- Every 9 citizen of Straszyn,
- Every 25 citizen of Koleczkowo.

Assuming that the average family is four people, we can say that:

- in Kolbudy every 7 family conducts business
- in Straszyn every 2 family conducts business,
- in Chwaszczyno every 4 family conduct business,
- in Koleczkowo every 6 family conduct business.

In the case of residents of Gdansk, one company falls on every 14 families.

Updating statistics with data indicating companies in reality existed in suburban areas, economic activity is even higher compared to the city center. This is due to the fact that some people are still domiciled in the city center, but in practice both lives and business conduct in suburban areas. This can be described as a "hidden suburbanization." Much higher economic activity is not only determined by economic factors. It shows the analysis of land prices pointing out that the price of investment land in chosen suburban areas are higher than the prices of land in some districts of Gdańsk (Gdańsk East). The reason of such a situation is surely communication infrastructure, but also the social conditions that result from the characteristics of inhabitants of suburban areas.

The natives, the former owners of the land involved in agriculture in the past, after the sale of part of the land acquired funds to invest in a new company set up personally or by children. Another motivator setting up a company in suburban areas are family reasons (reducing the time and costs of traveling to the city), and the new needs of the population. It can therefore be concluded that the well-educated, active and creative residents of suburban areas conducive to the development of local entrepreneurship.

4 CONCLUSION

In Poland and especially in the TOM the economic activity is intense in suburban areas. This intensity is counted by the number of citizens and the firms established there. The experience of developed countries shows that decides about their economic power the SME sector. Polish model of "Edge City" based on the development of micro and small enterprises is somehow created. There could be a new way of the spatial development of this areas created on the basis of SME potential. Local authorities should change their passive attitude and look for the new opportunities. However there is quite a large number of SMEs operating in suburban areas, but officially registered in the city center. It results in taxes being paid not to the local communities, but to the Gdansk budget, giving rise to the so-called "tax gap." The challenge then is to encourage companies to register in the suburbs. Moreover – change to create something in kind of "local patriotism" based on the corporate social responsibility for the arounding space.

Apart from this, the development of SME is an opportunity for suburban areas in terms of joint activities in the framework of public law. Their strong links with the local community and the environment mean that their owners often personally solicit local infrastructure, knowing that it will be used not only by the company, but also the family. So they are more willing to participate in the cost of its development and actively participate in the planning process of establishment. This means that the development of the SME sector results in the development of suburban areas and can contribute to the financing of measures to improve the spatial order, eliminate the negative effects of suburbanization.

In summary, the Polish suburban areas are business incubators and it should be taken into account while planning and creating land use policy.

5 REFERENCES

CZERNY M., Przestrzenna ekspansja miasta – przegląd współczesnej tematyki badawczej, [in:] T., Rogacki H. (eds.): Współczesne problemy i koncepcje teoretyczne bada przestrzenno-ekonomicznych, Biuletyn KPZK 219, 156-172., Warsaw,, 2005:

LISOWSKI A., GROCHOWSKI M., Procesy suburbanizacji. Uwarunkowania, formy, konsekwencje, Biuletyn KPZK 240 (1), 216-280, Warsaw, 2009

LORENS P. (2005), Suburbanizacja w procesie rozwoju miasta postsocjalistycznego. in: P. Lorens (eds.) Problem suburbanizacji, Urbanista ,Warsaw:, 33 – 44

MARTYNIUK-PĘCZEK J. (2005), American Dream a sprawa polska : amerykański i polski kontekst suburbanizacji in: P. Lorens (eds.) Problem suburbanizacji, Urbanista, Warsaw, 103-112.

DUANY A., PLATER-ZYBERK E., SPECK J., Suburban Nation. The rise of Sprawl and the decline of the American Dream, North Ponit Press, New York; 2000

P.ZBIEROWSKI, D.WĘCŁAWSKA, A.TARNAWA, P.ZADURA – LICHOTA, M.BRATNICKI, Global Entrepreneurship Monitor – Poland, PARP, s.18 , Warsaw,, 2012,

Raport o stanie sektora małych i średnich przedsiębiorstw w Polsce w latach 2010 – 2011, PARP, s. 18 – 21, Warsaw,, 2012,

Plan Zagospodarowania Przestrzennego Województwa Pomorskiego, Gdańsk, 2009,

www.stat.gov.pl 16.11.2012

www.ec.europa.eu 16.11.2012

www.solidet.pl 16/11/2012

Polycentric Structures and Mobility in Agglomerations – an Analysis of the Vorarlberg Rhine Valley in Austria

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1 ABSTRACT

Sustainable urban mobility always stands between conflicting priorities of different stakeholder groups and is even more difficult to achieve in a region with several municipalities with a similar number of inhabitants. The Vorarlberger Rhine Valley (Vorarlberger Rheintal) consists of 29 municipalities including the capital city of the Province, Bregenz, and the even bigger cities Dornbirn and Feldkirch. In the last 50 years the number of inhabitants almost doubled up to 250 000 inhabitants (reference year: 2011). The built up area has increased even more forming a single area of settlements with a widely polycentric structure. In 2003 a co-operation among the 29 municipalities has been established following the aim of a common vision of the Rhine Valley ("Vision Rheintal") including a balanced distribution of economic, cultural, educational, retail, recreational and administrational institutions across different locations.

The Rhine Valley has been selected as demonstration site of the Poly-SUMP project commissioned by the European Commission in 2012. The idea of the project is to understand elements of a successful implementation of a polycentric co-operation, to analyse to which extent polycentric structures are able to support sustainable mobility and to exchange experiences with other regions on a European level.

20 Stakeholders have been interviewed in the Rhine Valley covering a variety of stakeholder groups (local and provincial government, transport planner, cyclist group, economic sector etc.). It turned out that almost all experts ranked the collaboration among different stakeholder groups as well-established. Regular conferences and meetings as well as transparent transport planning processes are an ideal platform for exchanging interests and for finding common solutions.

Polycentric structures have an influence on the daily mobility of the inhabitants, e.g. the average trip distance is shorter than a region with just one major city, as people find appropriate destinations more likely nearby. Data of a mobility survey launched in 2008 show that the average trip length in the Rhine Valley is 8.6 kilometres, which is about 1/3 shorter compared to the rest of Vorarlberg. In order to be able to compare the degree of polycentrism and its effect in mobility among different regions a set of indicators has been developed including not only spatial data (e.g. population density) but mobility data as well (average distance travelled to work).

2 INTRODUCTION

Depending on local circumstances, the historical growth of population led to different settlement patterns, caused by the increasing number of centres and/or an increasing concentration of the population within one dominant centre (Figure 1). These effects create different settlement patterns (Bus et al. 2012):

(1) Monocentric regions are characterised by a high density central city which attracts and directs daily commuting flows from and to the surrounding regions, often leading to a high amount of mileage driven. Centripetal mobility patterns are aggregated on radial road or rail axes penetrating the major city core. Most of the inhabitants of a region live in the major city, almost all facilities of the daily live (work places, education, shopping …) are concentrated in this city.

(2) Disperse settlements are characterised by the equal distribution of the population all over the region without clear defined centres.

(3) Polycentric regions are characterised by a number of centres forming a network of cities of equal size with a balanced distribution of economic, cultural, educational, retail, recreational and administrational institutions across different locations.
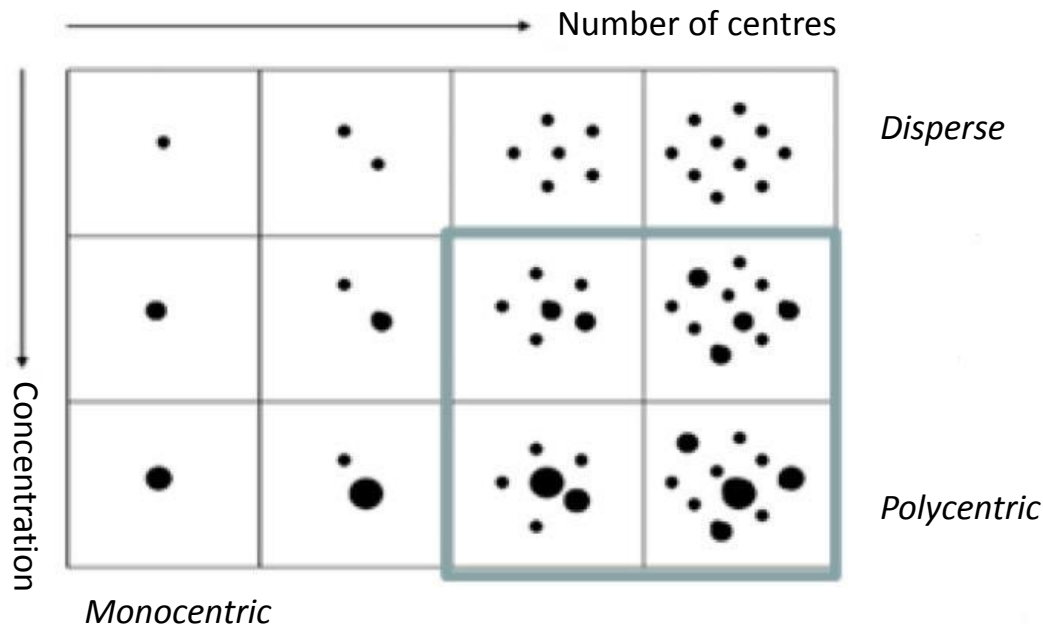
Figure 1: Settlement patterns (Source: Bus et al. 2012)

The Poly-SUMP project commissioned by the European Commission within the Intelligent Energy Europe programme in October 2012 is dealing with the special needs of polycentric regions in terms of spatial and transport planning, as this is an even more difficult undertaken in a region with several municipalities of almost equal status and with a similar number of inhabitants. The idea of the project is to understand elements of a successful implementation of a polycentric co-operation, to analyse how polycentric structures support sustainable mobility, and to exchange experiences and transfer knowledge within polycentric regions. Based on lessons learnt a common methodology for Polycentric Sustainable Urban Mobility Plans (Poly-SUMP) is developed by testing practical planning approaches in European regions of Europe. The Vorarlberger Rhine Valley in Austria (Vorarlberger Rheintal) has been selected as demonstration site in the Poly-SUMP project as it has a long tradition of polycentric co-operation among the municipalities of the Rhine Valley.

Figure 2 Location of the Province of Vorarlberg in Europe (Source: google maps)

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3 THE VORARLBERGER RHINE VALLEY

3.1 Characteristics of the region

The Province of Vorarlberg is the most western province of Austria and is mainly a mountainous area where more than 2/3 of the territory is 1000 m above sea level (Figure 2). Thus, only 25 % of the area can be used as built up area or for agricultural use. Due to this land use restrictions the provincial government developed a soil protection concept early in the 1990'ies already. This concept considers real estate transfers, spatial planning and agriculture polices as well as aspects of air pollution control, environmental, landscape and nature protection [Amt der Vorarlberger Landesregierung 1992]. The province of Vorarlberg has an over average flourishing economy at Austrian as well as European level. Only 3.6 % of the population (reference year 2011) are currently unemployed [Statistik Austria 2012].

In 2011 the Province of Vorarlberg had about 372.000 inhabitants [Amt der Vorarlberger Landesregierung 2012]. Almost 2/3 of the population lives in the Vorarlberger Rhine Valley, which consists of 29 municipalities including the capital city of Bregenz, and the even bigger cities Dornbirn and Feldkirch. This is caused by the fact, that this region is one of the rare plain areas in the province and at low altitude between 400m (Bregenz) and 450m (Feldkirch). The extent is about 40 km from North to South and about 10 km from West to East. The river Rhine, which is bordering the region in the west, represents the national border between Austria and Switzerland at the same time.

3.2 Establishing polycentric concepts in the Vorarlberger Rhine Valley

In the last 50 years the number of inhabitants in the region almost doubled, the amount of buildings and the area of settlements increased even more, so that several municipalities have grown together forming an almost single area of settlement. Therefore the administrative boarders do not always represent areas functionally belonging to each other (Figure 3). Although Austrian municipalities are responsible for the construction of the local road infrastructure in their area as well as for the local spatial planning the project "Vision Rheintal" has been founded more than 10 years ago with the aim to establish a discussion platform across all 29 municipalities of the region and to develop strategies for integrated spatial and transport planning, following the principles of polycentric developments. One of the key topics is mobility, enabling sustainable transport by fostering settlement structures, which decreases the traffic demand and supports environmental friendly modes. These can be achieved by a balanced distribution of economic, cultural, educational, retail, recreational and administrational institutions across all 29 municipalities.

Some examples of the functional division for the major settlements in the area of the Rhine Valley are:

- Bregenz as the capital of the Province of Vorarlberg, but only the third biggest city in the region, hosts the provincial government, provincial police, provincial library, provincial school administration and main cultural facilities (theatre, festivals) whereas

- Wolfurt hosts the logistic centre for goods distribution for the whole area and cross border transport;

- Dornbirn hosts the polytechnic college, provincial television, provincial health insurance organization, chamber of commerce including supporting funds for economic development;

- Feldkirch hosts provincial court of justice, chamber of labour, pedagogical college, unions headquarter, provincial hospital, provincial finance office and act as diocesan town of the province,

- Lustenau hosts the provincial chamber of industry and the central provincial storage facility for oil supply.

4 ASSESSMENT OF THE CURRENT SITUATION IN THE VORARLBERGER RHINE VALLEY

The analysis of the current situation is based on a desk research of information mainly provided by the project "Vision Rheintal" and in-depth interviews with 20 stakeholders representing different stakeholder groups.

4.1 Assessment of the current transport situation

The evaluation of the current transport situation is based on a ranking provided by stakeholders on a scale from 1 (best) to 5 (worst). The mean value is 2.7, however, with a strong polarisation between

representatives of the chamber of commerce and oppositional parties scoring "unsatisfying" and local government and transport planners scoring "satisfying" on the other.

Figure 3: The Vorarlberger Rhine Valley Region with 29 municipalities (Source: Assmann 2006, own modification)

The situation for pedestrians and public transport users are rated positive by almost all respondents, whereas the ranking of situation for cyclists and car users dependents on the group of stakeholder the respondent belongs to. In particular, too restrictive policy towards private car traffic or missing capacity extensions of the road network are mentioned by car-oriented persons. On the other hand, there are stakeholders criticizing the car friendly policy in the area.

The questions for measures to be implement in the near future in order to improve the traffic situation polarised as well. The majority of respondents argued to invest in new infrastructure measures, however the focus on the transport mode differs depending on the particular interests, e.g. car-oriented stakeholders mentioned the missing extensions of the road network (e. g. a new link to Switzerland, bypass road for city of Feldkirch and Lustenau). Only a few times organisational measures are mentioned, i.e. public transport at traffic signals, mobility management, pricing measures (parking pricing, reduced public transport ticket) or improved marketing.

4.2 Assessment of competences

Sustainable development requires the coordination of policies and services of many actors – transport and urban planners, local and regional policy makers, urban and interurban public transport providers etc. – within and across different urban and administrative boundaries. Therefore, regular conferences and meetings as well as common transparent transport planning processes are pre-requisites for exchanging interests and finding common solutions in the Vorarlberger Rhine Valley.

Identifying stakeholders and understanding their current and potential role are important conditions to map the actors to be involved in a polycentric planning process. In the Vorarlberger Rhine Valley seems to be a common sense that all relevant institutions (and therefore competences) are involved in the current planning processes. It seems that these activities do not comply with the transport strategy in the region. Institution and persons primarily mentioned by the respondents are politicians (most important), administration staff at local and regional level, public transport operators as well as public transport consortia, citizens and the energy agency. A bicycle-coordinator, transport user's lobby group and the industry dealing with electric supply was mentioned only a few times.

In addition, the provincial government commissioned a regional transport masterplan for the Vorarlberger Rhine Valley. In 2006 a collaborative, consensus-oriented planning process was initiated to solve the traffic problems of this particular region. A multi-modal package of measures should be developed through a mediation process led by an external team, i.e. departments of the provincial government, the highway agency (ASFINAG), representatives of all affected communities, interest groups, and representatives of lobbying organizations as well as the conservation organisation in order to ensure the widest possible consideration of all interests. The aim of the process was to find a consensus on comprehensive mobility solutions, most suited to reduce negative impacts of transportation significantly. Thus, not only new road infrastructure for private car traffic has been considered, but more a useful combination of improvement of cycling and public transport measures.

4.3 Assessment of the implementation of sustainable mobility

Stakeholders interviewed were asked to score the importance of considering sustainable mobility in transport plans. Nearly all respondents fully identify themselves with the concept of sustainability. Elements often mentioned to be included in sustainable mobility plans are the maximum freedom of mode choice, efficient use of resources, less use of private car and not to stress future generations.

The good planning culture and the communication established among the 29 municipalities are one of the most important drivers enabling the implementation of sustainable mobility plans. In particular, this includes the cooperation between the municipalities on an administrative level within the region. Additionally, the awareness of the citizens with regard to the importance of sustainable mobility is seen at high level, which increases the acceptance towards sustainable transport planning.

The dominance of private car use and corresponding infrastructure supply in the region is still seen as main barrier. In addition, economic pressure on enterprises offering mobility supply (public transport, car sharing, etc.) sometimes prevents sustainable developments. Moreover, it is often difficult to change habitual mobility behaviour of the transport users.

Stakeholders scored the importance of different planning elements on a scale from 1 (not important) to 4 (most important). Generally, all elements discussed are important or very important. However, as it can be seen in Figure 4 political support is of most importance, followed by measurable goals and awareness measures.

4.4 Pros and cons of polycentric structures in terms of sustainability

The term polycentrism is known by the majority of the stakeholders asked. A missing dominate city was mentioned as characteristic of a polycentric settlement area by almost all stakeholders asked. This leads to a cooperation of municipalities at an equal level in order to develop the region commonly and to share administrative or spatial functions. Consequences on the transport system are noticed by a more homogeneous distributed transport demand and the option to create axes which supports the rail based public transport system. Advantages of polycentric regions are shorter distances between origins and destinations of trips, the opportunity to find smart solution on a smaller scale, keeping smaller villages attractive as

investments are more even distributed, a bigger variety of land use and infrastructure within the region. Generally, the co-operation among the municipalities enables more sustainable solutions for the whole region.
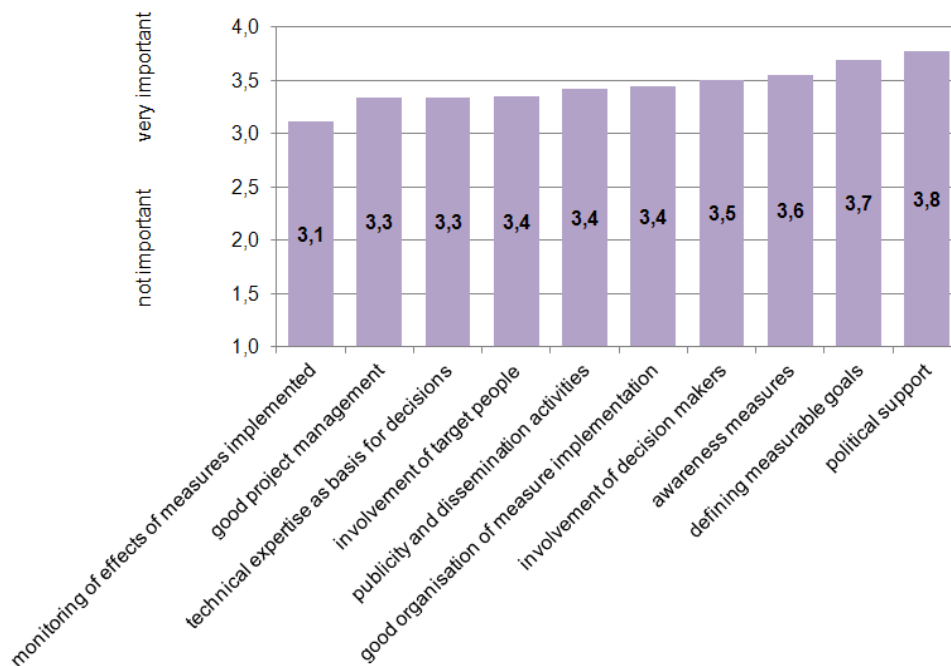
Figure 4: Importance of planning elements

Arguments against polycentrism are the more effective possibilities to access a dominant city by high capacity modes and the need of goods transport to drive through settlements areas as a clear segregation between settlement areas and transport corridors is missing.

5 MOBILITY PATTERNS OF THE VORARLBERGER RHINE VALLEY

For the comparison of mobility patterns of polycentric areas with monocentric regions a matrix is built where the capital city of the region is fixed as central spatial reference point with four classes of distance. This is a residual of a monocentric vision with the capital city considered as the most prominent centre of a region, where the higher urban/regional authority functions are located. However, thanks to the matrix structure, it is possible to analyse and compare the degree of polycentricity vs monocentricity of the regions in two ways:

Along the diagonal cells key land use variables (resident population, workplaces, total area, and settlement area) are recorded for the capital city and for the other communities grouped by class of distance from the capital city. These data allow computing population and jobs density indicators that may typically show a marked density gradient (from high value in the central city to low values in the distant poles) in monocentric regions, and a less steep density gradient in polycentric regions, where population and jobs are more distributed across the region. The first row and column of the matrix include mobility flows within the capital city (first cell) and to/from the capital city to the other poles. These are monocentric (centripetal/centrifugal) mobility flows. They can be compared with the magnitude of the mobility flows within the other distance groups of poles (recorded in the diagonal cells) and within these groups, which represent polycentric/transversal mobility flows (i.e. not gravitating towards the capital city).

Following the concept as mentioned above 4 areas are defined:

(1) Capital city (Bregenz)

(2) First ring around the capital city (poles of Dornbirn, Hohenems. Lustenau), which is about 8 to 20 km away from Bregenz)

(3) Second ring around the capital city (poles of Feldkirch, Götzis, Rankweil), which is about 20 to 40 km away from Bregenz)

(4) Other areas (remaining parts in the Province of Vorarlberg, Switzerland, Germany etc.)

For the analysis of the mobility pattern data of a mobility survey launched in 2008 are used. In total in this survey 17 140 households of 96 municipalities were contacted by mail or phone, which is about 12 % of all households in Vorarlberg. As reference days Tuesday, Thursday and Sunday were defined. More than 4 000 households responded and gave information about their daily mobility on a weekday as well as on Sundays (Herry et al. 2009).

The number of inhabitants is almost the same in the different areas as defined above and ranges from 70 000 to 95 000 inhabitants. Although Bregenz is the capital city of Province of Vorarlberg and place of the provincial government, it is even the smallest agglomeration of the Vorarlberger Rhine Valley. Same applies to workplaces which are well distributed over the poles with a slightly domination of the second ring, as this comprises the largest area (210 km²) and includes the biggest city of Dornbirn (Table 1).

Based on the number of trips stated in Table 1 the share of trips has been calculated according to the given O-D matrix. In monocentric areas it can be assumed, that the dominant (capital) city is attracting more trips. The share of these trips having other destination than the capital gives an indication on the degree of polycentrism. The analysis of the mobility data of inhabitants of the Vorarlberger Rhine Valley shows that ¾ of all trips are internal trips. A predomination of the relation to/from the capital city of Bregenz cannot be identified, only 10 % of trips originated in the first ring have the destination in Bregenz, and this value is even lower for the second ring.

			Destination poles			
		Dist. from capital city	Capital city (Bregenz)	First ring around capital	Second ring around capital	Other areas
			approx. 0-8 km	approx. 8-20 km	approx. 20-40 km	-
Origin poles	Capital city (Bregenz)	approx. 0-8 km	70 477 inhabitants 28 715 workplaces 96,98 km² in total, 55,91 km² (58 %) settlement area **183 097** trips in tot. on the average, 75 % of all trips (working day)	**31 483** trips in total on the average, 13 % of all trips (working day)	**7 208** trips in total on the average, 3 % of all trips (working day)	**20 774** trips in total on the average, 9 % of all trips (working day)
	First ring around capital	approx. 8-20 km	**30 671** trips in total on the average, 10 % of all trips (working day)	96 225 inhabitants 38 634 workplaces 210,92 km² in total, 96,71 km² (46 %) settlement area **221 382** trips in total on the average, 75 % of all trips (working day)	**23 434** trips in total on the average, 8 % of all trips (working day)	**19 166** trips in total on the average, 7 % of all trips (working day)
	Second ring around capital	approx. 20-40 km	**7 446** trips in total on the average, 3 % of all trips (working day)	**24 850** trips in total on the average, 10 % of all trips (working day)	84 289 inhabitants 29 551 workplaces 158,77 km² in total, 85,45 km² (54 %) settlement area **194 552** trips in total on the average, 76 % of all trips (working day)	**29 605** trips in total on the average, 12 % of all trips (working day)
	Other areas		**20 797** trips in total on the average (working day)	**17 294** trips in total on the average (working day)	**30 580** trips in total on the average (working day)	Not available

Table 1: Key land use and mobility data

In monocentric areas people often have to commute to the capital city, as workplaces are concentrated there. Therefore, the share of trips with the purpose "to work place" gives an indication of the advantage of polycentric structures, as it can be assumed that the inhabitants are able to find a proper workplace in a city nearby. Between 65 % and 69 % of all trips to work are internal trips, i.e. as workplaces are available at site (long-distance) commuting is necessary at a lower share only, even in the light of attractive (and assumable well paid) workplaces across the border in Switzerland (Table 2).

| | Destination | | | | |
	capital city	ring #1	ring #2	other areas	*in total*
capital city	69 %	15 %	4 %	12 %	*100 %*
ring #1	14 %	65 %	11 %	10 %	*100 %*
ring #2	4 %	12 %	67 %	17 %	*100 %*

Table 2: Share of trips to work based on the origin of trips based on ring concept (working day)

People who have to commute to the capital city for work are often using these opportunity to go shopping at this destination as well, as shopping facilities are established in dominant cities. This leads to a serious reduction of shops in the city centres of the surrounding municipalities and reduces the attractiveness of the overall appearance of public spaces in these areas. So it is of major interest to offer appropriate shopping facilities in each municipality. Due to the polycentric structure, no particular need to buy goods preferable in the capital city is identified. Up to 88 % of shopping trips are internal trips (Table 3).

| | Destination | | | | |
	capital city	ring #1	ring #2	other areas	*in total*
capital city	86 %	9 %	0 %	5 %	*100 %*
ring #1	7 %	85 %	4 %	4 %	*100 %*
ring #2	0 %	5 %	88 %	6 %	*100 %*

Table 3: Share of trips to shopping destination based on the origin of trips (working day)

The share of public transport trips on an average working day is less than in the other regions, however the use of the bicycle and walking seems to be more attractive compared to other regions of Vorarlberg. More than 1/3 of the trips are made by bicycle or on foot. The share of non-motorised modes is even higher on Sundays (36 %). This values give an indication that people living in polycentric structures are able to find their desired destinations nearby, so that the use of public transport, e.g. for commuting longer distances, is not that necessary than in other regions. Even leisure activities on Sundays are preferable undertaken by bike or are situated within walking distance, as more than 37 % of trips are undertaken by these modes (30 % car-driver, 28 % car-passenger). The share of car use is almost the same all over the Province of Vorarlberg, e.g. the share of car-driver or car-passenger is about 55 % on an average working day (Figure 5).
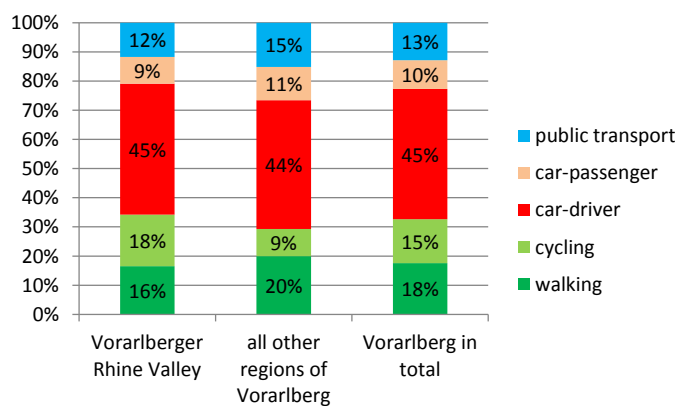
Figure 5: Modal Split on an average working day

The analysis of the average trip length per person and day determine the hypothesis that establishing polycentric structures are a proper tool to contribute to a more environmental friendly mobility. On an average working day the car trips of a car-driver in the Vorarlberger Rhine Valley are about 22 % shorter compared to the other regions in Vorarlberg, public transport trips shows a reduction of almost 25 % (Table 4).

average trip length [km]	**Vorarlberger Rhine Valley**	All other regions of Vorarlberg	Vorarlberg in total
car-driver	**10,8**	13,9	11,8
car-passenger	**13,4**	12,7	13,1
public transport	**15,1**	20,7	17,2
all modes	**8,6**	**11,4**	**9,5**

Table 4: average trip length (working day) [km]

In monocentric regions people often have to commute long distances to reach their workplace or schoolyard. Moreover, leisure and shopping facilitates are concentrated to just one dominate city. The analysis of the trip length according to purposes shows the advantage of a polycentric region. Instead of commuting to the capital city of Bregenz only, the inhabitants of the Vorarlberger Rhine Valley find appropriate workplace or schoolyards in one of the poles nearby. The same applies for leisure activities. Almost all trips of all purposes are shorter compared to the other regions in Vorarlberg (Table 5).

average trip length [km]	Vorarlberger Rhine Valley	All other regions of Vorarlberg	Vorarlberg in total
workplace	**9,3**	11,8	10,1
business	**22,2**	21,4	21,9
education	**7,0**	9,8	7,9
service	**4,5**	6,5	5,1
shopping	**4,0**	6,3	4,7
private purpose	**6,6**	9,8	7,6
leisure	**9,4**	13,2	10,5

Table 5: average daily trip length according to purpose (working day) [km]

At the same time people spend less time in transportation. On the average the daily trip duration on a working day is 20 minutes in the Vorarlberger Rhine Valley and 23 minutes in all other regions of Vorarlberg.

6 CONCLUSIONS

The Vorarlberg Rhine Valley has a long tradition of polycentric structures. 29 municipalities have established a common platform for the consensual development of spatial and transport plans in the region. Based on the results of interviews with stakeholders of the region it turned out that the communication culture among different interest groups are a major key for the implementation of sustainable measures in the region. Polycentric structures are able to support sustainable goals, as it offers the possibilities of finding points of interests nearby, so that the daily mileage driven is less than compared to other regions, Moreover, environmental friendly modes like bike or walking can be used more often. This has been determined by the analysis of mobility data. The average trip in the Voraerlberger Rhine Valley is 8.6 km, which is 2.6 km less than in the other region of the Province of Vorarlberg.

7 REFERENCES

Amt der Vorarlberger Landesregierung (1992): Bodenschutzkonzept Vorarlberg, Bregenz
Amt der Vorarlberger Landesregierung, Landesstelle für Statistik (2012): Die Bevölkerung Vorarlbergs und Die Staatsbürgerschaftsverleihungen im Jahr 2011, Bregenz
Assmann M. et al (2007): Vision Rheintal 2008 – 2010, Projekt Ziele Struktur Prozess, Bregenz
Assmann M. et al (2006): Vision Rheintal, Dokumentation 2006, Bregenz
Bus M. et al. (2012) Framework of comparable indicators to assess sustainable mobility in polycentric regions, Poly-SUMP Deliverable 2.2., Brussels
Herry M. et al. (2009) Mobilität in Vorarlberg, Ergebnisse der Verkehrsverhaltensbefragung 2008, Endbericht: Mobilitätsverhalten der Vorarlberger Bevölkerung, Einstellungen und Meinungen commissioned by Amt der Vorarlberger
Statistik Austria (2012): Mikrozensus, Regionale Gesamtrechnungen, F&E, Tourismusstatistik, Vienna

Pop-up Pest: An Educational Game for Active Participation of Children and Youth in Urban Planning

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1 ABSTRACT

This paper focuses on the design of a cooperative game for engaging children and youth in creating sustainable living environments. In cooperative games players achieve their goals acting together, collaborating with other players and helping each other. In addition to acquiring new knowledge, and expressing their own ideas and aspirations regarding their living environment, players acquire social competences essential for the coexistence and work in the community. In order to test the possibilities for designing a collaborative game for children we designed and implemented the Pop-up Pest game. It aims to support children in learning about their environment, understanding possible changes in urban spaces, and acquiring skills for active participation. The Pop-up Pest game was designed within a 25 m² large playing area which depicts Pest side downtown of the Hugarian capital Budapest. The players are divided into three groups striving to improve urban traffic, to establish more green spaces in the city, and to initiate a variety of cultural activities. The first version of the Pop-up Pest game was presented in September 2012. A total of 167 players from all age groups played the game. In addition, the game has been tested with 14 and 17 year old pupils as well as with a group of university students. This article presents the motivation for the game, the game story, design, concept and the first results of testing. We conclude the paper with a critical discussion and further research directions.

2 INTRODUCTION

The living environment greatly affects the child's development process, which should include the architectural design and space. This environment has an impact on the socialization processes, the formation of identity, as well as on the development of the child´s cognitive skills and competences. The research in the fields of psychology and social studies related to children's experiences of their living environment and the significance of built environment for their development and socialization (Muchow 1938/1978; Zinnecker 1979) reveals that their demands and needs and their involvement in urban planning processes need to be taken in account.

Current planning practices are characterized by an increasing demand for the qualitative integration of underpriviledged social groups. The limitations and shortcomings of established participative methods have emerged in the last decades, especially regarding the selective nature of the inhabitants participating (Fürst and Scholles 2008). For example, specific groups often participate because of their educational background, their ability to articulate or their availability at a particular time. Other social groups, such as children and adolescents, or the poor and under-represented, have little or no influence on local decision-making procedures. In the last few years we can observe the growing importance of children's participation in urban planning practices. New planning tools have been developed which strive to include children in planning. An example is the so called "Spielleitplannung" developed in Rhineland-Palatinate, Germany, which integrates child-friendly activities and children's participation in city planning. Several pilot projects took place in Germany in the last ten years and these experiences are described in several volumes and project documentations (e.g. Kultusministerium und Wirtschaftsministerium 2005; Reicher et al. 2006, Studio Urbane Landschaften 2009; Gaus-Hegner et al. 2009). Most of these projects concentrate on summarizing the participatory framework requirements and the results of the participatory processes from a planner's perspective. Applied participatory methods are rarely placed in a theoretical educational context and have not been studied from the perspective of the educational sciences. A substantial work still needs to be done related to age-appropiate methods for children and young people, how these practices can help to support learning, and whether educational processes are needed to accompany the participation process or not.

Developmental psychology focuses on the design of appropriate forms of participation in terms of skills and competencies of different age groups. Researchers have concentrated on the development of spatial perception of children (Piaget and Inhelder 1971), on the way children reproduce their everyday spatial experiences (Hart 1979), and on the development of their ability to participate in political, planning and

design issues (Oerter 1992). Richard Schröder's experiments (1995) with preschool and elementary school children showed that age-appropriate forms of participation have to be defined and developed in order to enable the children to participate. He based his research on the conclusions of developmental psychology, specifically addressing how preschool and primary school children are able to make decisions regarding their living environment, recognizing that their expressions and views differ greatly from those of adults. He investigated whether children are able to work with models to express their opinions and suggestions regarding their living environment. According to the results of his study, modeling is a suitable method for primary school children, as they have the ability to express ideas by means of spatial design, rather than verbalizing or visualizing them graphically. Their abilities and competencies to verbally or graphically express their ideas develop later. Schröder's research results also showed that in the case of older, 12-14 year old children, modeling seem to lose its appeal, especially for boys. His research clearly demonstrates that participation processes with children should be designed differently than those for adults, and they have to be differenciated even between different age-groups of children. The methods used in participatory processes should be adapted to the needs, interests and abilities of the children (and even of the particular age-group), in order to ensure the efficiency and sustainability of the participatory process.

In this paper we focus on the design and implementation of a collaborative game which aims to support learning about the environment and participion in planning for children. The Pop-up Pest collaborative game addresses 12-18 year olds. Its main goal is to stimulate them to formulate their needs and wants regarding public places in the city of Budapest, specifically in the Pest areas. The Pop-up Pest game enables the children/players to express their opinions concerning city development, and the game supports the development of a sense of responsibility for open spaces, and facilitates their ideas about further development of these places. The players can acquire skills for active participation in an engaged and playful way. We tested the Pop-up Pest game with 167 children and young people in Budapest during the European Mobility Week in 2012. In addition, the game has been tested with 14 and 17 year old pupils and a group of university students. The aim of the preliminary testing was to identify whether the game, as a method and as a concept of a collaborative game, is appropriate and successful in conveying the learning content. In the testing of Pop-up Pest we concentrated on the evaluation of the gameplay and the game experience. We present a short summary of the testing results and conclude the paper with a critical discussion and our further research directions.

3 GAMES FOR PARTICIPATION IN PLANNING

3.1 Design games for community planning

Sanoff in his work Design Games published in 1979 (Sanoff 1979; Sanoff 1990) introduced the idea of games for community participation in urban planning. These games are ideally suited for community workshops and aim to enable the involved parties to express their opinions and – often competing – interests. Since then researchers increasingly used maps as a representation of the focused or contested territory. Such games are intended to reconcile urban planning issues while playing out various scenarios (Sanoff 2000). Author Clark Abt (1970), in his book "Serious Games" described a serious game for urban planning. It was titled Simpolis, developed in 1967 and focused on major urban planning problems in New York City. The Simpolis game concentrated on some major urban problems such as education, housing, civil rights, poverty, crime, and pollution. The main goal was to educate the citizens about these issues and to suggest and communicate possible responses and consequences of different decisions. The game involved a controlled role-play in which the players received their profiles and specific constraints within which they had to operate. In contrast to that, free role-play enables the players to act and decide about their strategies and moves freely without any limitations. Since the 1970s the game concept has been often used in urban planning. A recent example is The Big Urban Game (2003) which was created by the Design Institute of the University of Minnesota with the goal of encouraging the residents of Minneapolis and St. Paul to think about the design of urban spaces. The Stadtspieler game Stadtspieler (2009), a recent German example, invites the players to discuss urban planning issues. The players can build the city according to their wishes and ideas and prepare a fictive urban plan. They use modeling clay and design their own city elements. In this way they also take on different roles in the city such as investor, citizen and neighbor, or an urban planner, and learn these perspectives related to the design of city environment.

3.2 Motivation for designing a participation game

Games have a potential to facilitate deep and sustained learning (Gee 2003) and cooperative problem-solving skills offering "several different levels of learning simultaneously to students of different abilities" (Abt 1970:23). Malone and Lepper (Malone 1981; Malone and Lepper 1987) developed a taxonomy of motivations in the context of educational/learning games for children, with four motivational categories: challenge, fantasy, curiosity, and control. Additionally, games enable learning through experimentation with alternative possible solutions and strategies played in a changing and sometimes also competitive environment. Within a safe, controlled realm, a player gets feedback from each experimental iteration, accumulating knowledge from the game system (Abt 1970; Cheng 1999). Games provide playful and engaging environments; they can motivate the players with the help of playful elements integrated in the concept of the game (Krek 2008; Poplin 2011; Poplin 2012). Games may stimulate "internal listening", which "acknowledges the importance of listening as a strategy for children to make sense of their world. Listening is, therefore, not just an avenue for other people receiving information but a reflective process for children to consider meanings, make discoveries and new connections and express understandings" (Clark 2005:17). Games may allow and even encourage taking on different roles; they enable the children to take on new roles, to lead and design the process, and to be in charge. They allow a shift in a relationship between the adults and children to the point of "accepting the place of the unexpected" (Clark 2005:25). "The advantages of accepting a shifting in power are a release from the need for adults to 'know all the answers'" (Clark 2005:25). Games also offer multisensory communication tools and means and are not limited to written and/or oral skills of the children; they offer new ways of learning and communicating.

3.3 Learning theory and pedagogical concepts

Cooperative learning greatly emphasizes the activity of learners and facilitates communicative processes between learners with different backgrounds. This pedagogical approach is based on structured divisions of positive interdependence, individual accountability, equal participation and parallel interactions (Kagan 2001). Positive interdependence refers to the positive relationship between the development of groups or individuals. In learning situations characterized by strong interdependence amongst learners, everyone is responsible for one's own work and for the performance of the whole group at the same time. Common aims promote individual responsibility and improve learning performance (Kagan 2001). Due to the equal sharing of responsibilities everyone has the responsibility for one part of the whole task. This not only strengthens the sense of responsibility but also promotes equal participation.

Accentuated learning aims to have an impact on the players' mindset. The learning process should be designed to procure new ideas and approaches regarding the overall theme that learners focus on; it aims to connect to their existing cognitive structures. The new knowledge needs to be embedded in the learners' real living environment and everyday situations. New information does not simply flow into the recipient, but the recipient has to construct it himself, or rather integrate the new material to his cognitive system. Ideally, a teacher or tutor has to be open and approach learning with constructive and encouraging attitudes, which allows the individual knowledge acquisition and an active role of the students in the learning process (Nahalka 1997).

Our work is influenced by the so called jigsaw method, developed by Elliot Aronson and his colleagues (Aronson, Patnoe 1997). Their aim was to reduce competition between pupils in the classroom. In their experiments, Aronson and his colleagues analyzed a fifth-grade class, which was studying the biography of Joseph Pulitzer. The researchers divided the Pulitzer biography into six equal parts, so that each of the important turning-points of his life was on a separate worksheet. Each child received a part of Pulitzer's life; just like in a jigsaw game, every child had a detail of the biography, but in order to be able to get acquainted with the whole learning matter, or the complete life, everybody needed the knowledge the others had. Results showed that when using the jigsaw method, children learned to pay attention to each other in the learning situation in which everyone's contribution is needed. Due to the mutual dependence, children became more acquainted with each other and accepted each other's point of view – independent from their social or ethnic background (Aronson 2004).

4   POP-UP PEST: A COOPERATIVE GAME FOR CHILDREN AND YOUTH

4.1 Background

The game Pop-up Pest was developed as part of a PhD project at HafenCity University Hamburg, Germany. The game is meant to be a preliminary study for the research project "Playful Children's Participation in Urban Planning." The game development took place in Budapest, Hungary, in the summer of 2012 and the first tests were conducted in the autumn of 2012. The development and the implementation of the Pop-up Pest game was accompanied and supported by the kultúrAktív Association, the first organization in Hungary dedicated to education about built environments. The project got financial support from the Hungarian Ministry of National Resources and the National Institute for Family and Social Affairs, as well as the Kunsthalle Budapest. The Pop-up Pest game was presented in September 2012 during the centenary celebrations of the Ernst Museum (the exhibition venue of the Kunsthalle Budapest), and also during the European Mobility Week. The tests with school groups and one university group took place at Balint Jewish Community Center in Budapest, Hungary.

4.2 Aims

The main goal was to design and implement a collaborative game for children and youth from downtown Budapest. The Pop-up Pest game aims to facilitate learning about their living environment and to support them to develop ideas for changes and improvements. Playing the game, children and young people explored the characteristics of the chosen districts from different perspectives and became aware of the current planning conditions and deficiencies. The game also aims to improve their orientation and to support the acquisition of competences regarding the use of urban space and the improvement of the quality of community life. The Pop-up Pest game primarily focuses on three areas in which local children and youth could proactively take part in shaping their living environment: the environment, transportation, and culture.

The long-term goal of the game is to promote an active children engagement in urban development. In addition, a further aim of the game is to enable the players to learn about contemporary urban concepts by presenting existing examples from their living environment such as guerilla gardening, community gardens, street art, public art, advocacy, etc. A great importance is given to social skills reinforced by players during the game such as positive attitudes and behaviors towards others, tolerance and "advanced communication". Advance communication means to be able to communicate within the group, to understand complex communicative processes and to have the ability to be consistent with others and to be able to understand and interpret different viewpoints.

4.3 Location

The game is located in the Pest side downtown of the Hungarian capital Budapest. It concentrates on large parts of the 6th and 7th districts, as well as on the edge of the 8th district of the downtown area in Budapest (Fig. 2). Figure 1 shows the area depicted on the play-ground of the game. All three districts were developed in the 19th century around the former city wall, and surround the Grand Boulevard. This area is one of the main tourist destinations of Budapest and includes some famous attractions. The Andrássy Avenue is a UNESCO World Heritage Site surrounded by spectacular eclectic mansions and numerous monuments, museums, theaters and cultural institutions as well as restaurants and coffee houses. It is also the most densely populated area in Budapest, and includes an extended apartment quarter characterized by deficient open spaces, green areas, and places for play and interaction. The so-called Jewish Quarter, with a lively religious community, is located in the 6th and 7th districts. The 8th district, called the "Roma District", is the densest and the poorest area in Budapest, inhabited in large part by the Roma or gypsy minority. Thus the selected parts of the city for our study are both a marvelous touristic attraction with an outstanding cultural heritage, and a deprived area with social issues and urban deficiencies. Blue, red and green markers on Figure 2 designate the so-called "priority sites", indicated on the playing field on Figure 1 by the same colors. Yellow markers highlight the Ernst Museum and the Balint Jewish Community Center, locations where testing of the game took place.
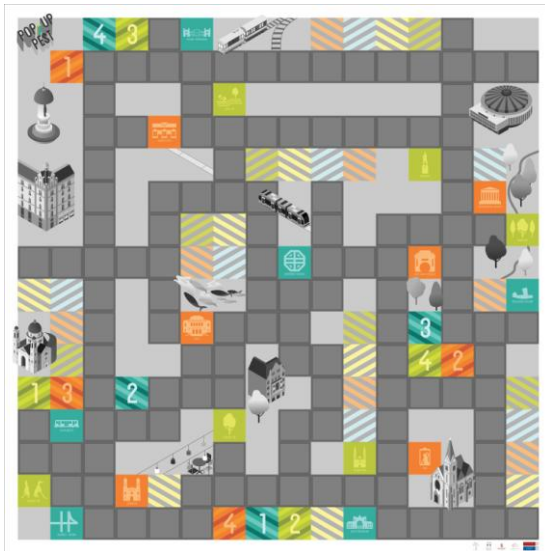
Fig. 1: The playing field of Pop-up Pest designed by Dóri Sirály (left)
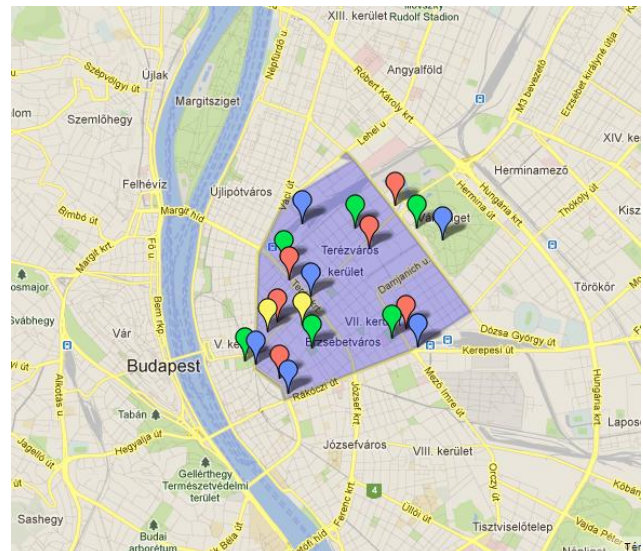
Fig. 2: The selected area on the map of Budapest (right)

4.4 Target Group

The game addresses 12-17 year old children and young people living in the selected districts of Budapest. This age group is able to explore the urban environment on their own and they are important users of public places, wherein a large part of their social interactions with other children take place. As result of an unpublished survey done in 2011 we discovered that children and young people living in the selected area of the capital of Hungary have very sparse knowledge of their own living environment. The study was done within an internship at LudwigInsert, an experimental art space of Ludwig Museum Budapest in the 8th district. During various educational programs, we made a survey on the spatial knowledge of pupils at local schools. In most cases, the children and young people interviewed only knew about the micro-environment of their school and home, the shopping centers and transport hubs. Signs of isolation and their preferences staying at home were observed. For these reasons, we chose the mentioned target group. We aim to enable them to gain an access to their own living environment and to learn more about it. An important consideration regarding the target group was the variety of religious, national, ethnic, cultural, social and economic backgrounds. The integration of social skills, especially (in)tolerance, and a variety of communication patterns, had to be taken into account in the Pop-up Pest game development.

4.5 Format

The game consists of a 25 m² large playing area. As the game board lies on the floor, players can move on it as living game pieces or counters (Fig. 3). In this way the children/players can get active – not only mentally, but physically as well. The continuous motion and the variety of sensory perceptions make the gaming experience more intense and at the same time it can support the learning process. The action, in this case each of the possible urban interventions, is symbolized by a 50 cm x 30 cm building block, each with different patterns (Fig. 4). The four different kinds of building blocks are related to traffic: bicycle stands, ramps, bicycle paths, and parking places. Following them, in the second row on Figure 4, are the building blocks related to the topic culture. They represent a monument, street furniture, public art work and a festival promenade. Below them are the building blocks related to the natural environment and green spaces in the city, which includes the park, recycle bins, alleys and the community garden. The children/players can place the building blocks on the playing field. This activity represents a direct action in the environment, sometimes referred to as an intervention in the urban space.

Fig. 3: Playing Pop-up Pest

Fig. 4: Building blocks, designed by Dóri Sirály

4.6 Game Design

The players of the Pop-up Pest game are divided into three groups and strive to collaboratively improve city services, to establish more green spaces and to create a variety of cultural activities in order to improve life in the center of the city. The three groups – environmental, transport, and culture – have a common goal: they aim to improve their living environment through urban interventions. Besides having this common goal, each of the groups has its own mission to fulfill. Sometimes the individual and group goals can possibly conflict with the other groups' interests. An example of a possible conflict is the available public spaces. The players that are quicker and can cooperate better have the chance to realize their interventions faster. They can, for example, place a bench, a bicycle stand or a recycle bin around the corner faster than the members that are not willing to cooperate.

Figure 5 shows the different individual missions, different possible interventions within the three groups. The environment group strives to gain more importance for the environmental concerns and create additional green spaces in the districts. The transport group stands for a better, more ecological transportation, accessible also for handicapped citizens. The culture group strives to broaden the cultural activities and the preservation of cultural values.

Environment group	Transport group	Culture group
alley	bicycle path	festival promenade
recycle bin	bicycle stand	street furniture
community garden	parking	monument
park	ramp	public art

Fig. 5: Individual missions within the groups

Each of the groups has four players with individual missions thematically linked to the higher group goal. Each of the players has control over three building blocks contributing to his or her individual mission. The players have to first select one building block and then place it on the playing field. The players fulfill their missions when they manage to place all three building blocks on selected spots on the playground. In order to do so, the children/players have to complete different tasks and go through a variety of steps.

- Site-visit

At the beginning of the game the players have to visit a "priority site" related to their group´s goal. This can be a park, a museum, a railway station or any other famous and important place marked on the playing field. Priority sites are marked with the color of the concerned group; parks and green areas with the green of the

environment group, transportation hubs, and railway stations with the blue of the traffic group, and cultural organizations with red of the culture group. Priority sites are graphed and marked with an inscription on the fields in order to strengthen nodes and landmarks in the selected areas. Arriving at the priority site, the children/players get an information card. These cards are individual, which means that each player has his or her own set of cards (Fig. 7). The cards contain a very short description of the urban intervention connected to concrete places or phenomena in the chosen districts.

The interventions are related to the individual mission of the player and they can be either constructive or deconstructive. A possible constructive intervention for the player belonging to the environmental group (in the mission "community garden") is to create an herb garden in the yard of the apartment building. An example for a deconstructive action is to neglect the maintenance of the parcel the player rents in the community garden. Another example for a constructive intervention from the mission "public art" is to make guerilla knitting in an unattractive public place, and for a deconstructive act is to draw a graffiti wall. In the case of the mission "bicycle stand" (Fig. 6), one possible constructive intervention is to collect signs for creating bicycle stands in front of the cinemas, and something deconstructive is to lock the bicycle in places where people with wheelchairs or prams cannot cross the street. In case there is a constructive intervention on the card, the player gets a building block. In contrast, if there is a deconstructive intervention, the player has to visit another priority site and take a new card.
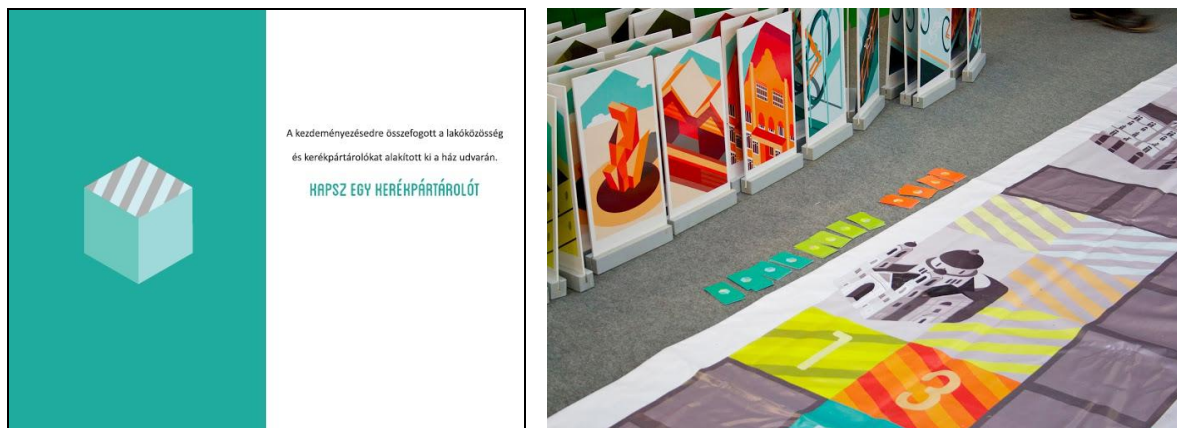
Fig. 6: Information card "bicycle stand". Fig. 7: Individualized information cards

- Intervention

In the next step, the obtained building block has to be placed on a free building area marked with striped patterns on the playing field. Different colors symbolize different kinds of building areas appropriate for diverse interventions. There are less building areas available to the players then the building blocks, therefore the players, need to be quick in placing them on the suitable field.

- Visting the other groups

After each intervention, the players need to visit a priority site or a fulfilled intervention of another team. For example, a player of the transport team needs to rest in a green space, an existing park or a green site created by the environment group or may enjoy a cultural event organized by an existing cultural institution or the culture group. Thus, each intervention can have a positive impact on the progress of the other players. The more environmental, vehicular or cultural elements are placed on the playing field, the easier it is to perform the obligatory visits, and the faster players can accomplish their individual missions.

- Cooperation

Players from a certain group can help the children/players from a competing group or the players within the same group. The Pop-up Pest game encourages the players to collaborate in accomplishing their individual and group goals. For example, once the player acquires a building block, she can ask a group mate to place it to a designated site, if she is closer to the area or has already completed her mission. On the other hand, when the player already completed the individual mission, she can reserve a free building area for her group mates. In the Pop-up Pest game, the players are motivated to cooperate with each other. Following Aronson's jigsaw method (Aronson and Patnoe 1997), we divided them into three different groups, and created a reciprocal dependence among them. The players can achieve their goals only by collaborating with their

team-mates. The game ends as soon as one group achieves its objectives. In order to win the game, every player of the group has to fulfill his or her own individual mission. Therefore, if someone progresses slowly, it is in the interests of her team-mates to support her. Just as in the case of a jigsaw puzzle, in the Pop-up Pest game, all players have to contribute in order to be able to renew the extensive, overall picture of the district.

4.7 Learning content and approach

Following the deductive approach of the constructivist learning theory, the Pop-up Pest game has as overriding objective – the idea of active participation in urban development. This idea has to be evident and understandable for all players of the game. The next level of learning consists of general patterns of action that players can perform in terms of the overall concept of participation. This content appears at the level of the players' activities and focuses on three thematic fields: environment, transport, and culture. Embedded patterns of action are examples for urban interventions, which players are able to realize beyond the context of the game as well (e.g. plant trees, place bicycle stands, advocate for the conservation of listed buildings). The third level of learning consists of real options for action and factual knowledge, both linked to the players' living environment. Embedded in the information cards which regulate the players' activities, these contents are integral parts of the game. The Pop-up Pest game draws attention to the existing interventions and changes in public places. Playing the game enables the players to acquire new knowledge, adding it to their existing knowledge, and to comprehend the options of practical applications and its effects.

The pedagogical concept of the Pop-up Pest game is based on a deductive approach, contextualization of the learning content and active learning (Nahalka 1997). It was influenced by the jigsaw method, developed by Elliot Aronson (Aronson, Patnoe 1997). Based on the results of the jigsaw method we proceeded on the assumption that this teaching method contributes to strengthening the players' senses of responsibility for their own environment as well as the development of empathy towards other residents and user groups, all of which encourages players to actively participate in urban development processes. Consequently, the Pop-up Pest game applies this method in the context of urban coexistence of children from different backgrounds, and districts.

5 EVALUATION OF THE POP-UP PEST GAME

An extensive evaluation of educational games or game-based learning requires a variety of criteria and methods: in general research focuses on the learning outcomes. Breuer (2011) in his study on digital game-based learning emphasizes the necessity to integrate the evaluation of both; the learning objectives or learning content and the gameplay. We aimed to integrate both aspects while testing the Pop-up Pest game in a variety of testing experiments.

In the first part of the test phase we presented the Pop-up Pest game at two open-air festivals in Budapest. The game was first presented in September 2012 during the centenary celebrations of the Ernst Museum, as well as during the European Mobility Week. Both festivals took place in public spaces of the 7th district in Budapest. This situation enabled the residents of the district to participate freely, independently from their age or social and educational backgrounds. Residents were able to join, quit, interrupt or repeat the Pop-up Pest game spontaneously. In the test phase, we investigated whether the concept of the presented Pop-up Pest game was appropriate for children engagement in planning, and whether children of the age-group 12-18 could accept Pop-up Pest as an interesting game. During the preliminary study we worked with questionnaires and interviews, in order to obtain the subjective opinions of the children/players.

From both festivals, a total of 167 players from all age groups played the game and 47 people answered the questionnaire. The quantitative survey included questions regarding the format of the game, gameplay and learning content. Most of the questions referred to the playful elements, subdivided into game dynamics and thrill, collaboration and personal achievement, motivation and reward, and visual representation as a sensory delight in the way as defined in Ritterfeld, Wagner (2006). The questionnaire included 28 different statements and the players had to decide to what extent they agree with the statements and marked their opinions on a 1 to 5 scale in which 1 meant "do not agree at all" and 5 meant "totally agree". In this way we were able to measure the attitude of the players related to certain issues.

In the preliminary evaluation of the survey, we sorted the responses by age groups. The preliminary results show that the target group accepted the game very well. Participants enjoyed playing in groups, they appreciated the graphic design and they were motivated to interact in the represented urban space. As Figure

7 shows, the players were very satisfied with the format of the game. Children 7-12 years, and young adults of 19-26 fully agree with the statement "I like the format of the game". The target group of the game, age 12-18 years, on average evaluated the format with a 4.3, which is still between good and very good. Regarding the format and design of the game, there were critical comments in relation to the design of the building blocks: "not practical", "they have been knocked over by the wind". They were also critical about the selected colors of the groups, which "should differ more from each other".

Figure 8 shows the attitude regarding the dynamics and activity of the Pop-up Pest game. The scale demonstrates that children between 7-12 were content with the dynamics. The need for activity increases with the age. The questions on collaboration within the group were valued most positively. On Figure 9 it can be seen that all children and young people up to age 25 agreed with the statement "I enjoyed playing in a group". The average value for the evaluation of this question in all questionnaires was the highest for this question.
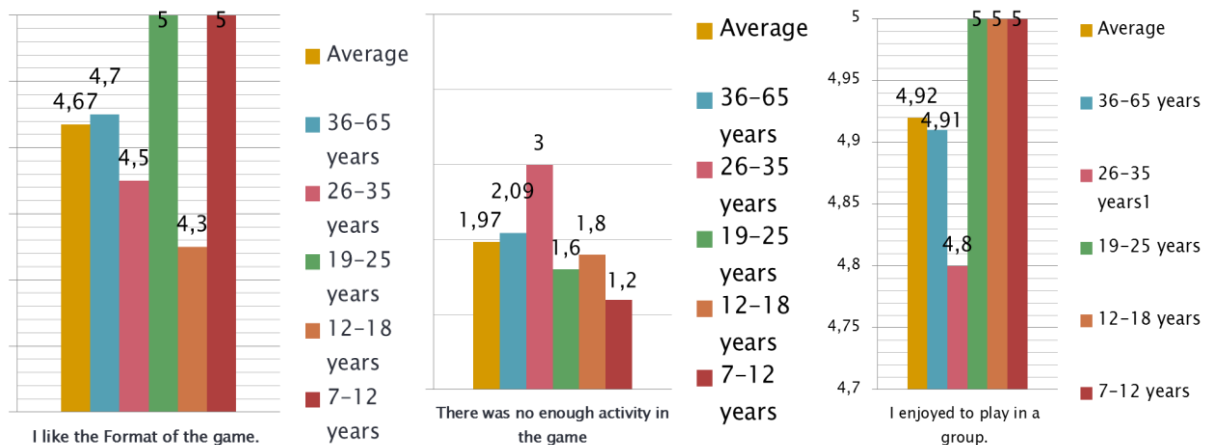
Fig. 7: "I like the format of the game". Fig. 8: "There was not enough activity in the game". Fig. 9: "I enjoyed playing in a group"

In the second part of the test phase, we tested the Pop-up Pest game with 14 and 17 year old pupils and a group of university students. We are going to continue with the second phase of testing during spring 2013 by placing the emphasis on the learning content and learning objectives. The survey will concentrate on the effectiveness and efficiency from the learning perspective.

6   CONCLUSIONS

This article summarizes the concepts and the implementation of the Pop-up Pest game for children and youth. Our main goal was to create a cooperative educational game for children which aims to facilitate learning about the environment, and to understand planned changes in this environment and their consequences on the quality of life in the city. The Pop-up Pest game was implemented for three districts of Budapest, but the main concept of the game could be used for other cities as well. Collaboration is an important part of this game; the children/players are encouraged to collaborate with members of competitive teams in order to accomplish their tasks. Only one team can win the game. In spite of that, winning is only one of the goals of the Pop-up Pest game. Learning how to collaborate and help the players of competing teams is also one of the central goals of this game. Children and youth can gain new awareness about the meaning of collaboration and can compete and collaborate at the same time in order to become co-creators of their living environment.

Besides the aspect of collaboration and co-creation, games also can empower children and youth; their voices and opinions can be expressed while playing the game. Inclusion of children in planning has been neglected for too long. Thus it is important to develop methods which can foster children's participation in planning. Games are just one possible framework, a concept that can possibly encourage children`s participation in planning. We are testing different game concepts and designs in order to understand better the possibilities of this method on one hand and the role they could play by the inclusion of children in urban planning participation. Currently we are working on the quantitative and qualitative evaluation of the developed Pop-up Pest game. Additional evaluations will be done in a set of experiments with children of different age groups. We are interested in differences among these age groups of children and young people. Can the same or similar game concepts be developed for several age groups? How differentiated

collaborative, participation games should be in order to be able to motivate and include children from different age groups? We will set up testing experiments in the way that will enable us to accomplish research related to these relevant questions.

Games for children have yet another interesting aspect which needs additional research; they are often led by adults, but aim to involve children. Clark (2005) addresses the issue of power in communication with children in both situations: in "adults imparting 'knowledge' to children or children communicating their ideas to adults". The issue is how to deal with the differences in their status, especially when adults work with children. Clark (2005:25) suggests that "Viewing young children as weak, powerless and vulnerable may lead to high expectations of the adults' role in terms of protection and nurture but low expectations of children in terms of how they can express their perspectives, priorities and interests. Viewing young children as competent and valuable communicators requires researchers and practitioners to readdress their relationship with young children and therefore their respective roles. Games can help to change the roles by providing alternative, novel environments where the classical roles of an adult and a child "dissolve"; they can become just players and learners in a game that engages them all in topics that can help to create better, sustainable environments in which they, the adults and children, can co-exist and co-create together.

7 ACKNOWLEDGEMENT

8 REFERENCES

ABT, Clark C.: Serious Games. New York, 1970.
ARONSON, Elliot and PATNOE, Shelly: Cooperation in the classroom: The jigsaw method. New York, 1997.
ARINSON: A társas lény. Budapest, 2004.
CHENG, Nancy Yen-Wen:Playing with Digital Media: Enlivening Computer Graphics Teaching. Proceedings of the Association for Computer Aided Design in Architecture. O. Ataman and J. Bermudez. Salt Lake City, 1999.
BREUER, Johannes: Spieled lernen? Eine Bestandsaufnahme zum (Digital) Game-Based Learning. http://www.lfm-nrw.de/fileadmin/lfm-nrw/Publikationen-Download/Doku41-Spielend-Lernen.pdf Retrieved February 19, 2013.
CLARK, Alison: Ways of seeing: using the Mosaic approach to listen to young children's perspectives, in Clark, A., Kjørholt and Moss, P. (eds.) Beyond Listening. Children's perspectives on early childhood services. Bristol: Policy Press, pp. 29–49.
ENNEMOSER, Marco: Evaluating the Potential of Serious Games. In: U. Ritterfeld, M. Cody and P. Vorderer: Serious Games: Mechanism and Effects. New York, London, 2009. pp. 344-373.
FÜRST, Dietrich – SCHOLLES, Frank (ed.): Handbuch Theorien und Methoden der Raum- und Umweltplanung. 3. revised edition, Dortmund, 2008.
GAUS-HEGNER, Elisabeth, HELLMÜLLER, Andreas, WAGNER, Ernst, WEBER-EBNET, Jan (ed.): Raum erfahren – Raum gestalten. Architektur mit Kindern und Jugendlichen. Oberhausen, 2009.
HART, Roger: Children's Experience of Place. New York, 1979.
KAGAN, Spencer: Kooperatív tanulás. Budapest, 2001.
KREK, Alenka: Games in Urban Planning: The Power of Playful Public Participation. Mobility Nodes as Innovation Hubs. Proceedings of 13th International Conference on Urban Planning, Regional Development and Information Society. u. a. Manfred Schenk. Schwechat-Rannersdorf, 2008. pp. S. 683-669.
KULTUSMINISTERIUM UND WIRTSCHAFTSMINISTERIUM (ed.): Architektur.in.der.schule. transform 2 r.a.u.m. Bayer. AK, Bayer. München, 2005.
MALONE, Thomas W.: Towards a theory of intrinsically motivating instruction. Cognitive Science , 1981, pp. 333-369.
MALONE, Thomas W. and LEPPER M. R.: Mining learning fun: A taxonomy of intrinsic motivations for learning. Aptitude, learning, and instruction. R. E. Snow and M. J. Farr. Hillsdale, NJ: Erlbaum. 1987.
MUCHOW Martha – MUCHOW Hans Heinrich: Der Lebensraum des Großstadtkindes. Hamburg, 1935/1978.
NAHALKA, István: Konstruktív pedagógia – Egy új paradigma a láthatáron (III.). In: Iskolakultúra, 1997/4. pp. 3-21.
OERTER, Rolf: Können Kinder ihre Zukunft mitbestimmen? Entwicklungspsychologische Befunde zur Entscheidungsfähigkeit von Kindern. In: Werkheft Kinderleben, Freiburg, 1992.
POPLIN, Alenka: Games and Serious Games in Urban Planning: Study Cases. Lecture Notes in Computer Science (LNCS). Santander, Spain, 2011.
POPLIN, Alenka: Playful Public Participation in Urban Planning: A Case Study for Online Serious Games, Computers, Environment and Urban Systems, Vol. 36, 195-206, Elsevier, 2012.
PIAGET, Jean and INHELDER, Bärbel: Die Entwicklung des räumlichen Denkens beim Kinde. Stuttgart, 1948/1971.
REICHER, Christa, EDELHOFF, Silke, KATAIKKO, Päivi, UTTKE, Angela (ed.): Kinder_Sichten. Architektur und Städtebau für und mit Kindern und Jugendlichen. Troisdorf, 2006.
RITTERFELD, Ute, WAGNER, René: Video Games for Entertainment and Education. In: P. Vorderer & J. Bryant: Playing Video Games. Motives, Responses, and Consequences. Mahwah, NJ, 2006, p. 399-413.
SANOFF, Henry:Design Games. Los Altos, California,1979.

SANOFF, Henry: Participatory Design: Theory and Techniques. Raleigh, North Carolina, 1990.

SANOFF, Henry: Community Participation Methods in Design and Planning. New York, 2000.

SCHRÖDER, Richard: Freiräume für Kinder(t)räume! Kinderbeteiligung in der Stadtplanung. Weinheim/ Basel, 1996.

STUDIO URBANE LANDSCHAFTEN (ed.): Stadtsurfer, Quartierfans &. Co. Stadtkonstruktion Jugendlicher und das Netz urbaner öffentlicher Räume. Berlin, 2009.

The Big Urban Game. http://www.decisionproblem.com/bug/bug2.html. (2003) Retrieved December 29, 2012.

ZINNECKER, Jürgen: Straßensozialisation. Versuch, einen unterschätzten Lernort zu thematisieren. In: Zeitschrift für Pädagogik, Issue 5, pp. 727-746. Weinheim/Basel, 1979.

Public Space Issues in Bali Tourist Beaches

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1 ABSTRACT

This paper presents a review of issues associated with tourist beach development in Bali. An empirical study is used to clarify the issues in Bali tourist beaches. The rationale behind this paper is because Bali is generally considered as one of the best tourist destinations in the world, and due to a key tourist asset is its beaches. Many beautiful panoramic beaches are located in the southern coast of the island; among them are Kuta, Jimbaran, Pecatu, Nusa Dua, Sanur, Candi Dasa, and other. These have developed rapidly as tourist attractions and resorts. However, most resorts have developed naturally without planning. Only Nusa Dua resort was developed through planning and design stages.

Today, the environment of the tourist beaches is under serious threats; due to erosion, leading to the environmental damage of the beaches and loss of land in some parts of the coast, though a handling effort has been done recently in the major resorts. Another threat is the development of tourist accommodation and facilities along the beach which are too close to the coastline. These do not comply with the national Law and Regulations. These two threats affect the width of the beach which becomes narrowed leading to insufficient width in accommodating public activities. These activities include; tourist activities, art and cultural attractions, ritual for the Balinese, as well as the livelihoods of fishermen. Therefore, the loss of beaches as public spaces will significantly impact on the social, economic and cultural/religious life of the Balinese.

2 HISTORICAL BACKGROUND OF BALI

Bali is a tiny island, located approximately eight degrees south of the Equator. It has a tropical zone with 5,632.86 square kilometres of extravagantly fertile land which are mostly cultivated with corps. Volcanic mountains occupy the island's hinterland sloping steeply to the sea in the northern part, and more gradual slopes in the South. With a coastline of approximately 436.80 kilometres, its abundant coastal resources are many and varied here such as white/black sandy beaches, coral reef and associates, mangroves, sea grass beds, and dunes which are important coastal resources.[1]

Bali is an enclave Hindu from the Islamic majority in Indonesia which has approximately 3.5 million inhabitants. Bali has a unique culture rooted in Hindu philosophy and their specific customs. After Independence, Bali had been proclaimed as a tourism island and a major international tourist destination. Most travel & tourism guides have chosen Bali as one of the best world travel destinations. Up to now, tourism in Bali relies mostly on the cultural and beaches.

2.1 Cultural Identity

In the early eighth century, it was recorded that the historical development of Balinese culture strongly related to the development of the Hindu religion taking place in Bali. The Hindu religion takes a key factor in the notion of Balinese cultural and religious identity. The golden age of Balinese culture took place when Bali under the rule of the Majapahit Dynasty based in East Java or West of Bali Island. During this time, the agriculture system of Subak, art and architecture, ritual ceremonies all thrived significantly on the island. The Kingdom Palaces and the Priest's houses became centres for the development of their culture. The Majapahit era occurred during the fourteenth-sixteenth century. After this era, the Dutch then colonised Bali in the earliest twentieth century in which their influence also introduced new values particularly in architecture. Even with this external influence, the roots of Balinese culture still derive from their religion. [2]

2.2 Philosophy

The basic philosophy of Balinese Hinduism is how to achieve a balance between humankind and nature in terms of micro-macro cosmos. This is referred to as "cosmological balance". They believe that a harmonious balance will bring their life into serenity and happiness. This philosophy derives from the belief that

humankind is similar to nature in that it consists of three divine parts in which each part follows its own nature and character. These puts, for example, could be described as head, body, and feet. From this, all things in nature can be distinguished abstractly as consisting of three elements. Environment or land, village, building, structure, wall, pillar, and other building details also consist of three divine divisions each with their own characteristics. Moreover, humankind is also considered to consists of three layers such as soul-mind-physical body or inside-middle-outside (inner-middle-outer). And in turn human life consists of birth, life, and dead.

2.3 Concept of Space

Within Balinese philosophy a concept of Kaja-Kelod or North-South (Mountainward-seaward) can be identified. Within this, concept of space can be divided symbolically into three zones; each of those is mountain, midland, and sea. The mountain as a head is a primary part of the zones regarded as the purest place. The midland as the body or middle zone which is a place for dwelling and other human activities, and the sea is an impure zone as a symbol of feet. The impure zone does not mean that it is unsuitable place for shrine indeed. Many shrine places are built in the three zones in order to maintain cosmological balance. The symbolisation of the three zones in the land or earth is also transferred into villages, temples, palaces, and dwelling. At the village level, for instance, there are three temples, called Tri Khayangan which form the main identity of the traditional village. These temples are located at north, middle, and south of the village.

To maintain a balanced, the existence of temples, dwellings, and open spaces are considered as essential places. These are because the three places are also associated with the philosophy of Tri Hita Karana meaning three causes of serenity and happiness of humankind. This philosophy teaches adherents to form harmonious relationships between humans and God, human and human, as well as human and the environment. The external environment is seen as one of three essential places within Balinese culture. As a consequence, it has to be preserved and protected in order to maintain a harmonious environment. To keep this, it is not only maintained through a physical approach but also through offering ceremony as one of important parts of Balinese belief. The ritual ceremony takes place usually at mountain, lake, forest, farm, graveyard, cross and T junction, coastal area, beach, sea, and others.

2.4 Beaches

From the philosophy and concept of space, a beach is an open space which amongst its function has to accommodate ritual activities. The ritual activities relate to temple, humankind and cremation ceremonies as well as harmonious beach environments. The most well attended ritual activity takes place the day before the Balinese New Year. The cremation ceremony is the most regular ritual event on the beach. Furthermore, there are a lot of temples along the beach with different functions and hierarchies. In some places, fishermen have a special shrine to offer respect before going to the sea. From this point of view, it is clear that beaches are sacred areas, though these areas are categorised as public space according to the Indonesia National Policy. This policy states that littoral regions are protected areas and disaster-prone areas which can be used for public only. [3]

3   DEVELOPMENT OF BALI TOURIST BEACHES

The tourism industry is one of the top foreign exchange industries in many countries, including Thailand, Philippines, Singapore, Fiji, and also Indonesia. [4] In addition, tourism is also known to stimulate economy of the areas, so that it is very often described as 'new kind of sugar', 'tool for regional development', 'invisible export', 'passport to development', and other terms.[5} Nowadays, the combination of domestic and international tourism has become one of the world's largest and faster-growing industries in terms to volume of income and employment generation.[6]   According to UNWTO, the annual growth of international world tourist arrival increased by 4.6 % in 2011 (nine hundred eighty three million) and 6.4 % in 2010 (nine hundred forty million). In comparison to other regions, Asia and Pacific (including Indonesia) received an increase of 6.0 % which is the second largest percentage increase in tourist arrival in the world after South America. [7] In terms of value, the UNWTO in its World Tourism barometer of June 2009 reported that the growth in income from this sector reached $ 944 million in 2008, up 1.9 % from 2007. [8] This evidence indicates that the tourism industry and tourist arrival in that region is experiencing a long period of growth.

Focusing on Bali, according to Bali Tourism Statistic in 2010, the number of foreign tourists arriving Bali in 2010 was 2,493,058 and 4,825,068 of domestic tourists, so that the total number is 7,318,126. [9] This figure was recorded from the main gate of Bali; Ngurah Rai International Airport and Gilimanuk Harbour, excluding other gates such as Padangbai, and Benoa Harbour. While the growth rate of tourist arrival in the last five years is 13.26 % per year. Data from the Statistics Office of Bali Province in late 2010 recorded that the total number of properties providing accommodation and the number of rooms in Bali was 2,190 and 45,408 respectively, it means that over the last five years there was an increase of 5.05 % in the number of hotels & other accommodation and 2.5 % in the number of rooms. Badung Regency embraces the areas of Kuta, Nusa Dua, Tanjung Benoa, Pecatu, Canggu is the largest number of total room for accommodation which is up 62.47 % of total room in Bali, followed by Gianyar Regency and Denpasar Municipality. [10]

3.1 The Development of Coastal Tourism Resort

From the beginning, the increasing growth of tourism in Bali produced a positive outcome with the opening of Bali Beach Hotel (recent name: The Inna Grand Bali Beach Hotel) in 1966 and Ngurah Rai International Airport in 1967. Both facilities are located at Sanur and Tuban/Kuta Beach. Although both facilities had negative impacts on the coastal environment, such as Bali Beach Hotel constructed its waste water treatment tank at offshore (Figure 1) and the International Airport constructed their runway crossing shoreline by approximately 800 meter (Figure 2). It seemed that Bali had been proclaimed as the centre of tourism in Indonesia and expected tourist coming to Bali could spread to other regions in Indonesia.[11] Since then, the development of coastal tourism resorts at Sanur and Kuta had grown without planning and coordination. The unplanned and uncontrolled tourism resorts indicated by lack of infrastructure especially access to the beach, lack of public facilities, worse sewerage system, discharging water disposal to the sea, building frontier offences, and others had led to a high building density and threats of environmental disaster.

Figure 1: Bali Beach Hotel's waste water treatment tank at shoreline – offshore (BBCP, 2006). Figure 2: International Airport's runway with cross structure by approx. 800 metre (BBCP, 2008)

Meanwhile the resorts of Sanur and Kuta had been abandoned to grow themselves; the central government was interested in constructing a model of tourism resort as a centre of tourism resort taking at other location in Bali. In 1968, they asked some experts in planning and design from developed countries to develop the tourism resort model. Based on the experts recommendation, in 1970 the central government reached an agreement with the United Nations Development Programmes (UNDP) as the financing agency, the World (International Bank for Reconstruction and Development-IBRD, and the International Development Association-IDA) as the executive agency for the preparation of a regional tourism plan for the island of Bali.[12] An emphasis of the need is to concentrate the development of tourism resort providing international standard accommodation in an area with minor negative impacts. The Plan was designed by the France consultant; SCETO (Societe Centrale Pour l'Equipment Touristique Outre-Mer) was completed into six reports and approved by the central government in 1971 and through President's Decree in 1972. [13]

The SCETO succeeded in designing Nusa Dua enclave as an ideal site to be the centre of tourism resort in Bali. The aims of enclave tourism resort development of Nusa Dua are to minimise the interaction between tourists and local community, to provide natural demarcation of tourist areas, and other borders. Besides producing the physical planning, they also recommended to establish two institutions for managing tourism development and control. The two institutions mentioned were Bali Tourism Development Board (BTDB) as giving consultation to the government in the development of tourism in Bali and Bali Tourism Development Corporation (BTDC) as managing the implementation of Nusa Dua Master Plan. [14] The institution of

BTDB had had a significantly important role to control and secure the impact of tourism. Unfortunately, all foreign experts as technical experts of BTDB left this institution in1979, due to the possibility of political interest and abuse of power. Since the Government of Province was taken over the function of BTDB, they were not able to control the faster-growing tourism resorts. New resorts were built in other places and beaches, such as Tanjung Benoa, Pecatu, Candi Dasa, Tanah Lot, Lovina Beach, and other beaches. An excursion road built to connect Nusa Dua resort with Sanur and Kuta resort changed to be public access, which are very crowded.

3.2 Unplanned Versus Planned Coastal Tourism Resort

Even though the central government succeeded in developing Nua Dua resort as a model of tourism resort in Bali, it failed to set out Nusa Dua resort as the centre of tourism development. And also it failed to execute the initial aims of the enclave tourism resort development. New resorts were built in other places and beaches, such as Tanjung Benoa, Pecatu, Candi Dasa, Tanah Lot, Lovina Beach, and other beaches. Even an excursion road built to connect Nusa Dua resort with Sanur and Kuta resort has changed into a public access, which has become very crowded today. From this point of view, there are essentially two types of tourist resorts in Bali: the unplanned and the planned resort.

As the only properly planned resort, Nusa Dua was designed through ecological considerations. For instance, a Central Sewage Collection and Treatment System were built too far from the sea to avoid water infiltration to the sea. Watering the garden and other landscape of the resort are supplied from the treated sewage effluent and well-field. The resort has a large open space as every plot area uses Building Covered Ratio or Floor Area Ratio of approximately 35 %, following Building Codes. [15] Whilst setback line of the structures to coastline was assumed around 60 metre from High Water Level (HWL). With wide and beautiful sandy beaches stretching along the coast supported by calm wave, it deserves this resort as one of the best resort areas in the world. Nowadays, the management of Nusa Dua resort is still under BTDC. With the authority of BTDC, the resorts' beaches, however, is not for public.

Meanwhile, other resorts were unplanned which each tourist facility was owned by private sector. The owners bought and built their land according to land certificate, although a part of their land was used previously by public as an access to the coast or to beach temples. Some cases took place in Kuta, Pecatu, Sanur, Candi Dasa and other places. They tended to ignore public interest as they are secured and guaranteed by the law. With profit oriented, they built their land as effective as possible and attempted to take advantage in every front, it includes encroaching the beach as public areas little by little. The Building Covered Ratio tends to be more than 35 %, since the owner extend commonly their facilities after operation. In addition their building structures were too close to the coastline which assumed not accurate from Local and Regional Regulation. This condition is due to less control and monitoring as well as weak law enforcement.

4   PUBLIC SPACE ISSUES IN BALI TOURIST BEACHES

As mentioned above, Bali beaches are sacred areas and also important public spaces whilst the tourist hotel operators treat the beaches in front of their properties is a vital asset to satisfy their tourist guests so that they tend to use them as much as possible. Besides the impact of tourism, beaches are also under threat from natural disaster. The issues of public space in Bali tourism beaches can be categorised into two factors; human activity and natural disaster.

4.1 Eroded Beaches

There is inevitable that eroded tourist beaches have resulted from a combination of natural disasters and human activities, leading to the significant change in their shoreline. According to the Bali Beach Conservation Project (BBCP) Inception Report 2006 recorded that eroded beaches were up to 51.5 km in the year of 1978, 70.33 km in 2000 to be 91 km in 2006.[16] The erosion took place in almost all coastal areas in Bali, which were dominantly moderate erosions (Figure 3). While hard eroded beaches were recorded at three locations, one of them is Candi Dasa Beach resort (Figure 4). The report also identified that the hard erosion taking place is due to climate change, coral mining, waste disposal, fishing activity, inaccurate hard structures built along the coast, and other human activities. Nowadays the eroded beaches in Bali are predicted to reach approximately 100 km, since there is no protection in the most coastal areas. This condition has resulted in the narrower beaches and definitely lack of public space.

Even though, the central government has rehabilitated the main tourism resorts in Bali such as Tanah Lot (2002) Sanur, Tanjung Benoa and and Nusa Dua (2006), and Kuta Resort (2008), the erosion cannot be stopped. To maintain the beach's space in these resorts, the government has prepared a sand stockpile located in West Sanur area. [17] But the cost to transport the sand to the location and to fill it on the beach needs a lot of budget which has to be financed by the government regency. The problem is not solely on the cost of beach maintenance but also after running out sand stockpile. To dredge the sand from the previous source at Geger beach, it will not be easy anymore since it needs a huge of money and also needs hard socialisation to the community in terms of getting approval from them. While the resort beaches have eroded continually, the others have been serious damaged even have lost in some parts.

Notation:
- Hard Erosion
- Moderate Erosion
- Minor Erosion
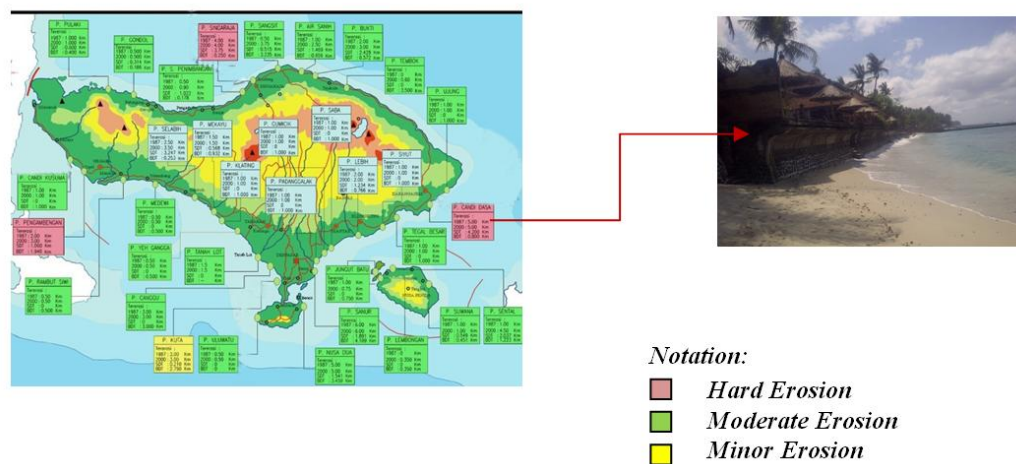
Figure 3: Eroded Beach of Bali Island. Source: Bali Beach Conservation Project (BBCP, 2006). Figure 4: Candi Dasa Beach Resort

4.2 Conflict of Interest

There are different perspectives from Balinese community/public, the government, and tourism companies concerning about the function of the beach especially in tourism beaches. The different perspectives have become a conflict of interest from the beach users, and it will have a high risk to be friction even confrontation from the parties if there is no clear solution particularly from the government as the agent of policy authorities. The involvement of the government of regency and province to manage conflict of interest in these areas is essential. The National Policy No. 22/1999 and No 26/2007 state that both the governments have been responsible to manage the beaches. It means that management of conflict must be handled mainly by the government. From the both policies, the government of regency has been more responsible than the province.

However, the government of regency has given a mandate to preserve the beaches to a traditional village, called Desa Pakraman. The reason is to give their authority back as a part of the traditional village territory. But the situation is not similar to two centuries ago when the Desa Pakraman had got directly a mandate from the King to manage their territory, so they were so powerful to maintain the beaches as ritual areas. Today the situation is clearly more complex, most of them have only tasks to organise ritual rites when take places and to take parking and entrance ticket. Only Desa Pakraman of Kuta and Legian has full attention to manage their beach territory, although they could not handle all problems. They still need some helps to the regency, such as manpower, heavy equipments, and other materials.

Meanwhile, from empirical data, other villages have various problems in managing their beach territory which depends on internal and external factors. Sanur resort, for example, it seems that conflicts of interest are not only from the beach users, but it also comes from the member of villages. Among them are the administrative village of Sanur Kaja and Kauh, Desa Pakraman of Intaran Sanur, Sindu Traditional Sub-village, Youth Organisation of Batu Jimbar Sub-village, and other groups. Even though they are powerful, there is less coordination among them. On the other hand, the resort locations which are too far from the traditional village, tends to use the beach optimally, for instance Geger, Pecatu, Dreamland, Jimbaran, Candi Dasa, Canggu Beach, and others. At this time, the government of regency are still continuing to open wide investment in tourism sector in order to increase their local income. An awareness to manage conflicts of interest in the beach is not to be established yet, so that the conflict will be more complicated in the future.

4.3 Private Beach

From the first step, Nusa Dua was designed as an enclave tourist resort and private resort to avoid the negative impacts of tourism to local culture and community. This private resort was approved by the province and central government. This is because the rationale was good and reasonable; however it means that there was contradiction from the notion of Balinese Hindu Society, and also disagreement from the National Policy in which the beach is sacred and public area (Figure 5). Though an access to two temples which located at the two small islands has been available, the nuance and atmosphere for preparing ritual rites at the temples is strictly different (Figure 6). Because of this sample, the beaches at the northern and southern side of Nusa Dua resort tend to be private, even the beaches at Geger Beach. At those locations, hotel operators use the beaches in front of their property as much as possible, backed up by their security guards.

Figure 5: Nusa Dua's aerial photo with artificial reefs as Groins after Project (BBCP, 2006). Figure 6: Two small islands as an identity of Nusa Dua Resort (BBCP, 2006)

4.4 Lack of Access and Public Facility

Public access is a determining factor whether the beach is to be private or public. With the lack of public access to the beach, it is difficult to say the beach in front of the resort is public space. Most unplanned tourism resorts have been indicated by lack of public access as mentioned above. In some places, the Balinese have to get permission from the hotel operators access their beach temples for ritual ceremony. This is due to no public access to their temples. This is a very unfortunate situation. Another problem is the lack of public facility in most tourism resorts. When the beach rehabilitation took place in the four locations, the central government, through the project built some public facilities such public toilets, tourist information centres, public showers, and others, but those are only in Kuta beach. Sanur resort has some small public toilets, built by the community initiative. The main reason is lack of areas to build these facilities. And also there is no initiative from the government of regency to redevelop the existing unplanned resorts by providing public facilities along the coast. If the government state that the beaches in front of the tourism resort are public space, they ought to utilise facilities as the needs of public.

5 CONCLUSION

This paper has considered the issues associated with tourist development in the beach areas of Bali, in which it can be summarised as follows:

The initial development of Nusa Dua enclave resort designed to mitigate negative impacts of tourism on Balinese culture and local community unfortunately did not perform as expected, indicated by the rapid growth of uncontrolled beach development in other places which are close to the local community. This development growing continually that cannot be controlled again. Building codes requiring the setback of building structures from coastline by 100 metres also failed to be implemented, leaving most accommodation too close to the coastline. Weak control and monitoring might be one of the main reasons allowing the problem to occur. Moreover, a desire by the government to encourage investment in tourism for economic development without putting in place measures to protect socio-culture and environment has exacerbated problems, particularly in public space issues.

The issues have been identified such as; eroded beaches, conflicts of interest, private beaches, lack of public access and facilities. The recent issues relating to public space in the beach tourism resorts seem difficult to

be stop. Loss of the beach's space from offshore and onshore due to erosion and encroachment is an indication that the issue could not be stopped. In the future, the public spaces issue are set to become a more contentious issue and meet more resistance. Furthermore, marginalised public interests, friction and confrontation are some serious threat in the beach usages.

To manage the problems especially public space issues, there are several important steps and strategies which should be implemented immediately. These are:

There is a need for the local and regional government to evaluate the development of Bali tourism as a whole and develop a strategy for its management. The strategy should recognise that development without consideration of human and environmental conservation is a real failure and a poor step for the next generation. For this purpose, stakeholders must have the same vision and mission in setting out local wisdom of cosmological balance as the key role of tourism development, and also this has important parallels with aspects of the concept of sustainability. An organisation body like BTDB constituting a synergy between the local and regional government is essential to be established to control and monitor the development of tourism especially the tourism resorts

In addition, it is a better way to improve the existing resorts rather than to extend and develop new resorts. The beach identified as public spaces and scared areas must be a priority to be implemented, supported by tight control and monitoring. No space should be designed as private beaches for any reason or argument.

Although the implementation of regulation about setback line of building structure from the coastline to all existing buildings are almost impossible to implement, the organisation body should push the hotel owners to show their land certificates for clarification whether they take public areas or not. If they take public areas, it must be recovered leading to prosecution. After that, the placement of benchmarks is essential to monitor the position of the existing buildings and other hard structures, equipped by an advance technology in mapping and monitoring system such as Geographic Information System (GIS) for covering the whole resort beaches.

6   REFERENCES

1. Direktorat Jenderal Sumber Daya Air (1998) Bali Beach Conservation Project: Feasibility Study Report. Denpasar Bali: Balai Wilayah Sungai Bali Penida..
2. Mantra, I. B. (1996) Landasan Kebudayaan Bali (Fundamentals of Bali Culture). Denpasar : Yayasan Dharma Sastra.
3. Undang-Undang RI. No.26/2007 tentang Penataan Ruang (the National Policy of Indonesia Republic for Spatial Planning). Jakarta
4. Pitana, I Gede. (2000) Cultural Tourism in Bali: A Critical Appreciation. Denpasar: Research Centre for Culture and Tourism University of Udayana.
5. Ibid.
6. Kastarak, Bulent I., Barber, Brian K. (2012) Fundamentals of Planning and Developing Tourism. Upper Saddle River, NJ: Prentice Hall.
7. UNWTO. Tourism Highlights. 2012 Editions
8. UNWTO World Tourism Barometer, Volume 7 No.2 June 2009
9. Bali Government Tourism Board (2010) Bali Tourism Statistics 2010. Denpasar Bali
10. Bali Regional Statistics Agency (2010) The Growth Number of Accommodation and Room in Bali, 2010. Denpasar Bali.
11. Pitana, I Gede. op.cit. p.1.
12. Inskeep, E., Kallenberger, M. (1992) An Integrated Approach to Resort Development. Spain: World Tourism Organization.
13. SCETO (1971) Bali Tourism Study. Six Volumes.
14. Ibid.
15. Peraturan Daerah Dati I Bali No. 2,3,& 4/1974 tentang Tata Ruang, Lingkungan Khusus, dan Bangunan-Bangunan (Regional Regulations of Bali Province for Spatial Panning, Specific Environments, and Building Codes).Denpasar Bali.
16. Direktorat Jenderal Sumber Daya Air (2006) Bali Beach Conservation Project: Inception Report 2006. Denpasar Bali: Balai Wilayah Sungai Bali Penid.
17. Ibid.

Quantifying Town Development in Space and Time using Land Use Data

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1 ABSTRACT

The most popular methods to measure urban sprawl are based on population growth and/or density measurements. The data needed for these calculations are easily available as long as the focus lies on politically drawn boundaries or jurisdictions. If however the emphasis lies on the organic de-facto town boundaries, these population data are not always readily (and cheaply) available. Here we employ and develop indicators that focus on the organically grown (functional) size of a town or village rather than its politically defined boundary. We use the structure provided by the Corine Land Cover (CLC) Project (2006) to define usage categories as well as grid size (100m x 100m).

In this paper we follow two lines. First, we identify mismatches between legal and de-facto town boundaries using land use data. Second, we employ several land-use-based urban sprawl indicators and compare their performance. Some of these indicators have been used in the literature before, others we developed ourselves. These indicators are based on the structure and/or composition of urban space.

2 INTRODUCTION

Urban sprawl is a complex phenomenon. For some the main characteristic of urban sprawl is poor accessibility, or as Al Gore defined it: "a gallon of gas can be used up just driving to get a gallon of milk". [1] For others the main components of urban sprawl are low density zoning (single family homes on large plots) or single-use zoning rules that lead to a geographical separation between residential and commercial areas. For some urban sprawl is an aesthetic criterion. Sprawl in this sense is defined as boring housing developments, interchangeable commercial developments containing malls and fast food chains. Not everyone sees urban sprawl in a negative way however, Glaeser and Kahn (2003) for example see urban sprawl as the "inexorable product of car-based living" and argue that "sprawl has been associated with significant improvements in quality of living", and that "the environmental impacts of sprawl have been offset by technological change". Brueckner (2000) also see urban sprawl as the by-product of rising incomes, growing population and a fall in car-commuting costs. His argument however takes a different note in that he argues that sprawl is associated with three different types of market failure: The failure to take into account the value of open space, the failure to take congestion and ecological consequences of urban sprawl into account, and the failure to make developers pay for the infrastructure they need. As urban sprawl means different things to different people, it is not surprising that many different definitions of urban sprawl exist in the literature. However everyone seems to agree that urban sprawl is an important phenomenon. Frenkel and Ashkenazi (2008) summed up the situation very well when they wrote: "we know that sprawl is significant, but we are not yet sure what it is exactly or how to measure it" (Frenkel and Ashkenazi, 2008).

Of course, measuring urban sprawl is important not only because experts agree on the importance of the sprawl phenomenon. Measuring urban sprawl is important because it is associated with a variety of major ecological, social, and health effects and developments. The impacts associated with urban sprawl range from the lack of scale economics (Frenkel and Ashkenazi, 2001), ecological problems such as air pollution and congestion due to increased car use associated with urban sprawl (Brueckner, 2000, Nechyba and Walsh, 2004), to social problems of increased segregation (e.g. Glaeser and Kahn, 2003) or increased isolation (Frumkin, 2002), to health problems such as obesity [2] (e.g. Ewing et al., 2003, Bray et al., 2005).

Our objective here is to compare alternative measures of urban spawl. Some have been previously used and some we have developed ourselves. Our land use data comes from the Corine Land Cover Project (European

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[1] Quote from the speech "war on sprawl" by Al Gore during his campaign for the U.S. presidency, January 1999.

[2] Obesity and urban sprawl are statistically correlated. Most researchers argue that obesity is a negative by-product of urban sprawl, partly induced by the car dependency of the population. However some researchers argue, that the causation between urban sprawl and obesity is actually the reverse with obese people being more likely to choose to live in a sprawling environment (see e.g. Eid et al., 2008).

Environment Agency, 2010). We use the grid structure as well as the land use labelling of the CLC Project to calculate alternative measures of urban sprawl. The grid size in the Corine Land Cover Project is 100 by 100 meters. There are 42 land use classes present in the CLC Project. Cells are classified according to their dominant usage. Population is mainly found in CLC class 1 (continuous urban fabric) and 2 (discontinuous urban fabric).

In our empirical comparisons we focus on Austria's second largest city, Graz, as well as two smaller regions in the same province, Gleisdorf and Leibnitz. We choose different size urban developments on purpose, as urban sprawl does not only affect large cities: "urban sprawl is a process which can affect even the smallest of villages" (Sudhira et al., 2004).

3 DENSITY MEASURES

The most popular methods to measure urban sprawl are based on population density measurements. The main input in these measures is the number of people living in a particular area (e.g. people per square kilometer). Low population density numbers suggest high degrees of urban sprawl. We consider two different ways of measuring population density.

3.1 Density Measure 1: number of people divided by total area of district/municipality

The standard version of the density measure is to divide the number of people by the total area of a district/municipality ( ). Using this method we can see large differences in the population density for major international cities. The 6,299km^2 city area of Los Angeles has a population of 14,900,000, which corresponds to a population density of 2,400 people per square kilometre according to this method. For the 2,163km^2 area of Seoul-Incheon in South Korea with a population of 22,547,000 people, the population density is 10,400 people per square kilometre. The city of Dhaka in Bangladesh has by far the highest population density in the world with 44,400 people per square kilometer (New Geography, 2013). According to the density measure of urban sprawl, if a specific area experiences positive population growth, the population density becomes higher and urban sprawl is reduced.

The formula for this density measure reads as follows:

$$D_1 = \frac{\sum_i pop_i}{\sum_i x_i}$$

where pop_i is the population in cell i for $i = 1, ..., n$ with n as the total number of cells in the city and $\sum_i x_i$ is the whole area of the city (sum of all cells in the town).

For the three Austrian municipalities the population densities per square kilometer are more moderate. While the population density within the official city limits of Graz is 2,234 people per km^2, for the 57 surrounding communities of Graz it is only 128 people per km^2. Within the official political city limits, the density index for the regional town of Gleisdorf is 1,214 and for the southern styrian town of Leibnitz it is 1,322 people per km^2.

3.2 Density Measure 2: number of people divided by built-up cells in district/municipality

We include a second density measure here which considers the population density in built-up areas only (. The rationale for doing this is that the population may not be spread evenly across all cell types in a municipality. Suppose for example that the district/municipality contains a large park. This acts to reduce overall population density and hence increases the level of measured urban sprawl according to density measure 1. However, it could be legitimately argued that the park should be ignored when measuring population density. This is what density measure 2 does.

We use land use data from the Corine Land Cover Project (2006) to classify individual 100m x 100m grid cells according to their dominant usage into 42 possible land use classes. Our first task is to decide which of these land use classes constitute a built-up area. This may differ across regions. We define a cell as built-up if there is residential housing in that cell. While we do not have population data at the level of individual cells, we can determine which cell types contribute population uing a regression model.

The city of Graz has 285,387 inhabitants (including principal and secondary residence) in 2006. The city is divided into 259 voting districts ("Zählsprengel") for each of which we have the number and land use type of

the cells lying within that area as well as the number of inhabitants. Within Graz only 12 CLC cell types are observed.

We estimate the following regression:

$$bev_{ZSP} = \beta_i \cdot x_i, \ i = 1, \ldots, 12$$

where bev_{ZSP} is the population in a district, x_i is the number of observations of cell type i observed in that district. The regression is run over the 259 districts in Graz. We find that only two cell types are significant with a p-value [3] smaller than the significance level of 5 %: these are CLC class 1 (continuous urban fabric) and CLC class 2 (discontinuous urban fabric).

To find the relative distribution of population between CLC classes 1 and 2 within the city region, we run the regression above for the entire area of Graz and include only CLC class 1 and 2 as explanatory variables. For the city area of Graz we find an imputed average cell population of 101.85 people for CLC class 1 and 22.84 people for CLC class 2. This corresponds to a relative population weight of 0.82 for CLC class 1 and 0.18 for CLC class 2.
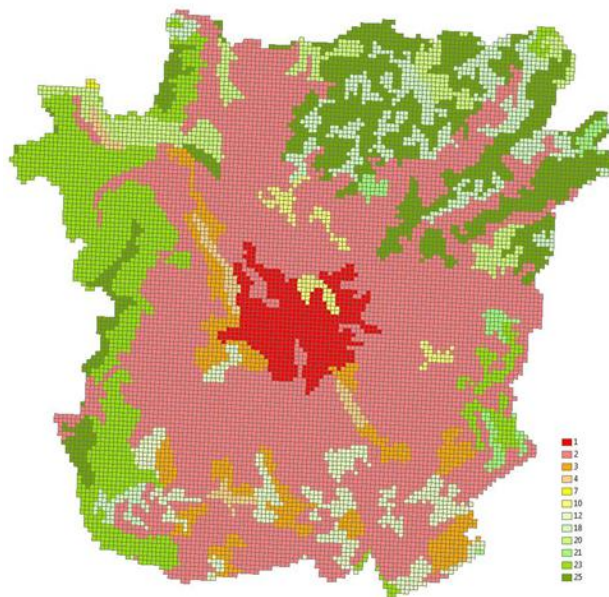
Fig. 1: Corine Land Cover classes of the city of Graz.
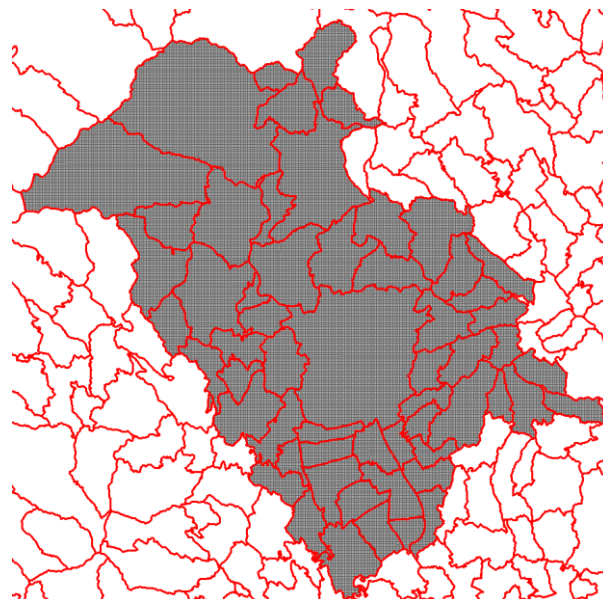
Fig. 2: The city of Graz with its surrounding 57 municipalities.

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[3] In our case the null hypothesis is . The smaller the p-value, the more strongly the test rejects the null hypothesis which means that the tested variable has a significant influence on the population variable bev_{ZSP} .

There are 57 small municipalities surrounding Graz. Equivalent to the first regression above, we now run regressions for these 57 municipalities. The surrounding area of Graz contains 22 of the 42 possible land use classes.

This time we find that in addition to the CLC classes 1 and 2 (continuous and discontinuous urban fabric), three further CLC classes are significant for housing population, these are CLC class 18 (pastures), CLC class 20 (complex cultivation patterns) and 23 (broad-leaved forest). Even though these additional cell types are statistically significant, they house a very low number of people on average.

Population density according to our density measure   is therefore calculated as follows: For each of the 259 sub-districts within the city limits of Graz we divide its population by the sum of the number of cells of class 1 and 2 within this district. Population density for each of the 57 municipalities outside of Graz is calculated by dividing its population by the sum of CLC cells of class 1, 2, 18, 20 and 23 within that area.

Therefore the formula for this density measure reads as follows:

$$D_2 = \frac{\sum_i pop_i}{\sum_j x_j}$$

where pop_i is the population in cell i for $i = 1, \dots, n$ with n as the total number of cells in the city and $\sum_j x_j$ is the built-up area of the town.

4 ENTROPY MEASURES

4.1 Measuring entropy at the district/municipality level with population data

Entropy measures of urban sprawl focus on differences in density across districts rather than the density level itself. A high entropy score implies that population density does not vary much across districts. This is interpreted as a high level of urban sprawl. A low entropy score conversely implies high variability in population density across districts and a low level of urban sprawl.

Here we use Shannon's measure of entropy. This has been used previously to measure urban sprawl by Yeh and Li (2001) in China, Sudhira, Ramachandra, and Jagadish (2004) in India and Sun, Forsythe and Waters (2007) in Canada.

Urban spawl according to Shannon's entropy measure is calculated as follows:

$$E = \sum_i p_i \cdot \log(p_i),$$

where

$$p_i = \frac{pop_i / \sum_j x_{ij}}{\sum_i (pop_i / \sum_j x_{ij})}$$

are the weights that sum to one. The index j counts the number of land use classes, pop_i is the population, and x_i is the land area in district i. Its upper bound is $\log(n)$, where n is the number of districts. E takes the value $\log(n)$ when the population density is the same in all districts. Dividing E by $\log(n)$ provides us with an index that lies between zero and one. This normalized entropy measure makes it easier to compare entropy results between regions.

$$E_{1,2} = \frac{\sum_i p_i \cdot \log(p_i)}{\log(n)}$$

Using our two measures of density from the previous section (i.e., density measures D_1 and D_2) we obtain two different measures of Shannon's entropy (E_1 and E_2). We calculate these entropy measures for the city of Graz, the surrounding area of Graz, and greater Graz (the latter being the sum of the city and surrounding area).

4.2 Entropy measures that do not use population data

The Shannon entropy measure can also be applied to density measures that are not based on population data. One example of such a density measure for a district is the number of built-up cells divided by the total number of cells in the district. In this case, the entropy measure takes the following form:

$$E_3 = \sum_i p_i \cdot \log(p_i), \text{where}$$
$$p_i = \frac{\sum_k x_{ik}/\sum_j x_{ij}}{\sum_i (\sum_k x_{ik}/\sum_j x_{ij})}$$

are the weights summing up to one. The variable x_{ik} denotes the number of cells in district i with built-up cells k ($k = 1, 2$ for the city of Graz, and $k = 1, 2, 18, 20, 23$ for the surrounding communities of Graz) and x_{ij} is the number of cells in district i of land use class j for $j = 1, \dots, 12$ in the city of Graz, and $j = 1, \dots, 22$ in the surrounding area of the city.

5 SHAPE BASED MEASURES

Urban sprawl can also be thought of as a land use issue rather than one of population density per se. We now consider a class of methods for measuring urban sprawl that do not require any population data. This feature can be useful since obtaining population density measures can be problematic when the political boundary of a town does not coincide with its functional boundary. [4] For example, in Figure 3 we see that our town A* lies mostly within its political boundary (A). Most of its borders however lie outside its political boundaries in the political jurisdictions of B, C, and D. Data on population changes are readily available for each political jurisdiction, but these data are not geographically referenced – they do not show in which cell of each jurisdiction people live. Suppose that the town A* expands rapidly towards the north and west but not anywhere else. If we just measure population change in A, we completely miss this expansion. If on the other hand, we include all of the population growth that happened in A, B, C, and D together, we overestimate the expansion of A*, since each of these jurisdictions also has settlements that are not connected to A*. In this section we will illustrate a method to overcome this problem.
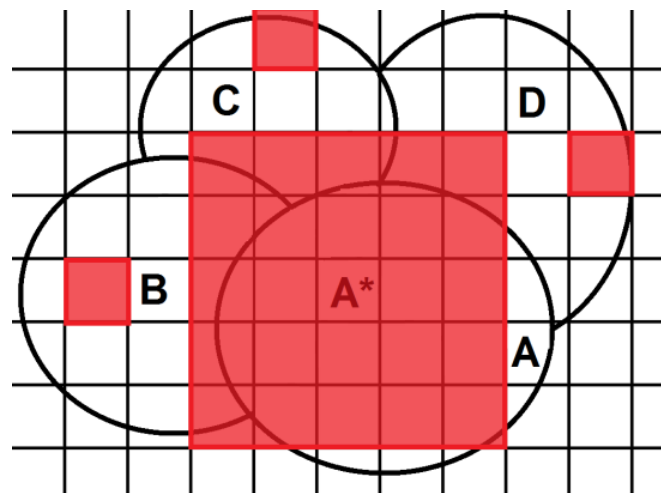
Fig. 3: Political vs. functional boundary of a town.

A class of urban sprawl measure focuses on the shape of a town's boundary. The most compact boundary is a circle. This minimizes the level of urban sprawl according to this type of measure. The more the shape departs from a circle the higher is the resulting measure of urban sprawl. Also, the wiggliness of the boundary can play a role in Fractal-type measures from this class.

The Corine Land Cover Project (European Environment Agency, 2010) provides an ideal framework for illustrating these types of methods. The landscape is divided into 100 by 100 meter cells, thus allowing the boundary to be identified at this fine level. This is a topic that we will consider in future research.

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[4] The question of „where does a town end?" has various possible answers. We define the "end of town" as the end of cells with Corine Land Cover classification 1 or 2 (continuous or discontinuous urban fabric).

6   RESULTS

Sprawl Measures	Density Measure D_1	Density Measure D_2	Entropy measure E_1	Entropy Measure E_2	Entropy Measure E_3
Graz	2234/km²	4183/km²	0.927	0.937	0.990
Surrounding communities	128/km²	309/km²	0.917	0.932	0.979
Graz including surrounding area [5]	360/km²	735/km²	0.918	0.933	0.980
Gleisdorf	1130/km²	×	×	×	×
Leibnitz	1242/km²	×	×	×	×

Table 1: Results of Density Sprawl Measures.

7   CONCLUSION

Urban sprawl has many interpretations. Different measurement concepts capture different aspects of this complex issue. We have shown how entropy measures and land use data can be used together to capture the phenomenon of urban sprawl in new ways. Measuring sprawl at the functional settlement level rather than the political level is a big benefit for city and regional planners. Being able to do so without gathering expensive cell level population data is another benefit of our approach.

8   REFERENCES

BRAY R, VAKIL C., ELLIOTT D: Report on Public Health and Urban Sprawl in Ontario: a review of the Pertinent Literature, In Energy Technology Data Exchange World Energy Base (ETDEWEB), 2005.

BRUECKNER Jan K.: Urban Sprawl: Diagnosis and Remedies, In: International Regional Science Review, Vol. 23, Issue 2, pp. 160-171, 2000.

EWING Reid, SCHMID Tom, KILLINGSWORTH Richard, ZLOT Amy, RAUDENBUSH, Stephen: Relationship Between Urban Sprawl and Physical Activity, Obesity, and Morbidity. In: American Journal of Health Promotion, Vol. 18, No. 1, pp. 47-57, 2003.

EUROPEAN ENVIRONMENT AGENCY: Corine Land Cover Project 2006, Version 13, http://www.eea.europa.eu/data-and-maps/data/corine-land-cover-2006-raster, 2010.

FRENKEL Amnon, ASHKENAZI Maya: Measuring Urban Sprawl; How Can We Deal With It? In Envirionment and Planning B: Planning and Design, Vol. 35, Issue (1), pp. 56-79, 2008.

FRUMKIN Howard: Urban Sprawl and Public Health, In: Public Health Reports, Vol. 117, Issue 3, pp.201-217, 2002.

GLAESER Edward L., KAHN Matthew E.: Sprawl and Urban Growth, In Working Paper 9733, National Bureau of Economic Research, Cambridge, MA 02138, May 2003.

EID Jean, OVERMAN Henry G., PUGA Diego, TURNER Matthew A.: Fat City: Questioning the Relationship between Urban Sprawl and Obesity, In: Journal of Urban Economics, Vol. 63, Issue 2, pp. 385-404, 2008.

NECHYBA Thomas J., WALSH Randall P.: Urban Sprawl, In: Journal of Economic Perspectives, Vol. Volume 18, Issue 4, pp. 177–200, 2004.

NEW GEOGRAPHY: World Urban Areas Population and Density: a 2012 Update, http://www.newgeography.com/content/002808-world-urban-areas-population-and-density-a-2012-update, accessed on 27.2.2013.

SUN Heng, FORSYTHE Wayne, WATERS Nigel: Modelling Urban Land Use Change and Urban Sprawl: Calgary, Alberta, Canada. In: Networks and Spatial Economics, Vol. 7, pp. 353-376, 2007.

YEH Anthony G.O., Li Xia: Measuring and Monitoring of Urban Sprawl in a Rapidly Growing Region Using Entropy. In: Photogrammetric Engineering and Remote Sensing, Vol. 67, Issue 1, pp.83-90, 2001.

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[5] The weights for the assignment are according to their relative area (relative number of cells).

Regional Land-Taking Processes in Italy: a Study Concerning Sardinia

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1 ABSTRACT

Land take is a process of significant relevance in the countries of European Union (EU). In 2011, the European Commission (EC) put in evidence that an important milestone for the EU should be to reach the goal of no net land take by 2050, and to take under strict control the impact on land-taking processes of the EU policies in the new Structural Funds programming period (2014-2020) (Communication of the EC to the European Parliament COM(2011) 571 of 20.9.2011).

In this paper we analyze the Sardinian land-taking process as related to factors which are identified as relevant variables in several studies concerning land take, such as area size, accessibility, proximity to regional and local cities and small settlements, natural risk, proximity to nature conservation areas.

2 INTRODUCTION

The EC indicates that land take in the EU amounted to more than 1,000 km2 per year between 1990 and 2000, decreasing to about 920 km2 between 2000 and 2006 (European Commission, 2011), and that, as a consequence, the objective of no net land take by 2050 would imply a decrease rate of about 800 km2 per year.

Land take in Italy parallels the difficult general situation of the EU countries. Figures at the national level put in evidence that in 2009 a 7.3 percent of the Italian land had an artificial land cover (European Commission, EUROSTAT, 2012), with an average growth rate of about 6 percent between 1990 and 2000 and of about 3 percent between 2000 and 2006 (ISPRA, 2011, p. 479). The implementation of analyses of land-taking processes at the regional level is problematic since currently available geographic databases and information systems do not provide systemic information on the phenomenon (CRCS, 2012).

However, some Italian regional administrations, such as Lombardy and Sardinia, have set up regional information systems that address land-taking processes. The geographic information systems of these regions allow to relate land take with spatial, economic and planning-policy related variables, and to infer on correlations between such variables and the land-taking phenomenon.

We study the land-taking process through the land cover maps of Sardinia, made available in 2003 and 2008 by the Sardinian regional administration [1]. The results and inferences of our study could be easily generalized to other Italian and EU regions, under the necessary condition that geographic databases and maps were made available for these contexts as well.

This paper is organized as follows. In the third section we propose the definition of land take for the purpose of this paper. We feel that we have to clarify what we mean by land take, which is a rather controversial issue. In the following section, we discuss the set of variables that we use as covariates to frame the Sardinian land-taking process in the context of relevant studies concerning this topic. Explanatory and dependent variables are described and spatially represented in the fifth section, and correlations between covariates and the dependent (land take) variable discussed.

The sixth section presents the results of regression models which use the land take variable and covariates in order to analyze if, and to what extent, the land-taking process is related to the covariates altogether. In the concluding section, we discuss the influence of the factors/variables found relevant on land take that could be

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[1] The 1:25,000 "Land Use Map of the Region of Sardinia – 2003 Edition" and "New Land Use Map of the Region of Sardinia – 2008 Edition" are actually two land cover maps that cover the whole island. Data were obtained mainly from photo-interpretation of aerial photographs, satellite images, and orthoimages, but other vector data sets (e.g., regional digital cartography) were also used, together with on-site surveys. The maps' minimum mapping unit (Longley et al., 2001, 151) equals 0.5 ha in urban areas and 0.75 ha in rural areas. Both maps can be freely downloaded from http://www.sardegnageoportale.it/index.php?xsl=1598&s=141401&v=2&c=8831&t=1 [accessed December 12, 2012].

taken into account to define regional planning policies to limit or possibly prevent land take, and, by doing so, help implementing the EC recommendation on no net land take by 2050 into the EU regional policies.

3 WHAT IS LAND TAKE?

As we put in evidence above, the EC considers to reach no net land take by 2050 as an important milestone for a roadmap to a resource-efficient Europe. One of the most dangerous consequences of land take is soil sealing, but other related phenomena are soil contamination and erosion, decrease of soil organic content and of agricultural production and productivity. In a recent study published by the Italian Institute of Urban and Regional Planning (CRCS, 2012), a systematic discussion on the impacts of land-taking processes is proposed; such impacts are grouped as follows:

- impacts on the carbon cycle: a decline of the power of the soil's organic content to fix carbon dioxide in the atmosphere and an increase in concentration of carbon dioxide generated by the mineralization of the carbon present in the excavated soil of new urban developments;

- impacts on the water cycle and microclimate: soil sealing implies: i. a significant decline of stored ground- and underground water; ii. an increased flood risk due to the rising quantity of rainfalls which run directly into rivers, augmenting their levels, turbulence, and sediments in the water; iii. impacts on urban microclimate, since the decrease of the soil evapotranspiration power may very possibly generate an increase of the atmospheric temperature;

- impacts on biodiversity: land-taking processes cause the soil's impoverishment and, as a consequence, the loss of huge quantities of microorganisms, which could mitigate soil contamination, filter percolation waters and make available nutrients for vegetation and pastures;

- impacts on agricultural production: potential agricultural crops are heavily and progressively hindered by land take and soil sealing.

However, if we read the relevant paragraph concerning land–taking processes of the EC communication quoted above (paragraph 4.6), it will be rather difficult to derive a rigorous definition of land take, which should be based on its unwanted impacts in order to effectively address and mitigate their consequences.

Let us consider, for example, the Land Use and Cover Areas frame Survey (LUCAS) of EUROSTAT (European Commission, EUROSTAT), and the COoRdination de l'INformation sur l'Environnement (CORINE) Land Cover vector map (CLC) of the European Environment Agency (EEA) of the EU (European Environment Agency). In LUCAS, "artificial land", that is land taken by land-taking processes, is classified into two main groups, that is "built-up" and "non built-up" areas, where the former are further classified according to the number of floors of their buildings, while a separated sub-group is represented by greenhouses (Technical reference, document C-3 – Land use and Land Cover: Nomenclature, pp. 14-16). In CLC, "artificial surfaces" are classified into four groups (CORINE Land cover – Part 2: Nomenclature, p. 1): i. urban fabric; ii. industrial, commercial and transport units; iii. mine, dump and construction sites; and, iv. artificial, non-agricultural vegetated areas. Even though both LUCAS and CLC address the issue of artificial land cover, propose definitions of artificial vs. non-artificial land cover, and identify artificial and non-artificial areas, it is quite clear that CLC and LUCAS greatly differ from each other.

The example above shows that it is quite difficult and controversial to frame and identify a precise measure of land take, which in some way can make it difficult to implement rigorous quantitative studies on this subject. From this perspective, there are at least two relevant general issues to be taken into account. First, it is rather controversial to state univocally that land take is always negative in terms of the negative impacts indicated above, since there are types of land take which do not generate those impacts. For example, soil sealing, one of the most dangerous impacts, is not a necessary consequence of land-taking processes, as indicated by the EC, which puts in evidence that soil sealing is limited to about a 50 percent of the land taken: "In the EU, more than 1,000 km² are subject to 'land take' every year for housing, industry, roads or recreational purposes. About half of this surface is actually 'sealed'." (EC COM(2011) 571, paragraph 4.6)

Second, there is the trade-off critique. This critique considers land take as a process caused by a strong pressure in favor of settlement development, which implies that the land taken will increase its market value once new land uses displace existing uses. So, why, in principle, existing uses should be preferred over the new ones? Moreover, is a prohibitionist, normative, approach the most efficient way to prevent the negative

impacts of land-taking processes from taking place in the long run? Neo-liberist positions support this critique (see, for example: MacCallum, 2003; Moroni, 2007). From this point of view, heavy taxation on land rent could possibly be the most effective means to counter demand for land take, which is consistent with Henry George's proposal of eliminating land monopoly "by shifting all taxes from labor and the products of labor and concentrating them in one tax on the value of land." (George, 1971, p. viii)

In this paper we do not propose ethic narratives or value judgments on land take, but we analyze land-taking processes in order to detect which factors, and possibly to what extent, can be considered relevant to explain the phenomenon. We implement our analysis with reference to the Sardinian region, one of the two Italian islands which are governed by regional administrative bodies. Sardinian is located to the west of Central Italy, off the west coast just below the French island of Corsica. Sardinia has advanced land-cover maps based on the CLC classification, available for 2003 and 2008, that make it possible to analyze the dynamic of land cover through the comparison of land cover classes which are consistent with each other. So, we use the CLC-based maps of Sardinia to study land take processes, since the LUCAS data, available for 2008 only, would have not allowed us to study land take as a dynamic process.

In the CLC classification, non-artificial surfaces are classified into four classes (at Level 1): i. agricultural areas; ii. forests and semi-natural areas; iii. wetlands; and, iv. waterbodies. The land-taking process is identified in this study as the passage of areas from non artificial classes in 2003 to the artificial land-cover class in 2008. Sardinia has experienced an increase in artifical land from a 2.75 percent in 2003 (66,206 hectares) to a 3.22 percent in 2008 (77,516 hectares).

Table 1 shows the variables that describe non-artificial and artifical land cover and their descriptive statistics. The variables refer to spatial units identified with the 377 municipalities of Sardinia.

Variable	Definition	Mean	St.dev.
ARTIF03	Artificial land cover in 2003 (ha) (source: Corine Land Cover Map of Sardinia – 2003 Edition, next "CLCMS03", level 1)	175.62	318.47
NARTIF03	Non-artificial land cover in 2003 (ha) (source: CLCMS03, level 1)	6,212.60	5,993.52
NARTIF08	Non-artificial land cover in 2008 (ha) (source: Corine Land Cover Map of Sardinia – 2008 Edition, next "CLCMS08", level 1)	6,181.76	5,956.36
PERLTAKE	2003-2008 percent change from non-artificial to artificial land cover (sources: CLCMS03, CLCMS08)	0.53	0.99
PVARLU1	2003-2008 percent change in artificial land cover (sources: CLCMS03, CLCMS08)	13.55	18.81
PVARLU2	2003-2008 percent change in non-artificial land cover, agricultural areas (sources: CLCMS03, CLCMS08)	2.39	12.57
PVARLU3	2003-2008 percent change in non-artificial land cover, forests and semi-natural areas (sources: CLCMS03, CLCMS08)	-4.65	24.32
PVARLU4	2003-2008 percent change in non-artificial land cover, wetlands (sources: CLCMS03, CLCMS08)	0.96	32.57
PVARLU5	2003-2008 percent change in non-artificial land cover, waterbodies (sources: CLCMS03, CLCMS08)	11.51	59.69

Table 1. Definition of land-cover variables and descriptive statistics.

4 FACTORS RELATED TO LAND TAKE

Land take is related to location-related, socio-economic and planning code determinants (Sklenicka et al., 2013; Huang et al., 2006) and it is essentially a consequence of pressure for future land development (CRCS, 2012).

In terms of location-related and physical determinants, we consider the average size, slope and distance from the closest market place, that is the closest urban center, of a municipality's non-artificial-land areas in 2003 which became artificial in 2008, as these are frequently cited as important factors for land development (Sklenicka et al., 2013; Cheshire, 1995; Palmquist and Danielson, 1989). Accessibility is another characteristics related to the physical location of non-artificial land (Stewart and Libby, 1998), which we describe through: i. endowment of roads which connect regional town and city centers, which the Italian Code concerning Road Regulation (Italian law enacted by Decree no. 1992/285) classes as "Highways", "Main extra-urban roads" and "Secondary extra-urban roads;" ii. proximity to the regional administrative capital city, that is Cagliari, which is also the most important city center of the region; iii. proximity to the nearest province administrative center.

In the case of Sardinia, an island which coincides with an administrative region of Italy, the distance from the coast is of particular importance, since the so-called "coastal strip" (CS) is defined in article 19 of the Planning Implementation Code (PIC) of the Regional Landscape Plan of Sardinia (RLP, approved by the

Regional Government of Sardinia in 2006 [2]) as a "strategic resource, vital for the achievement of sustainable development in Sardinia, that requires integrated planning and management." Under article 20 of the PIC, as a general rule, new development of land and transformation of current land uses are not allowed in the CS; in particular, construction of new major roads, of new industrial or commercial developments, of new camping sites and of facilities associated with golf courses is forbidden within the CS. Some exceptions to the general rule are allowed, provided that municipalities and developers abide by regulations and procedures given by the PIC. Due to these particular restrictions in force in the CS, it was believed that the amount of municipal land area included in the CS could be a relevant impact factor on the ability of cities and towns to spend funds allocated for public services and infrastructure (Zoppi and Lai, 2013). So, a proximity-to-coast effect could be expected, since coastal land is demanded for future tourism development. If land-taking processes related to tourism development are forbidden, it seems very possible that land take will occur in the proximity of the CS. This argument is discussed by Dewi et al. (2013), who found that the establishment of protected areas in Asian and African tropical forestry regions determines an increased exploitation of the marginal lands just outside the protected areas.

Variable	Definition	Mean	St.dev.
PARCSIZE	Municipality's average size of areas classified as non-artificial in 2003 and artificial in 2008 (ha) (sources: CLCMS03, CLCMS08)	0.33	0.29
SLOPE	Municipality's average slope of areas classified as non-artificial in 2003 and artificial in 2008 (percent) (sources: CLCMS03, CLCMS08, Digital Terrain Model of Sardinia, cell size 90 m)	8.97	6.60
PROXSETL	Municipality's weighted average distance from areas classified as non-artificial in 2003 and artificial in 2008 CLC to the closest urban center (km); weight = area size (sources: CLCMS03, CLCMS08, Spatial Dataset of the Regional Geographic Information System of Sardinia, next SDRGISS[3])	2.62	1.64
ACCESS	Endowment of roads connecting regional town and city centers per unit of municipal land area (km/km2) (source: SDRGISS)	0.95	0.47
DISTCAPC	Distance of a municipality from the regional capital city, Cagliari (km) (source: Google Maps)	126.45	71.17
DISTNEAC	Distance of a municipality from the closest province administrative center (km) (source: Google Maps)	30.98	16.67
DISCOAST	Municipality's weighted average distance of areas classified as non-artificial in 2003 and artificial in 2008 from the shoreline (km); weight = area size (sources: CLCMS03, CLCMS08, SDRGISS)	21.02	13.99
CONSAREA	Municipality's total protected area in 2008: parks, reserves, etc. (ha) (sources: CLCMS03, CLCMS08, SDRGISS)	1,342.74	2,632.62
NATAR	Municipality's landscape components with an environmental value, defined as natural and seminatural areas that change from non-artificial to artificial land cover in 2003-2008 (ha) (sources: CLCMS03, CLCMS08, RLP spatial dataset)	11.67	26.05
AGRFORAR	Municipality's landscape components with an environmental value, defined as agricultural and forestry areas that change from non-artificial to artificial land cover in 2003-2008 (ha) (sources: CLCMS03, CLCMS08, SDRGISS, RLP spatial dataset)	25,70	50.83
COASTRIP	Percentage of a municipality's area included in the CS (sources: SDRGISS, RLP spatial dataset)	11.18	24.96
OLDPLAN	Municipality's area classed under the planning code in force before 2006 as area where land transformations and new developments are almost totally forbidden that changes from non-artificial to artificial land cover in 2003-2008 (ha) (sources: CLCMS03, CLCMS08, SDRGISS)	14.85	43.06
DENSITY	Municipality's population density in 2008 (residents per square kilometer) (source: web site Sardegna Statistiche: http://www.sardegnastatistiche.it [accessed December 12, 2012])	77.42	209.25
INC2008	Municipality's real per-capita income in 2008 (euros; 2008 consumer price index = 1) (source: web sites Sardegna Statistiche and Comuni-Italiani.it: http://www.sardegnastatistiche.it and http://www.comuni-italiani.it [accessed December 12, 2012])	9,212.95	1,391.61

Table 2. Definition of land-cover covariates and descriptive statistics.

Among planning-code-related determinants, we consider the endowment of protected areas, since these areas provide environmental amenities. Proximity to protected areas should increase the demand for new residential, commercial or recreational developments, which may possibly generate a change from agricultural to artificial land cover. The argument is even stronger than the Dewi's cited above, since, from this perspective, land take is also driven by the availability of environmental amenities.

Other planning-code factors are related to the class of an area according to the PIC of the RLP. The PIC establishes a rigid conservative regime with respect to areas classified as "landscape components with an environmental value, defined as natural and seminatural areas." It should be comparatively fairly more difficult that an area classified in this way changes its status from non-artificial to artificial land cover. The other class of landscape components with an environmental value is defined as "agricultural and forestry areas." Since the conservative regime is less rigid for these areas, areas located there could be more likely to

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[2] Available at: http://www.sardegnaterritorio.it/paesaggio/pianopaesaggistico.html [accessed December 12, 2012], which includes the PIC of the RLP, its cartography and its cartographical zoning classes.

[3] Available from the Regional Geoportal, at: http://www.sardegnageoportale.it/index.html [accessed December 12, 2012].

become non-artificial than the former. As we put in evidence above, the CS is a class for which the PIC of the RLP establishes a very restrictive and conservative regime, so areas located in the CS should be particularly unlikely to change their non-artificial land cover. Finally, a planning-code-related variable is represented by the areas for which the planning code in force before the PIC, that is before 2006, forbade almost completely any land transformations and new developments.

Moreover, we consider two socio-economic factors as possible determinants. First, population density, whose correlation with land cover change, which puts in evidence a positive agglomeration effect, is underlined by several studies (Sklenicka, 2013; Guiling et al., 2009; Forster, 2006). Second, we use change in per-capita income from 2003 to 2008 to control for a possible income effect. It is quite likely a significant factor, although we do not have a definite expectation as to the sign of the coefficient, since, for example, increasing per-capita income could make a municipality more willing to invest in agriculture or could displace agriculture if the available investment from increased income is diverted elsewhere (Lai and Zoppi, 2012).

Table 2 shows the variables which describe factors related to land-taking processes and their descriptive statistics.

5 LAND TAKE AND ITS COVARIATES: SPATIAL REPRESENTATION AND CORRELATIONS

Except for DISTCAPC and DISTNEAC, none of the land-cover variables and covariates listed in Table 1 and Table 2 were available "off the shelf"; therefore, some kind of analysis was required and performed on data (both geographic and non- geographic) collated from different sources. In most cases, GIS-based analyses consisting in combinations of basic geoprocessing operations were performed; in some cases (e.g. to estimate the values of SLOPE, PROXSETL, DISTCOAST), however, more advanced analyses were performed using algorithms built in two open source software programs. [4] This made it possible to develop a geographic dataset, to calculate the value of each land-cover variable and covariate for each of the 377 Sardinian municipalities, and to analyze their spatial distributions.
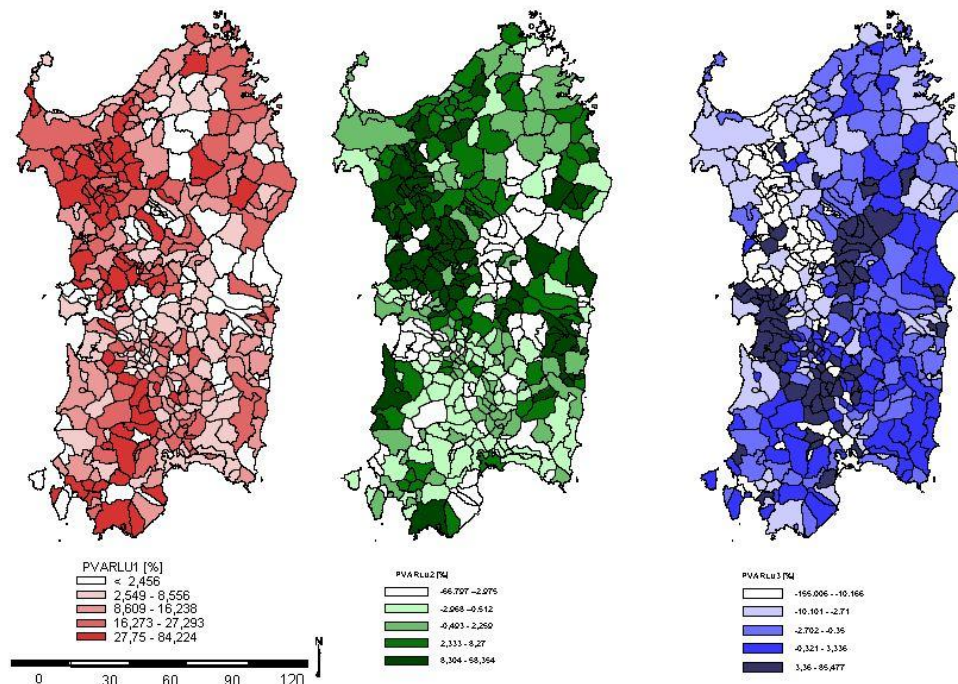
Fig. 1: Spatial representation of the land-cover variables PVARLU1, PVARLU2 and PVARLU3 at the municipal level (20th, 40th, 60th, and 80th percentiles).

The spatial distribution of three of the land-cover variables is shown in Fig. 1: in the first map (PVARLU1), darker polygons correspond to municipalities with the highest values of the ratio of amount of land taken

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[4] "Quantum GIS", available at http://hub.qgis.org/projects/quantum-gis/wiki/Download, and "gvSIG", available at http://www.gvsig.org [accessed December 12, 2012].

between 2003 and 2008 to amount of land that was already classed as artificial in 2003. In the second map (PVARLU2), paler polygons highlight those municipalities which lost the highest share of their agricultural areas between 2003 and 2008 (positive values of PVARLU2 indicate that between 2003 and 2008 agricultural areas increased); similarly, in the third map, paler polygons higlight those municipalities which lost the highest share of their forests and semi-natural areas between 2003 and 2008 (positive values of PVARLU2 indicate that between 2003 and 2008 forests and semi-natural areas increased). Such maps only put in evidence changes in land cover between 2003 and 2008, without necessarily implying that land take actually occurred; for instance, where PVARLU2 is negative and PVARLU3 is positive, part of the decrease in agricultural land might be due to forestation or to abandonment of agricultural uses, rather than to urbanization.

	ρ		ρ		ρ
PARCSIZE	0.68	DISTNEAC	-0.21	COASTRIP	0.19
SLOPE	-0.22	DISTCOAST	-0.20	OLDPLAN	0.21
PROXSETL	0.06	CONSAREA	-0.06	DENSITY	0.40
ACCESS	0.12	NATAR	0.36	INC2008	0.32
DISTCAPC	-0.08	AGRFORAR	0.33		

Table 3. Pearson product-moment correlation coefficients between PERLTAKE and all of the land-cover covariates in Table 2.

The values of the correlation coefficients (ρ) measuring the linear dependence between the variable PERLTAKE (accounting for land take at the municipal level) and its covariates are shown in Table 3, where a high and positive correlation between PERLTAKE and PARCSIZE is put in evidence (ρ=0.68). This means that, in general, the higher the value of land take, the larger the size of parcels whose land cover changed from non-artificial to artificial between 2003 and 2008. Lower, and yet relevant (between 0.40 and 0.30), are the positive correlation coefficients between PERLTAKE on the one hand and DENSITY, NATAR, AGRFORAR and INC2008 on the other hand. This means that, usually, higher values of land take occur in municipalities where the residential density is higher, where areas artificialized between 2003 and 2008 that were classed by the RLP either as natural and seminatural areas or as agricultural and forestry areas are larger, and having a higher per-capita income. The highest negative values of the correlation coefficient are those between PERLTAKE on the one hand and the variables SLOPE, DISTNEAC and DISTCOAST on the other hand, although the linear correlation is not very relevant (ρ takes values between -0.20 and -0.22).
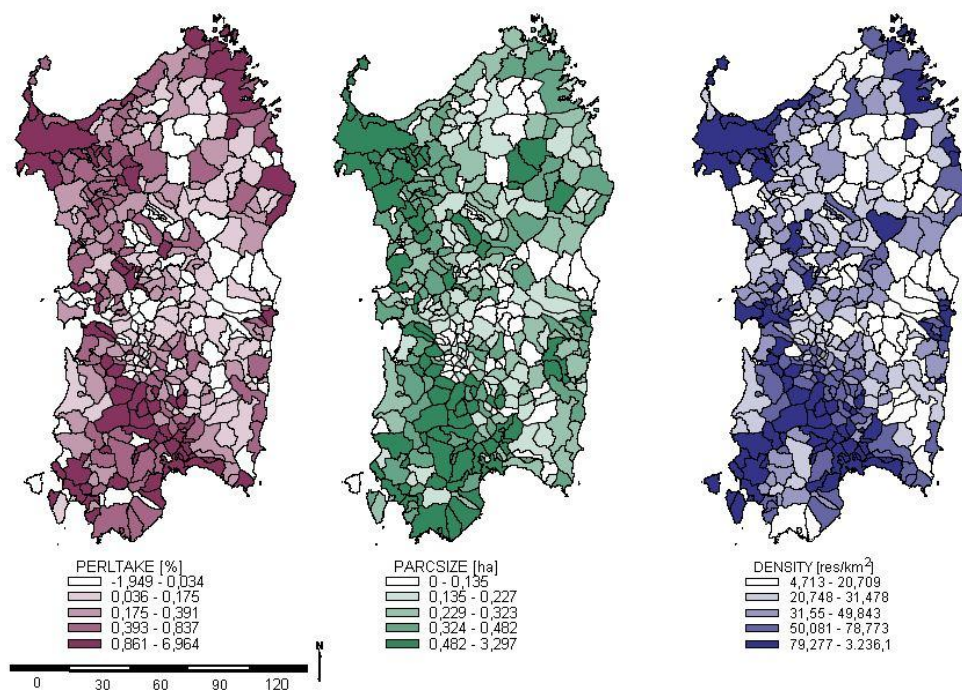
Fig. 2: Spatial representation of the variables PERTAKE, PARCSIZE and DENSITY at the municipal level

(20th, 40th, 60th, and 80th percentiles).

Maps in Fig. 2, where polygons represent Sardinian municipalities, depict the spatial distribution of the variable PERTAKE and of its two covariates having the highest positive values of the correlation coefficient, that is, PARCSIZE and DENSITY. They unveil similarities in the geographic distribution of the variables with reference to both high and low level of the variables: large dark clusters of polygons are clearly identifiable in the south-western, north-western and north-eastern parts of the island in all of the maps. To the contrary, small clusters of polygons having paler colors emerge in some inner parts of the island and close to the Gulf of Orosei (middle-eastern coast).

6   RESULTS

In the first place, we use a simple ordinary-least-squares (OLS) model to analyze if and to what extent each factor which the literature quoted in the fourth section identifies as possibly related to land-take processes. Table 4 shows significant correlations, at 10 percent level of statistical significance, for the average size of areas classified as non-artificial in 2003 and artificial in 2008 (PARCSIZE), endowment of roads connecting a municipality to the main regional urban centers (ACCESS), which is a measure of a municipality's accessibility, distance from Cagliari (DISTCAPC), the regional capital city, which is another accessibility indicator, extent of protected areas (CONSAREA), extent of areas where transformations were prevented by the planning code in force before year 2006 (OLDPLAN), and population density.

The distance of a municipality from the closest province administrative center (DISTNEAC), the average income level of a municipality (INC2008) and the size of a municipality's environmentally-valuable landscape components (NATAR), are less-significantly correlated to land take (25-30 percent), while no significant influence on land-take processes is put in evidence by the other covariates. In particular, there is no significant correlation between land take and proximity to the coast or to the closest urban center, nor is there with reference to the land taken's status of agricultural and forestry landscape component or inclusion in the CS.

Moreover, we estimate an OLS-regression model which includes the covariates whose coefficients are significant at 30 percent. The model's results are reported in Table 5. The model with a reduced set of explanatory variables substantially confirms the estimates of the model whose results are shown in Table 4. The values of the adjusted R-squared's are almost the same as well, so we are quite confident that the excluded variables would not have contributed to the goodness of fit of the estimated OLS model, while uncertainty remains on the influence of DISTNEAC, NATAR and INC2008.

Variable	Coefficient$_i$	Stand.error	t-statistic	Hypothesis test: coefficient=0
Constant	-1.1696	0.3047	-3.839	-0.0001
PARCSIZE	2.3516	0.1443	16.300	0.0000
SLOPE	0.0018	0.0056	0.327	0.7436
PROXSETL	-0.0111	0.0261	-0.427	0.6696
ACCESS	0.2378	0.0833	2.855	0.0046
DISTCAPC	0.0013	0.0005	2.437	0.0153
DISTNEAC	0.0025	0.0023	1.107	0.2690
DISTCOAST	0.0015	0.0031	0.476	0.6347
CONSAREA	-2E-05	1E-05	-1.754	0.0803
NATAR	-0.0026	0.0021	-1.214	0.2256
AGRFORAR	0.0003	0.0009	0.347	0.7291
COASTRIP	-9E-05	0.0018	-0.048	0.9617
OLDPLAN	0.0021	0.0011	1.878	0.0612
DENSITY	0.0016	0.0002	8.889	0.0000
INC2008	4E-05	3E-05	1.202	0.2301
Adjusted R-squared= 0.5918				

Table 4. OLS results, dependent variable PERLTAKE: the regression model includes all the covariates of Table 2.

Since 301 out of 377 (about 80 percent) values of 2003-2008 percent change from non-artificial to artificial land cover (the dependent variable PERLTAKE) are included in the interval (0,1), we also estimate a censored-regression model, considering only the values of PERLTAKE of the interval (0,1), in order to check the robustness of the OLS estimates, under the work hypothesis that the values outside the interval

were outliars. [5] The model's estimates, shown in Table 6, confirm the results of the OLS model, with the exception of the variable NATAR, which is less signicant than in the case of the OLS model.

Variable	Coefficient$_i$	Stand.error	t-statistic	Hypothesis test: coefficient=0
Constant	-1.1068	0.2664	-4.1540	0.0000
PARCSIZE	2.3407	0.1379	16.9780	0.0000
ACCESS	0.2400	0.0759	3.1630	0.0017
DISTCAPC	0.0012	0.0005	2.3550	0.0191
DISTNEAC	0.0028	0.0021	1.3380	0.1817
CONSAREA	-3E-05	1E-05	-1.9350	0.0537
NATAR	-0.0023	0.0019	-1.1830	0.2378
OLDPLAN	0.0020	0.0010	1.8990	0.0583
DENSITY	0.0016	0.0002	9.0300	0.0000
INC2008	3E-05	3E-05	1.1450	0.2528
Adjusted R-squared= 0.5964				

Table 5. OLS results, dependent variable PERLTAKE: the regression model includes the covariates whose coefficient estimates are significant at 30 percent with reference to the OLS-model of Table 4.

7 DISCUSSION AND CONCLUSION

This paper analyzes the Sardinian land-taking process as related to factors which are identified as relevant variables in several studies concerning land take in several studies of the mainstream literature, through censored and OLS regression models. We tentatively consider a set of variables which includes location-related and physical determinants, planning code rules, and socio-economic factors.

We find that there is a double agglomeration effect, since land-taking processes are positively and significantly related to high population density and high concentration of land which changes its status from non-artificial to artificial. This indicates that saving non-artifical land, or limiting land take, could be effectively supported by low-density settlements and extensive and light land-taking processes, since the concentration of land take in a limited number of municipalities would imply a larger extent of land which becomes artificial, being non-artificial in the first place.

Variable	Coefficient$_i$	Stand.error	t-statistic	Hypothesis test: coefficient=0
Constant	-0.5120	0.1330	-3.849	0.0001
PARCSIZE	1.4791	0.0940	15.736	0.0000
ACCESS	0.1309	0.0372	3.521	0.0004
DISTCAPC	0.0004	0.0003	1.395	0.1630
DISTNEAC	0.0014	0.0010	1.364	0.1726
CONSAREA	-2E-05	6E-06	-3.405	0.0007
NATAR	0.0029	0.0012	2.347	0.0189
OLDPLAN	0.0004	0.0006	0.653	0.5138
DENSITY	0.0008	0.0002	3.352	0.0008
INC2008	2E-05	1E-05	1.208	0.2269
Decomposition-based fit measure=0.5266				

Table 6. Marginal effects of covariates estimated on a censored-regression model based on Lai and Zoppi (2012), dependent variable PERLTAKE is censored between 0 and 1.

Secondly, the more a municipality is accessible, the more it is suitable to land-taking processes, which indicates that balancing the accessibility opportunities would be a strategic regional policy in order to limit the concentration of land take and, ultimately, to mitigate the agglomeration effect which characterizes land take. This goal could be reached by increasing the endowment of public roads connecting regional town and city centers to small municipalities, giving particular care to road connections to the regional capital and province cities.

Thirdly, we find that the presence and size of protected areas is negatively and significantly connected to land take, as expected. So, conservation of natural resources, habitats and environment could be strategically important in order to deal with land-taking processes, and to influence their territorial layout. This is also confirmed by the estimates related to the covariate OLDPLAN, which is positively correlated to the change

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[5] The censored-regression model is estimated following the methodology proposed by Lai and Zoppi, 2012. Censored-regression models are also known as Tobit models. Censored-regression models allow to estimate the covariates' marginal effects on the dependent variable. We omit the model specification, which is discussed by Lai and Zoppi (2012).

of land from non-artificial to artificial. This indicates that the more conservative planning rules are weakened, the more land-taking processes occur, which is what happened (in year 2003) in the areas where the old regional landscape plans were not in force any more. A similar phenomenon is put in evidence by the covariate NATAR, which is positively, even though not significantly, correlated to PERLTAKE, which suggests, as before, that the more conservative planning rules are weakened, the more land-taking processes occur: in the case of NATAR it is evident that the conservation character of the RLP PIC was weak if non-artificial areas defined as landscape components with an environmental value were allowed to change their status from non-artificial to artificial land between 2003 and 2008.

The fact that protection of nature, environment and natural resources matters is also put in evidence by the absence of correlation between land-taking processes and the variables COASTRIP and DISCOAST, which indicates that land take was not a coastal phenomenon in the period 2003-2008. Since in the eighties and in the nineties the Sardinian regional land-taking processes were almost exclusively concentrated in coastalmunicipalities, the non-coastal characterization of land take between 2003 and 2008 could only be related to the conservative planning rules that the regional landscape plans in force before 2006 and the RLP, from year 2006 on, have implemented.

Moreover, there is a slight, statistically-significant at 25 percent only, positive income effect, which indicates that a more balanced income distribution could help limit territorial concentration of land-taking processes. This slight income effect is consistent with the previous findings concerning the effectiveness of the 2000-2006 Sardinian Regional Operational Programme funded by the European Agricultural Guidance and Guarantee Fund (EAGGF) in maintaining and possibly increasing agricultural land use (Lai and Zoppi, 2012), that is, the higher the average household income of a municipality, the more agricultural (non-artificial) land is maintained and possibly increased.

In this paper, we tentatively consider a set of variables which includes location-related and physical determinants, planning code rules, and socio-economic factors. As we stated in the third section, we do not assume ethic narratives or value judgments on land take. Nevertheless, the findings imply a set of policy statements which can be taken into account in order to influence land-taking processes. Agglomeration effect both in terms of land which becomes artificial being non artificial in the first place, and of residential concentration increases the intensiy of land take. As a consequence, extensive urbanization and planning codes which prevent the artificialization of vast contiguous areas should be effective in saving-up non-artificial land. A balanced accessibility of regional cities and towns and a comprehensive regional policy concerning protection of nature, natural resources, environment and endangered species and habitats should be important as well. Moreover, supporting a more balanced distribution of the regional household income and restrictive planning rules concerning new development in the CS are policies which help to counter and limit land take.

This paper analyzes the Sardinian land-taking process as related to factors which are identified as relevant variables concerning land take in several studies of the mainstream literature, through censored and OLS regression models. The methodology can be easily replicated and exported with reference to other Italian and European contexts and results could be straighfowardly comparable. Policy implications of the findings could be a point of reference for future Italian and European land-use and planning policies which entail a careful consideration of the negative impacts of artificialization of land, as the Communication of the EC to the European Parliament COM(2011) 571 of 20.9.2011 puts in evidence. Future research should also relate to the construction of a spatial data infrastructure to monitor and control land-taking processes, with a view to the objective of no net land take by 2050.

8 REFERENCES

CRCS (Centro di Ricerca sui Consumi di Suolo, Research Center for Land-taking Processes): Rapporto 2012. INU Edizioni: Rome, Italy, 2012.
DEWI S., van Noordwijk M., Ekadinata A., Pfund J.L.: Protected areas within multifunctional landscapes: Squeezing out intermediate land use intensities in the tropics? In: Land Use Policy, Vol. 30. Issue 1, pp. 38-56. Elsevier: Amsterdam, The Netherlands, 2013.
EUROPEAN COMMISSION: Report on best practices for limiting soil sealing and mitigating its effects. 2011. Available at http://ec.europa.eu/environment/soil/pdf/sealing/Soil %20sealing %20- %20Final %20Report.pdf [accessed December 12, 2012].
EUROPEAN COMMISSION, EUROSTAT: Land cover/use statistics (LUCAS). Available at http://epp.eurostat.ec.europa.eu/portal/page/portal/lucas/introduction [accessed December 12, 2012].

EUROPEAN ENVIRONMENT AGENCY: CORINE Land Cover. Available at: http://www.eea.europa.eu/publications/COR0-landcover [accessed December 12, 2012].

FORSTER D.L.: An overview of U.S. farm real estate markets. Working Paper of Agricultural, Environmental and Development Economics, Ohio State University: AEDE-WP-0042-06. 2006. Available at http://ageconsearch.umn.edu/bitstream/28319/1/wp060042.pdf [accessed December 12, 2012].

GEORGE H., JR.: How the book came to be written. In: George H.: Progress and Poverty, pp. vii-ix. Robert Schalkenbach Foundation: New York, NY, United States, 1971.

GUILING P., Brorsen B.W., Doye D.: Effect of urban proximity on agricultural land values. In: Land Economics, Vol. 85, Issue 2, pp. 252-264. University of Wisconsin Press: Madison, WI, United States, 2009.

HUANG H., Miller Y., Sherrick B.J., Gòmez M.I: Factors influencing Illinois farmland values. In: American Journal of Agricultural Economics, Vol. 88, Issue 2, pp. 458-470. Oxford University Press, Oxford Journals: Oxford, United Kingdom, 2006.

ISPRA: Annuario dei dati ambientali 2011 – Tematiche in primo piano [Yearbook of 2011 environmental data – Mainstream themes]. Available at http://www.isprambiente.gov.it/files/pubblicazioni/statoambiente/tematiche2011 [accessed December 12, 2012].

LAI S., Zoppi C.: Empirical evidence on agricultural land-use change in Sardinia, Italy, from GIS-based analysis and a Tobit model. In: Cartographica, Vol. 47, Issue 4, pp. 211-227. University of Toronto Press: Toronto, Canada, 2012.

LONGLEY P.A., Goodchild M.F., Maguire D.J., Rhind D.W.: Geographic information. Systems and science. John Wiley & Sons: Chichester, United Kingdom, 2001.

MACCALLUM S.H.: The enterprise of community. In: Journal of Libertarian Studies, Vol. 17, Issue 4, pp. 1-15. Holborn, Alabama, United States, 2003.

MORONI S.: La città del liberalismo attivo [The city of active liberalism]. Città Studi: Milan, Italy, 2007.

PALMQUIST R.B., Danielson L.E.: A hedonic study of the effects of erosion control and drainage on farmland values. In: American Journal of Agricultural Economics, Vol. 71, Issue 1, pp. 55-62. Oxford University Press, Oxford Journals: Oxford, United Kingdom, 1989.

SKLENICKA P., Molnarova K., Pixova K.C., Salek M.E.: Factors affecting farmlands in the Czech Republic. In: Land Use Policy, Vol. 30. Issue 1, pp. 130-136. Elsevier: Amsterdam, The Netherlands, 2013.

STEWART P.A., Libby L.W.: Determinants of farmland value: the case of DeKalb County, Illinois. In: Review of Agricultural Economics, Vol. 20. Issue 1, pp. 80-95. Oxford University Press, Oxford Journals: Oxford, United Kingdom, 1998.

ZOPPI S., Lai S.: Differentials in the regional operational program expenditure for public services and infrastructure in the coastal cities of Sardinia (Italy) analyzed in the ruling context of the Regional Landscape Plan. In: Land Use Policy, Vol. 30. Issue 1, pp. 286-304. Elsevier: Amsterdam, The Netherlands, 2013.

Regional Planning and Territorial Competitiveness: the Role of Identitary Heritage. The Case of the Sardinian Region

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1 ABSTRACT

The recent economic crisis has strongly affected the spending capacity of local governments which have had to adopt austerity policies and increase their territorial competitiveness. Regions and global-cities are then looking for "original" plans and programs, tailored on resources available in a given territory, respectful of its settled communities and their identity, and able to provide sustainability to the global competition.

In Europe many regions have identified in landscape planning based on historical, cultural and environmental heritage the way to a sustainable future. Despite this, in Italy the regional landscape project culture acts through the instrument of the obligation. Only recently it has been discussed the possibility to make the restrictions become a shared instrument for landscape project, as demonstrated during the first revision of the Landscape Plans drafted after the adoption of the Italian Code of Cultural Heritage and Landscape in 2004.

The paper aims to investigate the innovative methodologies introduced by the landscape planning in building set of rules referred to stratified, historical and cultural sites within planning instruments and according to territorial competitiveness principles. It is taken into account the case of the Sardinian Regional Landscape Plan (2006), now in redraft, in which they were introduced new problematic categories of cultural assets detected on the bases of their identitary value.

The objective is to defining a set of rules in order to clear up Identitary Heritage concept and its implementation in urban and regional planning in order to ensure an effective sustainable territorial competitiveness.

2 CULTURAL HERITAGE IN URBAN PLANNING: A RESOURCE FOR TERRITORIAL COMPETITIVENESS

2.1 Introduction

The recent economic crisis has drastically reduced the government spending budget persuading local administrations to narrow down the fields and objectives for intervention on the basis of territorial excellences which, due to their scarcity and irreproducibility, are considered as the only chance to conquer some niches of the "new new economy" and take part in the global competition (Crivello, 2010; Florida, 2003, 2005; Grandi, 2010). Consider, for example, the recent Anglo-Saxon policies relating to culture, creativity and urban regeneration (Landry, 2000; Evans, 2001).

The Italian cultural heritage, famously characterized by a wide geographical spread, a notable historical extension and a high symbolic and identity significance, could not escape this new approach and has therefore become a central topic in the search for alternative policies for sustainable local development (Amari, 2006; Carta, 2002, 2004; Ponzini, 2008; Sacco et al., 2006; Scandale, 2005). It investigates on the assets with a territorial nature and, above all, on the landscape assets that, with the Convention of Florence of 2000, have become the starting point for the development of new forms/rules of territorial government guided by the Right to Landscape and commonly contained under the definition of landscape planning (Cortesi et al., 2009; Gambino, 2009). In Europe emblematic is the introduction in the UK of maps of landscapes and landscape character assessments in the implementation of the European Landscape Convention (ELC).

In Italy, the ELC's implementation was carried out through the Code of Cultural Heritage and Landscape[1] (hereafter the Code) which updates the system of protection by providing, on the one hand, the transfer to

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[1] Legislative Decree No. n.42/2004

Regions of jurisdictions in heritage valorization and, on the other hand, the preparation by the same of Landscape Plans, higher-level planning tools than ordinary (Barbati, 2008; Sciullo, 2008; Cartei; 2008).[2]

Landscape Plans approved since 2004 show that Regions interpret the changes introduced by the Code above all in relation to their statutory position and their previous urban policies. This is particularly evident in the implementation of the article 143 of the Code which recognizes to Regions the opportunity to identify new categories of landscape assets in addition to those already provided by national laws and subject them to protection through the Regional Landscape Plan, by virtue of their identity value (Barbati, 2008; Cartei, 2008; Ponzini, 2008; Sciullo, 2008).

In order to identify innovative methods of reading and planning of landscape assets within the Italian landscape planning, we analyze the Landscape Plans of Tuscany and Puglia, two regions with ordinary statute considered a model to follow in the literature of the field, and then the Landscape Plans of Sicily and Sardinia, two regions with a special statute who, due to their autonomy, can defined with greater freedom their identity dimension.

2.2 The national legislative framework: the innovations introduced by the Code of Cultural Heritage and Landscape

The set of rules concerning the protection of cultural heritage, given the breadth and richness of Italian heritage, has ancient origins,[3] but to have specific laws on this matter Italy had to wait until 1939 with the approval of the laws No.1089 and No.1497, respectively dedicated to "things of historical and artistic interest" and "natural beauties".

With the Law n.431/1985, known as the Galasso Law, the protection of the landscape and natural beauties has passed from State to Regions that take on the task of drawing up enviromental territorial plans to institute and manage the restrictions on enviromental assets (Antonucci, 2009). These contents has been afterwards incorporated in the Consolidation Act on the Protection of Cultural Heritage and Environment, adopted in 1999[4] (hereafter the Consolidation Act).

The coming into force of the Code of Cultural Heritage and Landscape in 2004 has re-affirmed the central role of State and Regions in cultural heritage's protection and enhancement with the attempt to preserving both national identity and local communities' memory (Antonucci, 2009).

Cultural heritage is defined by Article 2 of the Code as a complex system consisting of cultural and landscape assets which are further divided into categories. The entry of an asset within the above categories may happen by operation of law or by an assessment of cultural interest,[5] ie an administrative act aimed at the recognition of values and significances of the asset and its consequent classification (Sandulli, 2012).[6]

Innovative is also the concept of protection, a State competence, which is connected in the Code to the asset's fruition allowing overcoming the existing gap between the conservation and valorization activities, these latter subject to concurrent legislation between State and Regions (Ferretti, 2010). In fact, even if it picks up on the Consolidation Act of 1999, the Code states that the fruiton and valorization of the asset represent the finalities of the conservation activity establishing a link between the two moments of the cultural chain[7] (Sandulli, 2012).

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[2] In order to put right the historical conflict between urban development and protection of cultural heritage born with the National Urban Planning Law of 1942

[3] It has its roots in the Law No.2359/1865 concerning the expropriation for public utility, in which encouraged the Italian State and its Local Governments in acquiring every monument and historic building whose preservation was at risk.

[4] Legislative Decree No. 490/1999

[5] Pursuant to LD. No. 42/2004 Art.10 paragraph 1 (except in case of negative verification of Article 12), Art. 10 paragraph 2, Art.11, Art. 91 and Art.142.

[6] Pursuant to LD. No. 42/2004 articles 10 paragraph 3, Art.13, Art.136, Art.143 and Art.156.

[7] Pursuant to LD. No. 42/2004 Art.1 paragraph 6; Art.2 paragraph 4; Art.6 paragraph 2.

In the light of the innovations introduced by the ELC of 2000 is attributed to the characteristic landscape of uniqueness and its protection must therefore be exercised as a whole rather than on single portions of the territory.[8]

The article 10 of the Code identifies the types of properties which are included into the category of cultural assets, distinguishing those of public belonging (paragraphs 1 and 2) from those of private belonging (paragraph 3). This distinction reflects perfectly the distinguished methods for their inscription in the cultural heritage and their protection. In fact, for public properties the title of 'cultural asset' is given ex lege, while for private assets this feature is acquired through the assessment of cultural interest (Cammelli, 2004).

The Article 134 of the Code defines the categories of landscape assets, distinguishing among: buildings and bound areas by an administrative act that declares their significant public interest, areas protected under the provisions of Law 431/1985, additional buildings and areas specifically identified and subject to protection through Regional Landscape Plans provided by Articles 143 and 156.

The drafting of Regional Landscape Plans must be made jointly between the Ministry of Cultural Heritage and Activities (italian: Ministero per i Beni e le Attività Culturali, MIBAC) and the Regions, limited to the aspects relating to the discipline of the landscape assets (Art.135 paragraph 1).

3 CULTURAL HERITAGE IN THE REGIONAL LANDSCAPE PLANNING

3.1 The landscape planning in the ordinary statute Regions

3.1.1 The Regional Territorial Landscape Plan of Apulia

The Region of Apulia had already had a Territorial Plan on Landscape (Italian: Piano Urbanistico Territoriale tematico per il Paesaggio, PUTT/P), which has come into force in 2000 in accordance with the Galasso Law. In 2004 the PUTT/P's conceptual and operational limits made disadvantageous its adaptation to the new rules introduced by the Code, therefore it was decided to draw a new Regional Territorial Landscape Plan (Italian: Piano Paesaggistico Territoriale Regionale, PPTR).

The first PPTR's Report highlighted many critical aspects of the previous instrument: shortage in cartographic representation of the legally bound protected assets, exclusion from the plan of the most important urbanized and rural areas; excessive fragmentation of the knowledge framework; set of rules difficult to understand and to apply; a major focus more on restrictions rather than on concessions.

The preparation of the new PPTR started in 2007 with the Decision No. 357 of the Regional Council. Subsequently, the Apulian legislation has been implemented with the Regional Law No. 20/2009 on the "Standards for landscape planning." The PPTR's first draft has been approved by the Regional Parliament in 2010,[9] however, it has not been adopted yet. So far, it is still in force on the PUTT/P.

In the PPTR it has been experienced the theoretical approach of the territorialist school which have its roots in Alberto Magnaghi's work on landscape, meant as a common good for a self-sustainable local development.[10]

To ensure the Landscape Plan's effectiveness in the government of the territory it is necessary that the same Landscape Plan could be able to interact with other plans and programs. For this reason the PPTR establishes, on the one hand, a robust institutional framework of clear and effective rules with statutory character and, on the other hand, a strong process of negotiation and participation with a bottom-up strategy (Magnaghi, 2011).

Assuming the centrality of territorial heritage, in its different components (environmental, infrastructure, urban, landscape and socio-cultural) in sight of a future socio-economic development based on the sustainable and durable valorization of its assets, PPTR passes from a restrictive conception of the plan to a vision of itself as an instrument of social mobilization aimed at developing strategies for the improvement of

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[8] Landscape is meant as "an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors" (European Landscape Convention, Florence, 2000, Article 1).
[9] Regional Council Resolution No. 01/2010
[10] Magnaghi is also the designer in charge of drafting the new PPTR.

environmental and landscape quality of living of the population.[11] The development of participatory methods to improve public awareness of landscape asset has proved to be a necessary condition for the support from local communities to the objectives of the plan (Magnaghi, 2011).

The construction of the knowledge framework, which precedes the drafting of any planning tool, in the PPTR assumes a complementary role to the collection of data and knowledge, traditionally aimed at legitimizing of the plan's regulatory apparatus and to its diffusion/communication. The description of local identities and the definition of a repertoire of good practices play a fundamental and strategic role, referred to as "statutory", for the territory's project. The representation of the identity elements of the different regional landscapes, through the so-called "territorial figures," and the definition of the relational rules existing among them, allow assessing the consistency or inconsistency of territorial interventions with respect to ongoing evolutionary trends in building landscapes (Lucchesi, 2011).

A fundamental document for Apulia's cultural heritage management is the Charter of Cultural Heritage which identifies and distinguishes: the ancient city; the modern city; cultural assets of uncertain identification; cultural assets of certain identification and areal nature; cultural assets of certain identification and punctual nature; topographic stratified contexts (Italian: Contesti Topografici Stratificati, CTS).[12] This classification has made possible to describe the innumerable types of cultural and landscape assets without having to use the traditional disciplinary distinctions (archaeological, architectural, artistic, etc..) and made possible to overcome the overlapping problems between cultural goods of different nature or historical period, thanks to 'introduction of the concept of multilayered site. The theme of the cultural landscape has been addressed with a holistic vision aimed at identifying and mapping "[...] every place where the story is sedimented, as a form of stratification, ie each site". The CTS's identification not only detects the concentration of cultural goods into a specific area, but it highlights the relationships that linked in time cultural and environmental heritage, determining their identity characteristics (Volpe, 2011).

In the plan it is possible to identify a structure defined as "identity and statutory" in which the assets are identified with their transformation rules, and another one defined as "strategic" that identifies transformative projects using the regional heritage as a development resource[13] (PPTR's Report, pp.18-19). With regard to the "statutory" structure, the plan's designers, having noted the crisis of building sector, suggest to overcome the difficulties related to the construction of shared rules aimed at the production of ordinary territory, and cultivate the idea to extend authoritative restrictions to a destructive ars aedificandi (PPTR's Report, pp.21-23).

The protections apply to hydro-geomorphological structure, environmental and ecosystemic structure, antropical and historic-cultural structure. In this latter they are delineated two cultural asset's categories, landscape assets and additional landscape contexts. Landscape assets are defined as areas subject to landscape costraint; areas on which there are civic uses and areas of archaeological interest.[14] Additional landscape contexts are identified on the basis of Article. 143 of the Code and consist of: historic city; evidence of stratification settlement (Italian: Testimonianze della Stratificazione Insediativa, TSI), monumental olive groves, agricultural areas of scenic interest.[15]

The TSI consists of "all the sites affected by the presence and/or stratification of historic-cultural assets of particular landscape value as expressions of the identity characteristics of the region." They comprise: the architectural heritage worthy of protection widespread in suburban area of particular traditional value and expression of the historical memory of the land, including buildings already protected under Article 10 of the Code; areas with polygonal boundary, which identify buried archaeological sites still readable (discovery of

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[11] Among the projects proposed by the landscape PPTR there are: the Regional Ecological Network and the Covenant town and country, the infrastructure system for soft mobility, enhancing and upgrading integrated landscapes; regional systems for cultural heritage fruition.

[12] See the elaborate No. 3.2.5 "La Carta dei Beni Culturali"

[13] Regarding this aspect see the regional systems for cultural heritage fruition in the elaborate No. 4.2.5. "I sistemi territoriali per la fruizione dei beni patrimoniali (CTS e aree tematiche di paesaggio)"and PPTR's Technical standards for implementation, Art. 34 paragraph 1 and 2.

[14] PPTR's Technical standards for implementation, Art.74 paragraph 2

[15] PPTR's Technical standards for implementation, Art. 76. The definition of historical city includes that part of urban centers that goes from the nucleus of the foundation up to the urbanizations compact made in the first half of the twentieth century.

artifacts on the surface, presence of traces identified by aerial photography or other innovative diagnostic tools), a buffer-zone of protection from the outer perimeter of property and areas of the depth of 100 meters or as otherwise defined by the municipal plans adapted to PUTT/P.[16]

Local authorities, in adapting their planning instruments to PPTR, should increase the level of knowledge of the regional Charter of Cultural Heritage, specifically analyzing the values expressed by areas and buildings surveyed; adjusting, where necessary, the perimeter of the cultural good or by defining the exact location for the objects with identification uncertain identifying antropic, historical and cultural components for which it could be considered the existence of significant public interest in accordance with Article 136 of the Code or of cultural interest pursuant to Section 13 of the Code and activating the provided proceedings; redefining the width of the buffer-zone around the evidences of stratificate settlement, ensuring the protection and enhancement of the landscape in which these assets and areas are included, depending on the nature and significance of the relationship with their surroundings in enviromental terms, both of contiguity and integration of forms of use and visual enjoyment..[17]

The change from an individual-use of the assets to a more complex one, consisting of cultural-turistic territorial systems, shows the PPTR's proactivity as revealed by the choice of going beyond the definition of adequate safeguard rules throught the prevision of new valorization forms, as projects for site's knowledge and its integrated fruition. PPTR's territorial projects are focused on the study of regional local landscapes' features for the proposition of measures able to enhance enviromental quality, territorial fruition services, accessibility and the internal connections (Volpe, 2011).

3.1.2   Regional Landscape Plan of Tuscany Region

The landscape planning of Tuscany finds its foundations in the Regional Law No.4/1990 by which the Region put an end to the distinction between landscape and urban planning by adopting a unique territorial planning instrument where the essential resources of the territory, including the landscape, shall form the "structural invariants" to future changes. The principle of territorial unity of this law found its effective application through the Regional Law No.5/1995 which has provided for responsibilities allocation in the field of urban planning thanks throught the following instruments (Gregorini, 2007):

Regional Territorial Address Plan (Italian: Piano di Indirizzo Territoriale regionale, PIT): it contains rules regarding urban-territorial and identifies landscape values under L.431/1985, Art. 6,   paragraph d;

Provincial Territorial Coordination Plan (italian: Piano Territoriale di Coordinamento Provinciale, PTCP): it has the value of territorial urban plan with specific consideration of landscape values, according to Law 431/1985 art. 16, paragraph d;

Municipal Structure Plan (Italian: Piano Strutturale comunale, PS): it defines the strategic directions for the government of the municipality and contains the municipal environmental-landscape discipline, pursuant to L. 431/1985, Art.1-bis.

The Regional Law No. 1/2005, concerning urban planning, kept the structure of the previous two but its "Regulations on the Government of the Territory" (Italian: Norme sul governo del Territorio) contained several novelties about natural and cultural heritage related to the Code of Cultural Heritage and Landscape and its subsequent amendments.[18] However they contained also an internal contradiction: under Title IV Chapter I, infact, the articles 30 and 33 stated that the PIT's Statute had the value of Regional Landscape Plan and any instrument of planning and/or territorial government of the had to be adapted to it, while articles 32 and 34 gave to Municipalities the power to plan and protect their landscape in an autonomous manner, in compliance with the guidelines and requirements of the PIT, in derogation from the Regional Landscape Plan pursuant to Art. 143 paragraph 5 of the Code (Morelli et al., 2010). This contradiction was resolved by the judgment No.186/2006 of the Constitutional Court which affirmed the unlawfulness of Art. 32 paragraph 3 and Article. 34 paragraph 3 of PIT's Statute.

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[16] In the buffer-zone of 100 meters around areas of archaeological interest (as landscape assets) and evidence of stratification settlement (as additional landscape contexts), it is deleted any change in visual integrity and pursued the redevelopment of the context. It is eliminated each land use incompatible against PPTR's objectives of safeguard. See PPTR's Technical standards for implementation, Art. 77 paragraph 2.

[17] PPTR's Technical standards for implementation, Art.78 "Direttive per le componenti culturali e insediative".

[18] L.D. 24 March 2006 No. 156 and 157; L.D. 26 March 2008 No. 62 and 63

Due to this, the L.R. 1/2005 was modified giving to the Region the skills on the definition of the landscape assets and of their discipline pursuant to Art. 143 of the Code (Regional Law of Maintenance of 2008) and PIT was integrated into its lanscape contents (Cinquini, 2008):

Plan Document: Section 6.5. – The "landscape" as forming the Tuscan territory and its government;

Technical standards for implementation (Italian: Disciplina di Piano): technical standards for landscape assets;

Charts of landscapes identification and quality objectives (relative to the territory of each Province): Recognition of the structural features; Recognition of natural, historical, cultural and aesthetic-perceptive values; Recognition of local dynamics, quality objectives and priority actions; Recognition of lanscape assets subject to protection under Article 136 of The Code and ist subsequent amendments.

Cartography bearing the identification, definition and scaled representation of properties and areas declared of significant public interestin accordance with Art.143, paragraph 1, letter b) of the Code

Cartography bearing the identification, definition and scaled representation of properties and areas declared of significant public interestin accordance with Art.143, paragraph 1, letter c) of the Code

Documents containing technical standards for landscape assets have been drawn through a conjunction of institutional collaborative agreements consist of: Memorandum of Understanding between the Region of Tuscany and the MIBAC's General Directorate for Architectural Assets and Landscape;[19] Memorandum of Understanding del novembre 2008 tra MIBAC's General Directorate for the Quality and Protection of Landscape, Contemporary Art and Architecture, Tuscany Regional Directorate for Cultural Heritage and Landscape, MIBAC's Provincial Superintendences, Tuscany Region, ANCI, UNICEM and UPI Toscana[20] (Regione Toscana, 2009).

To sum up, the PIT's last version, adopted June 16, 2009, separates the Tuscan landscape discipline, which is general and applied to the territory as a whole, from the discipline of landscape assets, which is specific and site-oriented according to the the Code and the ministerial concept of 'scenic beauty' identified and protected by law or by Ministery Decree after a positive assessment of cultural interest (Regione Toscana, 2009). The PIT provides therefore a participative assessment of cultural interest for the identification of the landscape assets, as required by art. 143 of the Code, which involves municipalities, local Superintendents, the Region and interested Ministries and concludes with the issuance of a restriction decree by MIBAC (Cinquini, 2008; Poli, 2012).

This procedure was adopted during the PIT rewriting, between 2007 and 2009, and it is now applied in the process of adapting provincial and municipal tools to regional landscape planning. To this end, the Region has instituted provincial committees with the task of identifying new landscape assets and it has set up the Landscape Observatory with tasks of monitoring and coordination (Regional Law No.1/2005 Art.33 paragraph 6). In addition, benefits are provided for the Municipalities who have actively participated to the rewriting phase between 2007 and 2009. For example, in the event that the municipal urban plan has proved to be adeguate to the PIT, Tuscany Region forwards directly the "advice of conformity" to the Regional Directorate of MIBAC while, if the municipal urban needs of additional measures and integration, the Region starts a variation to the plan.

From the examination of the Tuscan landscape planning emerges a strong sense of identity linked to the territory in its unity that can be preserved, maintained and restored only through the knowledge of its structural components (invariants), its dynamics as well as the natural, historical, cultural, aesthetic-perceptive values of local landscapes (Marson, 2012; Poli, 2012). However, this holistic approach has collided with the MIBAC's need of clearly defining the object of protection, whether an individual asset or a complex one, so as to adopt a restriction decree. Within the PIT there are thus general rules for landscapes protected at regional level for their identity value and, at same time, lists of landscape assets bound by Ministerial Decree by operation of law or pursuant to a participative assessment of cultural interest.

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[19] Signed 23 January 2007 and subsequently amended by an act of integration of the July 24, 2007
[20] November 2008

Synthetically, the landscape assets of regional unitary interest,[21] originally removed with the repeal of Articles. 32 and 34 of PIT's Statute and Art. 32, 33 and 34 of PIT's Technical standards for implementation, are now inserted in the lists of ordinary landscape assets,[22] for which it is expected the presence of a restriction decree and the compliance with the conditions of use contained in the priority actions set out in the Cards of landscapes identification and quality objectives attached to PIT: << These quality objectives and priority actions represent, with reference to landscape assets, the shared use conditions for municipalities planning tools and acts of government land under article 143 of the Code >> (Art.1 of PIT's Technical standards for landscape assets).

3.2 The landscape planning in the regions with a special statute: the island context

3.2.1 The Regional Landscape Territorial Plan of Sicily

Landscape planning in Sicily finds its basis in the Landscape Territorial Plans (italian: Piani Territoriali Paesistici) prepared in accordance with the Guidelines for the Regional Landscape Territorial Plan (Italian: Piano Territoriale Paesistico Regionale, PTPR) dated 1999, which have, as normative reference, the Galasso Law and the ex Consolidated Law on cultural and environmental heritage (Legislative Decree No. 490/1999). Due to the the Code's introduction, it has been started a process of revision and adaptation of these instruments that, because of the autonomy statutory, has led to a reorganization of the Sicilian landscape planning on different levels (Costantino, 2009; Costantino et al., 2009):

Regional Planning: consists of the PTPR's Guidelines which define strategies and general objectives for the Sicilian landscape, identify landscape units (Italian: ambiti di paesaggio) with their systems, subsystems and components, provide guidelines and requirements for each of those components.

Sub-regional planning: consists of the Provincial Landscape Plans (Italian: Piani Paesaggistici Provinciali, PPP), prepared by MIBAC's Provincial Superintendences for the landscape units which fall within the province of their competence, and Landscape Unit Plans (Italian: Piani d'Ambito) relating to the island (Ustica and Pantelleria) and the archipelagoes (Pelagie and Egadi), which are considered freestanding landscape units fo their peculiarities.

This architecture is the result of a long path began in 2004, thanks to funds of the Regional Operational Programme 2000/2006, and not yet completed in which it is possible to recognize some topical moments.

The first is the preparation of the Provincial Landscape Plans for Trapani Province during 2007 (hereafter the Trapani's PPP). The plan included the contents of PTPR's Guidelines for the Lanscape Unit No.1 "Rilievi del trapanese" (systems, subsystems, components, guidelines, prescriptions) and, through a process of understanding and interpretation, it pointed out their systemic interactions in order to define "Local Landscapes", ie the territories relatively cohesive, open and interacting identified according to the main components and relationships that characterize them and determine their identity[23](Costantino,2009; Costantino et al., 2009). For each "Component" and "Local Landscapes" the Trapani's PPP defined objectives, priority actions and rules of use that reflected objectives, guidelines and prescriptions from PPTR's guidelines. The rules of use re-broke up Local Landscape in systems, subsystems and components defining for each one the terms of use/restriction. Considering landscape assets, these rules were prescriptive if they fell on properties protected under the law[24] (they can limit interventions without permission[25] and instruments of territorial government have to respect them) viceversa they assumed a proactive and adressing value.

The structure of Trapani's PPP became soon the model for subsequent sub-regional plans, but it was already clear that the weakness of collaboration between the Regional Office of the Plan and MiBAC's Provincial Superintendents produced tools very different for content and method. For this reason, in February 2008 the the Regional Office of the Plan submitted to Superintendents a Scheme of Regulatory Apparatus (italian:

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[21] Covered by Art. 143 paragraph 1 letter c) of the Code

[22] Covered by Art. 136, 142, 143 paragraph 1 letter b) and d) of the Code

[23] Considering the handbook Landscape Character Assessment (LCA). Guidance for England and Scotland edited by the Countryside Agency and Scottish Natural Heritage in 2002, the Sicilian "Local landscape" includes both Landscape Character Types (LCT) and Landscape Character Areas (LCA).

[24] It comes to assets safeguarded by Art.134 paragraph 1 letter a) and b), 136 and 142 of the Code,

[25] See Art. 149 of the Code

Schema Apparato Normativo) for the drafting of PPPs technical standards for implementation, that represent also the second topical moment of the process.

The Scheme extended to whole Region the three protection levels[26] provided by the Landscape Provincial Plan of Caltanissetta (hereafter: Caltanisetta's PPP) for the Landscape Units No. 6-7-10-11-15 and aimed at landscape heritage in Art. 134 of the Code (Provincia di Caltanisetta, 2008):

Level of protection 1: affects areas with perceptive values essentially due to the recognized value of the geomorphological configuration; perceptive emergencies (structuring components); panoramic visual and intervisibility basins (or visual afference). In these areas, the protection is accomplished through the authorization procedures laid down in Art.146 of the Code.

Level of protection 2: affects areas characterized by the presence of one or more qualifying components with their contexts and landscape sceneries. In these areas, in addition to the procedures referred to in the previous level,it is required impacts mitigation of visual detractors

Level of protection 3: covers the areas that owe their recognisability to the presence of various qualifying components with their relevant contexts and landscape sceneries, or in which the presence of a significant element of exceptional importance, at least at regional level, requires specific requirements of protection.

Five years after the process is not yet complete and the frame of sub-regional landscape planning is partial and fragmentary: many plans are still under review or drafting, some have been adopted and wait for final approval, only one has been approved and it is in force. Perform an examination of the Sicilian landscape planning as a whole is therefore difficult, especially when it comes to assessing the effects produced by the new levels of protection on landscape heritage and, in particular, on the assets identified at regional level under Art.134 paragraph 1 letter c) of the Code and bound by ministerial decree, following the agreements between Provincial Superintendent, MIBAC and Region.

Nevertheless it is possible to make some general observations about Sicilian Region activity. The element that emerges most strongly is the complexity of landscape planning due to the fragmentation of the Landscape Unit on the basis of the provinces in which it falls. This is mainly due to the absence of an organic discipline regarding the protection of landscape and cultural heritage, matters on which the Autonomous Region has exclusive legislative competence under article 14 of its Statute. Not being present a regional law, the Code of Cultural Heritage and Landscape has replaced the Region in landscape planning determining its content, criteria and procedures as usually happen in the ordinary statute regions. From this point of view, Sicily, therefore, has not properly taken advantage of the opportunities provided by its autonomy, deferring the merge between landscape and territorial government, a process undertaken instead with great courage and determination by other regions with ordinary statute, such as Tuscany.

In addition, in the rules of use for "Components" and "Local Landscapes", the application of levels of protection exclusively to landscape assets protected by operation of law (Art. 134 paragraph 1 letter a and b of the Code), seems to have forgotten the innovations introduced by the European Landscape Convention and The Code, returning to L.1497/1939 even though contemporary landscape heritage includes new assets categories (under Article.134 paragraph 1 letter c of the Code) (Costantino,2009; Costantino et al., 2009). In this regard it should be noted that a definition of identity in relation to the content of the regional landscape planning could find consistency and completeness only when all sub-plans will be adopted and Municipalities will have adapted their planning tools to them. Sicilian identity is now defined in a rather generic and theoretical way only by the PTPR's Guidelines of 1999.

4 CULTURAL ASSETS IN THE REGIONAL LANDSCAPE PLAN OF SARDINIA

Landscape planning in Sardinia finds its basis in the Galasso Law, which lead to the Regional Law No.45/1989 on Urban Planning and fourteen Landscape Territorial Plans (italian: Piani Territoriali Paesistici, PTP).[27]

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[26] See Art. 20 in Technical standards for implementation of Caltanissetta's PPP

[27] Previously there was only the Landscape Territorial Plan of Molentargius-Monte Urpinu, approved on the basis of L.1497/1939

The initiative to develop a regional landscape plan was taken with the Regional Law No. 8/2004[28], after the annulment of all PTPs approved under Galasso Law, except for PTP No. 7 of "Sinis", by the Regional Administrative Court between 2001 and 2003 (Falqui, 2011).

The Regional Landscape Plan of Sardinia (Italian: Piano Paesaggistico Regionale, PPR), was approved in September 2006 as the first Landscape Plan complies with the Code's amendments adopted during the same year.[29] The PPR identifies twenty-seven landscape units located along the coastline, the protection of which is considered a priority by the plan with respect to the interior of the island. They are analyzed in their identity and peculiarities based on three levels of reading: environmental framework, historical and cultural framework, settlement structure.

The discipline of protection contained in PPR's Technical standards for implementation was aimed primarily at five categories of properties: landscape units, individual landscape assets, complex landscape assets, landscape components and identity assets. These latter were defined by PPR under Art. 134 paragraph 1 letter c) of the Code and included those types of properties, areas and/or intangible assets that allow the recognition of the sense of ownership of local communities to the specificity of Sardinian culture.[30]

Identity assets were usually defined in their perimeters by PPR cartography or, later, by Municipalities in the adaptation of communal planning tools to PPR. In both cases, the implementation of PPR's provisions took place primarily through an agreement between the regional and local authorities on the basis of which were defined land transformations compatible with PPR's landscape quality objectives. Until the adoption of a municipal planning tool adequate to PPR (transitional period), PPR's Technical standards for implementation established a buffer zone of integral protection of 100 metres around each landscape asset identified in PPR's cartography.

The depth reconnaissance of Sardinia's historical and landscape heritage was made during the preparation of the PPR through an analysis of multi-archive sources (wealth of knowledge of provincial planning tools, archives of MIBAC's Provincial Superintendents, State Archives, specialized archives, historical cartographies, etc.) (PPR Report, p.110). However, this research was not followed by inspections aimed at the verification of the real consistency and preservation of the asset during the preparation of PPR's cartography and, afterward, during the Region-Municipality co-planning phase, reaching sometimes to impose the buffer zone on areas without any element of historical or landscape value.

To overcome such problems has been enacted the Regional Law n.13/2008 on landscape assets and the delimitation of their protective perimeters, with regard to those included in historical centers. Considering the assets of regional interest,[31] the so-called identity assets, the law specifies the need for them to be promptly recognized and demarcated in municapal and regional cartography in such a way as to be easily identified, even in the transitional period. The agreement between the City and Region is expected to define the boundaries of the historic center in case where the existing perimeter does not coincide with the one developed by PPR. The agreement is also applied to define protective perimeters of landscape assets protected by operation of law and identity assets protected after a positive assessement of cultural interest. The buffer zone of 100 meters for the landscape and identity assets does not apply if the same fall within the perimeter of the historical center (Art.2 of Regional Law No.13/2008). Despite the novelties, the law has been strongly criticized because, during the transitional period, it excludes from protection different categories of identity assets, not already identified/mapped at regional and comunal level, such as the typical Sardinian rural settlements.

In conclusion, it can be said that PPR's guidelines and prescriptions, should be punctually adapted within the municipal planning instruments in order to build appropriate valorization proposals. So adapting the municipal planning tools to PPR represents today the most delicate moment of Sardinian landscape planning because there takes place the negotiation of protection principles expressed by PPR, determining its real effectiveness (Bitti, 2008).

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[28] The so-called "Save Coasts" Law
[29] L.D. 24 March 2006 No. 156 and 157
[30] See Art. 6 paragraph 5 of PPR's Technical standards for implementation.
[31] Identified by PPR and bound by ministerial decree after an assessement of cultural interest with a positive result, as determined by Art.134 paragraph 1 letter c) of the Code

5 CONCLUSION

The landscape and cultural heritage assume a central role in the definition of policies for sustainable development based on the protection and enhancement of local identity. The Landscape Plan, in the light of the directives of the Legislative Decree n. 42/2004, becomes the main instrument for the protection of the regional heritage and its enhancement in a perspective of sustainable local development. However, the comparison between the regional plans of Apulia, Tuscany, Sicily and Sardinia, shows a widespread and shared difficulty in the identification of local landscapes and identitarian heritage that does not depend on their statute or on the previous planning advancement. This fact emerges especially considering the cataloging phase, which is often postponed and carried out during the adaptation of the provincial and municipal tools to Regional Landscape Plan.[32] A further confirmation is provided by the delay registered in Apulia, Sicily and Sardinia in the enforcement of the safeguard rules provided by their Regional Landscape Plans, which has involved the creation of a constrained buffer zone around each landscape asset, independently from its real substance or existance. So, Plans often become ineffective in respect to heritage valorization and building activity's regulation leading to a premature revision of the instruments themselves.

Referring to the definition of regional landscape assets as provided by the article 143 paragraph 1 letter c) of the Legislative Decree n.42/2004, it can be said the concept varies from region to region: in Tuscany the landscape assets are called "assets of regional unitary interest", in Apulia "further landscape contexts", in Sicily "Local Landscapes and their Components", in Sardinia "identity assets". The only element that joins these regions is the choice to apply to the regional assets the procedure laid down by the articles 136 and 142 of the Legislative Decree n.42/2004 for properties with landscape value of significant public interest and for protected areas with environmental value. Despite the identification of specific elements of the territorial reality is considered to be the main strength of landscape planning, due to the fact that, as submitted by the European Commission in 2005, each region has a specific territorial capital, the difficulties encountered in the development of standards and guidelines for each regional asset, has led Regions, Provinces and Municipalities to activate the traditional verification of interest through memoranda of understanding between local authorities and MIBAC that, if successful, have taken the form of a ministerial decree of restriction under LD. 42/2004.[33]

Apulia is the only positive example with the introduction of an innovative protection system that classifies the landscape heritage according to the real possibility of a punctual identification of the property and its buffer zone, going beyond the traditional distinction by type of asset (archaeological, architectural, etc.) and reinterpreting in an innovative way the relationship between the individual goods through a system of "multilayered topographical contexts" to be protected and enhanced. In Sardinian Regional Landscape Plan, it can be read an attempt to organize the "identity assets" in interconnected networks for integrated use but, operationally, this translates into a map of the cultural heritage with a restrictive approach, far from the Puglia's model from which it had been originally inspired.

The application to the regional landscape assets of the verification of interest and the ministerial restriction decree, as in case of property protected by operation of law (articles 136 and 142 of the LD n.42/2004), it seems almost a waiver by the Italian regions in defining their own identity in relation to cultural territorial heritage though the issue has also been addressed in the rules of governance of the territory of each regional landscape plan through the definition of binding guidelines for the areas of protected landscape (despite the garbled bureaucratic difficulties the regions had to face). It should be also acknowledged that, if the planning has reached a certain maturity and has established itself at the local level, it has been possible to legitimize the idea of regional identity through propositions of plan that take into account both the aspect of properties (landscape assets) that of the landscape (landscape character areas and types) as demonstrated by the "multi-layered topographical contexts" in Puglia.

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[32] As in the case of Tuscany Region where the allocation to municipalities of the task of cataloging the regional landscape and identity heritage, through the articles 32 and 33 of the PIT, led to the ruling of the Constitutional Court and the repeal of these two articles as unconstitutional.

[33] Significant is the case of Tuscany: deprived by the Constitutional Court of the possibility of delegating to municipalities the definition of technical standards for each landscape regional asset, the Region has decided to equate the "assets of regional unitary interest" to the other goods protected by the LD. 42/2004.

6 REFERENCES

AMARI M., (2006).Progettazione Culturale. Metodologia e strumenti di cultural planning, FrancoAngeli, Milano,pp.59-61

ANTONUCCI D., (2009). Codice commentato dei beni culturali e del paesaggio.Napoli: Gruppo editoriale Esselibri, pp.15-16, 38-39

BARBATI C., Le modifiche al Codice dei beni culturali e del paesaggio dopo i decreti legislativi 62 e 63 del 2008/Beni culturali. La valorizzazione: gli artt. 101, 104, 107, 112, 115, 119. In: Aedon – Rivista di arti e diritto on line, Vol.3/2008, Bologna: Il Mulino [online] http://www.aedon.mulino.it/archivio/2008/3/barbati.htm

BITTI S., Il Piano Paesaggistico della Sardegna: problematiche, sfide e opportunità. In: Urbanistica Informazioni,219/2008, pp.43-45

CAMMELLI M., a cura di (2004). Il codice dei beni culturali e del paesaggio: commento al Decreto legislativo 22 gennaio 2004, n.42 e successive modifiche. Bologna: Il Mulino, pp.109-111

CARTA M., (2002). L'armatura culturale del territorio: il patrimonio culturale come matrice d'identità e strumento di sviluppo, II ed., Milano: Franco Angeli

CARTA M., (2004). Strutture territoriali e strategie culturali per lo sviluppo locale, Economia della Cultura, Vol. 14, n. 1, pp. 39-56

CARTEI G. F., Codice dei beni culturali e del paesaggio e Convenzione europea: un raffronto

Aedon – Rivista di arti e diritto on line, n.3/2008, Bologna: Il Mulino [online] http://www.aedon.mulino.it/archivio/2008/3/barbati.htm

CINQUINI F., Tanti paesaggi una sola Toscana. In: Urbanistica Informazioni, Vol.224/2008, pp. 37-39 [online] http://www.urbanisticainformazioni.it/IMG/pdf/UI224.pdf

CORTESI G., Lazzeroni M., Cultural economy, patrimonio culturale e paesaggio: il vantaggio competitivo territoriale. In: Mautone M., Ronza M., a cura di (2009). Patrimonio culturale e paesaggio. Un approccio di filiera per la progettualità territoriale, CNR – Dip. Patrimonio Culturale, Roma: Gangemi Editore, pp.187-192

COSTANTINO D. (2009). La pianificazione paesaggistica siciliana dai vincoli ai livelli di tutela. In: Atti della XII Conferenza nazionale della Società Italiana degli urbanisti "Il progetto dell'urbanistica per il paesaggio", Bari 1-4 dicembre 2009, Bari: Adda Editore

COSTANTINO D., Fucarino A. (2009). Pianificazione paesaggistica in Sicilia: i Piani d'Ambito. In: Atti XIII Conferenza Nazionale ASITA, 1- 4 dicembre 2009, Bari, pp.795 -801[online] http://www.attiasita.it/Asita2009/Pdf/292.pdf

CRIVELLO S., (2010). La città competitiva e sostenibile: alcune riflessioni sul rapporto fra i due discorsi. In: Ed. Sezione Sociologia del Territorio, Atti II Conferenza Nazionale Annuale della Sezione "Sociologia del Territorio" dell'Associazione Italiana di Sociologi. Città-campagna: la sociologia di fronte alle trasformazioni del territorio, 25-26 febbraio 2010, Alessandria. Università del Piemonte Orientale [online] http://www.sociologiadelterritorio.it/ricerca.php

FALQUI P., (2011). La vicenda paesistica in Sardegna: dalla Legge Galasso all'annullamento dei PTP (1985-2003). In: Gazzetta Ambiente. Rivista sull'ambiente e il territorio. Anno XVII n.6/2011, pp.11-28

FERRETTI A., (2010). Il Codice dei beni culturali e del paesaggio: commento organico al D.lgs. 22 gennaio 2004 n.42. Napoli: Edizioni Giuridiche Simone, p.26

FLORIDA R., (2003). L'ascesa della nuova Classe Creativa, Milano: Mondadori. Ed. or.: Florida, R., 2002. The rise of the creative class: and how it's transforming work, leisure, community, and everyday life". New York: Basic Books

FLORIDA R., (2005). The flight of the creative class: the new global competition for talent. New York: HarperBusiness

EVANS G., (2001). Cultural Planning: An Urban Renaissance?, London: Routledge Press

GAMBINO R., Landscape planning: invarianti e criticità. In: Mautone M., Ronza M., a cura di, Patrimonio culturale e paesaggio. Un approccio di filiera per la progettualità territoriale, CNR – Dip. Patrimonio Culturale, Roma: Gangemi Editore, pp.177-182

GRANDI R., (2010). Le città creative. Bologna: Il Mulino, 6(10), pp. 1037-1044

GREGORINI M., (2007). Le politiche della Regione Toscana per la tutela dei beni paesaggistici e del paesaggio. In: Atti del Convegno Internazionale "Vestire il Paesaggio", 29 Giugno 2007, Santomato (Pistoia), Milano: Il verde editoriale, pp. 24-28

LANDRY C., (2000). The Creative City. A Toolkit for Urban Innovation. London: Earthscan

LUCCHESI F., Il quadro conoscitivo in forma di Atlante. In: Urbanistica, n.147/2011, pp.23-24

MAGNAGHI A., La via pugliese alla pianificazione del paesaggio. In: Urbanistica, n.147/2011, pp.7-9,12-15

MARSON A., (2012). Verso nuove forme del piano paesaggistico. In: Atti del Convegno "Aspettando un paesaggio per il Friuli Venezia Giulia", 27 aprile 2012, Udine [online] http://cms.legambientefvg.it/governo-del-territorio/276-aspettando-un-piano-per-il-paesaggio-del-fvg-i-materiali

MORELLI E., Ercolini M., Natali C., Paesaggi in filiera. Il percorso toscano. In: Ri-Vista ricerche per la progettazione del paesaggio, Vol. 13/2010, pp.77-86.

POLI D., a cura di (2012). Regole e progetti per il paesaggio. Verso il nuovo piano paesaggistico della Toscana, Firenze: Firenze University Press

PONZINI D., (2008). Il territorio dei beni culturali. Interpretazioni strategiche del processo di privatizzazione dei beni e delle attività culturali in Italia, Roma: Carocci, pp.20-33

PROVINCIA DI CALTANISETTA (2008). Piano territoriale paesistico della Provincia di Caltanisetta – Norme di attuazione [online] http://bca.regione.sicilia.it/ptpr/main/index.htm

REGIONE TOSCANA (2009). Piano di indirizzo territoriale della Regione Toscana – 1. Documento di piano, pp. 62-71 [online] http://www.paesaggiotoscana.it/

SACCO P., Ferilli G., Il distretto culturale evoluto nell'economia post-industriale. In: Working papers Università IUAV di Venezia, Venezia: Dipartimento delle Arti e del Disegno industriale, n.4/2006

SANDULLI M.A., a cura di (2012). Codice dei beni culturali e del paesaggio. Milano: Giuffrè, p.17

VOLPE G., La Carta dei beni culturali della Puglia: il sistema dei beni culturali e paesaggistici. In: Urbanistica, n.147/2011, pp.29-32 [online] http://paesaggio.regione.puglia.it/

SCANDALE L., Verso ideapolis. Cultura e creatività come fattori di competitività della Knowledge-based city. In: Archivio di Studi Urbani Regionali, 36(84), Milano: Franco Angeli, 2005, pp.107-122

SCIULLO G., 2008. Il paesaggio fra la Convenzione e il Codice. In: Aedon – Rivista di arti e diritto on line, n. 3/2008, Bologna: Il Mulino [online] http://www.aedon.mulino.it/archivio/2008/3/barbati.htm

Research on China's Urban Network Based on the Relations between Micro-Blog Users: a Case Study of Sina Micro-Blog

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1 ABSTRACT

The change of urban regional spatial structure influenced by information technology has become a hotspot of foreign and domestic scholars' research. This study tries to analyze China's city network characteristics from the social network space perspective, by using Sina Microblog as an example. The result showss that China's city network based on the Micro-blog social space has a clear hierarchical structure and level distinction. Firstly, the result shows the existence of regional characteristics, performance as a visible regional development pattern which contains "Three Main-regions and Four Sub-regions" according to the analysis of the level distinction in the city network and the connection rate between cities. Specifically speaking, the three main regions contains the Beijing- Tianjing- Hebei region represented by Beijing, Pearl River Delta region presented by Guangzhou and Shenzhen, the Yangtze River Delta region represented by Shanghai, Hangzhou and Nanjing. The four sub-region contains Chengdu- Chongqing region, Hercynian region represented by Fuzhou and Xiamen, Wuhan region presented by Wuhan and Changsha, Northeast region represented by Shenyang, Harbin and Changchun. Secondly, the result shows a significant difference of the network links among the Eastern, Central, Western China. Links within the Eastern region and the links between Eastern region and Central region, Western region constitute almost all of the current network system. The result also finds that the high-level cities has an absolute dominance in the city network pattern, Beijing is the contact center in China's city network, with an overwhelming advantage. Shanghai, Guangzhou and Shenzhen is the sub contact center in China's city network.

2 INTRODUCTION

Spatial relationship between cities has always been a key research topic of urban and economic geography. Since 1990s, information technology, represented by the Internet, has developed rapidly and globally, which not only changed the human social system and economic structure, but also reconstructed the structure of the global physical and virtual space (Graham S, Marvin S., 1996). Considering globally, nationally or regionally, the development of cities has crossed their own boundaries. Cities and their facilities are closely linked to each other through a variety of high-speed network to form a diversified global or regional urban network (Zhen Feng, Liu Xiaoxia, 2007). With the growing impact of information technology, many scholars began to take information factors into consideration in the study of urban network, and network paradigms based on the complex links between cities also emerged (Batty M., 1991). From then on, urban network under the influence of globalization and informatization has become the main research field of urban and regional spatial relations. The Space of Flow proposed by Castells emphasizes the value of urban nodes in shaping the entire network system (Castells M., 1996), which provides an important theoretical frame for the urban network research at home and abroad. For the shaping of information flow on the relationship between cities, western scholars have studied parcel mail, Internet traffic, network bandwidth and other information flow (Mitchelson R., Wheeler J O., 1994; Townsend A M., 2001; Malecki E J.,2002), as well as the influence of traffic flows like flights and cargo volume, port throughput, highway and railway traffic flow on urban network system (Goetz A R.,1992; Ho Shin K , Timberlake A, 2000; Mat sumoto H, 2004). Later, western geographers represented by Zook, Townsend and Moss, based on the data of Internet domain names and network capacity, Internet names and IP addresses, conducted lots of meaningful studies on network information space from the global, national or regional, and inner city levels (Zook M A., 1998, 2000, 2001; Castells M., 1999; Townsend A M., 2001; Moss M L, 1997, 1999, 2000).

In recent years, Shoko et al (2011) collected more than ten million Twitter data with geographical tags through the geographical collection system of Twitter, constructed the Japanese social geographical boundaries, and simulated the urban characteristics based on social urban crowds according to the Vironoi

diagram and the geographical laws of human activities in daily life. Croitoru et al (2012) conducted a systematic study of the urban or regional characteristics by constructing the social geographic analysis platform (G-SAW). This shows that, current studies on urban characteristics reflect the activities and local characteristics of the entire city and made quantitative representations on the relatively qualitative geographical features mainly through the research on the network activities of a large number of residents. Gautier et al (2009) adopted the communications information of 25 million users provided by the Belgian mobile phone operator, established urban social network based on the corresponding zip codes of the mobile phone billing addresses of the users, and studied the communication activity between cities and found the urban structure in the communication network. Seeing from the existing research results, the way of employing users' communication information to carry out studies on urban structure is in its infancy and has a relatively single method. Although its data acquisition is difficult, the research results are found to be accurate and thus should be paid more attention to. At the same time, as the flow data are often difficult to obtain, many western scholars attempt to analyze the network links between cities through urban function contacts. The impact of globalization makes the global city become a production base of advanced producer services (Sassen S., 2001). Based on it, some scholars judged the function contacts and changes between cities, and the distribution of corporate headquarters, large banks and other global producer services have been used to analyze the structure of these world cities (Friedmann J., 1986; Taylor P J., 2004).

Since 2000, Chinese scholars also have become concerned about the urban network system and achieved lots of results. Similar to the western research ideas, Chinese scholars mainly interpreted the development pattern of urban network on the national level and its changes based on the infrastructure networks of air transport and railway (Jin Fengjun, Wang Chengjin, 2005; Xue Junfei, 2008; Wu Wei, et al., 2009). In recent years, the network paradigms of western world cities were comprehensively introduced to China (Yang Yongchun, et al., 2011). Some scholars studied the national or regional urban network system from the perspective of enterprises (especially producer services) (Zhang Xiaoming, 2006; Jin Zhongfan, 2010; Yin Jun, Zhen Feng, et al., 2011; Ning Yuemin, Wu Qianbo, 2011), while others also studied from the relationship between Internet facilities (Wang Mingfeng, Ning Yuemin, 2006; Sun Zhongwei, et al., 2010), both of which explained the changes in Chinese urban network system under the influence of globalization and informatization.

The network constructs a new human social form, while the spread of network logic substantially changes the operation and results in production, experience, power and culture. In addition to the emphasis on the roles of information infrastructure and information nodes, in the theory of Space of Flow constructed by Castells, there is another important content, that is, "spatial organizations of the work, games, and sports of the world's elite. However, in the research literature of world and national urban network, the power of social network space is seemingly ignored, while it is playing an increasingly large spatial influence. Currently, the research on China's urban network from the perspective of interpersonal networks is rare. The emergence of social network sites like micro-blog not only enriches and expands the social relation network, but also provides a new perspective for the interpretation and analysis of urban network structure. Micro-blog, a system similar to blog, can release real-time news. Its text content is limited to 140 words and can achieve real-time sharing. By the end of June, 2011, the total number of netizens in China has amounted to 485 million and Internet penetration rate has reached 36.2 %. The number of micro-blog users has increased to 195 millions, while the netizen utilization rate has been expanded to 40.2 % from 13.8 %, becoming the fastest-growing Internet application.[1] From the world's first micro-blog of Twitter to the Sina Micro-blog and Tencent Micro-blog in China, micro-blog has gradually become an influential social media platform. The return of voice to the public rebuilds the social space. More importantly, compared to the point-to-point contact characteristics of the previous network communities like BBS and QQ, micro-blog itself is a completely open and civilian interactive network platform. It gets a lot of people involved and has strong social mobilization ability, making it ideal for the utilization of fragmentized time and space under the influence of information technology (Liu Yang, 2010; Zhan Zihua, 2011). As a result, this paper tries to study China's urban network architecture and its spatial characteristics with the help of this emerging network media and interactive platform of micro-blog.

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[1] China National Network Information Center (CNNIC), "The 28th Statistic Report of China Internet Network Development Status", 2011

3 RESEARCH METHODS

According to the survey data of "White Paper of Sina Micro-blog in 2010", Sina Micro-blog is a mainstream micro-blog with the highest market visibility and highest user utilization rate.[2] Therefore, this paper selects Sina Micro-blog as the research object, analyzes the social relation network from the perspective of the relationship between network users, and then interprets the changes in China's urban network system.

3.1 Research ideas

Sina Micro-blog has a wide range of national influence and adequate user distribution, so we can use the relationship between micro-blog users to effectively support and reflect the linkages between cities. In Sina Micro-blog, the relationships between users include three types, namely, follower, following and friend. As we can see in Figure 1, follower and following reflect the unidirectional information transfer between users. A follows B, meaning that A is willing to accept B's updated real-time information and make comments as well as exchange ideas. Under this circumstance, for A, his relationship with B is the "following"; for B, his relationship with A is the "follower". Compared to the relationships of followers or followings, the users with the relationship of "friend" can accept the updated real-time information from each other and make comments as well as exchange ideas. It is better to achieve the bidirectional transfer of information. From the geographical perspective, the cities can be understood as the nodes in the network communities, and the friend relation between cities can be interpreted as the information flow between nodes in the network communities. These understandings will facilitate the analysis of the state in which strong and weak relationships exist, so as to construct a city's network system based on network community. As a result, if more friend relation between the micro-blog users in City(A) and the micro-blog users in City(B) exists, then more closely related information contact can be found in the network systems of City(A) and City(B); if more friend relation between the micro-blog users in City(A) and the micro-blog users in other cities exists, then City(A) enjoys a higher degree of importance in the whole network system as well as a higher hierarchy.

According to the current status of China's urban network system, this paper first selects the cities which are economically powerful and highly informatized and likely to become the backbone notes in micro-blog space as the representative cities based on certain screening criteria, then uses Sina Micro-blog site to make a statistics of the micro-blog users of each representative city. Then, we collect the data of friend relation between the selected micro-blog users and other geospatial data, and construct a matrix of the network community friend relation between the representative cities referring to the research method of world city networks proposed by P. Taylor. Finally, with the help of Arcgis analysis software, we reflect the network community friend relation in the geographic space, and analyze China's urban network system
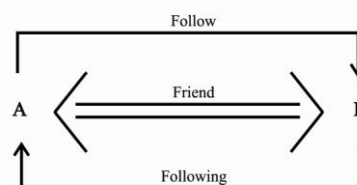
Fig. 1: The relationship between users based on user A

3.2 Data collection

This paper selects several representative cities in Mainland China as the research units, and reflects the friend relation between Sina Micro-blog users of each research unit in the geographic space.

(1) The selection of urban network notes in social network space

According to the indicator of "Number of the Internet Users" in the China City Statistical Yearbook of 2011, we select the top 100 cities. Combined with the existing study of China's urban hierarchical scale (Gu Chaolin, 1990; Gu Chaolin, Hu Xiuhong, 1998), we finally select 51 note cities and build a urban network framework in social network space (Table 1).

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[2] Sina Micro-blog neice was made on August 14, 2009. It became the first portal website which provided micro-blog service. Currently, greater than 3 million micro-blogs are released each day, and nearly 40 micro-blogs are released in a second.

City name	The rankings of the number of Internet users in China	The rankings of GDP in 2010 in China	City name	The rankings of the number of Internet users in China	The rankings of GDP in 2010 in China	City name	The rankings of the number of Internet users in China	The rankings of GDP in 2010 in China
Shanghai	1	1	Dalian	18	14	Xuzhou	48	35
Tianjin	2	6	Chengdu	19	13	Liuzhou	53	92
Beijing	3	2	Xi'an	22	29	Daqing	61	40
Kunming	4	51	Jinan	24	22	Hefei	64	41
Wenzhou	5	32	Shijiazhuang	25	26	Wulumuqi	66	88
Guangzhou	6	3	Handan	26	45	Lanzhou	69	107
Changchun	7	28	Ha'erbin	29	24	Guiyang	72	98
Shenzhen	8	4	Taiyuan	30	64	Jilin	74	66
Chongqing	9	7	Fuzhou	31	31	Huhehaote	85	62
Suzhou	10	5	Nanchang	33	50	Baoji	90	121
Hangzhou	11	8	Changsha	35	20	Haikou	92	206
Wuhan	12	12	Tangshan	38	18	Xiangfan	99	77
Qindao	13	10	Yantai	40	21	Changzhi	129	130
Ningbo	14	15	Nanning	42	65	Sanming	166	124
Nanjing	15	17	Xiamen	44	55	Xining	172	205
Zhengzhou	16	23	Lianyungang	45	101	Yinchuang	185	182
Shenyang	17	16	Guilin	46	103	Lasa	-	280

Table 1: The 51 selected node cities

(2) The selection of micro-blog users of each note city in urban network

With the selected 51 representative cities as the strongholds, we choose 20 users from each city as the research samples. These samples should meet the following three conditions: (1) The user lives in the selected city; (2) The user is the "grassroots", but not a "celebrity",[3] which helps to reflect the real social network relations and excludes those relations without actual communication but for influence expansion or celebrity worship; (3) The user is active, has 400 followers and followings respectively, and releases more than 6 micro-blogs every day. Finally, with the help of the application module of "Finding Someone" in Sina Micro-blog, we collected data on December 4, 2011, and obtained 1020 samples from the 51 representative cities for Sina Micro-blog research.

(3) The acquisition of friend relation of the micro-blog research sample

Due to the large amount of data, we collected the micro-blog IDs of the followers and follow users of the 1020 research samples through the establishment of a crawler program,[4] find out the micro-blog users with friend relations and recorded their geographic information data. Finally, by running the program, we got 243451 effective friend relation data (excluding the friend relations of overseas, Hong Kong, Macao and Taiwan regions and default data). There are 183597 friend relation data among the 51 research samples, accounting for 75.41 % of the total data, which also verifies the reasonability of the city selections in data collection.

3.3 Data calculation

The data calculation includes four steps. The first step: standardize the collected friend relations data of the 51 note cities, and construct a matrix of the number of friends of the 51 cities. The formula is as follows:

$$V'_{ij} = V_{ij} / \sum_j V_{ij}$$

(1)

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[3] In Sina Micro-blog, the users can be generally divided into "celebrities" and "grassroots". Compared to "celebrities", the words and deeds of the "grassroots" are usually the information communication with other users and play the role of maintaining the social relations between users, so they can reflect the links between cities more truly.

[4] A crawler program can enter the Sina Micro-blog web page of each user, and calculate the numbers of the user's followers, followings and friends automatically, making the data collection more convenient and feasible.

Where V_{ij} is the number of the friends of the collected City$_{(i)}$ in City$_{(j)}$; $\sum v_{ij}$ is the sum of the numbers of City$_{(i)}$ in each City$_{(j)}$ (51 note cities); V_{ij}' is the standardized number of the friends of City$_{(i)}$ in City$_{(j)}$.

The second step: on the basis of the above calculation, calculate the city's external connectivity index in the network system. The formula is as follows:

$$N_i = \sum_j V_{ij}' - V_{ii}'$$
(2)

Learning from the Central Place Theory proposed by W. Christaller, we use the external connectivity index to represent urban hierarchy. In the formula, N_i is a city's external connectivity index, reflecting the sum of the ratios of the friend relations of City$_{(i)}$ in other cities; V_{ij}' is the standardized number of the friends of City$_{(i)}$ in City$_{(j)}$; V_{ii}' is the standardized number of the friends of City$_{(i)}$ in the same city.

The third step: calculate the network connectivity between cities to reflect the closeness of contact information between cities in the network. The formula is as follows:

(3) $R_{ij} = V_{ij}' * V_{ji}'$

Assume that =100, we adopt the maximum standardization:

$$R_{ij}' = \frac{R_{ij}}{Max(R_{ij})} * 100$$
(4)

Where V_{ij}' is the standardized number of the friends of City$_{(i)}$ in City$_{(j)}$; V_{ji}' is the standardized number of the friends of City$_{(j)}$ in City$_{(i)}$; R_{ij} is the network connectivity between City$_{(i)}$ and City$_{(j)}$; $Max(R_{ij})$ is the maximum of the calculated network connectivity; R_{ij}' is the standardized network connectivity between City$_{(i)}$ and City$_{(j)}$.

The fourth step: calculate the network connectivity of each city to reflect the contact intensity of the city in the network system. The formula is as follows:

$$M_i = \sum_j R_{ij}' - R_{ii}'$$
(5)

Where M_i is the network connectivity of City I; R_{ij}' is the standardized network connectivity between City$_{(i)}$ and City$_{(j)}$; R_{ii}' is the network connectivity of the inner City$_{(i)}$.

4 CHINA'S URBAN NETWORK CHARACTERISTICS FROM THE PERSPECTIVE OF MICRO-BLOG SOCIAL SPACE

Based on the above methods, we analyzed and calculated the friend relations of the micro-blog users of the selected 51 representative cities. Combined with the geospatial urban network patterns, we made the following analysis of China's urban network system based on the micro-blog social space.

4.1 Analysis of the Overall Structure of Urban Network System

The micro-blog social space itself should be flat and without centers. However, the analysis of the micro-blog friend relations shows that, the urban network system in the network space is obviously influenced by the urban network relations in real life, exhibiting the following characteristics.

4.1.1 The relative consistency of network connectivity and urban structure in the network

In Figure 2, the abscissa is the city ranking based on its external connectivity index ( ) with a descending order and a lower ranking suggests a lower hierarchy in the network system; the ordinate is the corresponding network connectivity of each city ( ), reflecting the contact intensity of the city in the network system. It can be drawn that, a city's network connectivity is positively correlated with its hierarchy and shows a downward trend with the decreasing of the urban hierarchy, which means, the higher the urban hierarchy is, the higher the city's network connectivity will be. However, the inconsistency between network

connectivity and urban hierarchy also exists in cities like Shenzhen, Chengdu, Tianjin, Fuzhou, Zhengzhou, Qingdao, Nanjing and Harbin, while these cities are often the network node center of the small region where it belongs. For example, the network connectivity in Chengdu and some western cities is relatively high. This suggests that, although some cities have a low hierarchy, they have relatively higher network connectivity due to its strong network connectivity in the small region.
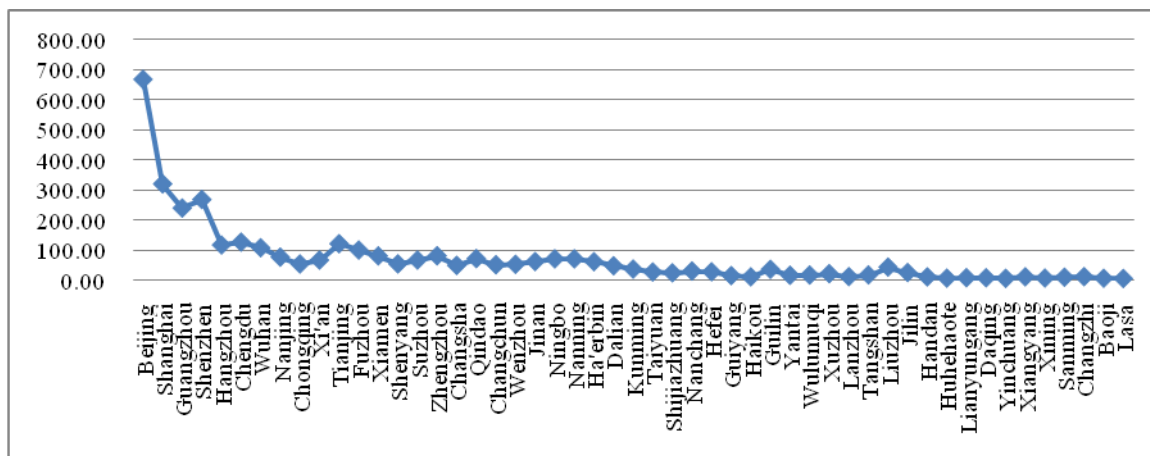
Fig.2: The relationship between the connection rate and the hierarchy system of the cities in the network

4.1.2   City-level distribution in urban network

In order to further subdivide the city level, we sequenced the cities' network connectivity ( ). As shown in Figure 3, the ordinate is the ranking sequenced according to the city's network connectivity; the abscissa is the corresponding city. The lower the ranking is, the weaker the city's contact role in the network will be. According to K-means clustering analysis, these 51 research cities are divided into 6 levels (Table 2). Beijing is in the first level: its network connectivity is more than 600, being the contact center of the national network; Shanghai, Guangzhou and Shenzhen are in the second level: their network connectivity is between 200 and 600, being the sub-centers of the national network; Chengdu, Tianjin, Hangzhou, Wuhan and Fuzhou are in the third level: their network connectivity is between 100 and 200, being the contact centers of regional networks; Zhengzhou, Xiamen, Nanjing and Qingdao etc. are in the fourth level: their network connectivity is between 50 and 100, being the contact centers of sub-regional networks; Changsha, Dalian, Liuzhou and Kunming etc. are in the fifth level: their network connectivity is between 10 and 50, being the contact centers of local networks; Lianyungang, Daqing, Xining and Huhehote etc. are in the sixth level: their network connectivity is less than 10, being the contact nodes of local networks and having the weakest contact roles in the network.
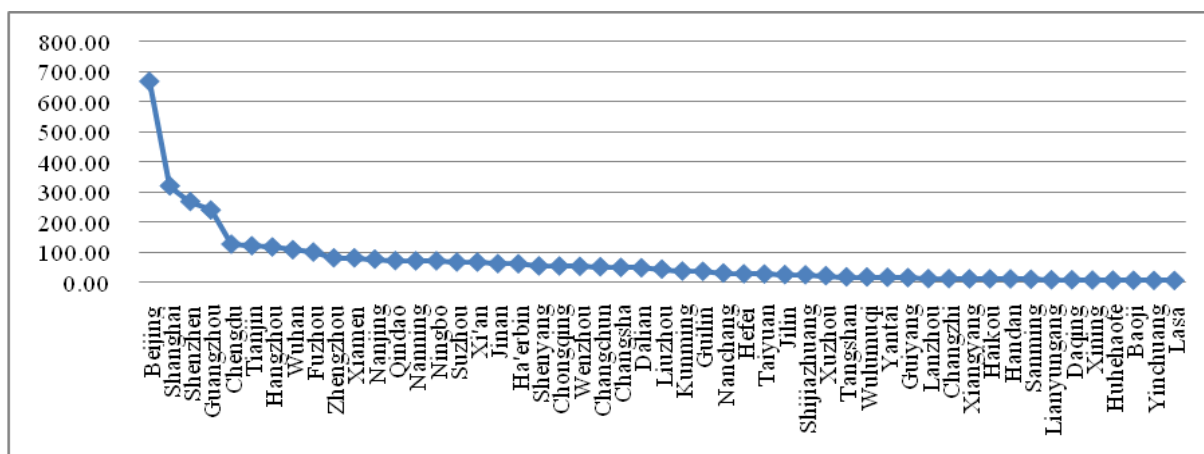
Fig.3: The rank of the connection rate of cities in the network

Considering from the six levels, several cities like Chengdu, Fuzhou, Nanjing, Harbin, Lanzhou and Kunming only play the roles of regional network contact sub-centers or local network contact center, totally inconsistent with the existing urban system-level characteristics related to the entity economies or infrastructure, especially for the regional, sub-regional and local levels. This reflects to some extent that the

spatial expansion of the micro-blog network is not in full compliance with the existing based geospatial. The hierarchy of a city in the network system is not entirely determined by the level of economic development, but the result under the influence of socio-economic level and geo-culture.

Level	Network connectivity	Cities
Center of the national network	＞600	Beijing
Sub-center of the national network	200-600	Shanghai, Guangzhou, Shenzhen
Center of the regional network	100-200	Chengdu, Tianjin, Hangzhou, Wuhan, Fuzhou
Sub-center of the regional network	50-100	Zhengzhou, Xiamen, Nanjing, Qindao, Nanning, Ningbo, Suzhou, Xi'an, Jinan, Haer'bin, Shenyang, Chongqing, Wenzhou, Changchun
Center of the local network	10-50	Changsha, Dalian, Liuzhou, Kunming, Guilin, Nanchang, Hefei, Taiyuan, Jilin, Shijiazhuang, Xuzhou, Tangshan, Wulumuqi, Yantai, Guiyang, Lanzhou, Changzhi, Xiangyang, Haikou, Handan, Sanming
Node of the local network	＜10	Lianyungang, Daqing, Xining, Huhehaote, Baoji, Yinchuang, Lasa

Table 2: Level distribution of the city network

4.1.3   City contact intensity partition in urban network system

Sequencing the network contact intensity ( ) of the 1275 ( ) groups of contact between each two cities from low to high, we found that significant levels exist in these data. Specifically speaking, there are 984 groups of contact between two cities whose network connectivity is between 0 and 1, accounting for 77.17 % of the total number; there are 149 groups of contact between two cities whose network connectivity is between 1 and 3, accounting for 11.69 % of the total number; there are only 112 groups of contact between two cities whose network connectivity is greater than 3, though only accounting for 8.78 % of the total number, the sum of all the network connectivity of these 112 groups reaches 1254.72 which accounts for 70.59 % of the total urban network connectivity. This reinforces that there is a greater level in the network contact intensity between cities. We sequenced the network connectivity of these 112 groups from small to large and also found a significant level. As shown in Figure 4, with the increasing of sequence, the network intensity between cities shows a growth trend similar to an index.
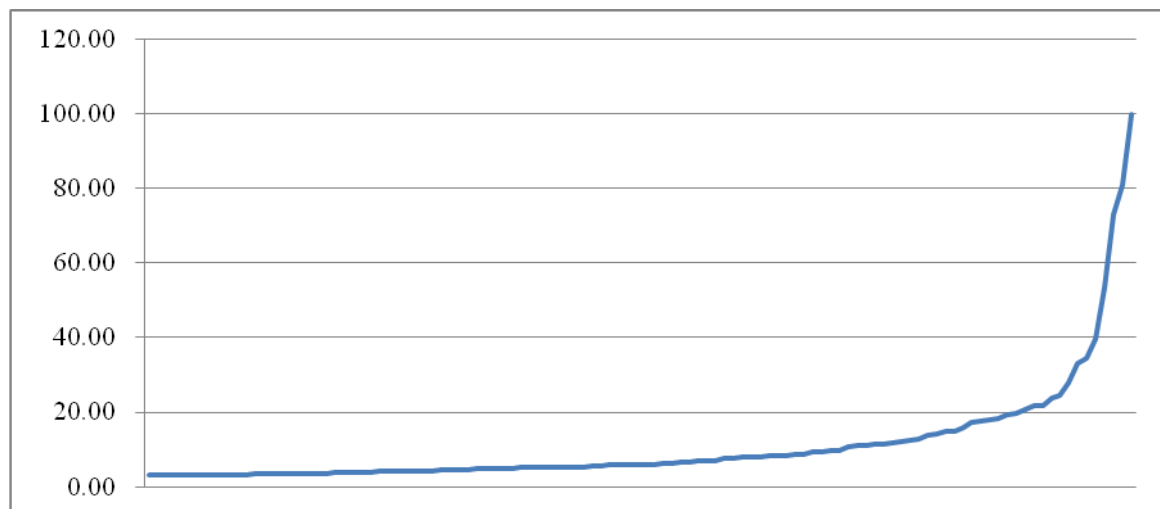
Fig.4: The rank of the connection rate(＞3) between cities

4.2 Spatial Analysis of Urban Network System

With Arcgis analysis software, we prepared the thematic maps about the urban hierarchy in urban network system and the network connectivity between cities to further analyze the spatial characteristics of urban network system. We also divide the network connectivity of the 112 groups of contact between each two cities into six levels.

4.2.1   Significant difference between Eastern China and Midwest China

According to the traditional division method of three regions, namely, Eastern China, Central China, and Western China, we conducted a geographic division of these 51 node cities. As shown in Figure 5, the horizontal axis is divided into three major regions of Western China, Central China, and Eastern China from left to right. We then sequenced the cities in each region according to their network connectivity. The

analysis showed that, although cities with higher city levels also exist in Western China and Central China, the average city level in Eastern China is significantly higher than those of Central China and Western China. However, the difference between Central China and Western China is not so significant. The 29th Statistic Report of China Internet Network Development Status newly released by China National Network Information Center (CNNIC) also pointed out that, the provinces and cities whose Internet penetrations are above the national average level are mostly concentrated in the eastern coastal areas. This suggests that, the difference in the Internet development level directly affects the city's network connectivity and further widens the development gap between Eastern China and Midwest China.
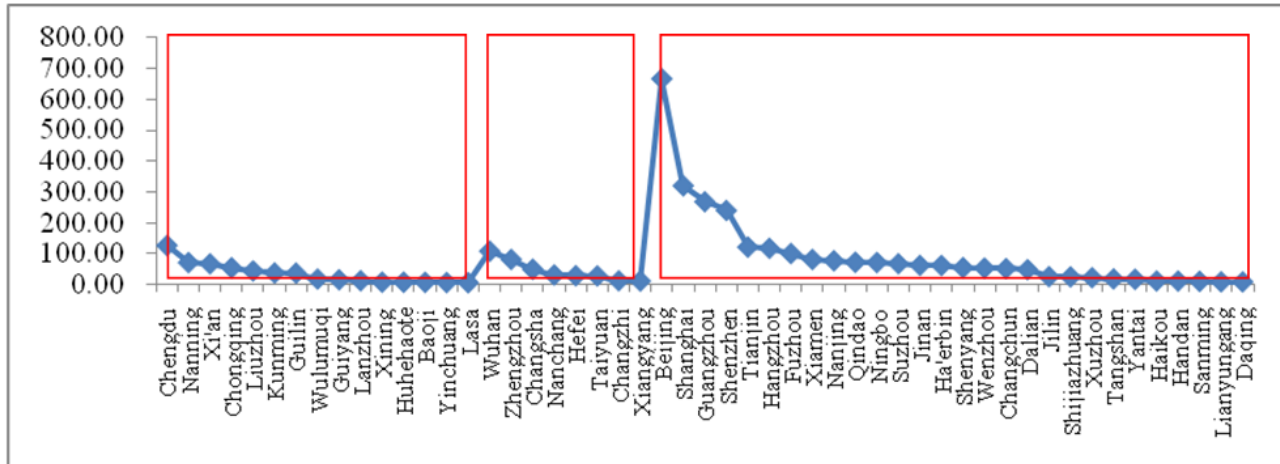
Fig.5: The rank of city level distribution in the Western, Central, Eastern China

We further made a comparative analysis of the information contact intensity and geographical characteristics in the internal Eastern China, between Eastern China and Central China, Eastern China and Western China, Central China and Western China. It can be seen from Figure 6 that, the internal relations in Eastern China is still the main body of current network system. In the statistics of the network system topology whose network information contact intensity is greater than 3, there are 59 connections in the internal Eastern China, accounting for 52.68 % of the total number. The network connectivity totals 846.56, accounting for 67.4 % of the whole network. Secondly, the contacts between Eastern China and Central China, Eastern China and Western China are relatively close. In the network system topology, each has 18 connections, accounting for 16.07 % of the total number respectively. In the cumulative network connectivity, they are nearly the same, which are 132.4 and 138.38 respectively, accounting for 10.54 % and 11.03 % in the entire network respectively. Meanwhile, the network contacts in the internal Central China, in the internal Western China, and between Central China and Western China are obviously weaker. As a result, we can conclude that, the contacts in the internal Eastern China, between Eastern China and Central China, Eastern China and Western China constitute almost all of the current network systems. Besides, the network contacts in the internal Eastern China are the strongest, which reflects the levels of Internet development and economic ties. At the same time, there is no significant difference between Central China and Western China and the contacts between them are also weak.
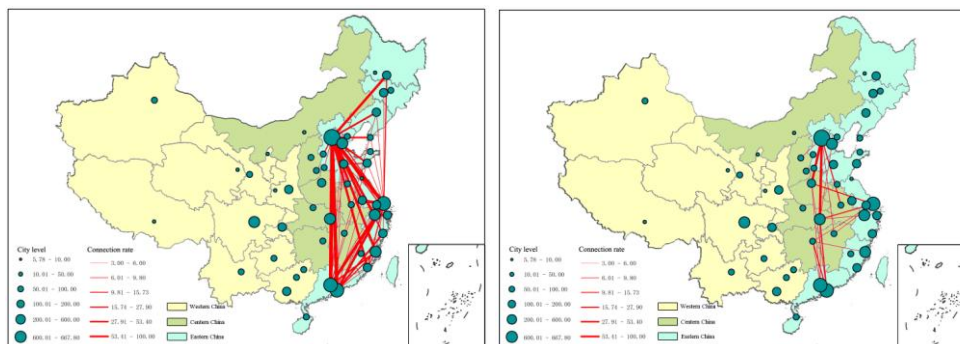
The internel network connection in Eastern China (left). The network connection between Eastern and Centern China (right).
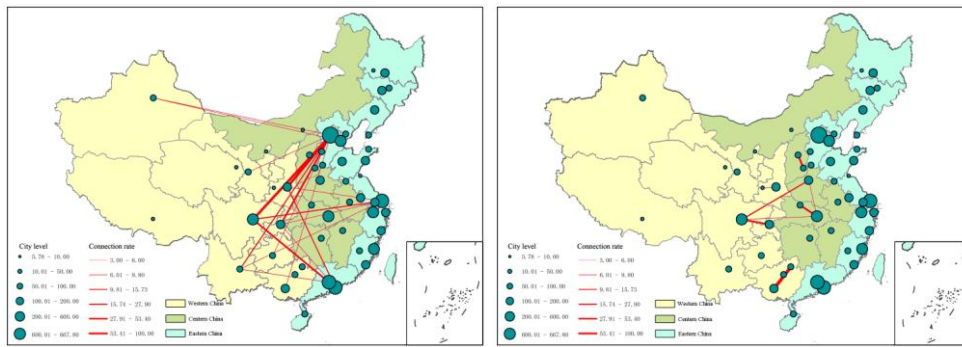
The network connection between Eastern and Western China (left). The network connection between Centern and Western China (right).

Fig.6: The network connection among Western, Central, Eastern China

4.2.2 Hierarchical agglomeration in urban network

Analyzing the urban network pattern from the perspectives of city level and network contact intensity (>3) between cities, we can found that, hierarchical agglomeration exists in China's urban network system, the specific performance of which is the spatial pattern of "Three Majors and Four Smalls". Figure 7 directly shows the important roles of the three major regions of the Beijing-Tianjin-Hebei, Yangtze River Delta and Pearl River Delta in the entire network system. It shows a great similarity with the urban network system pattern in the geographic entity space, especially the emergence of three gathering areas of the Beijing-Tianjin-Hebei, Yangtze River Delta and Pearl River Delta in the entire network system.
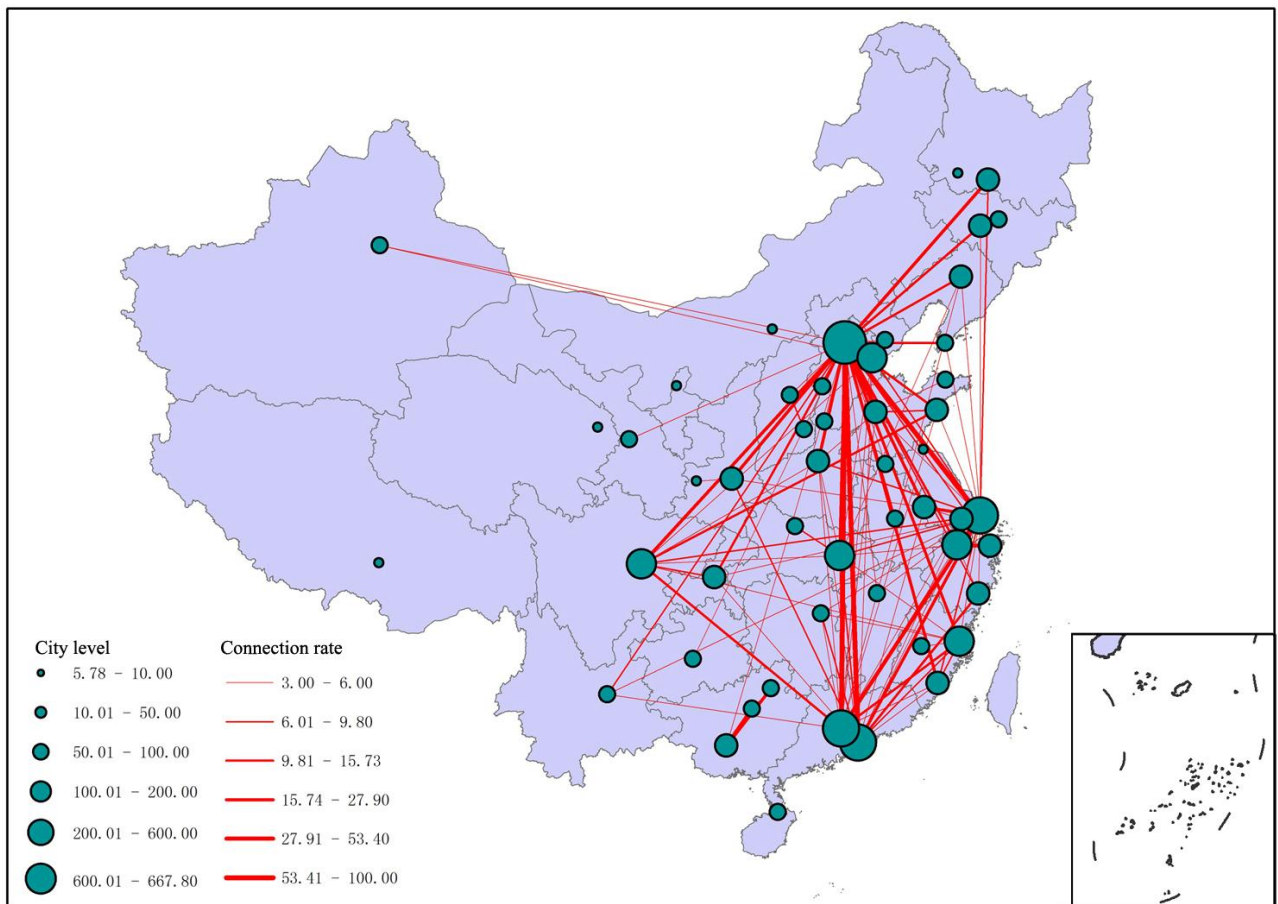
Fig.7: The pattern of China's cities network based on the social network space

Specifically speaking, the "three majors" include the Beijing-Tianjin-Hebei region (Beijing, Tianjin, Shijiazhuang, Tangshan), the Pearl River Delta (Guangzhou, Shenzhen), the Yangtze River Delta (Shanghai, Hangzhou, Nanjing, Ningbo, Suzhou, Wenzhou); the "Four Smalls" include Chengdu-Chongqing region (Chengdu, Chongqing), Hercynian region (Fuzhou, Xiamen, Sanming), Wuhan (central) region (Wuhan,

Changsha, Nanchang, Hefei, Changzhi, Xiangyang), Northeast China (Shenyang, Harbin, Changchun) (Table 3). Table 3 is based on the statistical analysis of the network levels of the note and key cities in the seven regions and the network contact intensity between them and the outer world, elaborating the urban network architecture characteristics and division basis more detailedly. The hierarchical agglomeration in China's urban network structure based on network communities is still significant. However, combined with the previous analysis on the characteristics of city level distribution, as an interactive network platform, micro-blog still strengthens the "horizontal contacts" between cities, especially in the local level. This can also explain the emergence of the localized agglomeration of the "Four Smalls" regions.

City-region	Node cities	City level	Connection rate of cities (＞3)
Beijing-Tianjin-Hebei region	Beijing, Tianjing, Shijiazhuang, Tangshan	Beijing is the center of the natioanl network;Tianjing is the center of the regional network; Shijiazhuang and Tangshan are the centers of the local network;	There are 39 connections between these four cities and other cites, accounting for 32.0 % of the total of connections; and the commulativeconnection rate of these four cities are 675.94, accounting for 53.87 % of the total.
Pearl River Delta	Guangzhou, Shenzhen	Guangzhou and Shenzhen are the sub-centers of the national network	There are 31 connections between these four cities and other cites, accounting for 25.4 % of the total of connections; and the commulativeconnection rate of these four cities are 384.33, accounting for 30.63 % of the total.
Yangtze River Delta	Shanghai, Hangzhou, Nanjing, Ningbo, Suzhou, Wenzhou	Shanghai is the sub-center of the national network; Hangzhou is the center of the regional network; Nanjing, Ningbo, Suzhou and Wenzhou are the sub-centers of the regional network;	There are 39 connections between these six cities and other cites, accounting for 32.0 % of the total of connections; and the commulativeconnection rate of these six cities are 448.06, accounting for 35.71 % of the total.
Chengdu-Chongqing region	Chengdu, Chongqing	Chengdu is the center of the regional cetwork; Chongqing is the sub-center of the regional network;	There are 13 connections between these two cities and other cites, accounting for 10.7 % of the total of connections; and the commulativeconnection rate of these two cities are 104.28, accounting for 8.31 % of the total.
Hercynian region	Fuzhou, Xiamen, Sanming	Fuzhou is the center of the regional network; Xiamen is the sub-center of the regional network; Sanming is the Center of the local network;	There are 12 connections between these three cities and other cites, accounting for 9.8 % of the total of connections; and the commulativeconnection rate of these six cities are 102.07, accounting for 8.13 % of the total.
Wuhan (central) region	Wuhan, Changsha, Nanchang, Hefei, Changzhi, Xiangyang	Wuhan is the center of the regional network; Changsha, Nanchang, Hefei, Changzhi and Xiangyang are the centers of the local network;	There are 18 connections between these six cities and other cites, accounting for 14.8 % of the total of connections; and the commulativeconnection rate of these six cities are 108.22, accounting for 8.63 % of the total.
Northeast China	Ha'erbin, Shenyang, Changchun, Jilin	Ha'erbin, Shenyang and Changchun are the sub-centers of the regional network; Jilin is the center of the local network;	There are 9 connections between these four cities and other cites, accounting for 7.4 % of the total of connections; and the commulativeconnection rate of these six cities are 81.21, accounting for 6.47 % of the total.

Table 3: The overall city network structure

Figure 8 further shows the status of the regions of "Three Majors and Four Smalls" in the national urban network system. Beijing-Tianjin-Hebei region enjoys a widest coverage in the network system and covers the whole country, bearing the status of the country's center. The coverage of the Pearl River Delta region and the Yangtze River Delta region in the network system is less than that of Beijing-Tianjin-Hebei region. There is a certain correlation between the coverage and the geographical entity pattern. The Pearl River Delta region shows obvious characteristics of the network system center in South China, while the Yangtze River Delta region shows the characteristics of the network system center in East China. At the same time, the network contacts between the three major regions dominate the entire network system. In addition, Chengdu-Chongqing region, the Hercynian region, Wuhan region, and Northeast region also occupy a certain position in the whole network system. In addition to reflecting the characteristics of local contacts, each region of the "Four Smalls" shows a unified spatial directivity towards the three cities of Beijing, Shanghai and Guangzhou. It is worth noting that, the geometric center of Wuhan region in the network system is obvious, showing the central characteristics of the blending of North and South, East and West and a significant regional advantage.
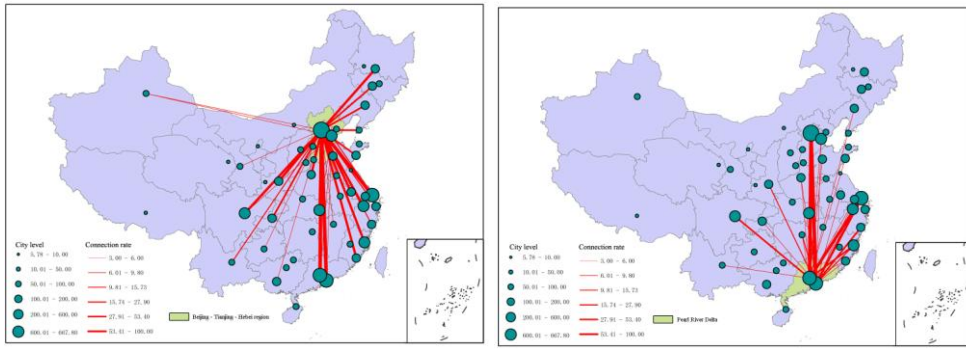
The connection of Beijing-Tianjin-Hebei region in the network (left). The connection of Pearl River Delta in the network (right).
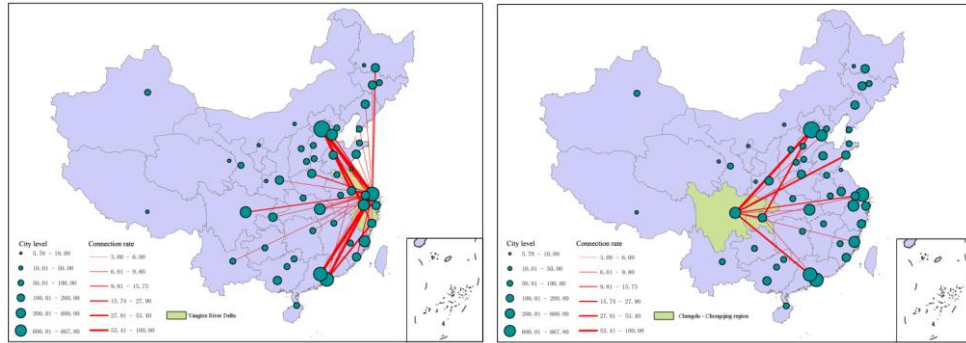
The connection of Yangtze River Delta in the network (left). The connection of Chengdu-Chongqing region in the network (right).
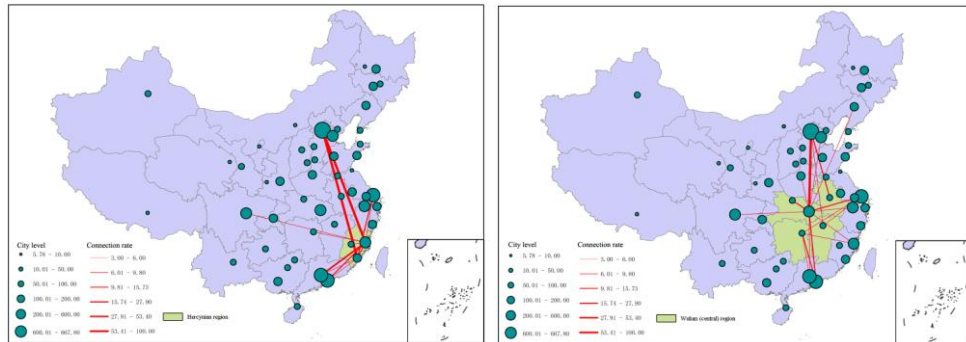
The connection of Hercynian region in the network (left). The connection of Wuhan (central) region in the network (right).
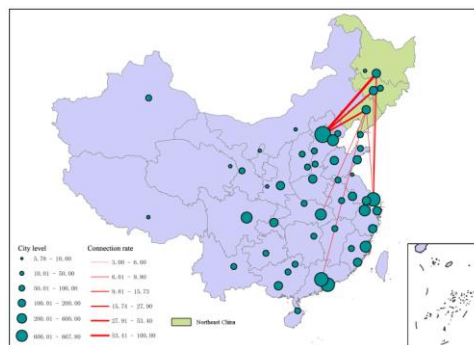
The connection of Northeast China in the network.

Fig. 8: The position of different region in China's city networks

4.2.3 High level city-dominated urban network system

In order to analyze the importance degree of the core cities in the network system, we extracted the first four cities in the urban network system, which are the national network contact center---Beijing and the three national network contact sub-centers---Shanghai, Guangzhou and Shenzhen. The study shows that, cities with high hierarchy dominate the urban network system. It differs from the previous study of China's urban system based on aviation network, railway network and Internet in that the difference between Beijing and

Shanghai, Guangzhou, Shenzhen are significant and they cannot by measured in the same level. In the national level, Beijing has the strongest network connection directivity and involves the most widely (Figure 9). Beijing's network contacts nearly cover the whole country, including 33 connections with other cities and accounting for 29.46 % of the total number. The cumulative network connectivity reaches 645.43, accounting for 75.66 %. It is not difficult to see from the figures that the urban network systems constructed between the four cities of Beijing, Shanghai, Guangzhou, Shenzhen and other cities are basically consistent with the national urban network system, which further reflects the dominance of the four cities in the network.
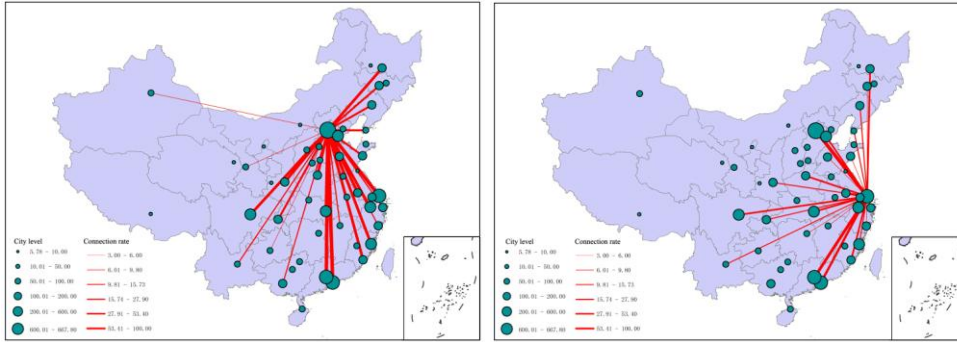
The network connection between Beijing and other cities (left). The network connection between Shanghai and other cities (right).
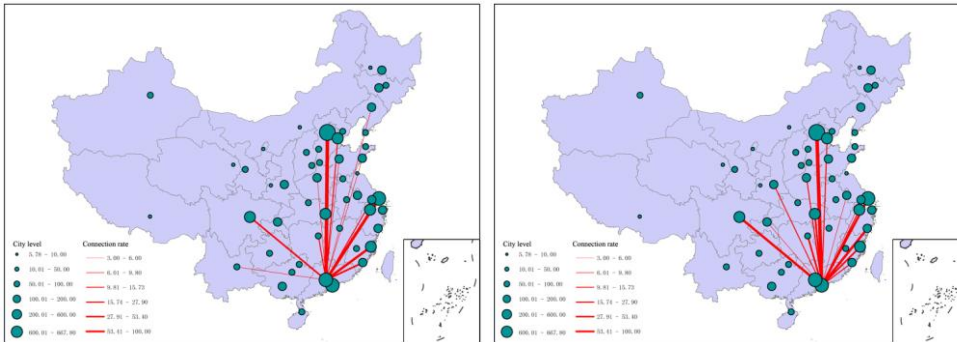
The network connection between Guangzhou and other cities (left). The network connection between Shenzhen and other cities (right).
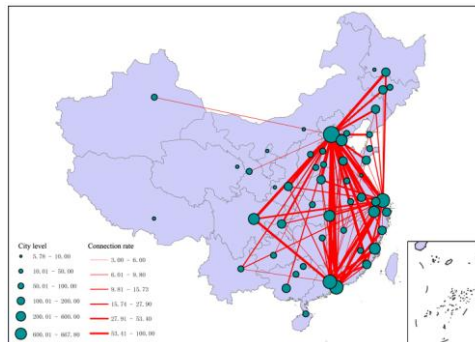
The network connection between Beijing, Shanghai, Guangzhou, Shenzhen and Shenzhen to other cities

Fig.9: The network connection between Beijing, shanghai, Guangzhou and Shenzhen to other cities

5 CONCLUSIONS AND DISCUSSIONS

Information technology has an increasing influence on the development and changes of China's urban network system. From the perspective of social space, with the help of the social relation network reflected in micro-blog friends, this paper studies the patterns and characteristics of urban network system in the social network space. This is a new attempt of the urban network research under the influence of globalization and informatization. The result analysis also proves the effectiveness of the relations between micro-blog users in the study of urban network system.

Based on an empirical analysis of Sina Micro-blog, from the perspective of micro-blog social space, the paper finds that significant hierarchical relationship and level distinction exist in China's urban network. A city's network connectivity is positively correlated with its comprehensive strength and hierarchy, which means that, the higher urban hierarchy is, the higher its network connectivity will also be. The city's network connectivity shows a downward trend with the decreasing of its hierarchy. It is worth noting that, the social network space itself has no center and level, but the social relations of its participants-human beings, reflect the geospatial characteristics of the socio-economic and cultural ties. This result has a great similarity with the urban network system pattern of the geographic entity space. But it does not mean that, the urban network in the social network space is a simple projection of the geospatial urban network. This paper finds an inconsistency exists in the hierarchies of cities like Chengdu, Fuzhou and Xiamen in the urban network system based on micro-blog space and in actual entity urban system, suggesting that the spatial expansion of micro-blog network is not in full compliance with the existing based geospatial.

Based on the city's network level and network contact intensity, the research results show significant spatial differences between the three major regions of Eastern China, Central China and Western China, but the difference between Eastern China and Midwest China is more significant. Hierarchical agglomeration exists in China's urban network system, the specific performance of which is the spatial pattern of "Three Majors and Four Smalls". They are the Beijing-Tianjin-Hebei region (Beijing), the Pearl River Delta (Guangzhou, Shenzhen), the Yangtze River Delta (Shanghai, Hangzhou, Nanjing); Chengdu-Chongqing region (Chengdu, Chongqing), Hercynian region (Fuzhou, Xiamen), Wuhan (central) region (Wuhan, Changsha), Northeast China (Shenyang, Harbin, Changchun). This further verifies the domestic scholars' research on China's urban network system. It can be said that the emergence of micro-blog network space promotes the further agglomeration of the original geospatial urban network system. Its main performance is to accelerate the development of the densely urbanized areas formed by surrounding the cities with high hierarchy. This also shows that, the economic factor and the original urban structure still play their roles in shaping the urban network pattern. However, when gathering together, as an interactive network platform, micro-blog social space still strengthens the horizontal contacts between cities. The roles of the hierarchy of some cities are weakened a bit, especially in the regional and local levels. For example, the emergence of the Hercynian region and the Northeast region as regional network space, not only shows the equilibrium of network information diffusion, but also reflects the local characteristics in the social network space like micro-blog.

Of course, as a newly emerging network community, micro-blog is still in its infancy. Its influence on the geographic entity space remains to be verified. But undoubtedly, the spatial "flow" and "viscosity" brought by this powerful social dynamics will have a positive impact on the reconstruction and networking of national and regional urban systems. For the mechanisms behind it, further studies should still be conducted.

6 REFERENCES

Batty, M.: Urban information networks: the evolution and planning of computer communications infrastructure. in: Cities of the 21st century new technologies and spatial system. Edited by John Brotchie, Michael Batty, Peter H all& Peter Newton, pp. 65-72, Colorado, 1991.

Castells, M.: The Rise of the Network Society. Cambridge, MA: Blackwell Publishers, London, 1996.

Castells, M.: The culture of cities in the information age. In: Conference Frontiers of the Mind in the Twenty-First Century. Library of Congress, Washington D C, June 14-18,1999.

Croitoru, A.; Stefanidis, A.; Radzikowski1, J.; et al.: Towards a collaborative geosocial analysis workbench. Proceedings of the 3rd International Conference on Computing for Geospatial Research and Applications, 2012.

Friedmann, J.: The world city hypothesis . Development and Change, Vol. 17, pp. 69-83, 1986.

Gautier, K.; Francesco, C.; Carlo, R.; et al. Urban gravity: a model for intercity telecommunication flows. Journal of Statistical Mechanics: Theory and Experiment, pp. 1-8, 2009.

Goetz, A. R. Air passenger transportation and growth in the US urban system 1950-1987. Growth and Change, Vol. 23, pp. 2418-2421, 1992.

Graham, S.; Marvin, S. Telecommunications and the City: Electronic Spaces, Urban Places. London: Routledge, London, 1996.

Gu, Chaolin. Hierarchical structure and distribution pattern of China's urban system and its structure prediction. Economic Geography, 10 (3), pp. 50-56, China, 1990..

Gu, Chaolin, Hu, Xiuhong. Current situation of urban system in China. Economic Geography, 18 (1), pp. 21-26, China, 1998.

Ho, Shin K.; Timberlake, A. World Cities in Asia Cliques, Centrality and Connectedness. Urban Studies, Vol. 37, pp. 2257-2285, 2000.

Jin, Fengjun.; Wang, Chengjin. Hub- and- Spoke system and China aviation network organization. Geographical Research, 24 (5), pp. 774-784, China, 2005.

Jin, Zhongfan. On structural properties of transnational urban network based on multinational enterprises network in China：As the case of link with South Korea. Geographical Research, 29 (9), pp. 1679-1682, China, 2010.

Liu, Yang. Micro- blog: Happy words from media age. Today's Massmedia, Vol. 1, pp. 34-35, China, 2010.

Malecki, E. J. The economic geography of the Internet's infrastructure. Economic Geography, 78 (4), pp. 399-424, 2002.

Mat, Sumoto. H. International urban systems and air passenger and cargo flows: Some calculations. Journal of Air Transport Management, Vol. 10, pp. 239-247, 2004.

Mitchelson, R.; Wheeler, J. O. The Flow of Information in a Global Economy: the Role of the American Urban System in 1990. Annals of the Association of American Geographers, 84(1), pp. 87-107, 1994.

Moss, M. L.; Townsend, A. M. The internet backbone and the American metropolis The information Society Journal, Vol. 16, pp. 35-47, 2000.

Ning, Yuemin.; Wu, Qianbo. Spatial Organization of Enterprise and Development of City- region. Beijing: Science Press, China, 2011.

Shoko, Wakamiya.; Ryong, Lee.; Kazutoshi, Sumiya. Urban area characterization based on semantics of crowd activities in Twitter. Geospaitial Semantics, pp.108-123, 2011.

Sassen, S. The global city. Princeton. NJ: Princeton University Press, 2001.

Sun, Zhongwei.; He, Junliang.; Jin, Fengjun. The accessibility and hierarchy of network cities in the global internet. Economic Geography, 30 (9), pp. 1449-1455, China, 2010.

Taylor, P. J. World city network: a global urban analysis. New York: Routledge, 2004.

Townsend, A. M. Networked cities and the global structure of the Internet. American Behavioral Scientist, 44 (10), pp. 1698-1717, 2001.

Wang, Mingfeng.; Ning, Yuemin. The network advantage of cities: an analysis of spatial structure and node accessibility of Internet backbones in China. Geographical Research, 25 (2), pp. 193-203, China, 2006.

Wu, Wei.; Cao, Youhui.; Liang, Shuangbo.; Cao Weidong. The accessibility pattern of railway passenger transport network in China. Geographical Research, 28 (5), pp. 1389-1400, China, 2009.

Xue, Junfei. Hierarchical structure and distribution pattern of Chinese urban system based on aviation network. Geographical Research, 27 (1), pp. 23-32, China, 2008.

Yang, Yongchun.; Leng, Bingrong.; Tan, Yiming.; Li, Tiantian. Review on world city studies and their implications in urban systems. Geographical Research, 30 (6), pp. 1009-1020, China, 2011.

Yin, Jun.; Zhen, Feng.; Wang, Chunhui. China's city network pattern: an empirical analysis based on financial enterprises layout. Economic Geography, 31 (5), pp. 754-759, China, 2011.

Zhan, Zihua. Research review on Micro-blog. Journal Of University Of Ji'nan (Social Science Edition), 21 (1), pp. 34-37, China, 2011.

Zhang, Xiaoming. Characteristics of the Yangtze River Delta Mega – City Region. Acta Geographica Sinica, 61 (10), pp.1025-1036, China, 2006.

Zhen, Feng.; Liu, Xiaoxia. Regional urban network influenced by information technology: new directions of urban studies. Human Geography, 22 (2), pp. 76-81, China, 2007.

Zook, M. A. The web of production: the economic geography of commercial Internet content production in the United States. Environment and Planning A, Vol. 32, pp. 411-426, 2000.

Zook, M. A. The Web of Consumption: The Spatial Organization of the Internet Industry in the United States. The Association of Collegiate Schools of Planning 1998 Conference, Pasadena, CA, November 5~8, 1998.

Zook, M. A. Old hierarchies or new networks of centrality: The global geography of the Internet content market. American Behavioral Scientist, 44 (10), 1679-1696, 2001.

Smart Community Participation for Revitalization of Urban Green Spaces Over Time: Case Study New Delhi

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1 ABSTRACT

The cornerstone of turning the Indian city a smart city, is towards an integrated approach of ecology and the conservation of the natural resources for City Planning. During the last century Urban Population of India increased ten folds from 27 million to some 270 million. Cities today are in the centre-stage of environmental pollution, and degradation and loss of bio-diversity. Concentration of intense economic processes and high level of consumption in cities increase their resource demands. The main problem with cities today is that they have become centres of mobilisation rather than civilisation. They are nodes of an increasingly intense economic activity, with the volume of travel having reached unprecedented levels in recent years. The urban economic culture has a deep impact on the human mind, which has become too pre-occupied with the pursuit of personal gain. The city of the future, to be sustainable, will have to re-establish the concept of green spaces development and mangement, with greater dependence on smart local community partcipation, with concern on the liveability of local environments and with a greater emphasis on creating public spaces for people to enjoy.

New Delhi, the fast growing Capital City of India has presently a population of about 17 million persons (census 2011) and is estimated to grow in a 23 million population Mega City by the year 2021. After Independence Delhi had 1.43 million populations by 1951 and has increased to 8.42 million by 1991. Despite a land locked situation and with such a big concentration of population, it is a liveable city with natural landscape and with very high percentage of landuse under green/open spaces. Out of total area of 1483 sq km in NCT Delhi, about 150 sq km has been proposed as Green Belt at the peripheral area of the city to act as lung spaces for City, 100 sq km land is in River Zone as Green Space to facilitate ground water recharge and about 90 sq km of Aravali ranges and water bodies with biodiversity parks for enriching the environment and natural flora and fauna in its original style in the city. The built up areas also contain more than 15 % area in form of city and neighbourhood level parks allocating about 5 sq km open space per person at city level. The area under recreational/ green use i.e. 7145 ha is in the form of District Parks, City Parks, Community Parks etc. comprising around 15 % of the total urban land area. The norms for City green for Delhi as Master Plan of Delhi 2021 varies from City Park for 100 ha to housing area parking as 0.5 ha for certain population.

The present paper analysed about how New Delhi lungs spaces can be used though smart community participation over time. Whether this open space is utilized by the comuniy for the community and to the community? The paper explores the upcoming virtual technology for transformation of community ideas and design to influence the decision making, strategy planning and predictive modelling for conservation and sustainable development of urban green spaces local level and management of problem of climate change at global level. Smart Community participation through 'Bhagidari System' to improve the urban environment and to revitalized Green Spaces of New Delhi over time was also analysed in the current paper.

2 INTRODUCTION

The cornerstone of turning the Indian city a smart city, is towards an integrated approach of ecology and the conservation of the natural resources for City Planning. During the last century Urban Population of India increased ten folds from 27 million to some 270 million. Cities today are in the centre-stage of environmental pollution, and degradation and loss of bio-diversity. Concentration of intense economic processes and high level of consumption in cities increase their resource demands. The main problem with cities today is that they have become centres of mobilisation rather than civilisation. They are nodes of an increasingly intense economic activity, with the volume of travel having reached unprecedented levels in recent years. The urban economic culture has a deep impact on the human mind, which has become too pre-occupied with the pursuit of personal gain. The city of the future, to be sustainable, will have to re-establish the concept of green spaces development and mangement, with greater dependence on smart local

community partcipation, with concern on the liveability of local environments and with a greater emphasis on creating public spaces for people to enjoy.

New Delhi, the fast growing Capital City of India has presently a population of about 17 million persons (census 2011) and is estimated to grow in a 23 million population Mega City by the year 2021. After Independence Delhi had 1.43 million populations by 1951 and has increased to 8.42 million by 1991. Despite a land locked situation and with such a big concentration of population, it is a liveable city with natural landscape and with very high percentage of landuse under green/open spaces. Out of total area of 1483 sq km in NCT Delhi, about 150 sq km has been proposed as Green Belt at the peripheral area of the city to act as lung spaces for City, 100 sq km land is in River Zone as Green Space to facilitate ground water recharge and about 90 sq km of Aravali ranges and water bodies with biodiversity parks for enriching the environment and natural flora and fauna in its original style in the city. The built up areas also contain more than 15 % area in form of city and neighbourhood level parks allocating about 5 sq km open space per person at city level. The area under recreational/ green use i.e. 7145 ha is in the form of District Parks, City Parks, Community Parks etc. comprising around 15 % of the total urban land area. The norms for City green for Delhi as Master Plan of Delhi 2021 varies from City Park for 100 ha to housing area parking as 0.5 ha for certain population.

The early urban life in Delhi was environment centric and full of plant lore, intimately concerned with the day to day life of our ancestors the hermitages. With the increase in population and the rapid spread of townships Delhi urban community have become more and more alienated from Nature. The scale of present urbanization is unprecedented and posses daunting requirements for Capital city of India to transform the urban community to, "Green Urban Community". Deforestation is increasing alarmingly and is disastrous. Apart from the aesthetic aspect, the loss of vegetation cover affects the soil, air and water balance adversely. The environment is badly affected due to deforestation and the consequent ecological imbalance. The capital city of India Delhi now face the mounting challenges with unprecedented rural and urban migration and population growth. The growth of Delhi/ National Capital Teritory (NCT) cities is beyond manageable limits. Therefore, complex urban issues demand smart, innovative actions and increasing attentions to combat. The natural landscape provides a vital background to urban community. The ever increasing urbanization process escalating socio-economic demands which alter the lunges spaces of the city. It is essential to emphasize the role of green spaces or urban forest for planning in New Delhi. The information technology and rich heritage of urban community offer significant opportunities for green cover to improve its quality through smart community participation or existing Bhagidari System. (Bhagidari System is a participatory approach addopted by the Government of Delhi in 2003 for provision of public services through involvement of the local Resident Welfare Organisations, local stakeholders, local professionals, local polititions, local City Government, local police and NGOs etc) refer website: www.delhigovt.nic.in/bhagi.asp .

The present paper analysed about how New Delhi lungs spaces can be used though smart community participation over time. Whether this open space is utilized by the comuniy for the community and to the community? The paper explores the upcoming virtual technology for transformation of community ideas and design to influence the decision making, strategy planning and predictive modelling for conservation and sustainable development of urban green spaces local level and management of problem of climate change at global level. Smart Community participation through 'Bhagidari System' to improve the urban environment and to revitalized Green Spaces of New Delhi over time was also analysed in the current paper. (figure 1).

3   CONCEPT OF SMART URBAN GREEN COMMUNITY SYSTEM (SUGCS)

A Bhagidari Green Community System (BGCS) to revitalize the green spaces for urban cities to act as the engine of smart growth and transforming the urban system to a smart sustainable system. BGCS will create the functional connectivity between physical and green spaces within the cities on the one hand and act as a buffers and recreational opportunities for urban fringe communities on the other hand. Such system might also promote greater ecological and biological diversity development, greater use of green infrastructure and multifunctional green spaces. By increasing the density of green through BGCS can also help to mitigate the climate discomfort generated within urban heat island as a result of concentration of roads, concrete buildings and pavement. Generation of micro-climate through provision of shading trees in the parking lots and pavement control the heat generated by buildings.

Figure 1: Impact of Urban Green Community through Bhagidari System

However, it is important to select or grow trees that will perform the best in the city climate. In addition to helping cut down carbon emissions globally, BGCS may aid in improving urban air quality. The problem of air pollution is one of the most important problems faced by Indian cities like smoke, noise, chemical effluents, garbage dust which act as the chief pollutants of the atmosphere. In the technical term there are main five elements responsible for creating pollution in the NCT like sulfur dioxide, nitrogen dioxide, ozone, particulate matter, and carbon monoxide and with the help of BGC System these can be combat with low cost. It is estimated that in order to remove one pound of pollutants required Rs200/- cost to mitigate while cost with the BGC System the same can be mitigated for Rs. 20/- or even less. Through management of green space strategically in combination with the watersheds region can reduce runoff and recharge the ground water and thereby controlling the problems of floods in the Delhi. Apart from creating strong biodiversity and ecosystem BGC System also generate the psychological and public health benefits. Implementation of BGC System will focus on the framework of Green Urban Land-use policies in order to create environmental justices. Thus, more effective partnership is required between the planner and local communities to establish the BGC System. In short, BGC System is urban and regional planning and environmental management efforts where green land-use located in the designated city area. BGC System is developed in pursuit of synergies derived from combined efforts in waste treatment, environmental preservation and promotion of industrial development.

3.1 Features of BGC System

- Strong regulation development control in support towards a recycling based community.
- Centre, State and local Government spearheading the drive to propagate the concept of BGC System.
- Foster the research and training in the field of environment and town planning through public and private sectors.
- Creating the Knowledge base for environmental system technologies and innovative solutions to solve the urban and regional problems.
- Focusing on energy conservation, eco-material development and integrated waste management
- Promoting the eco-business market domestically and internationally.
- Contribute to reducing, reusing and recycling of resources.
- Promoting the establishment of a sound material-cycle by local community involvement

For Urban and regional Planner, the development and implementation of BGC System provide incentives on a number of issues that may go beyond their professional boundaries. This, therefore, calls for

comprehensive multi-disciplinary partnerships that will enable the achievement of the goals and objectives of a BGC System. The Planner will need to provide inputs and facilitate such partnerships to plan and develop a BGC System.

3.2 Support infrastructure to Establish BGC System

a)   Policy and Strategy Development: BGC System requires adopting environmental base Urban and Regional Planning regulation and development control to succeed. Standards and codes to achieve targets and development goals need to establish besides integrating BGC System into Master and Zonal Plans of the Delhi. It should also have financial and other incentives to ensure that local community will adopt voluntarily.

b)   Develop Networking and creative economy: BGC System will be stronger if networking system should be developed by involving the local community for the community and from the community. Creation of common ground provides opportunities for private and public to meet and exchange information, solve problems and plan together of green environmental friendly infrastructure and services (eco-services). A group of technical professional will be formed to work across the professional boundaries and support to generate the propulsive creative economy.

c)   Application and Implementation of Environmentally sound technologies: BGC System can implement cutting edge and innovative technology demonstrations that are environmentally-friendly and also provide opportunities for capacity building and training on related issues.

d)   Information Access: BGC System will provide reliable and credible information to ensure the success of cites towards sustainable development. Software support and decision making tools will be generated to evolve the sustainable strategies and technologies for the development control concept. To take advantage of research and development in the international and national marketplace and private experts.

4   GENERATION OF KNOWLEDGE MANAGEMENT BANK.

To stay ahead in today's highly unstable and competitive urban environment, Planner needs to develop new ways to organized and deliver services with better quality of life and faster response to the urban community need there by a higher satisfaction. It has become increasingly apparent that potential bottlenecks in achieving these goals lie not just in Planning management or policies frame but also in the ability to effectively manage 'Planner's Knowledge'. Especially the profession like Urban and Regional Planning are defined by working relationships governed by functional interdependencies rather that creating professional boundaries. Knowledge Management is a major challenge for creating Smart Urban Green Community through BGC System. The rapidly growing importance of knowledge is highlighted by the fact that many organizations now attempt to organize and to make available the relevant collective knowledge for Planner to design and plan the sustainable cities. However, at the national level there is a need to build 'Green Community Knowledge Repository System' unlike the one attempted under National Urban Information System (NUIS) Scheme for generation of digital databases at City level. Urban forestry and green research are given us much more detail information and can provide smart way to collect the information and database for sustainable management of green spaces for the region or cities. Invent of information technology, entrepreneur GIS, satellite imagery and aerial photography provides smart ways to plan or monitoring the urban forest or green spaces.

Through the satellite imagery one can measure the degree of canopy cover over urban areas at various time and period and can also identify the urban heat island and increase or decrease of temperature and so can understand the climate change. Since 1972 Land-sat satellite is efficient in even creating documentation of trees in urban areas and help to generate the database on tree cover over time. But Cartosat series of satellites can offer much higher resolution data which help planners to access specific detail data for even tree at the site level, will revolutionize the decision making process. With the help of Aerial Photography technologies we can even identify the ecological system and functions of urban forestry and its linkages with other land-use system within the urban community. Hence, even while analyzing the Google map image, one can smartly generate the base line data for creating or achieving the desired tree density goal. These goals can also be managed by target percentage of green cover/ urban forest in the city.
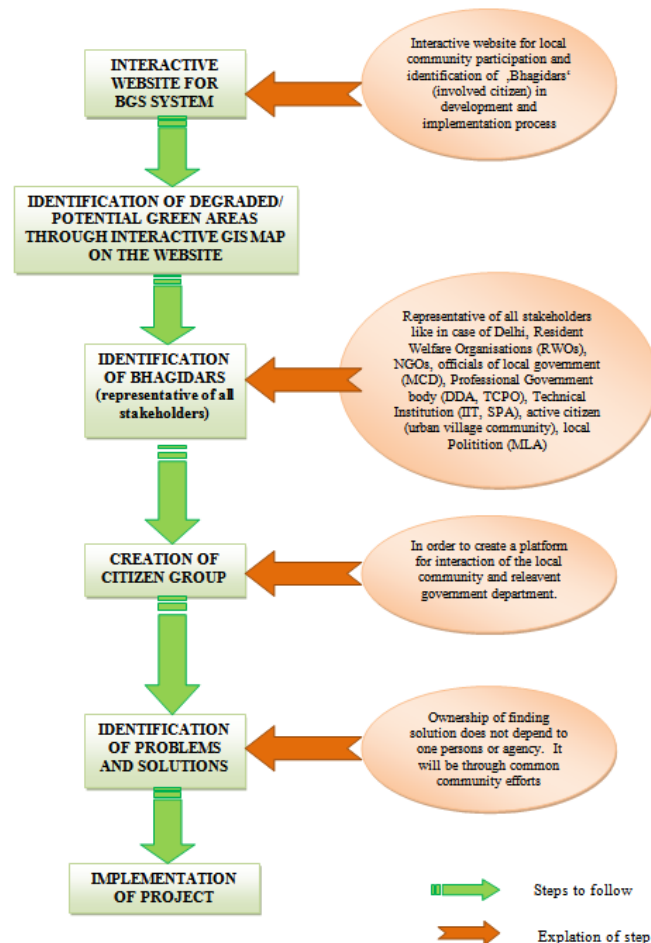
Figure 2: Steps for creation of BCG System

The Corporation's part department in Chennai and the State Forest Department are conducting tree survey for the city covering more than 426 Sq. Km., first of its kind in the country. Even a website – www.hashtrees.in – is also created to help the Chennai Corporation to put the check on trees being axed without permission and plan further to combat climate change. In the similar ways a GIS based software/ database tool is required to be develop at National/ Regional/ and City level in order to analyze the ecological and economic benefit of the green cover/ urban forest. In a way green/ forest based urban ecosystem gives sound money value for the urban community as a whole. Thus every tree is of more money value than only environmental benefit. Hence, BGC System services will provide environmental function by absorbing storm water runoff, removing air and water pollutions, stop soil erosion, reduce energy consumption, maintained ground water and help storing carbon. Municipal Corporation of Delhi (MCD) or Delhi Development Authority (DDA) can even use urban forest as a means of reducing carbon footprint and generate finance through carbon trading. Several studies show that, when urban forest is strategically planned, can reduce the demand of energy based on fossil fuels and consequently reduces the air and water pollution. Now the question arises that how to generate the BGC System for preparation of Master Plan/Zonal Plan and policy level in order to create SMART CITY for sustainable future. This problem can be solved in much way by creating a single knowledge base platform in Town and Country Planning Organization (TCPO) through Bhagidari (involment) of Resident Welfair Organistion, town planner, politicians, city managers, environmentalist, bio-scientist, software expert and ecologist.

5 METHODOLOGY FOR BGS SYSTEM:

Basic idea is to empower citizen to look after there green areas at decentralized community level. This will enhance inter action between the resident civil society ad releavent Government departments. The methodology of creation of BGS System is given in Figure 2.

6 STRATEGY OF REVITALIZATION OF GREEN SPACE THROUGH BGC SYSTEM:

In the above stated background the following three fold approach and strategy needs to be adopted through BGC System:

6.1 Land-use Efficiency Management:

Despite a land locked situation and with such a big concentration of population, it is a livable city with natural landscape and with very high percentage of land-use under green/open spaces. Out of total area of 1483 sq km in NCT Delhi, about 150 sq km has been proposed as Green Belt at the peripheral area of the city to act as lung space for City, 100 sq km land is in River Zone as Green Space to facilitate ground water recharge and about 90 sq km of Aravali Ranges and water bodies with biodiversity parks for enriching the environment and natural flora and fauna in its original style in the city. The built up areas also contain more than 15 % area in form of city and neighborhood level parks allocating about 5 sq km open space per person at city level.

6.2 Regional Park:

The Aravalli Range in the NCT of Delhi comprises of the rocky outcrop stretching from the University in the North to the NCT Border in the South and beyond, and sizeable areas of the same have been designated as the Ridge. This is not a continuum as various intervening stretches have, over a period of time, been brought under urbanization – for example the Central Ridge area was planned as an integral part of New Delhi, at the time of the development of New Delhi as the Capital in the early part of the twentieth century. The Master Plan of Delhi – 2001 identified the Regional Park into four parts as below:

- Northern Ridge 87 ha.
- Central Ridge 864 ha.
- South Central Ridge 626 ha.
- Southern Ridge 6200 ha.

The area of Regional Park is 7777 hectares. Part of this has been notified as Reserve Forest.

6.3 Green and Recreational Area

The area under recreational/ green use i.e. 7145 ha is in the form of District Parks, City Parks, Community Parks etc. comprising around 15 % of the total urban land area. In addition to this, a large chunk of green area is provided in the form of Neighbourhood Parks/Tot lots in the gross residential use zones, plantations/greens in large campuses like President's Estate, JNU, IARI, Delhi University, plantations along drains and roadside plantations. In addition to above, two Bio-diversity parks are under development.

In the Urban Extension the green cover is to be provided at the rate of 15 % of the total land, excluding the Ridge Regional Park. Out of this, some area shall be developed in the form of formal parks for the community and the rest shall be developed as woodlands and incidental greens for balancing the environment. This will be in addition to the development of specialized parks like Bio-Diversity Parks, plantation along the roads, drains, riverbank, etc.

6.4 Management of Natural Resources

The major natural features and eco-systems of Delhi are the river Yamuna, together with a network of streams/drains that empty into the river, and the Aravalli Range. Both of these are in a state of considerable degradation, and it is of vital importance to conserve and rejuvenate these ecosystems. This ecological reserve area has regional carrying capacity; therefore, surrounding States also have to contribute towards their conservation and rejuvenation.

Delhi has 18,000 parks and gardens under various civic agencies, measuring more than 8,000 ha which are managed by civic agencies alone or in association with NGOs/RWAs/Private Sector. Huge road length, railway lines, drains play an important role in greenery. Beside this, Forest Department and other agencies have about 9,500 ha under forests and other green patches ranging from 3 Acres to 6,200 Acre continuous forests. Forest Department of NCT Delhi has set up twelve City Forests in Delhi.

Civil society of Delhi (RWA), committed NGOs awareness in schools (Eco-Clubs), NGOs and so on are actively participate to enhance the urban forestry in Delhi.. The total green cover is much more than the recorded forest area (Forest Survey of India, 2009)over here. An unusually large number of agencies control land in Delhi and as a result the creation and management of green cover is a task shared by official agencies in Delhi namely, Delhi Development Authority, New Delhi Municipal Council, Municipal Corporation of Delhi, Airports Authority of India, Delhi Cantonment Board, Central/State Public Works Department, Forest Department and other civil agencies, including Railways.

Various issues related to urban greenery are – protection of created greenery, involving people in colony park maintenance, development of degraded parks, creation of greenery along roads, drains, railway track etc. Furthermore, blank institutional areas, village fallow lands and scrub forests need to be planted with suitable tree species for sustainable ecology. Only then 33 % of Delhi area can have green cover on sustainable basis.

Urban green spaces play a critical role in maintaining biodiversity and augmenting quality of life of a city's residents. Rapid population influx, inadequacies in city planning and regulations result in inadequate availability of land for greenery and landscaping. Redevelopment of the city through new infrastructure projects to cater to old and new needs creates additional pressure to remove trees even where they exist to provide necessary space to new developments.

Delhi is no exception so far as these pressures are concerned but still Delhi has managed to keep its green cover growing compared to other urban regions despite faster increase in population and other infrastructure developments than anywhere else in India.

To mitigate these adverse impacts and to restore and preserve the heritage of Delhi, the Delhi Development Authority (DDA) and University of Delhi have jointly initiated a major conservation effort to create a network of Biodiversity Parks which will not only serve as heritage sites but also act as home for thousands of vanishing species living together and provide a wide range of services to the human population inhabiting the city. It is a first landmark collaborative initiative by any infrastructure agency in India which has thought real estate development with ecosystems services in real sense. The concept of Biodiversity Parks if taken together with Real Estate will open new gateways in creating Green Civil Society.

Delhi has been hailed as a one of the greenest metropolitan cities of the world. Considerable work has gone into bringing tree cover to Delhi. It is estimated that the current green cover in Delhi is 20 percent, a quantum jump from that of only 3 percent in 1998. The current plans are to increase this green cover to 33 percent in 2012 and this involves several civic agencies like the Delhi Development Authority (DDA), New Delhi Municipal Council (NDMC), Public Works Department (PWD), Delhi Jal Board (DJB), Central Public Works Department (CPWD) and the Municipal Corporation of Delhi (MCD).

MCD is at the forefront of these efforts as it : a) Maintains about 14500 parks in the city, (ii) Provides greenery along MCD Roads(Road sides, Central Verges, Traffic Roundabout and traffic channelisers) (iii) Maintaining greenery in MCD establishments like schools, offices, hospitals, dispensaries, sanitary land Fill Sites spread all over Delhi and other vacant lands under its jurisdiction.

MCD has now embarked upon a new policy of involving other stakeholders to give a push to its targeted greening program names as "Public Private Partnership (PPP) in Development and Maintenance of Colony Parks". This institutional mechanism involves partnership of MCD and Registered Welfare Association/ Residents' Society, Residents' Social Welfare Association, NGO in the maintenance and development of the colony parks.

Municipal Corporation of Delhi today looks after 14500 parks in city. Some of the parks are in precarious condition. This is often due to shortage of staff at best and delinquency/absence at worst. In a city as large and complex as Delhi with the constraints in tow, public private partnership in management of city parks is not only desirable but an imperative if we are to deliver our residents the parks that they look forward to. MCD is now proposing to involve Resident Welfare Associations in maintenance of city parks. While the new policy is welcome a lot of institutional issues need to examined and resolved. Foremost, it is necessary to review the level of financial support to RWA to achieve the desired objectives as meager allocations are bound to dilute the efforts, and as a result the impact the new policy initiative.

6.5 Conservation and Development of resources

Green cover of the capital has increased the tree cover of Delhi from 36 sq km to over 300 sq. km. This could be possible because of the understanding & active participation of the citizens especially the school children: A Bhagidary System. Over the past three years the concept of City Forest has been given a new fillip. With the intent of having forest where ever it is possible to have it in Delhi. As a result in these past 3 years at least 28 forests have been setup. The idea is to set up at least 42 forest clusters to promote conservation of biodiversity, improve the quality of city's environment and create a better quality of life for Delhi's resident. In order to ensure that city's green spaces reflect the diversity and character of our rich flora Delhi Government has set up Delhi Parks and Gardens Society (DPGS) under the Department of Environment. A part of DPGS's ambitious mandate is to incorporate plant species that can adapt to Delhi's climatic conditions which seem to be going through a transition. There are already two biodiversity parks in Delhi, one in the northern part of Delhi and other in the foot hills of Aravali near Vasant Vihar. There is a third one coming up in the Vasant kunj area. These biodiversity parks are expected to play a stellar role in promoting a better understanding of the real ecological needs of Delhi and identify plants that can best flourish in the climate of Delhi. In order to enhance tree cover, the Delhi Preservation of Trees Act was enacted in 1994. The act had a provision, according to which, anybody cutting a tree for any purpose has to plant ten trees as compensatory plantation. But now an alternate arrangement has been made according to which, the person will have to pay Rs 28000 to the Department of Environment and Delhi Parks and Gardens Society so that they grow trees and also take care of them.

7 CONCLUSION

Finally as the result of implementation of BGC System will ensure wise use of the natural resources; generation of creative economy; creation of scientific and knowledge base; transforming gray land-uses into green for gaining the status of aesthetic luxury; and, reducing the budget of cities for combating environmental pollution. BGC System, therefore, calls for comprehensive multi-land-use partnerships that will enable the achievement of the goals and objectives of an Smart Government, Smart transportation, Smart economy, Smart planning, Smart innovation, Smart databank and thereby Smart NCT Delhi.

8 REFERENCES

Cities in Transition, World Bank Urban and Local Government Strategy, The World Bank Infrastructure Group Urban Development, 2000.
Development Alternative Newsletter, A magazine of Sustainable Human Development, Vol.22 No.12, Dec., 2012.
Guide on Plant Materials for Landscaping in India, Ecological and Planning and Landscape Division, Town and Country Planning Organization, Ministry of Works & Housing, Government of India, July, 1980.
Paolo La Greca, Planning in a more Globalized and Competitive World, Proceedings of XXXIX International ISoCaRP Congress 2003.
Report on National Mission on Sustainable Habitat (Climate Change), Ministry of Urban Development, Government of India, 2008.
Wilhelm Krull, Debates on Issues of Our Common Future, Eight Symposia of the Volkswagen Foundation, 2000.

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Social Housing in Serbia: Dual Approach

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1 ABSTRACT

Examining Serbian housing policy in the past two decades which has been radically transfered from the communist version of "welfare state" to the neoliberal concept of housing market, this paper firstly identifies major subjects and activities in the field of social housing and systematizes kinds of action related to these activities. Sudden state's withdrawal from the housing matter, followed by the lack of land regulations and permanent economic crisis, caused almost unsolvable problem of adequate provision of housing for the most of the population in Serbia.

The initial course, performed through privatisation of 98 % of public housing stock at the beginning of the last decade of the 20th century, took place apart from the few other housing policy initiatives and processes that were unconformably to each other. The state successively abandoned introduction of housing policy, untill it almost ran short of its institutional and active capacities that had been developing by decades in communism. Until 2004 housing policy was trying to achieve short-dated political aims, but since then, the need for introducton of new systematic housing solutions, including social housing above all, emerged. Serbian government began to act in two separate ways, although without yet established long-term national housing policy: First was to try to support, financially and legislatively, production of affordable housing, so called "cheap flats" for subsidized sale; and the other was to try to establish public rented housing, but this time based on economic sustainability instead of general social equity proclaimed in communism. Several projects of "cheap flats" for subsidized sale have been developed, while some of them are stlill under construction, or in the planing stage. On the other side, the initial impulse for public rented housing foundation in Serbia was the 15 milion euros pilot project – Settlement and Integration of Refugees Programme (SIRP 2003-2008.) – financed by the Italian government, that was realized in seven Serbian municipalities. Thus, first non-profit Public Housing Agencies in Serbia were established, and new public housing stock was built and inhabited.

Considering serbian social housing policy in general and highlighting some of their characteristics related to several projects, this study focuses on both of these two recognized courses by analisys and critic review of achieved results.

2 MAIN CHARACTERISTICS OF HOUSING POLICY IN SERBIA AT THE TURN OF THE 21 CENTURY

In the past two decades, Serbian housing policy has been radically transferred from the communist version of "welfare state" to the neoliberal concept of housing market. Sudden state's withdrawal from the housing matter, followed by the lack of land regulations and permanent economic crisis, as well as significant political changes caused almost unsolvable problem of providing adequate housing for the most of the population in Serbia.

The initial course, performed through privatisation of 98 % of public housing stock at the beginning of the last decade of the 20th century, took place apart from the few other housing policy initiatives and processes that were uncomfortably to each other. The state successively abandoned introduction of housing policy, until it almost ran short of its institutional and active capacities that had been developing by decades in communism. Different subsidised programmes and various measures of development of housing policy in Serbia on which, in the 90-ties, were spent between 800 million and 1 billion euros (Mojovic, 2009) did not produce significant effect in the overall picture, simply as there was no comprehensive project of housing development. Usually, individual programmes were in the promotional role of political parties at the time and also represented huge financial burden for local authorities where the sluggishness contributed to the fact that some were late or even they were not started to this day.

2.1 Public housing stock privatisation

Milestone event in the Serbian housing policy occured in 1990 when the Government put an end to the four-decade financing practice of so-called "social residental building". Privatisation of so-called "cheap flats" primarily was carried out according to the Law on Residental Relations[1] (Official Gazette SRS and Official Gazette RS, 1990) and according to the Residental Law[2] (Official Gazette RS, 1992), after the next five years, resulted in 98 % of privately owned apartments.

Although Serbian government intended to gain remarkable sum of money through the privatisation process and planned to transfer that money to the next residental building cycle, because of the hyperinflation and decentralized manner of flat buyout, the whole process ended without any positive financal impact on the proposed aims.

Serbian Constitution[3] (Official Gazette SRS, 1990) from 1990 had forseen that citizens should satisfy their residental needs by acquireing residental space (flats, residental buildings or houses) on their own, either by buying it or renting it on the free market. Yet, according to the same Constitution, the State was still in obligation to provide a certain public housing stock for socially endangered households.

2.2 Development of residential market after democratic changes in Serbia

Increasing demand for new apartments as a result of rising number of households compared with increased population brought the new concept of housing market. Unlike EU in the 90-ties, where number of households have risen by 15 % and number of apartments was larger than number of households, in Serbia, in number of households increased by 6 % and number of apartment by 7 % (Petovar, 2003). After year 2000 in Serbia there was larger number of apartments than number of households by 8 % (2002 Census) and according to the 2011 Census by as much as 30 % (Statistical Office of the Republic of Serbia). This data confirms drastically increase of demand for the apartments. Present estimate that only in Belgrade city there is a need for 40.000 appartment units supports the previous statistics. On the other hand, rising number of households prompted the increase market of private rental housing units which represent a significant share in total housing stock (today in Serbia there is approximately 500.000 subtenants, including 100.000 in Belgrade alone) (B92, 2008).

Since 2004., in order to encourage and support normal function of housing market, the state established governmental insurance and subsidies for housing loans, enacted an efficient Mortgage Law[4] (Official Gazette RS, 2005) SRS and initiated Real estate registry.

Idea of subsidized loans for real estate purchase is not an invovative, nor is the idea of "mass low cost housing construction", as starting from 1999 local governments have been advertising it, though it was never fully implemented. The establishment of Natioanal Mortgage Insurance Corporation (NMIC)[5] in 2004 was followed by signing of first agreements with approximately 20 banks regulating mortgage procedures that was primarily based on reduction of annual interest rate below 9 % instead of regular 12 %-15 %. According to NMIC data for the period from 2004 to 2008, the total sum of several thousand loans subsidized by the state was about 205 million euros. By the end of 2012 number of such approved loans was more than 70.000 (National Mortgage Insurance Corporation, 2013). For Serbian economic and social circumstances, this type of financing also represents the really good bust for the housing industry.

All these governmental activities are directed towards the attempt to encrease the potential number of solvent clients on the housing market, which has nothing to do with social housing itself. Main doctrine of state's policy still remains the same: agitation for personal possesion of a real estate neglecting noumerous positive aspects of rented housing as an equal housing concept.

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[1] In Serbian: Закон о стамбеним односима, Службени Гласник СРС, Бр. 12/1990, 47/1990, 55/1990 Службени Гласник РС, Бр. 3/1990 и 7/1990

[2] In Serbian: Закон о становању, Службени Гласник РС, Бр. 50/1992

[3] In Serbian: Устав Републике Србије, Службени Гласник СРС, Бр. 1/1990

[4] In Serbian: Закон о хипотеци, Службени Гласник РС, Бр. 115/2005

[5] In Serbian: Nacionalna korporacija za osiguranje stambenih kredita (NKOSK)

3 SOCIAL HOUSING IN SERBIA AFTER YEAR 2000

This complex issue of social housing in Serbia is lead by the fact that social housing are not built just for the low income population at the bottom of the income ladder, but are also needed for the middle income population which is restricted by the high property price, unfriendly interest mortgage rates and can not afford appropriate standard of living at market prices due to overall economic situation.

Untill 2004 housing policy was trying to achieve short-dated political aims, but since then, the need for introducton of new systematic housing solutions, including social housing above all, emerged, although without yet astablished long-term national housing policy.

Serbian government began to act in two separate ways, although without yet astablished long-term national housing policy: First way was to try to support, finacially and lagislatively, production of affordable housing, so-called "cheap flats" for subsidized sale; and the other way was to try to establish public rented housing, but this time based on economic sustainability instead of general social equity proclaimed in communism. The initial impulse for public rented housing foundation in Serbia was SIRP programme. On the other side, several projects of "cheap flats" for subsidized sale have been developed mostly in Belgrade, the capital city of Serbia, while some of them are stlill under construction or in the planing stage. The estimate is that in the past two decades over 15.000 housing units were built in Serbia via state budget and various donations (Mojović, 2009).

3.1 Re-establishing of social rented housing in Serbia after year 2000

The Settlement and Integration of Refugees Programme (SIRP), devoted to solve the housing problem of Serbian refugees from Bosina and Herzegovina, Croatia and Kosovo, was based on the "National Strategy for resolving the problems of war refugees and forcedly displaced persons" from 2002.

Re-establishing of social rented housing in Serbia and all the necessary institutions on the municipal level, as well as the erection of a certain number of social housing real estates (531 flat in total) in the period from 2005 to 2008, are the teamwork results of: seven Municipal Housing Agencies and other communal departments at the local level,[6] amenable state ministries and the UN-HABITAT international experts team. SIRP programme was partly financed by the Italian government with the amount of 15 million euros for covering the 70 % of estimated costs (UN-HABITAT, 2008).

Primal aims of SIRP programme was to conceive, evolve and test the basic elements of future system of social rented housing, as well as housing policies on the municipal level.

The series of architectural and urbanistic competition were held during 2005 and 2006 in order to get the best design solutions for the social housing buildings. Serbian architects showed great interest on this topic, which resulted with over 130 competitional entries in total that were disposable on the seven SIRP competitions.

Fig. 1: SIRP programme – Social housing in a) Pancevo built in 2008 and b) Stara Pazova built in 2007.

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[6] SIRP programme was realised in seven major Serbian municipalities and cities: Cacak, Kragujevac, Kraljevo, Nis, Pancevo, Valjevo and Stara Pazova.

a)   b)

Fig. 2: SIRP programme – Social housing in a) Nis built in 2007 and b) Kragujevac built in 2007.

Although social housing buildings were built at urbanisticaly and morphologically different sites (Fig. 1, Fig 2, Fig. 3 and Fig. 4), thus unique and recognizable, there are some common characteristics of these sites and buldings, such as:

- Access to the comunal services and infrastructure.
- All buildings consist of small flats (20 m² – 55 m²)[7] for 2-5 tenents.
- All social housing real estates function as multy-dwelling residental housing.
- Buildings have ground floor plus 2 – 4 stories.
- Basement, if there is any at all, is never used for residental purposes.
- There are no lifts in these buildings.
- Additional exterior spaces for common use (playground for children, parking spaces, green spaces with benches, etc.) are obtained in the surrounding of buildings.

User households that were chosen through a transparent system of criteria and selection rules are: refugees, former refugees and local socially endangered population (single parents with children, homeless, families who lived in the inadequate housing conditions, etc.), which means that a social mix have been achieved, according to the European social housing practice.

Fig. 3: SIRP programme – Social housing in Cacak built in 2008.

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[7] Serbian housing standards define the structure of a flat by counting all the rooms. For example, "two-room flat" consists of 1 bedroom and 1 living room.
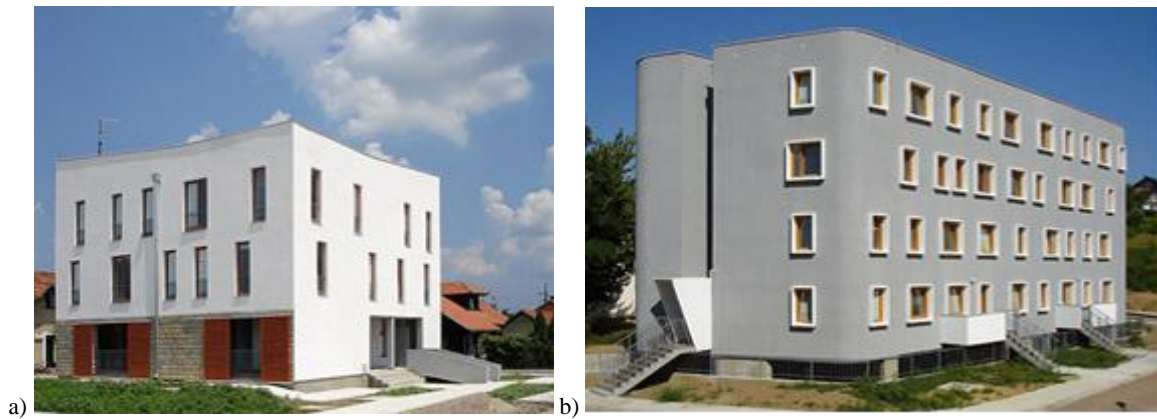
Fig. 4 a) and b): SIRP programme – Social housing in Valjevo built in 2008.

3.1.1 Usage and maintenance of new social rented housing stock

These social housing buildings in Serbia are in use only 3-5 years so far, and this period coincide with the first contract period of flat renting. At this moment, it is possible to make a cetrain overview of usage and maintenace of these buildings.

Generally, SIRP programme was targeted to obtain temporary homes for Serbian refugees in municipal owned housing stock. Obviosly, refugees were glad to move from the refugee camps, shelters and collective centers to separate housing units. Generally speaking, these people, before the war, lived in good housing conditions in their native countries, and this program was an attempt to restore their dignity by giving them housing conditions which are familiar to them.

First conflicts between users and Municipal Housing Agencies (MHA) occured when they realized that social flats they are using are meant to be "social rented flats" owned by Municipality and there will not be any subsidized purchase of these, as they expected. Moreover, in many municipalities certain number of chosen users refused to sign 3-year housing contract when they bacame aware they can not become owners of these flats by no means (Damjanovic and Gligorijevic, 2010).

Expectations and demands of users in the first months of using social rented flats were great and unrealistic: they expected Municipal Housing Agencies to repair damage they made, to finance replacements of water boilers, bulbs etc. (according to 3–year housing contract, these were users obligations).

Original enthusiasm of users and their delectation with new homes soon was suppressed by fury and frustration. Suddenly, they felt that social rented housing (as is obvious, is nothing more than temporary solution) can not be adequate way for "permanent integration in Serbia", and they started to wander "what kind of integration can be achieved with temporary housing?".

Whereas SIRP programme was not a donation but a subsidized loan, very precise plan for cost recovery from the flat renting have been made. Programme has forced Municipal Housing Agencies to be obliged to amortize 30 % of the loan to Republic Housing Agency in 30-year period based on annual interest rate of 0,5 %. In theory, this system was meant to be sustainable, but in practice, some arised problems can compromise the entire cost recovery system.

Although rents for social rented flats are lowest possible even for the Serbian standard,[8] Municipal Housing Agencies are confronted with quite a number of users who do not pay their rent regularly or even refuse to pay as a kind of protest for impossibility of flat purchase.

Furthermore, lot of users often delay the monthly payment of their bills for electricity, heating, telephone etc. or do not pay at all. Due to this problem which is present in all municipalities, some Municipal Housing Agencies (for example in Kragujevac) were forced to react: one of the main conditions for new 3-year housing contract is that the user is obliged to pay all his debts.

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[8] EUR 25 per month for the flat of 20 m² up to maximum of EUR 88 per month for the 55 m² flat

3.2 Belgrade experience in the social housing development after year 2000

In the new social and legal environment with increased burden of socio-economic problems as a result of so called transition, just ended wars and NATO intervention, Belgrade newly elected authorities starts two parallel activities:

- City Council in cooperation with Funds for financing low cost "solidarity housing" starts Programme of building of solidarity housing 2001-2005, with target of 2000 units, where only 1421 were finished.

- City Council adopts the decision of building so called "social-non-profit apartments"[9] and social apartments for governmental employees and other social categories.

First of such projects was "Project of 1100 flats in Belgrade" in 2003. This project was accompanied by the Decision on conditions and manner of disposal of apartments built according to project "1100 apartments in Belgrade".[10] The ownership of apartments would be still in the governmental hands, but the City of Belgrade could offer it for sale (1000 flats so-called "cheap flats") or rent for the certain period of time to the persons with clearly defined social needs (100 flats – Public Rented Housing), Project was done on the basis of analysis of various available locations owned by city Council, namely Cukaricka padina, Retenzija (Fig. 5a), Vojvodjanska Street (Fig. 5b) and Olge Alkalaj Street. The project was finished by 2007.

a)   b)

Fig. 5: Social-non-profit apartments in Belgrade – a) Retenzija built in 2006 and b) Vojvodjanska street built in 2007.

By the end of 2007 "Project of 2000 social-nonprofit flats in Belgrade" started. Locations proposed for realization of this project were: settlement Dr Ivan Ribar (Fig. 6a), Vojvodjanska Street (Fig. 6b), Cukaricka padina, settlement Kamendin and New Belgrade's blocks 62 and 29. First 1000 units were offered for sale in 2012 following terms of who could be buyers. Buyers that were chosen through a transparent system of criteria and selection rules were governmental employees such as teachers of elementary and high schools, university employees, law enforcement employees, local councils, young married couples, war veterans, artists, sportsmen and disabled persons with their families.

The terms for apartment's sale were 20 % deposit, 20 year loan with 0,5 % annual interest rate. This has provided the possibility for future customer's loan with a maximum of ½ total monthly incomes per household to meet monthly obligation for debt repayment. Price was 1.050 euros per sq. meter. Though it was so called non-profit development, nowhere one could publicly find the price of design, construction and infrastructural part of the selling price.

So far 2.150 "social-non-profit flats" have been built in Belgrade. Due to long lasting planning and other procedures the second project for another 1000 flats is still in the drafting phase.

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[9] There is "social housing" and there is "non-profit housing building", but there are no "social-non-profit apartments". What amaze is the fact that City government in official communication with public uses non-existent term demonstrating elementary ignorance and misunderstanding term of social housing.

[10] In Serbian: Одлука о условима и начину располагања становима изграђеним према пројекту 1100 станова у Београду, Службени лист града Београда, Бр.20/2003

Fig. 6: Social-non-profit apartments in Belgrade – a) settlement Dr Ivan Ribar and b) Vojvodjanska street, both built in 2012.

Simultaneously, with the construction of social-non-profit flats started the construction of social apartments for renting to people in state of social need in locations: settlement Dr Ivan Ribar (Fig. 7a), Kamendin and Veliki Mokri Lug (Fig. 7b). From the beginning up to today 450 social apartments has been built in Belgrade.

Fig. 7: Social apartments in Belgrade – a) settlement Dr Ivan Ribar and b) Mali Mokri Lug, both built in 2012.

Taking into consideration already mention data, the number of social housing units in Belgrade represent negligible share of housing units in total housing units stock, unlike countries like Germany, Austria and Great Britain where share of social housing units is about 25 % (Petovar, 2003).

3.2.1 Planning and legislative documentation

So-called General Plan of City of Belgrade 2021[11] (Official Gazette of the City of Belgrade, 2003) is the first planning document which clearly defines and introduces the definition of social housing as it is known in developed countries.

General Plan gives the definition of vulnerable social groups which need special attention and help in obtaining adequate housing (young families with income insufficient to purchase an apartment, single parent families, big families with children, refugees, temporarily displaced persons, disabled persons, unemployed, etc.); gives guidelines for social living standards stipulating 5-15 m2 per person; states the criteria for location for social housing and gives two systemic solutions for obtaining locations:

- Construction of social housing dwellings in the planned residential group of more than 250 apartments, within which 5-8 % should be assigned for social housing.
- Construction of social housing dwellings on 58 designated locations of various capacity prevised by General Plan.

In essence, problems which are recognized in Belgrade, and are mostly the same for other locations within Serbia for social and non-profit housing, are (Damjanovic and Gligorijevic, 2010):

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[11] In Serbian: Генерални план Београда 2021, Службени лист града Београда, Бр. 27/2003

- None existing legislative and regulations which would constitute a consistent legal support and channelling of development of such programs and projects.

- Small number of locations for such purpose – problems arising from obtaining such locations in the existing legal frame. Suggested locations are in accordance with General plan but there are still ownership issues to be resolved.

- Problem of implementation of social housing due to the intolerant neighbouring population – so-called NIMBY syndrome.[12]

- None existing standards for social housing.

3.3 Law on social housing

Final result of these programmes was the Draft of Law on social housing, which task was to initiate legislative establishing of basic instruments and institutions, on both national and local level, that would secure implementation of public intervention in housing policy in Serbia.

Concepts and principles that the Draft of Law proposes are (Damjanovic and Gligorijevic, 2010):

- Public intervention in the realm of housing policy (i.e. social housing) allude to much wider set of measures then traditional concept of social rented housing

- Financial support for social housing programmes should be obtained at the national level, but the implementation should be done at the local level

- System of financing has to be based on non-profit but recoverable cost principle

- All subsidies must be transparent

- Social housing must be based on economical, financial, social and ecological sustainability

Law on social housing[13] (Official Gazette RS, 2009), based on previously mentioned Draft of Law, came into force at the end of August 2009, after several years of legal procedure.

On its very beginning, the Law states that social housing is not a part of some special housing policy, but more likely a part of broader housing policy that has to be defined in the future by changable strategic documents. The realm of public intervention is not bounded by this Law and it purports widest possible comprehension of non-profit, affordable and social housing which corresponds to the definitions of social housing given by European associations.[14]

Law on social housing suggests urgent need of enactment of "National strategy for social housing" and apropriate "Action plan", as well as establishing of Republic Housing Agency. Republic Housing Agency, as an national institution that resembles to those in most european countries, was finally founded according to Law in July 2011. by Serbian Government, but no "National strategy for social housing" or "Action plan" have been enacted or even concidered so far.

First Municipal Housing Agencies (MHA) in Serbia, as major institutions in charge for setting and implementation of local housing policies, in fact were established in 2003, before the SIRP programme: City Government of Nis and Kragujevac transformed existing public institutions that remained from the communimst period (so-called "City Funds for Solidarity Housing Construction") into Municipal Housing Agencies. After that, more MHA-s were established during the SIRP program (Kraljevo, Cacak, Valjevo, Pancevo). Apart from SIRP, MHA-s were found in Leskovac, Kikinda and Smederevo, while there are few more cities an municipalities that are preparing foundation of their own MHA, according to the Law.

4   CONCLUSION

Intensive development of social housing programmes worldwide happened during two last decades when Serbia experienced the toughest political and economic time in its recent history. In the context of socio-economic problems caused by the transition, wars and bombing by NATO, the long-term national social

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[12] Not In My Back Yard (NIMBY) – English phrase refers to the fact that is generally agreed that there is residential care for socially vulnerable groups somewhere else, "but not in my backyard".

[13] In Serbian: Zakon o socijalnom stanovanju, Службени Гласник РС, Бр. 72/2009

[14] Such as for example: CECODHAS Housing Europe

housing policy has not been established as yet and its clues in practice are still rare. Republic and Municipal Housing Agencies as main institutions are establishing the basic instruments that would secure implementation of public intervention, identifying needs on both national and local level and gaining experience from recent projects and programmes. This paper is aimed in showing the results of two different approaches to social housing policies.

It absolutely clear today that it is not realistic to expect good quality apartments to be give as a "free gift" nowadays to any group of population, no matter how poor it is in the context of today's economic, political and social circumstances in Serbia. The solution maybe lies in the blend of existing models for social housing which in the existing moment has to prevent rigid interpretation of the rules and regulations for housing developments of this kind and create flexibility which will be able to adapt to living dynamism of an individual person. In that sense bigger flats should be built without finishing and interior works opposing to smaller completely finished units. As a result of this model low building price can be achieved and needs of the future tenants easier met, where they would be tailoring the interiors to their taste and will not be spending extra money as it is now, when the full product is on the market. This in return will give more financial space to local government for infrastructure development projects on the designated locations.

Housing construction has to be complex process that starts on the concept phase to the realisation phase going through wide range of carefully selected activities and stakeholders, where the role of the architect as "demijurg"[15] of living space can not be neglected even in the process of decision making and implementation of various housing programs. As there is no relevant experience, rules, models, as well as guidelines for the design of social housing in Serbian practice, recommendations for further research and development should be sought at the intersection of global (European) experience and local (regional) characteristics, in order to find solutions that are socially acceptable and economically feasible.

The disadvantages caused by delays in introduction of housing policy, might be used as advantage by adopting the best experiences and solutions. However, it is of vital importance to identify characteristics of local culture and context, the legislative base, as well as of social housing features, that significantly differ from the standard European milieu. Just with identified local specifics it would be possible to find optimal solutions for further establishing National strategy for social housing and Action plan.

Providing higher public intervention and financial support for social housing programs and establishing set of regulations and standards, as well as straightening connections between national and local institutions, will be of the highest priority for the further development of social housing in Serbia.

5 REFERENCES

Damjanovic, D. and Gligorijevic, Z.: Social Housing – Review of housing policies in Serbia and selected European countries (Социјално становање – Приказ стамбених политика Србије и одабраних земаља Европе), Palgo Centre, Belgrade, 2010.
Mojović, Ђ.: Social housing finally in the agenda (Социјално становање коначно на дневном реду). RTS News, 6 June 2009, 15 Feb. 2013, <http://www.rts.rs>
National Mortgage Insurance Corporation, Serbia, 15 Feb. 2013, <http://www.nkosk.rs>
News B92, 28 Aug. 2008, 15 Feb. 2013, <http://www.b92.net>
Official Gazette SRS, No. 1/1990, 12/1990, 47/1990, 55/1990
Official Gazette RS, No. 3/1990, 7/1990, 50/1992, 115.2005, 72/2009
Official Gazette of the City of Belgrade, No. 20/2003, No. 27/2003
Petovar, K.: Urban Sociology, Our cities between the state and the citizen (Урбана социологија, Наши градови између државе и грађанина). Faculty of Geography, Belgrade, 2003.
Statistical office of the Republic of Serbia: 2011 Census of Population, Households and Dwellings in the Republic of Serbia-First Results. 15 Feb. 2013, <http://webrz.stat.gov.rs>
UN-HABITAT: The book about SIRP. In: Programme of the settlement and integration of refugees in Serbia 2005-2008 (Књига о СИРП-у. У: Програм становања и трајне интеграције избеглица у Србији 2005-2008), pp. 27. Belgrade, 2008.

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[15] Builder of the World according to Plato's doctrine – a shaper of matter on the basis of perfect ideas.

Solid Waste Management, an Environmental Challenge in Millennium Cyber City in India, Gurgaon

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1 ABSTRACT

The cities only encompass two percent of the world's land surface, yet they are responsible for consuming over 75 percentage of the planet's resources and produce 75 percentage of the world's waste. The most pressing problem faced by any urban centre in India today is Municipal Solid Waste Management (SWM). Rapid urbanisation and changing lifestyles have led to the generation of huge amounts of garbage and waste in the urban areas. Over the past few years, the handling this SWM has become a major organizational, financial and environmental challenge.

As one of the signatories of the resolutions regarding Agenda 21, India is committed to the implementation of Agenda 21. Accordingly, India is considering applying the Green City concept to Gurgaon City as "Model for Sustainable Urban Management" by incorporating environmentally sustainable solutions with major urban issues in India. Gurgaon is "satellite" town in National Capital Region, Delhi, today turned over a new leaf, joining important position on the industrial map of India challenged by a very fast growth rate and is home to major icons in information technology recognized as 24 x7 hrs city. Its close proximity 25 km to Delhi, the capital of India is become an ideal showcase for the whole of India. A land locked city Gurgaon, with a standard urban area at about 167 square km. and a resident population of about 228,820 in year 2001 become 1,514,085 populations by year 2011. It generates 600 metric tons of solid waste every single day. The collected waste on 15th August 2012 was 521.27 metric tons for ultimate recycle plant whose capacity is only 400 metric ton solid waste everyday. Low lying area near the iconic DLF City (costliest residential colony in Gurgaon as well as in India) is being used for dumping. Close proximity of Aravalli Ridge, an ecological fragile area is another favorable place for illegal disposal site.

The SWM is a low priority. The existing SWM is constrained by institutional weakness, lack of proper funding, management and operational systems, public apathy, lack of municipal will. Waste dumping is the only favorable method to urban local body without any further action. Day by day increasing trend practice of dump to dump yard won't sustain the function. Developing countries, such as India, are undergoing a massive migration of their population from rural to urban centres. New consumption patterns and social linkages are emerging. India, will have more than 40 per cent, i.e. over 400 million people clustered in cities over the next thirty years (UN, 1995). Modern urban living brings on the problem of waste, which increases in quantity, and changes in composition with each passing day. There is, however, an inadequate understanding of the problem, both of infrastructure requirements as well as its social dimensions. Urban planners, municipal agencies, environmental regulators, labour groups, citizens' groups and non-governmental organisations need to develop a variety of responses which are rooted in local dynamics, rather than borrow non-contextual solutions from elsewhere. This paper aims to highlight the major challenges in Municipal SWM in Indian arena with the case study of millennium cyber city Gurgaon.

2 INTRODUCTION

Gurgaon, with a standard urban area at about 167.5 square km. and a resident population of about 1,514,085 (2011 census), the floating population is 1,00,000 per day. Average annual population growth is 18-20 %. The district headquarter is situated in Gurgaon city. Now Gurgaon has become one of the most important corporate and industrial hubs of state Haryana in India. Gurgaon also known as 'Guru Gram' or 'Guru Gaon' (village of the spiritual teacher) was named after Dronacharya, a character in the Epic Mahabharata. It is said that Guru Dronacharya of the Pandavas and the Kauravas gave spiritual instructions to them at this place. The office and manufacturing plant of India's largest car maker Maruti Udyog Limited is situated here as a large number other industries. Another area in which Gurgaon is excelling is the IT industry and software development. Real estate is booming here with new buildings coming up at an astronomical pace. Now this city is chosen for a showcase for sustainable urban development as a model for other Indian cities.

As one of the signatories of the resolutions regarding Agenda 21, India is committed to the implementation of Agenda 21. Accordingly, India is considering applying the Green City concept to Gurgaon City as "Model for Sustainable Urban Management" by incorporating environmentally sustainable solutions with respect to:

- water supply and waste water treatment;

- energy supply, energy savings and renewable energy development;

- waste management, soil pollution and air pollution;

- cleaner industrial technologies and environmental management;

- agriculture and food industries;

- building construction and urban ecology management;

- urban traffic and transportation.

The aim is to achieve lasting harmony between man and nature and to protect the interests of future generations. An integrated medium to long-term planning and implementation strategy, close public-private participation, public awareness and responsibility constitute a basic approach to a holistic solution to urban environmental concerns.

3   GROWTH & EXPANSION OF CITY

Gurgaon city is located at 28°53' N latitude and 75° 35' E longitude and is situated at a distance of 25 kms south-west of Delhi, the National Capital and 285 km from Haryana state headquarter of Chandigarh. It lies at 229 meters above mean sea level and forms a part of the National Capital Region. Gurgaon district is an area of confluence of aravalli hills, Indo-Gangetic plains and Indian desert, Gurgaon urban area can be broadly classified under two district sections namly the HUDA (Haryana Urban development Authority) area and the old town (municipal area limit). The area under HUDA can be further subdivided into (i) private coloniser area, (ii) Huda sector (iii) Institutional area and (iv) the urban villages. The population of Gurgaon including the urban area, the existing town, and the 18 village surrounded by urban development was in 2001 400,000 (HUDA 2001). The projected total population of the urban area for the year 2011 is 1.5 million.

The Gurgaon city has been the head quarters of Gurgaon district, the southern most district of Haryana since 1816, and has exhibited steady growth after the independence of country. Spread over an area of 15.33 sq km the Gurgaon town had a population of 1,73,542 in 1991 and the Gurgaon urban area had a population of 2, 29,243 spreading over an area of 30.2 sq km according to 2001 census. The population density shows that Gurgaon city and urban area are densely populated as compared to the Gurgaon ditrict. The most important factor for this is its close proximity to Delhi. National Highway No. 8 passes throgh its main core of city. This Gurgaon originated as a village called Guru gram. Since that time it has been undercontrol of various rulers who come to rule from Delhi like Maurya, Tomar, Chauhan and Mughals. The Gurgaon district passed into British hands in 1803 and revealed in 1851. In 1966 Haryana took birth and it was designated as district and has been Tehsil and district headquater. The first development pro was started in 1971, 77 and further 82 and NCR in 1989 asigned as important hub for development. In 1981 haryana model has been eveolved as public-private partnership and it was boost up as Electronic City. But it was boost up where Maruti udyog has been set up in 1984 and in 1997 been develop Corporate park.It becomes recognise as Class I town in 1991.The city has developed into 5 phases:

1968-71 1st Phase, 1975-78 2nd phase, 1985-95 3rd Phase, 1995-2001 4th Phase, 001-2021 5th Phase

| 1971 landuse | 1986 landuse | 2001 landuse | Indexing of Landuse | 2021 Propsed landuse |
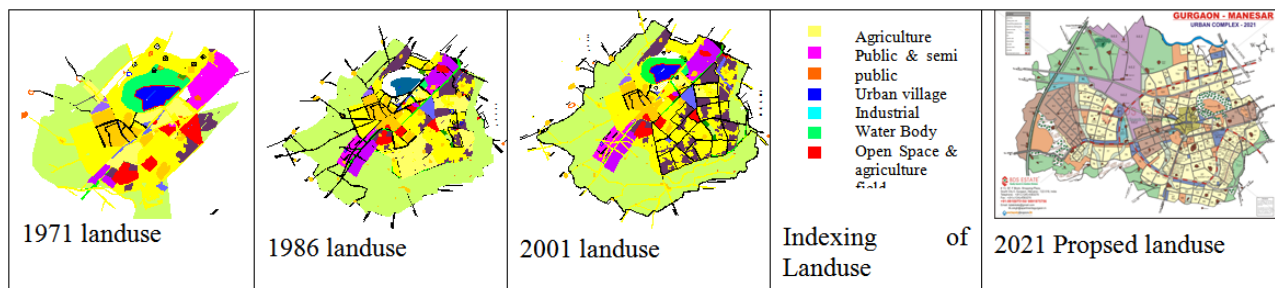
The existing demographic profile of the city plays an important role in understanding the growth pattern and changes witnessed by the city during the last decade. As per the 2001 Census, the population of Gurgaon urban area (Gurgaon UA andUrban villages) was approximately 3,42,000 (Gurgaon MCG -2,01,322; Towns-47,645; and urban colonizers was about 1,20,000 in 2001). Therefore the total population of Gurgaon urban

area was estimated to be 4,60, 000 persons in the year 2001. Gurgaon has also developed on similar trends as the NCT of Delhi and NCR.

Table 1.1 shows that during the past two decades, the urban population in Gurgaonhas registered a higher growth rate.

Area	Population in Year (No)			Growth Rate in %	
	1981	1991	2001	1981-1991	1991-2001
Urban NCR excluding Delhi	33,51,972	52,73,159	80,12,939	57 %	52 %
Delhi	62,20,406	94,20,644	137,82,976	51 %	46 %
Haryana State Sub Region	49,38,541	66,43,046	86,89,268	34 %	30 %
Gurgaon	1,00,877	1,35,884	2,29,243	34.7 %	69 %

Table 1.1: Growth of Urban Population, Gurgaon Municipal Area. Source: Census of India, 2001

The development plan for Gurgaon published in 1971 estimated the Citys population at 0.125 million. Later in 1977 and 1982, it was revised for a perspective population of 0.225 and 1 million respectively for 2001. The NCR Regional Plan 2021 has proposed the population of Gurgaon could grow to 1.65 million by 2021. However, the Department of Town and Country Planning, Government of Haryana expects the population to grow to 3.2 million. As per Census 2011 the population of Gurgaon is become 1.5 million.

The settlement pattern of Gurgaon city can be categorized as; Gurgaon developed area (HUDA sectors and private housing colonies), urban villages and informal housing or slums. Gurgaon developed area comprise of the residential colonies within the Guraon Municipal Council, and sectors within HUDA area. Approximately 60 % of the total population resides in these. This also includes areas, which have been developed by the private developers.

As per the census 2001, approximately 21 % of the total population of the city urban area lives in the 18 villages within the city. These urban villages have become incorporated in the urban extension.

The city started witnessing the squattering settlement from the early 90s,with setting up of new industries, townships and business parks due to huge influx of migrants. There are currently 14 slums in Gurgaon, accounting to 18 % of the total population of the town.

According to the new guidelines,the population density has been calculated at 48 people per hac, compared tothe earlier population density of 44 people per hac.

4 SOLID WASTE MANAGEMENT SYSTEM IN GURGAON

Rapid urbanization along with increases in population has led to the deterioration of physical environment in Gurgaon. Effective Solid Waste Management is one of the major challenges faced by the local authorities. High volumes of waste generation, inefficient collection and transportation system and limited disposal options are continuously impacting the health, environment and quality of life in the area. Field study indicates that availability of land for disposal is major area of concern in Gurgaon. Real estate boom coupled with NIMBY (Not in My Back Yard) issues have left very less land available for disposal of waste in the urbanized area.

Field observation indicates that large volume of waste is being generated per day within the urban area of which only a very-small portion is being collected and disposed in accordance with the Waste Management Rules of India. It generates 600 metric tons of solid waste every single day. The collected waste on 15th August 2012 was 521.27 metric tons for ultimate recycle plant whose capacity is only 400 metric ton solid waste everyday.

The provision of infrastructure for solid waste management by HUDA is sub optimal. The infrastructure for solid waste include 1.5 cum capacity bins, placed indifferent sectors for collection and three refuse collector trucks owned by HUDA and tractor-trailer deployed by private contractor. A site alone the Faridabad-Gureaon road is being used as a waste disposal site.

Public cooperation or participation in the solid waste management is non-existent at present and careless disposal of waste on vacant plots and streets is prevalent, this has the potential to cause health problems. Absence of a ground and surface water monitoring can not confirm the environmental sustainability of the disposal site.

5 CHARACTERISTICS

The majority of waste is generated by residential, commercial and institutional sources and municipal activities such as street sweeping and drain cleaning. The municipalities do not maintain records of waste generation by source itself. Contractors have kept record for total quantum of collection.

Municipal waste generation in Gurgaon is not formally tracked by MUNICIPAL CORPORATION GURGAON or HUDA. There are no controls or weighbridges at Municipal dumping gounds and no records were available to assist in establishing waste quantities. As a result, no quantitative municipal data is available for estimating waste generation in Gurgaon. The approach in establishing waste quantities used information obtained from other studies conducted in India or on line record of collection of waste by contractors and total potential generation quantum of city.

5.1 Generation

Per capita waste generation had assumed for Gurgaon is 320 gm/day which includes residential, commercial, institutional waste by govt. It is attributed to a number of factors which includes food habits, standard of living and degree of commercial and industrial activities in the area. Currently, about 400 MT of municipal waste is collected per day within the controlled area as per Govt record, of which about 75-80 MT is generated within MUNICIPAL CORPORATION GURGAON (MCG) area and balance is contributed by HUDA sectors, private developers' area, and urban villages. Municipal solid waste in Gurgaon, as per Indian scenario, is expected comprises of 50-52 % biodegradable, 12-15 % dry recycles and 30-35 % inert component. But actually the total quntum is 600 Metric tonns. The Municipal Solid Waste (MSW) generation of Gurgaon city in different areas are as under:

Sl No.	Area	Total Quantity of MSW Generated (MT) per day
1.	Gurgaon Old Municipal Area (MCG)	110
2.	DLF (Private Developers)	35
3.	Ansal (Private Developers)	7
4.	HSIIDC area (Industrial area of HUDA)	70
5.	HUDA area	120
6.	Other Private Developers & Commercial	58
Total		**400**

Table 1.2: MSW Generation (based on study conducted by MCG, 2006). Source: MCG, 2006

Population increases, economic activities and personal income levels will influence future waste generation in Gurgaon. Future waste generation for Gurgaon is calculated based on the estimated population carrying capacity of Gurgaon and the per capita increment in waste generation as 1.33 % per annum based on available national data (MCG, 2013). Waste projection for year 2011 and 2021 has been highlighted in the Table 1.3.

Year	Population	Per Capita Waste Generation (gm/capita)	Total Waste (MT/Day)
2006	1,250,000	320	400
2011	1,514,085	350	525
2021	2,600,000	400	1040

Table 1.3: Waste Projection. Source: MCG, 2013

5.2 Collection & Transportation

Municipal solid waste in Gurgaon is being managed by a number of organizations and there is no single authority responsible for waste management of entire urban area. MCG is responsible for collection, transportation and disposal of waste generated within the municipal limit; HUDA manages the waste generated in HUDA sectors; individual private developers in their respective colonies; and village Panchayat in the urban villages. Municipal Council and the private developer area have some level of waste management system, whereas waste management in HUDA sector is highly dismal and need immediate attention.

HUDA sectors: Waste management in HUDA sectors is undertaken by private contractors, RWAs as well as by permanent employees of HUDA. RWAs with financial assistance from HUDA manages the waste generated in sectors 4,7,9 and13; waste generated in sector 10 and 34 is being managed by HUDA itself and for rest of the HUDA sectors private contractors are deployed for street sweeping, collection and transportation of waste.

There is no planning for waste management system to meet the current or future needs. The provision of infrastructure is sub-optimal. The infrastructure for solid waste includes 1.5 cum bins, placed in different sectors for collection and 3 refuse collectors owned by HUDA and tractor-trailer deployed by private contractor.

Staff deployment pattern indicates that road length to be covered per sweeper is relatively high. About 30 sanitary staffs are in the regular role of HUDA and the balance is provided by RWAs and Private contractor. HUDAs SWM contract with the private operator neither specified the number of work force or road length nor the equipment and vehicles required for collection and transportation. This has resulted in adequate sweeping of the main roads, while interior roads and by-lanes are often left unattended. There is no need-based allocation of waste, which has lead to accumulation of waste in respective pockets.

Public cooperation or participation in the solid waste management is non-existent and careless disposal of waste on vacant plots and streets is prevalent resulting in littering of waste. In addition, absence of a proper monitoring mechanism has resulted in poor supervision of waste management activity.

MUNICIPAL CORPORATION GURGAON manages the waste generated only in the municipal area i.e. Gurgaon Town, with an operational staff of 387 sanitary workers, under the overall supervision of chief sanitary inspector. Storage of waste at source and segregation into organics and inorganics fraction, MSW rules is not practiced and street sweeping continues to be the principal system of primary collection of waste. Although some primary collection system has been initiated in the recent years, it is still in its infancy with no synchronization with secondary collection and transportation. While door to door primary collection has resulted in a dramatically improved level of cleanliness within neighbourhoods; it has resulted in a much dirtier appearance at the secondary storage or community bins abutting such neighbourhoods, as the city service at these collection points is not complementary and adequate.

Three different types of waste storage points exist in MCG area viz. Dhalao (community bin), refuse container and the dumper placer containers. The capacity of the waste storage receptacles is sufficient to store the waste generated within the municipal limits. The system of waste collection is predominantly manual, with only 25-30 % of the waste being collected mechanically using dumper placer container, loader and trucks. Waste transportation is done collectively by municipal and private operator. Although the number of vehicles deployed for collection and transportation is sufficient, designed transprtation network are not followed and waste is not cleared at regular intervals. The garbage clearance efficiency for MCG area is 60-70 %.

PRIVATE DEVELOPER: Private developers have engaged private contractors for door todoor collection, street sweeping, and transportation and disposal of waste. Door-to-Door collection is done by cycle rickshaws and tractors trolley or dump trucks are used for transportation of waste. In the absence of any designated site, collected waste is disposed in the vacant land or amenities in the develop area is also done on contract basis.

URBAN VILLAGES: There is no system of waste management in the urban villages (villages within urban pockets) within the controlled area boundary. Waste is normally thrown in the vacant landwithin or outside the village limit. In some villages, village Panchayat have employed sweeper for sweeping of villages roads

and collection of waste from the doorsteps, whereas in other villages, no proper measures has been adopted for waste management. Households throw waste directly on the streets, and there are no sweeper to collect them. As a result, waste is accumulated on the roads, adversely affecting health of the people and environment of the area.

Apart from different Contractor there is some sanitation contractor also transporting the Garbage to Landfill from some villages/colonies, Approx 50 to 75 ton/day with rate of per ton/per Km basis.

5.3 Physio-Chemical Composition of Waste

Test Results on Physical Parameters of MSW Samples of Gurgaon isprovided at Table 1.4

Sl No.	Physical Parameters	Civil Line Area (MCG)	Station Area (MCG)	Vyapar Sadan, M. G. Road (HUDA)	HSIDC Area (HUDA)	DLF Area (Private developer)	Present Dumping Site	Weighted Average
1.	Paper	1.8	2.0	1.42	1.87	3.3	4.5	2.341
2.	Plastic	3.63	3.33	3.57	3.75	2.5	2.7	2.912
3.	Metal	-	1.33	3.57	6.25	8.3	4.5	3.715
4.	Glass	-	3.33	-	9.37	-	0.9	1.693
5.	Cloth	27.2	6.63	7.14	25	16.6	18.2	15.84
6.	Stone	2.0	20	-	6.29	2	2.7	5.69
7.	Sand & Grid	2.72	2.6	-	2.5	2.4	1.46	1.94
8.	Rubber	1.8	3.4	5.71	1.25	2.5	1.8	2.987
9.	Wood	1.8	0.66	4.28	2.5	3.3	2.7	2.868
10.	Leather	4.54	3.33	2.85	3.75	5.0	4.5	3.969
11.	Wax	-	-	-	-	-	-	-
12.	Organic Matter	54.5	53.3	71.4	37.5	54.1	56	56.01

Table 1.4: Test Results on Physical Paramaters of SW Samples of Gurgaon (On Moisture Free Basis in Percentage). Source: MCG, 2013
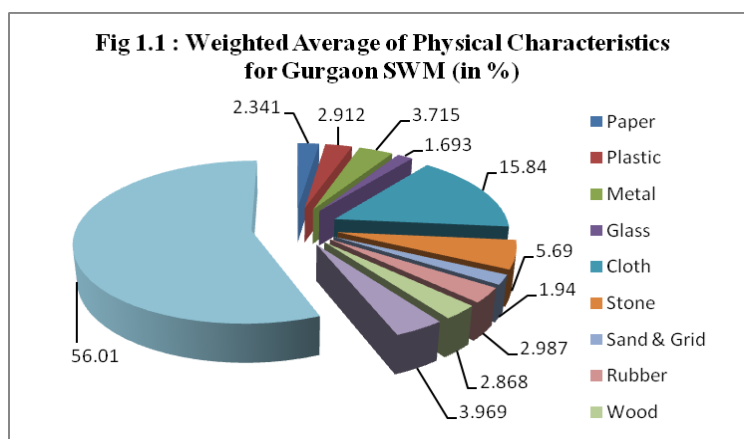
The overall weighted average of Gurgaon waste physical characteristics is varied. The maxium value is under organic matter. Next is Cloth material and after that leather material which can be reused. The trace of metal in waste is also remarkable notice which shows the unhygienic disposal procedure of waste management practice. The debris quantum is also showing the characteristics of the real estate town. The organic content of the waste was found to vary considerably at various sites due to the variations in origin of waste and it is ranging very high. The average share of this biodegradable component was found to be 56.01 % against 35 % for the national average of Class-I cities in India. Compared to this, the average organic waste content of USA is 11.2 % (EPA, 2004). Around 15-20 % of the generated waste does not reach the disposal sites since part of it gets recycled even before reaching the dumps, part is dumped locally in rural areas, and part of it remains uncollected at several sites. Test Results on Chemical Parameters of MSW Samples of Gurgaon is provided at Table 1.5

Sl No.	Chemical Parameters	Civil Line Area (MCG)	Station Area (MCG)	Vyapar Sadan, M. G. Road (HUDA)	HSIDC Area (HUDA)	DLF Area (Private Developer)	Present Dumping Site	Weighted Average
1.	Free Moisture	36	30	42.39	32.8	34.7	21.4	34.02
2.	Dry Matter	82	61	72	86	62	75	71.5
3.	Volatile Substances	18	49	28	30	48	25	34.1
4.	Ash Content	62	37	46	56.3	42	43.8	47.41
5.	Organic Matter	18	11	24	12	7	30	16.2
6.	Total Nitrogen	0.49	0.36	0.08	0.43	0.43	0.42	0.357
7.	Phosphorus	0.012	0.021	0.032	0.029	0.022	0.024	0.0227
8.	Potassium	0.029	0.029	0.046	0.38	0.040	0.042	0.071
9.	pH(10%)	6.84	7.11	6.29	7.03	6.80	6.0	6.711
10.	Calorific value (Gross cal/gm)	2033	1303	2703	1504	981	3707	1925.1

Table 1.5: Test Results on Chemical Parameters of SW Samples of Gurgaon (On Moisture Free Basis in Percentage). Source: MCG, 2013
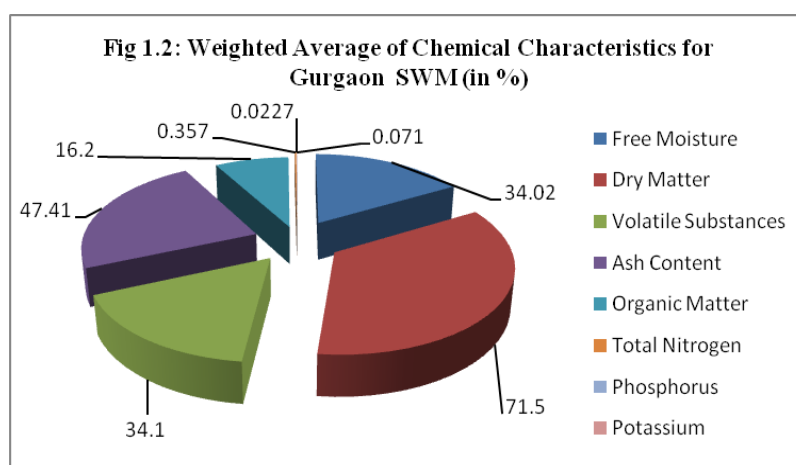
The overall weighted average of Gurgaon waste chemical characteristics is more compostable in nature. The maxium value is under dry matter constituting. Next is ash content which is recyclable material too. Organic matter has also high value. Volatite substances are very high which is obnoxious. The pH value is 6.7 i.e acidic which is near to normal. Calorific value is also high. So, overall the content of SW is most suitable for composting plant. Total nitrogen, phosperouys and potassium (NPK) value is marginal.

5.4 Processing and Disposal

1000 TPD Combined solid waste management facility plant set up at Bhandwari (Faridabad-Gurgaon toll road) for processing the MSW for Faridabad (another town) and Gurgaon Municipal corporation in PPP model under JNNURM (Jawaharlal Nehru Urban Renewal Mission) scheme for a project cost of euro. 5.3 million where 50 % fund has been funded by Govt: of India, 30 % by Municiapl council of Faridabad (town of Haryana) , 20 % by Govt: of Haryana and the Land is provided by MCG at free of cost with an agreement between MCF & MCG . The MCG is using the facility for dumping the MSW at the processing plant where no charges incurring for processing the garbage for MCG. The AKC Developers is the Operator for the plant for 30 years and the National Building Construction corporation (NBCC) is the consultant for the setting of the plant. All monitoring & Administrative control is under MCF. This plant is RDF (Refuse Derived Fuel) plant which is taken 600 tons from Faridabad waste and 400 tonns from Gurgaon waste.

In developing countries like India with MSW which has a low calorific value (7.3 MJ/kg compared to values greater than 10 MJ/kg in Europe, Japan and US) and high percentage of inerts, processing of waste is necessary to make it suitable as a fuel. This makes RDF an important alternative to WTE combustion. One of the less expensive and well-established technologies to produce RDF from MSW is mechanical biological treatment (MBT). An MBT plant separates out metals and inert materials, screens out organic fractions (for stabilization using composting processes), and separates out high-calorific fractions for RDF. RDF can also result from a 'dry stabilization process' in which residual waste (after separating out metals and inert materials) is dried through a composting process leaving the residual mass with a higher calorific value

(USEPA, 2010). The RDF thus produced is either used directly as floc/fluff or is compressed to make pellets. RDF fluff (as it is called in India) can be directly combusted in dedicated WTE plants whereas making RDF pellets increases the marketability of the product as they can be used for co-combustion in various solid fuel industries like cement kilns, coal fired power plants, etc.

RDF plants which make fluff are located near Hyderabad, Vijayawada, Jaipur and Chandigarh (other city in India). RDF produced at Hyderabad and Vijayawada is taken to dedicated WTE plants for electricity generation, whereas RDF from Jaipur and Chandigarh plants is transported to cement plants to be used in place of coal.

National Solid Waste Association of India (NSWAI) assuming 6 % of all MSW generated in India is treated in MBT facilities, out of which, 60 % is compost rejects which could be used as refuse derived fuel (RDF), India is currently generating 2.48 million TPY of RDF. Such a huge source of energy is being generated and landfilled every year. This is equivalent to landfilling nearly 4 million barrels of oil because there are no facilities which could use them. This RDF can be used in the already well established solid fuel industry in India. India would have landfilled 58 million barrels of oil in the form of RDF alone by 2041 if there were no RDF co-combustion or WTE facilities to generate energy out of it (NSWAI, 2010). Review the fact RDF is the best posible option for Gurgaon Wsate processing technlogy. It is being calculated that about 1-2 % area of total geographical area of urban premise are occupied by crude landfill site. By using different processing unit the requirement for dumping inert material is about 10 % to total present area. Gurgaon inert material is still disposed nearby RDF plant which should be placed as regional dumping yard far away from city boundary of Gurgaon and other town.

6   ENVIRONMENTAL CHALLENGES

The rapid urbanization process lead too many problems in which solid waste is one of the aspects which are changing the environment of Cyber City Gurgaon. The solid waste management is a low priority but can create social and environmental problem with risks to public health and environment. The existing solid waste management is constrained by institutional weakness, lack of proper funding, lack of proper management and operational systems, public apathy, lack of municipal will to become financially self-sufficient through municipal taxation and whole sole no administrative control on ultimate waste management stage i.e. disposal and processing system. Waste dumping is the only favorable method to urban local body without any further action. Day by day increasing trend practice of dump to dump yard won't sustain the function. The MSW facility with waste recycling plant is planned at a 30-acre (12 Hac) site in Bandwari village at Gurgaon-Faridabad road. Already 50 % land is occupied within 2 years of operation as dunmpyard where it is carrying two towns garbage. So there is a requirement of taking integrated policy and technology to use less land as land is precious. Different part of India's dumpyard has started to reclaimed and process of SWM to reach zero waste city tag. Recycling, composting and ultimate power generation makes this city also zero waste city status. Sanitary landfill system does not make sustainable mechanism process in city development plan as per Agenda 21. Different techonology has initiated in India to become energy efficient mechanism of ISWM process. Delhi the Capital of India has also started year marking step to run RDF. Footstep to sustainable development it is an imperative requirement to understand the basic concepts concerned to the solid waste management practice and bare minimum requirement of land at each level. The following options with respect to solid waste management for cyber city have been described:

- Processing of MSW and recycling of construction and demolition debris (C&D) has been emphasized upon to minimize landfill space requirement.

- Reservation of land for processing and disposal of solid waste in the Zonal Plans suggested.

- The most important concern currently is reduction in land requirement for disposal by maximize appropriate treatment of different waste streams, in order to reduce volumes of waste requiring being land-filled. MCG has privatized collection and transportation in 4 zones under Public Private Partnership (PPP) module. The balance areas are also under consideration for privatization. It is envisaged that gaps in these aspects will be met by the private sector in such a manner that required performance criteria are met. Under transportation total availability of trucks are available but there is shortfall of management.

- The basic thing in waste disposal is separation of polythene, iron and metal, using densifiers and magnetic system. Between bio-degradable and non-degradable, inert material is dumped, while degradable waste will be processed to make manure. By 2021 Processing capacity to be increased to take care of total generation through PPP (1000 TPD) for one city itself. In order to mitigate adverse impact to the environment, the immediate development of incineration process is proposed. Alongside this, the closure, capping and landscaping of existing dump-sites would have to be undertaken. Composting plant is proposed with segreagated compostable waste.

- Household level segragation should mandatory in policy planning stage. Removal of community bin is proposed. This would have to be accompanied by intermidiate transport vehicle to carry out to dispose in ultimate destination (composting plant or landfill site).

- Improvement of service delivery is critical in ensuring that quality of the environment in the city is maintained and should monitor by citizen charter itself. The proper wing under MCG should be developed. In order to build this, sustained training for all the municipal staff as well as staff of any private operator involved in waste management for their capacity building and planning capability, has also been proposed.

- Overall contrary to RDF plant only Biomethanation Technology for electricity from waste should be operated in Bandwari village.

7 REFERENCES

Datta M, 1997, Waste disposal in engineered landfills. India: Narosa Publishing House Private Limited, New Delhi.
EPA, 2004, Municipal Solid Waste Basic Facts U.S. Environmental Protection Agency, http://www.epa.gov/epaoswer/non-hw/muncpl/facts.htm.
Bundela P.S, Gautam S.P , Pandey A.K, Awasthi M.K, Sarsaiya S, 2010, Municipal solid waste management in Indian cities – A review in International Journal of Environmental Sciences, Volume 1, No 4, 2010, ISSN 0976 – 4402, Pg 501-606
Kumar S, 2005, Municipal Solid Waste Management in India: Present Practices and Future Challenge, NEERI Report
ENVIS, 2010, Municipal Solid Waste Management in India: Present Practices and Future Challenge, ENVIS, Newsletter, March, 2010
Integrated approach to Municipal Solid Waste Management, IL&FS Newsletter, IIDC, 2009.
Bandyopadhyay, S. & Bandyopadhyay, P (2006) "GIS As A Tool For Sustainable Development of Model Green City In India", Corp, 2006

Spatial and Temporal Dynamics of Residential Areas Affected by the Industrial Function in a Post-Communist City – Case Study Bucharest

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1 ABSTRACT

Industrial areas are among the main land use categories causing locational conflicts in human settlements. In Romania, this type of problem mainly appeared as a result of the forced industrialization carried out in the communist era (1949 – 1989). In this period, compact, multi-family, high density residential areas were built in order to accommodate the workforce necessary to the large industrial platforms developed in close proximity. As a result, some of the city's residential neighbourhoods were developed in the influence area of the industrial sites, negative side effects being neglected in favour of social and economic benefits. In the post-communist period part of these conflicts disappeared with the reconversion of the industrial units, while others changed their characteristics due to their abandonment. New conflicts emerged between declining industrial activities and residential areas because of the unplanned urban development and increased density of the urban fabric.

The paper is aimed to analyze the changes that occurred in the relationship between the residential and industrial areas during the post-communist era.

In order to fulfil the objectives we created a spatial database containing information about the residential and industrial areas in Bucharest for two different periods. We used spatial analysis, models and scenarios for the analysis. The main findings highlighted the surface decrease of residential areas directly affected by the proximity of industrial function due to the reconversion processes and the emergence of distressed brownfields or abandoned industrial sites (which also have negative externalities on the nearby areas still causing locational conflicts). The main tendency characterizing the dynamics of residential areas is represented by the replacement of individual residential areas with collective residential (blocks of apartments) meanwhile the industrial areas are affected by abandonment, reconversion and relocation. In order to establish the appropriate planning solutions for the future management of industrial areas situated within the urban fabric we studied the reconversion process that took place in Bucharest in the last years and analyzed the advantages and disadvantages of each.

2 INTRODUCTION

In 2010, the urban population represented over 50 % of the total world population (UN, Department of Economics and Social Affairs, 2011). Although the surface globally occupied by urban ecosystems is reduced, with only 4 % urban areas with average density over 200 inhabitants/km2 (Small, 2002), the large population and building concentrations generate challenging problems of system sustainability. Specific fields of research were proposed in order to deal with this phenomenon, such as urban ecology, an interdisciplinary approach aimed at understanding the manner in which the human society interacts with ecological processes in artificial and artificialized systems (Marzhuff et al, 2008).

Urbanisation is increasing through the outward spreading of a city, often non-regulated, and/or infill development inside the city perimeter, leading in either case to the appearance of environmentally inefficient human settlements (Pauleit et al., 2005) and low quality of life. The expansion of built surfaces determines the accentuation of certain problems, such as the pollutants emissions, urban heat island, locational conflicts (such as the industrial – residential association) or the absence of adequate infrastructures.

The association between residential and industrial areas represents one of the most frequent land use conflicts. Industrial sites influence proximity areas with negative externalities such as emissions of pollutants in the air, water and soil, noise due to production and transport activities (Sofer et al, 2012), large quantities

of waste (Lejana & Smith, 2006). Consequently, there is a general decrease in the quality of life, while the health risk increases (Morra, 2009; Marques & Lima, 2011). These consequences were for a long time conscientiously or unconscientiously ignored, as industry is an important factor influencing economic growth, contributing directly and indirectly to the creation of services and sustaining large material, energy, human and information flows between the city and its surrounding environment (Ianos, 1987).

Pre-industrial cities were characterized by a division of urban functions, rather on a vertical than on a horizontal gradient (Chelcea, 2008), with a large incidence of housings situated at the upper floors, above shops, workshops, restaurants and other services. With the appearance of large industrial areas and the intensification of commerce and services, residential areas needed isolated from other functions with negative impact on the quality of life and living. Between 1970 and 1980, most of the cities created a system of exclusive zonation for their different functions (Chelcea, 2008). Although initially industry occupied the peripheral areas of the cities, urban growth determined their physical inclusion inside the settlement. Consequently, the industrial activities, some with high environmental and health impact needed relocation. The industrial relocation to the peripheral areas or satellite cities has certain benefits: lower land prices, permissive environmental regulations and fewer administrative levels of control (Chelcea, 2008).

The relation between residential and industrial areas is a complex one. From the economic efficiency point of view, the production and the residential area need to be in proximity, as it reduces travel time and costs for the workforce. The population searches areas with high quality of the environment, often isolated form industrial sites. The two functions are complementary, but the spatial relation is of mutual exclusion. In order to characterize this complex relation, we can use statistical methods (determining the population exposed or segments of sensible population in industries with high impact upon health), spatial methods (mapping of industrial activities in residential areas (Sofer et al, 2012), mapping and analyzing the patterns of residential segregation (Marcinaczak, 2012)), temporal analysis (diachronic analysis), models, scenarios, interviews and questionnaires (exploring the experience of residents in relation with the industrial activities nearby (Sofar et al, 2012)).

In Romania, the characteristics of this relation have been modified by the transition from the communist and centralized system to a market-based economy. The communist period forced industrialization led to a situation where most of the cities had at least one large industrial unit (even if it was unsustainable, the centralized system ensured its survival for social or even propaganda reasons). The post-communist period determined a decrease in the productivity, extractive and manufacturing industries were closed as the subsidies ceased (Ianos, 2004) and the privatization emerged. If in 1989 the industry represented 58.1 % of the national GDP (Ianos, 2004), in 2011 its contribution decreased to 26.28 % (INS, 2012).

The present study has the purpose of analyzing the manner in which changes from the economic and political system affected the spatial relation between industrial and residential areas from Bucharest. Previous studies realized for this area focused on the historical evolution of the industrial landscape in Bucharest (Mirea, 2012), the reconversion of industrial area (Chelcea, 2008) or the present characteristics of the industrial sector (Cepoiu, 2009).

The objectives of this paper are: 1) to analyze the dynamics of residential surfaces located in the proximity of industrial areas between 1990-2011 in Bucharest, 2) to identify the residential areas currently exposed to negative externalities generated by industrial areas in different stages of reconversion and 3) to develop planning solutions in order to minimize the impact of industrial areas on the residential ones.

3   STUDY AREA

Bucharest is the most important political, economic and urban centre of Romania. With a surface of 228 km2 and a stable population of almost 2 millions inhabitants (INS, 2012), Bucharest is an European metropolis struggling with the environmental and planning problems of large urban areas.

The historical evolution of industrial areas in Bucharest can be differentiated into four main stages: incipient industrialization (until 1918), industrial expansion (1918-1944), communist (1944-1989) and post-communist period (after 1989) or de-industrialization. Each stage had its own environmental and landscape impact, influencing the city as a whole and the residential areas in particular.

The industrial surface in Bucharest has continuously increased (Fig 1) from the begining of the 20th century, reaching its maximum value in the final period of the communist era (1976-1989),

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The industrial activity started with small handcrafting production in the 15th century, in small shops situated generally in the central area of the city, with no separation for the residential areas (Giurescu, 2009). At the beginning of the 20th century in Bucharest 178 industrial units were recorded, with small and non-polluting industries located in the central area and larger ones at that time periphery (now the central ring of the city (fig. 2)). In the industrial expansion period, Bucharest became the most important industrial center in Romania. Since the city developed and increased its spatial footprint, old industrial areas were now comprised within the city, and new residential areas were developed in the proximity of newly created industrial cores (CFR Grivita, Viilor, Titan). Between 1944 and 1989, the communist industrialization led to the development of large compact industrial platforms accompanied by dense residential areas inhabited by the workers (fig.2). The city enclosed in its urban fabric old industrial areas, now with central placement.
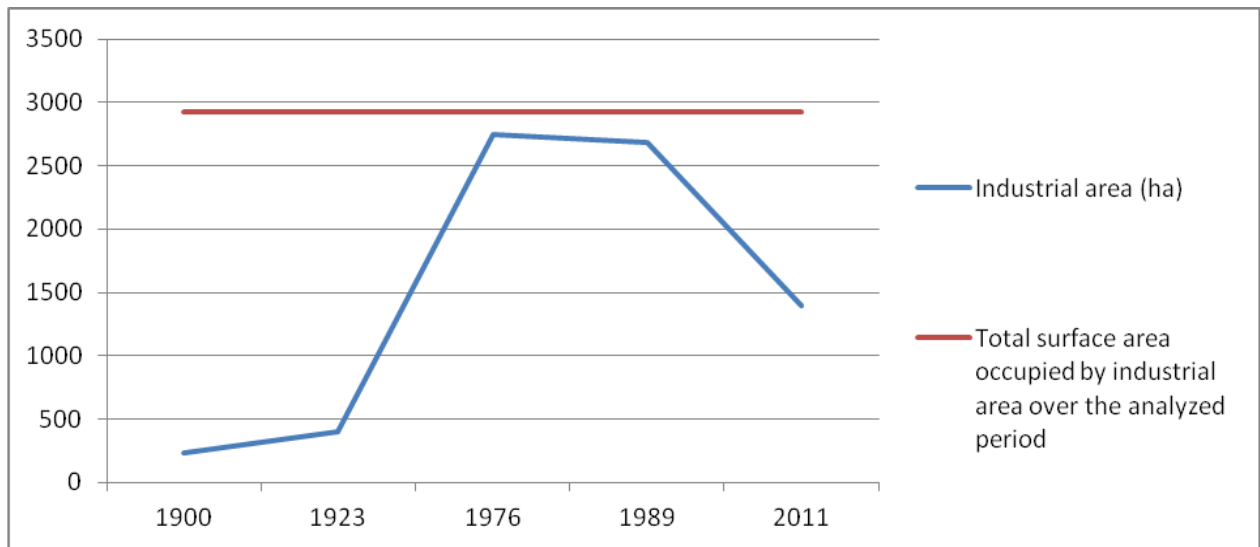
Fig. 1: Dynamics of industrial surfaces (ha) in Bucharest in the last century (after Planul orasului Bucuresti, 1911, 1923; Harti topografice 1977, Ortofotoplanuri, 2008; Mirea, 2012).

Building industrial sites next to residential areas was considered the best solution for eliminating the contrast between central and peripheral districts (Giurescu, 2009) in terms of available public infrastructure, as the industrial activity came together with the necessary transport and public utilities infrastructure. Also, this proximity meant cost and time economies for the workers. In the same time, it generated functional conflicts and discomfort for the residents (exposure to pollutants, noise and odors) overlapped over the insufficiency of green areas and the large proportion of built areas.

The industrial areas encountered in Bucharest in 1989 are very diverse. They include industries with an important negative impact on the environment (~22 % of the industrial areas) such as chemical industry, rubber industry, plastics industry or energy industry, industries with a medium negative impact on the environment (~41 % of the industrial areas) such as machinery industry, transport industry and industries with a low negative impact on the environment (~37 % of the industrial areas in Bucharest) such as food industry or textile industry.

The post-communist era (1989-present) is characterized by the relocation of industrial activities outside the city; process that may generate abandoned distressed brownfields (Dingsdale, 1999), and the reconversion of certain activities. The chaotic development of residential areas due to a lack of legislation represents another phenomenon characterizing Bucharest.

Currently, the residential areas in Bucharest are represented by two main categories: the low density residential (single unit housing or individual residential) which represents 15.15 % of the surface of the city (57.44 % of the surface of residential areas in Bucharest) and the multi-family, medium or highly dense residential areas (multi unit housing or collective residential) which represent 10.26 % of Bucharest surface (38.9 % of the residential areas in Bucharest).
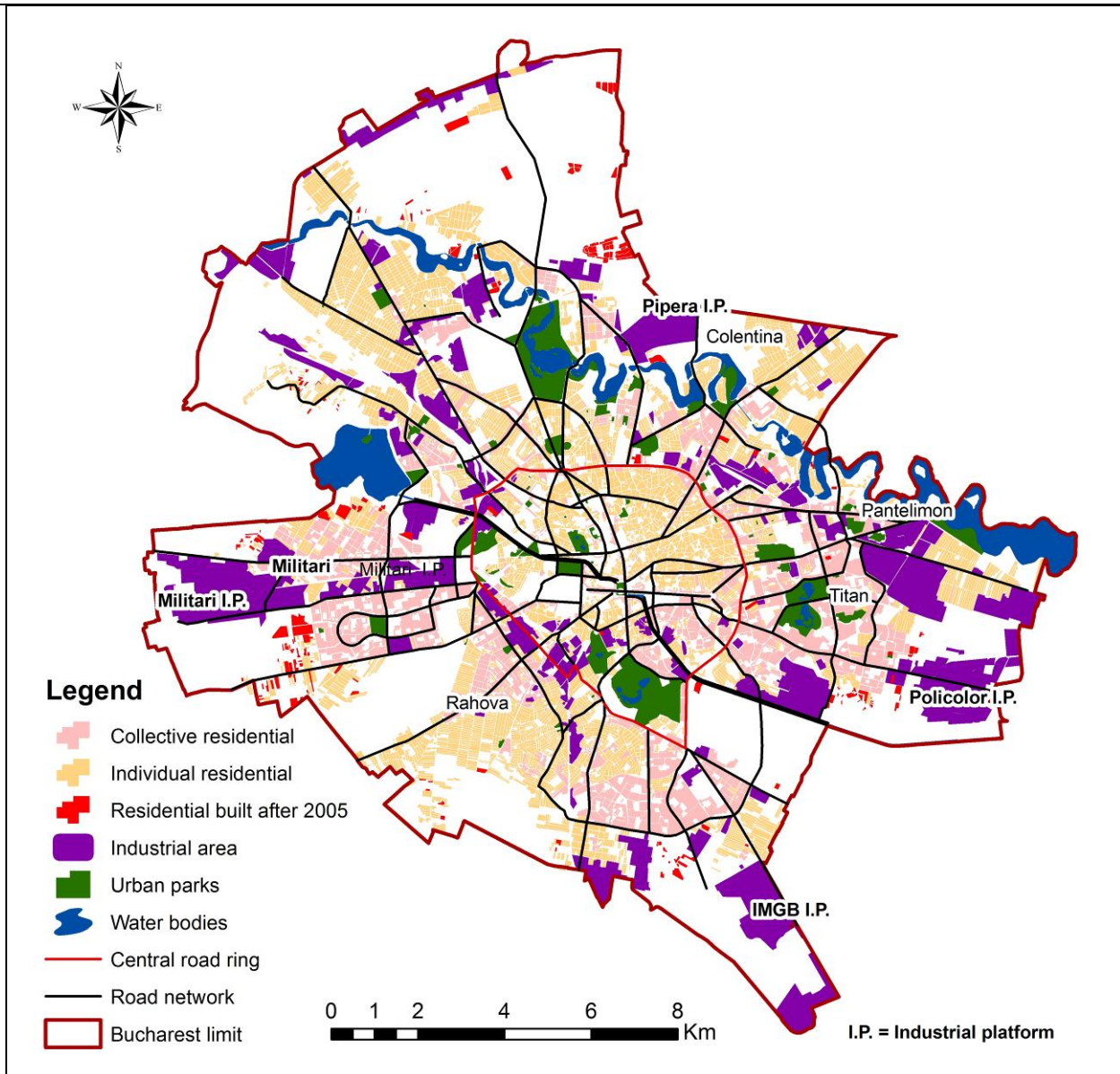
Fig. 2: Residential and industrial area in Bucharest (2011)

4 DATA AND METHODS

In order to assess the spatial and temporal dynamics of the residential areas exposed to industrial function a spatial database was created. The geospatial information was extracted using the 1976 edition of the topographical maps (scale 1:25.000) and 2008 edition of aerial images with an average resolution of 0.5 m (www.ancpi.ro). We used as a start point for the analysis the 1976 maps. We considered such an approach is suitable because the large industrial platforms in Bucharest were already built at this point in time and so were the compact, multi-family, high density residential areas which are the main characteristics of this period. We couldn't use satellite images to cover the 1989 moment because even if they permit the differentiation of built and natural areas, the identification of different kinds of functional zones inside an urban area is almost imposible (Chen et al, 2011) being suject of personal interpretation of the urban morphology.

The spatial database contains information about the localization of different categories of residential areas (low density residential areas or individual residential and multi-family medium or high density residential areas or collective residential) and industrial surfaces, their surfaces, the current situation of industrial areas (abbandoned or demolished industrial areas, active industrial areas, industrial in conversion and industrial areas affected by improvised conversion) and the main tendency regarding the conversion phenomenon (conversion in residential areas, comercial units, offices building, transportation areas or other uses). The database was validated through field surveys realized in random points.

We used the multiple ring buffer method (a proximity analysis), with an option of excluding the surface of the industrial areas from the resulted buffer (Sumathi et. Al, 2008) for extracting the residential areas situated at certain distances from the industrial areas. For the multiple ring buffers we used the distances mentioned in the Romanian legislation (Order 536/1997) – 300m, 500m and 1000m corresponding to areas strongly, medium and little affected by the industrial function. These distances correspond to the protection areas that should isolate certain industrial activities according to their level of aggresivity in relation with the environment or the human health. Beside the proximity analysis that took into account all industrial areas existing in 1976 and 2011 in Bucharest, for the second moment of interest the analysis was realized also using as imput only the still active industrial areas and the abandoned or demolished ones, as these two categories were considered capable to affect in a negative manner the residential located in proximity. The other two identified categories, industrial in conversion and industrial aggectef by improvised conversion, were considered to have a considerable lower potential of causing problems or discomfort to the nearby residential.

The spatial and temporal dynamics analysis and the modeling of the relation between industrial and residential areas were conducted in ArcGIS 9.3 (Environmental System Research Institute, California, CA) and the statistical analysis was realized in Microsoft Office Excel.

5 RESULTS

The residential area in Bucharest represents around 25 % of the city's surface both in 1976 and 2011. The difference is made especially by the change that took place in the structure of the residential, not in its surface.The spatial analysis highlighted that the main process that characterize the final period of the communist era is the transformation of low density residential areas (individual residential) in multy-family, medium or high density residential areas (collective residential). This process affected about 3 % of Bucharest surface (~15 % of the area occupied by individual residential in 1976 which is considered the start point of the analysis) and resulted in the construction of Rahova (fig. 2) and Crangasi neighborhoods and of the area between Unirii Square and Titan neighborhood.

The figures underline the stagnation of the residential development in the first years of the post-communist period. After 2005 there can be noted a new tendency in the direction of residential areas expansion (~1 % of Bucharest surface is converted to residential uses).

Regarding the industrial areas, their surface increased by 6 % (which means 0.75 % of Bucharest surface) untill 2005. That is if we include in this category all the industrial areas (many of them closed, abandoned or demolished) which still kept their image and characteristics untill that moment in time. The real conversion process of industrial areas started in Romania after 2005. The spatial analyze, validated through random field surveys, highlighted that the traditionally industrial areas in Bucharest are divided in 4 categories (Mirea, 2012): abandoned and/or demolished industrial areas (12.41 % of the surface occupied by industrial areas in 2005), active industrial areas (47.75 %), industrial in conversion (15.52 %) and industrial affected by improvised conversion (24.3 %) (fig. 6).

In order to evaluate the surfaces of residential areas exposed to the industrial function side effects, a proximity analysis was realized (fig. 3). It highlighted that in 1976 92.57 % of the collective residential areas were located at less than 1000m from an industrial unit (34.94 % within the first 300m, 26.03 % between 300-500m and 31.59 % between 500-1000m) (fig. 4). The percentage was inferior in the case of individual residential – 80.06 % (33.21 % within the first 300m, 18.23 % between 300-500m and 28.6 % between 500-1000m) (fig.5). The situation remains almost the same untill 2005 (94.1 % of the collective residential at less than 1000m from an industrial unit (fig. 4) and 79.03 % of the individual residential (fig.5)) with the most important modifications in the surface of the collective residential situated within 300m from an industrial facility. The increase of 5 % is especially due to the construction of Rahova neighbohood in the proximity of Progresului Industrial Platform.

Interesting to notice is that 65 % of the residential built between 2005 and 2011 is also located in the first 1000m from the industrial units (22.27 % at less than 300m, 21.63 % between 300-500m and 21.88 between 500-1000m).
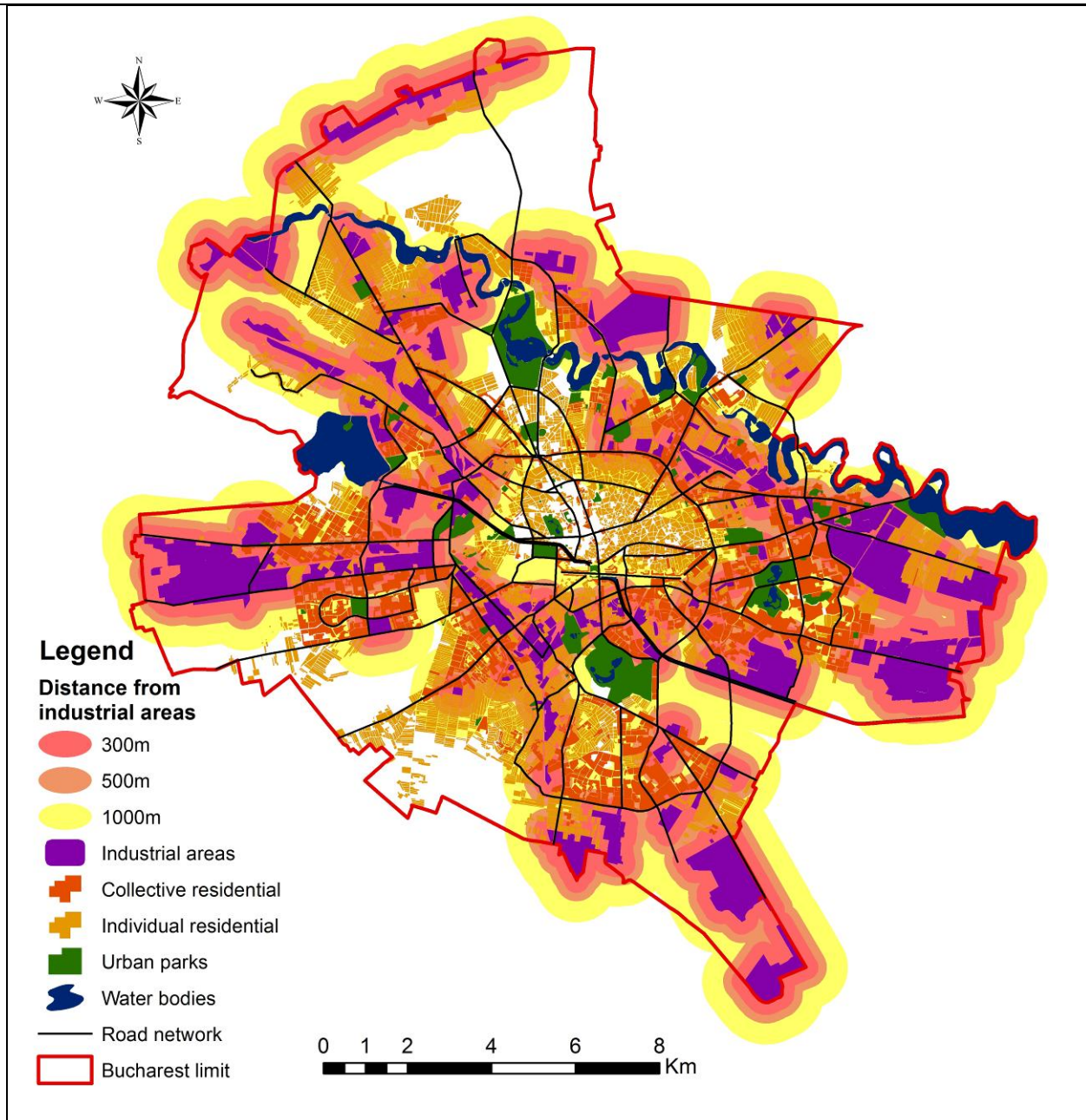
Fig. 3: Distance from industrial areas in Bucharest (including the industrial surfaces which were abandoned, demolished or converted) (2011)

The proximity analysis was also realized for the active industrial areas (fig. 6) and for the abandoned and demolished ones as they were categorized in 2011. Only these two categories of industrial were chosen for the analysis (of the four identified) because these two are the ones which generally cause locational conflicts when situated in the proximity of a residential area. The collective residential areas were were exposed in proportion of 57.25 % to the active residential areas (9.46 % in the first 300m) and 51.76 % to the abandoned and demolished ones (14.01 % within the first 300m) (fig. 4). Meanwhile, the individual residential had 40.66 % of its surface affected by active industrial areas (10.58 % within the first 300m) and 51.29 % (12.22 % within the first 300m) by abandoned and demolished industrial sites.

The residential areas built after 2005 have a good localization in relation to the abandoned and demolished industrial areas only small surfaces being in their proximity (2.92 % within the first 300m and 18.32 % within 1000m) but an average one in relation with the active industrial (15.28 % within the first 300m and 54.77 % within 1000m).
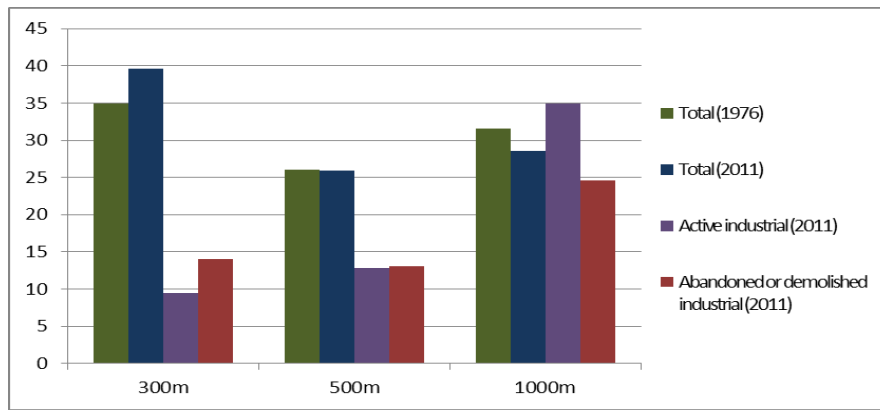
Fig. 4: Percentage of collective residential areas (of the total surface of collective residential in Bucharest) affected by the industrial function
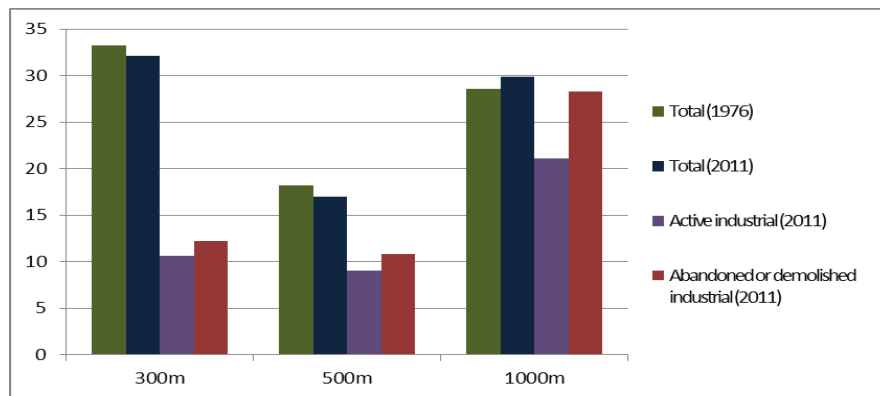
Fig. 5: Percentage of individual residential areas (of the total surface of individual residential in Bucharest) affected by the industrial function

6 DISCUSSION

Once the communist era ended and the market-based economy begin to replace the centralized system, the expansion of built up areas (both residential and industrial) in Bucharest stagnated. The construction projects left unfinished by the previous regime were part abandoned and part finished after years. However there can be noticed the tendency of ignoring the potential problems that could raise from the vicinity of industrial areas when building new residential.

Regarding the residential areas, the communist era was characterized by the transformation of individual residential areas in collective residential ones and the post-communist era at first by stagnation in construction works, and after 2005 by urban sprawl and infill development.

The reasons that triggerd the transformation of individual into collective residential in the communist era were the desire of maximizing the accomodation capacity of the city in order to assure the needed number of workers in a developing economy (Rahova neighborhood was built in the proximity of the industrial units which formed Progresului Platform), the implementation of important planning projects and the desire for improving the quality of life and the image of the city (the construction of Morii Lake which closed the flood protection system of Bucharest lead to the disappearance of part of a slum area, while the rest was transformed in multy-family high density residential; the extensive demolition works in the center of Bucharest carried out in order to make room for the House of Parliament were followed by te remodeling of the area and the construction of both administrative and residential buildings).

The dynamics of industrial areas in Bucharest was influenced by the political and economic measures that characterized the first years of post-communism. In those years the industries received important subsidies which helped even the unsustainable ones to continue to function. Slowly, with the subsidies termination, part of the industrial units closed, others were abandoned and some were privatized which in many cases led to the previous mentioned situations. After 2005 the conversion process of industrial areas became an important factor in shaping Bucharest landscape. With the closure of many industrial units, more than half

(52.25 %) of the industrial area previously existing in Bucharest changed its use. As a direct consequence the residential area affected by this locational conflitct almost halved.

Fig. 6 shows that active industrial areas are situated almost entirely in the peripheral areas of Bucharest, the industrial areas near Bucharest central road ring (fig. 2) being abandoned or in conversion. 12.41 % of the ex industrial areas are currently abandoned or demolished, representing brownfields (Oliver et al, 2005). Currently they cause a locational conflict through the negative externalities they produce (PM, odors, noise, historical pollution, feral and stray animals, etc) but better planning solutions may increase the environmental quality in those areas.

Stratton (2000) has identified five directions of the industrial conversion: comercial areas, small and performant industries, residential areas, offices and cultural or retail use. The most used conversion solution in Bucharest appears to be the transformation of previous industrial areas in important commercial facilities (hypermarkets or malls), 35.91 % of the surface of already converted industrial having this function. This surface will increase more once the already approved projects of comercial centres will transform more of the relict land in comercial area. The rest of the industrial surface was converted in offices (38.48 %), residential areas (7.73 %) and other uses (17.84 %). Just a little part of the converted industrial area kept its industrial function and that was possible only due to new approaches such as organizing units for the assembly of different products.
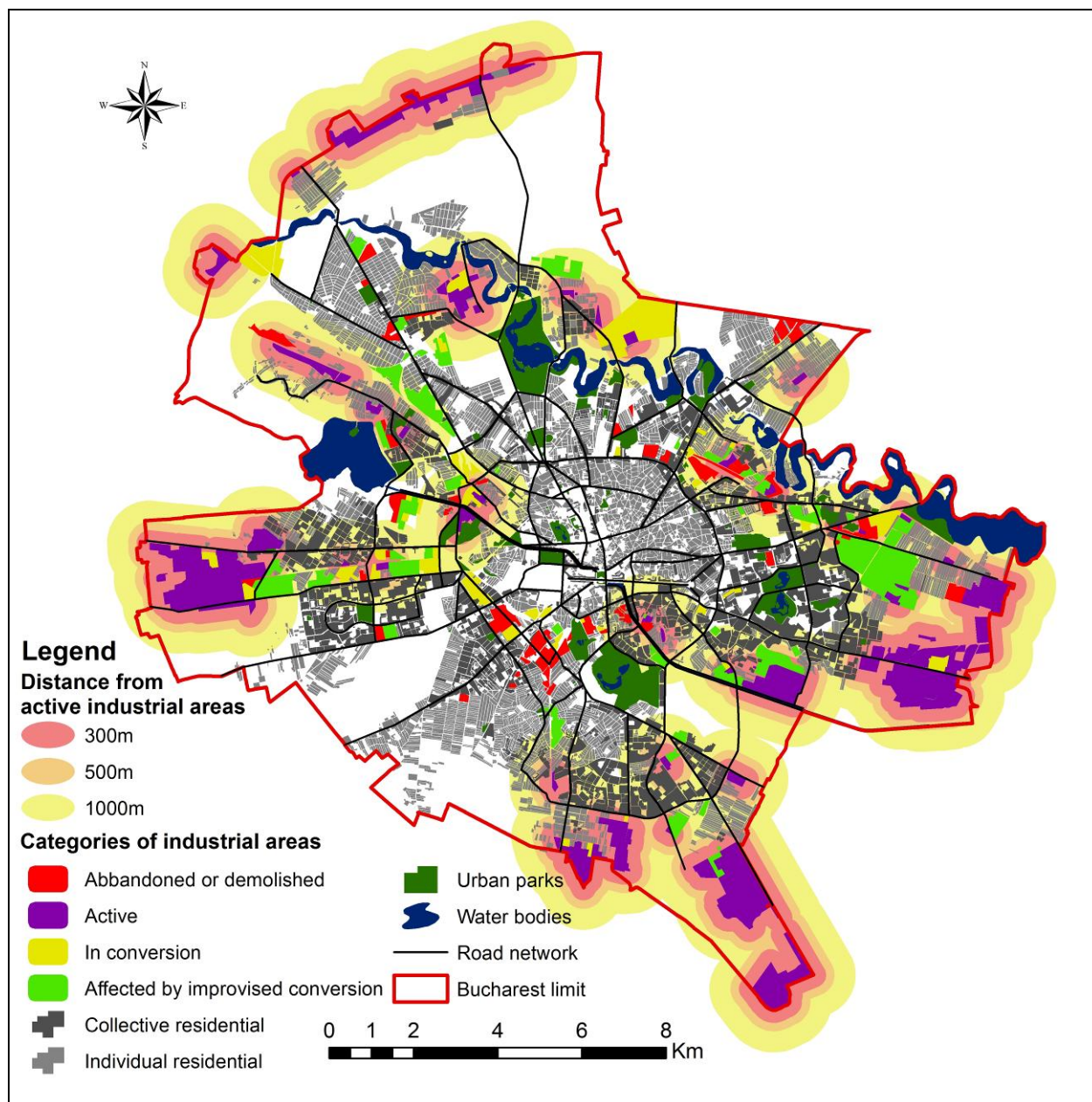
Fig. 6: Categories of industrial areas in Bucharest and the surfaces they affect (2011)

It is important to mention that the distances of 300, 500 and 1000 metres, used in the analysis, were taken from the Romanian legislation. They may vary in other countries and should vary in relation with the magnitude of the negative impact the industrial activity may cause to the environment or human health. Also important is that if an industrial area is separated from a low density residential area by a front of high buildings (offices, collective residential) the latter may not be exposed to the negative impacts the industrial area produces, but the front of high buildings will be affected more. Such an analysis may be the subject of a future research along to the correlation of people's perception of industrial areas and their conversion with the area where they live.

7 CONCLUSION

The study area represents a good example of the changes that can occure in a post-communist city with important economic and demographic impact. It offers an exemple of how a neglijent planning (both from an economic point of view and a territorial one) can lead to locational conflicts of high spatial importance. Although currently the surface of residential areas directly exposed to industrial function has decreased, the diversity of locational conflicts caused by the former industrial surfaces has diversified (emergence of abandoned and demolished areas, brownfields, new uses that may still not fit to the proximity of residential areas). A special attention must be directed to the conversion of industrial areas because this process may importantly increase the environmental and life quality in the proximity by promoting projects suitable for each area.

8 ACKNOWLEDGMENTS

9 REFERENCES

CEPOIU A.: Rolul activităților industriale în dezvoltarea așezărilor din spațiul metropolitan al Bucureștilor. București, 2009.
CHELCEA L.: Bucureștiul postindustrial – memorie, dezindustrializare și regenerare urbană. București, 2008.
YIMIN CHEN, XIA LI, YONG ZHENG, YANYAN GUAN, XIAOPING LIU: Estimating the relationship between urban forms and energy consumption: A case study in the Pearl River Delta, 2005-2008 In: Landscape and urban planning 102, pp. 33-42. 2011.
DINGSDALE A.: Budapest's built environment in transition. In: GeoJournal 49, pp. 63-78. Netherlands, 1999.
GIURESCU, C., C.: Istoria Bucureștilor, București, 2009.
IANOȘ I.: Orașele și organizarea spațiului geographic. București, 1987.
IANOȘ I.: Dinamica urbană. Aplicații la orașul și sistemul urban românesc. București, 2004.
INSTITUTUL NAȚIONAL DE STATISTICĂ. http://www.insse.ro/cms/rw/pages/index.ro.do 2012.
LEJANA R.P., SMITH C.S.: Incompatible land uses and the typology of cumulative risk In: Environmental Management 37 (2), pp. 230-246, 2006.
MARCINCZAK S.: The evolution of spatial patterns of residential segregation in Central European Cities: The Lodz functional urban region from mature socialism to mature post-socialism In: Cities 29, pp.300-309. 2012.
MARQUES S. LIMA M. I. Living in grey areas : Industial activity and psychological health In : Journal of Environmental Psychology 31, pp. 314-322. 2011.
MARZLUFF, J.; SHULENBERGER, E.; ENDLICHER, W.; ALBERTI, M.; BRADLEY, G.; RYAN, C.; ZUMBRUNNEN, C.; SIMON, U. (Eds.). :Urban Ecology. An International Perspective on the Interaction Between Humans and Nature. New York, 2008.
MINISTERY OF HEALTH.: Order 536/1997 for approving the sanitation regulations concerning the populations living environment. 1997.
MIREA D.: Metode de evaluare a efectelor reconversiei peisajului industrial în starea mediului municipiului București, București, 2012.
MORRA P., LISI R., SPADONI G., MASCHIO G.: The assessment of human health impact caused by industrial and civil activities in the Pace Valley of Messina. In: Science of the Total Environment 407, pp. 3712-3720. 2009.
OLIVER L., FERBER U., GRIMSKI D., MILLAR K., NATHANAIL P.: Th escale and nature of European Brownfields In: International Conference on Mapping Urban, 13-15 April, Belfast, 2005.
PAULEIT S., ENNOS R., GOLDING Y.: Modeling the environmental impacts of urban land use and land cover change—a study in Merseyside, UK. In: Landscape and Urban Planning, 71, pp. 295–310. 2005.

SMALL C.: Physical environment and global population distribution. Larmont-Doherty Earth Observatory, 2002.

SOFER M., POTCHTER O. GNAIM N., GNAIM J.M.:Environmental nuisances from industrial activities in residential areas of Arab municipalities in Israel. In: Applied Geography 35, pp. 353-362. 2012.

STRATTON M.: Understanding the potential: Location, configuration and conversion options In: Industrial Buildings: Conservation and Heritage, London, 2000.

SUMATHI V.R., NATESAN U., SARKAR V.:GIS-based approach for optimized siting of municipal solid waste landfill. In: Waste Management 28. Pp. 2146-2160. 2008.

UNITED NATIONS, DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS: World Urbanization Prospects, the 2011 Revision in Population Division, Population Estimates and Projections Section http://esa.un.org/unpd/wup/index.htm .2011

Spatial Resilience of Megacities based on Conceptual Model from Concept to Implementation. Case Study: Greater Cairo, Egypt

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1 ABSTRACT

Analysis and understanding of megacities' properties such as rapid spatial growth, rate of population increase and development, loss of fertile land, urban sprawl, water and air pollution, and others are becoming a sophisticated and a complicated task in environmental management approaches especially in developing countries. The European Environment Agency recommends a concept which distinguishes driving forces, pressures, states, impacts, and responses (DPSIR) to develop a strategy for integrated environmental assessments.

In this study, the DPSIR model is used to identify and to determine the framework to find and describe the development indicators of megacity in relation to ecology and environment and also to provide a deduction of main transformer indicators in Greater Cairo.

Accordingly, the relationship between the human activities (society) and the dynamic processes of land-use cover change are understood and implemented into management strategies. Hence, the population growth and fast increase of investments represent the main drivers which lead to environmental and spatial changes in land use and land-cover. As a result of exerting pressure, the state of urbanization and losses of fertile land are major indicators of transformation that shows dynamic processes through the DPSIR chain. Therefore, the spatial monitoring can identify hot-spots (objects) of changes. Based on the application of DPSIR model and their looping mechanism, new planning strategies could be elaborated to improve management of a megacity such as Greater Cairo.

2 INTRODUCTION

Megacities are increasingly vulnerable systems because they often harbour pronounced poverty, social inequality, growing pressure and environmental degradation, all of which are linked together by a complex system supplying goods and services (Megacity report 2005 http://www.yearofplanetearth.org/). That figures out the scale of the challenge to understand and analyse megacity's indicators such as rapid growth, rate of population and development, loss of fertile lands, urbanization sprawl, water and air pollution, and others in developing countries. So, this is one of the main challenges faces the studies of a rapid development of big cities; because the fast growth is accompanied by dramatic changes in the socio-environmental structure and land utilisation.

To monitor such complex changes for sustainable information and to integrate and manage the relation between indicators, a conceptual model and a good tool to support the management of ecosystems is needed. In a similar way, Ines et al., 2004 stated that, determination of indicators is an excellent way of representing the environmental components avoiding the measurement of too many parameters. Indicators are often adopted to avoid and reduce the complexity of environmental data. However, most conceptual models deal with ecosystem in one direction of analysis such as; from top to down (i.e., hierarchy constitutes), key constitutes to link and find relation between elements, and fuzzy which concerns with the changed core and fuzzy boundary in system. Furthermore, Cumming et al. (2005) defined a resilience social-ecological system as consisting of essential actors, components, and interaction. And the system identity consists of maintaining these elements through space and time. The state of susceptibility to harm from exposure to stress associated with environmental and social change is mentioned as "Vulnerability" by Adger (2006). Regarding the sustainable development and sustainability, Norberg and Cumming (2008) responded them as "the equitable, ethical, and efficient use of natural resources".

3 CONCEPTUAL MODEL

Because of the spatial and temporal scope of the phenomena addressed by social ecological system (SES) theory ranges from local to global and over time scales that are relevant to human usage of natural resources (Pickett et al., 2007).

In this point of view, some authors described and simplified the system complexity of the real world to capture key aspects of interest of social ecological system.

Holling (1995) simulated hierarchies framework of complex system based on agent-based model, and he at (2001) proposed that social-ecological system are composed of series of interconnected adaptive cycle at different scales. While, Kay and Boyle (2008) assumed hierarchies of structures and processes; focuses on flows, feedbacks, and thresholds based on self-organization of resources dissipation (energy). And, Ostrom (2009) divided the social-ecological system (SES) into four interacting levels: resource units, a resources system, a governance system, and users, which aimed to identify relevant variable and provide a common set of variables for organizing comparisons of similar SES.

In order to develop a strategy for integrated environmental assessment, The European Environment Agency (EEA) recommended a concept, which distinguished driving forces, pressures, states, impacts, and responses (DPSIR) (Figure. 1) that has been developed by OECD (The Organisation for Economic Co-operation and Development).

Furthermore, DSPIR described by Kristensen (2004), Mara et al. (2007) and others as a logic relations and causal links of the bulk of socio-environmental reactions starting with 'driving forces' (functions and activities that exert pressures on the environment) through 'pressures' (the act of driving forces on the environment) to 'states' (the influence of acting pressure on the environment) leading to 'impacts' (the reactions of environment due to changes of states) , which eventually may lead to political "responses" (prioritisation, target setting, indicators).
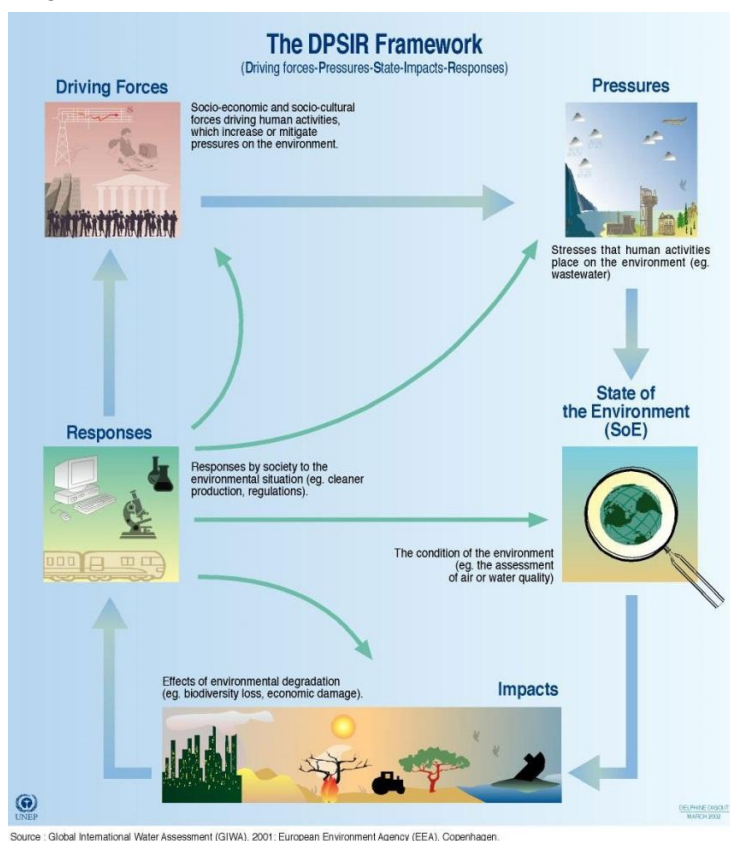
Fig. 1: DPSIR scheme.

4 STUDY AREA

The selected area of study is the metropolitan area of Greater Cairo and its surroundings, which is known as the capital of Egypt and one of the fastest growing megacities worldwide (Figure 2). The area covers about 600 km2, encompassing major parts of the governorates of Cairo, Giza, Six October, and Helwan. The Nile forms the administrative division between these governorates, with Cairo and Helwan on the east bank of the river and, Giza and Six October on the west bank. The area includes a variety of land uses associated with a complex mix of land cover, such as a central business district (CBD), urban/ suburban residential areas and

some rural areas (e.g. cultivated areas and soil). This area has encountered rapid urban development and population growth in the last 20 years.

Consequently, immense strain put on cultivated areas in the greater Cairo from a serious problem of urbanization. This problem has caused an irretrievable loss of very fertile suitable soils. A very severe status and rate characterized the problem while the risk is severe.
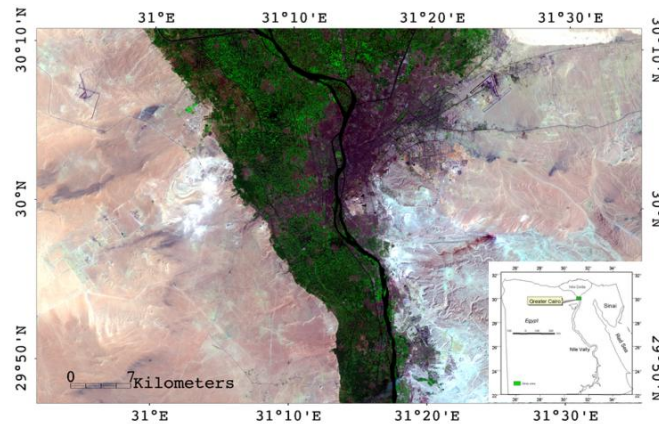
Fig. 2: Location of the study area

Consequently, immense strain put on cultivated areas in the greater Cairo from a serious problem of urbanization. This problem has caused an irretrievable loss of very fertile suitable soils. A very severe status and rate characterized the problem while the risk is severe.

5 GREATER CAIRO MODULES IN THE LIGHT OF THE DPSIR FRAMEWORK

There is many socio-ecological indicators are identified in Greater Cairo metropolis (Figure 3) which are concern the rapid increasing and physical change of the city. This means that, the scope of conceptual framework for such megacity (G.C) in current study would be included historical and/or temporal questions, such as how rapid development drive land use and land cover changes.

The author mentioned that the application of DPSIR-model on monitoring of mega-city meets most of components identified and described in other previous theories and frameworks concern the social economical system.

So, in this study, the DPSIR model used to identify and to determine a framework to find and describe the development indicators of megacity in relation to ecology and environment, and also to provide a deduction of main transformer indicators in Greater Cairo Metropolis.

Hence, the environmental status scheme (DPSIR), which could be applied for G.C is described as following (Figure 4).

By using the DPSIR scheme mentioned above, the relationship between the driving forces and the dynamic process of land use are guided in G.C. Hence the population growth and fast growing of investments (human activity) were representing the main drivers, which lead to environmental and spatial changes in land uses and planning. As a result of exerting pressure on the land, the states of Urbanization and loss of fertile land will be concerned in this study as major transformer indicators implemented and linked between dynamic processes through the DPSIR chain. Moreover, the spatial monitoring was applied to determine what and where the effect of the failures were and to put them into place responses to manage these changes.

Accordingly, the relationship between the human activities (society) and the dynamic processes of land-use cover change would be understood and implemented into management plan.
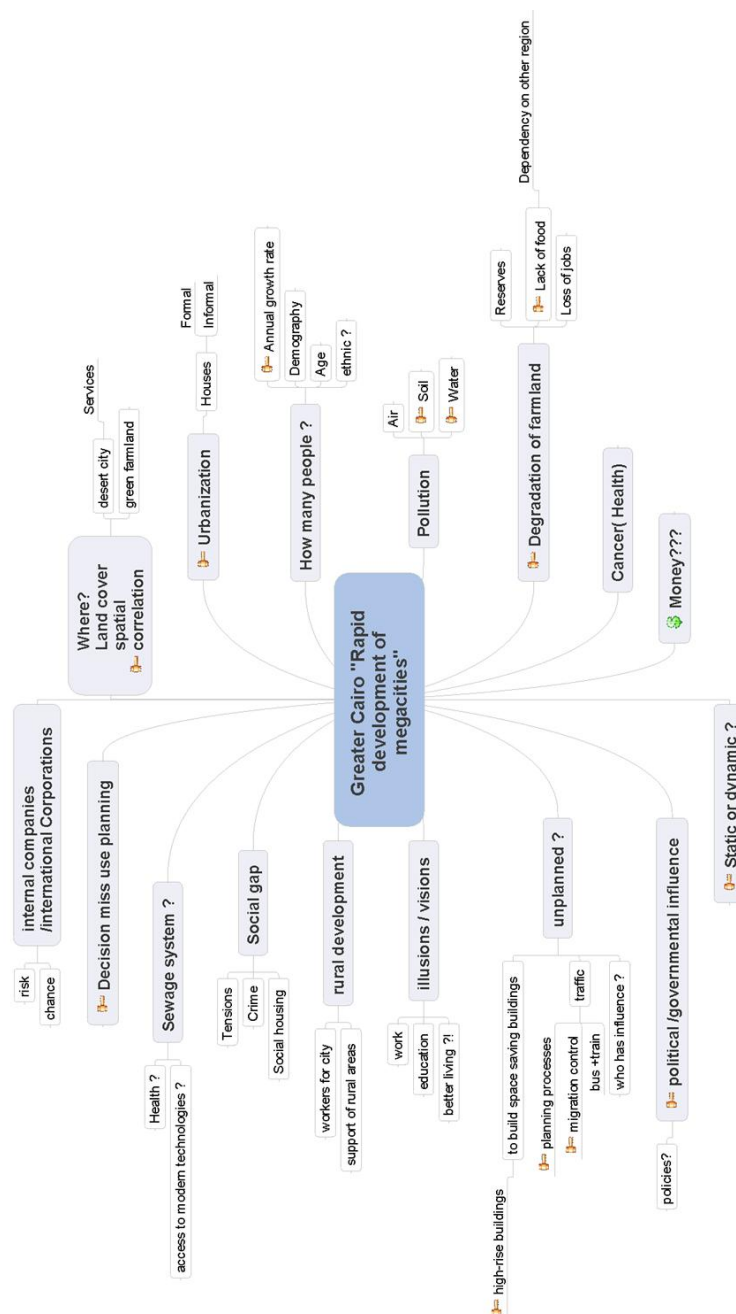
Fig. 3: The main megacity's indicators.

6 CHANGE DETECTION BY USING REMOTE SENSING TECHNIQUES

Remotely-sensed information is of particular relevance in the worlds developing countries because it provides fundamental information on growth-related processes and their effect on the environment that are not available from other sources (Miller & Small, 2003). Hence, this study describes and discusses different remote sensing (RS) techniques to monitor and analyse dynamic expansion and change detection in Greater Cairo Metropolis. While the availability of different resolutions of satellite images, which launched in different dates by different sensors, encouraged most of spatial and environmental planners to specify different applications to improve spatially and spectrally historic data and collected information of the land. Furthermore, archived remote sensing data has been used to examine the possibilities of multi-temporal imagery for mapping and monitoring changes in land cover (Sobrino and Raissouni 2000). As well, monitoring information can then be combined with different layers to help predict which areas are affected in the past and which could be at risk in the future, allowing secure decisions to be taken where it is needed most. Therefore, successful utilization of remotely sensed data for land-cover and land-use monitoring requires careful selection of an appropriate data set and image processing techniques (Lunetta, 1998). Consequently, Landsat 5TM and 7 ETM+ provide an opportunity to extend the area and frequency with

which we are able to monitor the Earth's surface with large geographic cover (Curtis 2001). This address that monitoring LULCC on large cities could be processed and give fast-recent information of alternative indicators, which are dynamically and dramatically transformed.

Recently, change detection of a particular object between two or more time periods, which lead to produce a quantitative spatial analysis in an area of interest (Macleod and

Congalton, 1998), are provided by several remote sensing satellite sensors. Thus, different satellite systems have different characteristics, e.g. resolutions, number of bands, and have their own importance for different application.
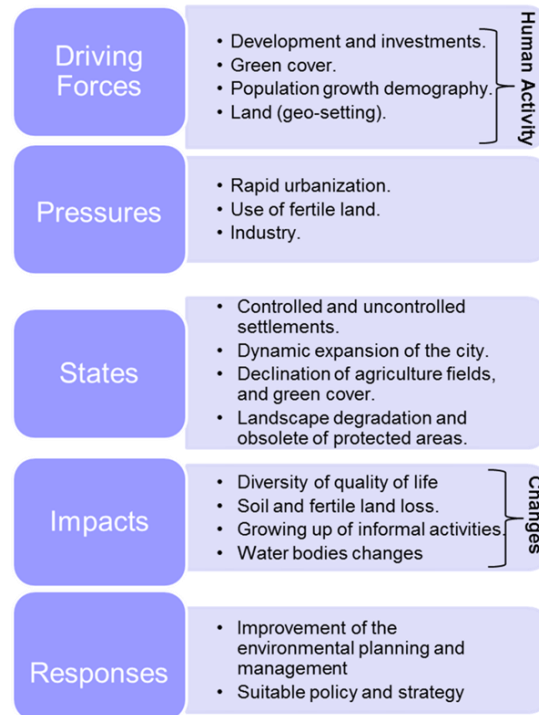
Fig. 4: General scheme of DPSIR for Greatre Cairo.

7 MATERIAL AND METHODOLOGY

7.1 Data

Beside the ground information, the selected satellite data and its time span represented the whole study area spatially, and two main phases concern the rapid development, expansion of infrastructure services, and investment economically. To classify the whole area of Greater Cairo metropolis during the last two decades of the last century and the first decade of new millennium, the low to medium resolution images of Thematic Mapper TM and Enhanced Thematic Mapper ETM were used with about 28 m pixel size.

The close relation between land use cover changes and economic growth and reforming has been putting on the track of change detection researchers and they emphasized some phrases. For example; Luc 2001 mentioned that a spatial econometric approach is not exclusively a consequence of the nature of the data, but may also be required to quantify the "spatial" components of a theoretical specification.

Therefore, the three different time series with sixteen years difference started from 1884 (which is considered as the reference year for the other images), then 1990, to 2006 have been chosen. Consequently, the time span from 1984 to 1990 represented the continuity of a phase of market economy which was introduced at the end of 1970´s by Sadat's regime (http://www.mideastweb.org/egypthistory.htm). From 1991 Mubarak undertook a number of important laws and decrees which have been significantly reformed the domestic economic program to reduce the size of the public sector and expand the role of the private sector (IDRC report 1996).

7.2 Image processing

If A series of processing operations was performed on these images. The images were georeferenced using UTM map projection for zone 36 and WGS84 datum. The images were resampled to 30 m for bands 1, 2, 3, 4, 5, 7, to 15 m for panchromatic and to 60 m for thermal bands using the nearest neighbour technique. In order to produce a test area, false colour composites from ETM+ bands 7, 5 and 3 were used, while all of the six bands (ETM+ bands 1, 2, 3, 4, 5 and7) were used for pixel-based classification.

7.3 Object-based classification

Since pixel-based analysis in complexly structured land-use and land-cover (LU/LC) areas is limited because the semantic information necessary to interpret an image is usually not represented in single pixels, and also, the statistical independence assumption pixel-based classifications involve the DN values individually without considering the neighbourhood pixels (Castelli et al., 1999), the Object segmentation module was used for object-oriented analysis and classification.

Segmentation is the main process in the classification module in eCognition Developer software and its aim is to create meaningful objects. This means that an image object should ideally represent the pattern of each object in question. This pattern combined with further derivative colour and texture properties can be used to initially classify the image by classifying the generated image objects.

Thereby we found that, the classes are organized within a process tree and sophisticated class hierarchy that has been compatible with the concept of DPSIR framework and it looping mechanism.

In other hand, the multi-scale behaviour of the objects can construct a semantic hierarchy by detecting a number of small objects, which could be aggregated to form larger objects (Matinfar et al. 2007). The latter is used for back-forward analysis.

8   IMPLEMENTATION OF LUCC BY USING DPSIR

The main selected elements of land use / land cover (LULC), which have been examined and classified, are investigate the relation between human activity and landscape surface in Greater Cairo (G.C) and expose their linkage status and impact. For the sake of classification and monitoring, the six land classes were considered to refer to the urbanization (dense and lose), cultivated, surface water, desert (hinterland), cultivated-to-urban areas, and bare soil. These classes provide a practical means to dynamic change in spatial resilience to achieve management objectives, and also, they can be used for predicting coming changes and assessing development challenges.

As we addressed before the needs of conceptual model to explore key aspects of human-environment relations in Greater Cairo metropolis, here is the first impression of the implementation of DPSIR model to clarify the interaction between different stages in this model and land classes selected for Greater Cairo regarding the back-forward mechanism (Figure. 6).

According to, Luc (2001) concluded that the uses of an appropriate" spatial" methodology can one hope to discover the "true" underlying relationships. This study assumed that the land classes or indicators in the term of land use/cover classification are representing the spatial driving forces, exerted pressures, and affected states of increasing or shrinks of Greater Cairo. In spite of the population rate are changed through the time span but it is represented here as static indicator during the spatial classification of each selected year. While the other indicators defined as anthropogenic drivers such as "urbanization, cultivation, and artificial water bodies" and natural drivers such as (natural surface water and geo-cover). These indicators defined as dynamic drivers which could be detected and monitored spatially by using remote sensing techniques. As a result, the impacts of the human activity could be reanalysed and implied as driving forces in sub-scheme of DPSIR, that mechanism is called here internal looping process or reiterate analysis.

Therefore, this study modified the DPSIR scheme to be adapted and used effectively in back-forward manner in spatial analysis of a Megacity knotty system. That permits to reselect elements (objects) within the system and repeat the analytical process through the system framework. This process named by author as "Looping Mechanism" of spatial analysis and resilience.

The back-forward (Looping Mechanism) is working by two ways regarding new data or information coming from the change of time span and/or spatial information (resolution). The first one (main vision) is the flexibility to add and modify the data through the main framework (Figure 6). The second one (minor vision)

is the ability to extract from the main framework a specific object and reanalyse and monitor it by using subsidiary DPSIR scheme (Figure 7). This means that, the monitoring system of spatial changes took place, which leads to irritation iterate of change detection program in any level of working flow and prospective date. For instance; choosing the green cover and urbanization changes as main objects to use them separately in work scheme and monitoring system has been applied (Figure 7).

9 RESULTS

The analyses of LU/LC state of each year in different time series show that, the mutual linking between the six environmental indicators is representing a first level of classification (Figure 8) (Table 1). This level of classification can lead directly to individual time response. This response is ineffective for growing cities and monitoring studies. As a result, the subsidiary DPSIR frameworks and other level of classification were applied to compare and detect the change of any key element (object) separately such as agriculture activity (green cover) and urban development through time span is based on and part of the main frame work and classification tree (Figure 7, 9&10).
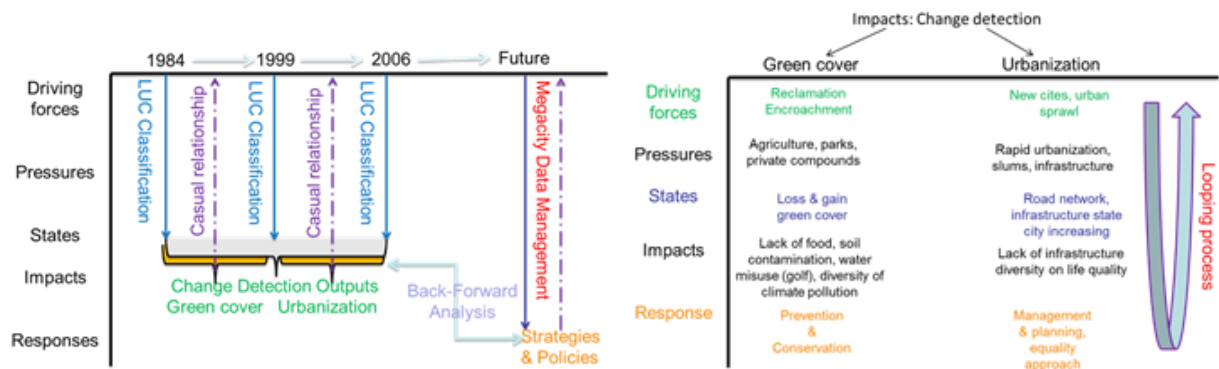
Fig. 6 (left): Implementation of LUCC analysis by DPSIR. Fig. 7 (right): Back-forward process analysis (Looping Mechanism)of changed indicators by using DPSIR for G.C.
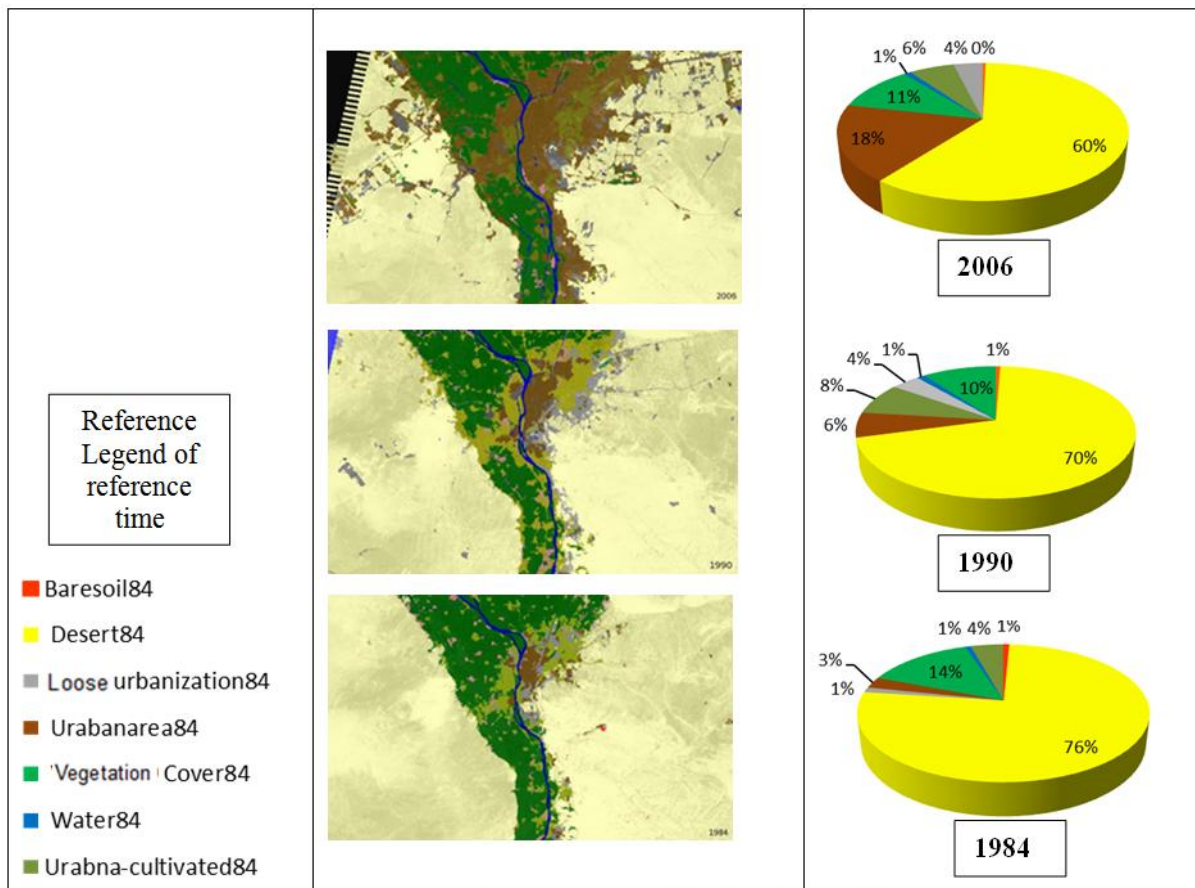
Fig. 8: The classified images and their distribution analysis.

LU/LC (Land use/cover)	1984 %	1990 %	2006 %
U (Urban areas)	3	6	18
CL (Cultivated land)	14	10	11
CU (Cultivated to urban)	4	8	6-
D (Desert area)	76	70	60+
BS (Bare soil)	1	1	0+
WB (Water Bodies)	1	1	1
(LU) Loose Urban	1	4	4

Table 1: Land cover-use change analysis of Greater Cairo.

There are two main contrasting aspects have been affecting the green activity in area of concern, the first one is the reclamation and the second one is encroachment. Additionally, the new cities and urban sprawl represent the main forces when the spatial development and dynamic of urbanization in Greater Cairo takes place.
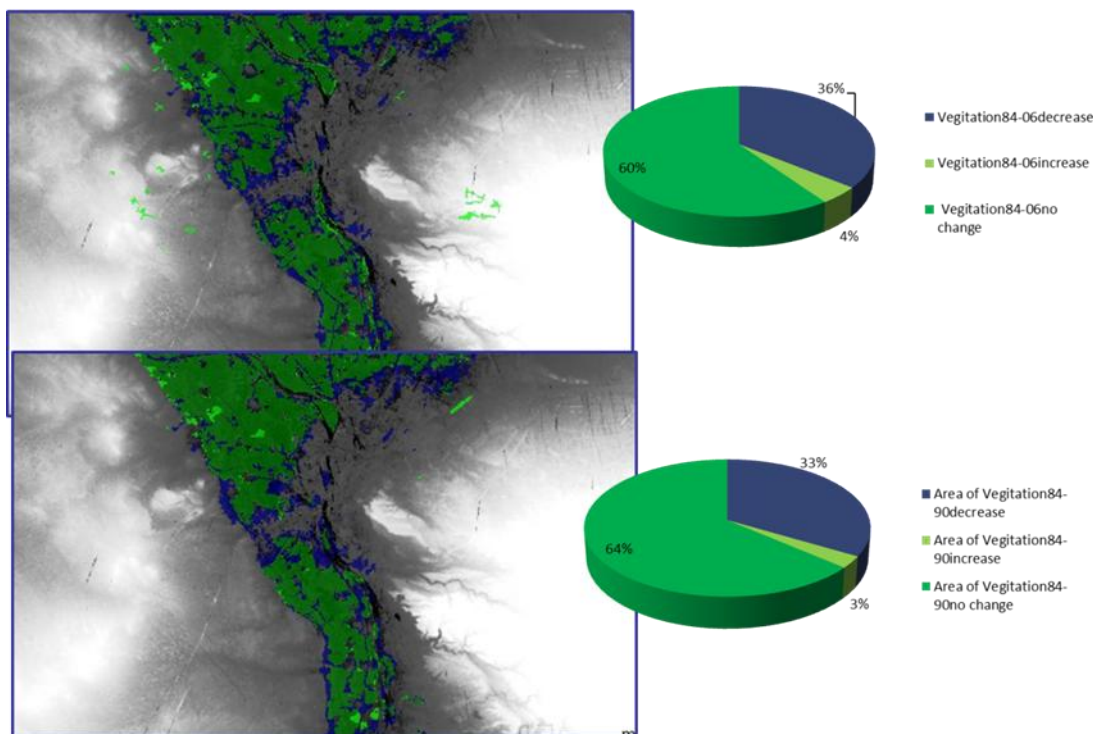
Figure 9. Green cover changes in G.C (Impact)

In these two sub-schemes, the two keys are used as drivers to move to another level of monitoring and classification which is strongly connected with the basic classification and main framework. Moreover, any change, addition, or erase of time span or image resolution rather than classification algorithms do not affect the main structure of the analytical framework and their subsidiary schemes. But, such changes can contribute smoothly and systematically to the interconnected sub-DPSIR-responses which can be aggregated and used to develop a data base of management planning and to update monitoring information.

According to such approach, it is possible to examine the accuracy of using tool to analyse and mention the criteria of more affected objects (spots) for further processing and estimation of the change levels.

So, the sub-DPSIR scheme for urbanization shows that the impact in water is mainly dealing with the drinking water, unlike; the sub-scheme for green activity expresses its impact on irrigation water (Figure 7). This means that, the strategy of analysis and purposed plan has been oriented by selected object.
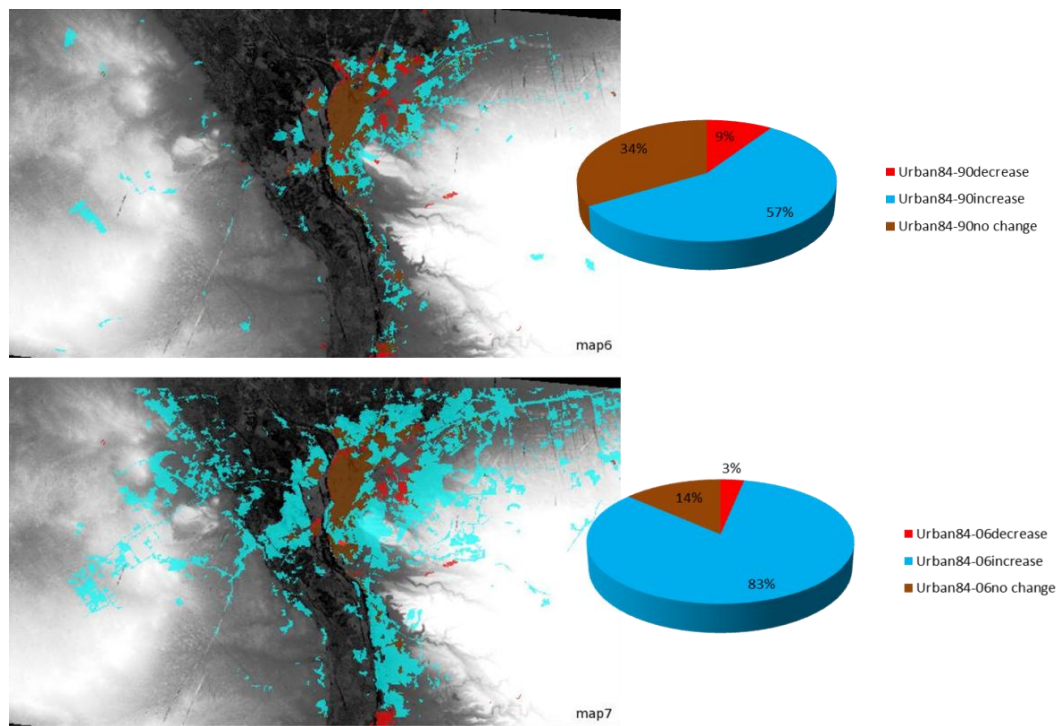
Figure 10. Urbanization changes in G.C (Impact)

10 CONCLUSIONS

- The spatial monitoring and change detection of megacity is not based only on the classification and remote sensing techniques but also on effective conceptual model to understand the environmental indicators and to identify the more effective hot-spots (objects) of changes.

- In this study we found that the applications of DPSIR model are useful to identify and analyse the causal link between the socio-environmental indicators of megacities (e.g. Greater Cairo metropolis) based on goal oriented and tracked flow of a conceptual scheme.

- Flexibility and elements interaction characters of DPSIR could be modified and used as looping process analysis for wide range of uses in different levels, approaches, scales and times.

- It could be concluded that, the object oriented classification technique is very compatible with DPSIR model in monitoring and change detection approach.

- New and modifies planning strategies could be elaborated based on the main DPSIR framework and its subsidiary schemes, these would contribute to improve management and support the decision makers and stakeholders to choice an individual element or group of elements to understand and response.

- The using of Socio – Envirronmental Models are useful to build knowledge system of megacites, that would be used for geo-spatial information service and data mining with what means (e.g. planning system, national and regional spatial development policies, other legislation, etc.).

11 REFERENCES

Adger, W. N., (2006):.Vulnerability. Global Environmental Change, 16, p 268-281.

Carr, E. R., P. M. Wingard, S. C. Yorty, M. C. Thompson, N. K. Jensen, and J. Roberson. (2007): Applying DPSIR to sustainable development. International Journal of Sustainable Development and World Ecology 14: p. 543-555.

Cassidy L., Binford M., Southworth J., and Barnes G., (2010): Social and ecological factors and land-use-land-cover diversity in two provinces in southeast Asia. Journal of Land Use Science, Vol.5. No. 4, p.277.306.

Castelli V., Elvidge C. D., Li C. S. and Turek J. J.,(1999): Classification-based change detection Theory and applications to the NALC dataset. In remote sensing change detection: Environmental monitoring methods and applications, edited by R.S. Lunetta and C. D. Elvidge.London, UK: Taylor & Francis, 53-73.

Chen, Jian-fei; Wei, Su-qiong; Chang, Kang-tsung; Tsai, Bor-wen (2007): A comparative case study of cultivated land changes in Fujian and Taiwan. In: Land Use Policy 24 (2), S. 386–395. Online verfügbar unter http://www.sciencedirect.com/science/article/pii/S0264837706000317.

Cumming, G. S., Barnes, G., Perz, S., Schmink, M., Stieving, K., and Southworth, J., et al. (2005): An exploratory framework for the empirical measurement of resilience. Ecosystems, 8, p. 975-987.

Curtis E. Woodcocka,b, Scott A. Macombera,b, Mary Pax-Lenneya,b, Warren B. Cohenc, (2001): Monitoring large areas for forest change using Landsat: Generalization across space, time and Landsat sensors. Remote Sensing of Environment 78 p. 194– 203.

Griffiths P., Hostert P., GruebnerO., and Linden S., (2009): Mapping megacity growth with multi-sensor data. Remote Sensing of Environment 114, 426-439..

Herold, M., Gardner, M., Hadley, B., Roberts, D. (2002). The spectral dimension in urban land cover mapping from high resolution optical remote sensing data. In, Proceedings of the 3rd symposium on remote sensing of urban areas. Istanbul, Turkey.

Holling, J. H. (1995). How adaptation builds complexity, New York: Perseus Books p. 185.

Holling, J. H. (2001). Understanding the complexity of economic, ecological, and social systems. Ecosystems, 4, p 390-405.

IDCR report 1996, "Egypt economy Profile", Economic Research Forum for Arab countries, Iran and Turkey. p. 01-07. In: Journal of Environmental Management 72 (1–2), S. 1–3. Online verfügbar unter http://www.sciencedirect.com/science/article/pii/S0301479704000684.

Ines, M., Sandra, C., Maria, H. C., Tomás B. R., and M. P., (2004): Application of the DPSIR model to the Sado Estuar in a GIS context–Social and Economical Pressures. Proceedings of 7th Conference on Geographic Information Science. Crete University Press, AGILE, Crete, Greece, p 391 – 402.

Kay, .J., and Boyle, M. (2008): Self-organizing, holarchi, open systems (SOHOs). The ecosystem approach: complexity, uncertainty, and managing for sustainability, New York: Columbia University Press, p 383.

Kozova M, and Finka M., (2010): Landscape development planning and management systems in selected European countries. The problems of Landscape ecology, Vol. XXVIII. P101-110.

Latocha A., (2010): Sptial planning in mountain regions-present trends, threats and opportunites (Sudety Mountain case study). The problems of Landscape ecology, Vol. XXVIII. P55-64.

Luc Anselin (2001): Spatial Effects in Econometric Practice in Environmental and Resource Economics. American Journal of Agricultural Economics, Vol. 83, No. 3, pp. 705-710 (Published by: Oxford University Press on behalf of the Agricultural & Applied Economics Association, Article Stable URL: http://www.jstor.org/stable/1245103)

Lunetta, R.S., Elvidge, C.D., (1998). Remote Sensing Change Detection: Environmental Monitoring Methods and Applications, Ann Arbor Press, Chelsea, MI, 318 pp.

Macleod, R. D amd Congalton, R. G., A., (1998). Quantitative comparison of change detection algorithms for monitoring Eelgrass from remotely sensed data Photogrammetric Engineering and Remote Sensing.64 (3), 207-21.,

Matelas. L., and Prastacos. P., (2011) Sustainable urban growth for Athens. Uraban and Regional Data Management-Zlatanova, Ledoux, Fendel & Rumor (eds) UDMS annual, p.193-200.

Matinfar H.R., Sarmadian F., Alavi Panah S.K., and Heck R.J.,(2007):.Comparisons of Object-Oriented and Pixel-Based Classification of Land Use/Land Cover Types Based on Lansadsat7, Etm+ Spectral Bands (Case Study: Arid Region of Iran)", American-Eurasian J. Agric. & Environ. Sci., vol 2 (4), p.p. 448-456.

Miller R. B., and Small, C.: Cities from space: Potential applications of remote sensing in urban environmental research and policy. Environmental Science & Policy, 6, pp. 129−137, 2003.

Norberg, J., and Cumming, G. S. (Eds.) (2008). Complexity theory for sustainable future. New York: Columbia University Press.

Peter Kristensen., (2004): The DPSIR Framework. Workshop on a comprehensive / detailed assessment of the vulnerability of water resources to environmental change in Africa using river basin approach. UNEP Headquarters, Nairobi, Kenya.

Phinn, S., Stanford, M., Scarth, P., Murray, A. T., & Shyy, P. T. (2002): Monitoring the composition of urban environments based on the vegetation–impervious surface–soil (VIS) model by subpixel analysis techniques. International Journal of Remote Sensing, 23, 4131−4153.

Pickett, S. T. A., Jones, C. and Kolasa, J. (2007): Ecological understanding: the nature of theory and the theory of nature. New york: academic Press.

 Rogan, J., Chen, D., (2004), Remote sensing technology for mapping and monitoring land cover and land use change. Progress in Planning 61, p 301−325.

Sobrino J. A.; Raissouni N., Toward (2000), remote sensing methods for land cover dynamic monitoring: application to Morocco. International Journal of Remote Sensing, Volume 21, Number 2, p.353-366.

Veldkamp, A.; Verburg, P. H. (2004): Modelling land use change and environmental impact. Modelling land use change and environmental impact Environmental Change 15 (3), S. 238–252.

Strengthening Alexandria Urban Fabric by Planning Urbanism's Walkable Area

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1 ABSTRACT

Nowadays city of Alexandria has a very wide range of urban development projects, some of them has a major influence to the physical being of the city meanwhile others just have a small interpretation to its characteristics. The rapid growth of Alexandria city in the nineteenth century led to calls for parks to be provided for the health of all categories in the society. This could be seen as an early precedent to highlight the role of open spaces in supporting what we now call sustainable development.

This paper proposes an urban development project which make a replacement of an urban crawl in Alexandria city into unique open space through presenting a comprehensive approach for assessing this suggested project to create a walkability area based on a combination of its conceptual and applicable aspects. Discussion of the sustainability modules to this new urban development project in Alexandria will be accomplished, by the aim of investigating its ability to stand against the future challenges.

It is concluded that a significant attribute of urban design achieves continuity of the urban fabric and streets, because this facilitates flows. Wherever movements occur, there is vitality and flow creates eyes on the street producing spontaneous surveillance. Also, Comparison of contextual and neighbourhood before and after the project revealed the positive impact of the suggested project either on the built (physical) environment's or health and social well-being.

2 INTRODUCTION

Alexandria is the chief port of Egypt and is located in the north and occupies a T-shaped peninsula and strip of land separating the Mediterranean from Lake Maryout. (Fig.1).[1] The city was founded in 331 BC by Alexander the Great and was the capital of Egypt for over 1000 years.

Alexandria witnessed a continuous urban growth from the beginning of the Mohammed Ali era (1805) up to the present time. In 1905, Alexandria's 370 thousand inhabitants lived in an area of about 4 km2 between the two harbors. Since that time the city has expanded rapidly, eastwards and westwards, beyond its medieval walls. It presently occupies an area of about 300 km2 and has a ten-fold increase in population at 4million, with a density exceeding 1,200 per km².[2] Population is projected to become 5.4 million by 2015 (Figure.2). Because of this, Alexandria is the second largest urban governorate in Egypt. At an international level, the city was ranked 62 in 1996 and it is predicted to become rank 54 by 2015.[3] This enormous urban growth requires precise detection with good management, prediction and planning to solve circulation and traffic problems especially in the city center.

Fig. 1: Area of Study.

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[1] research.ncl.ac.uk/forum/v5i1/azaz.pdf

[2] Shouk, Y. H. a. F. A. (2000) Human impacts on Alexandria's marine environment. Paris, © UNESCO, http://www.unesco.org/csi/pub/source/ alex8.htm, (Feb., 2000)

[3] United Nations, (1997). Urban Agglomerations 1996, http://www.undp.org/popin/wdtrends/u rb/urbpab.htm (Feb., 2001)
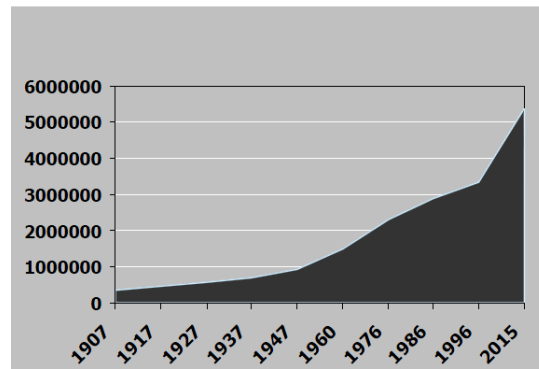
Fig. 2: Population growth in Alexandria1997-2015.

3   CHANGING ALEXANDRIA URBAN FABRIC:

The rapid growth of towns and cities in the nineteen century led to calls for parks to be provided for the health of factory workers and consequently it benefited society as well. This could be seen as an early precedent to highlight the role of open spaces in supporting what we now call sustainable development. This achieved a wide range of benefits to the economy (healthier, happier, and therefore more productive workers), social life (people relaxing and meeting in the parks) and the environment (as open spaces were created amongst streets, mines and factories).[4]

One of the main urban problems in Alexandria is lack of Structured Public Squares. The primary public squares do not offer enough enclosure. Not only are the surrounding buildings too large (in plan), they are all separated by streets. Another problem with the public spaces is their large provision for traffic and parking.

Public open spaces can take the responsibility as key design elements for enhancing urban life quality and to reduce the negative effects of urbanization. For that sake, open spaces must meet the expectations of potential users and offer the suitable mix of environmental, economic, social, and even political conditions.[5]

Strategies for sustainable growth in Alexandria can be summarized in strengthening of the central parts of Alexandria, a particular focus on a strategic node such as sidi gaber terminal and the connection of city areas which until now have been separated and the creation of a vibrant urban environment.

Designing public spaces for pedestrians, is a challenging task for urban planners as it deals with the built environment which includes buildings, streets, plazas, trees and platforms, and also extends to people activities that play the important role in urban design as mentioned by previous researchers.[6]

Good urban design is not only the design of aethetically acceptable places, but actually it depends on making places usable for people.

Redesign of urban places can always be the catalyst for change in cities. Alexandria city must increase the quantity and quality of well-planned beautiful public spaces that are human in scale, sustainable, healthy, safe, and lively. City streets, parks, and squares are important sites for social, economic, and political activity.

4   THE CASE STUDY AREA (SIDI GABER TRAIN STATION) :

4.1 History of the station

The interior section of the Eastern District in Alexandria; Egypt, contains the Sidi Gaber railway station, the main rail entry point to Alexandria for most travelers. The station is one of the oldest in Egypt, having served

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[4] Shirley, P. (2005). The Urban Park, In M. Cliff (ed.), Urban Design: Green Dimensions, Elsevier, Architectural Press, Oxford, UK, pp. 77-92.

[5] BRUSE, M. : Simulating human thermal comfort and resulting usage patterns of urban open spaces with a Multi-Agent System. Proceedings the 24th International Conference on Passive and Low Energy Architecture PLEA, pp. 699-706.Singapore, 2007.

[6] RASLAN, R., BAKR, A., & AYAD, H.: Simulation of Pedestrian Behaviour in Urban Spaces. A Case Study of "Sidi Gaber" PublicSpace,Alexandria, Egypt. In: Schrenk M.; Popovich, V.V.; Zeile, P. (Eds.): Proceedings REAL CORP 2011, pp. 863-872. Essen, 2011.

the eastern regions of the city even before their transformation into major urban districts (they had previously been summering resorts for foreigners and wealthy and middle-class residents).

The station Sidi Gaber is also one of the oldest Egyptian stations, is the first railway line outside Europe, and the second in the world, started to create between the cities of Alexandria and Cairo in 1851, following the start-up the rail line linking the cities of Manchester and Liverpool in Britain in 1830.[7]

The Khedive Abbas the first in 1851 had contracted with British Robert Stephenson, son of George Stephenson inventor of the ferrous tractor, and paid $ 56 thousand pounds sterling for the establishment of a railway linking the Egyptian capital and Alexandria length of 209 km.

First locomotive on the line between Alexandria and the city of Kafr El Zayat in the Delta region was in 1854. The train cars was crossing the Nile water in different cities by ferries prior to the establishment of iron bridges on the waterway.

The Sidi Gaber station witnessed many events such as in twenties of the last century reception Saad Zaghloul Pasha after his return from exile, as celebrated by Alexandrian people with Sayed Darwish song famous specially composed for the occasion «safety safety ..We went and return safety". Also the train offered by France in 1862 to Khedive Said, which was a locomotive containing a luxury salon, which remained used by the rulers of Egypt to move between El-Montaza and Ras El-Teen in Alexandria until 1898.

The famous train station building has a special architectural style and unique Dutch character building that was constructed instead of the traditional old wooden one, in 1948 and was built with yellow brick. The station is distinguished with a clock tower, and major map in front of it a showing the main streets of the city of Alexandria and the most important tourist attractions.

Fig.3: the old and new facades of Sidi Gaber station.

Fig. 4 Perspective of the new project as shown in advertising

4.2 New development project at the station:

As of 2011, the station is undergoing expansion, with the intent to turn old parts of the station into a railway museum, and include space for commerce in the newer parts.

Development project has been implemented to use the top of the station to provide large halls for passengers either for commercial or recreational services. The cost of the project was estimated by 225 million Egyptian

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[7] http://www.aawsat.com/default.asp

pounds. The station serves nearly 4 million passengers annually and now will provide more than 7,000 square meters of commercial spaces and cafeterias as well as places for 850 cars parking.

The two-storey mall over the station equipped with escalators, elevators, central air conditioning and alarm systems and fire-fighting up to date system, is considered an integrated service for station's clients.

The ground floor will serve as train station with highly equipped ticketing tools and services.

4.3 New development project design philosphy:

The philosophy of the new design was based on the new design elements added to the internal train station with services and new activities to entertain passengers in the waiting times next to the events of economic boom. The building of the station is a sensitive quality in public building and brings a symbol of expression on the public spaces more than just a service relying on community service. This station is the welcoming gate of Alexandria for all passengers.

The philosphy of the project design idea begins with the influence first given in the design of the building and with the emphasize of the internal strength and depth with new technologies used either in materials finishing or in the construction methods to create a dominant building and a place to remember while arriving or leaving the city.

The design concept was inspired from Egyptian symbol of the Sun God as he was stripped of its wings and took and put them to send a date centric lighting ressembling the new building embracing the old one. Industrial lighting next to natural adopted from sky light reflecting images from the juxtaposed buildings. Use of transparancy and the blue color of the glass indicate the color of the Nile and life to the Egyptians. Despite the dominance of the design idea but the spirit of the age has been confirmed with the most recent technological manner (High tech) and through materials and transparent glass wall, where all are full of cylindrical columns of concrete coating aluminum metal ore, fig. (5).[8]
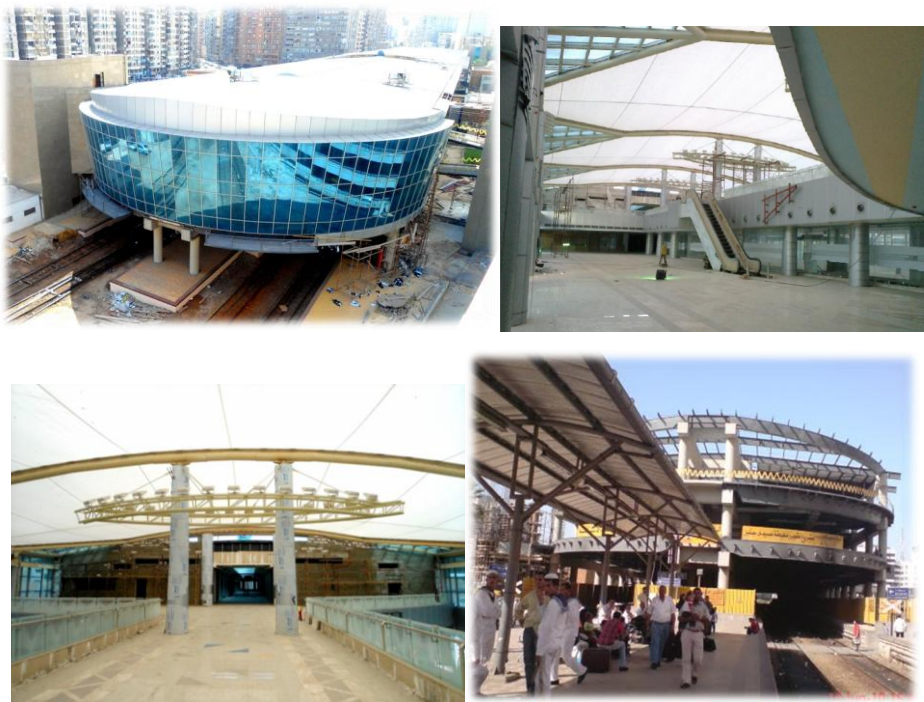
Fig. 5 The new development project of sidi gaber station photos showing the use of modern finishing materials.

The designer tried to link between the old building with its unique character and modern style in architecture.

But the difference between the two buildings was clear and obvious even in the functions performance and quality of materials.

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[8] http://www.bonah.org/news

From another point of view, the new design had to encompass the old building and to cope with it in harmony, which was never accomplished in reality, fig.6.

Fig. 6 The new facade with new finishing materials over the old train sation building causing aesthetic pollution.

5 PROBLEM DEFINITION:

With the new design of Sidi Gaber station project, the need for pedestrian walkable area becomes a must.

Pedestrians usually cross the street from extremely critical access that is in conflict with vehicles traffic. In order to eliminate such behavior, the local authority constructed a pedestrian bridge and escalators that in reality are not used by pedestrians according to previous studies, fig. 7.(7)

Fig. 7 the pedestrian bridge that in reality is not used by people.

The new design of the station either accepted by people or rejected is a reality that must be dealt with as soon as we can. The change of the train station and the new designed building have caused change in population densities to increase and require spatial development as soon as possible. Pedestrian flow coming to the station besides the flow of the people visiting the mall will create Chaos.

It is important that urban design achieves continuity of the urban fabric and streets to facilitate flows. Wherever movement occurs, there is vitality and flow creating the need of street surveillance. From the field observations on the selected space there are a number of pedestrian that have been noticed as pedestrian movement destinations. Within these paths, pedestrians need to cross " Al- Horreya Avenue" in order to arrive to their targets.

There are interferance between private and public activities either inside or outside the train station , giving the feeling of confusion to the users of the train station. The organization of this area will allow people to find their way clearly. There also a need to minimize the impact of the new invasive mall building in the surrounding public space. There must be a system to manupilate the flow of people either entering the station or visiting the mall.

Fig. 8 : Pedestrians crossing Horreya street to arrive at Sidi Gaber with higher flow.

In urban spaces, people must be the decision makers, and they are free to choose their next steps. Where spaces are supposed to be designed to meet pedestrians' needs and support their activities. Most of our urban spaces are not giving pedestrian movements the enough priority and that cause a mis-use problem.

Norman Foster design in Santa Giulia provides a very safe pedestrian condition, thanks to the addition of clear walking paths and the public surveillance from the presence of stores.[9]

Fig. 9: Different circulation flow of people going to and from station with an obvious disorder.

6 SUGGESTED PROPOSED PROJECT

Open spaces in neighborhoods are defined as " any unbuilt land within the boundary or designated envelope of a neighborhood which provides or has the potential to provide environmental social and/ or economic benefits to communities, whether direct or indirect.[10]

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[9] McNeill, D. (2006). Globalization and the ethics of architectural design. City,10(01), 49-58.

[10] Campbell, K. (2001). Rethinking Open Space, Open space Provision and Management: A Way Forward, Report presented by Scottish Executive Central Research Unit, Edinburgh, Scotland, UK.

The proposed project composed of either greenspaces represented in vegetated land or water elements and greyspaces represented in paved or hard landscaped areas with civic function can be an enhancement to the urban structure of this central crowded part of Alexandria, Egypt, fig.9.

Fig. 10 the proposed plaza in front of the train station to solve the problems resulted from the new development project of Sidi Gaber.

The new design of a plaza in front of the station relating it with the tram line on the other side and creating an urban public space offer the urban quality to the place as well as solving the chaos problem in this district. The Ground floor will be the entrance for users both coming from the front street of the station or from the plaza or from the back street, fig. 10..

In general, in the previous solution as shown in fig. 10, Landing cars level in the way of Horreya street under the ground, and raise the level of the tram as a monorail, leads to organize cars circulation and seperate between them and the pedestrian as an important improvement that must be considered. Creating a plaza outside the train station untill the tram side will allow people to walk or sit with maximum safety. It organizes the people flow either coming to the station or visting the new mall and other public spaces in harmony and logical way.

In such a central terminal, wakable paved greyspaces is required to develop the quality of the urban space outside the train station.Using patterns and new materials in pavements can facilitate the direction of people path.

The new planning of the site will organize the pedestrian places and seperate the cars allowing the pedestrian to cross street safely. Alhough, greenspaces especially trees, palms and flowers led to the shading of some parts in the space. The presence of fountain in the middle give psychological effect of satisfaction, beauty and climate mitigation that could send joy in the space. Provision of greenspaces in this crowded area is a source of recreation to the residents specially Sidi Gaber Towers, which overlooks it directly. So comfort and pleasure is provided for train station users and residents in the same time. Fire fighting alarm and Extinguisher must be distributed according to the new building design and people flow. Also guidance signs must be provided in prominent and clear places for the eye.

The huge height of the existing towers in the background has always led to distort the fine harmonious impressive image of the station. The new building juxtaposed to the old train station can give good impression to the viewer now especially with the disposing of visual obstacles in the old situation.

We note that the provision of green areas will restore the sense of scale of the station and the surrounding space.

7   EVALUATING SUSTAINABILITY PERFORMANCE OF THE PROPOSED PROJECT

Urban quality is the overall key word for the understanding of how the relationship between cities and people works. When urban quality is low the number of pleasure visits and activities are low. The activity is limited to the most necessary visits and walks which people do because they are compelled to carry them out.

A number of issues affect the public spaces and the way we act when we are in the city. These issues are presented in a keyword list for urban quality, which is used when identifying problems, potentials or possible solutions to issues of different character as shown in the next table.[11]

Protection	**Traffic** - protection against traffic accidents - pollution, fumes and noise - visibility	**Security** - lived in / used - street life - street watchers - overlapping functions on spaces and time - overlapping functions in space and time
Comfort	**Walking** - room for walking comfortably - interesting layout for streets - interesting facades - good surfaces - no obstacles - good accessibility to key points - few footway interruption - convenient crossings - Access for everybody, ramps, elevators, etc.	**Staying** - staying zones - good possibilities for sitting, view, sun , people to watch - good seats - good local climate - soft edges, inviting facades for resting - points of support for leaning - benches for resting - points of support for leaning
	Seeing, talking, hearing - reasonable seeing distances - free vistas - interesting views - good lighting (evening / night) - low noise level - bench arrangement - talks capes	**Activities and interaction** - invitation to physical activities, play, and entertainment day and night and summer and winter
Enjoyment	**Climate** Protection against - wind / draft - rain / snow - cold / heat possibilities for - sun / shade - warmth / coolness - breeze / ventilation	**Aesthetic quality** - good design and good detailing - views / vistas - trees, plants, water - clean streets and squares - good lighting quality - good materials - building scale dimensioned to the human scale

Fig. 11: Key words list for urban quality criteria.

Applying the previous list of urban quality criteria on the research proposal indicated that besides the new plaza fulfill most of the list, it also it creates a well public functionning domain offering a wide range of attractive public activities for people.

Sustainable design takes the circulation of people on foot and bike and the effectiveness of public transport as starting points. However, creating neighborhoods where walking is the natural and pleasurable means of access between activities achieves much of sustainability goals and objectives (quality of life-health economics of communities and community participation).[12]

The role of open spaces to play within the neighborhood structure, to achieve sustainability goals and objectives, is formulated in three key issues; space management, space function (circulation of people and permeability), and the role of objects within space (sustainable landscape).(11)

The detailed study of these issues can be the set of sustainability checklist applied to open spaces. Applying the matrix of sustainability parameters used in previous research[13] on the proposed project (table(1), can reveal many conclusions. The project, as shown in the table below, achieved 66.5 % of the first sustainability parameter in the space management issue, 80 % of the second space function issue and 85 % of the last issue

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[11] Gehl Architects. (2004). Zurich Public spaces. Quality & use analyses for 18 selected public streets, squares and parks. Report presented to Stadt Zurich and delegation fur wirtschaft und offentlichen raum des stadtrates. March-September, 2004.

[12] National Neighborhood Coalition (2005).Neighborhoods, Regions and Smart Growth Toolkit: The Smart Growth, Better Neighborhoods Action Guide,National Neighborhood Coalition, WashingtonDC. Online. www.neighborhoodcoalition.org, Accessed February 2008.

[13] Al-Hagla, K. (2008). Towards a sustainable neighborhood: the role of open spaces. International Journal of Architectural Research, 2(2), 162-77.

concerning the role of objects within space, respectively. The space function in our case is the key issue to be discussed as it is the solving procedure of the pedestrian's dilemma in order to reach the station or to enter the mall. Presence of accessible, active spaces can socially support children, young people and people with disabilities. Also, it can improve visual appeal, enhance social cohesion opportunities for active socialization and generate a more sustainable healthy system.

	Sustainability Parameters	Proposed project Achievements
Space Management	Encouraging sustainable lifestyles	×
	Making maximum use of existing features assets.	×
	Strengthening the sense of place	×
	Incorporating local or recycled materials	
	Encouraging community participation and involvement	×
	-Reducing inputs of non-renewable resources during construction and subsequent maintenance	
	Eliminating or reducing the use of herbicides and resources that affect other ecosystems	
	Encouraging habitat creation and native planting.	×
	Managing resources carefully.	
Space Function	reduce the level of car reliance,	×
	Effectiveness of public transport.	×
	Reduce the need to travel.	×
	Social benefits of increasing transport choice for all groups in the population.	×
	Enhancing local security and community.	×
Role of objects in Space	Return to original sources of inspiration, whether nature or culture.	×
	Respond to the site:	
	creating connections and themes (functional and perceptual as well as spatial) within and across sites while defining and delineating boundaries;	×
	• transforming site constraints into environmental opportunities;	×
	•Minimizing negative environmental impacts (including sensory as well as physical pollution);	×
	• maximizing positive impacts, off-site as well as internally.	×
	- Minimize inputs of materials and energy and maximize outputs of renewable and reusable resources.	
	Maximize resilience and dynamic stability in the :	
	• maximizing the diversity of landscape elements and the diversity of relationships between elements;	×
	Creating opportunities for the emergence of self- sustaining and self-regulating systems in the landscape.	×
	Create 'place' as distinct from merely manipulating space, in such a way that the design maximizes the potential for user Interaction with the environment.	×
	Make systems visible, which means making environmental processes apparent and celebrating them.	×
	Minimize maintenance.	
	Meet the varied recreation and leisure needs of users.	×
	Involve local communities.	×

Table (1): Sustainability parameters achievement of the proposed project.

8   CONCLUSION

In Alexandria, residents are in real need of having walkable areas especially in the center of the city and in crowded places. In the new sustainable design of the city, the quality of the urban space is equaly important with the effiecency of the space. The previous research project is an attempt to solve a major aesthetic and functional problem that Sidi Gaber, a major terminal in Alexandria, is facing and will be elaborated with the new extension.

The research discussed the prompt and accurate solution, especially with the high increase of population in the city. Once the mall at the train station will be opened a real traffic jam will occur in the center of the city.

Also, the proposed solution creates green and open sustainable spaces and provide walkable areas which are the most important issues to be considered in Alexandria new planning to enhance the city urban pattern or the residents behaviour and safety. Our urban design sustainable solutions of Public Urban spaces should prioritize life quality, health, safety and an inclusive environment for all. We regard the public realm as a place for all people, regardless of ethnic background, age, socio-economic class, disability, religion, or the like. Residents, visitors, students, workers, children, and the elderly are all invited to meet in the public realm.

A city public spaces must be available and open to invite and include all people, having different activities and possibilities and thereby ensuring multiplicity and diversity. Well-designed cities inspire the people who live in them, whilst poorly designed ones brutalize their citizens.

9   REFERENCES

research.ncl.ac.uk/forum/v5i1/azaz.pdf

Shouk, Y. H. a. F. A. (2000) Human impacts on Alexandria's marine environment. Paris, © UNESCO, http://www.unesco.org/csi/pub/source/ alex8.htm, (Feb., 2000)

United Nations, (1997). Urban Agglomerations 1996, http://www.undp.org/popin/wdtrends/u rb/urbpab.htm (Feb., 2001).

Shirley, P. (2005). The Urban Park, In M. Cliff (ed.), Urban Design: Green Dimensions, Elsevier, Architectural Press, Oxford, UK, pp. 77-92.

BRUSE, M. : Simulating human thermal comfort and resulting usage patterns of urban open spaces with a Multi-Agent System. Proceedings the 24th International Conference on Passive and Low Energy Architecture PLEA, pp. 699-706.Singapore, 2007.

Taha, D., Raslan, R., & Bergner, B. S. The Egyptian Revolution from the Perspective of an Urban Planner: Demonstrations on the Streets of Alexandria, Egypt.

RASLAN, R., BAKR, A., & AYAD, H.: Simulation of Pedestrian Behaviour in Urban Spaces. A Case Study of "Sidi Gaber" PublicSpace,Alexandria, Egypt. In: Schrenk M.; Popovich, V.V.; Zeile, P. (Eds.): Proceedings REAL CORP 2011, pp. 863-872. Essen, 2011.

http://www.aawsat.com/default.asp

http://www.bonah.org/news

McNeill, D. (2006). Globalization and the ethics of architectural design. City,10(01), 49-58.

Campbell, K. (2001). Rethinking Open Space, Open space Provision and Management: A Way Forward, Report presented by Scottish Executive Central Research Unit, Edinburgh, Scotland, UK.

Gehl Architects. (2004). Zurich Public spaces. Quality & use analyses for 18 selected public streets, squares and parks. Report presented to Stadt Zurich and delegation fur wirtschaft und offentlichen raum des stadtrates. March-September, 2004.

National Neighborhood Coalition (2005).Neighborhoods, Regions and Smart Growth Toolkit: The Smart Growth, Better Neighborhoods Action Guide,National Neighborhood Coalition, WashingtonDC. Online. www.neighborhoodcoalition.org, Accessed February 2008.

Al-Hagla, K. (2008). Towards a sustainable neighborhood: the role of open spaces. International Journal of Architectural Research, 2(2), 162-77.

Study on "Micro-Participation" of the City – Emergency Management in the Age of Micro-Blogging

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1 ABSTRACT

With the rapid development of information technologies, the Internet and mobile terminal facilities, the network information platform has been widely used, and the number of micro-blogging users (such as twitter, Sina micro-blogging,…) is growing rapidly as well. By the end of June 2012, the number of micro-blogging users had reached 274 million, accounting for 50.9 % of netizen based on the statistical report of Internet development in China. The dissemination of information with micro-blogging is more timely and interative than tranditional Internet platforms. Micro-blogging is playing an increasingly important role in the dissemination and diffusion of urban hot topics.Some local governments and urban planning experts use Micro-blogging to interact with the public and respond to localresidents' needs. So, how are we to use mirco-blogging in dealing with city emergency and help facilitate government management?

The rainstormon 21 July 2012 in Beijing caused serious desaster in the whole city, especially on infrastructure. Roads, bridges, water conservation projects as well as some landscape and historical sites were destroyed. Meanwhile, the rainstorm also caused great losses of lives and property, totalling an economic loss of nearly ten billion. Fortunately, different parties such as the government, the media and the pubic were able to use different Intenet platforms to disseminate information related to the rainstorm disaster through interaction and discussion of relief hot topics, that finally led to effcient emergency management in the rainstorm disaster.

Taking Sina micro-blogging as an example, this paper researches emergency management process with micro-blogging during the "7.21" rainstorm disaster in Beijing, analyzes the different stages and the main content of the micro-participation, and focuses on the participation method of different subjects, such as the government, media, the public and experts. Meanwhile, this paper puts forward a mechanism for information dispersion and interactive communication, the mechanism of public participation and public opinion guidance. Lastly, some strategies for enhancing the level of urban management are given, and they are, the new paradigm of public participation in urban management, improving system security mechanisms, the real-time public participation and smart city service management system.

2 BACKGROUND

New media based on network and mobile information plays more and more important roles in urban emergency management, especially in the Sanlu milk powder scandal, the Wenchuan and Yushu earthquake, the Wenzhou high-speed rail accident. New media can be used as a way of hot topic dissemination and diffusion. People can receive information more quickly as well as interactive communication with others through the new media platform compared to the traditional media(e.g., Newspaper, TV, Radio, ...). So, it is very important to adapt to the new media such as micro-blogging network to build an urban emergency management system in the network and information age(Gu fumei, Zhai Guofang,2012). The Beijing storm disasters on July 21, 2012 caused significant damage on roads, bridges and water conservation projects. Many houses collapsed, hundreds of cars and many scenic spots were ruined, causing huge economic loss in the storm. The government, the media and the public body interchanged the rainstorm disaster information through micro-blogging information platform, delivered rainstorm information and discussed the hot topic of disaster relief. Micro-blogging played a key role in the storm disaster emergency management.

Domestic and foreign scholars have conducted research on public participation in urban management in the network and information era, analyzed the realization method of participation in urban planning, and designed the public participation geographic information systems (PPGIS) with network, and was applied to public participation in urban planning(Emma J. Stewart,etal,2008). With public participation geographic information systems, e-government was developed in the city (Sukumar Ganapati, 2011; Milan Tung-Wen Sun, et al, 2009), and the governments monitor the dynamic process of urban development(Gregory Brown, Delene Weber, 2013). New information technology offers new possibilities for public participation in urban planning, and provides an interactive communication platform that can be used for long-distance

communication (Malgorzata Hanzl, 2007). The researchers analyzed the methods of public participation in urban planning, mainly through public government information, television and online media, and studied on their characteristics and existing problems (Xu MY, Tao Dekai, 2012; Zhou CS,Wang F.,2006). Using the theory of association planning, they summarized the characteristics of public participating in urban planning with network mass media, and advised that the departments and the staff memebers of urban planning should learn to integrate mass media into the public, and exchange opinion with other public participants (Chen Yao, 2007). With network and information platform, we can break the traditional "top-down" mode, and build the "bottom-to-top" participation mechanism in information dissemination of urban planning and urban disaster outbreaks.

It is timely and interactive to communicate and disseminate information with each other by Micro-blogging. Micro-blogging has more advantage than traditional information platforms in public participation in urban management. According to the 30th China Internet Development Statistics Report surveyed by the China Internet Network Information Center, micro-blogging users in China reached 274 million, accounting for 50.9 % of Internet users, and cellphone micro-blogging users reached 170 million by the end of June 2012. China has fully entered a micro-blogging era. With the rapid growth of users, micro-blogging plays an increasingly important role in information dissemination of urban government management and emergencies such as mudslides, earthquakes and other disaster outbreaks (Liu Hua,2011). Administrative departments can release information and communicate with the public through official e-government micro-blogging platforms (Seong Eun Cho, Han Woo Park,2012; Li Xiaofang,2011). The use of Sina and Tencent micro-blogging platform greatly promoted public participation and interaction on hot topics of urban security, urban planning, public services, and urban management.

3   MICRO-PARTICIPATION IN URBAN EMERGENCY MANAGEMENT

3.1 The connotation and characteristics of micro-participation

Micro-blogging is a platform for freely sharing, disseminating and accessing information based on user relationship. Micro-blogging sites are always operated and managed by some enterprises, but the governments keep the power of supervision on public opinion. Micro-participation in urban emergency management, an information releasing and interactive discussing process involved in urban emergencies through the micro-blogging platform, is a new network form for public participation in urban emergency management. Micro-blogging shares the characteristics of the civilian interaction, interactive and fragmented, and its information is shorter than others. Ordinary people can be free to release and disseminate information, so micro-blogging participation in urban emergency management can be called the "micro-participation" process.

Receiving and transmitting information by means of Internet based mobile terminal equipments, micro-participation can happen anytime and anywhere, therefore it has the following characteristics: Firstly, information about urban disaster outbreaks can be published freely. Anyone who uses internet and its terminal equipment can use micro-blogging to release information of urban sudden disasters timely, and prompt administration to respond actively and reduce losses. Secondly, it can help realize immediate interaction with micro-blogging. Being highly interactive, micro-blogging can realize the sharing and communication of unexpected disasters between different populations, shorten the reacting time for urban emergent disasters, and improve the efficiency of disaster response and preparedness. Thirdly, it is easy to generate recognition on disaster information. There are some linkage between social networking in micro-blogging and the actual social intercourse circle, and the majority of users can be identified, so it is easier for people to trust the interaction content in micro-blogging, and behaving accordingly.Micro participation in urban emergency management can generateattention and induce actual rescue efforts from those involved.

3.2 The significance of micro-participation in urban emergency management

The popularity of the network changed the traditional social imbalances that was caused by lack of the public rights to speak in real life (Hu Yi, Zhang Jingxiang,2010). Micro-participation can play the role of diffusing information, hot topic discussions and supervising public opinion. Micro-participation also has the characteristic of active participation, and netizens achieve social management through the care of their own interests and the interests of the social community. Through the diffusing effect of micro-blogging, information on disaster warning, the disaster situation and the rescue situation could be disseminated timely,

and can alert urban residents to take action and help improve efficiency of relevant departments' rescue efforts in disaster prevention and reduce disaster losses. As a method of social management, network mobilization can be used for mobilizing resources and efforts of social organizations, civil society and individual citizens of all sectors of society in a short time to form a huge disaster relief force (Liu Xiaolan, Li Jun,2011). Micro-blogging involved in disaster discussions can play the role of the public participation in the management of the public domain to promote the mode of government administration to shift from the traditional top-down governance to modern management (Zhao Min,Liu jing,2010). Meanwhile, Micro-blogging information often forms a certain public opinion against bad behaviors and promote the city spirit, which is another aspect of urban society management.

4   DATA AND ANALYSES

4.1 Samples

Using "rainstorm" as key words, the author adopted the methods of hierarchical statistics and hot micro-blogging ranking to search and record real-time posting status and popular Sina micro-blogging from 20 to 31,July 2012. The process of data collection include three steps. First, recorded number of original real-time daily micro-blogging in whole China and Beijing. Second, after sorting the daily blogging information by relevance,   more than 1,000 pieces of representative information were chosen from the browsed total of nearly 10,000 entries of hot topic information. Finally, Selected four types of identifiable micro-blogging users (government departments, media, planners and ordinary Internet users) and their entries for indepth understanding and recorded the micro-blogging status, the discussions involved and comments of 53 micro-blogging users about the Beijing rainstorm.

4.2 Descriptives of samples

The real-time original micro-blogging was recorded from 20 to 31, July in China and Beijing. According to the general stages of disaster emergency management and the collection dates, rainstorm disaster outbreaks in Beijing is divided into four stages: warning period (July 20,2012), disaster outbreak (July 21-22,2012), spreading(July 23-26) and recovery period (27-31 July). The number of micro-blogging in whole China in different stages shows that only 26 pieces of micro-blogging information in the warning period, a large number of original micro-blogging in disaster outbreak period and spreading period, and that is 52,214 and 97,701 respectively, and 32,972 original micro-blogging in disaster recovery period. This suggests that the number of people involved in micro-participation and degree of concern are relatively higher during disaster outbreak period and its spreading period.
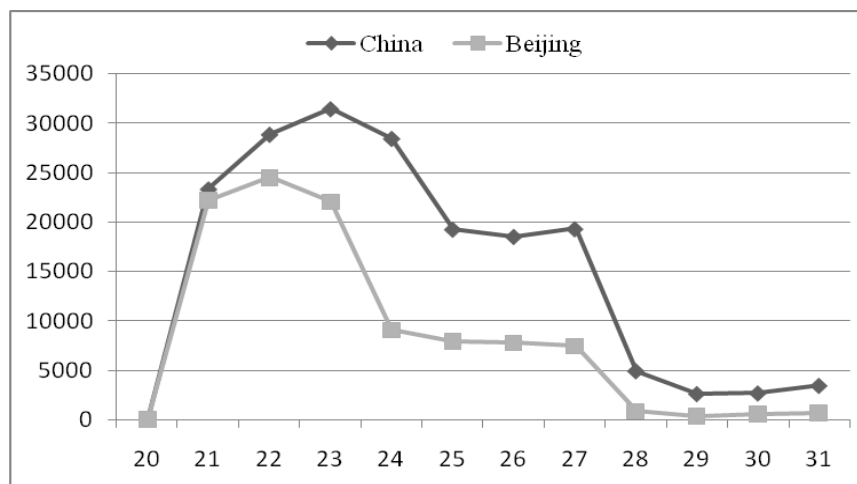
Fig 1: The number of original micro-blogging about Beijing rainstorm

993 pieces of blogging entries were picked from over 1,000 entries based on their relevance with the Beijing rainstorm disaster, then the selected blogging entries were coded according to the text content of its recorded information. First, the themes that best represent the meaning of micro-blogging content was explored, and a total of 37 basic themes were identified and named as thematic content. Second, themes with the same meaning were sorted into one class according to the logical relationship between different themes, and 12 types was formed (Tab.1).

Themes(number of micro-blogging)	Types(number of micro-blogging)	themes(number of micro-blogging)	types(number of micro-blogging)	themes(number of micro-blogging)	types(number of micro-blogging)
Rainstorm forecasting（77） Rain characteristics（61） Causes of rainstorm disaster (3)	Rain condition（141）	Help seeking information（10） People and object searching（13） Offering help of disaster relief（23）	Disaster relief Information（56）	drainage（23） urban infrastructure（5） urban planning and construction（9）	urban construction（37）
Rainstorm warming（57） Contingency plans（2） Flood control and emergency questions（8）	Warning and Contingency（67）	Offering living services（5） Appealing for disaster aid（5） Safety strategies（74） Suggestion for precaution and help disaster（30）	Coping strategy（104）	Action of government（23） deed of helping disaster（47） Bad behavior（6）	Social performance（76）
Disaster scenes（24） broadcasting situation of disaster（112） damage statistics（12） The number of death toll（24）	Disaster condition（172）	donation（8） recovery after disaster（66）	rehabilitation work（74）	Society and economics influence（6） Government regulation（4）	post-disaster impact（10）
The actions of disaster relief（48） Progress of disaster relief（31） Organizing disaster relief spontaneously（4）	rescue operations（83）	urban emergency management（30） Urban infrastructure management（7） Road and traffic Condition（68）	Urban emergency management（105）	ridicule（6） touching（19） Criticism（5） praising（6）	personal emotion（36）

Table 1: The themes and types of micro-blogging information
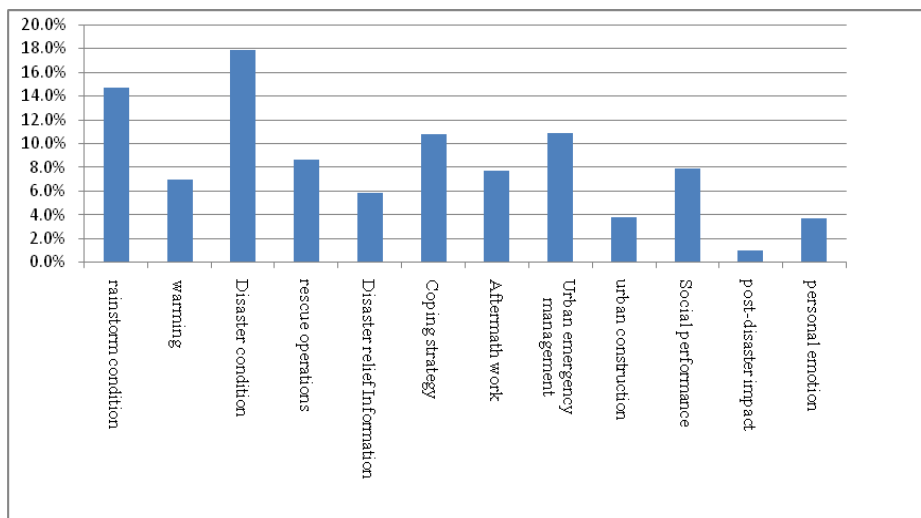
Fig 2: Main content of micro-participation in rainstorm disaster

5 EMPIRICAL STUDY ON MICRO-PARTICIPATION OF BEIJING "7.21" RAINSTORM DISASTER EMERGENCY MANAGEMENT

Taking micro-participation of Beijing rainstorm disaster as an example, we analyzed the process, different means and mechanisms of micro-participation, and explored urban emergency management in the micro-blogging information age.

5.1 Main content and process of micro-participation

Micro-participation content of the rainstorm in Beijing suggests that the proportion of micro-blogging information about disaster situation, rainstorms, coping strategies and urban emergency management is relatively high, accounting for 17.9 %, 14.7 %, 10.8 % and 10.9 % respectively, and the proportion about warning, emergency relief, rescue operations, aftermath work and social performance ranks medium, and

less blogging entires relate to urban construction, personal emotional expression, and post-disaster impact. It shows that micro-blogging plays a huge role in weather forecast, reporting rain condition, disaster coping strategies and the urban emergency management process, and helps inform the public and the government of the rainstorm, disaster-related information, disaster responses, and the implementation of the rescue timely. Micro-blogging platforms can also be used to release information of helping, rescuing, and rehabilitation efforts to improve the efficiency of disaster relief, and reduce social and economic loss. At the same time, publishing social efforts and personal emotion in rainstorm disaster through micro-blogging platforms could boost the spirit of the urban society. Discussions on city building and socio-economic impact triggered by rainstorm disasters can help promote urban planning and construction, and guide socio-economic operations gradually to more sustainable and scientific direction.

Based on the analysis of the content of micro-participation in Beijing rainstorm disaster, the main content of micro-blogging information was divided into six aspects of hot topics, including disaster forecasting and emergency, disaster situation, relief process, and urban construction management. Then the hot topics and features of each micro-participation stage were summed up as follow:

5.1.1   Disaster warning period

The hot topic of this stage was disaster possibility forecasting. The government and media released weather forecast, warning information for rainstorms, and alerted the residents of travel safety. Meanwhile, residents adjusted their travel activities in advance, changed travel plan and means of transportation.

5.1.2   Disaster outbreak period

This period has the highest degree of micro-participation. The hot topics include disaster forecasting and emergency coping strategies, disaster situation, relief process, management of urban construction, the spirit of the city and the quality of residents. The government, the media and the public released disaster information (such as disaster scenes, disaster broadcast, etc) and disaster relief information (such as Help seeking, people and object searching, rescue scenes, etc) with different concerns. At the same time, the information about urban emergency management, urban public services, test of urban drainage facilities and other topics was released, including the good deeds and bad behaviors in the rainstorm.

5.1.3   Disaster spreading period

The hot topics of this stage include disaster response strategies, disaster statistics, urban construction, daily management and socio-economic impact. The information related to detailed distribution of disaster, socio-economic loss, real-time progress of the relief operations and rehabilitation work were released accordingly. People began to reevaluate the existing problems on urban planning, daily maintenance of urban facilities and the model of urban development, and discussed the socio-economic impact of disaster such as rising prices.

Hot topics	Disaster warning period	Disaster bursting period	Disaster spreading period	Disaster recovery period
Disaster forecasting and emergency	Rainstorm forecasting, rainstorm warming, resident's travel activities adjustment	rainstorm warming, contingency plan, security protection of rainstorm, trip reminder	Rainstorm coping strategies, questions in flood prevention	Disaster consciousness and learning security, emergency management approach
Disaster condition	—	Rainfall characteristics, disaster scene, disaster broadcasting	Distribution of disaster, statistics for loss, disaster situation reporting	Statistics and analyzing disaster
Process of disaster relief	—	Information of calling for help, People and object searching, rescue scene	Rescue operations, donation for disaster area, rehabilitation work	donation for disaster area, maintenance recovery, victims placed
urban construction management	—	Urban emergency management, urban public services, urban drainage facilities	Problem of urban planning and construction, daily management of urban infrastructure, urban developing mode	Urban building strategies, formulating urban construction and management standard
social performance and personal emotion	—	Positive action of government, praising good people and deeds in rainstorm, criticizing bad behavior in rainstorm	Touching story, condemning bad behavior	Investigation on bad behavior
Socio-economic effection	—	—	Rising price, stock market volatility	Stable prices

Table 2: The hot topics of micro-participation in different rainstorm disaster stage

5.1.4   Disaster recovery period

The information in micro-blogging mainly concerns the problems of disaster exposure and follow-up efforts. Micro-blogging users published knowledge of security education and disaster prevention, disaster statistics and compensation, discussed more scientific and rational city emergency management approaches, urban construction & management standards and urban building strategies. The government carried out investigation on those involved in the blaming and bad behaviors.

5.2 Different roles of micro-participation in urban emergency management

Different users played different roles on micro-blogging platforms, the number of concerns and follows were different among micro-blog users, and the number of posts was also different, which led to the different manner and extent of micro-participation(Fig.3,Fig.4).

5.2.1   Government: micro-participation in affairs management

Through announcing official micro-blogging accounts (such as Beijing released, Beijing meteorological, Beijing planning,etc), government departments played positive roles in social management innovation, government information opening up, offering guidance to news report and the media, political participation of the civilian matters, listening to the voice of public and establishing the image of government. Beijing government departments at all levels, especially the Beijing Municipal Government, planning & construction bureau, transportation bureau, public security bureau and district-level departments, played an important role in urban management during the Beijing "7.21" rainstorm through the Sina micro-blogging platform.

With micro-blogging platforms, government departments released contingency plans according to real-time weather forecasts timely, and prompted city residents to take rainstorm prevention action, ensure the safety of travel and prevent landslides and other secondary disasters. During the rainstorm, government departments posted the information of urban emergency management, such as urban disaster emergency plan, locations of damaged roads and other infrastructure, urban emergency transportation and services. During the recovery period, government departments actively responded to hot topics of urban planning & construction and urban management to which residents showed concern. Through micro-participation in the process of urban sudden disasters, government departments could timely disclose the information, strengthen the coordination of work between government departments, and follow disaster information of the public, and this played an important role in reducing disaster losses and improving the city's public service capacity.

5.2.2   Media: micro-participation in disaster spreading

Mobile Internet and interactive media are the main trend of modern media, With the help of micro-blogging platforms, traditional media and online media can disseminate information more timely and conveniently to provide services for urban residents. News media, such as Beijing TV, Beijing News, Financial Network and ordinary people, all participated in information dissemination of Beijing "7.21" rainstorm sudden disaster through the Sina micro-blogging platform. During disasters, the micro-blogging of news media spread information of rainstorm, disaster and rescue conditions and provided the information quickly through different channels to the public. Media micro-blogging reported the touching stories and positive behaviors in the rainstorm disaster, which can improve urban cohesion and enhance urban disaster emergency response capability. During the recovery period, the media conducted investigations on hot topics that the public showed concern for and the surveyed results announced by media micro-blogging to promote urban planning and construction management in a scientific, fair and efficient way.

5.2.3   The public: micro-participation during disasters

The public accounts for the majority of micro-participation. They posted micro-blog entries and commented on others' blogging to achieve information sharing. The content of micro-participation of the public in Beijing rainstorm disaster were as follow: (1) releasing disasters and help information. With micro-blogging platform, the public released floods location, the degree of disaster and help tracing information. (2) Organizing activities of rescue. Enthusiastic netizens called for others to provide help for residents trapped in the rainstorm, involve in disaster relief work and offer donations to disaster affected residents. (3) Personal emotional expression. The public published personal views and attitudes of disaster-related things, and commented on the right and wrong of other people's behaviors.(4) urban drainage systems, urban planning management and urban emergency management issues.

5.2.4   Urban planners: micro-participation in urban planning and disaster emergency management

The micro-participation of urban planners was less compared to the above three types. This is because the number of planners involved in micro-blogging is smaller. Most planners in the micro-blog social network had dual identity of the planners and ordinary people, and communicated with similiar or the same occupation, so they have limited influence on society. Fortunately, more and more urban planning and design institutions begin to use enterprise microblogging to communication with the public on urban planning and management .

During the Beijing rainstorm disaster, planners posted and discussed on urban planning relevant problems as follow: analyzing the causes of waterlogging disaster from urban site selection and facility layout, discussing on current China's urban drainage system construction standards and the problems with reference to United States, Japan, Germany, France and other cases and ancient China urban drainage system, as well as on the concern for China's future urban construction.
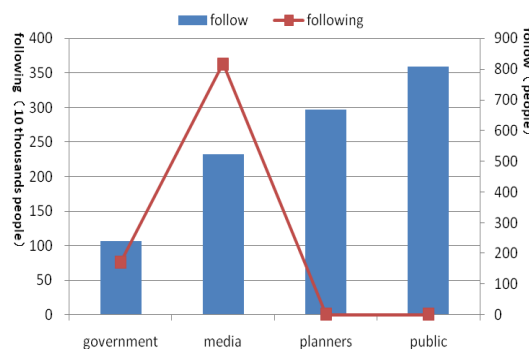
Fig 3: The number of follows and followings of different roles
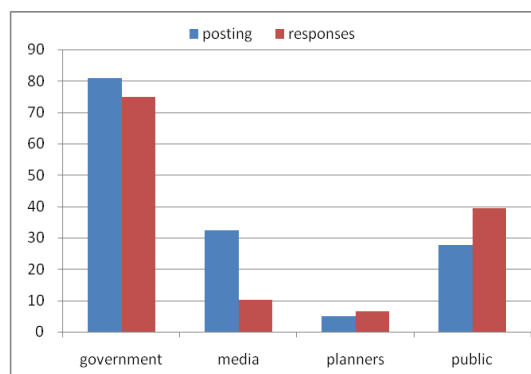
Fig 4: The number of postings and responses of different roles

5.3 The mechanisms of micro-participation in urban emergency management

5.3.1   The mechanism of information diffusion and interactive communication

Information diffusion and interactive communication through the micro-blogging platform is the main operating mechanism of micro-participation in urban emergency disasters. Diffusions of information include the top-down information disclosure mechanisms led by the government and the bottom to top information diffusion mechanisms led by the public. In this process, the government, the media and the public can realize immediate dialogue and interactive communication.

(1)Top-down information disclosure mechanism

The government disclosed the information of rainstorm warning, contingency plans, disaster situations, relief and aftermath work to the public through the official micro-blogging timely. Through media diffusion, direct communication to the public and other ways, the government achieved top-down disaster information diffusion. When the official disaster information and the public demand are consistent, the public will make positive response and participate in disaster prevention and rescue. While when the official public disaster information and the public demand are not consistent, the public will question the official information, and the governments give responses and interpretation on the inconsistencies.

(2) Bottom-up information diffusion mechanisms

The public released information on rainstorm, disaster scene information, rescue information, enquiries and other information with their personal micro-blogging account, and part of the public released information directly to official and media users to attract their attention. If the information released by the public is relevant to the official administrative responsibilities, the government will respond and take appropriate disaster relief operational measures to reduce disaster loss for the public. Although part of information released by the public is not within the scope of the administrative duties of the government, it will lead to information dissemination and cause other social groups to pay attention.
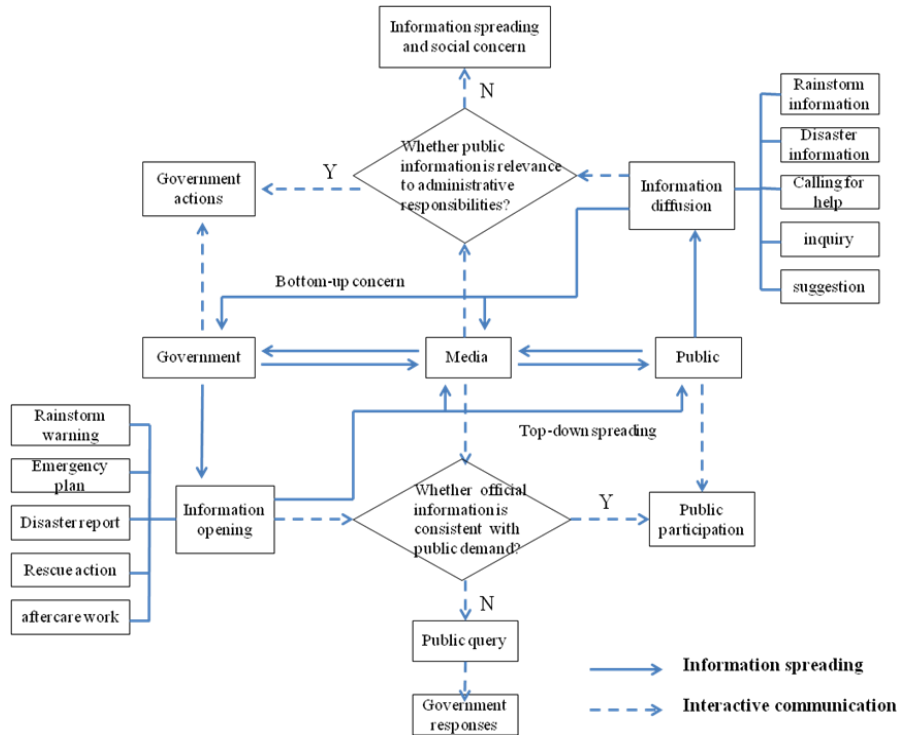
Fig 5: Information spreading and interactive communication in urban emergency management
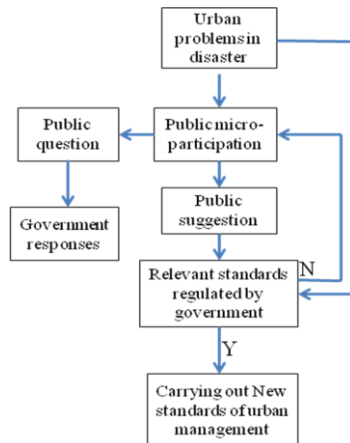
Fig 6: The mechanism of micro-participation in urban management

5.3.2   Mechanism of public participation in urban emergency management

Urban infrastructure, urban planning, urban emergency management, public services and other problems exposed in the Beijing rainstorm disaster got plenty of attention from the public and the media. During the Beijing rainstorm disaster, the public discussed around the topic of urban drainage systems and other infrastructure construction with the Sina micro-blogging platform. Netizens posted messages, such as "drainage system represents the conscience of the city", " waterlogging reveals the problems and defects of the urban underground drainage line", "municipal traffic often failed, what about the warning services?", etc. Based on these problems and questions, the government responded timely and announced some key strategies, like "the maps of dangerous sections in the Beijing rainstorm", "the urban road maps of

hydrocephalus", "emergency shelter maps in the Beijing rainstorm" and other information. At the same time, the government improved the concept of urban planning and adjusted the standards of urban emergency management according to the advice the netizens gave on urban planning and construction. The new measures and management practices will be published and modified according to further opinion of the public.

During the period of disaster recovery construction and rehabilitation, the government announced the official service phone numbers and strengthened interactive communication with the public through micro-blogging. Meanwhile, the administration departments carried out maintenance on facilities, resettlement housing construction work and timely opened information through micro-blogging.

5.3.3   Supervision and guidance mechanisms of public opinion

Supervision mechanisms of public opinion by the network means to keep the implementation process of public decision not be distorted in the implementation process of public decision-making (Zhai Guotao,2007). With the features of more direct and real-time interactive communication, micro-blogging plays a more and more important role in the supervision of public opinion. But due to the asymmetry of information and personal emotional factors, there are some incorrect even wrong views in the public opinion that is easy to cause misunderstanding and social panic, so correct guidance of public opinion is of supreme importance.

The public discussed on the disaster relief efforts of the Beijing rainstorm and other hot topics to achieve adaptation and constraints on the behavior of the implementation policies by the pressure of public opinion. The discussion on the number of death in the disaster is a case in point. First the official death toll statistics were published, but the public questioned the truth of the death toll. Due to pressure of public opinion and the attention of senior leadership, the Beijing official department eventually announced the new death toll list. Meanwhile, Public suspicion and inaccurate messages that government actively guided and corrected had said the Zijingguan reservoir in Juma river upstream would spill. On this topic of public concern, the Beijing water authority and other departments denied the micro-blogging rumor that the Juma River upstream reservoir spill was not real and eliminated the concerns of the public and unnecessary panic.

Bad behaviors in urban disasters can be supervised and the urban spirit can be propagated by public opinion through micro-blogging. The public discussed and condemned the rising price of taxis, hotels and other bad behaviors which caught the attention of the government and the media, and triggered relative investigation into related issues. The collaboration between officials and the public, self-sacrifice and other good spirit of the city was passed on by micro-blogging. This was good for enhancing the credibility of the government and spreading positive energy of the city.

6   POLICY RECOMMENDATIONS ON PROMOTING URBAN MANAGEMENT IN THE AGE OF MICRO-ERA

6.1 Constructing a new paradigm for public participation in urban management

Using the micro-blogging platform of information disclosure and the subject of different interactive functions to make a new paradigm for public participation in urban management, we can change the traditional city management mode of the centralized mechanism led by the government, keep the mechanism of interactive communication on city infrastructure function and urban public space management and urban emergency management, and build a comprehensive management mode for the city. The government should perfect micro-blogging network platforms of public participation in urban management functions, set up official micro-blogging and also different management department ones, clarify full-time personnel government micro-blogging of city management as well as the micro-blogging topic response department. Due to the large amount of information of micro-blogging and their redundant nature, even valid information is likely to be covered by other invalid ones.A new mechanism is to be established to make sure micro-blogging information can be released publicly in through straight and directional ways to improve the efficiency of public affairs of information management. Establish a proper system so as to extract effective public information to respond to through the network or start interactive commucation on relevant issues,and will take the public demand into account for government departments and the urban management in the implementation process.

6.2 Establish and perfect the security mechanism system in public participation

Micro-blogging of public participation have corresponding laws and regulations system as a backup in western countries. As early as 2009, the British government issued a "government Twitter use guideline" that can make clear system requirements through the contents of Twitter micro-blogging platform for information disclosure and public interactive communication and so on. Although government through micro-blogging has been widely used in China, the corresponding rules and regulations are yet to be established. We need to establish a systematic mechanism for micro-blogging of government affairs and public participation in urban management urgently. The powers and responsibilities in the network hot topic information should be clearly defined between the government, the media, social organizations and experts. The administrative activities with micro-blogging should be made a routine so as to further enhance social democracy and toestablish a response mechanism of hot topics and take response actions to meet the social needs of the public. Norms of participating in social hot topics discussion need to be established for the media, social organizations and experts to define the main duties of different bodies. Institution on the micro-blogging information posting mechanisms for the public and the information processing mechanisms for the government should be established to improve the efficiency of micro-blogging participation in urban management, and the guiding mechanisms of public opinion in micro-blogging network should be established for discussing the urban management strategies and key elements.

6.3 Toward collective decision making and real-time participation in urban management

Using micro-blogging platforms, the government can lead public participation in the decision-making process of urban planning and urban emergency management to realize collective democracy of urban management. The government could expand the scope of public participation in urban management affairs through micro-blogging information dissemination and difussion, and lead more extensive public participation in topic discussion of urban management so that the city management decisions reflect the most democratic willingness. It is necessary to build a real-time participation in formulating urban management policies, implementing urban management and other stages, and build the response mechanisms of "participation- feedback – and then participation" in order to have an inclusive attitude to listen to all kinds of public voices and encourage sincere and open dialogues and exchanges (Luo pengfei, 2012;Zou Bin, et al., 2011). The entire process of public participation in urban management can play the role of public decision-making and supervision in urban management, as well as contributing to improvegovernment credibility in the process of urban management.

6.4 Establishing the service management systems of smart city

With the help of micro-blogging platforms, information can be shared in urban areas. Urban constructers can use location information services (LBS), social network services and other technical means to create public service platforms as an important aspect of smart city. China's economically developed urban areas should take the lead in constructing intelligent services and information management control center, which can then be associated with resident's location information and service needs through the positoning capabilities of mobile terminal devices to structure the smart city public service mode of "releasing urban resident's service needs through micro-blogging-the resident location information positioning-wisdom service center information processing-intelligence services providing and responses". The combination of micro-blogging information and public services of smart city can provide mobile services (toward personal services) functions, such as vehicle maintenance, food service, medical services that will improve the efficiency of urban public services and make urban life more livable and convenient.

7 REFERENCES

Bing,Z., Jun,F., Yongbin,Z., Guilin,W.: From Public Consultation to Joint Decision-making: Practice and Revelation form Public Participation of Shenzhen Comprehensive Urban Plan. City planning Review, Vol. 35Issue 8, pp. 91-96. Beijing,2011
China Internet Network Information Center. The 30th China Internet network development state statistic report,2012. http://www.cnnic.net.cn/hlwfzyj/hlwxzbg/hlwtjbg/201207/t20120723_32497.htm
Chunshan,Z., Fang W., Bingqiu,Y.: Public Participation in Urban Design Supported by Information Network. Planners, Vol. 22, Issue 2, pp.12-14.Nanning, 2006
Emma,J., Stewart, Dan Jacobson, Dianne Draper: Public participation geographic information systems (PPGIS): challenges of implementation in Churchill, Manitoba. The Canadian Geographer, Vol. 52, Issue 3, pp.351–366. 2008
Fumei,G., Guofang, Z., Mengqiao,R., Chenye,J.: Urban Emergency Management of Nanjing City against the Background of New Media. Modern Urban Research, Issue 5, pp.88-93. Nanjing, 2012

Gregory Brown, Delene Weber: Using public participation GIS (PPGIS) on the Geoweb to monitor tourism development preferences. Journal of Sustainable Tourism, Vol. 21, Issue 2, pp. 192-211.

Guo, T.: Study on Public Participation Mechanism on Internet in Public Administration. Northwest University in China, Xi`an, 2007

Hua,L.: Micro-blogging spreading of information on disaster events. Modern Communication, Vol. 177, Issue 4, pp.89-92.Beijing,2011

Milan T., Y., Tsai, M., Shih, Jessica Y.,: Public participation and the concept of space in environmental governance: An application of PPGIS. Public Administration and Development, Vol. 29, Issue 3, pp. 250–261.

Malgorzata Hanzl: Information technology as a tool for public participation in urban planning: a review of experiments and potentials. Design Studies, Vol. 28, Issue 3, pp.289-307.2007

Mingyao,X., Dekai,T.: Exploring and Thinking over the Public Participation in Urban Plan Fomulation in the Ormulation in the New Period: a Case Study of Nanjing Master Plan Revision. City planning Review, Vol. 36, Issue 2, pp. 73-81. Beijing,2012

Min,Z., Jing,L.: Social Claims and Institional Garantee in Public Participation of Urban Planning-Discussion from Xiamen "PX Project" Event. Urban Planning Forum, Issue 6, pp. 81-86. Shanghai, 2010

Pengfei,L.: Reflection and mechanism construction of the public participation in urban planning. Urban Problems, Issue 6, pp. 30-35. Beijing,2012

Seong Eun Cho, Han Woo Park: Government organizations' innovative use of the Internet: The case of the Twitter activity of South Korea's Ministry for Food, Agriculture, Forestry and Fisheries. Scientometrics, Vol.90, pp.9-23.2012

Sukumar Ganapati: Participation Geographic Information Systems Applications in E-Government. Public Administration Review, Issue 5, pp.425-434.2011

Xiaofang, L.: Analyzing on the communication characteristics of government and public based with the platform of micro-blogging. E-government, Vol. 105, Issue 9, pp.62-68. Beijing,2011

Xiaolan,L., Jun,L.: Research on internet mobilization patterns in disaster relief. Journal of Natural Disasters, Vol. 20, Issue 6, pp.158-162. Haerbin,2011

Yao,C.: Transcending "Instrumental Reason". City planning Review, Vol. 31, Issue 11, pp. 57-63. Beijing,2007

Yi,H., Jingxiang,Z.: ANewPublicForum:OnlinePublicParticipationforUrbanPlanning.Planners, Vol. 26, Issue 6, pp. 75-79. Nanning,2010

Supporting Spatial Planning with Qualitative Configuration Analysis

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1 ABSTRACT

Today, spatial planning strongly relies on computerized Spatial Information Systems (SIS) which, thank to continuous improvements, provides increasingly better techniques for handling, visualizing, and analyzing quantitative (geometric or geographic) spatial data. An important typology of instruments today largely lacking in SIS is concerned with the management and analysis of qualitative spatial information. Indeed, although quantitative spatial information is necessary when it comes to precise computations, a qualitative approach is to be preferred in situations where preciseness is not necessary or even undesired. This is typically the case when it comes to the interaction with human beings. In this paper we outline an extension for a generic SIS that enables the system to handle qualitative spatial information and discuss how this can support spatial planning in several ways.

2 INTRODUCION

Geographic Information Systems (GIS) and Computer-Aided Design (CAD) applications play a central role in spatial planning. Such computerized systems, indeed, provide increasingly sophisticated representational and analytical means which support spatial planners in carrying out improved land studies and in making more accurate decisions.

In spite of continuous improvements, however, GIS and CAD keep on relying mainly on quantitative spatial (i.e., geometric or geographic) representations, while some important features largely missing today are concerned with the management and the analysis of qualitative spatial information. Indeed, although quantitative analysis is necessary when it comes to precise computations, a qualitative approach is to be preferred in situations where preciseness is not necessary or even undesired. This is typically the case when it comes to the interaction with human beings, which, as argued in the past (K. Lynch, 1960), naturally represent and reason about space in a qualitative manner: for example, people prefer to express relative position between two objects resorting to predicates like "*left of*" and "*right of*" rather than reporting the angular distance among them. Predicates of this type are called *qualitative spatial relations*, and, accordingly, a set of them describing a spatial scene shall be called a qualitatively-described spatial configuration or, more simply, a *qualitative spatial configuration* (Fogliaroni, 2012).

In this paper we outline an extension for a generic Spatial Information System (SIS) that enables the system to handle qualitative spatial information and, more specifically, qualitative spatial configurations. We elaborate how this can benefit spatial planning in several ways:

(1) Natural planner-SIS interaction: the identification of a spatial plan location can be done either by describing in natural language or by sketching its position with respect to other elements of the embedding environment;

(2) Design phase support: according to the type of plan being designed, the extended SIS suggests a list of items that should be placed in the workspace as well as the best spatial arrangement;

(3) Public participation enabling: a spatial plan eventually yields a change in the structure of a real environment whose quality is best assessed by its users; assessment (at least partly) relies on the (qualitative) spatial configuration of environmental elements. Thanks to its capacity of qualitatively representing spatial configurations, the extended SIS allows for the collection of public feedback which can be used to enhance the support provided in the design phase.

The remainder of this paper is organized as follows. In Sections 3 and 4 we provide an overview on the relevant state of the art in Spatial Information Systems and Qualitative Spatial Representation and Reasoning, respectively. Section 5 reports about an extension for a SIS developed in (Fogliaroni, 2012) that enables the system to deal with qualitative spatial information. In Section 6 we further extend the system and discuss how it allows for supporting spatial planning whereas in Section 6.1 we present an approach for

computing prototypical spatial plans out of previous designs. Section 7 is devoted to show how the described system can be integrated with standard web-based pooling platforms to refine plan prototypes according to public expectation. Finally, conclusions are drawn in Section 8.

3 SPATIAL INFORMATION SYSTEMS

With the term Spatial Information System (SIS) we shall intend, in the scope of this paper, any system of hardware and software elements that allows for surveying, storing, analyzing, manipulating, retrieving, sharing, and presenting spatial data. Two well-known examples are Geographic Information Systems (GIS) and Computer-Aided Design (CAD) applications. From a logical perspective a SIS consists of a series of specialized layers interacting and collaborating with each other; at the lowest level lays the storage layer: a support to persistently represent data in a computer. Data storing can be done by means of purposely designed file encodings—e.g., shapefiles (ESRI, 1998). Nonetheless, the usage of a spatial database in this role is the most common scenario, since its optimized access methods notably improve data storage, retrieval, and, thus, analysis performance.

A spatial database is a database furnished with data types and functions suited for handling spatial information, which, in the (geo)spatial domain is concerned with real and factitious entities: Real entities comprise physical objects, natural or artificial (e.g., a lake or a building), whereas factitious entities are those that are not physically distinguishable from surrounding ones or that refer to agglomerations of single entities as a unique concept (e.g., administrative districts or countries). An ontological perspective on this issue is taken by Smith (1995) who distinguishes between entities with bona fide and fiat boundaries, respectively. Modeling spatial information is done mainly following two approaches that in the literature (Longley et al., 2005; Worboys & Duckham, 2004) are typically referred to as field-based and object-based. The field-based approach looks at the properties that have to be modeled as continuous fields and discretizes them via the superimposition of a (typically regular) geometric structure (e.g., a grid). The resulting data model is commonly known as raster. Conversely, in the object-based approach the main focus is on the spatial entities, whose geometry is modeled by means of a series of line segments called vectors.

Any manipulation of spatial data (drawing, analysis, selection, and so forth) in a SIS corresponds, at the database level, to the employment of a series of so-called spatial operators: functions defined over a set of spatial objects that perform some kind of geometric operation over the input data and return a result. The OpenGIS Consortium released a set of specifications for spatial operators (OpenGIS Consortium, 1998) intended to serve as guidelines for any spatial database. An important typology of spatial operators is concerned with the determination of the topological relationship between pairs of objects. However, as pointed out in (Clementini & Di Felice 2000), topology is not the only spatial aspect one might be interested in. Thus, further operators should be defined to deal with other aspects of space (e.g., direction and distance).

4 QUALITATIVE SPATIAL REPRESENTATION AND REASONING

Qualitative Spatial Representation and Reasoning (QSR) (cf. Cohn & Renz, 2008 and Cohn & Hazarika 2001 for an overview) is a subfield of artificial intelligence that aims at developing spatial representation techniques and computational models capable of simulating human spatial cognition. Such computational models draw upon the development of so-called qualitative spatial calculi.

A qualitative spatial calculus is a sound mathematical structure providing (*i*) a finite set of symbols (called qualitative spatial relations) that can be used to model spatial scenes and (*ii*) a set of operations defined over such symbols that allow for performing symbolic reasoning. Typically, a qualitative calculus focuses on one specific aspect of space. More than thirty years of research efforts in the field of QSR led to the birth of a vast and heterogeneous set of theoretical frameworks addressing a variety of qualitative spatial aspects (e.g., topology, direction, and distance among the most fundamentals). One of the best-known qualitative spatial calculi is the 9-Intersection Model (9-IM) (Egenhofer, 1989) which defines the 8 topological relations that can hold over a pair of spatial regions homeomorphic to the closed unit disk. They are depicted in Fig. 1 and arranged according to their *conceptual neighborhood graph* (Egenhofer & Al-Taha, 1992).

The term conceptual neighborhood has been first introduced in (Freksa, 1992) and refers to the property of a qualitative relation holding among a sequence of objects to change into another relation when the spatial objects it relates are continuously deformed according to a certain type of transformation (e.g., a topological transformation: movement, stretching/shrinking, or twisting). For example, the conceptual neighborhood

graph for 9-IM correctly shows that *Meet* is the nearest relation to *Disjoint* and *Overlap*. This means that, if at time t_i two objects are *Disjoint* and at time t_k they *Overlap*, there has to exist a time point t_j when they *Meet* such that $t_i<t_j<t_k$. In other words, the relational transition between *Disjoint* and *Overlap* goes through *Meet*.
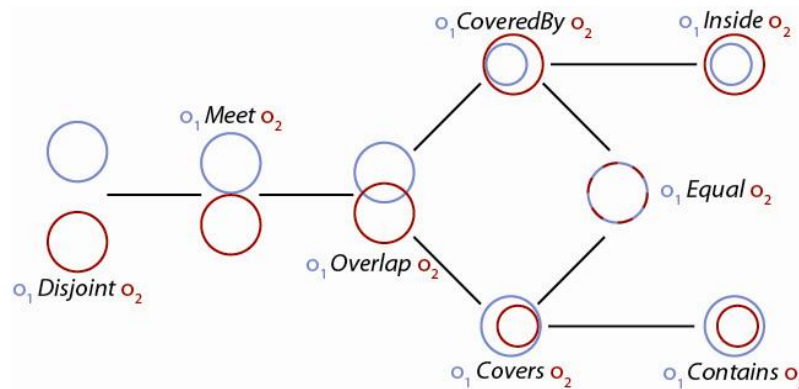
Fig. 1: the 8 possible topological relations between convex regions in the plane, as defined by the 9-Intersection Model (Egenhofer, 1989) and arranged to form the neighborhood graph.

As mentioned above, qualitative spatial calculi can be used to represent and reason about a configuration of spatial objects. One of the most spread methods resorts to the utilization of so-called Qualitative Constraint Networks (QCNs) (cf. Dechter, 2003 for a detailed discussion). A QCN can be seen as a labeled, directed (hyper)graph: each node represents a spatial object in the configuration; each (hyper)arc indicates which relation (reported in the label) holds among a sequence of spatial objects (those represented by the nodes connected by the hyperarc). For example, the spatial configuration depicted in Fig. 2(a) can be topologically described by the QCN in Fig. 2(c) taking relations (arc labels) from the 9-Intersection Model. Note that while the QCN associated to a geometrically described spatial configuration is unique, the opposite is not true: the same QCN can represent geometrically different spatial configurations. For example, the network in Fig. 2(c) also describes the configuration reported in Fig. 2(b), where object shapes, orientations, and relative positions are distorted and the only unchanged aspect is the topological one.
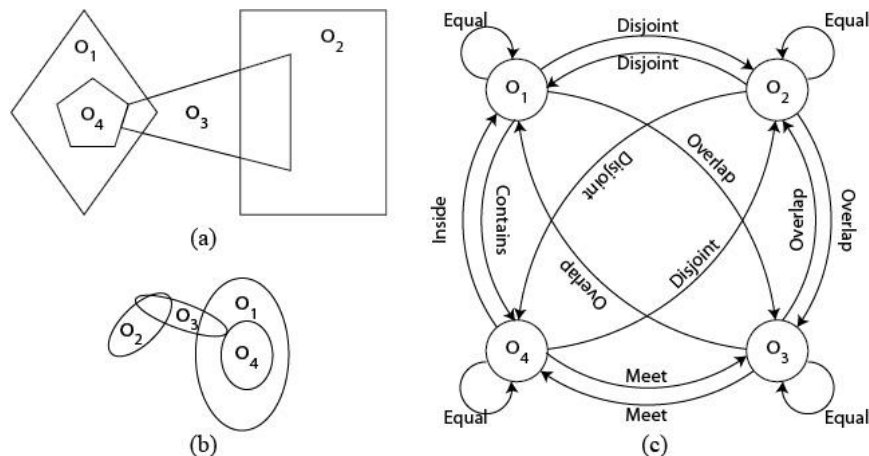
Fig. 2: The spatial configuration in (a) is uniquely represented by the qualitative (topological) constraint network in (c). However, note that the same network also represents the configuration in (b), meaning that the two configurations are topologically equivalent.

5 QUALITATIVE SPATIAL INFORMATION SYSTEM

In spite of continuous improvements in spatial data management and analysis, the interaction modalities between humans and Spatial Information Systems (SIS) keep remaining largely artificial and cognitively unnatural. One main motivation resides in the different ways SIS and humans deal with spatial information: SIS mainly draw upon quantitative spatial representations typically based on raster and vector data models, whereas human beings naturally resort to a qualitative and relational approach. For example, we use expressions like "the lake is to the right-hand side of the wood" or "is there a supermarket close to the university?" which qualitatively locate a spatial entity with respect to another.

Nowadays, such a gap in representation has to be plugged by the system user: He has to translate his mental, qualitative representation of space into a series of numerical constraints and to encode the latter in an

artificial language which the system is capable of elaborating. As a result, this augments the cognitive effort of the interaction and, consequently, denies casual users (non-experts) the possibility to exploit the system.

One possible solution to this problem is presented in (Fogliaroni, 2012) where a theoretical and practical framework is detailed which allows for enabling any SIS relying on a spatial database to explicitly deal with qualitative spatial information: The database is enhanced with an extensible pool of qualitative spatial calculi in such a way that the spatial relations provided by the latter are available to the system as spatial operators. Such relational operators extend the artificial language of the system, allowing for a direct encoding of spatial descriptions naturally produced by a human. More specifically, they allow for modeling by means of Qualitative Constraint Networks (QCNs) both, a quantitatively described spatial dataset and a natural spatial description coming in either verbal (written or spoken utterances) or pictorial (sketch maps) format. The QCN representation of a spatial dataset is referred to as qualification (or more explicitly as qualitative dataset) whereas that of a natural spatial description is called Qualitative Spatial Relation Query (QSRQ).

QSRQs consist of sets of predicates of the form

<div align="center">(spatial relation, spatial object, …, spatial object)</div>

taking spatial relations from those provided by the calculus pool; they are classified according to the level of indeterminacy of the spatial predicates they encode: the more numerous the elements of the predicate left unspecified, the harder the query to be solved. The hardest (realistic) query type consists of a series of predicates having only the spatial relation specified. A query of this category qualitatively describes the spatial arrangement of a set of undetermined objects (spatial variables) and, accordingly, it is called Qualitative Spatial Configuration Query (QSCQ). In (Fogliaroni, 2012) a set of algorithms and data structures has been designed that allows for efficiently solving such queries.

6 SUPPORTING SPATIAL PLANNING IN SPATIAL INFORMATION SYSTEMS

In this section we outline a further enhancement for the qualitative spatial information system (QSIS) discussed in Section 5 that allows for supporting spatial planners in the design phase. We suggest equipping the QSIS with two domain ontologies providing a hierarchical categorization of spatial objects and spatial plans, respectively. For the sake of exposition it is necessary to distinguish between the design of a spatial plan and its realization in the real world: we shall refer to the first as plan design and to the second as plan environment. Moreover, in the case the location for a spatial plan is not predetermined, but rather has to be decided by the planner, we also shall discriminate between workspace location and environment location: the first indicates the location a planner has to identify within a spatial dataset according to certain given constraints whereas the second denotes the actual location of a plan environment in the real world.

Spatial object categories define classes of spatial objects like dwelling, road, and grocery. Moreover, we assume that the ontology defines some categories like public green, industrial area, and residential area which describe agglomerates of spatial objects (factitious entities). Object categories can be used in place of generic spatial objects within a QSCQ to provide a more accurate definition of the searched configuration, although still general. For example, the following is a QSCQ describing the arrangement of two dwellings, one road, one grocery and one agglomeration of objects that is a public green zone:

{dwelling(o1) adjacent to road(o2), dwelling(o1) right of road(o2),

dwelling(o3) adjacent to road(o2),

grocery(o4) adjacent to road(o2), grocery(o4) close to dwelling(o1),

public green(o5) close to dwelling(o1), public green(o5) right of road(o2)}

Plan categories potentially coincide with object agglomeration categories and we shall assume that to each of them is associated a QSCQ describing the optimal spatial configuration for that specific plan category. In particular, such an optimal configuration defines the number of objects of each category that should be placed in the design (and, consequently, in the environment) as well as in which manner they should be spatially arranged.

A QSIS enhanced in this way can support the design of a spatial plan in several ways:

(1) In the case the environment location is not decided a priori and it is on the planner selecting an appropriate one, the planner can complement a standard search (based on object attributes like land usage or

land type) with a sketched or a verbally described spatial configuration (i.e., a QSCQ) that the workspace location has to satisfy. As an example let us consider the search for an optimal location of a residential area. Several conditions must be met: The noise level should be low, transport capacity of the nearby transportation network must be adequate, the impact on nature shall be limited, and there should be not excessive risk of flooding or avalanches. These conditions are expressed as a QSCQ and suitable areas can be found.

(2) Once the workspace location is decided and selected, the planner states the plan category he intends to design. The system exploits the optimal configuration associated to that plan category to suggest to the planner a list of spatial objects (divided by category) that should be placed in the workspace and how they should be arranged. Possibly, the system might already suggest an arrangement taking into consideration the morphology of the land parcels covered by the workplace. For example, a residential area comprises more than just buildings and gardens. A road network, green areas, public services, etc. are also necessary. Using basic predicates (e.g., green areas should be accessible for all inhabitants) a starting distribution can be computed.

(3) During the design phase, the planner can drag and drop new objects in the workspace or transform objects already placed. The system continuously parses the design and produces the corresponding QCN which is compared with the optimal configuration associated to the plan category. The outcome of the comparison is used to point out to the planner which elements does not fit the optimal configuration and for associating an overall "optimality" score to the current design. For example, one might design a road going through a park and, if the spatial arrangement of such elements would conflict with the one reported in the optimal configuration, the system would point this out to the planner. Of course is up to the planner deciding whether taking care of the suggestion (i.e., the arrangement was a mistake) or not (i.e., the arrangement was intended to be like that).

While the scenario described in point 2 does not require anything more than retrieving the optimal configuration associated with plan category and use it to produce a prototypical design, points 1 and 3 give raise to a number of more advanced issues. Particularly, in the scenario described in point 1, the system shall return a location perfectly matching the given constraints. However, if such a perfect matching does not exist a best matching location might be suggested to the planner. The problem raised in point 3 is concerned with similarity assessment.

Since qualitative constraint networks (QCNs) naturally lend themselves to be represented as hypergraphs, such problems can be stated as (sub)graph matching problems. In particular they are: perfect matching, best matching, and similarity measurement.

The problem of finding a perfect matching can be solved via an adaptation of famous Ullmann's subgraph isomorphism algorithm (Ullmann, 1976) as described in (Fogliaroni, 2012, Section 3.4.1). In (Wallgrun et al., 2010), another variant of Ullmann's algorithm is used to find the best matching between a pair of QCNs. Although apparently very similar to the first problem, the problem tackled by Wallgrun et al. differs in two main points. (i) They look for best partial matchings rather than for complete matchings, namely, they try to match the highest number of (hyper)arcs. This means that they are faced with a maximum common subgraph problem instead of a subgraph isomorphism. (ii) They also consider ambiguous QCNs, i.e., hyperarcs may be labeled with disjunctions of relations. Accordingly, they employ an A* algorithm to drive the matching process, employing consistency checking as the main constituent of the forward checking function.

The last problem can be solved as a combination of the two techniques above in the following manner: If a perfect matching is found, the two networks are equivalent (i.e., maximum similarity score), otherwise the best partial matching is detected which has a number of unmatched hyperarcs. The qualitative relation encoded by each such hyperarc differs from the relation reported in the QCN describing the optimal configuration and the distance in the conceptual neighborhood graph between each such relation pair can be used to compute a similarity score between the two networks.

Let us resume the exemplary qualitative configuration given in Fig. 2 and refine it by including object categories as depicted in Fig. 3(c). The QSCQ reported in Fig. 3(a) perfectly matches such a configuration. Indeed, it is easy to verify that the only variable assignment that ensures the matching is the following $\{x1=o2, x2=o1, x3=o4\}$. Conversely, there is no way to assign all the variables of the QSCQ in Fig. 3(b) in such a way that all its arc labels match those in the given configuration. In this case only a partial assignment

is possible that maximizes the number of matched variables, it is: {x2=o1, x3=o4}. Starting from this partial assignment a complete one can be generated. In the example it is: {x2=o1, x3=o4, x1=o2}. Such a complete assignment yields a mismatch between the arc (x1 Overlap x2) of the QSCQ and the arc (o2 Disjoint o1) of the configuration. The distance between the mismatching relations in the conceptual neighborhood graph (cf. Fig. 1) is equal to 2. Such a number can be used to assign a similarity score to the matching that is an index of how close the QSCQ is to the qualitative configuration (i.e., the optimality score).
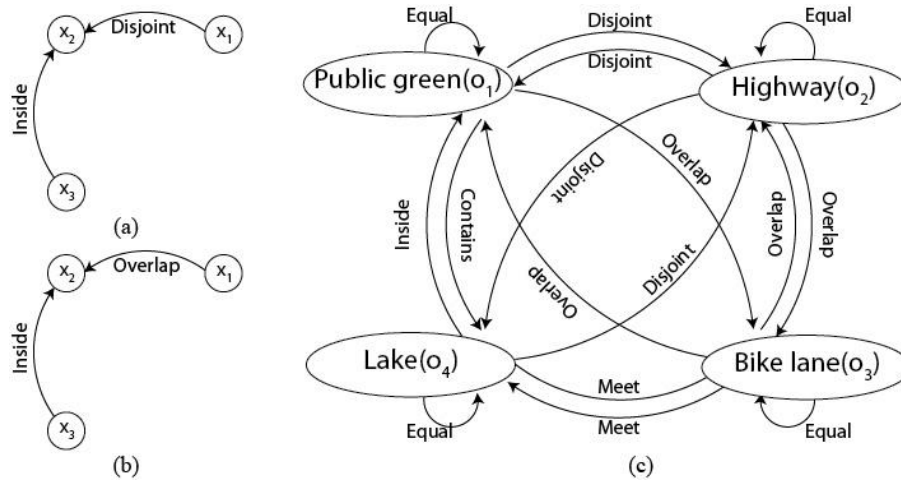
Fig. 3: The QSCQ in (a) perfectly matches the qualitative configuration in (c) while the QSCQ in (b) matches partially.

6.1 Computing the optimal plan

In this section we describe an approach to compute optimal configurations for spatial plan categories. Thanks to its features, the qualitative spatial information system we described in Section 6 is capable of maintaining a list of qualitative datasets for each plan category. Such datasets are, simply, the qualification of spatial plans designed within the system. As such, each of them shall embody at least a subset of common-sense, best-design, environmental, and urban rules that should be commonly fulfilled in the design phase.

To compute the optimal configuration for a given plan category we suggest to compare all the corresponding qualified datasets in the following manner.

(1) Normalize the qualitative datasets by

(1.1) computing the maximum common set of spatial objects (separated by category) involved in the plans;

(1.2) removing from each qualitative dataset the objects not contained in the common set as well as the relations in which they are involved.

(2) Compare the normalized datasets (via hypergraph matching) to find the minimum common hypergraph.

The resulting minimum common hypergraph represents the optimal spatial configuration we look for.

7   FITTING SPATIAL PLANS TO PUBLIC EXPECTATIONS

Public participatory online applications are web platforms developed to collect public opinions about a given topic of common interest. One recently established form of public participatory applications integrates standard pooling techniques with Geographic Information Systems to obtain public feedbacks about spatial matters. Such a form of public participation is referred to as Public Participatory Geographic Information System (PPGIS) and in (Poplin, 2012) it is shown how it can benefit spatial planning.

In the previous section we outline a method to compute for a given type of spatial plan an optimal configuration which conveys rules of good planning design. Now we show how our qualitative-enhanced spatial information system allows for automatically exploiting people feedback conveyed through a PPGIS application to let the optimal configuration fit public expectation.

The fact that human beings mentally map space in a qualitative manner means that the assessment of the quality of a certain environment is (at least partly) based on the presence (or absence) of a number of objects of a certain category and on their spatial arrangement within the environment. The quality assessment might also be influenced by a number of aspatial aspects including air pollution, price of a service, and weather

conditions. However, in the scope of this work we shall disregard aspatial aspects and assume that the assessment of an environment can be directly associated to its qualitative representation (i.e., a QCN).

Accordingly, we suggest two slightly different approaches that resort to people feedbacks on the quality of an environment to compute optimal configurations.

The first approach draws on the idea that the quality of an environment (eventually resulting from a spatial plan) can be reliably assessed by its users: people working, living, or, more generally, carrying out an activity in the environment itself. Accordingly, we suggest asking users to evaluate the quality of a given environment by a numeric score. Such quality scores can be collected within the system and their average (or any other meaningful statistical operator) can be used to weight the plan design which the environment has been realized from. Every time the weight of a plan changes the optimal configuration for its category has to be recomputed as described in Section 6.1, this time taking into consideration the computed weights.

The second approach takes advantage of an online participatory application like, for example, the B3 project (http://www.geogameslab.de). B3 is a web platform that allows the registered user to actively participate in the planning process of Billstedt (a market place in Hamburg, Germany). The application consists of a 3D design environment displaying the actual (empty) location. The user can drag and drop environmental items from a predefined list or move them around within the scene until he obtains an environment satisfying his expectations. We suggest integrating our system to tools like B3 in such a way that the plan designed by each user can be qualified into a QCN which can be added to the list of qualitative datasets of a certain plan category. In such a way the optimal spatial configuration will fit not only good design rule, but also public expectation.

8 CONCLUSIONS

In this paper we presented an extension for a generic Spatial Information System (SIS) designed to benefit spatial planning. The extension builds on top of a framework presented in (Fogliaroni, 2012) which provides a standard SIS with qualitative spatial representation and reasoning capabilities. We suggested complementing such a framework by means of two domain ontologies providing hierarchical categorizations for spatial objects and spatial plans, respectively. The result is a qualitative-enhanced SIS that can benefit spatial planning design in several ways. As a basic functionality it provides more natural interaction means by bridging the representational gap existing among human beings (qualitative) and spatial information systems (quantitative). It also offers a mechanism to suggest the planner which environmental items should be placed in the design (according to the type of plan) and in which way they should be arranged in the workspace. The system is capable of assessing the plan being designed by comparing it with an optimal plan that accounts for good design rules; moreover it is also capable of pointing out which objects should be rearranged (if any). Finally we presented two approaches to integrate the suggested system with standard web-pooling techniques to collect public feedback and discussed how such a feedback can be used to refine the optimal plan; namely, to include public expectation in the spatial plan design phase.

9 REFERENCES

Clementini, E. & Di Felice, P. (2000). Spatial operators. SIGMOD Record, 29(3), 31–38.
Cohn, A.G., Hazarika, S.M. (2001). Qualitative spatial representation and reasoning: An overview. Fundamenta Informaticae 46(1-2), 1–29
Cohn, A.G., Renz, J. (2008). Qualitative spatial representation and reasoning. In: Frank van Harmelen, V.L., Porter, B. (eds.) Handbook of Knowledge Representation, Foundations of Artificial Intelligence, vol. 3, pp. 551–596. Elsevier
Dechter, R. (2003). Constraint processing. The Morgan Kaufmann Series in Artificial Intelligence, Morgan Kaufmann
Egenhofer, M.J. (1989). A formal definition of binary topological relationships. In: Litwin, W., Schek, H.J. (eds.) 3rd International Conference, FODO 1989 on Foundations of Data Organization and Algorithms, Lecture Notes in Computer Science, vol. 367, pp. 457–472. Springer-Verlag
Egenhofer, M. J. & Al-Taha, K. K. (1992). Reasoning About Gradual Changes of Topological Relationships. in: A. U. Frank, I. Campari, and U. Formentini (Eds.), Theories and Models of Spatio-Temporal Reasoning in Geographic Space, Pisa, Italy. Lecture Notes in Computer Science 639, pp. 196-219, Springer-Verlag, New York.
ESRI (1998). Shapefile technical description. Tech. rep., Environmental Systems Research Institute, Inc.
Fogliaroni, P. (2012). Qualitative Spatial Configuration Queries – Towards Next Generation Access Methods for GIS. Ph.D. Thesis (http://nbn-resolving.de/urn:nbn:de:gbv:46-00102731-11)
Freksa, C. (1992): Temporal reasoning based on semi-intervals. Artificial Intelligence 54, 199-227.
Lynch, K. (1960). The image of the city. MIT Press.
Longley, P., Goodchild, M., Maguire, D. & Rhind, D. (2005). Geographic Information Systems and Science. John Wiley & Sons, Ltd.

OpenGIS Consortium (1998). OpenGIS simple features specification for SQL. Tech. rep., OpenGIS Consortium (OGC).

Poplin, A. (2012). Playful public participation in urban planning: A case study for online serious games. Computers, Environment and Urban Systems.

Smith, B. (1995). On drawing lines on a map. Spatial Information Theory: A Theoretical Basis for GIS, 475–484.

Ullmann, J. (1976). An algorithm for subgraph isomorphism. Journal of the ACM (JACM), 23(1), 31–42.

Wallgrün, J.O., Wolter, D. & Richter, K.F. (2010). Qualitative matching of spatial information. In Proceedings of the 18th SIGSPATIAL International Conference on Advances in Geographic Information Systems, 300–309, ACM.

Worboys, M. & Duckham, M. (2004). GIS: A computing perspective (2nd edition). CRC Press, Inc.

Synergies and Goal Conflicts for Climate Change Policy and Spatial Planning

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1 ABSTRACT

The purpose of this paper is to identify goal conflicts – both actual and potential – between climate and social policies in government strategies in response to the growing significance of climate change as a socio-ecological issue (IPCC 2007). Both social and climate policies are political responses to long-term societal trends related to capitalist development, industrialisation, and urbanisation (Koch, 2012). Both modify these processes through regulation, fiscal transfers and other measures, thereby affecting conditions for the other. This means that there are fields of tensions and synergies between social policy and climate change policy. Exploring these tensions and synergies is an increasingly important task for navigating genuinely sustainable development. Gough et al (2008) highlight three potential synergies between social and climate change policies: First, income redistribution – a traditional concern of social policy – can facilitate use of and enhance efficiency of carbon pricing. A second area of synergy is housing, transport, urban policies and community development, which all have potential to crucially contribute towards reducing carbon emissions. Finally, climate change mitigation will require substantial and rapid shifts in producer and consumer behaviour. Land use planning policy is a critical bridge between climate change and social policy that provides a means to explore the tensions and synergies that are evolving within this context. This paper will focus on spatial planning as an opportunity to develop strategies to adapt to climate change, and reviews the challenges of such change.

Land use and spatial planning involve the allocation of land and the design and control of spatial patterns. Spatial planning is identified as being one of the most effective means of adapting settlements in response to climate change (Hurlimann and March, 2012). It provides the instrumental framework for adaptation (Meyer, et al., 2010) and operates as both a mechanism to achieve adaptation and a forum to negotiate priorities surrounding adaptation (Davoudi, et al., 2009). The acknowledged role of spatial planning in adaptation however has not translated into comparably significant consideration in planning literature (Davoudi, et al., 2009; Hurlimann and March, 2012). The discourse on adaptation specifically through spatial planning is described as 'missing' and 'subordinate' in national adaptation plans (Greiving and Fleischhauer, 2012),'underrepresented' (Roggema, et al., 2012) and 'limited and disparate' in planning literature (Davoudi, et al., 2009). Hurlimann and March (2012) suggest this may be due to limited experiences of adaptation in developed nations while Roggema et al. (2012) and Crane and Landis (2010) suggest it is because climate change is a wicked problem involving an unfamiliar problem, various frames of understanding and uncertain solutions. The potential for goal conflicts within this policy forum seem to outweigh the synergies. Yet, spatial planning will be a critical policy tool in the future to both protect and adapt communities to climate change.

2 INTRODUCTION

There is a strong scientific consensus that climate change is happening, that it is the result of human activity, that it is global, cumulative and destructive of human and environmental well-being (IPCC, 2007; Patz, J. and Kovats, 2002). However, this scientific consensus has not led to any meaningful coherence between economic and social policy, planning laws and climate change policy in developed countries like Australia (Koch, 2012; Gough, 2011). Without an integrated public policy framework and an inclusive approach to planning the vision of fair, prosperous and sustainable urban and regional communities will not become a meaningful reality (Gough, 2010, Stern, 2009). The broad policy challenge is to create conditions for human flourishing within the ecological limits of a finite planet (Jackson, 2009). Meeting this challenge will require the social and planning dimensions of public policy to be integrated with the environmental dimension. The integration of these policy dimensions in the critically important policy domain of land use planning presents a significant opportunity for synergies and goal conflicts to develop.

While this problem of coordination is acknowledged by some scholars, there is as yet little empirical research being done to understand the dynamics between economic, social policy/planning and

environmental policies and programs. In part, this is a problem of competing paradigms and knowledge systems, a clash between dominant economic models that have reached their ecological limits on one hand (Jackson, 2009) and scientific discourses that struggle to engage and incorporate the knowledge of local communities on the other (Whatmore and Landstrom, 2011). The result is increased uncertainty and knowledge controversy. What will be needed to address this uncertainty are more deliberative planning processes and more radical policy solutions, which can not only tackle the social equity and justice issues but also improve energy performance, land-use planning and reduce reliance on carbon based energy consumption. The purpose of this paper is to identify and explore existing and potential goal conflicts in pursuing social and economic objectives and climate change goals within the policy field of land use planning. This is done to aid in building synergies and minimising conflicts between environmental, economic and social policies and integrating principles of justice and sustainability in planning in the context of climate change. Section 2 identifies three macro scale approaches to social policy and climate change; Section 3 explores the role of and various approaches to land use planning in the context of climate change; Section 4 identifies three categories of goal conflicts; and finally, Section 5 suggests a role for planning in dealing with goal conflicts and knowledge controversies generated by competing policy paradigms and policy objectives.

3 CLIMATE CHANGE AND SOCIAL POLICY

Governments confront climate change with varying degrees of willingness to change economic, planning and social policy directions. In terms of social policy and climate change Gough (2011) identifies three scenarios which that provide some useful macro analytical tools. The first scenario, 'irrational optimism', is associated with freer markets and technological optimism and exemplified by mainstream Republican positions in the US. The prevailing idea is that economic growth will 'equip future populations to cope with climate change, mainly through adaptation …' (Gough 2011: 16). Favoured solutions are first and foremost deregulated drilling for oil in combination with some federal subsidies and loan guarantees for alternative energy sources, in particular nuclear energy, as well as carbon capture and storage.

The second scenario is 'green growth' or ecological modernisation, to which most European countries subscribe (Gough, 2011: 18). The incorporation of environmental interests, including climate change mitigation, will require a much more active state or 'a return to planning' (Giddens, 2009) to set goals and targets, manage risks, promote industrial policy, re-align prices through taxation and regulate externalities otherwise neglected by business interests. Especially in circumstances of financial crisis, economic recovery is seen to demand public investment, and this should be targeted towards energy security and low-carbon infrastructures. By reducing energy costs and reliance on the fragile geopolitics of energy supply, providing jobs in the expanding 'green' sector and meeting carbon emission reduction targets, the intention is to achieve synergies between economic, ecological and welfare goals.

While the second scenario in Gough's (2011) typology argues for an essentially Keynesian and green reorganisation of the economy, the third scenario questions economic grow per se. It is this scenario that involves more radical policy change and coordination. In 'slow-growth' approaches, researchers such as Victor (2008) and the UK Sustainable Development Commission stress the distinction between relative and absolute decoupling of GDP growth and CO2 emissions, the former referring to 'decline in the ecological intensity per unit of economic output' (Jackson 2009: 48). While emissions decline relative to GDP in some countries, they do not do so in absolute terms. To stabilise CC at the levels of relatively optimistic assumptions, emissions would need to decline absolutely. There is as yet no empirical evidence that this is being achieved (Garnaut et al 2009; Gough 2011). However, it is important to assess to what extent governments follow welfare and social policy strategies 'beyond growth' – that is, their preparedness to initiate a controlled transition towards a low or no growth strategy. This will mean going beyond what Hamilton (2003) calls the 'growth fetish', which he defines as the unchallengeable consensus that the overriding objective of modern government in developed countries must be continued economic growth.

Acknowledging the limitations of economic growth raises fundamental philosophical questions about what constitutes a 'good life' and 'the good society' within the ecological limits of a finite planet. Sen's (1984) early work on the 'living standard' is a useful point of departure for an adequate understanding of welfare and wellbeing under slow-growth conditions, where he argues that the material requirements for physiological flourishing tend to be fairly similar in all societies and that reported life satisfaction has

remained more or less unchanged in most advanced economies over several decades in spite of significant economic growth. Further insights are provided from philosophers such as Soper et al (2009), who argue that consumer society has already passed a critical point where materialism is now actively detracting from human well-being, and psychologists such as Kasser (2010; 2011), who provides evidence that people with higher intrinsic values are both happier and have higher levels of environmental responsibility than those with materialistic values. What is consistent across these frameworks is an appreciation that societal well-being needs to be defined in ways that are not only focused on the distribution of wealth, but also the distribution of time and opportunities not instrumentally tied to labour market status or potential for profit.

Developing these capabilities and measures will require public dialogue and debate about risk management, and the role of government, markets and civil society in climate change adaptation, the design of cities and regions and community and individual well-being. What is clear is that science cannot be the ultimate authority to settle these policy and value conflicts (Gottweis, 2003). It is this acknowledgement that underpins deliberative policy making and planning, an approach that seeks to keep problems and issues contestable (not to deny their controversial character), and ensure that the boundaries between experts and non-experts and between science and non-science are more permeable (Healey, 2003; Gottwesi, 2003). This deliberative and discursive approach to policy analysis and planning will inform climate change governance at the national and sub-national levels, as it moves beyond traditional policy analysis and 'top-down' planning and it has the potential to build inclusive public understandings, climate change strategies and redistribute scientific knowledge.

However, the challenge extends beyond a democratic and discursive approach for land use planning. Land use and spatial planning, as a method of moving knowledge to action, has inherent conflicts as a policy tool. These conflicts often occur at the substantive level, where spatial planning is a broad instrument that affects many aspects of the community such as affordable housing, economic development, hazard zoning, and environmental protection. This broad application is a strength of land use planning as it integrates important community goals into one vision. Yet, substantive elements within a plan often conflict: economic development with environmental protection; affordable housing with single family zoning restrictions; and hazard protection with tourism development. The paradoxical nature of planning is to both constrain and liberate land owners: to protect individual property owners from infringement, and yet act in the greater community interest. If we extend this range of conflict to include climate change the task becomes considerably more complex.

4   CLIMATE CHANGE AND LAND USE PLANNING

Land use and spatial planning involves the allocation of land and the design and control of spatial patterns. The United Nations and European Commission define land use planning as 'the systematic assessment of physical, social and economic factors in such a way as to encourage and assist land users in selecting options that increase their productivity, are sustainable and meet the needs of society' (UN, 1993; EU, 2006). The world bank similarly defines land use planning as 'a public policy exercise that designates and regulates the use of land in order to improve a community's physical, economic, and social efficiency and well-being' (WB, 2010). These definitions identify the broad range of factors which land use planning must consider and the ambiguous goals of sustainability, meeting the needs of society, efficiency and well-being. This broad scope underpins the opportunity for conflicts and synergies between the various and equally legitimate goals and policies of land use planning and the emerging 'adaptation turn' in planning.

Climate change introduces and intensifies a range of spatial impacts on settlements and results in dimensions of change and uncertainty in the social, environmental and economic context of human activities. Existing spatial configurations, particularly urban areas are both significant contributors to climate change and highly vulnerable to climate change (UN Habitat, 2010). Spatial planning is identified as being one of the most effective means of adapting settlements in response to climate change, particularly flooding associated with more frequent storm events and sea level rises (Hurlimann and March, 2012). This is generally argued on the basis of the spatial dimension of climate change impacts and the ability of planning to facilitate anticipatory action and cross-sectoral coordination. The critical role of planning in relation to climate change is recognised in both climate policy literature (IPCC, 2007; Stern, 2007) and spatial planning literature (Crane and Landis, 2010; Davoudi et al., 2009; Wilson and Piper, 2010). As Priemus and Davoudi (2012, p1) urge, urban planners need to revisit their traditonal concepts, methods and ways of thinking. However the

acknowledged role of spatial planning in adaptation has not translated into comparably significant consideration in planning literature or practice (Davoudi, et al., 2009; Hurlimann and March, 2012). The discourse linking adaptation and spatial planning is described as limited and disparate (Davoudi et al., 2009), sparse (Blanco et al., 2009), underrepresented (Roggema, Kabat, et al., 2012) and a paucity (Hurlimann and March, 2012) in planning literature and missing' and 'subordinate in adaptation plans (Greiving and Fleischhauer, 2012).

The exact nature of the role planning plays in relation to climate change adaptation comprises two complementary capacities. First spatial planning is expected to provide the instrumental framework or delivery mechanism to implement strategies and measures to influence spatial development patterns in a way that reduces vulnerability and increases resilience (Meyer et al., 2010). Second spatial planning is suggested to provide a forum or arena to negotiate priorities, explore options and create synergies between adaptation and at times conflicting mitigation and sustainability objectives and social and economic goals (Biesbroek et al., 2009; Davoudi et al., 2009). The first is an outcome oriented technical task while the second is a process oriented socio-political task. Davoudi et al., (2009, p16) explains that 'Spatial planning can play a pivotal role not just as a technical means by which climate change policies can be delivered, but also as a democratic arena through which negotiations over seemingly conflicting goals can take place, diverse voices can be heard, and place-based synergies can be formed'. These roles reflect top-down synoptic and bottom-up communicative approaches grounded in traditional planning theory (see Allmendinger, 2009).

The broader climate change science and policy literature emphasises the role of planning as an instrumental framework and delivery mechanism, while the planning literature is more likely to consider planning's role as a democratic forum or arena. However the merits of a more direct implementation approach verse a participatory approach in the context of climate change is contested. For example Dymen and Langlais (2013) argue that a more direct calculation and implementation of adaptation measures is required while Bulkeley (2009, p294), challenges the notion that spatial planning can provide a linear translation and delivery of top gown policy goals: 'Spatial planning should not be considered as a delivery mechanism for climate change policy. Rather, what it means to respond to climate change is defined, contested and made material through processes of negotiation and conflict'. In its capacity as a communicative and participatory forum for negotiation, the potential for goal conflicts is recognised and the capacity of planning to consider and resolve these conflicts is emphasised.

5 GOAL CONFLICTS

In negotiating climate change and social policies, governments often have to deal with contradictory goals (Jessop, 2002). Three levels of goal conflicts are identified: (1) philosophical conflicts between different ways of thinking and different fundamental values, (2) policy conflicts which involve incompatible or competing policy objectives, and (3) instrumental and implementation conflicts which involve incompatible or competing approaches to implementation. These categories of goal conflicts are interrelated. A philosophical conflict for example often leads to subsequent policy conflicts and instrumental and implementation conflicts.

Conflict Type	Explanation	Conflict Between:
Philosophical Conflicts	Divergent Approaches to Planning	Different Planning Cultures Different Planning Rationales
Policy Conflicts	Incompatible Policy Objectives	Social Wellbeing Objectives Economic Development Objectives Environmental Protection Objectives
Instrumental and Implementation Conflicts	Incompatible or Competing Approaches to Implementation	Different Timeframes Different Spatial Scales Different Governance Structures Different Resource Allocation

Figure 1: Goal conflicts in planning for climate change

5.1 Philosophical Conflicts

Philosophical conflicts involve different ways of thinking and different fundamental values. Various rationales have been provided as justification of the legitimacy and value of planning. These are important because they not only explain the reason planning is needed but underpin concepts of how planning is should be undertaken. Public interest rationales (Klosterman, 1980; Campbell and Marshall, 2002) support planning based on notions that some actions are in the common interest and general welfare of society. Social justice

rationales (Davidoff, 1965; Markusen, 2000) pursue some sense of equity and see planners as advocates who represent the interests of and facilitate the involvement of marginalised and underrepresented groups. Economic rationales (More, 1978; Klosterman 1985) identify planning a having a legitimate role in cases of market failure such as in public goods, externalities and high transaction costs. The underlying rationales dictate to some degree whether planning is primarily concerned with serving a collectively held interest, combating conditions of inequity and injustice or in correcting market failures. These different rationales not only underlie different approaches to planning but are linked to the different scenarios discussed in Section 2: irrational optimism, green growth, and slow growth.

Each rationale can be seen to support a consideration of climate change in planning. Action on climate change is in the public interest in that it impacts the whole of society. It is also supported in terms of social justice because impacts are disproportionally felt by the socioeconomically disadvantaged groups, (Leichenko and O'Brien, 2008) of instance observe that patterns of climate change vulnerability correlate with patterns of socioeconomic vulnerability originating from neoliberal globalisation. From an economic perspective climate change is an uncontrolled externalities and a stable climate can be construed as a public good. However conflicts arise from the divergent focus of each rationale.

Value conflicts do not need to be well defined and distinct. Even amongst the planning profession – value differences abound. Stead (2013) identifies forces of convergence and divergence in spatial planning in Europe and argues that path dependency and planning cultures can operate as a force against convergence. The importance of planning cultures and their impact on decision-making is poorly understood in the literature (Stead, 2013). Indeed, the value and cultural differences provide both opportunities for conflict and poor integration of policy to application.

5.2 Policy Conflicts

Policy conflicts involve incompatible or competing policy objectives. Planning may fail to deliver climate change policy goals because of the number of planning concerns which involves diverse social and economic objectives. Bulkeley (2006, 2009) argues that the adaptation agenda may cause tensions between other legitimate dimensions of planning, and notes cases where conflicting planning objectives have obstructed climate change mitigation and adaptation and increased levels of vulnerability. This occurs when adaptation objectives such as the development of renewable energy infrastructure and limiting development on floodplains conflict with, and are subordinated by other legitimate planning objectives such as visual amenity and provision of affordable housing through spatial planning processes (Bulkeley, 2009). Tensions can also exist between mitigation strategies and adaptation strategies and perusing one independently may hinder the other (Biesbroek et al., 2009; Howard, 2009).

Other planning objectives can compete with and constrain adaptation. This occurs when, due to the breadth of planning concerns and the scarcity of planning resources, other planning objectives compete with adaptation objectives for priority and resources (Measham et al., 2010). These situations are attributed by Owens and Cowell (2010) to competing interpretations of sustainability and the relative emphasis placed on the environmental, social and economic dimensions which ultimately originate from divergent concepts of the public good. Under these situations even if adaptation is supported at the strategic level it may not be successfully carried into implementation. And while the prioritisation and reconciliation of objectives is a necessary role of planning which may legitimately qualify the achievement of some objectives (Owens and Cowell, 2010), this process has historically resulted in an over prioritisation of economic interests and undervaluation of social and economic interests. Thus, perhaps the role of planning becomes focused on arbitration, as Greiving and Fleischhauer (2012, p.41) argue that at the policy level "the main challenge for planning is to identify synergies and conflicts between the different problems a city is confronted with".

5.3 Instrumental and Implementation Conflicts

As discussed earlier, planning and land use control are often comprised of inherent conflicts – and the role of planning is arbitrate the range of values. Thus, obvious differences in common substantive elements such as local economic development verses environmental protection are arbitrated at the Local Council level and decisions are made (or not made) to resolve or mediate the conflict. Even within common elements of a land use plan, such as transportation, the goal conflicts often result in conflicting instrumental outcomes between public transport and automobile use. Within this arena, larger scale issues such as sustainability are often

placed aside, and the public interest is reinterpreted for shorter term goals. Thus, large scale, poorly defined (by local eyes) concepts such as global warming are marginalised to a minor role compared to objectives which are perceived to be a more immediate priority.

Davoudi (2013) summarises planning tools and resources under four generic categories: strategies and plans, regulatory measures, resource mobilisation, and collaborative practice. The realm of conflict is vast at this scale – as planning is often viewed as the basis to resolve conflict – ranging from competing values within community plans, development priorities, and funding priorities. As Davoudi (2013) notes, planning at this level is effective if it can achieve collaboration across other policy instruments.

Instrumental and implementation conflicts include diverging views of the appropriate implementation time frames, spatial scales, governance contexts and resources. Romero-Lankao (2012) for example, considers local concerns, leadership and institutional capacity, the autonomy, resources and decision making power of local authorities and the inertia of cultural preferences as factors in determining how climate policy is translated from rhetoric to implementation. Conflicts at this level can occur despite high level strategic policy agreement because there are vastly different methods of implementation and different factors that impact operations. The levels of governance often conflict; national, state, and local governments need to have converging agendas. Resources are also a significant area of potential goal conflict, such as both the allocation of administrative resources within planning authorities and the allocation of land according to specific policies.

6 CONCLUSION

The application of land use planning to adaptation strategies for climate change is complex. If land use planning is to be one of the mechanisms to implement climate change adaptation, then internal conflicts in the policy and implementation frameworks must be recognised. Without this acknowledgement and resolution of these goal conflicts – spatial planning will be ineffective as an implementation tool. Within this context 3 levels of conflict are identified: philosophical, policy, and instrumental/implementation. Each level is interrelated; certainly the philosophical basis of a policy impacts its implementation (for example, neoliberal market oriented approaches). If planning is to be effective as a platform to respond to climate change: (1) actual and potential goal conflicts need to be recognised and explored (2) land use planning needs to assume a communicative and participatory approach to negotiate and resolve goal conflicts at a local level to prevent paralysing knowledge controversies.

Planning tools based on climate science are critical resources in producing knowledge that can protect and help communities mitigate and adapt to climate change, but they will need to be implemented in such a way that involves close collaboration with affected parties in the community. In effect, the science behind spatial planning and other climate change tools needs to be 'democratised'. New forms of public engagement will be required, beyond the traditional one-way consultation involved in typical planning and policy development cycles (Healey, 2003; Fischer and Forrester, 1993). As Yeardley argues (1999: 863) in terms of climate models and planning tools, "…to build robust and legitimate models, public bodies will need to devise methods of consultation and participation not only when the model is running, but also in setting out the objectives and parameters of the model in its earliest stages". It is this kind of deliberative reasoning and network approach to governance and decision making that will be required to address goal conflicts and improve policy coherence between land-use planning, social policy and climate change.

7 REFERENCES

Allmendinger, P. (2009). Planning theory. New York: Palgrave Macmillan.

Biesbroek, G., Swart, R., and Van der Knaap, W. (2009). The mitigation–adaptation dichotomy and the role of spatial planning. Habitat International, 33(3), 230-237.

Blanco, H., Alberti, M., Forsyth, A., Krizek, K., Rodríguez, D. A., Talen, E., et al. (2009). Hot, congested, crowded and diverse: emerging research agendas in planning. Progress in Planning, 71(4), 153-205.

Bulkeley, H. (2006). A changing climate for spatial planning. Planning Theory and Practice, 7(2), 203-214.

Bulkeley, H. (2009). Planning and governance of climate change In S. Davoudi, J. Crawford and A. Mehmood (Eds.), Planning for climate change: strategies for mitigation and adaptation for spatial planners. London: Earthscan.

Bulkeley, H. (2009). Planning and governance of climate change In S. Davoudi, J. Crawford and A. Mehmood (Eds.), Planning for climate change: strategies for mitigation and adaptation for spatial planners. London: Earthscan.

Campbell, H., and Marshall, R. (2002). Utilitarianism's bad breath? A re-evaluation of the public interest justification for planning. Planning Theory, 1(2), 163-187.

Crane, R., and Landis, J. (2010). Introduction to the Special Issue. Journal of the American Planning Association, 76(4), 389-401.

Davidoff, P. (1965). Advocacy and pluralism in planning. Journal of the American Institute of Planners, 31(4), 331-338.

Davoudi, S. (2013) Climate Change and the Role of Spatial Planning in England In J. Knieling and W. Leal Filho (Eds) In Climate Change Governance. Berlin: Springer.

Davoudi, S., Crawford, J., and Mehmood, A. (eds.). (2009). Planning for Climate Change: Strategies for Mitigation and Adaptation for Spatial Planners. London: Earthscan.

Dymén, C., and Langlais, R. (2013). Adapting to climate change in Swedish planning practice. Journal of Planning Education and Research, 33(1), 108-119.

Garnaut, R. Howes, S., Jotzo, F., and Sheehan, P. (2009). The implications of rapid development for emissions and climate change mitigation. In Helm and Hepburn (eds) The economics and politics of climate change. Oxford: Oxford University Press.

Giddens, A. (2009). The politics of climate change. Cambridge: Polity.

Gough, I. (2010). Economic crisis, climate change and the future of welfare states. 21st Century Society: Journal of the Academy of Social Sciences, 5: 51-64.

Gough, I. (2011). Climate change and public policy futures. London British Academy.

Gough, I., Meadowcroft, J., Dryzek, J., Gerhards, J., Lengfeld, H., Markandya, A., and Ortiz, R. (2008) JESP Symposium: Climate change and social policy. Journal of European Social Policy. 18(1): 325-344.

Greiving, S., and Fleischhauer, M. (2012). National climate change adaptation strategies of European states from a spatial planning and development perspective. European Planning Studies, 20(1), 27-48.

Hamilton, C. (2003). Growth Fetish. Sydney: Allen and Unwin.

Howard, J. (2009). Climate change adaptation in developed nations: a critical perspective on the adaptation turn in urban climate planning. In Planning for climate change: strategies for mitigation and adaptation for spatial planners. London: Earthscan.

Hurlimann, A., and March, A. (2012). The Role of Spatial Planning in Adapting to Climate Change. Wiley Interdisciplinary Reviews: Climate Change.

IPCC (2007b). Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007. Cambridge and New York: Intergovernmental Panel on Climate Change.

Jackson, T. (2009). Prosperity without growth? Economics for a future planet. London: Earthscan.

Kasser, T. (2010). Psychological need satisfaction, personal well-being, and ecological sustainability. Ecopsychology 2: 175-180.

Klosterman, E. (1980). A public interest criterion. Journal of the American Planning Association, 46(3),323-333.

Klosterman, R. (1996). Arguments for and against planning. In Campbell and Fainstein, Readings in Planning Theory. Malden Massachusetts: Blackwell Publishers.

Koch, M. (2012). Capitalism and climate change: theoretical analysis, historical development and policy responses. Basingstoke: Palgrave Macmillan.

Leichenko, R., and O'Brien, K. (2008). Environmental change and globalization: double exposures New York: Oxford University Press.

Markusen, A. (2000). Planning as craft and as philosophy. In The profession of city planning. New Brunswick, New Jersey Rutgers.

Measham, T., Preston, B., Brook, C., Smith, T., Morrison, C., Withycombe, G., et al. (2010). Adapting to climate change through local municipal planning: barriers and opportunities: CSIRO.

Meyer, B. C., Rannow, S., and Loibl, W. (2010). Climate change and spatial planning. Landscape and Urban Planning, 98(3–4), 139-140.

Moore, T. (1978). Why Allow Planners to Do What They Do? A Justification from Economic Theory. Journal of the American Institute of Planners, 44(4), 387-398. Retrieved 2013/02/26

Owens, S., and Cowell, R. (2010). Land and limits: interpreting sustainability in the planning process. Hoboken: Routledge

Patz, J., and Kovats, R., (2002). Hotspots in climate change and human health. BMJ, 325:1094-1098.

Priemus, H. and Davoudi, S. (2012). Introduction to the Special Issue. European Planning Studies, 20 (1), 1-6.

Roggema, R., Kabat, P., and van den Dobbelsteen, A. (2012). Towards a Spatial Planning e for Climate Adaptation. Smart and Sustainable Built Environment, 1(1).

Roggema, R., Kabat, P., and Vanden Dobbelsteen, A. (2012). Towards a spatial planning framework for climate adaptation. Smart and Sustainable Built Environment, 1(1)

Roggema, R., Kabat, P., and Vanden Dobbelsteen, A. (2012). Towards a spatial planning framework for climate adaptation. Smart and Sustainable Built Environment, 1(1)

Romero-Lankao, P. (2012) Governing Carbon and Climate in Cities: An Overview of Policy and Planning Challenges and Options. European Planning Studies, 20 (1), 7-26.

Sen, A. (1984). The living standard. Oxford Economic Papers 36:74-90.

Soper, K., Ryle, M., and Thomas, L. (2009). The politics and pleasures of consuming differently. London: Palgrave Macmillan.

Stead, D. (2013) Convergence, Divergence or Constancy of Spatial Planning? Connecting Theoretical Concepts with Empirical Evidence From Europe. Journal of Planning Literature, 28, 1 pp. 19-31.

Stern, N. (2007). The economics of climate change: the Stern review. Cambridge: Cambridge University Press.

Stern, N. (2009). A blueprint for a safer planet: how to manage climate change and create a new era of progress and prosperity. London: The Bodley Head.

UN Habitat (2010). Climate Change Strategy 2010-2013: United Nations.

United Nations. (1993). Guidelines for land use planning. Inter-Departmental Working Group on Land Use Planning: Food and Agriculture Organization of the United Nations.

Victor, P. (2008). Managing without growth: slower by design, not disaster. Cheltenham: Edward Elgar.

Wilson, E., and Piper, J. (2010). Spatial planning and climate change. London: Routledge.

World Bank. (2010). Land use and physical planning. In Safer homes, stronger communities: A handbook for reconstructing after disasters. World Bank.

Temporality of Physical and Political Liminal Spaces in the Urban Transformations of the Greater Paris

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1 ABSTRACT

Since the last decade, the city of Paris underwent through an important urban renovation related to the process of metropolization called Greater Paris. This operation relies on two elements: (i) the redefinition of the relation between the central municipality and its periphery and (ii) the increase of the city's international competitiveness by creating new economic clusters and public transports. The northern east part of the city is one of the most emblematic areas of this political and spatial intervention, in the frame of a typical process of deindustrialization of historical popular districts. This area is today one of the largest metropolitan building sites in which all the temporalities of this long transformation process can be observed.

This article proposes a comparison among different kinds of "historicity systems" (Hartog, 2003) coexisting in this portion of the city. The meantime of the planning process will be considered as the fertile uncertain temporal space that creates new forms of power negotiations between the institutions and the civic society.

Which is the role of the inhabitants in the large scale development planning? Which are the new forms of urban conflict and negotiation?

Through the analysis of the "non-formal political actors" (Sassen, 2008) in the Parisian context, this paper will address the role of temporality in the planning process and the creation of new forms of urban engagement. From squats to community gardens, from participatory design processes to urban walks, the aim will be to describe which are the bottom-up practices and strategies that react or participate to the top-down projects. Those collective actions open the issue of the inhabitants' empowerment in the social and physical management of the public space and highlight the non-hierarchic relations between local actors and global politics at different scales. Through the analysis of conflictive discourses on the right to the city (Lefebvre 1968, Harvey 2008) in the French context, I aim to understand the new forms of urban development that are proposed by those new processes of negotiation.

Which is the role played by the image of a future project in the transformation of the city? Which is the temporality of the civic resilience?

2 THE TIME OF PLANNING

2.1 Present utopias

For Leon Battista Alberti, building was to be defined as a "body" made of "form" coming from "intelligence" and of "material" coming from the "nature". This assumption, that Françoise Choay calls "the axiom edifice-body" (Choay, 1980), is one of the most founding concepts of humanist architecture. Urbanism is a discipline deeply rooted in this tradition. It conceives the built environment not just as the reproduction of an organic body but, as a product of the man's "intelligence", a perfect and reproducible model of a body. According to Francesco Ventura, "utopia is constitutive of urbanism" (Ventura, 2006). In the utopia, as originally conceived by Thomas More, the model of space is intimately related to the model of society. Thereby the city is more than a single body, it is the expression of the union and relations of a community of perfect entities. It is upon this idea of the perfect society that the utopia builds a peculiar temporality. In order to design the idea of a perfect future as a skopós [1], as an aim to be reached in an unlimited time, the past has to become a disease to heal, an "imperfection that needs a radical correction" (Ventura, 2006). In this register, the future absorbs the present completely thus rendering it an irrelevant point of the tension towards the skopós. Likewise, the present and past societies need to be sacrificed to reach the never-coming utopia.

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[1] In ancient Greek the word means target, goal. It defines a future that is searched and depicted starting from the analysis of the present conditions (Ventura, 2006).

However, the history of urbanism is not only made of utopias. I would like to consider here how the capitalist model of city is deeply based on the construction of a distorted utopian time. According to David Harvey, the capitalist urban model is meant to absorb the crisis of the surplus system (Harvey, 2012). In a moment in which surplus product cannot be absorbed and produce new surplus profit, urbanism comes in help by enlarging the scale of the city. This enlargement has two main goals: creating new infrastructures and proposing a new model of citizen. The first one responds to the need of new natural resources, labour forces and technology; the second provides the formation of new needs (consumptions) through the creation of a new way of life. This never ending process of market expansion projects the city in a continuous linear growth grounded on the imperative of technological and social innovation. This deletion of the past reproduces the same utopian idea of a society and a space that are stuck in a "messianic present" "anxious of predictions" (Hartog, 2003).

In European cities, the futurist attitude of the capitalist model finds today an evolution in terms of construction of time and creates new forms of presentism (Hartog, 2003). In the time of the crisis of the neo-liberal city – in which the future becomes "uncertain" and "threatening" (Hartog, 2003) – the present has to take the burden of the innovation and depict itself as an already-realized future. This is translated also in the tendency, produced by the media, to historicize the present and substitute the "presence" of the real human dialogue with the "present" of the image (Lefebvre, 1992). At the same time, the society is led to look at herself pretending to have an historical distance and hoping to embody all the possibilities of the future. In terms of urbanism the linear growth of the capitalist city has to be reinvented in a new form of accessible utopia. The future city is too uncertain to be depicted in a convincing skopós and in consequence becomes an image that needs to invade the present. In this sense, this image of the future city needs to be constantly reinvented and translated in order to become a consumer good. The idea of an accessible future is also modifying the place of the society concerned by the urban transformation. The "right to change the city" (Harvey, 2012) is translated in new forms of participation and governance that pretend to open the access to a more democratic control of the planning process. The civil society is then invited to "take part" of this present utopia.

2.2 The Greater Paris

Based on an ongoing research in urban anthropology, this article questions the relations between the official processes of urban development of Paris and the inhabitant's informal actions of space transformation in the popular districts invested by the renovation projects.

Paris faces, since the last ten years, a complete renovation of its urban structure that was explicitly compared by the former right wing president Nicolas Sarkozy, to the Haussmanian renovation projects. This operation is based on redefining of the relation between the central municipality and its periphery and on increasing the international competitiveness of the city through the creation of new economic clusters and public transports. Since the launch in 2007 of the international competition "Le Grand Pari(s) de l'agglomeration parisienne" – the great bet [2] of the Parisian agglomeration – this process adopts the name of Greater Paris. This competition invited ten famous international teams of architects to produce a future vision of Paris as a larger metropolis. The guiding principle was mainly the "post-Kyoto" sustainable development and the need of a more global international competitiveness of Paris. This competition started a process of redefinition of the city's limits carrying on the classical model of concentric expansion and definition of what should be "inside" and "outside" the territory (Sotgia, 2011). This process is translated in a project of a new circular subway defining at the same time the new limits of the city and the emplacement of new clusters of economic development. The result of this politics is also a debate on the governance of the city and the emersion of new political actors competing for the management of the metropolis [3].

This redefinition of the limits of the city started more locally in 2002 with the election of the socialist Bertrand Delanöe as mayor of Paris. One of his most important actions in terms of urban development is the

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[2] The title is a play between the word bet, pari, and the name of the French capital.

[3] The municipality of Paris is really small (105 Km2) compared to the metropolitan area that affects the city (almost two thirds of the Île-de-France region, about 8.000 Km2). Nowadays there isn't an official government that manages the politics of the peripherals and the central municipalities. The most important emerging actor is the syndicate Paris Métropole that tries to work as coordination of the about 150 municipalities taking part to this association.

definition of eleven Greats Projects of Urban Renewal[4] implanted on the peripheral highroad, the boulevard périphérique[5], which corresponds to the limit of Paris. The goal of these projects is the "urban reinsertion" (TVK, 2008) of the boulevard. This domestication of the limit is meant as the symbolic start of a new dialogue between Paris and the surrounding municipalities.

Fig. 1: Image created by the architect Chrstian de Portzamparc for the international competition « Le Grans Pari de l'agglomeration parisienne » in 2007. This image has become an icon of the futuristic visions of the architects of the Greater Paris. (© Atelier Christian de Portzamparc)

To go back to the initial reflection on the future, it is clear we are in a classical model of capitalistic expansion of the city in search of new forms of economic competitiveness and producing new ways of life. But which is the model of society that is designed behind those actions? In other terms, this paper addresses the "historicity system" (Hartog, 2003) that those official projects produce, in comparison to the idea of future led by the inhabitants of the districts in renovation. What seems to be clear is that Paris is building a future based on a modernist idea of an ineluctable future of the expansion of the city. But, looking closer, those magnificent projects are far from being unavoidable as they seem to be. The budget of the new circular subway is of about 30 milliards of euro of which only 5 milliards will be given by the State. This gap produces a big margin of uncertainty on those projects that should be balanced by the valorisation of the urban areas surrounding the future stations of the metro. Looking at the eleven great areas of renovation of the périphérique, only about 19 % are being realized since 2002 and there is a margin of uncertainty on the possibility of realizing the remaining projects, mostly those envisaging a covering of the highroad. Some of those projects were in fact inserted in the areas for the candidacy to the Olympic Games that Paris tried last time in 2005, the hope was of course to realize them whit the income given by the international event.

This way, I underpin that those projects, which are strongly occupying the media since ten years, have also an influence that is completely virtual on the present of the city. Nevertheless, inhabitants look with strong concern to discourses that project the city to the horizon of the next thirty years and that are already defining who will be inside and who will be pushed outside the city.

Another important element highlighting how the actual project of renovation is inserted in the presentism of the neo-liberal European city model is the juridical and practical context of the "urban participation" in France. The process of citizens' participation to the urban projects is becoming a new important element of governance of the cities since the proclamation in 2000 of the law Solidarity and Urban Renewal that reshapes the frame of the city politics and defines the concertation [6] as a mandatory practice for the public projects. But participation, in official processes, is still reduced to information meetings or workshops that

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[4] GPRU. Grands Projets de Renouvellement Urbain. http://www.paris.fr/politiques/vie-de-quartier/grand-projet-de-renouvellement-urbain-g-p-r-u/rub_6144_stand_612_port_13817

[5] The boulevard périphérique was built between 1960 and 1973 on the emplacement of the latest fortifications of Paris, the Thiers walls.

[6] Concertation is the French name for the institutional process of negotiation between different actors of a public project. Since the last ten years the word denotes principally the devices of information and participation of the inhabitants.

concern basically the architectural form of the projects and rarely his functional program. On the plan of the participation at a larger scale, the Parisian territory has recently tried to set up new forms of metropolitan concertation such as the public debate on the new metropolitan subway: this debate compared the project of the region with the one proposed by the state [7] and involved about 15000 participants in 55 meetings held in all the metropolis. But those remain as isolated events "which don't open a real debate articulating local and metropolitan issues" (Bacqué and Gauthier, 2011). We can also say that the format of those metropolitan meetings is based on a media model with showmen managing the debate and web-tv companies making the synthesis of the inhabitants' words. Looking to a series of devices which are recently used for the participation such as social networks and online forums that should "collect the words of inhabitants", we realize how this future that invades the present as an intrusive image don't produce a real dialogue between institutions and civil society. The words of people facing this far future, which is more concrete in terms of global economy than in terms of new ways of life, becomes a collection of atomized opinions that are impossible to translate in a collective voice. Those devices don't give in fact space to collective opinions or controversy actions but only to a series of individual conflictive stories. As a consequence, the discourses of the politicians can remain in the register of populism because their actions are not really questioned by the "inhabitants' words". In this sense we see how this fake accessibility of the future transformation of the city is only working as a form of virtual consensus within a society that still doesn't see clearly which is the social utopia that should follow through the urban projects.

3 THE TIMES OF TRANSFORMATION

3.1 Meantime and liminarity

This current research's ethnographic entry is the limit of the northern east area of Paris. This is a classical frame of post-industrial city that is representing the new horizon of the metropolitan projects. What we find here is a context whose transformation is more and more related to a large scale with an over-planning and over-regulation structure conceived to build a global metropolitan strategy of action. Projects are based on the rehabilitation of "unsanitary" buildings, creation of new public transports and building of new housing and activities. This does not induce massive evictions and renovations, but more a slow process of gentrification in which sparse operations engendering population displacement are accompanied by massive rehabilitation of ex-industrial buildings. The northern east of Paris is an emblematic territory of this obliteration of the city's limits and of the research of a new metropolitan identity. At the same time this territory is increasingly attracting new citizen's actions that are linked not only to the local context of transformation but also to the global diffusion of alternative urban practices. The presence of urban interstices together with the process of renovation, seem to create the perfect frame for informal experiments.
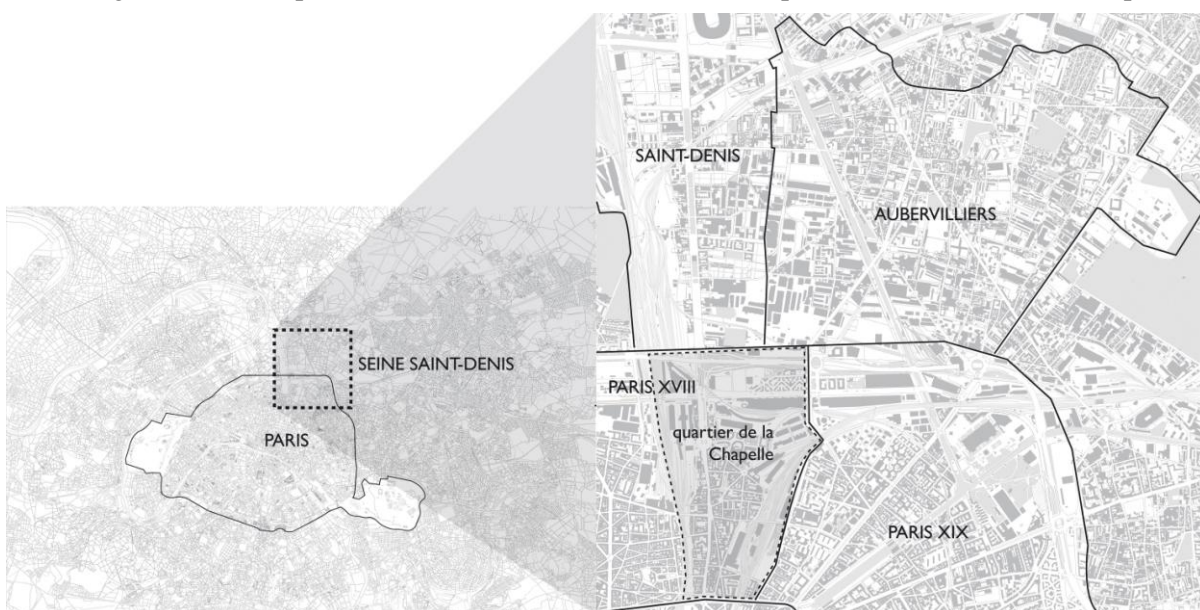
Fig. 2: The Northern-East of Paris as framed by the research.

[7] The National Commission of Public Debate held those meetings between October 2010 and January 2011.

The fieldwork elements presented in this paper come from an approach based on a situational analysis applied to the context of an anthropology of the city (Agier, 2009), taking the space not only as the setting of social relations but as a product of a relational process. Several associations [8] working in the North-Eastern Paris, principally in the Chapelle district in the 18th arrondissement [9], have been approached since November 2011 in order to see and follow their social network and to analyse their discourses and repertoires of contention. This ongoing observation takes place basically in everyday and ritual situation, involving the internal organization, the building of consensual relations, the public performance and the collective action. The definition of ritual situations (Agier, 2009) is chosen in reference to the particular status of those actors which represents a sort of political and physical liminarity linked both to their ephemeral condition in terms of space and action and to their positioning regarding the institutions. An interesting argument to this liminarity is in part given by the different biographical trajectories observed in the interviewed associative actors: from professionalisation (for instance subjects starting their political career in the voluntary work), to redefinition of identity (retirees investing in new kind of activities or rediscovering a political activism), to the expression of an alternative political point of view (anarchist, self-management, radical ecology). Associations seem to serve as a kind of passage through different social position or as a "limbo" that permits unconventional social organizations. At the same time those actions are often taking place in the "lost spaces" of the city: abandoned plots or buildings that are waiting to be renovated that can be defined as a margin between the city and its future. This physical and political liminarity is also an expression of a more global phenomenon.

In the last twenty years, we can in fact observe a global proliferation of new kind of citizens' "non-formal" actions (Sassen, 2004) linked to a post-global and anti-liberal political vision. From the occupation of terrain vagues with ecological projects, to the new forms of urban art and artistic engagement in the popular district, to the different variations of sustainable tourism, we see spaces and practices that seem to propose a new management of the social conflict. In the Parisian region since the last ten years those initiatives are mushrooming in particular next to the "sensible" areas in renovation, i.e. the areas of the former industrial part of the city situated in the northern east. Nowadays we can count ninety urban gardens, twenty official artists squats, an increasing number of associations of urban walks (organised by independent architects or inhabitants), and at least four big areas of renovation in which inhabitants or collectives of architects are working for participatory processes.

In this sense we would like to highlight another important form of temporality of the city in transformation. If we consider the project not as a result but as a complex process opening a tension between the "field of experience" and the "horizon of expectation" (Hartog, 2003), we can consider it also as the in-between time that can give new meanings to the future visions of the city and to their relation with the society. The meantime of the project [10], if lived and filled of sense, is actually the time that permits the birth of new actors and of new power relations. The acceptance of this gap between the present and the future as a thick temporality can create a fertile state of uncertainty. We intend here uncertainty as a concept that can reveal all the possible solutions and open up fertile controversies (Callon, Lascoumes, Barthes, 2001). The hypothesis presented here is that the informal actions reveal the need of conceiving the urban transformation as a continuous uncertain process and not as an event that belongs to the future.

3.2 Times of informal actions

The analysis that we sketch here is not based on the difference between different kinds of associations working in the districts. Rather, I propose the idea that those actors constitute a complex system of interconnections that creates an homogeneous context regarding the urban transformation. It is not then the difference between the actions of a squat and of an urban garden that I will highlight, but more the circulation of practices between those places. This idea of an homogeneous system is particularly clear in the

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[8] We use here the definition of association referring to the French context. In French culture those citizens' organizations represent one of the highest form of the civil society's right of expression. The so-called 1901 law defines the associations system through the right to civic organization and the non-profit activity contracts. In this flexible frame, the forms of associationism are quite diversified.

[9] The Chapelle district is a sort of triangle framed by the railroads of the East and North stations and by the boulevard périphérique.

[10] For the notion of meantime we refer to the researches of the Laboratoire Architecture Anthropologie of the School of Architecture of la Villette in Paris (www.laa.archi.fr).

Chapelle district in the 18th arrondissement. This district hosts a large number of associations that are linked to common interests and actions. In terms of urban transformation there are two big organizations that are extremely interesting.

The first one is an association working within the official concertation process, the Association for the Monitoring of Paris Nord-East Urban Development (ASA PNE18) [11]. The actions of this group of citizens started with the mobilization against a project of densification in the 1990s. After this experience they decided to become institutionally involved in the urban transformations of the Paris Nord-Est project, the biggest (200 hectares) of the eleven Great Project of Urban Renewal that touches this area of the périphérique highroad. At the present time they are involved in the official consultation committees. Their contribution includes the organization of public information meetings in the district and the participation to specific reunions with the architects and the institutional actors. In the ASAPNE18 the presence of architects and city planners, and the organisation of self-trainings are fundamental in order to "push" the limits of the institutional participation defined by the law. Moreover the association has the character of a coordination of different associations. What is important in their activities is not only the capacity of dealing with the most technical issues, but also their ability of being connected with both the political and the associative net of the district and of the city. In this sense it is evident how the role of this actors is not only of the defence of their own micro-local interest but it is a political action which goes beyond a NIMBY logic.

The second organization is the Collective of Chapelle Open Day (POLC) [12], a collective of three community gardens and three artistic squats that work as a federation. These associations organise festive weekends proposing a common program of artistic performances and concerts, based on an increasingly common model of the artists' open days in the eastern districts of Paris. The reasons that they give for the birth of this federation is the awareness that all the places were individually dealing with the same institutional process through negotiations and collaboration with public landowners and City Policy actors. As a reaction to the institutionalisation and social service demand [13] of the public powers, they claim for recognition of their precarious existence opposing their gradual space transformation to the renovation of the new development projects. The production of texts, graphic documents and exhibition of pictures showing the close relationship between urban development and ephemeral initiatives, becomes an information device that is exposed to inhabitants in order to draw the public attention to a larger spatial consciousness. This call for the public interest is not presented, then, as direct support of the single initiatives, but as a reflection to an alternative way of intervening on the deindustrialisation process.

This district is also the set of many urban walks organized by diverse actors [14], from independent inhabitants to architects that work for the metropolitan participatory actions. This practice can be seen as a symbolic valorisation of space through its physical crossing. It is based on the principle of visiting less known districts that are undergoing a process of urban transformation. The "tourists" usually meet the guide and follow an itinerary that is punctuated by a series of stops in specific places in order to discover some activities, projects or meet other inhabitants. The performance of those "situational sequences" (Palumbo, 2009) is meant to disclose the social life of the place or to explain its recent past and its near future. Unlike classical architectural sightseeing, which illustrates what is visible in urban space through a set of notions, the urban walks organized by the inhabitants want to reveal the invisible reality of the city through the concrete experience of social interactions.

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[11] Association du Suivi de l'Aménagement Paris Nord-Est 18e (http://asa-pne.over-blog.com/). The objective of the association is the promotion of a participatory design process for the Paris Nord-Est project sector in the 18th arrondissement.

[12] Portes Ouvertes de La Chapelle. All the components of the collective are associations recently established in the district. "The Collectif Portes Ouvertes La Chapelle federates a group of associations concerned by urban transformation and renovation of the district. Their initiatives took root in inhabitants' life." (http://portesouverteslachapelle.blogspot.fr/).

[13] This demand is both defined by the informal negotiation for occupation and by the contractual definition of public founding given to the association that imposes the declaration of a public interest of the structure in the context of a "sensible district".

[14] One of the first and most known example of this practice is the one of the "Global Greeter Network" (http://www.globalgreeternetwork.info/) started in New York in 1998. The Parisian version of the movement is the "Parisien d'un Jour" (One day Parisian) association (http://www.parisiendunjour.fr/) promoted by the Municipality of Paris and the Parisian Tourist Office.

In the following passages I would like to question the different "historicity systems" that are acted by those practices and their relation to the official time of planning. In opening the reflection on those temporalities I will refer to what could be defined as "performed discourses", in the sense of narrations that come out mainly from the direct action.

3.2.1 Futures

Speaking of future we find two different ideas that coexist in the informal actions.

The first one is what could be seen as an apocalyptic and nostalgic future. This kind of vision is mostly related to the ecologist visions that can be shared by the actions of urban gardens and artists' squats, and that finds its roots in the precautionary principle of environmental movements. According to some of those discourses the "possible" future is seen as fearful because it is putting in danger the next generations through environmental problems. In reaction, this form of temporality is constructing an ideal future that evokes a mythic past in which the man was living in a greater balance with the nature. In some ways this future reproduces the idea of a present that has to be sacrificed for the wealth of a skopós. Those discourses are performed through urban agriculture, both in the sense of farming and in the sharing of ecological knowledge. The understood goal is that people must learn how to live in self-sufficiency and outside the capitalist production system.
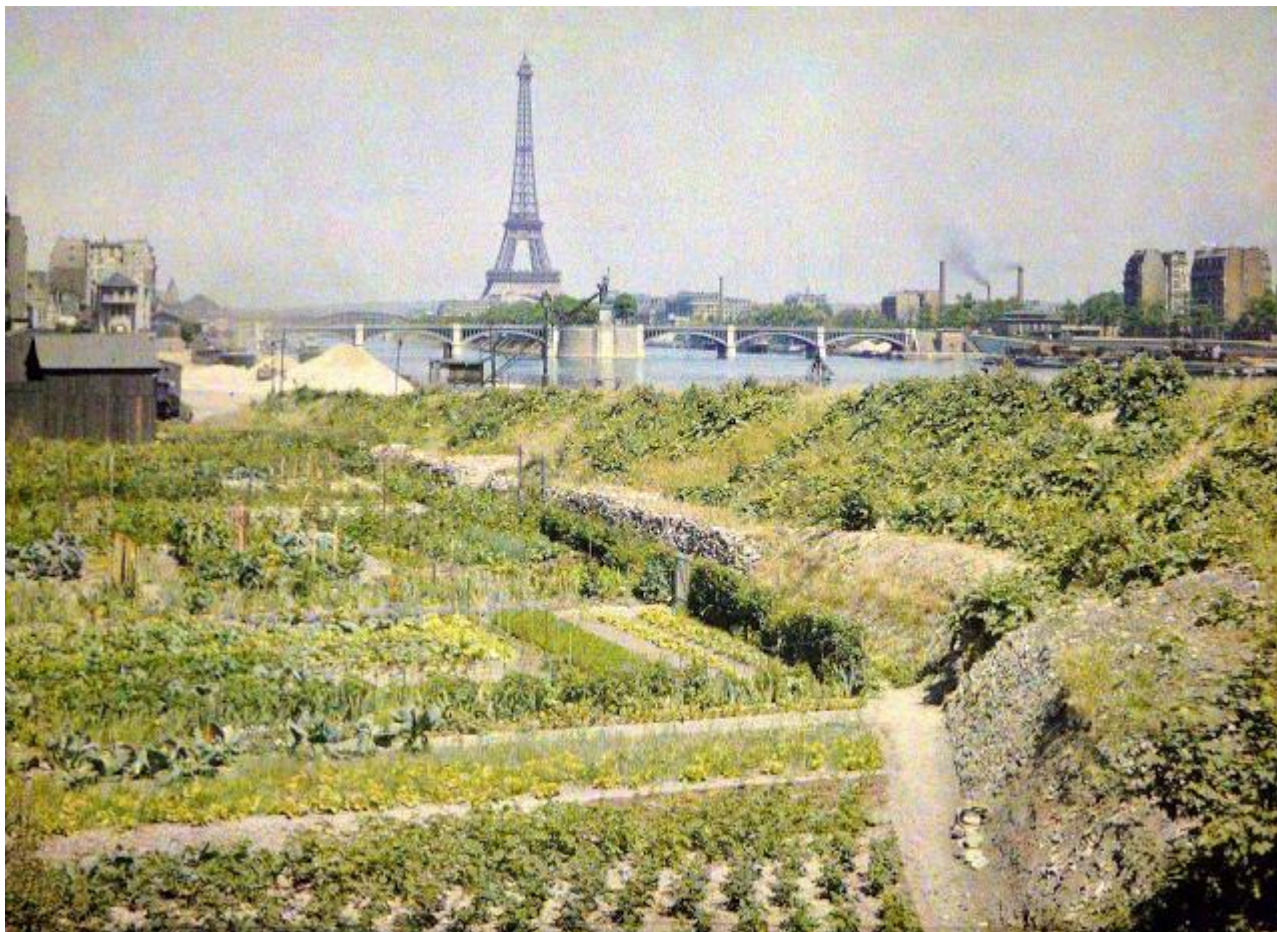
Fig. 2: Quai Louis Blériot, Paris 1918 (source: www.paris1914.com). This image was sent in February 2013 on the mailing list of a community garden of the Chapelle district with the title: "With (just) a little bit of chance, this is what we're going to have". The utopia proposed is the return to a post-war condition in which urban land is exploited for feeding the population.

The second idea is the one of an imminent and pragmatic future. The action of visiting a building site with an urban walk or to claim for the needs of the present inhabitants in a project that will be built in thirty years, seem to be a desperate effort of translating the future of planning in a presence that will affect the life of the district tomorrow and not in dozens of years. The future here becomes less eschatological. The performed discourse is the one of a research of the physical traces of the announced future in order to understand it pragmatically. At the same time this action builds a temporality that works as a "counter-device" (Agamben,

2006) giving back the future to a real space of existence and claiming for taking in account its daily presence.

3.2.2 Pasts

The different ideas of the past can be also articulated in two categories.

On one hand we have a nostalgic past. This past is mostly set in urban walks, but is also linked to the actions of urban gardens. What we face is again the case of a mythic temporality linked to a past that is reinterpreted and exploited in order to construct a discourse on the present. We find here also a form of presentism that in facts uses the past in order to patromonialize a present time. The performed discourse is meant to insert the built and green environment in a larger national history and preserved as it is. Associations occupy and valorise the terrain vagues and the former industrial buildings claiming to the recognition of their value in terms of biodiversity or architectural quality. The space is then used as the main pretext to defend the social practice that it hosts. This can be also seen as a form of "moderate resistance" to the transformation that works on the same register of the official transformation because tends to use the same type of arguments in order to be recognised.
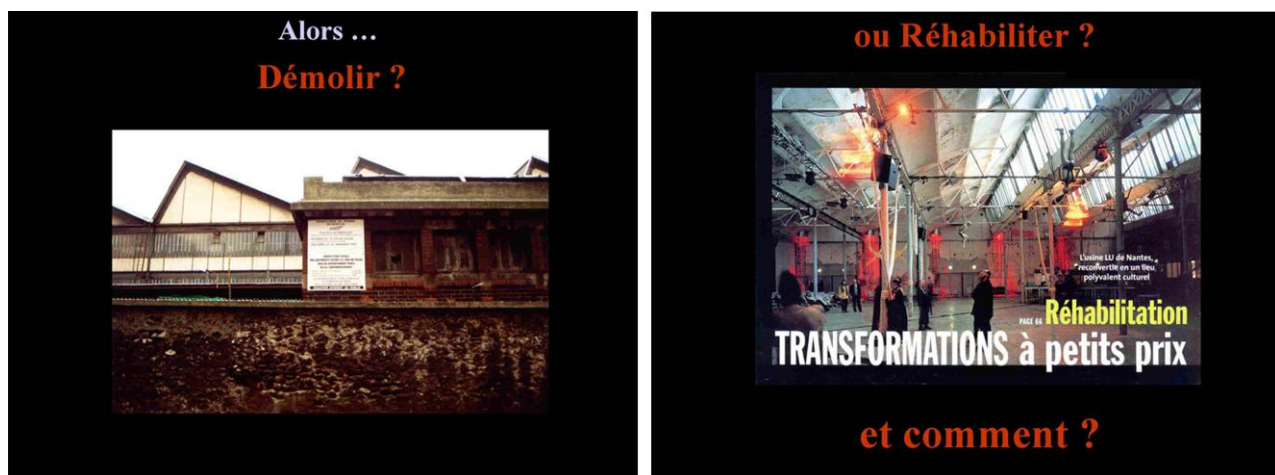
Fig. 3: Document produced by the ASA PNE18 (CEPA at that time) in December 2002 for a meeting with the municipality. The goal of the presentation was to convince the architects and politics to preserve an ancient industrial hall. The two slides question: "Then demolish? Or renovate? And how?" The image inside the second slide is taken by a magazine on renovations of industrial buildings and says: "To renovate at a small price". In order to contest the project of demolition the association shows a typical example of patrimonialization of an industrial hall transformed into a museum. (© Coordination Espace Pajol)

We can also talk of an anecdotic past that sets the space in a local or biographical chain of events. This temporality tries to inscribe the territory in a smaller and more controllable scale of comprehension. In reaction to the politic and economic forces, which act to link the territory to a global scale, the narrative related to a recent past gives the possibility to focus on the needs and wills of the people that are living the place in the actual present. This temporality can be set up by urban walks through the construction of biographical sequences in which the visitor is led to experience the daily path of its guide. A similar interpretation of the past can be found in the reconstruction of the history of projects made by the inhabitants during the participatory processes, or in the reconstructions of the ephemeral spaces' history in the district. In this sense the shift of point of view in the narration of the urban transformation can show how the space belongs to a plurality of temporalities.

3.2.3 Presents

The two last categories are based on rhythms that create two different articulations of the present.

One present can be the one of an intermittent but constant rhythm. This is specifically linked to the action of the ephemeral place as urban gardens and squats. Even in a context in which the municipality is in part institutionalizing those actions, the nomadic nature of some of these associations creates a form of constant presence within the city that escapes to a politics that would reduce them to a sort of short spectacular events in the future building sites of the cities. Some of the squats and urban gardens speak about a "nomadic strategy" that accepts to enter in negotiation with the municipality – that gives them a contract of temporary

occupation – but tend to exist beyond the single place that is occupied. This means that an urban garden can exist since ten years having occupied three different plots and that an association of artist can squat at the same time different places and be ready to move to new ones in a short time. This behaviour builds a present that is at the same time precarious and reproducible. The present time then is uncertain in terms of space but not in terms of action. This resistance can create also interesting situation in which those associations are finally taking part to the official projects by partially participating to the design or management of new spaces.
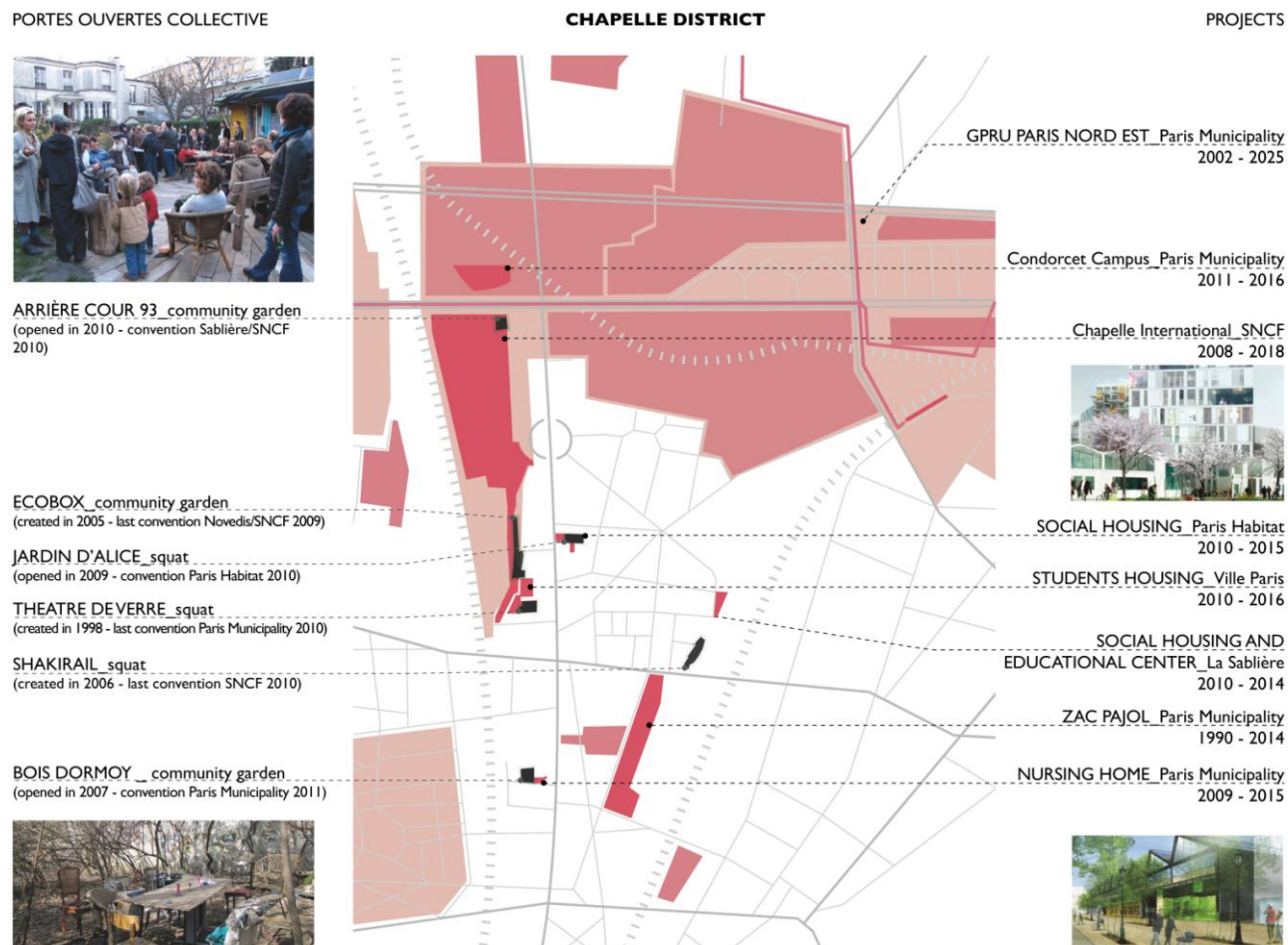
Fig. 2: Relation between the urban projects and the ephemeral spaces in the Chapelle district. The author has assembled the document in March 2012 for the POLC collective. It indicates: on the right side, the duration of the projects and the name of the developers; and on the left side, the start of the ephemeral activities an their date of convention.

The last form of temporality is the one of a constant and persisting rhythm of present. This temporality is built mainly by the associations working in the participatory process. The fact of acting in the district since even twenty years on one or more projects permits to inscribe the actions of this association in a stable present legitimating their action in the concertation. This rhythm is not based on a tactic of reaction to the politics like the previous one but is rather building a strategy of the "presence". Their action is largely based on a form of insistence: claiming for having meetings with the municipality, asking a continuous control of the evolutions of a project, or simply being present in every possible occasion. This permits also the inscription of the future of the project in a present time in which a physical and political space has to be built in order to speak about its existence.

4   GIVING BACK SHAPE TO THE PRESENT

Evidently, these temporalities are not completely separated and can be combined and overlapped in a continuous process of transformation and composition of the different actions of the associations. This short review would like to highlight how this diversity of temporalities, even with its inner critical points, makes possible the construction of a deeper temporality of the projects.

In terms of political discourse, those actions don't really seem to question the official urban development, but propose, as evoked, more a kind of "soft subversion". Differently from the claims of the 1970s, we observe here a more strict negotiation with the political powers and a direct management and control of the public space. In order to do that, the discourses tend to reproduce the same strategies of the official powers instead of opening a direct conflict with it. If on one hand we could ask if the social conflict is still possible in a context in which the State is abandoning his role of public guarantor, on the other hand the sphere of public informal actions seem to take a new relevant role. What appears is how the action is building a new temporal vision of the urban development. It is precisely through the action that the different "historicity systems" construct a present that finds its independence and emerges again as a positive element. Those performed discourses reclaim then the central importance of the present in the progressive construction of the future.

In conclusion, I would like to underpin how the contribution of these informal actions, based on this capacity of giving complexity to the temporality of the project, opens the idea of a project as a continuous and uncertain process. More than on the form of the city – which is questioned only partially -, the real debate seems to shift on the processes of empowerment and on the governance procedures. This way, those actions are questioning the definition of the project through an idea of future that should not only be concretized in a building site, but rather becomes an open debate that should release the citizens' imaginary on the possible and desirable models of society. In this sense, to release the imaginary is precisely "to think about what it would take to live in a world in which everyone really did have the power to decide for themselves, individually and collectively, what sort of communities they wished to belong to and what sort of identities they wanted to take on" (Graeber, 2004). If, as sustained by Immanuel Kant, time always needs a symbolization through the space and remember us that we need the space in order to know our existence, we should also realize how the space always need to be inscribed in a multiplicity of times to be our place of existence.

5 REFERENCES

AGAMBEN, Giorgio: Qu'est-ce qu'un dispositif?, Rivages, Paris 2007 [2006].
AGIER, Michel: Esquisse d'une Anthropologie de la Ville. Bruylant-Academia, Louvain-la-Neuve, 2009.
BACQUE, Marie-Hélène; GAUTHIER, Mario: Participation, urbanisme et etudes urbaines. Quatre décennies de débats et d'expériences depuis « A ladder of citizen participation » de S. R. Arnstein. In Participation, 1, 36-66. URL: http://www.cairn.info/revue-participations-2011-1-page-36.htm, 2011.
BERQUE, Augustin ; DE BIASE, Alessia ; BONNIN, Philippe (dir.): L'habiter dans sa poétique première. Actes du colloque de Cerisy-la-Salle. Ed. Donner lieu, Paris, 2008.
CHOAY, Françoise: La règle et le modèle. Sur la théorie de l'architecture et de l'urbanisme. Seuil, Paris,1980.
CALLON, Michel; LASCOUMES, Pierre; BARTHE, Yannick: Agir dans un monde incertain. Essai su la democratie technique. Seuil, Paris, 2001.
GRAEBER, David: Fragments of an anarchist anthropology. Prickly paradigm press, Chicago, 2004.
HARTOG, François: Régimes d'historicité. Présentisme et experience du temps. Seuil, Paris, 2003.
HARVEY, David: Rebel Cities: From the Right to the City to the Urban Revolution. Verso, New York, 2012.
LEFEBVRE, Henri: Le droit à la ville. Anthropos, Paris, 1968.
LEFEBVRE, Henri: Eléments de rythmanalyse. Ed. Syllepse, Paris, 1992.
PALUMBO, Maria Anita: Figures de l'habiter, modes de négociation du pluralisme à Barbès. L'altérité comme condition quotidienne. In "L'altérité entre condition urbaine et condition du monde", Lieux Communs. Les cahiers du LAUA, 12, 129-148, 2009.
SASSEN, Saskia: Local actors in global politics, in Current Sociology, 52(4), 649-670. URL : http://csi.sagepub.com/cgi/content/abstract/52/4/649, 2008.
SOTGIA, Alice: Edifier Sans Bâtir. Le Grand Paris, Métropole du XXIe Siècle. Case study for the "Research in Paris" Post-Doc program. Paris, 2008. URL: http://www.laa.archi.fr/IMG/pdf/edifier_sans_batir-site-DEF.pdf.
TVK: No Limit. Étude Prospective de l'Insertion Urbaine du Périphérique de Paris. Mairie de Paris/Pavillon de l'Arsenal, Paris, 2008.
VENTURA, Francesco: Sul senso utopico dell'urbanistica. In: MOCCIA, Francesco Domenico (dir.): "Visioni di territorio: dalle utopie agli scenari", in Urbanistica Dossier, n.89, IX, n.208 of Urbanistica Informazioni, INU Edizioni, september 2006.

The Beauty or the Beast? Can Illegal Housing Tackle the Problem of Social Integration and Social Housing?

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1 ABSTRACT

Serbia as a neighbouring EU country is, like some other countries, facing the problems of incoherent urban and regional development, of tackling the urban growth and of deficit of integrated urban strategies. On the other hand, specific problems of Serbia are related to the possibilities of integration of special socio-economic groups, such as low income citizens, refugees etc. Having this in mind, it is understandable that Serbia is coping with even bigger problem of affordable and social housing, which has become an emergency even in cities with a weak demographic growth in developed countries. The problem of the lack of adequate affordable housing and its capacity is often followed by the problem of real social integration of vulnerable social groups.

The pressure of these problems is more visible in Belgrade, Serbian capital since it deals with the demographic pressure and growth for a long time, and especially in past two decades. As a consequence of this pressure many previously agriculture areas at the fringes of the city have become illegal settlements.

Being a developing country severely hit by economic crisis in past few years, Serbia will not easily reform its housing policy and enable growth of the affordable housing which will meet demands. It is also not very likely to expect that the problem of illegal settlements will vanish or even lessen since the actual Serbian political framework is encouraging legalization process.

So what is to be done? Is it realistic to treat such big issues of urban development separately? Or maybe it is possible to change the prospective and try use problems in the way they partly solve each other?

This paper will enlighten the problem of illegal housing in unconventional way – by trying to understand the illegal settlements as areas of social/affordable housing and social integration. It will also discuss the possibilities of urban upgrading and regeneration of illegal settlements making them liveable places and areas which can be integrated into the Belgrade development.[1]

2 THE NEED FOR SOCIAL/AFFORDABLE HOUSING AND TACKLING URBAN GROWTH

Well-known statement is that appropriate housing is one of basic human rights (UN, 1948, art. 25th). It is usually interpreted as the affordability of decent and healthy homes. But the importance of appropriate housing as a human need is more complex issue today, since it also includes the questions of transport and public facilities as intermediate social needs (UN habitat, 2012, p. 33). Finally, housing is a good on the market, so the consequences of market trends are visible in patterns and conditions of housing. This is the reason why the integration of housing issue into wider spatial systems, such as cities and communities, is a necessity for urban development and growth.

Social (affordable, public, non-profit) housing is one of important ways to overcome the gap between social and economic aspect of housing. There are many definitions of all mentioned terms of the housing concept, depending on regional and historical conditions (UNECE, 2006, pp. 1-3), but the common ground for most of is the housing concept which is provided by government agencies or non-profit organizations for people on low and middle incomes or with particular needs. In continental Europe the term social housing is more familiar than other ones. This is also the main term in Serbian practice and legislature, although term affordable housing can be found in some new documents and policies, as well as in those in European Union – EU (Milić, 2006, p. 31). Because of this fact, this paper will use term social housing as the key term for this housing concept.

As it was previously specified, the concept of social housing has strong historical and regional context. Generally, social housing is more familiar to the countries with social capitalism than those with liberal capitalism. The best examples are "old" EU countries, especially those in Western and Northern Europe, where social housing has been especially developed since The Second World War, passing through several phases (UNECE, 2006, pp. 1-3). Firstly, Post-war social housing was built for growing population on public land with public money (Whitehead, 2010). Its main characteristics were cheap mass production and the building on "free land", usually on the outskirts of cities and towns, which produced "uniformization" and "ghettoization" of huge social housing areas during 60es and 70es. This was notably different from views of new generation of social housing occupants, who tended to be better educated, middle-income and less traditional in family issues.

These problems caused various new directions for social housing: from public building to public-private building corporations; from public ownership to several different ownership models, from new building to renewal and regeneration; from huge urban independent areas to small integrated quarters; from mass production to individualization and place-making; from low income persons to middle income ones; from nuclear families to different types of occupants (UNECE, 2006, pp. 1-3). There are also many regional and state-related differences and specificities. All these processes are flexible and never finished, so the field of social housing is still vivid and it represents a real support for permanent urban growth. Further impulse for these processes is the fact that the need for new housing has not decreased with well-known problem of aging population of EU in recent years. Relatively stable number of households, which are smaller and more heterogeneous, has given the new demand for various types of social housing (UNECE, 2010, p. 9). Finally, the model(s) of social housing in EU is used as a role-model for social housing policies and strategies all over the World.

Although the cities in developing countries face the similar problems about social housing concept and its realization, they also have to fight bigger problem than the cities in EU – taming the urban expansion, which is, in most cases happening out of the desired policies and plans. This is also the case with Belgrade, despite the fact that socio-economic path of Serbian capital was and still is different than of those in developing countries at other continents; nevertheless there are common effects and characteristics of spatial growth, with huge illegal settlements being most significant similarity. On the other hand, Belgrade's urban expansion has not much in common with the neighbouring EU countries' cities or even with ex-socialistic cities despite the geographical and historical link to them, with the exception of some Balkan cities.[2]

The magnitude of urban expansion is frightening when analysed through figures. According to the World Bank study (Shlomo, Civco at all, 2005.) cities in developing countries whose population is over 100,000 can be expected to triple their area, from 200,000 to 600,000 sq km until 2030. This means that every resident will convert, on average, about 500 sq m of non-urban to urban land.

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[2] This standpoint is supported by Petrovic, M, claiming that the task of transforming from totalitarian to capitalist system stipulated post-socialistic cities of Europe to get some characteristics of American and even Third world cities, rather than of balanced models of EU cities (PETROVIC M.: The transformation of cities towards de-politization of urban issues, The Institute of Sociological Research, Belgrade, 2009., p. 251). Same author, going back to the question of ex-Yugoslav cities' unique characteristics and/or similarities with other post-socialist cities, emphasizes that (they) resemble them in the slow pace of post-socialist restructuring and establishment of new types of public control, and respective elements of the Third World development (PETROVIC, Mina: Cities after socialism as a research issue. Discussion papers (LSE – South East Europe series), DP34, Centre for the Study of Global Governance, London School of economics and political science, London, 2005., p. 20). Finally, M. Petrovic concludes: "The most likely outcome is that ex-Yugoslav cities will become unregulated capitalist cities with more or less evident elements of Third World cities" (PETROVIC, Mina: Cities after socialism as a research issue. Discussion papers (LSE – South East Europe series), DP34, Centre for the Study of Global Governance, London School of economics and political science, London, 2005., p. 20).

Region	Definition
East Asia (China, Philippines and Vietnam)	Areas subject to urban expansion on the edge of cities (often called "rural-urban" areas or "peri-urban" areas) and environmentally fragile urban areas (e.g. river banks, canal edges and flood plains), which are unstable and unfit for occupation and should be protected to provide ecological services to cities. Spatially, this definition encompasses primarily marginal land (unstable and unfit for occupation) and land in the periphery of urban areas.
Europe and Central Asia (Albania, Kyrgyz Republic)	De facto urban areas that largely remain classified as agricultural. Largely comprised of informal settlements, which are not recognized by municipal governments.
Latin America and Caribbean (Argentina)	A wide strip of land that is too expensive for rural uses and yet too distant for urban purposes.
Middle East and North Africa (Egypt)	Localities where the rural-urban transformation is taking place – those vast areas that surround cities which are neither strictly rural nor urban. The existence of a large and disproportionate peri-urban segment is a central feature of African cities.

Fig. 1: Definitions of Peri-Urban Areas across Regions (Source: World Bank, 2008)

In general, the space within metropolitan areas can be categorized into 3 main types (1) urban cores, including central business district and the rest of the inner city; (2) suburbs, usually subdivided into the inner and outer and usually driven by residential expansion; (3) peri-urban areas which may be driven by industrialization and or spill-over effects from the city itself, depending on structure of the urban economy. The most of the urban expansion of course affects zones 2 (partly) and 3.

Urban expansion is expressed in different spatial forms – contiguous, leapfrogging, 'necklace' corridors, continuous corridors, etc. These different forms affect the overall efficiency, especially energy efficiency of cities a great deal. The bulk of rapid urban growth in developing countries is taking place in peri-urban areas. In many poorer cities spatial forms are largely driven by the efforts of low income households to secure land that is affordable and in location that is reasonably close to the places of work, often in peri-urban slums and informal settlements. There is also a trend induced by local governments to relocate inner city slum/informal dwellers to the urban periphery.

The growth of peri-urban areas is caused by different reasons: from enveloping previously rural settlements, to migration from other parts of the country, process of gentrification and other land use changes in the city core etc. The characteristics of per urban areas are as follows:

- Low density, mostly unplanned development, lack of infrastructure, mixed use depending on the economy of the city, rural and agricultural enclaves.
- Economic status of peri-urban citizens may vary, from high-income gated communities to low income housing, industrial areas and finally informal settlements and slums.

Depending on the mix of land use (residential/commercial) and infrastructure quality, these areas can often be squatter settlements, informal land subdivisions, not complied with building codes and constructed on the inappropriate land (such as landslides, flood plains etc.). Low income households often locate in the urban fringe as it offers access to affordable land and housing with minimal standards. Peri-urban areas grow rapidly in Latin America, east and South Asia, though are also seen in other parts of the world, such as South Eastern Europe.

According to the manual: Sustainable Land Use Planning – Peri urban growth, World Bank Institute, 2012, key challenges in peri-urban growth management are:

- Lack of effective regulations and management;
- Loss of arable land caused by urban expansion;
- Loss of land with environmental and cultural values;
- High cost of delivery of urban services associated with low density urban expansion;
- Inefficient transportation access in peri-urban areas;
- Lack of accessibility to services for low income communities in peri-urban areas;
- Vulnerability to hazard areas.
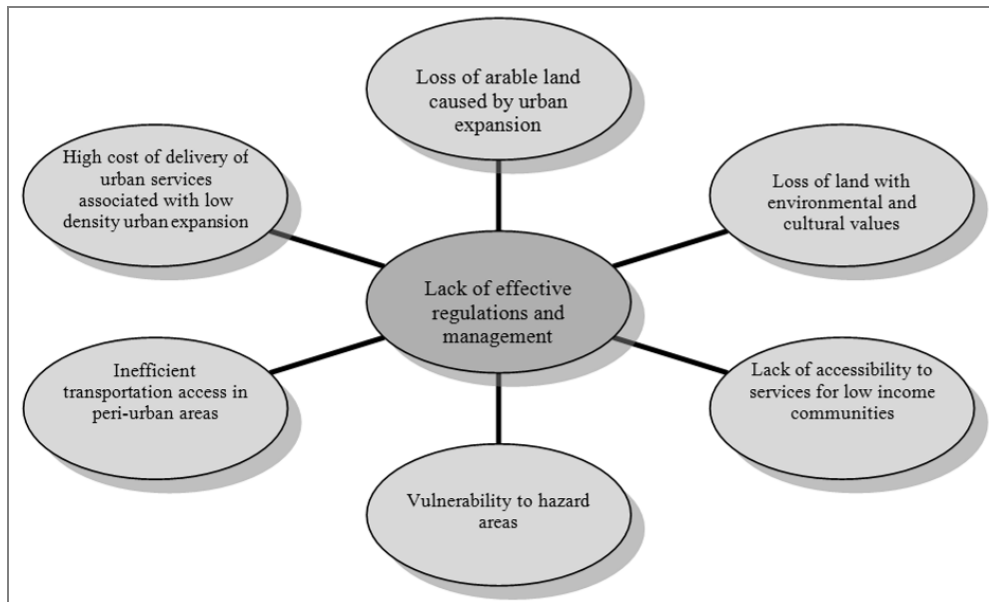
Fig. 3: Key Challenges in Peri-Urban Growth Management (Source: World Bank Institute, 2012)

Managing peri-urban growth and improving living conditions in peri-urban areas contribute to socioeconomic equity in the city as whole. The above mentioned document (World Bank Institute, 2012) names key interventions which include facilitating land tenure and management, increasing access to basic services which bring along environmental benefits, followed by service provision and regulatory coordination across jurisdictions. Cities in developing countries need to make realistic, minimal plans for urban expansion. The key areas for land use in those countries are: designation of adequate areas for accommodating projected expansion, investing in basic infrastructure to serve this expansion and protecting sensitive land from intrusion by new urban growth.

The discussion above undoubtedly shows the negative trends about land conversion and city growth globally and as a consequence, about the shrinking the agricultural and forest land while on the other side gives the possible directions for overcoming or lessening these negative impacts.

3 BELGRADE REGION DEVELOPMENT

3.1 Problems of incoherent urban and regional development, deficit of integrated urban strategies and tackling the urban growth in Belgrade

Belgrade, being by far the most vibrant city in Serbia over a long period, due to its diversity of economic activities, has been and still is a great demographic magnet. According to the official statistical data, 22.5 % of the country's population lives in the city, but unofficially there are more than 25 % of country population. Such trends have never been positive neither for Belgrade, making an enormous pressure about employment and housing, nor for the rest of Serbia, leaving many towns without adequate workforce and creating negative demographic situation. At the same time, Belgrade region has influenced greatly the development of other regions in the country, lessening the chances for balanced regional development.

Today, the economic profile of Belgrade is both oriented to the inner market as well as to the wider scene, aiming to be competitive in the country and region. Belgrade is defined as an organizational, administrative, service, educational, scientific and cultural centre. Among the most vibrant economic sectors of Belgrade core area is: construction industry, processing industry, wholesale centres, financial services and insurance companies and other business related activities. On the other hand, there are many insufficiently used possibilities, which are not adequately treated by most of actual plans, like development of tourism, culture and nodes, related to the position and intersection of European traffic corridors 7, 10 and 11.

Regional development of wider city area has never been actually balanced. Though Belgrade has adopted the Regional Psychical Plan (Town Planning Institute of Belgrade, 2004), as well as other relevant planning documents, such as: Master plan of Belgrade 2021 (Town Planning Institute of Belgrade, 2003), Belgrade Development Strategy (Town Planning Institute of Belgrade and PALGO Centre, 2011) and several sectorial strategies (Energetics Development Strategy, Tourism Development Strategy, Forestation Strategy, Retail

Development Strategy, Agriculture Development Strategy, Civil Society Support Strategy and others), unfortunately most of the development and especially peri-urban growth has already happened before and during the plan-making process. Moreover, the documents, though been made at almost the same period, did not acquire the substantial level of integration and coherence. Additionally, the instruments for the implementation and the institutional and procedural support of mentioned documents were not adequate so the real realization has failed.

Belgrade has got its Master plan after many decades so this document had a tough assignment to cover both strategic as well as regulatory elements of development. According to the Master plan of Belgrade 2021, there is strong orientation to foster touristic, cultural and business potential of Belgrade by development along riverfronts. Such very important ideas, though not new, required a detailed implementation covering and huge financial support which was not easy to enable in trying transitional and period of economic crisis. In the wider area, especially along main traffic corridors (such as highway) there is a great potential for development of creative economy – industrial eco parks, smart zones etc., but still there is no adequate strategy of corridors' tributary areas.

Though city development policy is not oriented and is not officially supporting the informal housing and economy, it is estimated that informal economy takes as much as 30 % of economic activities, mostly in the field of retail, services, catering, manufacture and even construction industry (supporting building of informal settlements). At the same time, informal housing takes almost 44 % of housing areas in Belgrade. Despite the fact there are perfect brownfield locations in wider centre of Belgrade with good spatial development chances, the city growth unwillingly turned to the agriculture land at the outskirts of the city.

Some of the main issues related to the land use and city growth in Belgrade are:

- Illegal and unplanned settlements, which have grown and spread intensively over the Belgrade territory during more than 2 decades, with the exception of historical centre of Belgrade;

- Generally insufficient and /or weak infrastructure equipment in metropolitan Belgrade area, with the exception of core area and New Belgrade; urgent problems for the city as whole are related to the waste disposal and treatment of wastewater;

- Unfinished and insufficient traffic network, mostly manifested in lack of transit roads, bridges and mass public transport;

- Inadequate use of the most attractive areas and locations in the city, especially in the river coastal areas;

- Unequally dispersed greenery and the lack of real green network;

- Chaotic growth along the main traffic corridors.

The problem of illegal and unplanned settlements in Belgrade region is strongly related to the other problems of city development, sometimes being a cause, but more often being a consequence of complexity of spatial, economic, social and political issues.

3.2 Characteristics of housing in Belgrade as a reflection of socio-economic transformations

The major influence of mentioned EU social housing concept is noticeable in Eastern and South-Eastern European countries which in this field face(d) many challenges. East European countries have been in the process of transition, as a fast and sudden transformation of one recognizable system to another one (Pickvance, 2002, p. 195) for more than 20 years. The process of transition was also related to the field of housing. The exclusive model of state-provided housing in socialistic system was dramatically transformed in market-oriented housing model. "In almost all post-socialist cities radical reforms of housing and urban policy are seen as a necessary step because of their economic inefficiency and social ineffectiveness" (Petrović, 2005, p. 7). Good example is the percentage of public-owned apartments in these countries, where previous exclusive model of housing has dwindled to negligible percent of housing (UNECE, 2010, p.13). The main result of the transition of housing sector in Eastern Europe is overall deterioration of housing condition in many urban areas (Vukov, 2008, p. 19).

Among several regional types of housing transition is "Ex-Yugoslavian type" (with the exception of Slovenia) (Petrović, 2005, p. 15). This type shares many characteristics with housing types of other Balkan

countries, such as: under-urbanization, self-help housing construction, common lack of infrastructure and amenities, the absence of "classical" social housing and other publicly supported measures in housing sector and the extreme confrontation "urban centre–periphery" (Tsenkova, 2005, pp. 115-123). Other characteristics of the type are connected to the postponed or "blocked" transformation during the wars in 1990s (Petrović, 2005, p. 16), which are connected to the problem of refuges and illegal housing construction.

Good example of "Ex-Yugoslavian type" is Serbia, where a radical turn-over from previous state-provided housing system to market-oriented one is also visible. Some local specificities are: complete privatization of the sector, lack of appropriate regulatory mechanisms and strategies, strong influence of refuges, housing construction as extraordinary profit, illegal practice in housing construction, degradation of old housing fund, weak mortgage system, etc. (Mojović, Čarnojević, Stanković, 2009, pp. 6-11). This is particularly evident in Belgrade, which being the capital city, played a leading role in the transformation and the introduction of new types of housing, such as social housing.

On the other hand, the introduction of real estate market in the 1990s, with the characteristics of those of capital cities, marked by extreme economic crises and high poverty of most of its inhabitants, had the negative effect on the city development. Public sector stopped investment in housing production and maintenance and the number of dwellings built per year dramatically declined (Vujovic and Petrovic 2007). Private investors have entered the process of housing production, but the crises of local planning institutions and state power pushed them to the illegal sphere. On the other hand, market prices of the housing in the city were too big for most citizens and new migrants to the city, economically exhausted by sanctions, inflation and unemployment. As a result, for many citizens and migrants of Belgrade the only chance for acquiring accommodation was private building of modest huts on the periphery of Belgrade (Zegarac 1999). The problem was severely aggravated by the influx of refugees from the other parts of the former Yugoslavia, when approximately 100.000 of them have settled in Belgrade (Hirt 2009). During the 90', the informal housing became a dominant form of housing development in Belgrade, ignoring the urban plans and legal frame. After 2000, political and other changes in Serbia resulted also in the expansion of building in Belgrade, bringing back the multi-family housing and construction of office buildings (Simeuncevic, Mitrovic at all, 2012). Within the total new building production, the amount of single-family housing has decreased, as well as the share of informal buildings.

3.3 Illegal settlements and housing in Belgrade

Since the overall study of the informal growth in Belgrade has never been made, there are no exact data about it, so the estimations vary. For example Janic (1998) estimated there were about 150.000 illegal housing units in Belgrade, while others say that only 20 % of the buildings in the peripheral areas were actually regulated by some urban plan (Djukic and Stupar 2009). Third approximation is based on the number of applications for the legalization – 147000 illegal buildings (Petovar 2005). We cannot take these numbers as final, since not all the owners of the informal housing applied for the legalization, while on the other hand the overall spatial analysis of the area and the approximate density will increase the figures for more than 25 %.

The largest informal housing settlements of Belgrade are situated at the North Eastern and Southern Belgrade outskirts, as well as on the left Danube river bank, expanding deeply to the north. There are other smaller settlements and scattered informal housing groups all over the city borders and within the city structure. In most settlements relatively convenient terrain for building prevails, with the exception of left Danube river bank. There is still a decent share of green areas. The concentration of buildings is the highest along the main traffic corridors. Dominant land use is for residential areas – approximately 90 % of total surface, but there is significant share of non-residential land use, such as retail, services and other commercial activities, mostly concentrated along the main traffic corridors. Traffic network is irregular and insufficient. Except the electrical network the infrastructure mostly does not exist. Some parts of the settlements are provided with water supply. Streets are narrow, without drainage and often are lined with large slope, so driving is difficult during winter period. There are almost no sidewalks for pedestrians. Since all kinds of transport overlap in a narrow corridor, safety is low. In the future, street regulation could be very difficult since it would cause massive demolishing of houses facing such streets in order to provide safe width of streets and sufficient place for infrastructure equipment.

One of the main problems about informal settlements' land use structure is lack of public spaces and services, such as schools, health and children day care facilities, which are a direct effect of illegal building process and absence of regulatory plans. Although the Institute of Urbanism Belgrade has started the draft version of regulatory solutions for whole Belgrade territory, including these areas, in 2010, it is not yet brought to public.

Urban structure of such housing areas is irregular and spontaneous. There is no firm urban matrix with defined size of blocks or parcels. Parcels are often irregular, not enabling good orientation and position of a house towards neighbouring houses. Therefore, privacy is often threatened since the space between houses is very narrow. Architectural design shows the spontaneous nature of building – houses are simply designed and in most cases without any particular characteristic of style. Decorations are rare and often inappropriately applied. The interior organization also lacks good architectural design but housing units are functional in its simplest meaning. Unfortunately, there are no reflections to the traditional Serbian housing.

There is a variety of social background of the informal housing dwellers. In the first group there are citizens of modest socio-economic background who have moved from other parts of the country in search for employment in Belgrade and they live and own smaller one-family units. Second group are refugees and people who have moved from other ex-Yugoslavian republics during civil war in 1990s and their economic status vary, so they live (and own) both in big houses – villas, as well as in smaller ones. Third group consists of residents – housing tenants of lower economic status who live in bigger houses, but rent the apartments, while the owners of these houses are of different background. Approximate socio economic structure of the population, given above, has significantly influenced the formation of settlements and size structure of the buildings.

Concluding, it is easy to say that instead of being respective residential area, with high quality of life, great green areas and good urban pattern with minimum of planning intervention, informal housing areas are mostly perceived as impersonal and disharmonized residential areas, being neither quite urban, nor rural settlements.

3.4 Possibilities of integration of special socio-economic groups (such as low income citizens, refugees)

As a result of the wars during the 90' in former Yugoslavia a large number of families had to leave their homes. Serbia has got the largest number of refugees in Europe – by 2008 there were 200.000 refugees, but other estimations say there were additional 220.000 refugees. Over past few years situation had changed for the better, but there is still a great number of refugees. One of the cities which have undertaken the most pressure of the new immigrants was Belgrade. Since Belgrade had not had ready building plots and building areas with completed infrastructure and traffic equipment, the city experienced an explosion of unplanned housing. In addition to this situation, the inhabitants of these illegally built areas in most cases did not have jobs and have been existentially threatened. Extremely difficult situation is in refugees' collective centres, where people live under very tough conditions – often whole family in the same room and with no sufficient sanitation. Most of the refugees' collective centres have been closed by 2012 but there is still significant number of it and they are problem for the inhabitants themselves, as well as for the local communities. On the wider territory of Belgrade there are still 17 informal and 7 formal refugees' collective centres, mostly located in several local communities: Palilula, Zemun, Rakovica, Zvezdara, Vozdovac, Cukarica, Grocka, Barajevo, Obrenovac. All mentioned kinds of settlements lack primary social infrastructure – above all there is lack of children day care facilities and older people nursing homes. There is also a lack of facilities for people with special needs, whose sharing in total population is greater than in other population groups because they had suffered stress and other specific health problems.

Besides refugees, who are the most important of targeted vulnerable groups for contemporary social housing in Serbia, there are several other socio-economic groups, who are seen as potential social housing users. Some of them are already included in programmes of social housing. This is in particular the case with Roma population, which is numerous in Serbian society (UNHS, 2008). The interest of researches about living conditions in Roma settlements and possibilities to their improvement are quite often and in focus of Serbian practice for a long time (Macura, Petovar, Vujović, 1997, p. 3). Other socio- economic groups are less pointed out.

Regardless of the above mentioned facts, it is interesting to notice the gap in perceiving the inclusion possibilities of these socio-economic groups by Serbian professionals, Serbian regulatory framework and

strategies, and foreign organizations, which are active in this sector in Serbia (for example, UN Habitat Serbia). Following table compares the similarities and differences in their views:

SOCIO-ECONOMIC GROUP	VIEW OF SERBIAN PROFESSIONALS[1]	VIEW OF SERBIAN REGULATORY FRAMEWORK AND STRATEGIES[2]	VIEW OF FOREIGN ORGANIZATIONS IN SERBIA[3]
Refugees	Very important group	Very important group	Very important group
Low income households	Very important group	Very important group	Very important group
Families with many children	Important group	Very important group	Less important group
Families with single parent	Important group	Important group	Less important group
Young families	Very important group	Important group	Important group
Single persons	Less important group	Less important group	Unimportant group
Older persons	Less important group	Important group	Unimportant group
Persons with special needs	Less important group	Very important group	Unimportant group
Ethnic minorities (*Roma*)	Important group	Very important group	Very important group
Students	Less important group	Unimportant group	Unimportant group
Seasonal workers	Less important group	Unimportant group	Unimportant group
Public sector employees	Less important group	Important group	Less important group
Comments: [1] Retrieved from: Milić, Vladimir: Urbanistički aspekti socijalnog stanovanja. Belgrade, 2006. [2] Retrieved from documents 1, 4, 5 and 6 in chapter 4.1 [3] Retrieved from documents 2 and 3 in chapter 4.1			

Table 1: Possibilities of inclusion of some socio-economic groups – the views of Serbian professionals, Serbian legislature and strategies of foreign-supported organizations in Serbia

In conclusion, it is inevitable to stress that comprehensive inclusion strategy of vulnerable social groups in Belgrade has not been made. The real challenge relates to the needed integration of social and spatial-psychical aspects of the problem of social housing.

4 THE POLICY OF SOCIAL HOUSING IN SERBIA AND EMERGENCY FOR AFFORDABLE AND SOCIAL HOUSING

4.1 Regulatory framework and policy of social and affordable housing in Serbia

Serbian regulatory framework and policy of social housing is relatively new and mainly without adequate „forerunners". The key documents of the framework are (by chronological order):

1. Housing Law (1992, amendments 1993-2012) is the oldest important document for the topic. It is one of relatively long-lasting legislative acts in Serbia. This is even more important if it is known that this law has "survived" ex-Yugoslavian wars, crisis, significant political turmoil and several national assembles. But, it has had 14 amendments, which indirectly have presented painful transition of Serbia in last two decades. This law is generally in sector of housing, so it regulates only key matters. The article No 2 is especially important for this topic, because it says that "State ... provides the conditions for the resolution of the housing needs of socially threatened persons" (PS, 1992-2012, Art. 2). But, crucial fact is that the law had been the only important act for the regulation of housing sector during long transitional period (1992-2006). Because of this it hasn't been "adequate to the conditions of market economy" and it had not enabled "resolution of housing needs of socially vulnerable groups" (Petovar, 2005[4], p. 15).

2. The Study of Housing Sector of Serbia (2006) was the first policy after overthrow of Milošević's authority. It is arranged as a review of legislative and other public actions in housing sector and it mainly deals with problems and understatements of previous period. Social housing sector is elaborated in one chapter. Special attention of the study is given to housing issues of the National strategy for refugees and displaced persons. This part presents various housing options with different building types, ownerships, kinds of construction and kinds of public support and is also connected to appropriate spatial distribution (UNECE/CHLM, 2006, pp. 58-59). This was certainly "refreshing" document for that period.

3. Publication "Four Strategic Themes of the Housing Policy in Serbia" (2006) is a document prepared by UN Habitat Serbia as a support for government institution and bodies. The field of social housing is directly

connected to Affordable rental housing, but its elements can as well be recognized in two other themes (informal settlements, inclusion of Roma population through housing). The main goal of this publication is defined set of recommendations for social/affordable housing development in Serbia and their connection to other housing problems, such are illegal settlements.

4. Social Housing Law (2009) is the most important legislative act in newer social housing practice in Serbia. The draft of the law was presented 2004, so Serbian society has waited for 6 years till it was adopted. The law especially deals with the issues of institutional context and financial aspect / ownership of social housing, giving several models. Other elements of social housing, particularly those related to spatial aspect, are not elaborated.

5. National Strategy of Social Housing (2012) is very new document, which is settled as en elaboration of Social Housing Law. Last part of the strategy proposes several models of social housing support, which are scarce in space-related instructions; they include basic standards of minimal space areas per occupants, but they do not include "urban dimension" (spatial distribution, typology, level of spatial intervention, links to land allocation, related public facilities and services, etc.).

6. Action Plan for Implementation of the Strategy (2012) is an addition to the strategy related to their implementation. It is more detailed document and it includes more spatial-related elements. Some terms and "word constructions" are interesting to debate for the purpose of this research. The usage of term стан (eng. housing unit, but also apartment) is by far more present than the usage of term кућа (eng. house, especially single-family house). The term кућа is only mentioned one time and connected to village areas, which are also mention only once. In accordance to expression of the action plan, it seems that dichotomy apartment building-single-family house is equalized with dichotomy urban-rural social housing. Besides, there are no actions aimed to improve urban context of socially supported housing (including any action targeting illegal settlements).

All listed documents guide to the conclusion that there are very few actions of spatial-related elements of social housing. Present actions are usually focused to basic architectural elements, without clear connection to "urban dimension". In some cases, they seem "narrowed" and even contradictory to rich contemporary EU practice. Then, although the current connotation of illegal settlements in Serbia is well-explained in most of the documents, distinct solutions for their improvement as a social housing action are not presented. Finally, in accordance with presented regulatory framework and policy in Serbia it is can be concluded that state institutions and bodies do not define strictly any model and/or building type of social housing as role-model for implementation "in situ".

4.2 Practice and typology of social and affordable housing in Serbia

In situation of newly introduced legislative and policy framework without strict directions and instructions practice is always trying to find other markers for undefined issues. Social housing sector in Serbia is not an exception, especially about the issues such as a typology, position in urban territory. The testing for the argument will be short analysis done in several cases of new social housing in Serbia, with the focus to Belgrade cases.

Dominant building type of new social housing is a building with numerous apartments. Programme propositions strictly specified this building type in many cases (UNHS, 2009, pp. 41-44). This type of construction was implemented even in urban quarters with predominant other type of housing – single-family housing. In the terms of social integration, this is even more illogical proposition, having in mind the social background of future dwellers – mostly refugees ((Vujošević, Žarković, 2009, pp. 21-22), who usually had lived in rural areas with low-density housing types. Partial exceptions are few cases with small buildings with several apartments, which are easily noticed and positively appraised by new dwellers (UNHS, 2009, pp. 50).

All social housing programmes were organized with cooperation of local authorities, who were responsible for adequate locations (Vujošević, Žarković, 2010, p. 24). One of the criteria was to choose locations that are public properties and it limited resources in Serbian towns. This occasion dictated many propositions for new projects. Majority of social housing projects are consequently smaller interventions (usually one building with yard) with random position in urban structure, which is sometimes with totally different typology.

Other actions in social housing sector were directed to the regeneration of existing social housing stock. They are usually directed to various types of structures (detached houses, houses in raw, transformation of collective refugee centres). Even though these cases were more similar to the Serbian context, they are named as "alternative housing solutions" (UNHS, 2009, pp. 61-62). The name can be understood indirectly as a negative or less-important connotation.

If all mentioned conclusions are put in the context of Belgrade as a capital, they become even more serious. All examples in Belgrade area are buildings with numerous apartments (according to the web site of The Society of Belgrade Architects) usually organized in huge urban blocks, provided by the city or state. These cases are often in more isolated positions (at edges of city) with weaker public transport and services. Because of that, they are completely related to older examples from the West, which have been "the personification of uniformization and "ghettoization". Therefore, their success is clearly doubtful.

4.3 Wider picture: Does the regulatory framework on planning and building in Serbia encourage illegal building?

Since 1996. there is continuity in regulatory framework in Serbia of encouraging informal sector. This is the statement many would argue about, but the fact is that several laws, appendixes and other regulation and legislative material have treated the informal/illegal sector without much success. The first document which has treated this issue was the appendix to then-in-force Planning law (1993.). The intention supposedly was to tame the illegal building by enabling the legalization of then-existed buildings built without permits or out of borders of actual plans, while future illegal building was strictly forbidden. After that, two Laws on planning and building came into force (2003 and 2009), both with several amendments and both, along with amendments, treated the illegal building again substantially in the same manner as the first one. All laws and regulation have emphasized the importance of placing the informal growth into legal framework and at the same time banned its future growth. While the intention was probably good, the measurements and instruments for its implementing were poor. Namely, the state and local governments and the administration did not have the capacity to support and realize such measures defined by law. The inspection bodies also suffered from the lack of capacity and other means of preventing new informal growth, while they were not quite empowered to implement the regulations by demolition of the illegal houses. As the illustration of the above said can serve the fact that less than 1 % of total number of illegal buildings in Serbia have been demolished. On the other hand, very well spread corruption was hand in hand with the informal sector supporting it, so the illegal settlements were flourishing and have expanded a great deal. As the consequence, many regulatory plans have been made with sole function to legalize the expanded informal settlements, instead of being the strategy for the future development.

Furthermore, the newly prepared amendments of the Law on planning and building (2013), which are adopted by the state Government but not yet adopted by the Assembly, propose that every building in Serbia, regardless of their ownership status should be noted by the cadastre (practically free of charge) and therefore would seem as building with building permits. While there are, beyond doubt, many positive effects of the proposed amendments it is important to emphasize the possibility of equalizing illegal and legal buildings as a negative effect in the context of this paper.

As the (theoretically, but not fully practically) rigid framework of banning illegal building sector does not work and the old policies seem to have failed, maybe it is the time to admit that changes in the attitude has to be made. All the above stressed leads us to conclusion that, instead of turning head off the fact that it is not possible to fully tame or prevent the illegal city growth, is not it better to embrace it and fully integrate into the planning frame and social housing policy and legislation?

5   CONCLUSION – THE ILLEGAL SETTLEMENTS AS AREAS OF SOCIAL/AFFORDABLE HOUSING AND SOCIAL INTEGRATION

The extensive discussion about the city growth, urban land management, informal settlements and housing sector made us question most of the conventional approaches to solving both the problem of illegal settlements and informal urban growth on one hand, and of the social housing in Belgrade on the other. The above mentioned sectorial policies and regulatory framework, as well as international strategies and instructions for overcoming the stressed problems of a contemporary city in developing countries seem to have been made to be implemented separately, not integrated with other aspects, problems and possible

solutions. Each trying to function on its own, they fail to acknowledge the 'bigger picture' and to 'think outside the box'. What we propose is the reviving of holistic approach by observing the problems overlapped in spatial, social, financial, environmental and other context.

In order to be able to do that, it is necessary to change the prospective and conventional way of thinking of the problem. First of all, instead of thinking of informal sector as of the outlaws and invisible, let us try to treat it as reality. The social structure of the inhabitants and owners of the informal housing sector leads us to conclusion that this form of habitat has certainly gained some qualifications of the social housing as well. Furthermore, the informal settlements and their inhabitants, by self-making process of their homes, have surely lessened the pressure of the population that would require a habitation in the field of social/affordable housing sector.

In order to make the idea more feasible, some future steps are proposed:

- The change in the perception of informal settlements as of undesirable, non-appropriate form of housing, far from legal framework and professional standards, that has only to be exterminated;

- The change in the social housing sector legislation as well as in the planning and building sector legislation in the way they become more comprehensive and integrative, embracing each other; furthermore, the legislative and regulatory framework of social housing should be more open to the public and private sector partnerships, as opposed to the actual practice of leaving it solely to the public sector; this could be the opening of the possibilities to include informal sector housing owners into the legal framework;

- The change in social housing typology so that it accepts and further develops other spatial and physical forms of social housing than it was the case in past, leading to greater diversification of types, including the transformed types of informal buildings;

- Acknowledging the values of the informal sector when possible, as opposed to the prevailing absolute criticism towards it; possible qualities of informal settlements, having in mind the spontaneously formed types in Belgrade, could be related to the relatively good quality of applied building materials in many cases, the size of the dwellings and its plots and most of all recognizing the amount of the greenery in the settlements. In order to recognize these values and of course for many other reasons, it is necessary to undertake a comprehensive research and study about the informal settlements and provide a reliable information data;

- Redefining the possibilities of upgrading the informal settlements so that they achieve newly defined standards of social/affordable housing.

- Other future steps and research required should refer to:

- Institutional support in the form of new body assigned to assist upgrading informal sector/settlements, providing adequate services, traffic and infrastructure network;

- Legislative support at local level and preferably also at state level when possible; since local government level is seen here as more willing to adjust in short time, a set of local measures and instruments to support urban upgrading of informal settlements are more likely to happen. This would include stimulations for houses and owners who invest an effort to meet social housing criteria, criteria of basic infrastructure equipment, energy efficiency, etc. The process should empower local tenant associations, neighbourhood organisations, builders from the informal sector, third sector social service providers (health, education, social provision, etc.) to improve existing settlements;

- Specific education process (e.g. short term courses) for local communities with the aim to train them to assist in implementation of this idea.

Bringing new ideas about working positively with existing informal settlements as a contribution to housing the local population instead of rejecting them or worse still trying to demolish such fixed capital investment, Belgrade could become a pilot area for experimenting with such alternative institutional arrangements and cooperative forms, supported by university research.

There should be a balance between formal and informal sector. The presence of informal sector might be stimulating and encouraging for formal sector, as opposed to the common and prevailing opinion that they

have to exclude each other. The treatment of informal sector should be related to the local characteristics and cultural and social background and other relevant aspects and fields. Cutting the informal growth in the surgery manner during the economic and transitional crisis is neither effective nor wise. It is not possible and not useful to define one pattern applicable all over the world, though there are similarities about informal sector worldwide. Though we are in the era of global economy and under the influence of global forces, it is local resilience that will make our cities survive.

6 REFERENCES

DJUKIC, Aleksandra, STUPAR, Aleksandra: Unplanned Settlements, (Un) Expected Problems: 'Green' Solutions for Low Carbon Serbia?. Porto, 2009.
HIRT, Sonia: Belgrade, Serbia. In: Cities, Vol. 26, pp. 293-303, 2009.
JANIĆ, Miodrag: Osnovni program za preporod Beograda. Belgrade, 1998.
MACURA,Vladimir, PETOVAR, Ksenija, VUJOVIĆ, Sreten: Siromašna područja Beograda – Prikaz stanja i mogućnosti poboljšanja uslova življenja (The Poor Areas of Belgrade – The Review of Present State and Possibilities of Upgrading of Life Conditions). Beograd, 1997.
MILIĆ, Vladimir: Urbanistički aspekti socijalnog stanovanja (The Urban Planning Aspects of Social Housing). Belgrade, 2006.
MOJOVIĆ, Đorđe, ČARNOJEVIĆ, Vlastimir, STANKOVIĆ, Živorad: Lokalna stambena politika (Local Housing Politics). Belgrade, 2009.
PARLIAMENT OF SERBIA – PS: Закон о становању (Housing Law). Belgrade, 1992-2012.
PARLIAMENT OF SERBIA – PS: Закон о социјалном становању (Social Housing Law). Belgrade, 2009.
PETOVAR, Ksenija: Illegal Construction and Usurpation (Bespravna izgradnja i uzurpacija). Belgrade, 2004.
PETROVIC, Mina: Cities after socialism as a research issue. Discussion papers (LSE – South East Europe series), DP34. London, 2005.
PETROVIC Mina.: The transformation of cities towards de-politization of urban issues, The Institute of Sociological Research, Belgrade, 2009.
PICKVANCE, Chris (2002). State-Socialism and Their Urban Patterns: Theorizing the Central and Eastern European Experience. In: Understanding the City. pp. 183-203, Oxford. 2002.
SHLOMO, Angel, CIVCO, Daniel, SHEPPARD, Stephen: The Dynamics of Global Urban Expansion. Washington, 2005.
TSENKOVA, Sasha: Trends and Progress in Housing Reforms: In South Eastern Europe. Paris, 2005.
UNITED NATIONS (UN): Universal Declaration of Human Rights. New York, 1948.
UN HABITAT: Sustainable Housing for Sustainable Cities: A Policy Framework for Developing Countries. Nairobi, 2012.
UN HABITAT Serbia – UNHS: UN-Habitat Joins Partners of the Decade of Roma Inclusion. Belgrade, 2008.
UN HABITAT Serbia – UNHS: SIRP Book: The Settlement and Integration of Refugees Programme in Serbia 2005-2008. Belgrade, 2009.
UNECE: Guidelines on Social Housing: Principles and Examples. New York and Geneva, 2006.
UNECE: The Relationship between Population and Housing. Geneva, 2010.
UNECE/CHLM: Студија стамбеног сектора Србије (The Study of Housing Sector of Serbia), Belgrade,2006.
URBAN PLANNING INSTITUTE OF BELGRADE: Генерални план Београда 2021 (Master plan of Belgrade 2021). Belgrade, 2003.
URBAN PLANNING INSTITUTE OF BELGRADE: Регионални просторни план административног подручја Града Београда (Regional Psychical Plan). Belgrade, 2004.
URBAN PLANNING INSTITUTE OF BELGRADE, PALGO CENTRE: Стратегија развоја града Београда (Belgrade Development Strategy). Belgrade, 2011.
VUJOŠEVIĆ, Marija, ŽARKOVIĆ, Branislava: Социјално становање у заштићеним условима: Истраживање о оствареним резултатима пројекта (Social Housing in Protected: The research about Achieved Results of Project). Belgrade, 2009.
VUJOŠEVIĆ, Marija, ŽARKOVIĆ, Branislava: Живети као остали свет: Социјално становање у заштићеним условима – подршка за достојанствен живот (Living as Other People: Social Housing in Protected Conditions – Support for Dignified Life). Belgrade, 2010.
VUJOVIC, Sreten, PETROVIC, Mina: Belgrade's post-socialist urban evolution: reflections by the actors in the development process. In: The Post-socialist City: Urban Form and Space Transformations in Central and Eastern Europe after Socialism, pp. 361–384. Dordrecht. 2007.
VUKOV, Danijela: Saradnjom do ravnomernog urbanog razvoja (From Cooperation to Balanced Urban development). In: CESS Magazin, Vol. 8, pp. 19-20. Novi Sad, 2008.
WHITEHEAD, Christine: Sustainable Options for Government Interventions in the Housing Market. Belgrade, 2010.
WORLD BANK: Peri-Urban Discussion Series. 2008.
WORLD BANK: Exploring Urban Growth Management Insights from Three Cities. June 15 2008.
WORLD BANK – East Asia Update: Sustainable Development in East Asia's Urban Fringe. April 2007.
WORLD BANK INSTITUTE: Sustainable Land Use Planning – Peri Urban Growth. 2012.
ZEGARAC, Zoran: Illegal construction in Belgrade and the prospects for urban development planning. In: Cities, Vol. 16/ 5, pp. 365-370. 1999.

7 BIBLIOGRAPHY

SIMEUNCEVIC RADULOVIC Sanja, MITROVIC, Biserka, RALEVIC, Miodrag, DJUROVIC, Mladen: Informal Growth of Housing in Belgrade under the Impact of Transition to Global Economy. Milano, 2013.

The Challenge of Economic Regeneration in Small Urban Settlements of Greece

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1 ABSTRACT

Greece is a country that has been focusing its development in big urban centers. Almost all policies were based mainly on the development of Athens, Greece's capital and then in the other urban areas. This phenomenon was not random as after the Second World War intense population movements towards big cities with the simultaneous abandonment of the countryside were taking place. This mono-centric development continued in the next decades until in 1999 the first Regional Plan for Greece noted the need for a more balanced development where all county's parts would be equally developed. But this speculation did not manage to reverse the gigantism of the urban centers and the simultaneous population reduction in the small urban settlements.

The economic crisis that Greece today faces has caused many changes in the productive basis of the country so and in the areal distribution of its citizens. The tertiary sector that for the last years was the basis of employment is today descending while many Greeks "return" to more traditional occupations of the primary and the secondary sector. Unfortunately Planning could not predict these rapid changes. The settlements that until today were faced fragmentarily only in cases where they could be exploited for touristic reasons must again be seen under the new view and must be adjusted in the new needs that have resulted.

The current paper will focus on the Greek settlements of Greece, their population changes and their productive basis, while it will also investigate the parameters that affect their development. Finally after the investigation of the small mountainous settlements, it will propose ways for their optimum development and their adjustment in the new crisis needs so that they can be a part of the solution and so that finally the

2 THE SMALL SETTLEMENTS OF GREECE

The Greek territory has been developed for the past 200 years without planning. The industrialization, the immigration and the enlargement of the tertiary sector in the big cities have shaped different kinds of areas. The regions that are overpopulated and their urban centers are continuously expanding at the expense of agriculture and forest areas and the regions that lose their inhabitants while the productive sectors, in which their economy is based, are declining.

The geomorphology of Greece with its mountainous areas and its 227 inhabited, islands have led to its population's distribution in many different areas. The majority of the population lives in urban centers[1] where 35 % of the population is recorded, while the 491 small cities[2] assemble 36,4 % of the total Greek population (table 1).

Population	Number of settlements	% of the total population
More than 100.000	8	17,7
50.000 <population<100.000	28	17,3
10.000 <population<50.000	108	22,8
2.000 <population<10.000	383	13,6
Less than 2.000	10.011	28,6

Table 1: The distribution of the Greek population in different size areas.

The 10.011 small settlements (some representative cases of their size are shown Figures 1 &2),[3] that are recorded in the total Greek web, concentrate 28,6 %[4] of the total Greek population according to the census of 2001. A more detailed research, shows that most of these settlements (81 %) have less than 500 residents and they concentrate 44,7 % of the small settlements population, while the rest 1.939 settlements are inhabited by 1.731.103 people (Table 2). As these settlements are basic for the country's development it is essential that Regional Planning focuses on their particularities and on the factors that define their changes.

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[1] with more than 50.000 inhabitants

[2] with more than 2.000 inhabitants

[3] areas that are inhabited with less than 2.000 people

[4] 3.135.678 of 10.964.020 inhabitants

Fig.1 Moutsouna Settlement, Naxos, Fig.2 Faraklata settlement, Keffalonia

Small Settlements			
Population	Number of settlements	Average population	Total population
1500-2000 inhabitants	173	1.730	299.340
1000-1500 inhabitants	411	1.208	496.674
500-1000 inhabitants	1355	690	935.089
1-500 inhabitants	8.072	174	1.404.575

Table 2: The distribution of small settlements regarding their population

The allocation of these settlements in the Greek territory is shown in figure 3. The small settlements are allocated in the all Greek territory except the areas with high altitude.

From the investigation of the small settlements population changes, during the 1991-2001 decade, results that in 1991 3.083.415 inhabitants were living in small settlements, while in 2001 3.135.678 were recorded. So, small settlements population has increased. This increase is not uniformly distributed as in many small settlements the population has increased, while in others the inhabitants have moved, not to the urban centers where the population is also recorded decreased, but in other bigger settlements where the population oscillates between 2.000 and 10.000 inhabitants (figure 4). The factors that cause these population changes and accordingly their development possibilities are the subject of the current research as small settlements planning is necessary for the achievement of a successful regional development policy that aims in the survival of the small settlements via the improvement of the factors that will lead to their population's increase.

3   THE MUTATION OF GREECE'S PRODUCTIVE BASIS

From the declaration of the Greek state until today, the Greek space has been developed according to the existing social, political and economic changes. The Greek, initally rural areas, diachronically mutated to urban areas as big population movements took place with different intensity, according to each prepondarate conditions from the small settlements to the urban centers. The desire for a different life with better conditions in the city, that was combined with the abandonment of the primary sector and the dream for a better and a more comofortable life through the employment in the secondary and tertiary sector, that were rapidly developing in the urban centers, led to the movements towards the cities.

It is characteristic that [Kotzamanis, 2009: 8]:

"[…] during 1920-1940 the trend for urbanization was decreasing, (the urban population consisted the 33 % of the total recorded population), while during the Second World War and the Civil War this urbanization accelerated. So in 1950, 38 of the 100 Greece's residents were living in urban areas. In the next thirty years, Greece will be characterized by the internal and external migration and urbanization. […]".

So, although in 1853 the rural population was 79.4 % of the total recorded population, in 2001 the rural population occupied only 28,6 % of the total recorded population (Figure 5).

Today, as Greece faces the phenomenon of economic crisis, the recorded data show a "return" to more traditional productive sectors, as the tertiary and the construction sectors are facing huge problems (figure 6). The fact that the Government has decided to stop the gigantism of the public services and has reduced the

salaries of public employees has drifted all the other sectors, as trade, construction e.tc. On the contrary, the lack of vacancies in the tertiary sector and the cheaper way of living in the small settlements has led to the relocation from the urban areas to small settlements. But is Greece prepared for this new reverse phenomenon? The up to today formulated policies have been concentrated on development of urban areas, whereas small settlements were fragmentarily faced.

Fig. 3. The areal distribution of small settlements of Greece.
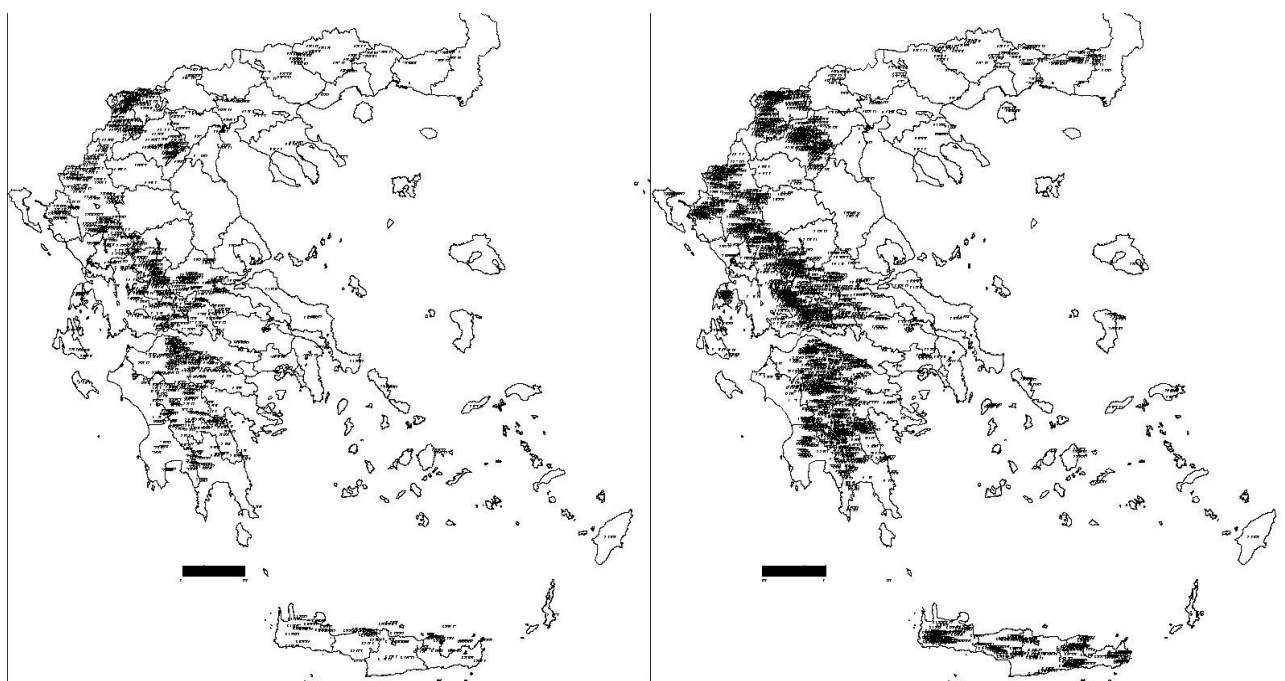
Fig. 4 . The population changes of the small settlements of Greece. Settlements with increased population (left), Settlements with reduced population (right).
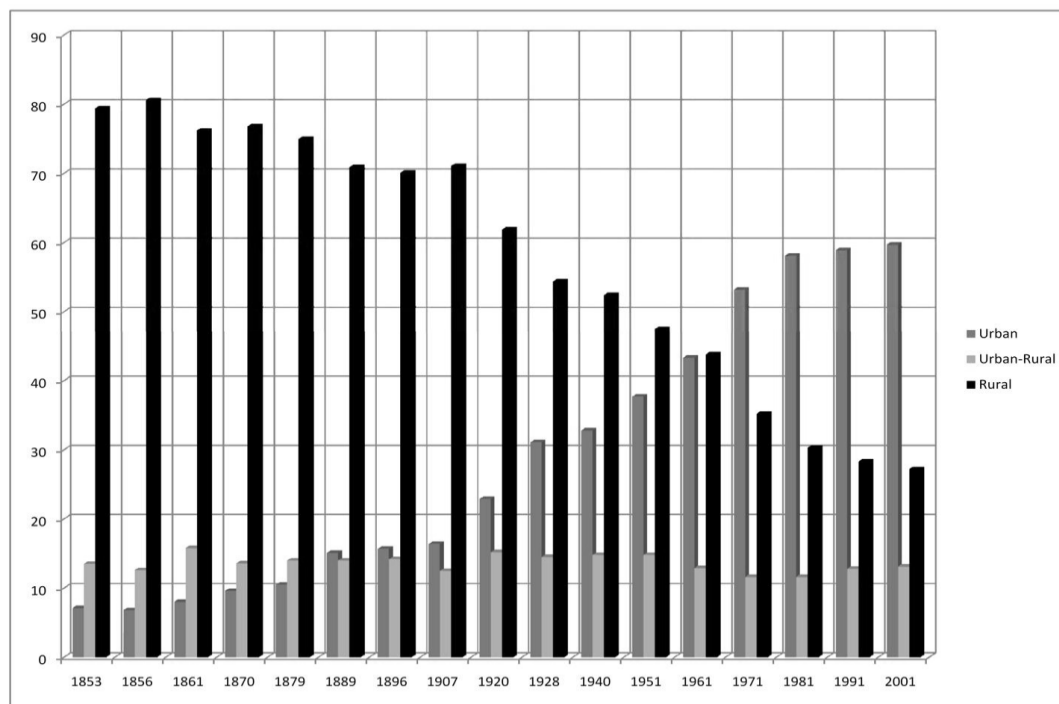
Fig.5 The population of Greece according to its urbanization degree. (%)
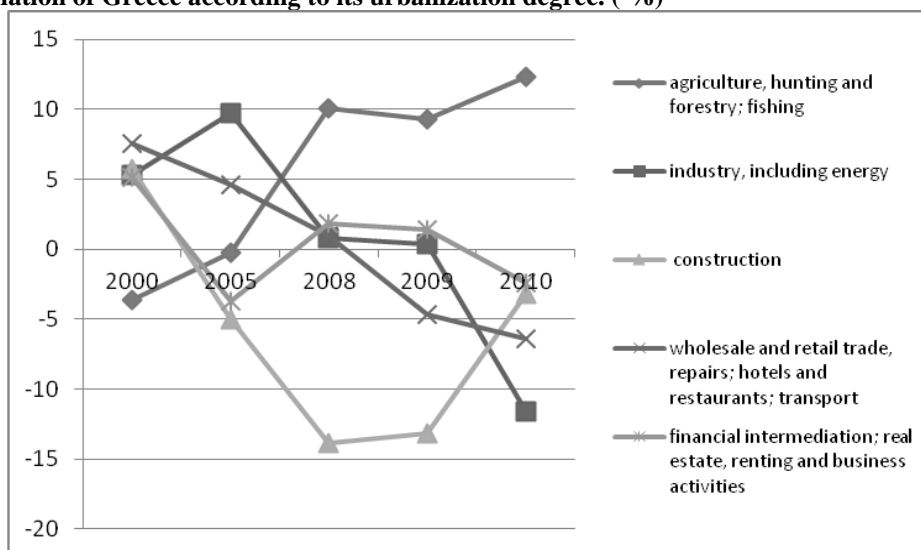
Fig.6: Real value added in productive sectors of Greece.

4   THE EXISTING SPATIAL POLICIES FOR SMALL SETTLEMENTS PLANNING

In the existing National Regional Plan of Greece, the small settlements are mentioned in Article 9, that concerns the areal development of the mountainous, coastal, island, rural and border areas. This article defines, that the development of small settlements will be achieved via the development of their infrastructures and the improvement of their accessibility.It also mentions that there is a need for the formulation of a more detailed National Mountainous Plan, which since 2008 has not yet been legislated.

In the urban planning level the 2508 law that was legislated in 1997 was the first law that noted the need for planning that would cover not only urban areas but also non- urban areas. But although the total space is planned,only directions based on estimations of future development are given. A more detailed approach, based on more specific elements is not realised, so it seems that planning is only about the definition of the necessary infrastuctures.

The speculation that results, is if these formulations are enough for the solution of the small settlements problems, or if planning should include specific features that will result by the use of quantitative and qualitative indicators. These indicators will reveal their particularities and will eventually lead to specific policies that will contribute to their best development.

5 THE CASE STUDY: THE SMALL MOUNTAINUOUS SETTLEMENTS (S.M.S.) OF GREECE

As mountainous settlements, according the European directive, are defined the settlements that are allocated in areas with altitude higher than 800 meters. In Greece, 2.504 mountainuous settlements are recorded.

The population changes that have been recorded during the 1991-2001 decade, regarding the settlements altitude are shown in figure 7 and table 3.
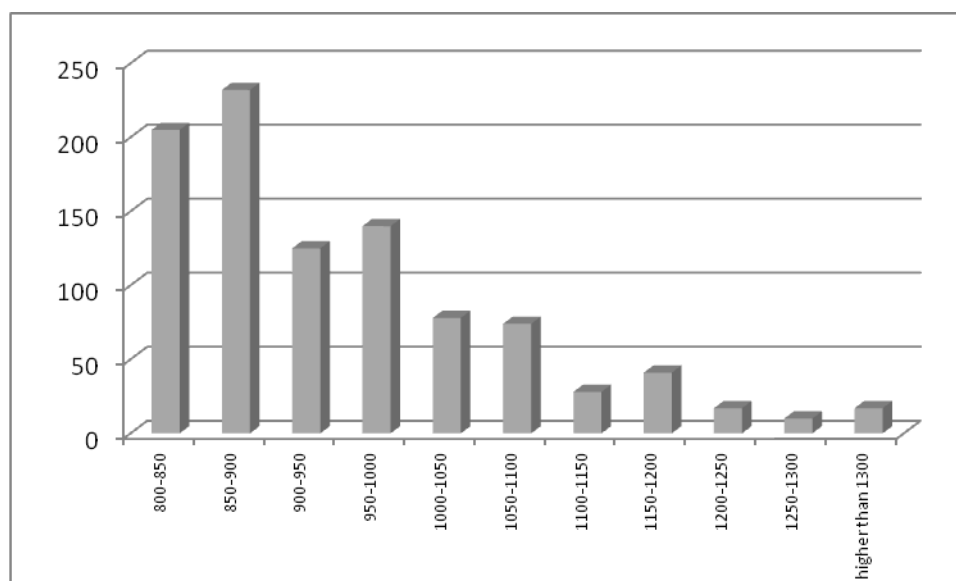
Fig.7: The number of s.m.s concerning their altitude

Altitude (meters)	Population		
	2001	1991	Variation
800-850	27288	29067	-1779
850-900	31450	36565	-5115
900-950	17310	18995	-1685
950-1000	29024	30794	-1770
1000-1050	10142	12742	-2600
1050-1100	6091	6990	-899
1100-1150	45	33	12
1150-1200	9483	9641	-158
1200-1250	595	656	-61
1250-1300	119	143	-24
more than 1300	920	814	106
total	132.467	146.440	-13.973

Table 3: The s.m.s. population changes concerning their altitude.

The relation of the recorded population changes with the existing road axes is obvious, as mountainuous settlements that are distant from the national road network (figure 8) present bigger population reduction, compared with the corresponding that are adjacent to the national road network. The same phenomenon is faced in the small settlements that are close to urban centers. In this case,the population reduction that is recorded, is less intense compared with the settlements that are distant from the urban centers. So, it is concluded that the demographic changes are not affected only by the altitude in which a small settlement is allocated but they are also affected by factors as distance from urban areas, road network e.tc.

6 THE CHANGES OF THE S.M.S PRODUCTIVE STRUCTURE

The s.m.s. concentrate most of the functons that are taking place in urban areas with different ratio. The main sector that was recorded during the 1991 employment census, was agriculture and livestock which concentrated 30 % of the total recorded employment. The tertiary sector concentrated 22 %,while industrial and manufacture activities concentrated only 11 %. From the employment 2001 census resulted that the employment in agriculture was reduced in 22 % while the tertiary sector was increased to 36 % (figure 9).
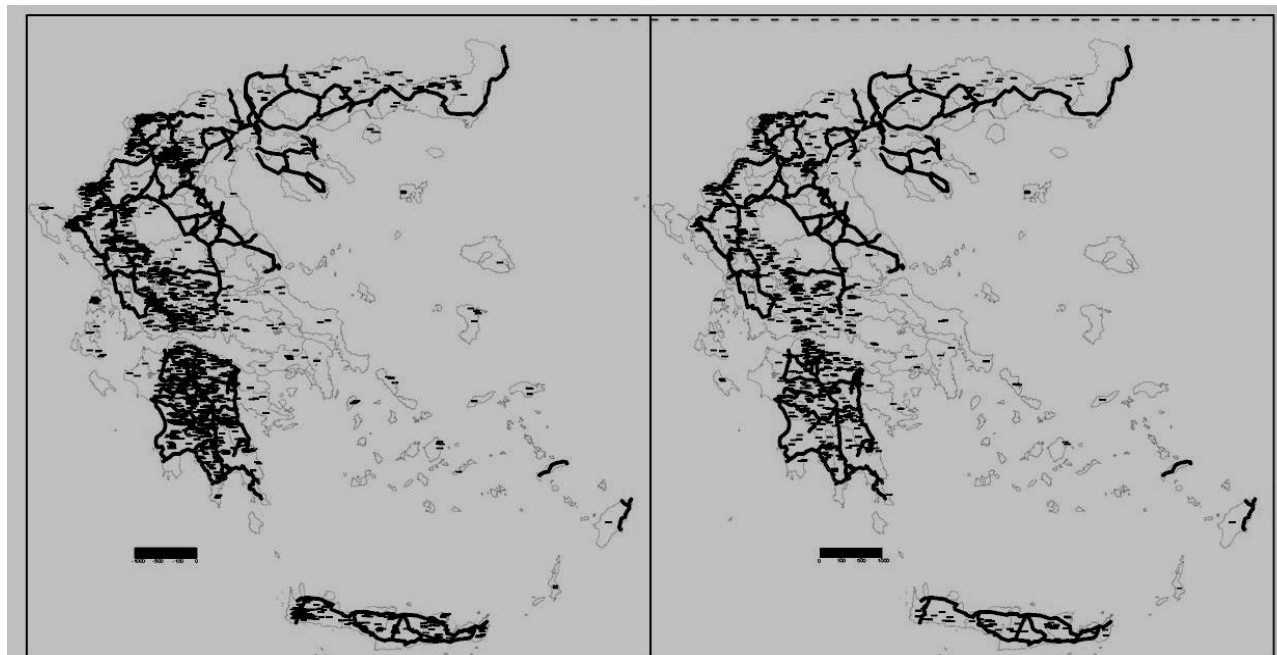
Fig. 8 . The population changes of the small settlements of Greece and their relation with the main road network. Settlements with increased population (left), Settlements with reduced population (right).
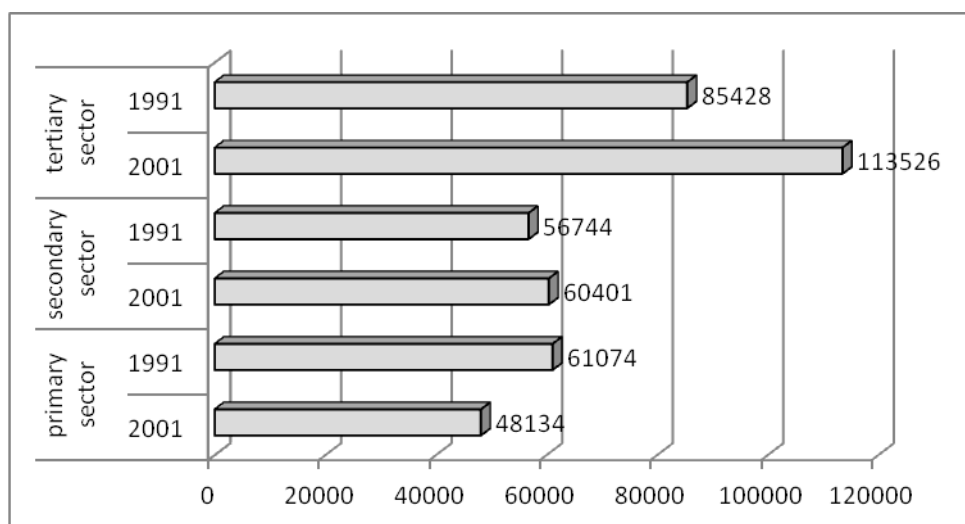
Fig.9 The employment distribution for each productive sector in the mountainous settlements in 1991 and in 2001.

For the reveal of the structural productive changes of the s.m.s., the research will proceed to their classification with the use of Principal Components Analysis, that reveals the settlements groupings based on their common characteristics. The variables of the analysis will be the recorded changes of each productive sector for each s.m.s..

From the Analysis resulted that five groups of s.m.s. were revealed. The first group included settlements that had increased their employees in the tertiary sector while the rest four groups were shaped by s.m.s. where changes in the primary and the secondary sectors were recorded. The investigation of this s.m.s groupings allocation, shows that there has not been a specific region where certain groups are recorded but that all the different groups are dispersed all over the Greek territory.

7   PROSPECTS AND PROPOSALS FOR THE DEVELOPMENT OF S.M.S.

The s.m.s. are areally dispersed with problems of infrastructures and accesibility lack. The investigation of their population changes shows thet they are not disadvantageous areas as in many of them population increase has been recorded while the employment in their productive sectors has increased.

It is also remarkable that when the changes of employment are areally recorded, it seems that s.m.s. function suplementarily. It is concluded that they can function as areal cells networks that are functionally related.

So, planning of all levels should encourage activities that face survival problems with the establishment of motives and create the infrastructures needed for the coverage of the s.m.s. residents needs. Simultaneously, the road network improvement can meliorate accesssibility, as the roads condition is a factor that influences s.m.s. development.

The fact that also results is that s.m.s. cannot be fragmentarily faced as they are characterized by particularities that are not taken into consideration by the existing planning systems of spatial levels.

So,the creation of an observatory is proposed as all the changes and the specific characteristics should be recorded and special policies should be applied. This way, planning can create hierarchies, predict and encourage or discourage the parameters that can contribute to s.m.s. development through coordinated policies that will derive from all planning levels. This approach which will be flexibly adjusted can focus on every areas particularites and lead to the achievement of the s.m.s. best possible development.

Finally, it must be realised that today is more than ever imperative the need for a new planning approach, that will focus on all kinds of areas, as new needs have emerged.

8 REFERENCES

Koutsopoulos K., Geography: Methodology and Methods of areal analysis, Athens, 1990.
Kotzamanis B., Androulaki E., The demographic development in Greece (1830-2007), Volos, 2009.
SiardosG., Multivariable statistical Analysis Methods, Thessaloniki, 1999.
National Statistical Services of Greece, census, 1991, 2001.

The Elderly under Urban Heat Pressure – Strategies and Behaviours of Elderly Residents against Urban Heat

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1 BACKGROUND

Urban areas especially suffer from hot days because of the urban heat island effect. Heat periods have impacts on urban residents; in particular, the elderly group, above 65 years, is suffering from the impacts of heat stress. Studies about previous heat impacts have revealed that the morbidity and mortality rate of the elderly are increased during and post heat periods. This has been observed for several US-cities (Anderson & Bell, 2009; O'Neill et al., 2003), as well as for several European cities such as London (Hajat et al., 2002), Paris (Fouillet et al., 2008; Vandentorren et al., 2004) and Rome (Michelozzi et al., 2003). The heat wave in the summer of 2003 in Europe resulted in about 70.000 deaths (Robine et al., 2008). Regarding Vienna, similar impacts of heat waves have been noticed (Hutter et al., 2007, Moshammer et al., 2006).

It is projected that climate change will further increase heat waves in number, intensity and duration during the 21st century affecting most land areas (IPCC, 2007). There will be an increase in hot days with temperatures above 30°C and tropical nights (with temperatures not below 20°C) (Formayer et al., 2007/2008). The living conditions of the urban population will be negatively influenced particularly by long lasting and intensive heat waves.

As cities have a large and increasing elderly population and a high number of those living isolated in poor housing conditions, the issue becomes far more important in the near future in particular as more heat periods are predicted because of climate change (Hutter et al., 2011). Thus, the reduction of the vulnerability of elderly people is a prior aim for city administrations. One strategy in reducing heat stress impacts is changing residents' behaviour during heat waves. Unfortunately, knowledge on adaptive behaviour of the edlerly during heat waves is often lacking.

2 PROJECT OBJECTIVES

The aim of the 3-year STOPHOT-project is the reduction of the vulnerability of elderly people (> 65 years) living in cities (in this case Vienna) against urban heat. This study develops sustainable short- and long-term preventive measures for the built environment and green spaces, and measures encouraging proper behaviour of the elderly. It will have a specific focus on social meeting places, in- and outdoors, avoiding social isolation. This study appears to be the first comprehensive one in Austria, developing adaption measures in an inter- and transdisciplinary manner, reducing the vulnerability of elderly urban residents. It specifically investigates elderly awareness of heat risks, perception of heat stress and adaptive behavior avoiding heat impacts (Wanka et al., 2012). The empirical study will identify gaps between 1) actual and recommended behavior of the elderly and 2) proposed or existing stakeholder health-related strategies and efficacious measures recommended by the medical resp. public-health experts.

3 METHODS

Several partners from different working fields (health, planning, seniors, …) are part of this project (Figure 1). A mixed-methods design that combines both qualitative and quantitative methods is used to take into account the viewpoints of different disciplines and actors (Figure 2).
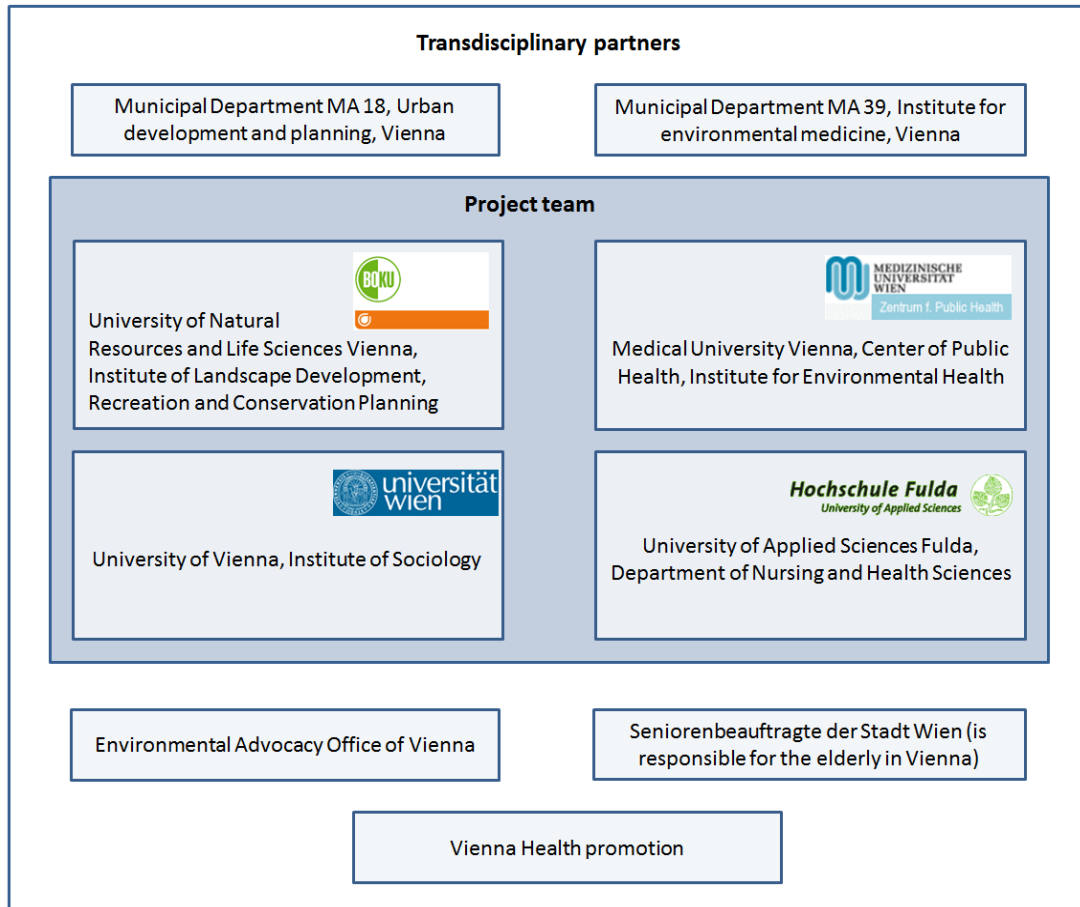
Fig. 1: STOPHOT-project team and partners

- Several types of urban study areas were selected. These types represent varying degrees of green spaces and socio-economical levels in and out of heat islands of Vienna. Older peoples' attitudes towards climate change, their awareness and perception of heat stress as well as their adaptive behaviour were investigated per study area type. Using a standard questionnaire, 400 subjects over the age of 65 were interrogated via anonymous telephone interviews in their private homes (in- and outside urban heat islands) in 2011. A telephone survey among younger persons for controlling age as major independent variable (n=200) was done. In addition, face-to-face interviews with elderly living in retirement and care homes in- and outside urban heat islands were carried out (n=200).

- Fifteen in-depth interviews with stakeholders from city planning, green space management, health care, retirement and care homes etc. were carried out between June and December 2011. The interviews focused on stakeholders' awareness, perception of climate change risks and their perceived relevance of heat impacts on elderly residents. It also provided an overview on the degree of stakeholders' activities reducing the vulnerability of the elderly. Using the free listing method adaption measures were collected. A inteview guide was developed, the interviews were recorded and transformed into text form and analysed using a qualitative content-analytical text analyses (Mayring, 2010), supported by ATLAS.ti software.

- Then the study identified the gaps between actual behaviour of elderly and recommended behaviour with respect to in- and outdoor activities and gaps between proposed or existing stakeholder strategies aimed at reducing the vulnerability of older people and efficacious measures from the medical point of view.

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- First results were presented in stakeholder workshops and first sustainable management and planning measures for urban heat islands were developed.

- In the next step the elderly will evaluate developed adaption strategies and management measures. For this purpose, a survey among elderly living in urban heat island will be carried out using a stated preference model (discrete choice experiment; Louviere et al., 2000). With face-to-face interviews, the elderly (n=200) will be asked to evaluate alternative configurations of hypothetical/existing adaption measures which are defined as combinations of physical, social and managerial factors. To ease the evaluation of the heat avoiding scenarios visualization of scenarios will be provided, using digitally calibrated images, which strictly controls the variables under investigation (Arnberger & Eder, 2011a,b).

- These results will be presented in a second stakeholder workshop to refine management and planning measures.
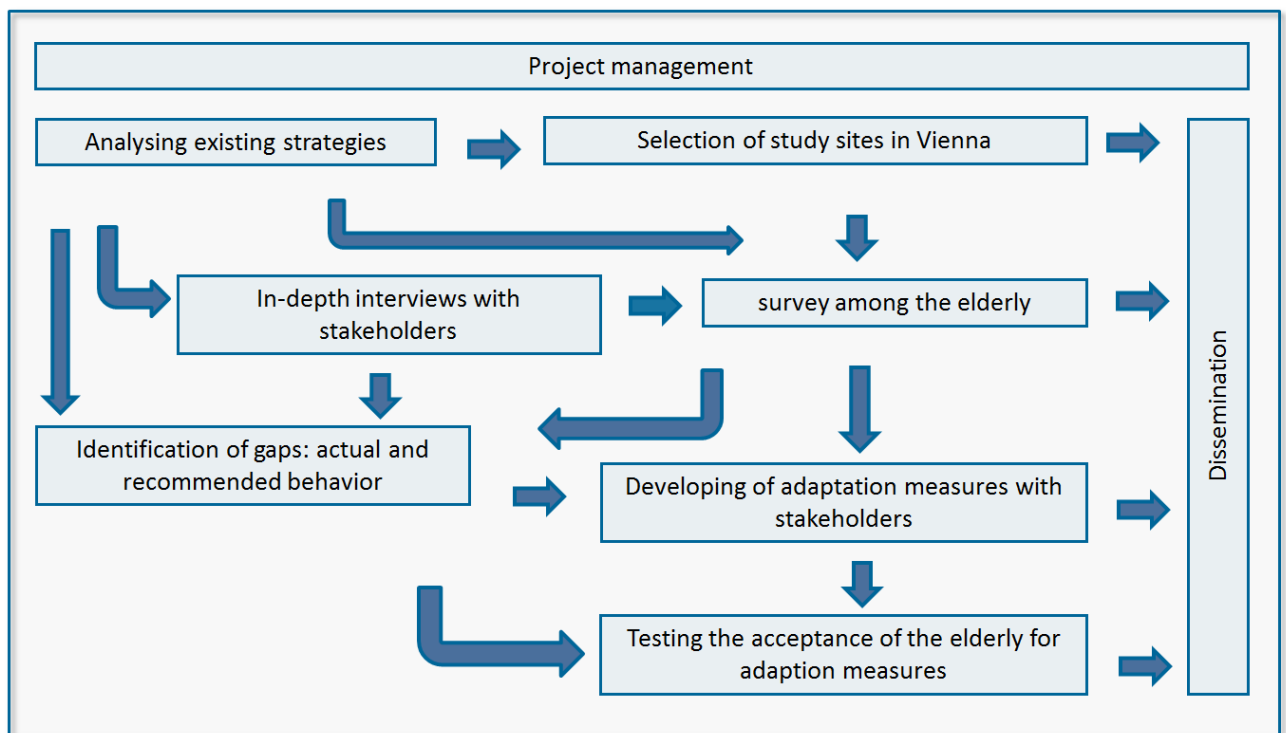
Fig. 2: Workflow plan of the STOPHOT-project

4 RESULTS

4.1 Elderly's perception of and behaviour during heat waves

The survey among the elderly aimed to work out 1) whether elderly people perceive climate changes and rises in temperature, 2) how they react to it physically and mentally, and 3) how they adapt to these changes. An overview of the results is provided below.

Elderly people and climate change awareness

Half of the elderly respondents living at home and half of the elderly respondents living in retirement homes stated that they have experienced more hot days, hot nights and longer heat periods today than ten years ago. Accordingly, the vast majority perceived climate change to be a serious problem that might have catastrophic consequences. Retirement home inhabitants, persons with a higher educational status und persons living in areas with little green spaces were more aware of this problem. However, the majority of the elderly also stated that climate change will not affect themselves anymore because of their old age.

Heat stress and its effects on elderly people

Elderly people felt most comfortable at temperatures which range from 21°C to 25°C during the day and 18°C to 23°C during the night. Particularly among women, sensitivity to heat increased with age.

Heat primarily affected the elderly's energy balance. Reported heat impacts on physical wellbeing were fatigue and sleeping problems. On the one hand, heat caused senses of pleasure. While both older and younger people (18 to 55 years) frequently reported these symptoms, older people suffered more from heat stress. Risk groups, defined as people who suffer most from heat stress, comprised:

- younger people (18 to 55 years) with a low socio-economic status who live in socially disadvantaged areas
- older people (65 years and older) with a low socio-economic status, poor health condition, who tended to be socially isolated

The latter group was more likely to withdraw from the public life during hot periods. Those who didn't withdraw appeared to suffer from fewer heat induced ailments. Factors that increased the likeliness to stay at home were a disadvantaged neighborhood, dissatisfaction with and lack of social neighborhood networks and age discrimination in the residential area.
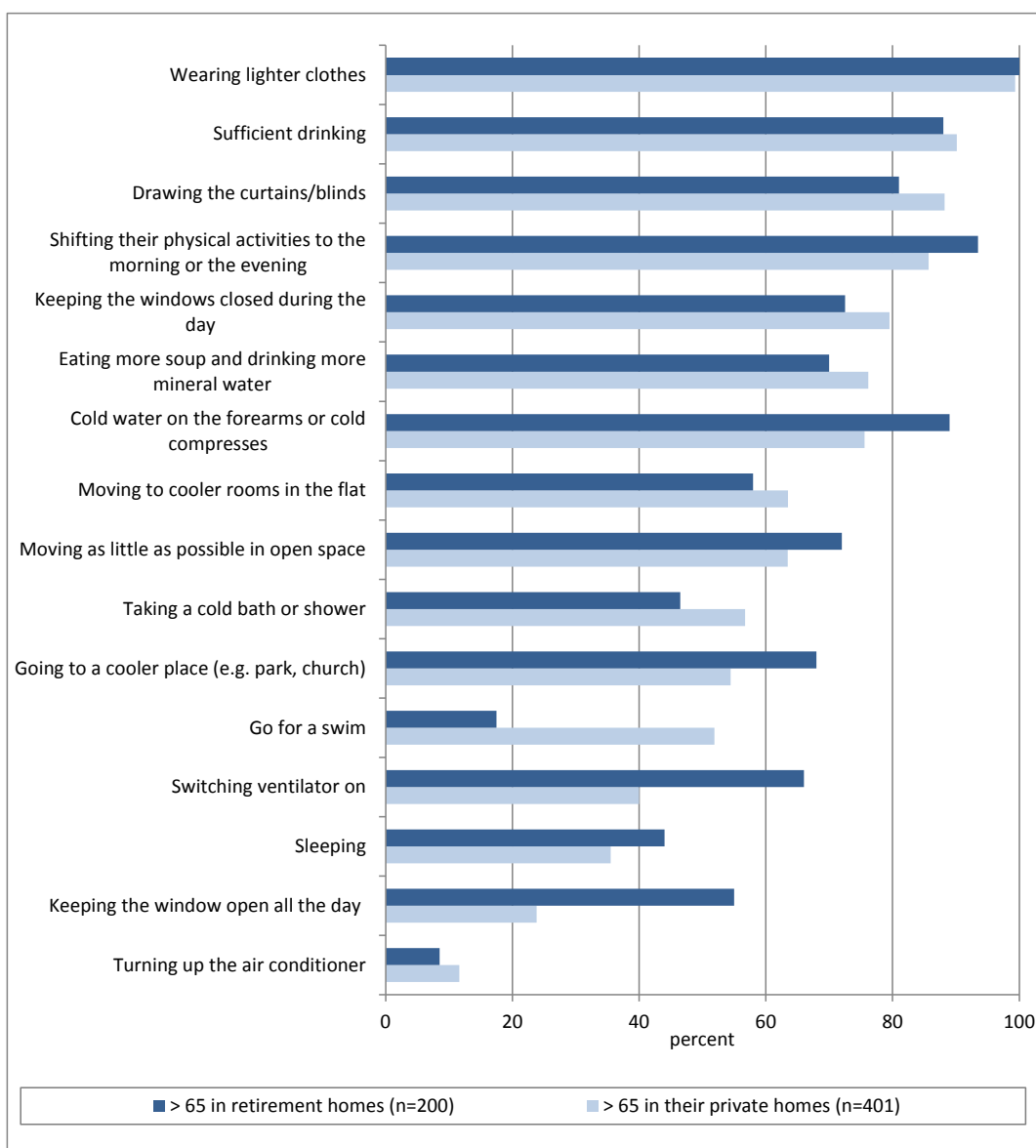
Fig. 3: Reported activities against heat stress (survey 2011)

Strategies to coping with heat stress

Altogether respondents felt well informed about the right behavior during a heat wave. Seniors living at home mentioned most frequently newspaper, television and radio as sources of information. In contrast, respondents living in retirement homes mentioned most frequently home management, doctors and care personnel as sources of information. This group perceived personal information as more helpful than media

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information. The most common recommendation elderly people received from their doctor (especially those living in retirement homes) was to increase their liquid intake during a heat wave.

Seniors themselves claimed drinking as one of their most commonly deployed measure against heat stress. Other often mentioned measures were wearing lighter clothes, drawing the curtains, shifting their pysical activities to the morning or the evening hours and keeping the windows closed during the day. Elderly people reduced their activity level to a greater extend than younger people.

The majority of older people stayed in their apartment when it was hot. They perceived the home to be cooler than the outdoors. Those who went out, did less suffer from heat stress. They visited semi-public (gardens, inner yards) and public (parks, waters) areas. Older people showed a preference for parks and green spaces, while the younger ones favoured blue spaces.

4.2 Stakeholders' views on urban heat and the elderly

Stakeholders had different perceptions on the topic of urban heat and the elderly. Most experts were aware of climate change and heat waves, but most of them had not yet considered them with respect to the elderly. Whereas stakeholders from the field of "planning / green space" have already dealt with the topic heat and climate change (mostly at workshops/conferences), representatives of older people had only discussions on that topic with senior citizens, but no experiences at scientific level.

The experts were able to name a lot of measures to make the summer heat in the city bearable for the elderly. In total, 79 different measures were mentioned. On average one expert named 13 measures.

The measures stated most frequently were "sufficient drinking", "greening of roofs/facades/courtyards", "planting and preservation of trees/avenues", "keeping/including more green in the city" and "more drinking fountains in public spaces".

Depending on their discipline, the experts focussed on different measures. Representatives from the sector "planning / green spaces", for example, named many measures which were related to public (green) spaces, such as "ventilation of the city", "greening of roofs/facades/courtyards", "planting and preservation of trees and avenues". Representatives of the elderly as well as representatives from the health sector had their focus on individual measures such as "sufficient drinking", "right food", "appropriate clothes", "avoiding midday heat" etc.

Although the stakeholders were able to name a number of measures, only few measures have so far been implemented for the elderly in Vienna. The representatives from retirement homes mentioned the following measures which have already been implemented in their retirement homes: drinking fountains in the common areas, diet food on heat days and apartments with heat protection. The care station has been moved to the ground floor due to the summer heat. Furthermore, posters and billboards as well as announcements inform about heat waves and provide recommendations regarding proper behaviour.

In addition, the city of Vienna provides a heat wave warning system and a list of recommendations regarding proper behaviour, which has already been distributed to those elderly who live alone in private homes.

Experts differrently assessed the present risk of urban heat for older people living in private homes. Some experts thought that there is already a risk for elderly people, especially if there is no person who looks after them, others believed that the risk will significantly increase in the future. The risk of the elderly living in retirement homes was estimated to be as high as that of those living in private homes. Representatives of the elderly, though, regarded the risk level to be lower due to residential care in retirement homes.

5   CONCLUSION

The elderly are particularly vulnerable towards heat stress. With urban populations ageing, and urban temperatures rising, planning and design of urban areas must increasingly consider the interaction of social and climatic factors as an important part of becoming an age-friendly city.

However, many relevant stakeholders in Vienna did not feel any direct responsibility regarding the issue, only few measures have so far been implemented for the elderly in Vienna. Therefore, a responsible person and multidisciplinary collaboration between the different organisations and working groups are needed; at the moment, synergies seem to be missing.

Study results suggest that heat is essentially a social problem in three ways. First, people with a lower socio-economic status tend to live in disadvantaged areas, in which heat exposure and heat stress are increased by building density, building materials, lack of public and green spaces and other environmental and planning factors. Second, once exposed to heat, people with a lower socio-economic status suffer more from heat stress due to their generally poorer health (caused by bad living and working conditions as well as unhealthy lifestyles). Third, the study has provided new insights in how disadvantaged groups tends to deploy unfavourable coping strategies, like staying at home in a hot apartment.

Recommendations for concrete measures and activities reducing the vulnerabilitis of the elderly can be drawn from these conclusions. The measures have been discussed and evaluated by stakeholders of urban planning, senior and social work as well as climate research in the course of a World Café. STOPHOT recommendations for urban outdoor planning comprise for example:

Challenge	Description of Measures
Accessibility	Elderly friendly and climate adapted corridors to reach public and green spaces and parks For example: Green paths and corridors Accessible public toilets and information about where to find them
Mobility	Elderly friendly and climate adapted resting possibilities like mobile benches that can be moved to shadowy or sunny places (depending on the weather and season)
Privacy	Elderly people enjoy to be outside, yet they express a need for semi-public places and places in public space where they can withdraw and have a moment of quietness
Maintenance	Provision of infrastructure (e.g. benches in green spaces) is not sufficient, it must be maintained. Urban planners should cooperate with local initiatives, NGOs and organisations offering leisure activities for older – and younger – people.

Heat has to be seen as an environmental factor which is not natural and unchangeable, but as part of social inequalities that can be balanced. Resilience and individual coping strategies have to be supported by community-planning initiatives (e.g. green corridors, community gardening).

6 REFERENCES

Anderson BG, Bell ML (2009). Weather-related mortality: how heat, cold, and heat waves affect mortality in the United States. Epidemiology, 20 (2): 205-13.

Arnberger, A., Eder, R. (2011a). The influence of age on recreational trail preferences of urban green-space visitors: a discrete choice experiment with digitally calibrated images. Journal of Environmental Planning and Management, 54(7): 891-90.

Arnberger, A., Eder, R. (2011b). Exploring the heterogeneity of rural landscape preferences: an image-based latent class approach. Landscape Research, 36(1), 19-40.

Formayer H., Clementschitsch, L., Hofstätter, M., Kromp-Kolb, H. (2008). Vor Sicht Klima! Klimawandel in Österreich, regional betrachtet Schwerpunkt Wien. Studie im Auftrag von Global 2000.

Formayer H., Haas P, Hofstätter M, Radanovics S, Kromp-Kolb H. (2007). Räumlich und zeitlich hochaufgelöste
Temperaturszenarien für Wien und ausgewählte Analysen bezüglich Adaptionsstrategien. Im Auftrag der Wiener
Umweltschutzabteilung – MA 22 der Stadt Wien gemeinsam mit der MA 27 – EU-Strategie und Wirtschaftsentwicklung.

Fouillet A., Rey G., Wagner V., Laaidi K., Empereur-Bissonnet P., Tertre AL., Frayssinet P., Bessemoulin P., Laurent F., Crouy-Chanel PD., Jougla E., Hémon D. (2008). Has the impact of heat waves on mortality changed in France since the European heat wave of summer 2003? A study of the 2006 heat wave. International Journal of Epidemiology; 37 (2):309-17.

Hajat S., Kovats R., Atkinson R., Haines A. (2002). Impact of hot temperatures on death in London: a time series approach. Journal of Epidemiology and Community Health, 56:367-72.

Hutter H.P., Moshammer H., Wallner P., Leitner B., Kundi M. (2007). Heatwaves in Vienna: effects on mortality. Wien Klin Wochenschr, 119 (7-8):223-7.

Hutter, H.P., Arnberger, A., Allex, B., Eder, R., Kolland, F., Wanka, A., Blättner, B., Kundi, M. Wallner, P. (2011). "In the Heat of the Night": Wie ältere Menschen Hitze wahrnehmen und welche Maßnahmen sie setzen.
12. Österreichischer Klimatag: Klima, Klimawandel, Auswirkungen und Anpassung in Österreich, Vienna, Austria, SEP 21-22, 2011. In: Klimaforschungsinitative AustroClim und Klima- und Energiefonds, 12. Österreichischer Klimatag.

IPCC (2007). Summary for Policymakers. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M.Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Louviere, J. J., Hensher, D. A., & Swait, J. D. (2000). Stated Choice Methods – Analysis and Application (Cambridge, UK, University Press).

Mayring P. (2010). Qualitative Inhaltsanalyse. Grundlagen und Techniken. 11. Auflage. Beltz Verlag.

Michelozzi P., Donato Fd., Accetta G., Forastiere F., D'Ovidio M., Perucci C. (2004). Impact of Heat Waves on Mortality – Rome, Italy, June-August 2003. MMWR, 53 (17): 369-71.

Brigitte Allex, Arne Arnberger, Anna Wanka, Renate Eder, Hans-Peter Hutter, Michael Kundi, Peter Wallner, Franz Kolland, Beate Blättner, Henny Annette Grewe

Moshammer H., Hutter H-P., Frank A., Gerersdorfer T., Hlava A., Sprinzl G., Leitner B. (2006). Einflüsse der Temperatur auf Mortalität und Morbidität in Wien. In: Universität für Bodenkultur DfWAUIfM, editor. StartClim. Vienna: Universität für Bodenkultur, pp. A1-a -48.

O'Neill MS., Zanobetti A., Schwartz J. (2003). Modifiers of the temperature and mortality association in seven US cities. Am J Epidemiol, 157 (12): 1074-82.

Robine, J.-M. et al. (2008). Death toll exceeded 70,000 in Europe during summer of 2003. C.R. Biologies, 331(2): 171-8.

Vandentorren S., Suzan F., Medina S., Pascal M., Maulpoix A., Cohen JC., Ledrans M. (2004). Mortality in 13 French cities during the August 2003 heat wave. Am J Public Health, 94 (9): 1518-20.

Wanka, A., Kolland, F., Arnberger, A., Allex, B., Eder, R., Hutter H-P., Kundi, M., Wallner, P., Blättner, B., Grewe H A (2012). Einen kühlen Kopf bewahren? Verhaltensstrategien älterer Menschen in Hitzeperioden – Ergebnisse des STOPHOT-Projekts. 13. Österreichischer Klimatag. Klima, Klimawandel, Auswirkungen und Anpassung sowie Klimaschutz in Österreich, Vienna, AUSTRIA, JUN 14-15, 2012. In: Klimaforschungsinitative AustroClim, Climate Change Centre Austria CCCA, Klima- und Energiefonds gemeinsam mit Universität für Bodenkultur Wien, Tagungsband 13. Österreichischer Klimatag

The Heart of the City from a Socio Cultural Perspective

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1 ABSTRACT

Ontological city planning theories suggest that the definition and location of the city heart (AKA CBD and City Center) is the geographically centered, economically based, and activity vibrant spot of the city. In Cairo, the heart has applied this actuality since its foundation in 969 AD, and has moved or transformed and changed size and location with every major shift in Cairo's planning milestones. However, January 2011 revolution in Egypt has identified a new parameter to the theory of the deteriorated heart; suggesting a new hypothesis: "the heart of the city is related to socio-cultural attributes rather than to the physical planning measures". Incidents of the revolution and its consequences and aftereffects are changing both the society and the urbanism at a fast pace. The question in debate here is: How can urban planning improve Cairo's resilience to political and social changes caused by the upheaval era we are living in? How can we make use of this transitional period towards an urban democracy of our victorious city?

The paper at hand aims at answering the preceding questions. It aims at introducing a differentiation between the CBD and the heart of the city as well as proposes some recommendations for its public spaces development. Its methodology is based on a review of the concept of the heart through a chronological review of the case of Cairo. Arguing the validity of the theory, the paper moves to showcasing the urban status of its major public spaces that are used as revolution and demonstration "hearts". Discussion of the cases is expected to shed light on some basic considerations needed to react to our fast changing City.

2 INTRODUCTION

While cities continue to grow, real knowledge of their evolution is tied with the study of social science. For the complexity of the urban life can never be explained without a complete analysis of the economic and social processes. This is our duty if we are to regulate the physical world. Works of Marx, Simmel, Freud, Weber and Wagner emphasized the preceding ideas since the first quarter of the twentieth century. In the last quarter of the century, Peter Hall and McLoughlin accentuated on the urge of a different kind of knowledge in order to accommodate the design of cities, and to improve the lives of their people. Zukin points to the significance of culture in the creation of urban forms, while Boyer explains that the production of built environment is part of the material production of society (Boyer, 1984). Moholy-Nagy wrote that cities, like men, are embodiments of the past, and mirages of unfulfilled dreams. They thrive on economy and waste, on exploitation and charity, on the initiative of the ego and the solidarity of the group. They stagnate and ultimately die under imposed standardization, homogenized equality, renewing themselves unit by unit in a slow time bound metabolic process. Society is therefor the determining factor in urbanization (Nagy, M. 1968).

We must return then to the economic and political, cultural and social contexts as pillars of the spatial morphology and building typology of the city. The city thus, is a text that can be read as a system of differences or fragments that bear a loose or indeterminate relation to each other. Since these texts are all constructions following certain laws, then they can also be deconstructed and therefore understood (Cuthbert, 2006). Indeed many cosmopolitan cities have undergone cultural and urban transformations, however, and despite any development or move of the CBD, there is always a constant fact; which is the urban essence of its heart. Along the history of Cairo, the heart has moved or transformed and changed size and location with every major shift in the city's planning milestones. From the old gated Fatimid city center, to the Ottoman center, to the Khedivial "West El Balad" (downtown) for over a century regarded as "Paris of the East" or the "Golden Age", to its fractioning to Heliopolis in the East and to Mohandessin in the West, and then out of the city fringes: to New Cairo and to 6th of October city as multinational business hubs with a change from the boulevards to the campus form. The original city has become a multiple city, and so its center was divided. Along with the journeys, an immigration of city dwellers with every political regime has led to decentralization and a defragmentation of the CBD to new downtowns as a natural consequence formulating an urban enigma. Each and every newer center always attracted the top of the Cairene social pyramid class, leaving the older heart to lower societal classes to enjoy the left overs of buildings and public spaces. However, the Cairo phenomenon I would like to highlight here is the revivification of the old Khedivial

downtown with January 25the revolution in 2011, introducing a knot in the urban logic. For in the large square that has long belittled into a central geographical node, since its fragmentation in the eighties (more than a quarter of a century ago) has accommodated millions of Egyptians for an uninterrupted 18 days with a continuum todate. Tahrir square (epic of the Khedivial downtown) and its surroundings has overnight been transformed into the heart of the country- not only Cairo; an Agora, a hide park speakers' corner and a sit-in as well as a camping site, in addition to Egypt's ultimate demonstration center. Every one was welcomed in the square; politicians, intelligencia, students, families, elite, scientists, officials, the urban poor and even criminals, homeless and street children. A new hypothesis can now be debated, that is: the CBD might be the geographical and economic center of a city, but the heart is related to socio-cultural attributes rather than to the physical measures.

3   A CHRONOLOGICAL REVIEW

Literature defines the CBD or the Central Business District as the focal point of a city. It is the commercial, office, retail, and cultural center and usually is the center point for transportation networks. Usually typified by a concentration of retail and office buildings. Also called a central activities district, is the commercial and often geographic heart of a city, also referred to "downtown" or "city center" (Gosling, D. & Maitland B. 1984).

The term "city place" is similar to CBD serving the same purpose for the city, and both are marked by a higher-than-usual urban density as well as often having the tallest buildings in a city. City center differs from downtown in that the latter can be geographically located anywhere in a city, while a city center is generally located near the geographic heart of the city. London arguably has three city centers; the City of London, the medieval City of Westminster and the transformed Docklands area. Mexico City also has more than one city center: Centro Histórico, the colonial; Paseo de la Reforma – Polanco the mid-late 20th century CBD, and Santa Fe, the new CBD. In Taipei, Taiwan, the area around its main railway station is regarded as the historic city center while the Xinyi Planned Area located to the east of the said railway station is the current CBD of Taipei and not only is it considered the financial district of Taipei, but it is arguably the premier shopping area in Taipei and Taipei's most modern cosmopolitan district. Taipei 101, Taipei's tallest building and currently the world's second tallest habitable skyscraper, is located in Xinyi Planned Area (Curthbert A.R. 2000, Mumphord, Kostof, S. 1993).

The shape and type of a CBD or downtown almost always closely reflect the city's history. Cities with maximum building height restrictions often have a separate historic section quite apart from the financial and administrative district. In cities that grew up suddenly and more recently such as those in the western half of North America, a single central area will often contain all the tallest buildings. It has been said that downtowns (as understood in North America) are therefore a separate phenomenon. Central Business Districts usually have very small resident populations. For example, the population of the City of London declined from over 200,000 in the year 1700 to less than 10,000 today. In some instances, however (and particularly in large Australian and Canadian cities), CBD populations are increasing as younger professional and business workers move into city center apartments (Mumford 1966).

A chronological review illustrates how the CBD was initiated as the market square in ancient cities. On market days, farmers, merchants and consumers would gather in the center of the city to exchange, buy, and sell goods. This ancient market is the forerunner to the CBD. The basic ancient Roman plan consisted of a central forum with city services, surrounded by a compact, rectilinear grid of streets. To reduce travel times, two diagonal streets crossed the square grid, passing through the central square. Many European towns preserve the remains of these schemes. Later, Renaissance and Baroque were featured by one city type which for a century and a half: the „star-shaped city", with radial streets extend outward from a defined center of military, communal or spiritual power.

As cities grew and developed, CBD's became fixed location where retail and commerce took place. Typically at or near the oldest part of the city and is often near a major transportation route that provided the site for the city's location, such as a river, railroad, or highway, a center of finance and control or government as well as office space. In the early 1900s, European and American cities had CBD's that featured primarily retail and commercial cores. In the mid-20th century, the CBD expanded to include office space and commercial businesses while retail took a back seat. The growth of the skyscraper occurred in CBD's, making them more and more dense. In recent decades, the combination of residential expansions and

development of shopping malls as entertainment centers have given the CBD new life. One can now find, in addition to housing, mega-malls, theaters, museums, and stadiums. Pedestrian malls are also common nowadays in an effort to make the CBD a 24-hour a day destination. The CBD is often far more populated during the day than at night as relatively few workers live there and most do commute to their jobs around. By the beginning of the 21st century, the CBD had become a diverse region of the metropolitan area and included residential, retail, commercial, universities, entertainment, government, financial institutions, medical centers, and culture. Lawyers, doctors, academics, government officials and bureaucrats, entertainers, directors and financiers are often located at workplaces or institutions in the CBD (Kostof, S. 1993).

In 1933, the German geographer Walter Christaller has developed the "central place theory", defining the central place, as it exists primarily to provide goods and services to its surrounding population. An attempt was to explain the reasons behind the distribution patterns, size and number of cities and towns around the world. Doing so, he attempted to provide a framework by which those areas can be studied both for historic reasons and for the locational patterns of areas today. Christaller further tested the theory in Southern Germany and came to the conclusion that people gather together in cities to share goods and ideas and that they exist for purely economic reasons (Christaller 1933). In 1954, German economist August Losch modified Christaller's central place theory creating an ideal consumer landscape. Both Losch's and Christaller's ideas are essential to studying the location of retail in urban areas today. This model is shown all over the world, from rural areas of England to the United States' Midwest or Alaska with the many small communities that are served by larger towns, cities, and regional capitals (Losch, A. 1954)

Back to the CBD, where the highest land value and the most valuable real estate in the city; core of the metropolitan area, would typically home to one of the city's tallest and most valuable skyscrapers. On the other hand, the convergence of road networks in the CBD often creates overwhelming traffic jams as commuters from the suburbs attempt to converge on the CBD in the morning and return home at the end of the workday. In recent decades, edge cities have begun to develop as suburban CBD's in major metropolitan areas. In some instances, these edge cities have become a larger magnet to the metropolitan area than the original CBD.

From retrospection, literature planning classics have identified the heart as the core of the city. In its "The Heart of the City: Towards the Humanization of Urban Life", the Congrès Internationaux d'Architecture Moderne (CIAM) has identified the heart as 'the core' as 'an element that made the city a city as opposed to an aggregate of individuals' (Sigfried Giedion), as 'the meeting place of the arts' (Le Corbusier), as 'the repository of the community's collective memory' (J.M. Richards) as 'natural expression of contemplation, quite enjoyment of body and spirit' (Ernesto N. Rogers), as 'background for spontaneity and feeling of processional development' (Philip Johnson) and as 'expression of the collective mind and spirit of the community' (Jaqueline Tyrwhitt). Team X has further developed the concept of the heart in the 1950's (Geddes, P. 1949)

4 THE CAIRO PHENOMENON

Along ist history, Cairo has been and still is a challenge to the study of urban design. For its socio- cultural attributes were and still are in continuous transformation. Since its construction in 969 AD, its occupation by Fatimids (969-1171), then Ayubids (1171-1250), then Memluks (Baharis 1250-1382, Burjis 1382-1517), then Othomans (1517-1798), then Mohamed Aly, and his ancestors who drifted Cairo's culture and urbanism towards the French, the Italian and then the English (1805-1952). A disperse and liberalization of culture for one and a half century were abruptly suppressed by the nationalization policy (1961) after the July 1952 revolution, shifting culture and urbanism towards socialism/collectivism. Then Cairo's culture and urbanism were turned head over heals overnight with the open-door policies (1974). A loss of stability was a prologue for the privatization that accompanied the globalization with its underlying aspects of trans-bordered economics and media rebellion accentuated the multi-layered and accumulative ad-hoc's of Cairo's cultural identity and urbanism over the last thirty years. Tracking the changes on the map reveal that perception of its CBD is always associated by a socio-cultural change, rather than economic measures (Safey Eldeen, H. 2008). The mile stones can be identified in four milestones: 1. Before Mohamed Aly (969-1805), 2. Khedivial Cairo and the Belle Epoch (1863-1952), 3. Post 1952-Revoltion, and 4. Cairo Today

Before and during the reign of Mohamed Aly, the unique urban fabric of Historic Cairo was a reflection of its social structure (Bianca, 2004). The heart was al-Mu'izz Lidin Illah Street – the Qasaba (Spine) of Fatimid Cairo, rooted in the principle of symbiotic interaction between the members of its community. The street, over one thousands years old and one kilometre long with dominant markets – besides residential – of specialised crafts and small trades of jewellery, copper, leather, clothes, herbs and other specialized goods and crafts. Each activity was located in a specific section of the street, along the different historic periods of the Fatimids, Ayyubids, Mamluks and Ottomans. User groups were well-to-do residents and merchants who have been replaced by a poorer working class community and a wave of emigrants from different Egyptian cities. Originally designed for pedestrians, horses and cattle, the narrow and sinuous street has been transformed into an over-populated typical residential/commercial activities in slow replacements of ist authentic nature as the medieval local heart and market due to the change in demographic characteristics of its users (Abdel Hady, A., Nachar, E., & Safey Eldeen, H. 2011).

With the Haussmannian Cairo Project (Paris of the East) 1863-1907 witnessed a new down town when foreigners and élite began to invest heavily. Grand palaces and beautiful European style buildings were erected, outstanding squares were designed. French architects, assisted by Italian contractors and designers undertook the building of a pleasant mix of Neo-Classic, Art-Déco, Art-Nouveau, Baroque and a little later, Neo-Islamic styles (Mintti, 1999 & Hawas, 2002). Along its "Belle Epoque", banks, insurance companies and wealthy individuals invested in blocks of flats. The very luxurious apartment buildings were then rented out as offices or private dwellings to a cosmopolitan élite careful to preserve the buildings in excellent shape. Later in the 1930's, downtown tenants abandoned their less fashionable address and transformed their flats into well-appointed offices for their own use or as an investment. Elegant boutiques provided shade with their colourful awnings to a selective clientele who preferred shopping in Cairo rather than in any European capital. Physicians, dentists, lawyers and accountants vied for clinics and offices in such prestigious surroundings. The metro project that has started in 1905 to link the capital downtown with the new suburb of Heliopolis has expanded to reach and link most of the city's districts. The increase in using motor private and transportation vehicles and the introduction of the bus as public transportation in 1935 in the newly paved urban roads have resulted in the expansion and maturity of the suburbs (Heliopolis 1905, Maadi and Hadaek El Qubba 1908, Dokki 1922). New urban suburbs were planned on modern aspects of urban design: Al Awkaf city, Mokkattam, New Helwan, and Nasr City. The older districts have also swelled and increased in number of their inhabitants. Each district was significant for its urban character and identity, reflecting its user groups' cultural and socioeconomic features and sometimes nationalities or ethnicities (Safey Eldeen, H. 2010).

It is hypothesized that the beginning of the urban change in Cairo goes back to the late forties of the twentieth century. After WWII, an inflation of the land values and building costs as well as the wages of craftsmanship took place. Internal immigration constituted a housing problem for the middle and low classes. The poor districts went from pathetic to miserable. For the first time in Egypt, cemeteries acted as housing areas. The number of Cairene inhabitants doubled in only ten years (1939-1949). Cairo remained attractive until the mid century with the break of the 1952 revolution. Afterwards, the exodus of the foreign community hit hard at Cairo downown. Its activities diminished, its boutiques no longer attracted the élite and its apartments were taken over by a social mobility that accompanied the nationalisation and centralisation. The user groups, the land uses, and the urban fabrics have changed. Shops changed ownership and indulged their own decorating schemes. Negligence in laws and regulations enforcement helped establishing commercial buildings into the neighbourhood, regardless of any aesthetic measures or considerations of the historic values of the buildings (Al-Ahram weekly, 2001). Parking problems, together with car exhaust fumes added to a misuse and a lack of maintenance of buildings and pavements. Decades of neglect by downtown landlords and tenants, precipitated by the migration of the expatriate community, and the succeeding departure of the upper classes, have left the ornate splendor of its lavish edifices mired in decay. Negligent enforcement of laws and regulations gave way to the entry of commercial establishments into the neighborhood, mostly with no regard to maintaining aesthetic harmony or preserving the historic buildings (Abdel Hady, A., Nachar, E., and Safey Eldeen, H. 2011).

5 CAIRO'S URBAN ENIGMA'S REFLECTION ON THE CBD

With the 1960 nationalization policy (laying hands on private projects), a centralization process has resulted in an unpredictable enlargement of the city master plan. Accompanied by a socioeconomic change of the Cairenes; a claim of eradication of the socioeconomic buffers has resulted in an allocation of the elite, and an advancement of the middle and lower middle classes, causing unsteadiness in the demographic map of Cairo. Rural immigrants, poor, and youngsters and unqualified class extensively worked in the capital, living on the margins and the peripherals of the city, composing the early urban slums and squatter settlements. After the 1967 Arab-Israeli war, the same inflation of WWII was repeated. However, the results were more intense because of the migration of the canal cities habitants during the war. The new regime of the open-door policy that has started after the 1973 victory has shifted the administrative orientation towards capitalism. Coinciding with the exploration of oil in the gulf countries has resulted in a new reconstruction of the social classes and urban configuration of the city. A shift in the formulation of the middle class was witnessed. Neaveau-riche constituted a new social class, which has contributed to a new urban irrelevancy in the new districts and suburbs with their comeback from oil countries for homing upgrade. Apart, was a vast investment movement empowered by the political decision, contributing to a tremendous inflation and the emergence of new residential districts with new housing cultures. In the eighties, the gaps between socio-economic groups have widened and the demographic structure has mingled. The housing projects could not cope with the pace of the housing need, leading to an entire urban deterioration allover the city. The squatter settlements then were estimated as an 85 % of the entire housing in Cairo. Blocks of flats were erected in place of private villas, or adjacent to villas in place of the gardens were sold. Cairene urban status was then described as spontaneous or "improvised" or "ad-hoc". A quick deterioration has spanned along the original older districts of the city because of over population, and lack of maintenance and renewal projects (Safey Eldeen, H. 2008).

In the early nineties, and after the political regime shifted its economy towards the privatization, the investment sector has swept like a flood, building its own residential compounds outside the borders of the city. Creating opportunities for the building sector to flourish and the demand of the out-side-the city new residential compounds to increase, creating a new inflation in the land prices, building costs and craftsmanship wages. From retrospection, the demand for houses for the poor classes became merely a need for shelter, which has resulted in the swelling of the older squatter settlements and the development of newer ones. The "modern" districts can be described as repellent, due to the urban mismanagement, defiance of laws and legislations and the defacement of urban standards (Sims, 2011).

During the last two decades, the desert land around Cairo has shown dramatic changes in its physical, cultural and social features. Starting as opportunities of desert land reclamations for the agricultural projects, the foundation of the ring road and several road conjunctions attracted many investors who started new housing projects hence, establishing new communities for upper middle class families, together with some educational, cultural, medical and commercial facilities (GOPP 1993). Those new communities are profit oriented and determined by land developers. Accordingly, a considerable portion of the socially higher population living in nearby overcrowded Cairo districts chose to move seeking a better quality of life in those new communities. In turn, this move imposed the extensive use of cars for long distances commuting to and from the city, with a limited availability of public transportation (Abdel-Hadi & Elazhary 2009). In 2008, Greater Cairo Region was expanded to include two more newly developed governorates, Helwan to the east and 6th of October to the southwest.

It is evident that the Khedivial downtown of the twenty first millennium Cairo has followed the ontological city planning theories suggest that the location of the city heart is the geographically centered, economically based, and activity vibrant spot of the city. The new CBD/City Center (or as we call: the downtown) it always attracted the top of the social pyramid class, leaving the old heart to lower societal classes to enjoy the left overs of buildings and public spaces. The entire downtown has witnessed the actual departure of head quarters, large shopping chains and hotels and A-class entertainment facilities. With every fracture or departure of the CBD, a rehabilitation of the user-groups is associated. Several studies, documentaries and even movies have tackled the issue of the deterioration of the urbanism of down town and the rehabilitation of its user-groups (ya'kubian building, banat west elbalad, and others). From a personal perspective, the area for us was avoided even for a pass by. Relying on the ring road, or hanged bridges penetrating Cairo, we-inhabitants of the fringes, visit downtown when it is extremely urgent. A trip that is always accompanied by

nostalgia for the days bygone and a dream of preservation of a suppressed genuine urban essence that most of the younger generations cannot perceive.

6   AL TAHRIR SQUARE IN REVOLT

Tahrir Square or "Liberation Square" is „the heart of the heart" the major public square in Downtown Cairo. The square was originally called "Ismailia Square", after the 19th-century ruler Khedive Ismail, who commissioned the new downtown Hausmannean 'Paris on the Nile' or 'Paris of the East' design. After the Egyptian Revolution of 1919 the square became widely known as "Tahrir" Square. However the square was not officially renamed until the Egyptian Revolution of 1952, which changed Egypt from a kingdom into a republic. In 2011, the square was a focal point for the Egyptian Revolution. At the centre of the Square is a large and busy traffic circle. On the northeast side is a plaza with a statue of nationalist hero Omar Makram, and beyond is the his Mosque. The square is the northern terminus of the historic Qasr al-Ayni Street, the western terminus of Talaat Harb Street, and via Qasr al-Nil Street crossing its southern portion it has direct access to the Qasr al-Nil Bridge crossing the nearby Nile River. The area around Tahrir Square includes the Egyptian Museum, the former National Democratic Party (NDP) headquarters building, the Mogamma governmental building, the Headquarters of the Arab League building, the Nile Hotel, Kasr El Dobara Evangelical Church and the original campus of the American University in Cairo. The Metro serves Tahrir Square with the Sadat Station, which is the downtown junction of the system's two lines, linking to Giza, Maadi, Helwan, and other districts and suburbs of Greater Cairo. Its underground access viaducts provide the safest routes for pedestrians crossing the broad roads of the heavily trafficked square.

Like any city geographical and large sized center. Tahrir Square has been the traditional site for numerous major protests and demonstrations; 1977 Egyptian Bread Riots, and March 2003 protest against the War in Iraq. On Tuesday, 25 January 2011, millions of protesters from a variety of socio-economic and religious backgrounds demanded the overthrow of the regime of President Hosni Mubarak. The uprising took place in Cairo, Alexandria, Suez as well as in other cities in Egypt, following the Tunisian revolution. Three days later (Jan 28th) "Friday of Anger" protests began. Millions demonstrated in Cairo and other Egyptian cities after the Friday prayers. Later that night clashes broke out in Tahrir Square between revolutionaries and pro-Mubarak demonstrators, leading to the injury of several and the death of some. A curfew was declared, but was widely ignored as the flow of defiant protesters to Tahrir Square continued throughout the night. On February 2nd, 2011, violence escalated as waves of Mubarak supporters met anti-government protesters, and some rode on camels and horses into the Square, wielding swords and sticks. During the 18-days-revolution; every one was there in the square; politicians, intelligencia, students, families, elite, scientists, officials, the urban poor and even criminals, homeless and street children. World media and global names on regular basis to join the protestors. Despite Mubarak's resignation on February 11th, thousands of protests have continued to gather and reside in Tahrir square. Although many pledged they would continue protesting until all the demands had been met. Since then- for more than two years, numerous "titled" Fridays demonstrations were held with demands or protests. From time to time police forces attempted to forcibly clear the square using tear gas, beating and shooting demonstrators, but protesters soon returned in more than twice their original numbers, and every now and then fierce fighting breaks out and continues through days and nights.

Eventually, with the continuum of Tahrir square occupation by camping protestors, and with the rate of violence increasing, the entrances and exists have been closed by concrete walls and up to date, turning the life of residents of the quarters to a night mare. More violence from the police and the army against the protestors and street gangs has intrigued a new type of demonstrations thus igniting the dreadful incidents of Mohamed Mahmoud and the Parliament Streets. Two more extremely drastic events in the Egyptian Contemporary history. More pessimestic environmental behaviour is witnessed and range fron vandalism and violation of buildings, streets and public spaces. More drastic attitude has started in the sexual harassments and the frequent rape cases in addition to the pick pocketing and robbery, and the street fights that have become recurrent incidents in the Cairene street lately! The square and the adjacent streets have been then transformed into a shelter for the homeless, which threatens the residents and the users of the areas. Some accuse the reminiscent individuals of the former regime to make people against the revolution.

If Tahrir square has become the icon of the revolution and reflection/indication of the political and social changes in Egypt along two years. Evidently, small hearts have appeared have been characterized by cultural/social/behavioral features according the nature of their location and the background and orientations

of the residents of theirs, or because of the acitivies and land use. The node of Mostafa Mahmoud in Mohandesin Area that has been founded and flourished in the eighties after the open-door policies and categorized as "rich" was an icon of the "anti-revolution" party. Abbaseya square was for the support of the army (Abbaseya is an old district from the late 19th century that has transformed from an elite district to a popular crowded and congested district since the mid twentieth century. Roxy square in Heliopolis residents are the elite of the second half of the twentieth century, now recognized as the icon of the "couch-potato" party, or the group of Egyptians that silently and remotely watch what is going on. And the auto-strade street, particularly at the unknown soldier memorial area is recognized by those supporting the late General Omar Soliman and Lieutenant General Ahmed Shafik (the last two men of the former regime that played roles part in after the revolution drama). Then, later in December 2012 Heliopolis has witnessed a union between the tahrir revolutionists and the Heliopolis revolutionist in front of the El-Eth'adeya palace accentuating on the collaboration between more parties against the ruling of the moslem brotherhood presidemt Morsy residing in the palace. Then it became a battle field, and the Tahrir cycle of events started all over again, this time in Heliopolis.

The fact is that political analysis goes beyond the scope of this paper, however, the 2011 revolution and beyond have shed light on the following four political/socio-behavioal/urban observations:

Rejuvination of the so long denied CBD of Cairo, and transforming it to the „center of the nation". During the 18-days revolution. This suggests the need of people for a common public urban space that would act as the social heart of the city where people can gather in large groups, uncategorized or classified by social/economic/cultural or religious measures-determinants so they can express themselves and renew their sense of belonging to the country. No matter how a city might swell in size or expand haphazardly out of ist peripherals, have as new CBD's as ist districts expand, yet, the classic heart would always be the refernce point where poeple will return to, despite of socio-economico or cultural differences.

The second observation pertains to the fragmentaion of the old heart to more recent hearts- as in the cases of Heliopolis, Muhandesin, Nasr City etc. has proved to be an urban phenomenon. This phenomenon is witnessed in the categorization of the demonstrations all around Cairo for their own reasons, expressing different political views and beliefs.

The margenalized, so long denied urban poor, who have been long supressed and underexpressed, deprived of any appropriate human built environemtnet and were underspoken, strive to experess themselves and announce their presence and their volume within the Cairene society (more than 65 % oft Cairo residents are urban poor according to several sources). Their message is that they are here to stay. Carrying some behaviors from their districts of origin- probably the informal areas and stress to the heart of the city right after the revolution and then to the fragmentted hearts where the demonstrations have moved to.

The fourth observation is the newly emerged street visual and performing arts; street journalism, graffiti, street troops, experimental plays, and others. Raising some doubts about where were those youth before the revolution? Didn't they have youth centers, clubs to perform and demonstrate such skills and talent shows? Was there urban suppression for some sectors of the society accompanying the political oppression that has found its way just like a jack –in-a-box after the revolution? Is there a relationship between a political dictatorship and urban dictatorship? Evoking an inquiry about the existence of adequate social places in the city to incube such cultural and entertainment cultural activities.

Day after day and month after the other more observations are detected. An unaccepted street behaviour has become dominant between both the youth and the adults as well. It has spanned to rign over personal, professional, and public interactions between many of the Egyptian youth and has accordingly changed the conception of use of open spaces and public areas in Cairo and other several major Egyptian cities.

7 DISCUSSION AND CONCLUSION

May be this previous section has relied more on personal observations and interpretations than on action-research investigation, However. They provoke several questions:

- Does politics influence socio-urban change?

Yes, and the review of the Cairine heart reveals the fact that politics dictates how a certain group/community live and therefor shape their districts, physically and conceptually.

- Can the design of the urban public spaces change with the change of the socio-cultural composition of residents in a district /area?

Yes, as every group of residents require some physical-tangible features for their conceptual-non-tangible vision, beliefs, requirements and aspirations, as seen in the transformations of the hearts reviewed along the paper.

- Did what happen of a change in attitude and behavior in the Egyptian conserved society has anything to do with a change of meaning and conceptualization of public spaces, squares and streets from merely physical paths and nodes to areas of human and social groups interaction?

Yes, what we saw of the newly emerged activities in the heart of the city and its major square "Tahrir" affirms the fact that we are in real need for the application of urban sociology and socio-behavioral studies in the planning, design and development of cities and districts

- Does what this paper tackle really calls for a redefinition of the heart of the city, detached from the definition of the CBD and totally detached from the city planning theories?

Yes, we are in urgent need of a socio cultural definition the proposes a new urban role of the vibrant areas inside the city and in need of methodic approaches for its urban design.

To conclude, and along the paper, theoretical foundation of the city heart, center and CBD was reviewed. Then, emphasis was given to the heart of Cairo; since its foundation, to its development, to its several migrations, proving that there is a difference between the CBD and the heart. After its migration to newer modern and contemporary districts, Down Town Cairo is NOT the CBD any more. Jan 2011 revolution is a milestone in the transformation of the heart of Cairo, transforming it to the heart of the nation after its decline and migration to remote hearts for more than a quarter of a century. The revolution has rejuvenated it as a heart repository of the community's collective memory (as described by J.M. Richards), an expression of the collective mind and spirit by the community (as described by Jaqueline Tywhitt). This phenomenon has rung a bell for "democratic urban areas" in the city that satisfy the sociocultural needs of the city dwellers, and not only the physical standardized measures. More, and as Le Curbosier has identified the heart of the city as "the meeting place for the hearts", it is evident that the young artists found no better place to revolt for their buried talents except by the "art demonstrations" in Tahrir. It is also worth mentioning that renowned artist, singers, poets and others, also perform in the square, accentuating on the notion that Tahrir and the Kedivial heart have been rejuvenated as an "art heart". I also believe what happens around me of a change in society and its shifting from a conserved, ethically driven society to a daring-bold attitude since the revolution and until now is a major socio-behavioral change that has to be dealt with from an urban perspective, if we believe that urbanism is a formula equivalent to [user*place*time]. I'm also convinced that we are in an urgent need that the city planning and city design sciences should include cultural and social aspects and measures, and not only engineering ones.

And finally, I leave the ending of the paper open for discussion and debate…

8 REFERENCES

ABAZA, Mona: The Changing Consumer Cultures of Modern Egypt: Cairo's Urban Reshaping. The American University in Cairo press: 2006
ABDEL HADI & ElAZHARI:. Centripetal Gated Communities in Egypt; in Tolba et al. (editors) Environment, Health and Sustainable Development, Hogrefe and Huber: 2009
ABDEL HADI, A. NACHAR, E., & SAFEY ELDEEN, H., 2011 …
ABOU LOGHOD, Janet: Cairo: 1001 Years of the City Victorious. Princeton University Press: 1971
BOYER, C. : The City of Collective Memory: 1994
BRAMBILAA, Roberto and LONGO, Gianni: (with a forward by Bernard Rudofsky). For Pedestrians only: Planning, Design and Management of Traffic-Free Zones. Library of Congress: 1977
CUTHBERTMA.R.: The Form of Cities. Blackwell Publishing: 2000
GEDDES, P. : Cities in Evolution. London: Williams & Norgate: 1949
GOPP (General Organization for Physical Planning) Egypt.
GOSLING, D. & MAITLAND, B.: Concepts of Urban Design, London: Academy Editions: 1984
HALL, E.T. The Silent Language: 1959, Hidden Dimension 1969, and Beyond Culture 1976
HEMDAN. G.: "introduction" (arabic) in Desmond Stewart's Cairo, Dar Al-Helal, Egypt: 1969
KOSTOF, S.: The City Shaped: Urban Patterns and Meanings through History. Bulfinch. 1993
L.MOHOLY-NAGY. Vision in Motion. Paul Theobald, Chicago: 1956
MUMFORD, L:. The City in History: Its Origins, Its Transformations, and Its Prospects. Harcourt Brace Jovanovich: 1961

SAFEY ELDEEN, Heba: Who am I: The Question of Cairene Identity in a Global Paradigmatic Change. Ain Shams University Scientific Conference: Architecture, Urbanism and Time: A Vision for the Future. October 2008

SAFEY ELDEEN, Heba: Al'Kahira: Khawater 'omraneya (Cairo: Urban Thoughts) ISBN 977-17-9876-6: 2010

SIMS, David: Understanding Cairo. The American University in Egypt Press: 2011

SMITH, Peter, F.: Architecture and the Human dimension. The Pitman Press, Bath: 1979

WIEDENHOEFT Ronald: Cities for People: Practical Measures for improving Urban Environments. Van Nostrand Reinhold: 1981

The Identity of Place ... and Memory of Time ... Define Space-Time of Human Architecture

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1 ABSTRACT

Problems of modernization and authentication in contemporary architectural experiments in the world and Arabic-Islamic countries, and manifestations of alienation in contemporary urbanism and debate among many intellectuals architectural theses. As these problems were raised in numerous conferences and symposiums which tried to shed light on the impact of new sciences and culture on heritage and urban civilization. As other, Arabic arts and Islamic architecture came under successive waves of Western cultural interruption and progress of scientific theories in the twentieth and twenty one centuries. It also changed the architecture features and urbanism, cross-cultural trend was cut with the past intellectual creations, informative literature, art and architecture.

The identity of the place is one of the important vocabulary which linking human, architecture with built environment containing it, so the strength and the weakness of the link generated by several elements, discussed several theories and intellectual urban studies through physic sciences ,psychology, sociology, and poetic of space studies where the spirit and Genius Loci of space emerge throw places, as viable place had physical and metaphysical characters effected and affected with human impact manufacturer and inhabitant.

Returning to the city and their connotations and links to the urban environment of the Arabic Islamic city in old era, and in the European medieval cities, where (human enclosure, the stimulus of streets and open spaces with response of memories, sensations and feelings), make the place an integral part of city life and their inhabitants, by overlapping times and products within masses and spaces of the city.

At present the sense of city components are less than past, and weakened its association with city spaces, and more weakness is the new design for the architecture of the city in particular within the city centre.

The place is not abstract location but real things component, possesses by material, moral entity, pro forma, sensory properties and symbolism give specific environmental identification, which are the essence of the place. The strongest place emerge when connecting time to space (space-time as in Relativity theory) in documenting events.

The architecture one of documenting events make place is a product of many forces including social, natural, historical and a spatial property create human environment satisfactory (including event in Folding Architecture), and that's what we see in some European experiences in preserving historical city centers such as (Venice, Prague, Rome, ...Etc) using laws and legislation concerning conservation strategies like (Venice Charter, Washington Charter, Zimbabwe Charter, Nara document of authenticity...Etc) and other conservation methods that can be adopted in the heritage of Arabic-Islamic cities, which give continuity of Identity of places, to connect ancient civilizations places with current time.

2 INTRODUCTION

Architecture is a thing of art, a phenomenon of the emotions, lying outside questions of construction and beyond them. The purpose of construction is to make things hold together; of architecture to move us. Architectural emotion exists when the work rings within us in tune with a universe whose laws we obey, recognize and respect. When certain harmonies have been attained, the work captures us. Architecture is a matter of "harmonies," it is a "pure creation of the spirit." Le Corbusier. (Vogler, 2006, p. 8)

In the few past decades, many cities are losing their characters and getting more and more ambiguous. As planners began to pay more attention on the categories of beauty and function, they failed to catch the essence and the humanity of place. Also, many traditional sites and heritages are destroyed which make cities lose the continuity and identification. While people call those as "loss of place", the research wants to avoid the losing and rebuilding our living places, so should first understand from the concept of "existence". And according to this, the research could catch the essence of place which exists in the locality.

The research also describes the progress that has been made recently in correspondences between apparently different theories of physics. These correspondences are a strong indication that there is a complete unified

theory of physics, but they also suggest that it may not be possible to express this theory in a single fundamental formulation. (Hawking, 2001, P. 1). Einstein's General Theory of Relativity seems to offer the possibility that we could create and maintain wormholes, little tubes that connect different regions of space-time.

Human experience of physical space and places is a complex phenomenon that includes architectural and sensorial, as well as more social and interpersonal dimensions. The research investigate theoretical insights from computing research and environmental psychology on space and place to determine the different dimensions of the experience of physical space. The research indicates dimensions that encompass the different ways of apprehending our environment, as well as the emotional relationships develop toward it, through personal and interpersonal experiences-in-place. Theoretical science and technology should be examined in terms of its potentiality for supporting rich experiences of and in physical space. Assuming that the identified dimensions can serve as basis for the development tools to be used in that perspective.

Sociological studies sensitive to the issue of place. So, How do spaces come to be places, and how do places come to be the way they are, and how do places matter for social practices and historical change? The research discusses how to make a harmonious place with nature, keeping the spirit of place which we call "Genius Loci", and using phenomenological analysis to understand the meaning of place through its structure. Symbolization and concretion are also discussed as they are used to transform nature to architecture; orientation and identification are used to prove the existence (Yiran, 2009, p. 2). This research also connects place to man's image with social and cultural aspects, and seeks a way to keep continuity in history. Therefore a humanistic place should have agreements with essence of place, human demand, and historic continuity.

The research concludes by providing glimpses of what awaits us in the 21st century. So work represent the cultural and social contexts as well as natural environment. this should be a way for contemporary planners and architects to understand humanity and harmony of place.

3   MEMORY OF TIME

Every civilization has been fascinated by notions of Space (the Heavens) and Time (the Beginning, the Change and the End). The space had three dimensional continuum which envelops us. Also time as flowing serenely, all by itself, unaffected by forces in the physical universe. Together, they provide a stage on which the drama of interactions unfolds. The actors are everything else in the universe. (Ashtekar, 2005).

3.1 From antiquity to Einstein

Early Muslim philosopher Al-Kindi (Alkindus), and Muslim theologian Al-Ghazali (Algazel), used logical arguments against an infinite past, being the "argument from the impossibility of the existence of an actual infinite", (Al Jabri, 2002, p. 280-284)

On the other hand, there existed a school of thought that differed with Al-Ghazali and Al-Razi and other intellectuals of that period. The pioneer of that school of thought was the philosopher Ibn-Rushd (1126-1198 AD), known in the Western culture as Averros. Many historians argued that the writings of the philosopher Ibn-Rushd had a major effect on the development of the Western philosophy from the 13th century AD onwards and its struggle for the differentiation between philosophy and theology. However, the Ibn-Rushd school of thought (Averros) acts as an example of the containment process that was evident throughout the development of Arab/Islamic philosophy and ways of thinking. (Al-Hokail, 2004, P 8)

In the early 11th century, the Muslim physicist Ibn al-Haytham (Alhazen) discussed space perception and its epistemological implications in his Book of Optics (1021). His experimental proof of the intromission model of vision led to changes in the understanding of the visual perception of space, contrary to the previous emission theory of vision supported by Euclid and Ptolemy. In "tying the visual perception of space to prior bodily experience, al-Haytham unequivocally rejected the intuitiveness of spatial perception and, therefore, the autonomy of vision. Without tangible notions of distance and size for correlation, sight can tell us next to nothing about such things." (Al Jabri, 2002, p. 344-350)

In modern terms one can say that in Aristotle's paradigm, there was absolute time, absolute space and an absolute rest frame, provided by earth. This was the reigning world-view, Isaac Newton was exposed to, as a student at Cambridge in the years 1661-65. Twenty years later, Newton toppled this centuries old dogma.

Through his Principia, first published in 1686, he provided a new paradigm. Time was sill represented by a 1-dimensional continuum and was absolute, the same for all observers. All simultaneous events constituted the 3-dimensional spatial continuum. But there was no absolute rest frame. Galilean relativity was made mathematically precise and all inertial observers were put on the same physical footing. The Principia also shattered Aristotelian orthodoxy by abolishing the distinction between heaven and earth. (Ashtekar, 2005)

Both Aristotle and Newton believed in absolute time. That is, they believed that one could unambiguously measure the interval of time between two events, and that this time would be the same whoever measured it, provided they used a good clock. (Hawking, 2001, ch. 2, P. 2) Time was completely separate from and independent of space.

An absolute speed blatantly contradicted Galilean relativity, a cornerstone on which the Newtonian model of space-time rested. By then most physicists had developed deep trust in the Newtonian world and therefore concluded that Maxwell's equations can only hold in a specific reference frame, called the ether. But by doing so, they reverted back to the Aristotelian view that Nature specifies an absolute rest frame. A state of confusion remained for some 50 years. (Ashtekar, 2005).

3.2 Human build architecture in order to achieve civilization

The concept of space and time connect with civilization, this relationship emerge through outlook absolute terms flowing space / time in each asset. In the theory of relativity emerge association between space / time, one depends on the other (Einstein). But after the relativity, the relationship between space and time seem more complex for more than one direction, and isn't separated from the event.

3.3 Relativity Theory (Einstein)

At the beginning of the 20th century, Einstein revolutionized the notions of space and time, first through special relativity and then, a decade later, through general relativity. Conceptual ideas underlying general relativity are explained and its physical ramifications summarized in general terms, without recourse to advanced mathematics. This theory is perhaps the most sublime creation of the human mind. Nonetheless, it has become increasingly clear that it too has serious limitations which can be overcome only through another dramatic revision of our notions of space and time. (Ashtekar, 2005)

Einstein's theory of relativity, which showed the interconnection between time, space and matter, exposed the limitations of Newtonian- Cartesian physics, even though Einstein himself remained a recalcitrant Cartesian as his historic debate with Bohr in the 1920s demonstrated.

3.3.1   Spacial theory of Relativity 1905

Einstein's theory based on the idea that the laws of science should be the same for all observers, no matter how they are moving, in the absence of gravitational phenomena. (Hawking, 2001, ch. 10, P. 5). Time lost its absolute standing. Only the 4-dimensional space-time continuum had an absolute meaning. Space-time distances between events are well defined but time intervals or spatial distances between them depend on the state of motion of the observer, i.e., of the choice of a reference frame. The new paradigm came with dramatic predictions that were hard to swallow. (Ashtekar, 2005).

3.3.2   General theory of Relativity 1916

In this theory, space and time fuse to form a 4-dimensional continuum. The geometry of this continuum is curved and the amount of curvature in a region encodes the strength of the gravitational field there. Space-time is not an inert entity. It acts on matter and can be acted upon. (Ashtekar, 2005). Einstein's general theory of relativity, on its own, predicted that space-time began at the big bang singularity and would come to an end either at the big crunch singularity (if the whole universe re collapsed), or at a singularity inside a black hole (if a local region, such as a star, were to collapse). (Hawking, 2001, ch. 8, P. 7).

3.4 Spacetime

In physics, spacetime is any mathematical model that combines space and time into a single continuum. Spacetime is usually interpreted with space as existing in three dimensions and time playing the role of a fourth dimension that is of a different sort from the spatial dimensions. From a Euclidean space perspective,

the universe has three dimensions of space and one of time. By combining space and time into a single manifold, physicists have significantly simplified a large number of physical theories.

In non-relativistic classical mechanics, the use of Euclidean space instead of spacetime is appropriate, as time is treated as universal and constant, being independent of the state of motion of an observer. In relativistic contexts, time cannot be separated from the three dimensions of space, because the observed rate at which time passes for an object depends on the object's velocity relative to the observer and also on the strength of gravitational fields, which can slow the passage of time. We can only say that Euclidean geometry deals with things called "straight lines," to each of which is ascribed the property of being uniquely determined by two points situated on it. (Einstein, 1920, p. 2)

Since space-time is also omnipresent and the same for all physical systems, Einstein was led to regard gravity not as a force but a manifestation of space-time geometry. Space-time of general relativity is supple and can be visualized as a rubber sheet, bent by massive bodies. (Ashtekar, 2005). This latter statement need not of necessity hold a priori; it is not contained in the conceptions of "motion" and "reference body" and derivable from them; only experience can decide as to its correctness or incorrectness. (Einstein, 1920, p. 71)

In accordance with the special theory of relativity, certain co-ordinate systems are given preference for the description of the four-dimensional, space-time continuum. We called these "Galilean co-ordinate systems." For these systems, the four co-ordinates x, y, z, t, which determine an event or—in other words —a point of the four-dimensional continuum, are defined physically in a simple manner. (Eins

-                              -   Which had spatial dimension: Any of the three dimensions that are space like – that is, any except the time dimension. (Hawking, 2001, ch. 10, P. 5). The fundamental postulate of the theory of relativity, as it was called, was that the laws of science should be the same for all freely moving observers, no matter what their speed. This was true for Newton's laws of motion, but now the idea was extended to include Maxwell's theory and the speed of light. (Hawking, 2001, ch. 2, P. 2)

In other words, the theory of relativity put an end to the idea of absolute time! It appeared that each observer must have his own measure of time, as recorded by a clock carried with him, and that identical clocks carried by different observers would not necessarily agree. (Hawking, 2001, ch. 2, P. 3). We were able to make use of space-time co-ordinates which allowed of a simple and direct physical interpretation, and which, can be regarded as four-dimensional Cartesian co-ordinates. This was possible on the basis of the law of the constancy of the velocity of light. But according to the general theory of relativity cannot retain this law. (Einstein, 1920, p. 111).

3.5 Sigfried Giedion's "Space, Time and Architecture"

The perspective was invented in the Renaissance period, around the fifteenth century –firstly used in a drawing by Masaccio, then adapted to architecture by Brunelleschi, and written down by Alberti. Almost five centuries later a new space conception – space-time as Giedion calls- was invented and appeared in the works of cubists. Both conceptions simultaneously grew with the developments in physics and brought about 74 revolutionary changes in art and architecture to their period and the following periods. (Giedion, 1971, p. 42). The terraces in the Piazza Del Popolo designed by Valadier in Rome (Fig. 1) –showing the hovering effect with the change in the horizontal and vertical surfaces. (Giedion, 1971, p. 153)

In addition, Giedion construes Cubism and Futurism in a way that they dwelled their arguments on one of the constituent facts –a new space conception- and helped the fact to progress. The last three constituent facts seem to be far from a direct contact with artistic production; they rather are the consequences of the developments in industry and technology in the nineteenth century, in which the spirit of the age was revealed from the sphere of thinking, but not from the sphere of feeling. (Giedion, 1971, p. 13-14)

The American architect Frank Lloyd Wright exposed the plain wall and the human-nature relationship more easily than his colleagues. (Giedion, 1971, p. 396-400). Architecture strongly influenced by that era these concepts, either through analogy or cognitive theme of architectural subject, specially mechanics waveform, that clear in the work of Wright, which called for organic forms refer to the origin of nature through mechanics waveform, and can be seen in the Guggenheim museum project in New York 1943-1959 (Fig. 2), with spiral form like wave which gave another dimension to the architectural form. Waves and twisted forms

influenced by nature, variable interaction with any object exists and private changing waves in nonlinear layer are important and ubiquitous presence of space – time for each one of them in nature.

Constituent facts should and could only be scrutinized within the framework of dialectic materialism in consideration of the content and the approach towards. This suggestion and the involvement of Space, Time and Architecture with dialectic materialism will be discussed. (Giedion, 1971, p. 400)

In order to produce a new tradition, Giedion asserts, introducing new methods has a vital importance. For Giedion, who did not believe in the notion of style, sought for another explanation to elucidate the discrepancies among the taste of different periods, acknowledging the reader as "… the links and associations between periods –the constituent facts- are more important to us than self-enclosed entities such as styles." (Giedion, 1971, p. 21) He found the remedy in asserting the constituent and transitory facts, under the very pioneering of the spirit of the age –namely, Zeitgeist-, which he became devoted to while he was writing his dissertation under the supervision of Wölfflin. (Boring, 1955, p. 2).

3.6 Zeitgeist

The term Zeitgeist was –most probably- first used by Goethe in 1827, which is very much involved with the concept of the spirit of time, the spirit of the age, namely the Zeitgeist. Everything happens for a reason, and it happens because the spirit of the age permits it to be. The formation of the constituent facts, and later their reawakening are in fact the consequences of the spirit of the age. (Boring, 1955, p. 102)

The spirit of the age is responsible for the construction of the interrelationships among various fields, such as science –including physics, mathematics, technology, philosophy, art, architecture, town planning, and naturally, history. Most evidently, "a common spirit" can be recognized in Baroque period, as Giedion puts forth. The simplest example Giedion gives about one of the circumstances that the spirit of the age gives rise to be how the development in mathematics and physics in Baroque period – the discovery of integral calculus- found its counterpart in the space conception of Baroque art and architecture as the impression of infinity. (Boring, 1955, p. 109). On the other hand, whilst the mathematician Herman Minkowski was working on the proof of a fourth dimension, the artists in various parts of Europe as being either cubist or futurist were developing the space-time notion in their works. (Boring, 1955, p. 14). For Giedion, these facts are all because of the existence of a spirit that runs through the age, and that affects the outcomes of the age. Throughout the book, that spirit is also referred to "the universal laws of Nature", that within the twentieth century, both modern art and modern science have found the common and parallel results by following the intuitions of the artists and scientists. (Boring, 1955, p. 460-461)

The most important aspect of the spirit of the age can be accepted as the demonstrability of the close relationship among new materials, new methods and the human needs. Along with some other protagonists of the era, Le Corbusier was the perfect model, who achieved to build relationships such as the one between ferroconcrete construction and the human needs. (Giedion, 1971, p. 542) (Fig. 3)

That Giedion"s Space, Time and Architecture was "more ambitious in its scope" than the other early historians of the Modern Movement because of the fact that went back further as to Rome of Pope Sixtus V (Fig. 4), and including the technical developments as well as urban planning. (Giedion, 1982, p. 82). However, forget to mention that he posited the developments in modern physics and mathematics in a more important level than the social change, which showed his strong formalist attitude. Giedion mentions, the immense developments in science in the nineteenth century could catch the spirit of the age, whilst the architecture could not.

4   THE IDENTITY OF PLACE

Architecture is the style of human life, therefore it is a tool to be our identities and our differences, and framing our knowledge of the world. Architectural Identity is one of the phenomena of public identity of the communities. The privacy defined in architecture, as reality containing qualities core. Architecture is actually within the dimensions of time, space and the impact of humanitarian axis (community / civilization) and clarified as a reflection of the life of society as evolved and reached a positive phase.

4.1 Space & Place

In popular discourse, space and place are often regarded as synonymous with terms including region, area and landscape. However, these twin terms have provided the building blocks of an intellectual and disciplinary enterprise that stretches back many centuries. Yet, as Livingstone intimates, the theoretical specification of space and place has remained a matter of some dispute, being transformed as new ways of 'thinking' have developed. Likewise, until the 1970s, most human researchers considered space to be a neutral container, a blank canvas that is filled in by human activity.

This work alerted researchers to the sensual, aesthetic and emotional dimensions of space. The humanistic tradition that these thinkers developed conceptualized place as subjectively defined. As such, what constituted a place was seen to be largely individualistic. Although attachments and meanings were often shared. Simply put, a place meant different things to different people.

4.1.1 Space

Space is a central concept in architecture, used in the form of absolute, relative and relational (cognitive) space (Table 1):

- Absolute space is an understanding of space as a distinct, physical and imminently real or empirical entity. Traditional regional studies the empirical entities, dependencies or vertical connections between humanity and the environment within the 'container space' of a particular region.

- Relative space has the location of, and distance between, different phenomena (horizontal connections) as the focus of architecture inquiry. Distance as measured in terms of transport costs, travel time and the mileage within a network, as well perceived distance, is given explanatory power. (Holt, 1999, p. 216-227).

- The meaning of relational (cognitive) space is that space and place are intrinsic parts of our being in the world – defined and measured in terms of the nature and degree of people's values, feelings, beliefs, and perceptions about locations, districts, and regions. Relate to other people and the physical environment. Thus relational space is consciously or unconsciously embedded in our intentions and actions. (Knox, 2004, p. 505).

4.1.2 Place

Space is organized into places often thought of as bounded settings in which social relations and identity are constituted. Such places may be officially recognized perceptual entities or more informally organized sites of intersecting social relations, meanings and collective memory. The concept of place, the uniqueness of particular places and place-based identities are hotly contested concepts in the contemporary context of increasing globalization and the perceived threat of placelessness.

Place was seen by positivists as more subjectively defined, existential and particular, while space was thought to be more universal, more abstract phenomenon, subject to scientific law. The humanistic concept of place, largely drawn from phenomenology, was concerned with individuals' attachments to particular places and the symbolic quality of popular concepts of place which link events, attitudes, and places and create a fused whole. It was concerned with meaning and contrasted the experienced richness of the idea of place with the detached sterility of the concept of space. Idea is that place is an emotional bounded area, often the dwelling-place, to which an individual or a group has a strong emotional relationship. People can even derive their personal identity from it. So Place is a portion of urban space, sometimes defined as 'territories of meaning' (Holt, 1999, p. 224)

Outside this place starts the immeasurable space, of which the individual or group has some knowledge but does not feel at home at or have any affectionate feelings towards. The way in which people identify with a place is very different from individual to individual. Humanistic studies show that people alternately associated place with safety and security (feeling at home) but also to imprisonment and isolation. The place where one lives, with its social pressure, and forced solidarity, can be perceived as suffocating. Space compared to the latter can be perceived as free and dissolute. In such a situation the dangers and threats of an unknown space are not so important.

4.2 Transformation from space to place

Environmental character is created by the relationship between things. Norberg-Schulz emphasized phenomenology, which he called "return to things" in his book Genius Loci to explain place. What factors make up a place? For example, location, landscape, climate, seasons, day-night, livings, buildings, even human activities. Generally, the research can classify them as natural things and man-made things.

These can be further subdivided as "objects", "temporal field", "spatial field". While Norberg-Schulz liked to classify them as "thing", "order" and "time", there is an easy way which is to put "time" into "order", so that "thing" and "order" could be two classifications. "Thing" contains natural things such as landscape, life-form, man-made things like building, city, human behavior. These all have their special characters and have certain contact with each other. "Order", we can understand through explaining "X axis", "Y axis" and "Z axis". Place is a structured space with the given character, cardinal points is the main orientation and identification of one place, we can call it "X axis", then, the hosts of heaven-the sun, the moon and stars, and the change of sky, can call it "Y axis". Basically, cardinal points and hosts of heaven could be collectively called "cosmic order", in a few words, earth and sky. Finally, time, which gives place continuity and variability could be thought as the variable of cosmic order, so it can be seen as "Z axis" which makes space from a plane to be stereoscopic. (Yiran, 2009, p. 7)

The interaction between space and place here is a crucial one. Equally vital is that while we must distinguish between these different realms if we are to apprehend place construction and transformation, we must simultaneously capture how they are in fact forged together in a dialectical unity. When dimensions are understood as mere components of the grid system, rather than physical attributes of space, it is easier to understand the alternate dimensional views as being simply the result of coordinate transformations.

Places are worked by people: we make places and probably invest as much effort in making the supposedly pristine places of Nature as in cities or buildings. Social processes (difference, power, inequality, collective action) happen through the material forms that we design, build, use, and protest. (Gieryn, 2000, p. 465). Norberg-Schulz (1980) pointed out: "'Thing' and 'character' are dimensions of the earth, whereas 'order' and 'light' are determined by the sky. Time, finally, is the dimension of constancy and change, and makes space and character parts of a living reality…" Therefore place exists between earth and sky, and living with time. (Yiran, 2009, p. 8).

4.2.1   Design space and create place

There are many different between space and place such as:

- Place is not space—which is more properly conceived as abstract geometries (distance, direction, size, shape, volume) detached from material form and cultural interpretation as thoughts of Hillier & Hanson 1984. Space is what place becomes when the unique gathering of things, meanings, and values are sucked out.

- Place is space filled up by people, practices, objects, and representations. In particular, place should not be confused with the use of architecture metaphors (boundaries, territories) that define conceptual or analytical spaces. (Table 1)

- Place is not just a setting, backdrop, stage, or context for something else that becomes the focus of sociological attention, nor is it a proxy for demographic, structural, economic, or behavior variables.

- Place is not merely a setting or backdrop, but an agentic player in the game—a force with detectable and independent effects on social life. place becomes a stand-in for clusters of variables located in spaces chosen for their analytic utility but generally denuded of architecture, landscape, and actors' own narrations. (Gieryn, 2000, p.466-467)

So we cannot understand social life without understanding the arrangements of particular social actor's in particular social times and places… Social facts are located. (Logan, 2011). Place stands in a recursive relation to other social and cultural entities: places are made through human practices and institutions even as they help to make those practices and institutions. Place mediates social life; it is something more than just another independent variable. (Gieryn, 2000, p.468)

A spot in the universe, with a gathering of physical stuff there, becomes a place only when it ensconces history or utopia, danger or security, identity or memory. In spite of its relatively enduring and imposing

materiality, the meaning or value of the same place is labile—flexible in the hands of different people or cultures, malleable over time, and inevitably contested. (Gieryn, 2000, p. 465). Place should not be confused with the use of cognitive maps (boundaries, territories) such as Jean Piaget Schemas that define conceptual and analytical spaces.

4.2.2 Active Place

A concrete term for environment is place. It is common usage to say that acts and occurrences take place. When things have characters and build the environment with phenomena, we call it "place". The meaning of phenomenon is revealed by "taking place", any tiny movement or happening make place to be lively and active, and under these circumstances, place does make sense. The research can also see it from the phrase "take place", it means something or some acts happening; the occurrence would "take" in certain "place", it cannot occurred without "place", the same, "place" is based on these occurrences. (Yiran, 2009, p. 6)

Therefore, place is a totality made up of certain things with their active characters and special atmospheres. No two such places are the same. Every place has its own attribute, or we can call it "environmental character". The character of place is presented by characters of the parts, which explained the "atmosphere" of things, or a "total phenomenon". (Yiran, 2009, p. 7).

4.3 Identity

The forces of new technologies, globalization and 'time-space-compression' have sought to represent localized identities as historical, regressive characteristics, and have worked to undermine the old allegiances of place and community. But the burgeoning of identity politics, and now nationalism, reveal a clear resistance to such universal strategies. If places are no longer the clear supports of our identity, they nonetheless play a potentially important part in the symbolic and physical dimension of our identifications. It is not spaces which ground identifications, but places!

National Identity refers to a group of people who share particular historical-cultural characteristics or imagine themselves to do so. Nationality refers to the condition of belonging to a nation. At its most basic, nationality can be seen as a mechanism of social classification. There are two components of national identity, according to Verdery:

- Collective identity which refers to national characteristics and so-called national traits and may include such things as language and style of dress. This is an identity which is shared by the members of the national community.

- National identity is the individual member's sense of self as a national. An individual's feeling and self-identification as 'Iraqi', 'Italy', 'Dutch', 'German' or 'French' is an important component in their self-perception. It refers to a feeling of belonging to a nation.

Therefore national identity as composed of five key elements:

- Psychological: consciousness of forming a community.

- Cultural: sharing a common culture.

- Territorial: attachment to a clearly demarcated territory.

- Historical: possessing a common past.

- Political: claiming the right to rule itself.

Obviously these five characteristics are closely interlinked. Within this milieu elements such as language, religion and social mores may take on particular significance. Many nations are seen to possess their own language, while in some the majority of members adhere to a particular religion. In these cases language or religion may be the key defining the characteristic of the nation. National identity is not some much a rational thing; as it is an emotional thing, it is hard measuring this objectively. A nation is more a mental construct than a concrete reality. Identity can be defined as the sense that people make of themselves through their subjective feelings based on their everyday experiences and wider social relations. (Knox, 2004, p. 508)

So, identity seeks in the similarities that gather a group of communities with similar characteristics (relations, elements), (Genotype, Phenotype). While Privacy seeking in differences that characterize a society has an identity, from other communities that have or may not have the identity itself, at the same time to achieve

privacy must be achieved similarity between (relations and elements) in the properties that varies the society from other communities that have or may not have the identity itself. (Al Jabri, 2002, p. 346)

To achieve the identity and privacy in the architecture of human societies it represents the idea of the bind everything followed to achieve differentiation, particularly with respect to its past, present and future with its ties to the temporal and spatial. Temporal relations are most relevant to the privacy of the place, and a sense of identity, as can be achieved acting time in architecture by translating temporal structures to spatial properties. (Schulz, 1980, p.54) Space is created for the temporal sequence of sensations, and the time is enriched through experience space. (Lynch, 1972, p.76-77).

5 THE GENIUS LOCI OF SPACE

The term genius loci were used in the ancient world to underline the idea that every place has its own character. (Verschuure, 2009). In Roman mythology a Genius loci was the protective spirit of a place. In contemporary usage, "genius loci" usually refers to a location's distinctive atmosphere, or a "spirit of place". The concept of "genius loci" has been discussed in modern architecture, but still is much underestimated. When it comes to extreme environment, the situation is even worse. The problem of sensory deprivation in extreme environments should even result in putting more emphasis on the concept of genius loci. An important part of the 'spirits' of a place is the environmental energies. In space habitats the 'Life Support System' becomes an intrinsic part of the 'atmosphere' of the habitat. On Earth, the use of these energies, not only to make buildings self-sufficient, should enhance the quality of the architecture and our built environment. Humans differently than the other entities of life on our planet are capable to force large scale devastative change on the environment. The need to save our environment for future generations is one of the greatest challenges that humankind must address today. (Vogler, 2006, p. 2)

About a design theory on the Genius of the Place 'To build, to plant, whatever you intend, To rear the Column, or the Arch to bend, In all, let Nature never be forgot. Consult the genius of the place in all.' (Verschuure, 2009). Nowadays, many architects base their work to this line. Although new designs in urban design or urban planning are necessary, the spirit of the place should be respected.

5.1 Spirit of the Place

In 1980 the term Genius loci was used again in the book of the Norwegian architect Christian Norberg-Schulz (Genius Loci- Toward a Phenomenology in Architecture), where he stated that 'every place is a space with its own character'. He stressed that this line is still valid for many new designs. By respecting the 'local spirit' a counter movement could be set in to the unheimich feeling Modernistic architecture can give. (Verschuure, 2009). But what elements are we talking about in the genius loci?

The research study the Genius Loci by Norberg-Schulz, Where He made lots of great arguments in this book, about "thing", "existential space", "natural and man-made place" and also his explaining of "Genius Loci" which applied to Rome, Prague, and Khartoum (Yiran, 2009, p. 3) (Fig. 4).

5.2 Create Place

Human culture is very strongly linked to places. Indeed, the inseparableness of the human being and the world, at least from the human being's point of view, has been one of the main discussions of philosophy. In Being and Time, Heidegger (1962) argued that, in conventional philosophy and psychology, the relationship between person and world has been reduced to either an idealist or realist perspective. In an idealist view, the world is a function of a person who acts on the world through consciousness and, therefore, actively knows and shapes his or her world. In contrast, a realist view sees the person as a function of the world in that the world acts on the person and he or she reacts. Heidegger claimed that both perspectives are out of touch with the nature of human life because they assume a separation and directional relationship between person and world that does not exist in the world of actual lived experience. (Vogler, 2006, p. 8)

Architecture has an eminent role as a key interface and definition of our being-in-the-world. Where natural environment is more and more lost, architecture takes a key role in creating places and in the best case a 'genius loci'. With the dawn of rationalism, this spiritual meaning of a place has been more and more negated. The modern movement in architecture tried to analyses the site based on scientific parameters and their optimization like sun angles and circulation distances. The fast growth of cities in the last century,

which is still continuing today, and the application of the ‚modern formula' quickly resulted in sterile and faceless neighborhoods.

6 EVENT COVERING SPACE-TIME

The term spacetime has taken on a generalized meaning beyond treating spacetime events with the normal 3+1 dimensions. It is really the combination of space and time. Other proposed spacetime theories include additional dimensions—normally spatial but there exist some speculative theories that include additional temporal dimensions and even some that include dimensions that are neither temporal nor spatial (e.g. superspace).

6.1 Event in scientific theories

In cosmology, the concept of spacetime combines space and time to a single abstract universe. Mathematically it is a manifold consisting of "events" which are described by some type of coordinate system. Typically three spatial dimensions (length, width, height), and one temporal dimension (time) are required. Dimensions are independent components of a coordinate grid needed to locate a point in a certain defined "space". For example, on the globe the latitude and longitude are two independent coordinates which together uniquely determine a location. In spacetime, a coordinate grid that spans the 3+1 dimensions locates events (rather than just points in space), time is added as another dimension to the coordinate grid. This way the coordinates specify where and when events occur.

The theory of relativity does, however, force us to change fundamentally our ideas of space and time. We must accept that time is not completely separate from and independent of space, but is combined with it to form an object called space-time. (Hawking, 2001, ch. 2, P. 4). Similarly, the light spreading out from an event forms a (three-dimensional) cone in (the four-dimensional) space-time. This cone is called the future light cone of the event. In the same way we can draw another cone, called the past light cone, which is the set of events from which a pulse of light is able to reach the given event (Hawking, 2001, ch. 2, P. 7) (Fig. 5).

The special theory of relativity was very successful in explaining that the speed of light appears the same to all observers. (Hawking, 2001, ch. 2, P. 10). The situation, however, is quite different in the general theory of relativity. Space and time are now dynamic quantities: when a body moves, or a force acts, it affects the curvature of space and time – and in turn the structure of space-time affects the way in which bodies move and forces act. Space and time not only affect but also are affected by everything that happens in the universe. Just as one cannot talk about events in the universe without the notions of space and time, so in general relativity it became meaningless to talk about space and time outside the limits of the universe. In the following decades this new understanding of space and time was to revolutionize our view of the universe. The old idea of an essentially unchanging universe that could have existed, and could continue to exist, forever was replaced by the notion of a dynamic, expanding universe that seemed to have begun a finite time ago, and that might end at a finite time in the future. (Hawking, 2001, ch. 2, P. 11).

6.2 Event in Folding Architecture

Folding is a transformation technique using in Digital signal processing architecture implementation for minimizing the number of functional blocks in synthesizing Digital signal processing architecture. Folding was first developed by Keshab K Parhi and his students in 1992. Its concept is contrary to unfolding. Folding transforms and operation from a unit-time processing to N unit-times processing where N is called folding factor. Thus, in N unit-times, a functional block in transformed system could be reused to perform N operations in original system. While the folding transformation reduces the number of functional units in the architecture, it needs more memory element to store the temporary data.

Folding is the art of seeing something invisible. Something that does not exist now. So, the fold represent space, mass at one time. The idea of folding is a time- event, when place left it is Spatial Situation. The place is temporal and spatial boundaries, and became non place and non time (timeless), and fold trying to restore time and space. So, The fabric of space-time is ruptured. Continuum physics rooted in this fabric stops. But the quantum threads are still meaningful. (Ashtekar, 2005).

6.3 The User as part of Places

The position of space in-between implies a middle location between two events and opposed spaces, the first space of origin or departure to the second space of arrival.(Luz, 2004, p. 155). The aim is to shift from the previous spatial narratives of preset planning into a more social-based approach, which identifies the user as the creative element in the construction of the transient situation. Contrarily to fixed spatial syntax analyses, recent studies sustain that the user is the most productive element and thus the co-author or co-producer of our production of spaces and places. Based on the user's capability to adapt to different situations, spatial behavior should be considered as an invariant variable, open to chance rather fixed in predictions. (Luz, 2004, p. 158)

A design possibility, By embracing the recent reclaims of urban space and street movements, the design of place-making should adopt new 'techniques' and methodologies for urban exploration based on everyday occupying practices. This entire urban buzz means that city dwellers are reclaiming their 'place in space'. they are moving away from the fixed preconceived idea of the Greek agora and the public life confined to the city central squares of political, economical and social powers. (Luz, 2004, p. 159) the opportunity provided by the spaces of transition, the leftover places and other uncertainty spaces suggests the development of new 'clever' designs, where experiencing the urban space could be more than seeing or passing by, but instead occupying, co-producing, touching, tasting and listening to different textures and sounds. (Luz, 2004, p. 159).

6.4 The Transformation

Transition is a change of state; a change from one thing to another, 'a passing or passage from one condition, action, or (rarely) place, to another; change;' 'the passage from an earlier to a later stage of development or formation;' 'a style of intermediate or mixed character'. While Transformation is a change of state, a more whole and complete change than in transition. 'The action of changing in form, shape, or appearance; metamorphosis;' 'a complete change in character, condition, etc.;' In physics 'Change of form of a substance from solid to liquid, from liquid or solid to gaseous, or the reverse' (Repenning, 2003, p. 12)

In this system, any one of the events along it, the program is dominant over the character of any one single space. The transformational sequence is based on rules and discrete architectural elements. Passage through this sequence becomes its own theoretical object. The process must become the result, with the sum of transformations being at least as powerful as the ultimate transformation. Transformational devices, or rules of transformation, include compression, rotation, insertion, and transference. They may show "particular sets of variations, multiplications, fusions, repetitions, substitutions, metamorphoses, anamorphoses, dissolutions."

These intermediate stages apply to each phase of separation, transition, and reincorporation. That is, a transformation is a more intricate journey than a here-and there set of steps. A transformation is a progression and the importance is the actual occurrence of the evolution. (Repenning, 2003, p. 20).

6.4.1 Transformation from space to event

The space between spaces and the time between times exhibits a distinct energy. Characterizing this energy of transition is essential to creating powerful and compelling spaces whose integral focus is transition. These spaces include Churches, Theaters, Museums, Transportation Facilities, Parks, Health Care Facilities, Educational Facilities, (Repenning, 2003, p. 9)

An event is something that happens at a particular point in space and at a particular time. So, one can specify it by four numbers or coordinates. (Hawking, 2001, ch. 2, P. 5). So, Ritual is A sequence of events, or states, specifically arranged to bring about a realized transformation; as standard cultural or religious observance (Repenning, 2003, p. 12). Also the historical experiences produce the autonomous culture of any human group. These historical experiences are called traditions and they constitute the heritage of any cultural grouping. (Al-Hokail, 2004. P 10).

In "Sequences," architect and theorist Bernard Tschumi categorizes sequences themselves into three groups:

- The transformational sequence is a device or procedure used for laying out spaces.
- The spatial sequence is the method of grouping the spaces and is founded on typological precedents and their morphological variations.

- The programmatic sequence is the usage and the occurrence of events planned for the spaces.

Tschumi views ritual as a framework held in place by its spatial and event sequences as in the La Villette Park in Paris (Fig. 6). For Tschumi, ritual calls for a highly structured program that orders movements, events, and spaces into a progression. Design connected to ritual sequence disregards the significance of the individual steps in the journey. (Repenning, 2003, p. 46).

"The linearity of sequences orders events, movements, and spaces into a single progression that either combines or parallels divergent concerns." Not all architecture is linear or made of clearly-defined parts. Some fragmentary experiences without beginnings or ends, produce a jumble, where meaning is derived from the order of experience, rather than from the composition as a whole. Order of experience refers to time, chronology, and repetition. (Repenning, 2003, p. 48)

Tschumi states explicitly, "A ritual implies a near-frozen relationship between space and event. It institutes a new order against the disorder it aims to avoid. When it becomes necessary to mediate the tension between events and spaces and fix it by custom, then no single fragment must escape attention. Nothing strange or unexpected must happen. Control must be absolute." (Repenning, 2003, p. 49).

6.4.2 Transformation from place to context

In urban studies, the liminal space is a major characteristic of the city. The term of 'cyberspace' was coined by cyberpunk writer William Gibson and used for the first time in his story "Burning Chrome" (1982). The principle of cyberspace is similar to Michel Foucault's heterotopias. The terms, concepts, notions and theories that reflect on this composite and indistinct spatiality of the contemporary world proliferate. (Bădulescu, 2011)

New perceptions of space are reflected in such conceptual perspectives as Foucault's 'heterotopias,' Which is refers to spaces of otherness, and are neither here nor there, simultaneously physical and mental. The French philosopher distinguishes between utopias, which are sites with no real place, and heterotopias, which are places absolutely different from all the sites that they reflect and speak about. However, between utopias and heterotopias there is what Foucault calls "a sort of mixed, joint experience," which is the mirror. (Bădulescu, 2011)

The globalization effected by the internet is a new major source of dynamism. In the first place, it reorders and compresses time and space. Secondly, communications and information technology facilitate action at a distance and are deeply bound up with the intensification of globalization. Instantaneous global electronic communication has profoundly altered the relationships of reciprocity and interdependency: we now live in a 'global society' in which we can no longer avoid other individuals and alternative ways of life. New communication networks increase the possibility of global scrutiny and global visibility, and also the possibility of mutual interrogation. We no longer merely exist 'side by side' with other cultures and other people but interact with them in many different and ever-changing ways. However, contemporary globalization raises feelings of anxiety and frustration. As global communication networks reorder time and space, they also facilitate shifts in the global flows of symbolic goods and in the concentrations of symbolic power. Given the complexity of the structured character and patterns of transmission, it is unlikely that our understanding of these features will ever be more than partial. (Bădulescu, 2011)

Ritual as a model displays the period of liminality as a critical phase for transformation and renewal. Additionally, activities and policies within the period of liminality are distinct from regular experiences and time constraints of customary society. (Repenning, 2003, p. 18) and looks like zeitgeist.

The reuse of buildings, urban structures or landscape architectural plans will be important in new design strategies in the 21st century. To understand architectural design, landscape architectural or urban designs, not only the plan or design itself should be examined, but also the surrounding or the context should be taken into account. And how the design is anchored to its context- to the genius loci?

Nowadays, rapid urbanization is swallowing the surrounding of these buildings. Understanding the context or the spirit of the place and the way the design was anchored to the location of these buildings will help to maintain or give a direction to reuse it, without harming the original design and giving room to new developments. (Verschuure, 2009)

In this time of growing globalization, greater movement of people, urban planners and architects seem to make more and more the same sort of plans, not taking in the specifics of the community, city or landscape they were made for. This can be seen in the objects of building itself, but also in the way a design is placed in its surroundings. The specifics of the surrounding, the context of architectural, urban or landscape architectural designs, is not always taken into account. This leads to uniformity of new plans and loss of identity, but also to designs not being anchored to the context they were made for. Especially for existing buildings and monument, this leads to unwanted situations. A building or structure is not a stand-alone element, but it is anchored to other buildings, structures or to the underlying landscape, which forms the context of the design. To add new developments to existing designs, the specific characteristics and the context should be examined, according to (Venice Charter, Washington Charter, Zimbabwe Charter, Nara document of authenticity...Etc). These specific characteristics determine the identity of the area & era – such as the genius loci of Rome (Fig. 4).

Absolute Space: *Mathematical Space*	Relative Space: *Socioeconomic Space*	Relative Space: *Experiential/Cultural Space*	Cognitive Space: *Behavioral Space*
Points	Sites	Places	Landmarks
Lines	Situations	Ways	Paths
Areas	Routes	Territories	Districts
Planes	Regions	Domains	Environments
Configurations	Distributions	Worlds	Spatial Layouts

Table 1: Different Kinds of Analyzed Spaces.

7 CONCLUSION

- Architecture influenced by new open philosophy of science and new sciences, beside positive achievement from these effects, but it spawned some of the negatives in the emergence of new intellectual references instead of human reference, which led to the violation of human rights and their associated relationships with the surrounding urban environment.

- The research indicates that architecture had many dimensions beside the normal 3 (space) +1(time) there are many additional dimensions like (Emotional, Spirit, Genius loci, Zeitgeist, Events, Intuition and Prediction).

- Sense of place not belonging to a certain architectural trends, or a specific environment, but emerges from the background of simple living for a long time as a liaison to the social interactions around the fixed parameters of significant importance to the occupants.

- When we combine quantum mechanics with general relativity, there seems to be a new possibility that did not arise before: that space and time together might form a finite, four-dimensional space without singularities or boundaries, like the surface of the folding architecture but with more dimensions.

- The modern movement in architecture tried to analyses the site based on scientific parameters. The fast growth of cities in the last century, which is still continuing today, and the application of the 'modern formula' quickly resulted in sterile and faceless neighborhoods.

- In place the research finds a rational way to integrate nature, human and continuity where man can lives harmoniously, humanly and poetically. So, to solve the problems of modern cities including Arab- Islamic cities, the environmental issues may at least bring people closer to live more in harmony with their natural environment.

- There are divisions of the elements of place with "space", "time" and "order", the structure of place could be seen as enclosure, expansion, foci, axis, boundary and domain while Kevin Lynch pointed them to five elements: paths, edges, districts, nodes and landmarks, and added later identity, structure, and meaning. These elements give the identity of the city.

- Norberg-Schulz make little attention on human's aspects and influence to nature made his theory trend to environmental determinism, while Kevin Lynch used man's subjective mental image of the city (mental map), and Jean Piaget use Schemas as (cognitive maps).

- To design something new is probably an approach to generate new meaningful places. Places are complex systems and we are still very weak in understanding and dealing with complex systems and their phenomena.

- Any object, event, situation or experience, there are a phenomenology of (light, color, architecture, place, home, travel, seeing, learning, change, relationship, economy, sociability) and so forth. All of these things are phenomena because human beings can experience, encounter, or live through them in some way.

- The design of place-making should adopt new 'techniques' and methodologies for urban exploration based on everyday occupying practices.

- Not all architecture is linear system or made of clearly-defined parts. Some are non linearity systems according fragmentary experiences without beginnings or ends; produce a jumble, where meaning is derived from the order of experience, rather than from the composition as a whole. Order of experience refers to time, chronology, and repetition.

- For plazas of the city, how can the genius loci – the spirit of place – been found and created today? The architect has to take into account the multitude of these phenomena to be able to create architecture with meaning. Architecture can neither be only an aesthetical exercise nor a technological construction to be able to create genius loci'.

- Nowadays in many cities especially Arab – Islamic cities, rapid urbanization is swallowing the surrounding of the historical and heritage buildings. Understanding the context or the spirit of the place and the way of design was anchored to the location of these buildings will help to maintain or give a direction to reuse it, without harming the original design.

- To add new developments to existing designs, the specific characteristics and the context should be examined, according to (Venice Charter, Washington Charter, Zimbabwe Charter, Nara document of authenticity...Etc). These specific characteristics determine the identity of the area & era- such as the genius loci of Rome.

- The research vision for future, that building should be one system within the natural environment and context. The research believe that designs with limited resources in extreme environments leads to a much higher respect of nature and the human being and thus is generating a strong drive to improve life on Earth. About a design theory on the Genius of the Place, let Nature never be forgot, and the spirit of the place should be respected.

8 REFERENCES

Al Jabri, Mohammed Abed; Formation of the Arab Mind, Critique of Arab Reason series, Center for Arab Unity Studies, the eighth edition of Beirut, 2002.
Al-Hokail, Dr. Abdulhakeem A.: Socio-Culture Contradiction in the Arab/ Islamic Built Environment: The CORP-2004 Conference, Vienna University of Technology, Vienna, Austria, 2004.
Ashtekar, Abhay; Space and Time: From Antiquity to Einstein and Beyond; Institute for Gravitational Physics and Geometry, Physics Department, Penn State, University Park, PA, U.S.A. 2005.
Bacon, Edmund: Design of Cities: Thomas and Hudson, London, 1978.
Bădulescu, Dana; Heterotopia, Liminality, Cyberspace as Marks of Contemporary Spatiality; University of Iaşi, Romania, 2011.
Boring, Edwin G.; Dual Role of the Zeitgeist in Scientific Creativity; The Scientific Monthly 80, no.2, 1955.
Einstein, Albert ; Relativity – The Special and General Theory; Professor of physics in the University of Berlin, Translated by Robert W. Lawson, University of Sheffield, Henry Holt and company, New York, 1920.
Giedion, Sigfried; Space Time & Architecture – The Growth of A New Tradition; Cambridge, Massachusetts, Harvard university press, U.S.A, 1971.
Gieryn, Thomas; A Space for Place in Sociology; Department of Sociology, Indiana University, Bloomington, Indiana, Annu. Rev. Sociol. 26:463–96 , 2000.
Hawking, Stephen; A Brief History of Time; file:// /blahh/Stephen Hawking – A brief history of time/A Brief History in Time.html, 2001.
Holt-Jensen, A; Geography, History & Concepts; London, Sage Publications Limited, 1999.
Knox, P. & Marston S.; Human Geography; Upper Saddle River NJ, Pearson Education, Inc, 2004.
Logan, John; Making a Place for Space: Spatial Thinking in Social Science; Department of Sociology, Brown University, Specialist Meeting—Future Directions in Spatial Demography Logan, 2011.

Luz, Ana; Places In-Between: The Transit(ional) Locations of Nomadic Narratives; International conference, Culture Nature Semiotics, Locations IV–Tartu, Estonia, 2004.

Lynch, Kevin; What Time is This Place?; M.I.T. Press, Cambridge, Massachusetts, 1972 .

Vogler, Andreas; Genius Loci in the Space-Age; 1st Infra-Free Life Symposium, Istanbul, December, 2006.

Repenning, Sara Spring; An Architecture of Liminality; University of Cincinnati, Masters Degree in Architecture, College of Design, Architecture, Art, and Planning, 2003.

Schulz- Norbreg, Christian; Genius Loci- Toward a Phenomenology in Architecture; Rizzole International publications Inc, USA, 1980.

Verschuure, Ir. G.A; Long Live the Genius Loci; The 4th International Conference of the International Forum on Urbanism (IFoU)– Urbanism beyond Neo-Liberalism, Amsterdam, 2009.

Yiran, Zhao; Pieces of Time and Perception of Place — From the view of Genius Loci and Contextualism; Blekinge Institute of Technology, The European Spatial Planning Programme, Master Thesis, Karlskrona, Sweden, 2009.

Piazza De Poplo in historical city center of Rome design with new type of relationship between space and time

Fig. 1 Piazza Del Popolo designed by Valadier in Rome (Bacon, 1978, pp.154-155) (Author, 2010)

Wright connect physics theories such as mechanics waveform with architecture
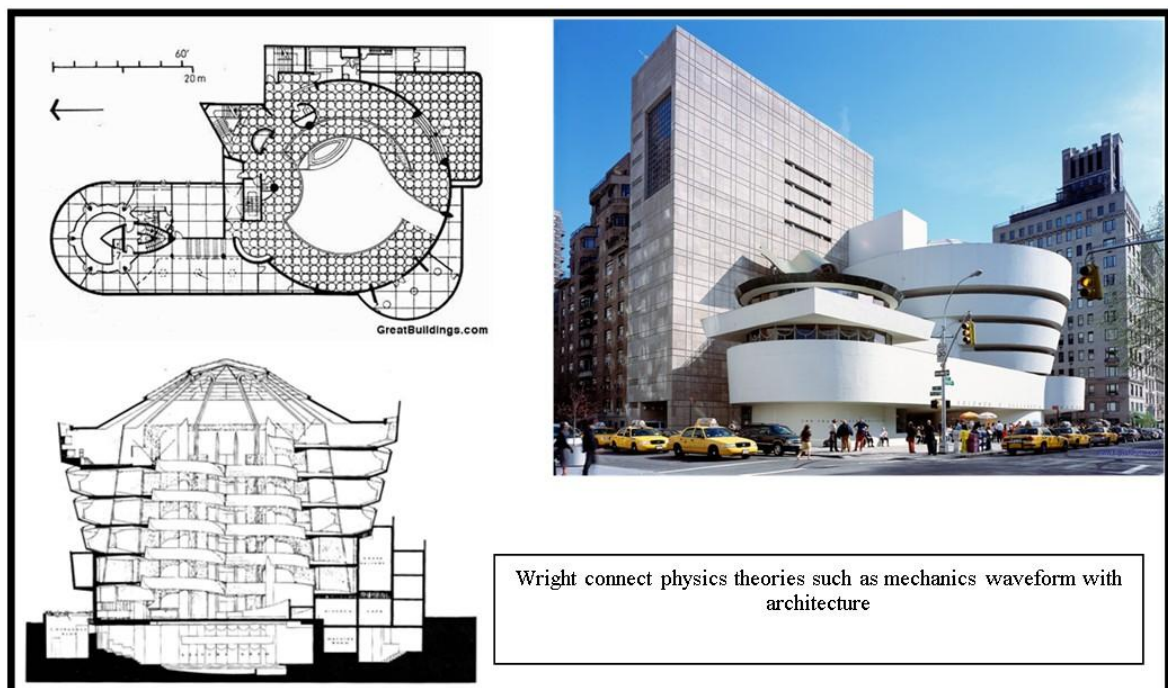
Fig. 2 Frank Lloyd Wright Guggenheim museum project in New York (Internet, 2013)
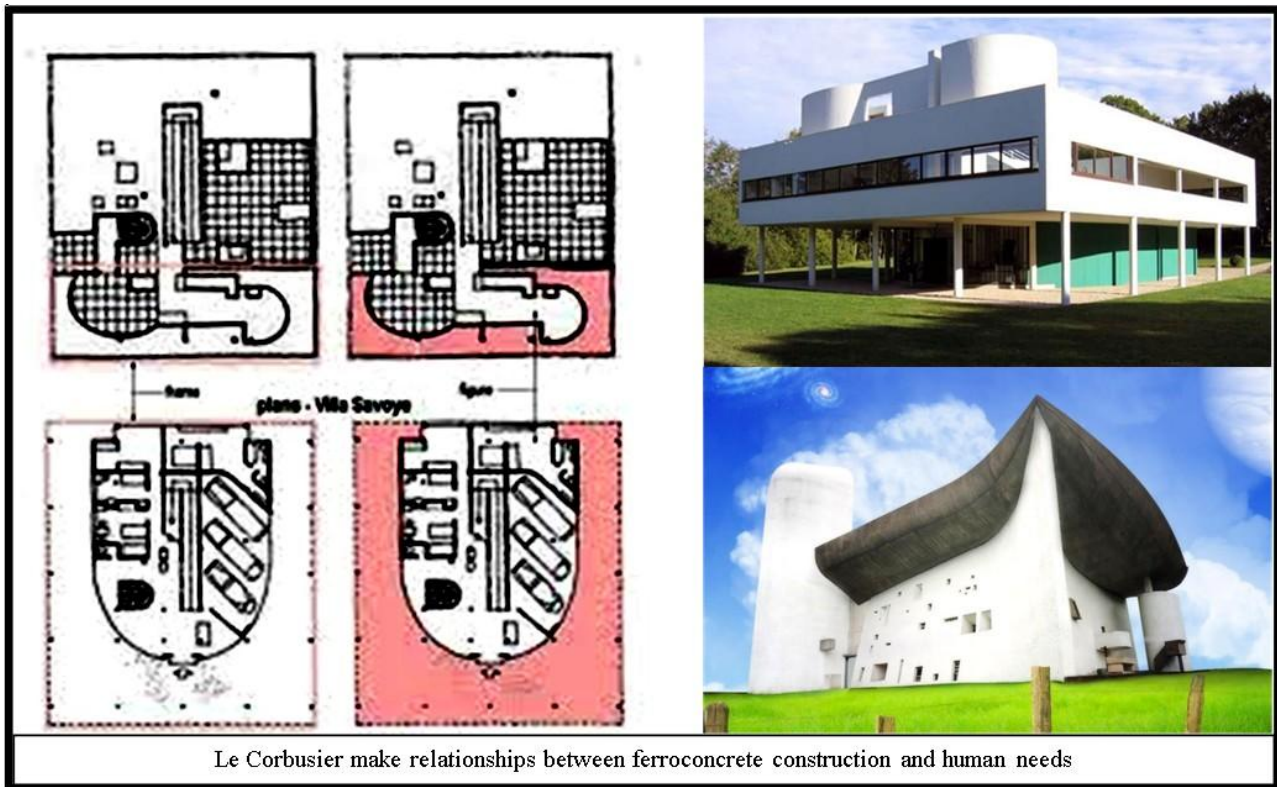
Le Corbusier make relationships between ferroconcrete construction and human needs

Fig. 3 Villa Savoy and Ronchamp church design by Le Corbusier (Internet, 2013)

Sixtus V connected six famous churches by semi radial type with clustered as zeitgeist of this era

Genius Loci of Rome emerge between organically fabric and enclosure places of piazzas
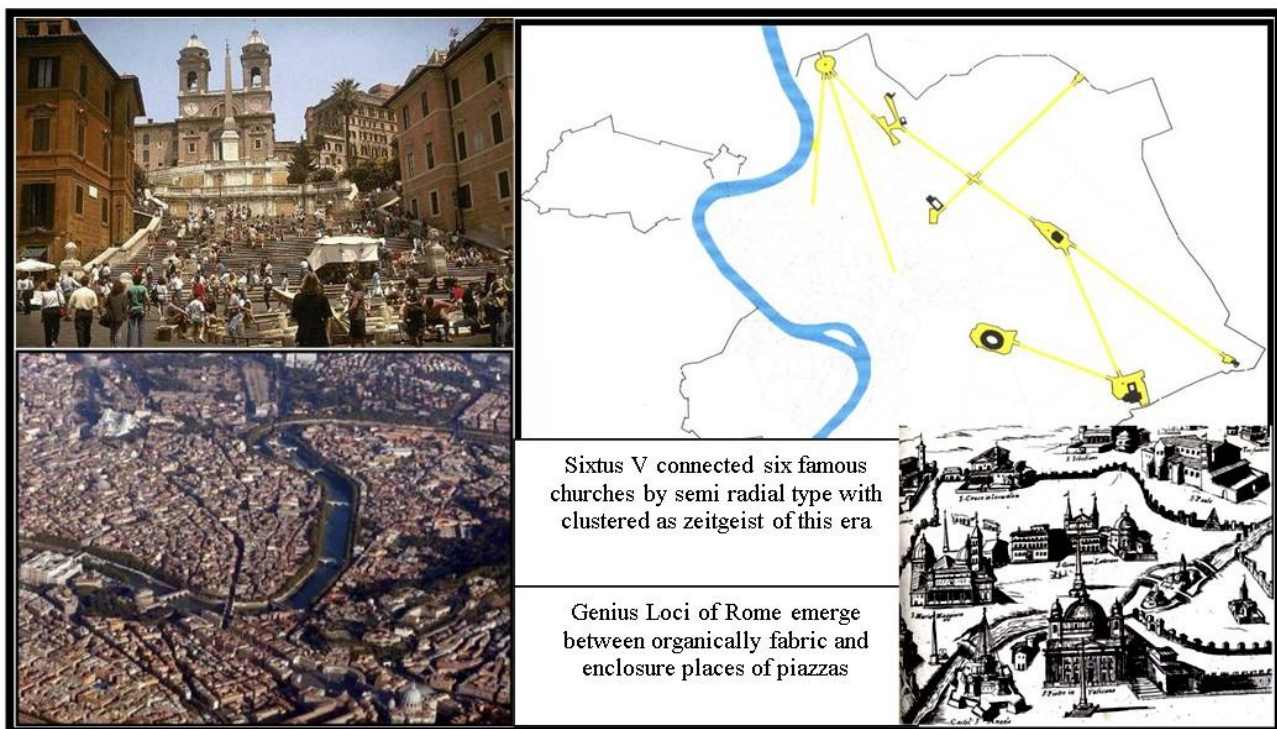
Fig. 4: Transformation of Rome city center (Bacon, 1978, p.142) (Author, 2010)

Space and Time

Time

Future light cone

Event (present)

Past light cone

Space

Space

Future

Present

Elsewhere

Elsewhere

Past

Space, place and event emerge between past and future
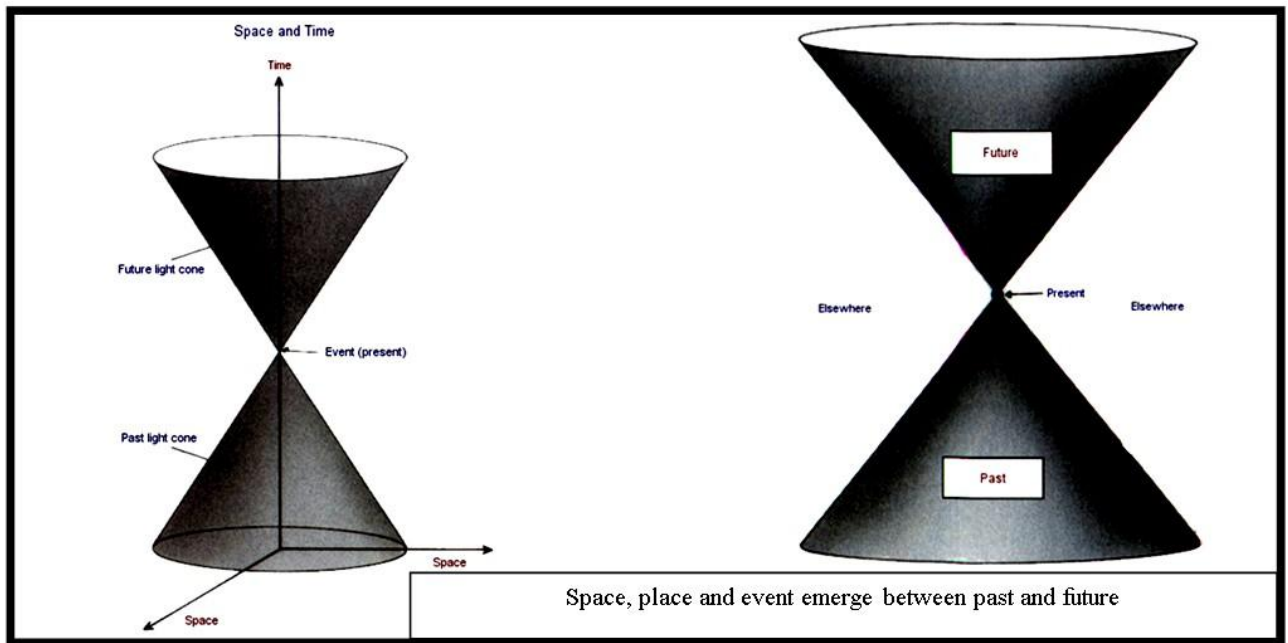
Fig. 5 Space-Time through cone with four-dimension (Hawking, 2001, ch. 2, P. 7)

Tschumi design park as spatial and event sequences with multi scenarios through follies, change according observer visual in movement
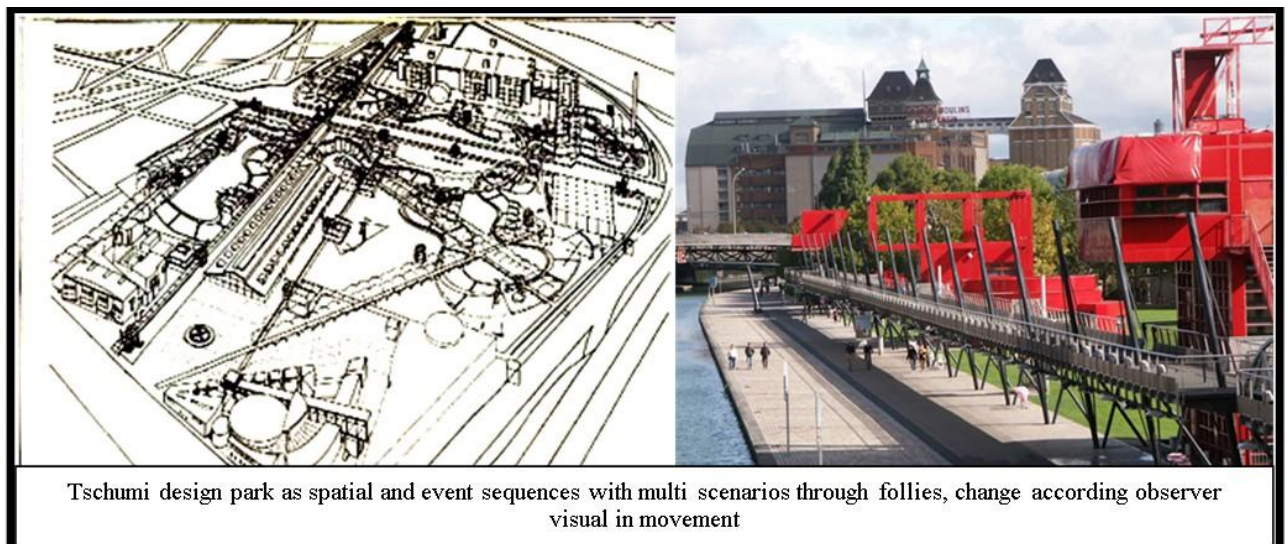
Fig. 6 The La Villette park – Paris Bernard Tschumi (Author, 2010)

🏆 *reviewed paper*

The Multidimensionality of Contemporary Urban Spaces – Implications for Design

Cecilia Scoppetta

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1 ABSTRACT

The paper is aimed at highlighting the spatial outcomes of structural changes occurred in world societies/economies, with the shift from the production of "tangible" to "intangible" goods, and the spread of the technical-economic information paradigm that is strictly connected to the globalisation process.

Such transformations seem to require an interpretative shift in the ways in which urban spaces are usually conceptualised and perceived. Moving from the more fruitful concept of multidimensionality of urban spaces, the paper suggests that (material) sites can be thought as the spatialisation of digital (immaterial) dynamics. Conceptualising urban public spaces along these lines creates both theoretical and operational openings that mean rethinking traditional approaches in designing public urban spaces.

2 TOWARDS NEW DESCRIPTIONS/INTERPRETATIONS (PROJECTS)

Since the early-Eighties, with the sh ift from a Fordist to a post-Fordist production (from "tangible" to "intangible" goods), we have witnessed a profound structural change of economies/societies. As it is well-known, this has meant market internationalisation, multi-nationalisation of productions, and increasing mobility of capitals, services and competences aimed at innovation. But, mostly, the techno-economic paradigm focused on information constitutes the main presupposition of such a relevant shift. In fact, even for the obvious «assonances» (Goodwin, 1984) with the results of scientific and technological evolution of the «network society» (Castells, 1996), during the Nineties a powerful network metaphor has become a «hegemonic image to which re-led the understanding/interpretation (planning) of contemporary complexity (city/territory/society)» (Scoppetta, 2009).

Effects of such shift on cities and metropolitan areas have been extensively studied, and they were often interpreted as the result of a particular issue related to globalisation, i.e. neo-liberal policies that were developed in order to support the wide reconversion process of economies/cities/territories/societies that started with the global crisis of the Seventies, when the new competitive scenario began to loom on the horizon.

Instead, what still remains too scarcely examined is the issue concerning the effects of digitalisation on the urban space: we have an interesting research field here, to be studied not only in analytical and descriptive terms, but also from the more operative view-point of planning and design.

Difficulties related to a fully understanding of the real impact of digitalisation on the urban space seem to concern two main interpretative errors (Latour, 1991a; Avgerou et al., 2004; Graham & Marvin, 2001). The first one tends to confinate the analysis within an strictly technological reading of the digital dimension, moving from the assumption that an innovative technology can be simply intended as a mere replacement of the slower and less effective previous one. The second error, instead, consists of a persistent dependence from analytic categories used within the highly different historical (and spatial) conditions of the pre-digital age.

Both readings, however, are guided by the idea of a substantial separation and independence between the intangible dimension of technology and the tangible reality of cities, so that a possible more complex interpretation that considers the inter-relations between material and immaterial (space and cyberspace) remains largely unquestioned. It is plain, indeed, that a large part of what happens into the cyberspace is deeply influenced by material practices, imaginaries, social and economic relations occurring in the material space. In other words, what the two above-mentioned readings tend to ignore is that an essential implication of globalisation consists of an increasing digitalisation of the urban dimension. This highlights the limits of a mere topographical representation, and forces us to rethink our traditional interpretative categories and operative tools (Scoppetta, 2011).

The matter in hand does not consists of a certain resemblance between virtual and real spaces (or between virtual spaces and the imaginary of real urban spaces) in the sense highlighted by Ursula von Petz [1]: «In the Seattle EMP […] Museum you can travel into a virtual plaza of a Spanish or South America small historic town, where people sing and dance joyously and integrate you seemingly into their happy street life. A deception. […] the environment of the virtual event is an invented historic site in the taste of CokaColaLand […] and not at all a futuristic spacelab or skyshuttle. Is it our restricted fantasy that prevents us to simulate some future images? Do we want to assure ourselves of the familiar past on our way into the new?».

The question rather is to highlight the emerging of a new multidimensional nature of urban space, i.e.: the co-existence of an immaterial component that is incorporated into the material, and cannot be intended as separated from the materiality of places. The limits of a topographical description/interpretation precisely lies into the incapacity to capture such multidimensionality through traditional categories that are still based on a rigid and unfruitful separation of material and immaterial.

3 THEORETICAL IMPLICATIONS OF TAKING MULTIDIMENSIONALITY AS A BASIC FEATURE OF PLACES

3.1 Co-existence of global and local dimension

A first important implication of the proposed approach concerns technical-disciplinary issues, and it is related to an interpretation of urban space aimed at overcoming the dichotomy between local and global. In fact, the main part of what we perceive as local in the reality can be rather interpreted as a micro-environment having a global span given because of its high or low degree of inter-connection. In this sense, each object that can be mapped as a place through a topographical description of its materiality is (can be) also a part of a long-range reverberation.

This is the case of the inseparability between international finance (an highly digitalised and immaterial global activity) and (very material and local) real estate, which can be interpreted (Sassen, 2008) as emblematic of both the multidimensional nature of contemporary urban space and the inadequacy of traditional interpretations and models.

Phenomena related to immigration in our post-industrial cities, with its internet point and money-transfer services (Hannerz, 1997), show us, however, the ways in which what we have always thought as "places" can really be nothing but single elements of wider territorial systems as they support larger networks and diasporas (Tarrius, 1992). Although unperceiveble according to logics that do not consider such further amplified dimension, in planning terms such "places" can be interpreted as "centralities" in all respects, and they end up to (informally) modify the "functioning" of that place within the city. Assuming the multidimensionality of urban spaces could allow us to better and more precisely understanding the disperse circulatory nature of contemporary territory (Tarrius, 1992) in order to elaborate effective urban policies answering the needs due to the relevant changes given by such new constantly re-territorialising plurality.

Furthermore, what we have traditionally interpreted and perceived in planning terms as a "centrality" (i.e.: a place of concentration high-level functions, as in the case of CBD) can be no more simply associated to a geographical centre with a specific physical shape (a concentration of office buildings and skyscrapers into the inner city): business activities, in fact, may have a disperse physical shape (Marcuse & van Kempen, 2000; Graham & Marvin, 2001; Scott, 2001). Evidences are given by the fact that the (concentrated) CBD in Chicago and the (disperse) Sylicon Valley share the same functions within the world digitalised economy, but their geographical shapes are deeply different.

And, however, evidences of such compenetration of material and immaterial, places and flows, real and digital come from the contemporary territorial (and institutional-political) rescaling, on which a vast literature exists (among the others: Sum, 1999; Taylor et al., 2002; Barry & Slater, 2002; Ferguson & Jones, 2002; Brenner, 2004; Olesen, 2005; Miller, 2009; on the European case, see: Berezin, 2003; Brenner, 2003; Gualini & Woltjer, 2004; Scoppetta, 2012d; 2012e) and highlights the destabilisation of older hierarchies,although such new organisations and formations do not replace them at all, but rather tend to emerge alongside them.

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[1] Lecture at the 4th Biennial "Culture of the city – transformations generating new opportunities" (Rotterdam, Sept. 20-22, 2001).

In the Italian case the proposed multidimensional interpretation has found full citizenship at the regional scale, resulting in the effective image of the «multi-layer territory-network» [2], which refers to flows of goods and people, but also of knowledge, capitals, innovation and ideas that are conveyed through social and digital networks.

Therefore, what is questioned here is how this view can be taken at a closer scale for the interpretation, planning and design of urban public space.

3.2 Political implications

A second relevant implication concerns the sphere of values to which the project of urban public space is to be referred, and this clearly is an implication of political nature. In fact, the acknowledgement of the new multidimensionality of places includes the possibility that some elements of the urban topography can be understood as the spatialisation of global and essentially digital dynamics. The political dimension of the issue precisely lies in the nature of such global digital dynamics.

This results in two different possible directions of investigation: the first one moves from the assumption that such dynamics are essentially market-oriented, since several studies (Sum, 1999; Urry, 2000; Brenner, 1998; 2004; 2009; Magnusson, 2009) have highlighted the ways in which the contemporary rescaling tends to cut across institutional dimension of territories through policies such as deregulation and privatisation, with consequences related to the privatisation of urban public spaces, social exclusion, segregation, spatial control, and so on.

The second, instead, moves from the observation of the increasing use of digital modes by social movements and political activists that, traditionally, are strictly linked to the immobility of local dimension. Think of networks of environmentalists that are interconnected through the web and that insert their specific local territorialised instances within broader de-territorialised global circuits (Cleaver, 1998; Mele, 1999; Donk et al., 2005; Garrett, 2006). In this sense, the emphasis on the multidimensional nature of places means highlighting a renewed relevance of social and political movements in the construction of urban space. And, moreover, as in the case of international finance, the immaterial dimension of inter-connections does not seem to be able to leave out of consideration the materiality of the city (rather than the national level) as the main space of political action (Torres et al., 1999; Lovink & Riemenes, 2002).

In this sense, the digitalisation of global finance has led Greece to a semi-bankrupt, just like the mobile synergy of SMS, alternative websites (such as Athens Independent Media Centre), different social applications – such as blogs of occupied universities, Twitter and other micro-blogs, Facebook and further networking sites (see: Milioni, 2009) – have played a relevant role as useful tools of communication and information exchange (text photos, videos) for individuals, affinity groups, collectivities and associations during the recent (2009 and 2012) struggles in Athens.

What is to be highlighted here is the way in which what started as a social conflict, due to the economic crisis combined with major cases of government corruption, has then evolved to a multifarious and inventive reclaim of city public space, so that we may say that urban space and its uses have become one of the stakes of the conflict, and the latter has ended by actively transforming such spaces, since new more or less temporary forms of spatiality have emerged in terms of both concrete arrangements of physical elements and ways to perform them, and they represent the ways people who participate tend to imagine spaces that will house the life they fight for.

Thus, in such molecular more or less temporarily re-appropriated free areas of otherness – which, however, can be defined by a recognisable perimeter (e.g.: in the case of Exarchia neighbourhood, where a large parking lot was transformed to an urban park through both open design meetings and online discussion and negotiations) – can be conceptualised, according to de Certeau (1984), as «a migrational, or metaphorical, city slips into the clear text of the planned and readable city», in which innovative social practices can be experienced: affordable food products bought directly from the farmers are now provided by the self-organised "potato movement", and non-monetary local exchange systems and time-banks are practiced (Dalakoglou, 2012).

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[2] As defined by the research study SIU-MIT/DiCoTer (2006) "L'armatura territoriale e insediativa del territorio italiano al 2020. Principi, scenari, obiettivi" (coordinators: A.Clementi, G.Dematteis, P.Palermo). See also: Scoppetta, 2012b.

Thus, especially this second direction of investigation may lead to more fruitful outcomes in terms of planning and design, while the first one seems to be more interesting in descriptive and interpretative terms, as it can offer useful insights into otherwise invisible inter-relations between different places.

4 POTENTIALS IN TERMS OF URBAN PLANNING AND DESIGN

In the light of the previously highlighted theoretical implications, three different modes of inter-relation between the material and immaterial dimension are examined here as well as the related planning and design approaches.

4.1 Control of urban flows

A first one refers to experiences based on the potential of typical ITC real-time representations, an effective tool for mirroring an "object" – the city – which is characterised by multiplicity and movement. The privileged technology, in this case, is the mobile phone and GPS, whose users are unwitting drawers of thematic maps with space and time coordinates.

The purpose of such real-time maps – which require the construction of a platform for collecting and exchanging data – concerns the control and management of specific phenomena, such as traffic or concentrations related to particolar events. In other words, such typology can be use for controlling and managing the unpredictable «hypermobility» (Gillespie & Richardson, 2000) of contemporary urbanity, also given by the result of the individualisation of working arrangements that has produced new «nomadic workers» (Castells, 2001; Prato & Trivero, 1985) with their «office on the run» (Thrift, 1996).

Obviously, this typology of interaction between material and immaterial dimension can be used within traditional top-down planning and decision-making, since participation is anaware. Furthermore, it is to be highlighted that a "dark side" exists: it concerns the potential of controlling spaces (and also people).

An example is given by the Real Time Rome project [3], in which aggregated data from the use of mobile phones are interpolated with traffic informations. What results is a representation of the (otherwise elusive) "urban ubiquity" deriving from an "hybrid" inter-connection between people, places, and technological infrastructures, between "static" and "fluid" urban elements. Fluidity is given by the time coordinate, which allows to represent, for example, the daily rhythms of a certain neighbourhood, or if the organisation of public transport effectively mirrors and answers the real dynamics of movement and/or concentration as well as the behaviours of specific groups (e.g.: tourists) or of the "urban organism" as a whole during a special event. Especially in the latter case, beyond representing and individuating the places in which people was concentrated, the map based on the use of mobile phones in different moments of the final match of the FIFA World Cup in 2006 returned phases and trends of collective enthusiasm, i.e.: it was able to represent the different intensities of (collective) emotion.

4.2 Community-building

The second typology of inter-relationship between material and immaterial space is linked to the spread of social softwares and the related virtual communities (Schuler, 1996), i.e.: groups that differ from the traditional ones for both the lack of face-to-face contact and the use of technology as preferred tool.

This has resulted in the interpretation of virtual "places" as public space in all respects, since they can be re-led to the Harvey's definition of space (2000) as «predominantly social construction» as well as the Lefebvre's well-known dialectical triad of the «production» of urban space (1974) – material space, representation of space, spaces of representation – according to which space can be interpreted as a tangible place of experience, as a conceptualised mental space, and as an interiorly lived space through emotions, desires, imagination, and memory.

A further example is given by the Lynch's study (1960) on the imageability of the city and the ways in which people, through their informal understanding, thought about its structure in terms of their own movements and opportunity to act: the Boston he describes is not a city made by grids and precise measures, but it rather is a loosely defined region, which is made by paths, landmarks, and networks.

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[3] The project is one of the implementations of the "WikyCity Project", developed at the SENSEable City Laboratory of the Massachussetts Institute of Technology. See: http://senseable.mit.edu/wikicity

In general, the design approach based on the typology of inter-relation of social softwares seems to be particularly fruitful as it can be referred to an idea of public space as a «construct» – in the sense used by Pasqui (2001) – or, better, as «activated construct», following an interesting definition of "context" formulated by Weik (1969), which, in turn, refers to Giddens (1984).

In particular, two different design levels can be individuated within this second typology of inter-relationship between material/immaterial, and they are aimed at translating the interaction in more or less transformative consequences about a place (about its distinctive meaning).

In both design levels the characteristic element consists of the existence of an identitary link between the virtual community and a specific place (Hampton, 2002; Scoppetta, 2009), and the latter may be the daily living environment of the components of the community, e.g.: their neighbourhood (Hampton, 2007). In this sense, the first level of the interaction consists of the fact that the construction of the virtual community moves from a map which is shared online. The emphasis is not so much on the ability to reproduce specific real places in the virtual space by replicating them (e.g.: through the use of 3D technology [4]), but it rather concerns the possibility of using the potential, given by the interactions and feedbacks of social softwares (such as Facebook, My Space, and so on) in the construction of social capital (Hampton & Wellman, 2003).

Such virtual maps, therefore, consist of representations that are collectively constructed online and that represent places that are understood as subjectively experienced, perceived, desired, i.e.: by including the "thickness" of a narration, or of a spatial practice.

A second level of interaction may be linked to cooperative needs of mutual exchange [5] or – being constructed around specific problems or claims also expressing a certain degree of potential design – can result in participative planning processes (Apostol et al., 2008). These are experiences that can be re-connected to the Lynch's «good city form» (1981) or, more generally, to the mainstream of community planning, or, with reference to the Italian context, to the «identitary maps» of the "territorialist school" (see: Magnaghi, 1990; 1998; 2000), which are aimed at creating synergies between "expert" and «local knowledge» (Geertz, 1993; see also: Scoppetta, 2012a).

The most trivial variant of such approach is the "institutional", which becomes merely passive especially when is intended as (uni-laterally) "communicative", since it is too often aimed at seeking consensus around essentially top-down decision-making processes in which participation mainly tends to be seen as «exit» (as in the case of audit or similars) and not as «voice» (Hirshmann, 1970).

4.3 Post-representational maps

A third mode of inter-relationship between real and virtual space includes a series of experiments that focuses not so much on community-building, but rather on the unexpected emerging of a place to which further temporary meanings are given thanks to their "construction" through an online interaction. This is the case of the so-called "flash mobs" that consist of the sudden and temporary concentration in a public space of a large number of people, which is activated through a flow of communications via web or via mobile phones, in order to play an unusual or extraordinary action, and then to disperse. Examples are given by experiences such as Meetup [6], in which a virtual community, which is established moving from a shared interest (and not from a place), meet or organise an event into a real place.

Such experiences clearly refer to the Situationists' practice whose aim was to reinvent everyday life in urban space by constructing situation which disrupted the ordinary and the normal in order to jolt people out of their customary ways of thinking and acting (see: Debord, 1994). By using the dérive (i.e.: the urban flow of act and encounters) and détournement (i.e.: re-routing of events and images), Situationists developed a number of experimental techniques stressing the relationship between events, the environment, and its participant.

Unlike the previously mentioned typology, what prevails is an occasional and temporary character as well as the lack of any identitary link between the virtual community and the real place. Thus, while the previously

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[4] An example in this sense is given by Twinity, in which the avatar of the online community move within a virtual representation of certain places oft he city of Berlin. See: Twinity on-line community (http://www.twinity.com/).

[5] This is the case of i-neighbors on-line community (http://www.i-neighbors.org) or Peuplade on-line community (http://www.peuplade.fr/).

[6] See: Meetup on-line community (http://www.meetup.com/).

described mode can be considered as an expression of instances and needs of the Castell's «space of places» (1996), the latter rather seems to refer to a «spaces of flows». Not surprisingly, frequently the relationship between virtual and real does not occur with reference to a single site, but rather to a network of places as well as the spatial experience that is played does not tend to be linked to the daily lived neighbourhood dimension, since it rather consists of crossing (and so linking together) different spaces as a discovery/invention of innovative territorial values and meanings.

It is not a coincidence, therefore, that the design dimension tends to be expressed through a map, and the latter may be intended as a post-representational map (Kitchin & Dodge, 2007; Kitchin et al., 2009) that is not assumed to be mirror of the world (it does not describe and explain it), but rather to produce (to re-create) it by making propositions, so that it is about «the construction of meaning as a basis for action»(Wood & Fels, 2008). Since they are socially constructed (Harley, 1989) – and, as such, «dialogic, polyphonic and multivocal» (Pickles, 2004): the writing the heterogeneity of (collective and individual) "histories" and narrations onto the multiplicity of contemporary urban geographies – such maps can also be intended as a set of social practices and, therefore, they as «mobile subjects» (Del Casino & Hanna, 2005) in a constant state of becoming. The digital de-materialised component provide these post-representational maps of a sort of instantaneous connective echoes that amplifying the organised event.

Not infrequently, the emphasis is on spatial experience as an artistic practice, which often explicitly refers to a wide range of creative streams: from the happening to the Situationists' psycogeographical actions; from the theatrical post-avant-garde to the cyber-performance. But it is worth noting that such mode of material/immaterial inter-relationship is not always associated with a specific design intent: the latter can consist only of attracting, even if for a short time, the collective attention on a particular place. Even in this case (even if in a different way), the main goal seems to be the construction of social capital as a prerequisite for the transformation/invention of one or more places by highlighting the potential of social creativity and self-organisation (Portugali, 2000). Such scope is pursued not so much through the strengthening of the ties of belonging, but rather through mainly playful interactions as well as by the use of the wide range of available technologies (social softwares, blogs, videos, twitter, and so on) and cross-media platforms (web, mobile, etc.).

5 MAIN CONCLUSIVE FINDINGS

Conceptual implications of taking the multidimensional nature of urban spaces, and the different ways in which such multivalency is expressed highlight the shift in understanding the meaning of contemporary design. The latter, in fact, can no longer be simply intended as configurative of spaces, but rather as an interactive and hybrid device, which is able to accommodate the categories of both the social and the natural (Latour, 1999), and to generate not necessarily predictable processes through the establishment and widening of an always changing network of interconnections between subjects/objects/discourses (Latour, 1991b; Akrich & Latour, 1992), who interpret the transformation/invention of a space as an opportunity for the mise-en-scéne of its own instances (Scoppetta, 2012c).

6 REFERENCES

AKRICH, M., LATOUR, B.: A Convenient Vocabulary for the Semiotics of Human and Nonhuman Actors. In: BIJKER W., LAW J. (eds.): Shaping Technology/Building Society Studies in Sociotechnological Change. MIT Press, Cambridge (Ma), 1992.
APOSTOL, I., ANTONIADIS, P., BENERJEE, T.: Flanerie between Net and Place: Possibilities for Partecipation in Planning. In: AESOP 4th Joint Congress, Chicago, July 2008.
AVGEROU, C., CIBORRA, C., LAND, F.: The Social Study of Information and Communication Technology Innovation, Actors, and Contexts. Oxford University Press, Oxford (UK), 2004.
BARRY, A., SLATER, D.: Introduction: the technological economy. In: Economy and Society, Vol. 31, Issue 2, pp. 175-93, 2002.
BEREZIN, M.: Introduction: territory, emotion and identity: spatial recalibration in a new Europe. In: BEREZIN, M., SCHAIN, M. (eds.): Europe Without Borders: Remapping Territory, Citizenship and Identity in a Transnational Age. Johns Hopkins University Press, Baltimore, 2003.
BRENNER, N.: Global cities, glocal states: Global city formation and state territorial restructuring in contemporary Europe. In: Review of International Political Economy, Vol. 5, Issue 2, pp. 1-37, 1998.
BRENNER, N.: Metropolitan Institutional Reform and the Rescaling of Space in Contemporary Western Europe. In: European Urban and Regional Studies, Vol. 10, Issue 4, pp. 297-324, 2003.
BRENNER, N.: State Spaces. Oxford University Press, Oxford, 2004.
BRENNER, N.: A Thousand Leaves: Notes on the Geography of Uneven Spatial Development. In: KEIL, R., MAHON, R. (eds.): Leviathan Undone? Towards a Political Economy of Scale. UBC Press, Vancouver, 2009.

CARNOY, M., CASTELLS, M. COHEN, S., CARDOSO, F.H.: The New Global Economy in the Information Age. Pennsylvania State University, 1993.

CASTELLS, M.: The rise of a network society. Blackwell, Oxford, 1996.

CASTELLS, M.: The Internet Galaxy: Reflections on the Internet, Business, and Society. Oxford University Press, New York, 2001.

CLEAVER, H.: The Zapatista Effect: The Internet and the Rise of an Alternative Political Fabric. In: Journal of International Affairs, Vol. 51, Issue 2, 1998.

DALAKOGLOU, D.: Beyond Spontaneity. In: City: analysis of urban trends, culture, theory, policy, action, Vol. 16, Issue 5, pp.535-545, 2012.

DEBORD, G.: The society of the spectacle. Zone Books, New York, 1994

DE CERTEAU, M.: The Practice of Everyday Life. University of Minnesota Press, Minneapolis, 1984.

DEL CASINO, V.J., HANNA, S.P.: Beyond the "binaries": A methodological intervention for interrogating maps as representational practices. In: ACME: An International E-Journal for Critical Geographies, Vol. 4, Issue 1, pp. 34-56, 2005.

DONK, W., LOADER, B.D., NIXON, P.G., RUCHT, D. (eds.): Cyberprotest: New Media, Citizens, and Social Movements. Routledge, London, 2005.

FERGUSON, Y.H., JONES R.J.B. (eds.): Political Space: Frontiers of Change and Governance in a Globalizing World. SUNY Press, Albany, NY, 2002.

GARRETT, K. R.: Protest in an Information Society: A review of literature on social movements and new ICTs. In: Information, Communication & Society, Vol. 9, Issue 2, pp.202–224, 2006.

GEERTZ, C.: Local Knowledge. Further essays in Interpretative Anthropology. Basic Books, New York, 1983.

GIDDENS, A.: The constitution of society. Polity Press, Cambridge, 1984.

GILLESPIE, A., RICHARDSON, R.: Teleworking and the city: Myths of workplace transcendence and travel reduction. In: WHEELER, J.O., AOYAMA, Y., WARF, B. (eds.): Cities in the Telecommunications Age: The Fracturing of Geographies. Routledge, New York, 2000.

GOODWIN, B.C.: Changing from an evolutionary to a generative paradigm in biology. In: HO, M.W., POLLARD, J.W. (eds.): Evolutionary Theory: Paths into the Future. Wiley, 1984.

GRAHAM, S., MARVIN, S.: Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition. Routledge, New York/ London, 2001.

GUALINI, E., WOLTJER, J.: The Rescaling of Regional Planning and Governance in the Netherlands. Paper presented at the AESOP annual conference, Grenoble, 2004.

HAMPTON, K.N.: Place based and IT Mediated Community. In: Planning Theory and Practice, Vol.3, Issue 2, 2002.

HAMPTON, K.N.: Neighborhoods in the Network Society: the e-Neighbors Study. In: Information, Communication and Society, Vol.10, Issue 5. 2007.

HAMPTON, K.N., WELLMAN, B.: Neighboring in Netville: How the Internet Supports Community and Social Capital in a Wired Suburb. In: City and Community, Vol.2, Issue 4. 2003.

HANNERZ, U.: Transnational connections: culture, people, places. Routledge, London, 1997.

HARLEY, J.B.: Deconstructing the map. In: Cartographica, Vol. 26, Issue 2, pp. 1-20, 1989.

HARVEY, D.: Space of hope. In: California Studies in Critical Human Geography, Vol..7, 2000.

HIRSCHMANN, A.O.: Exit, Voice, and Loyalty: Responses to Decline in Firms, Organizations, and States. Harvard University Press, Cambridge (Ma), 1970.

KITCHIN, R., DODGE, M.: Rethinking maps. In: Progress in Human Geography, Vol. 31, Issue 3, pp. 331-44, 2007.

KITCHIN, R., PERKINS, C., DODGE, M.: Thinking about maps. In: DODGE, M., KITCHIN, R., PERKINS, C. (eds) Rethinking Maps. Routledge, London, 2009.

LATOUR, B.: Technology Is Society Made Durable. In: LAWS, J. (ed.): A Sociology of Monsters. Routledge, London, 1991a.

LATOUR, B.: Nous n'avons jamais ete modernes. La Decouverte, Paris, 1991b.

LATOUR, B.: Politiques de la nature. La Decouverte, Paris, 1999.

LEFEBVRE, H.: La production de l'Espace. Anthropos, Paris, 1974.

LOVINK, G., RIEMENS, P.: Digital City Amsterdam: Local Uses of Global Networks. In: SASSEN, S. (ed.): Global Networks/Linked Cities. Routledge, New York/London, 2002.

LYNCH, K.: The Image of the City. MIT Press, Cambridge, 1960.

LYNCH, K.: Good City Form. MIT Press, Cambridge (Ma.)/London, 1981.

MAGNAGHI, A. (ed.): Il territorio dell'abitare. Lo sviluppo locale come alternativa strategica. Franco Angeli, Milano, 1990.

MAGNAGHI, A. (ed.): Il territorio degli abitanti. Dunod, Milano, 1998.

MAGNAGHI, A.: Il progetto locale. Bollati Boringhieri, Torino, 2000.

MAGNUSSON, W.: Scaling Government to Politics. In: KEIL, R., MAHON, R. (eds.): Leviathan Undone? Towards a Political Economy of Scale. UBC Press, Vancouver, 2009.

MARCUSE, P. VAN KEMPEN, R.: Globalizing Cities. A New Spatial Order. Blackwell, Oxford, 2000.

MELE, C.: Cyberspace and Disadvantaged Communities: The Internet as a Tool for Collective Action. In: SMITH, M.A., KOLLOCK, P. (eds.): Communities in Cyberspace. Routledge, London, 1999.

MILIONI, D.: Probing the Online Counterpublic Sphere: the case of Indymedia Athens. In: Media, Culture & Society, Vol.31, Issue.3, pp. 409-431, 2009.

MILLER, B.: Is Scale a Chaotic Concept? Notes on Processes of Scale Production. In: KEIL, R., MAHON, R. (eds.): Leviathan Undone? Towards a Political Economy of Scale. UBC Press, Vancouver, 2009.

OLESEN, T.: Transnational Publics: New Space of Social Movement Activism and the Problem of Long-Sightedness. In: Current Sociology, Vol. 53, Issue 3, pp. 419-40, 2005.

PASQUI, G.: Il territorio delle politiche. Franco Angeli: Milano, 2001.

PICKLES, J.: A History of Spaces: Cartographic Reason, Mapping and the Geo-Coded World. Routledge, London, 2004.

PORTUGALI, J.: Self-Organisation and the City. Springer Verlag, Berlin, 2000.

PRATO, P., TRIVERO, G.: The spectacle of travel. In: Australian Journal of Cultural Studies, Vol. 3, pp. 25-43, 1985.

SALET, W.: Rescaling of territorial governance: Recent experiences in Dutch urbanised regions. Paper presented at the international workshop "Territorial governance in a multi-level environment: new forms of institutional action", University of Amsterdam, 14-15 November 2003.

SASSEN, S.: Re-assembling the urban. In: Urban geography, Vol. 29, Issue 2, 2008.

SCHULER, D.: New Community Networks: Wired for Change. Addison-Wesley, Reading (Ma), 1996

SCOPPETTA, C.: Immaginare la metropoli della transizione: la città come living machine. Campisano, Roma, 2009.

SCOPPETTA, C.: Progettare lo spazio urbano multidimensionale. In: Urbanistica Dossier, Vol.1, pp. 51-56, 2011.

SCOPPETTA, C.: Cultura dell'acqua e conoscenza locale: il caso di Siena. In: EDA, 2012a.

SCOPPETTA, C.: Il territorio come infrastruttura. In: TEMA, Vol. 5, pp. 33-48, 2012b.

SCOPPETTA, C.: Using imagination to transform urban spaces (and planning imaginaries).. In: The Hybrid_Link, 2012c.

SCOPPETTA, C.: Nuove geografie dell'auto-organizzazione. In: Planum. The Journal of Urbanism, Vol .25, Issue 2, 2012d.

SCOPPETTA, C.: The Baltic Sea Macro Region. A soft synaptic space within European rescaling process. In: Smart planning per le citta' gateway in Europa. Connettere popoli, economie e luoghi. Atti della IX Biennale delle Città e degli Urbanisti Europei. Genova, 14-17 September 2011 INU Edizioni, Roma, 2012e.

SCOTT, A.J.: Global City-Regions. Oxford University Press, Oxford, 2001.

SUM, N.L.: Rethinking Globalisation: Re-articulating the Spatial Scale and Temporal Horizons of Trans-border Spaces. In: OLDS, K., DICKEN, P., KELLY, P.F., KONG, L., WAI-CHUNG YEUNG, H. (eds.): Globalization and the Asian Pacific: Contested Territories. Routledge, London, 1999.

TARRIUS, A.: Les fourmis d'Europe. L'Harmattan, Paris, 1992.

TAYLOR, P.J., WALKER, D.R.F., BEAVERSTOCK, J.V.: Firms and their Global Service Networks. In: Sassen, S. (ed.): Global Networks/Linked Cities. Routledge, New York, 2002.

THRIFT, N.: Spatial Formations. Sage, London, 1996.

TORRES, R.D., INDA, J.X., MIRON, L.F.: Race, Identity, and Citizenship. Oxford, Blackwell, 1999.

URRY, J.: Sociology Beyond Societies: Mobilities for the Twenty-first Century. Routledge, New York-London, 2000.

WEICK, K.E.: The social psychology of organizing. Addison-Wesley, Reading (Ma), 1969.

WOOD, D., FELS, J.: The Natures of Maps: Cartographic Constructions of the Natural World. University of Chicago Press, Chicago, 2008.

The Planning of Peri-Urban Agricultural Areas: the Case of "L'Horta de València"

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1 ABSTRACT

València is a city in the spanish mediterranean sea. Is the capital of Valencia's region. The peri-urban territory of Valencia is an agricultural land with higth productivity. This land is in production since the medieval age through an irrigation system of Arab origin. The "water court", with probable Arabic origin, dispensing with words (not write) justice among irrigators all Thursdays at gate Cathedral. The historical agricultural land had a surface of 10.000 ha of which 5.000 ha have been built. There are also another 10.000 ha of agricultural land of high quality. So this space has an important potential agricultural, cultural, económic, as landscape, historical, as a natural resource, ... All included in the metropolitan area of Valencia.

Since 1946 there have been several experiences and attempts for planning and management this space. Usually as passive planning. After the European Landscape Convention (Florence, 2000) changes the way for approach the problem. Now we have a perspective as a landscape product of human interaction. With this new perspectiva is realized the Territorial Plan of Action for the Protection of L'Horta.

However, the plan done, now completely finished but not approved, has not been able to overcome the contradictions and conflicts of uses for this peri-urban area.

Particularly, the Valencian society lives today the economic consequeces of the housing bubble crack. But this society (particularly public autoritys) expect another housing boubble and does not perceives the environmental bubble (consumption continued each year more natural resources than those produced by ecosystems in the same year).

This paper reflects on the approach of a new paradigm for planning and land management to prevent new bubbles and their consequences.

2 PERIURBAN AGRICULTURAL SPACE OF "L'HORTA DE VALENCIA"

2.1 Characteristics

L'Horta de Valencia is a unique landscape. It is located in the suburban environment of Valencia metropolitan area. Valencia is a city in the Spanish Mediterranean. Its origin is Roman. The Spanish Mediterranean coast, in general, is mountainous but Valencia is located in a flood plain along the river Turia. This has enabled the agricultural use of the land by irrigation.

About 30 km south of the mouth of the Turia river, Júcar river flows into the sea. Both rivers share therefore floodplain. Originally, this plain had numerous wetlands. Throughout the centuries have dried all that existed in the environment of Valencia city except Albufera lagoon.

Today, in the wetlands around the Albufera lagoon, rice is grown, and the rest of the plain vegetables and citrus fruits are grown. The whole plain is irrigated. Not precisely known but it seems that the origins of the irrigation network are Arabs.[1] The historic irrigation network has 7 channels that take water from the River Turia.

The long history of Valencian irrigation has generated a powerful agricultural and water culture whose main symbol is the Water Court (possible arab origin). The Court dispenses justice every Thursday at the door of the Cathedral even today. It deals with the problems of irrigation farmers. All processes are exclusively oral and judgments are met by the verbal agreement of farmers who submit to the court.

The historic vegetables garden came to occupy an area of about 10,000 ha. which, at present, approximately half are maintained (Biot, 1998). But also in the metropolitan area of Valencia are another 10,000 ha of high quality agricultural areas cultivated mainly with orange (Antolín et alt, 1998) .

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[1] Differents Muslims governments of Valencia occur in the period from 711 to 1238 years.

The first report of Dobris European Environment Agency (EEA, 1995) made an approach to European landscapes and identified only 6 places with landscape garden. Two of them in Spain, the orchards of Valencia and Murcia.

The agricultural land of L'Horta de València has special values as cultural heritage, historical heritage, anthropic landscape and for its heritage architectural and hydraulic work. And also, of course, for its agricultural economic activity (Miralles, 2012).

2.2 Transformation process

For a long time, the growth of the city of Valencia and its urban environment has been limited. Until 1960 the city of Valencia grows in the expansion of the historic walled city. The expansion area is developed following the Valencia Expansion Project. Thus, until 1960 remains almost the entire historic huerta of Valencia.

Fig. 1: Detail of Valencia and surroundings in 1944. Historical National Topographic Map of Spain, 1:50,000 original scales.

From 1960 began the first real estate expansive cycle in Spain and Valencia. In Spain and Valencia have been three periods of urban expansion: 1960-1972, 1985-1991 and 1997-2008. he three correspond to three real estate expansive cycles associated with real estate bubbles (Miralles, 2011).

Urbanization produced during successive booms housing bubbles have been very intense in Spain and, particularly, in the Valencia region. It has also been particularly strong in the third period of expansion (Miralles, 2009).

	1990	2000	2006*
Urban fabric	61.670	79.612	85.696
Industrial, commercial and transport units	10.696	18.897	22.988
Artificial non-agricultural vegetated areas	1.303	3.881	4.327
Sum (ha)	73.670	102.390	113.011
% surface areas of Com.Val.	3,17	4,40	4,86

Table 1: Artificial surface in Valencia region according CORINE database (Miralles, 2009).

In the third period begins to offer up to 180 Euros per square meter of land protected not urban developable of periurban Huerta of Valencia. Exactly protected land, with the expectation that the administration will change the urban plan to remove protection and allow its construction. These facts show that the land market to build is not efficient to optimize the uses of land in the territory.

New urban fabric in VALENCIA PROVINCE	Period, 1990-2000 (ha)	Period, 2000-2006 (ha)	Total surface (ha)
Coastal zone	2.630,62	2.115,48	4.746,10
Pre-coastal zone	5.161,90	4.099,04	9.260,94
Interior zone	2.557,44	1.631,67	4.189,11

Table 2: Rural land transformed in urban fabric in Valencia Province, 1990-2000-2006 (Miralles et alt, 2012).

Obviously, the price reaches the land for building is purely speculative and turn is generated as a result of speculative selling price reaches the price of housing. In this situation, the extra profits are not produced by the construction and sale of homes but by the change in land value.

In all three periods housing bubble, the expectation of business by changing land use has promoted a tendency to sprawl supported in new transport infrastructure. The process is similar to that occurred elsewhere but in each case with their own local characteristics. This alters substantially the landscape and generates margins urban or peri-urban areas with a specific problem (Magoni, 2012). In any case, the land transformation process is virtually irreversible and this forces us to rethink intervention in these spaces (Treu, 2012).

Fig. 2: Urban fabric in metropolitan area of València in 2011. Generalitat Valenciana, SIOSE geodatabase (GVA, 2011)

So, the process of transforming this periurban agricultural space shows a set of contradictions. It irreversibly destroys a natural resource, agricultural land, to create city. But the city is created by a speculative expectation and not the result of an objective demand of urban activity. Now there are many houses without a market and urbanized areas without buildings.

Urbanization processes in Spain, are planned. Local government approved urban plans that establish areas to urbanize and conditions. Governments administration has short-term objectives. Urbanization generate income for the local administration during the construction phase. Therefore, during the decision-making process are not considered long term consequences. Paradoxically, today foodstuffs are the first export concept of the Valencian economy.

3 PROTECTION PLAN OF "L'HORTA DE VALÈNCIA"

3.1 Historical attempts for planning and management of the vegetable garden

The first planning of Valencia metropolitan area is produced by the Plan General de Ordenación Urbana de Valencia y su Cintura (Urban Plan of Valencia and around) approved in 1946. At this time, the Spanish economy operates in autarky regime with the dictator Franco. So, it follows the general approach of reserving most productive agricultural land for food production. For the Valencia metropolitan area, the

urban growth in the plan focuses on central area and the west where there are no productive agricultural lands.

Fig. 3: General Urban Plan of València and Around, 1946. Historical Cartography.

In 1957 the Turia River overflows and produces a great flood causing serious damage. To prevent further similar disasters, decides to build a new river channel with sufficient capacity. The layout of the new channel runs through the south. This changes the territorial structure and motivates the metropolitan plan amendment.

So the Plan General de Valencia y su comarca adaptado a la solución Sur (General Urban Plan of Valencia and the surrounding area adapted to South solution) is approved in 1966.

At this time, Spain is in first expansive economic cycle and first real estate bobble. So, the agricultural activity is considered as an activity of underdeveloped countries and socially undesirable. Gradually, the children of farmers engaged in other economic activities in the sectors of industry, services or construction.

The urban plan of 1966 according to the value system of the time, committed to a great urban development with big symbolic projects. Especially big traffic infrastructure designed for a massive use of private vehicles. Agricultural land is considered to spaces for transform by processes of urban speculation.

In 1978 is approved the new democratic Spanish constitution and legislative powers in urban planning and land passed to the new regional governments. In 1988 is approved a new metropolitan plan, the Normas de Coordinación Metropolitana del Area Metropolitana de Valencia (Coordination Metropolitan Rules for Metropolitan Area of Valencia). This is a new metropolitan plan for establish land reservation for: infrastructures (especially transport), regional public facilities and protected areas. According this plan, an important part of agricultural land is protected but not everything. These metropolitan rules are implemented by Consell Metropolità de L'Horta (L'Horta Metropolitan Council).

The conflict of interest between the Metropolitan Council (which advocates a global vision and makes decisions that limit the ability of decision municipalities) and municipalities (who want freedom of choice to develop their land according to their particular interests) is finally resolved with the disappearance of Metropolitan Council and the metropolitan rules in 1999. So, since 1999, the municipalities of metropolitan area of Valencia define uses of their land by its own urban plan, tutoring with the regional administration but without a regional framework plan.

All such plans are static plans. That is, all of them down rules to possible uses but none provides initiatives for improving the design of the spaces, particularly for the active promotion and improvement of agricultural land.

3.2 The last attempt: regional action plan for the protection of L'Horta de València

Approximately in 1970 the first citizen movements arise in favour of protecting the agricultural space of L'Horta and against urbanization of agricultural land to residential areas and infrastructure. These citizen movements have been active, with greater or lesser intensity, to the present.

In 2000 he presented a popular legislative initiative in Valencia Parliament for protecting agricultural land of L'Horta. The initiative collected 113,000 signatures but was rejected. From these facts, successive governments have made efforts to recognize values of Valencia agricultural land of L'Horta. Actually initiatives have been a public acknowledgment of their values but no effective protection.

Fig. 4: Promoters of the popular legislative initiative for the protection of L'Horta in act of delivery of the signatures collected.

In 2004 is approved the Regional Planning and Landscape Protection Act. This law establishes the development of a Territorial Action Plan for the Protection of L'Horta. The work to drafting the plan began about 2006. In 2007, Regional Government assumed direct drafting the plan. In early 2011 completed the drafting of the plan. The plan is available in www.cma.gva.es (Plan de Acción Territorial de Protección de La Huerta de Valencia). Currently the plan is not yet approved.

For the preparation of the plan were made very rigorous and comprehensive analysis of the situation of the agricultural landscape of L'Horta. We also performed a very thorough process of public participation (July to December, 2008) which included public appreciation of the landscape of L'Horta. Therefore, the development of the plan has been a remarkable effort. Also conducted several "working groups" of experts on different realities of agricultural land: irrigation, agricultural economics, transport infrastructure, rural-urban relationship, sociological perception, stakeholders,

Fig. 5: Image of L'Horta, 2004. Picture of author.

The drafting team believes that the planning of this space cannot be reduced to a "passive" planning. That is, a geographical planning of uses and territorial rules for permitted uses. L'Horta landscape is a living landscape product of human labour. Thus, it is necessary to promote economic activities that produce the landscape. And we need a landscape management system that allows the collection of revenue to invest in promotion of the landscape. These ideas already point in the text of the popular initiative legislative for the protection of L'Horta.

This entire means that besides a regional planning, other plans are required to promote socioeconomic activities in the landscape of L'Horta and also laws to implement a management system of that landscape. So the intervention in the landscape of L'Horta arises in three axes:

- Regional planning: Territorial Action Plan for protection L'Horta de Valencia
- Complementary socioeconomics plans
- Complementary instruments

3.2.1 Territorial Action Plan for protection L'Horta de Valencia

This plan is designed as a conventional regional plan but with special attention to the landscape. In particular:

- Infrastructures
- Urban border
- Cultural, hydraulic and architectural heritages
- Visual landscape
- Amenities and facilities

The plan includes a prospective part where are planned projects and actions to promote activities.

3.2.2 Complementary socioeconomics plans

In addition on the regional plan are considered necessary:

- Agricultural plan: for to optimize the agricultural production and to promote ecological agricultural production.
- Irrigation modernization plan: usually agricultural land is irrigated by sheet of water and is possible improving irrigation systems to prevent losses and save on water consumption.
- Plan for rural tourism and recreational uses: the landscape of L'Horta within the metropolitan area of Valencia has a good tourism potential but it necessary to compatible with agricultural activities.

3.2.3 Complementary instruments

Many planned actions to improve the landscape or promoting activities need investment. You need an entity manager with ability to earn income from economic activities in L'Horta and invest in improvements such income. Only by law you can improve a specific management system for this space.

3.2.4 Methodology

The methodology for the elaboration of the plan is divided into three phases:

Phase 1:

- Identify the most valuable landscapes and spaces of connection between them
- Identify the major conflicts that threaten the preservation
- Identify change predictions in urban plans and programs

Phase 2:

- Identify quality objectives, level of protection and public use for different landscape units

Phase 3: Actions for

- Protect and connect most valuable landscapes

- Define sustainable systems for management and financing agricultural activity
- Integrate infrastructure and urban border in agricultural landscape
- Protecting and valuing cultural, visual and environmental heritages
- Valuing L'Horta for recreational and cultural public use

Fig. 6: Zoning proposal in Territorial Action Plan for protection of L'Horta (GVA, 2011)

3.2.5 Final proposal

From all this comprehensive approach, finally only regional plan was developed in full but not yet approved. During the execution of the work, the administration has made many public statements in favour of the preservation and promotion of the symbolic space of L'Horta. But it has resulted in any positive action to solve problems.

4 CONFLICTS AND CONTRADICTIONS

After the experience created by this case, one wonders why it has not been successful protection and maintenance of the historic agricultural land of Valencian huerta. On the one hand there are professional and technical capacity to address the problems and propose solutions for the future. hus, the cause of failure in conservation policy L'Horta be sought primarily in management, not in planning.

Moreover, agricultural space of L'Horta is not a particular case or local. Rather, it is a paradigmatic management case of natural assets necessary for the future in a society that is playing its own existence.

In fact there are three contradictions, unresolved, which impede progress in the efficient management of natural resources.

First, the sustainability management. Society tends to give priority to the immediate benefit and punishes the governors who demand current sacrifices for future benefits. This dominant social value is generating environmental bubble.

Second, the ownership of land for building prevents the maintenance soil as a natural resource. Particularly in situations of speculative value of land to build, such land acquire prices so high that no one dares to stop construction. Although it is irrational and generate misery in the future.

Third, the government of the territory is not adapted to the current needs of sustainability. Territorial administration do not have appropriate tools to ensure environmental and economic sustainability of the activities.

4.1 The environmental bubble: the contradiction between sustainability and immediate individual interest

Since 1998, the World Wildlife Fund publishes the Living Planet Report. The last report is in 2012. According these reports, since 1975 approximately, the ecological footprint of all planet activities is larger than the planet's surface that produces environmental goods flows consumed by society. So, the planet's Natural Capital decreases each year. The natural resource consumption and pollutant emission current is possible because it is being consumed each year a portion of the stock of such resources.

So, for a long time, economic activity is based on unsustainable consumption of natural resources. In other words, it is generating an ecological bubble: the current consumption level is at the expense of lower future consumption possibilities. But people do not want to renounce their current consumption or their current income level. As time goes on, the situation will become increasingly unsustainable.

It is clear that to achieve a sustainable situation, should be kept the natural resource stock (and if possible increase it) to ensure the flow of natural goods consumed (and if possible increase it).

In case of L'Horta, we must be this agricultural landscape as natural resources. But stakeholders want immediately incomes by land speculation (so agricultural land destruction).

In agricultural periurban areas we have two major issues for sustainability: urban sprawl and farmland deficit.

4.1.1 Energy deficit and urban sprawl

In Spain, and particularly in Valencia, all urban development is planned. But stakeholders prefer urban development (short-term income) to agricultural land maintenance (short-term low income but long-term activity). So we have in metropolitan area of Valencia an urban sprawl planned. Urban sprawl produces very inefficient energy consumption.

From this point of view should concentrate urban growth compactly on the land without value as a natural resource (en the case of Valencia, in the west).

4.1.2 Farmland deficit

It is known shortage of arable land on the planet. This produces food speculation and land hoarding by some countries (to ensure availability of food).

From this point of view, must maintain highly productive agricultural land and urban growth divert to other places.

4.2 Reviewing theory property: the building land market is not efficient to optimize the location of uses in the territory

The theories of Adam Smith on land ownership focus on farming. Defend the property to convert the farmers in direct beneficiary as a result of their own efforts. In fact, agricultural land is a product of farmer labour.

But the builder does not need the ground but underground. The constructor destroys and removes the ground to cement his work/built on the basement.

The underground is a natural good. Nobody has made the underground. Nobody has made underground. Therefore no one should pay anything for a good that nobody has produced. The price of underground is only a speculative price. If we pay for the underground, pay someone to do nothing and, consequently, discourages productive economy. So the underground should be public.

The value of land for building, or underground, in free market depends on the expectation value of the intended uses. Its value is absolutely independent of the economically optimal use for each area of the

territory. Thus the land market to build does not optimize land use, nor does it create a competitive economic activity. In contrast, generates irreversible destruction of natural resources, urban sprawl and increased costs of constructing and maintaining the networks of urban services.

This approach involves linking the building usufruct of the surface; compensate the landowner for its rural value and efficient administration in the management of natural resources for the future.

4.3 Reviewing the governance of the territory

Valencia's case shows the need to review the organization of the administration. Historically governance is seen as a representative of the people. May be more appropriate at present conceive the ruler as an administrator hired by the people to administer public affairs (state budget, property, assets, natural resources, ...), an administrator that must account for its management.

One of its functions should be the maintenance of the natural resources in the territory that may be needed in the future.

This approach is particularly important in the field of local administration. Spanish municipalities have their origin in the Roman administration (between 200 BC and 400 AD). An important part of their characteristics are maintained today. It is an organization designed for colonization of new territories. But today our country is fully occupied and the problems and the tools available are substantially another.

In addition, natural resources, agricultural lands and landscapes should form networks to maintain the connection between ecosystems. This new network we call green infrastructure.

4.3.1   From roman municipality to e-governance

Initially municipalities were created to administer the territory when transport systems were based on walking, the horse and carriage. The city was a perfectly bounded space and outer space was completely rural.

From 1900 he popularized the use of the car then urban living space extends diffusely. With the expansion of the Internet, vital urban space becomes a space without limits. The functional boundaries of cities gradually disappear. Increasingly, cities function in network.

The network of personal relations overlaps the network of personal relations by transport which, in turn, overlaps the network of relationships through internet.

The municipality as an organization that manages all public services in limited physical space has become obsolete. For some services still needed direct relationships, to other geographical scope more efficient is the region and other can be managed by internet.

So it's necessary reviewing the organization of public administration. Its necessary rethink the functions of public administration, to include between its functions the guarantee of sustainability in land use and equip it to accomplish its function.

If a significant part of the revenues of the municipalities, as in Valencia, comes from urban development and land speculation, it will never be possible to rationalize land use with sustainability criteria.

4.3.2   Green infrastructure in the territory of the networks

In the territory of the networks it's necessary to guarantee a new network: the green infrastructure. The green infrastructure should consist of the territorial spaces that contribute to the ecological footprint (which I prefer to describe as ecological larder because they are spaces that nurture society of environmental goods) connected by ecological corridors to keep the connection between ecosystems.

Besides, public administration must be prepared to ensure the maintenance of such spaces. Creating a Natural Capital Bank (an environment power) may be an option. This bank operates under the principle of "political protection and technical safekeeping". That is, the legislature decided to protect spaces so justified. Once an area has been protected, the safekeeping corresponds to the Natural Capital Bank (independent of political power) and you cannot remove the protection.

4.3.3 The CAP towards 2020

At the moment, it is in process the new Common Agricultural Policy (EC, 2010). The base document, The CAP towards 2020: Meeting the food, natural resources and territorial challenges of the future, structure the new policy around three strategic aims: food security; quality, value and diversity of food; and employment.

These strategies involve changes in food security, environment and climate change and territorial balance.

Particularly, the new CAP includes what "The active management of natural resources by farming is one important tool to maintain the rural landscape". And, according EU 2020 Strategy, "Targeting support exclusively to active farmers and remunerating the collective services they provide to society... ".

All these approaches are according with objectives for maintain the periurban agricultural areas as L'Horta de València.

But finally, the success of this new policy is strongly conditioned by the management system for application the European funds and efficiency of public institutions responsible for its implementation. For example, no sense in applying EU aid for maintenance farmland when no safeguards to protect such spaces against its urban development in the future. To avoid these situations can be useful contracts for land stewardship.

5 CONCLUSION

The agricultural land of L'Horta de Valencia is a particular landscape with high value environmental, economic and as heritage. Also it is a symbol of natural resources that its necessary to maintenance for the futur.

Although their values are recognized by the Valencian society for a long time, yet the regional government has not been able to establish an effective system for protection and management.

It is a paradigmatic case of inability to solve problems of sustainability in metropolitan area. To progressively correcting environmental bubble it is necessary to solve the contradiction between sustainability and immediate individual interest.

The building land market is not efficient to optimize the location of uses in the territory. So its necessary reviewing theory property to achieve sustainable progress.

Finally its necessary reviewing the system of governance of territory for to adapt public administration to new functions (garantee of sustainability) with new tools (e-governance) in the territory of networks.

The new European CAP can help make changes if appropriate tools are implemented.

6 REFERENCES

Biot Gimeno, Carmen: La agricultura ecológica, alternativa para la preservación de la Huerta de Valencia. Generalitat Valenciana. Conselleria d'Agricultura, Pesca i Alimentació. València, 1998.

Antolín Tomás, Carmen et alt: El suelo como recurso natural en la Comunidad Valenciana. Generalitat Valenciana, Conselleria d'Obres Públiques, Urbanisme i Transports. València, 1998.

Europe's Environment: Dobris Assessment. http://www.eea.europa.eu/publications. European Environment Agency, 1995.

Miralles i Garcia, José Luis: Los espacios agrícoles en las periferias de las áreas metropolitanas en España. El caso de L'Horta de València. In: Cooperare atrraverso l'Atlantico. Analisi, strategie e progetti per la riqualificazione dei margini urbani nei paesi latini europei e americani. Laboratorio di Cooperazione Internazionale, Politecnico di Milano. Milano, 2012.

Miralles i Garcia, José Luis: Real estate crisis and sustainability in Spain. In: Proc of the 5th Conf. on Sustainable Development and Planning, eds. C.A. Brebbia and E. Beriatos, WIT Press, pp. 123-132. Southampton, 2011.

Generalitat Valenciana. Sistema de Información Territorial de la Comunidad Valenciana. http://www.cma.gva.es/web

Miralles i Garcia, José Luis, Díaz Aguirre, Susana & Altur Grau, Vicent Jesús: Environmental impact on the Mediterranean Spanish coast produced by the latest process of urban development. In: WIT Transactions on Ecology and The Environment, Vol 155, WIT Press, pp 379-389. Southampton, 2012.

Miralles i Garcia, José Luis: Sustainability regulations in urban planning: the experience of the Autonomous Community of Valencia (Spain). In: WIT Transactions on Ecology and the Environment, Vol 120, WIT Press, pp 3-12. Southampton, 2009.

Magoni, Marcello: I margini urbani nei paesi latini, tra usi rurali, urbani e informali. In: Cooperare atrraverso l'Atlantico. Analisi, strategie e progetti per la riqualificazione dei margini urbani nei paesi latini europei e americani. Laboratorio di Cooperazione Internazionale, Politecnico di Milano. Milano, 2012.

Treu, Maria Cristina: Ripensare i margini urbani. In: Cooperare atrraverso l'Atlantico. Analisi, strategie e progetti per la riqualificazione dei margini urbani nei paesi latini europei e americani. Laboratorio di Cooperazione Internazionale, Politecnico di Milano. Milano, 2012.

Generalitat Valenciana. Territorial Action Plan for protection of L'Horta de Valencia. http://www.cma.gva.es

European Comission. The CAP towards 2020: Meeting the food, natural resources and territorial challenges of the future. http://ec.europa.eu/agriculture/cap-post-2013/communication/index_en.htm

The Rural-Urban Fringe in the Netherlands: a Morphological Analysis of Recent Urban Developments

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1 ABSTRACT

In spite of a strong tradition in spatial planning and ambitions to create compact cities, most rural-urban fringes in the Netherlands have seen substantial urbanization in recent decades. Urban expansions at the rural-urban fringe have formed complex hybrid landscapes consisting of residential areas, commercial zones, agricultural land, recreational functions and natural areas. These hybrid landscapes are characterized by great diversity in size, density, form and composition. Moreover, the urban developments in the rural-urban fringe take divergent forms in different urbanized regions. This paper analyses recent developments and urbanization patterns at the rural-urban fringe in the Netherlands. In some regions the urbanization is rather compact and concentric, whereas other regions show dispersed and polycentric morphological patterns. Paradoxically, at the local level, urban compaction policy seems quite successful, whereas at the regional level, local developments add up to traditionally unwanted urban development patterns. Moreover, the ongoing urbanization at the rural-urban fringe has been entailing many spatial, environmental, financial and social problems. Therefore, recent suburbanization and uncertainties concerning future spatial developments at the urban fringe raise some complex policy and design issues on the local, regional and national scale. At the national level, an important question is how increasing dispersed urbanization will affect the most urbanized regions in the Netherlands, in terms of both the economic performance of cities and the efficient use of existing infrastructure. At the regional level, there is a need for urbanization strategies that transcend municipal boundaries. At the local level, developing and deploying inventive urban (re-)design strategies to improve the spatial and functional quality of the rural-urban fringe are a challenge for local authorities and urban planners. Important design tasks are to create areas with combined functions, to improve connections between separated functions and to upgrade the identity of places at the fringe.

2 INTRODUCTION

The Netherlands has a distinct and internationally much acclaimed tradition of spatial planning on the national, regional and municipal level. In a context of limited space, challenges of water management and a strong demographic and economic growth, Dutch planners and policy makers have strived for compact and well organised forms of urbanization since the 1950s. Nevertheless, most rural-urban fringes in the Netherlands have seen substantial changes in land-use in recent decades. Large-scale residential areas and recreational parks were developed. Furthermore, a considerable number of commercial areas, office parks and retail centres were constructed in the surroundings of cities, mostly on locations in the vicinity of motorways. In general, the urban fringe, as in many other countries (see Bryant et al. 1982, Audirac 1999, Gallent et al. 2006), is characterized by a large degree of spatial and functional heterogeneity. At the rural-urban fringe, new urban expansions emerge next to established areas, large-scale developments next to small-scale locations and urban functions next to rural functions. Formerly agricultural and natural areas around villages and cities have slowly transformed in into a complex and hybrid landscape with a combination of rural and urban functions. Compared to other countries, most of the urban developments at the rural-urban fringe in the Netherlands take place nearby existing cities. Therefore we define the rural-urban fringe as a rather narrow area (approximately 2 kilometres) between the city and the countryside. This area is like a shell around the existing urban area and follows its irregular contours. In other countries, such as the United States and Canada, definitions of the rural-urban fringe in metropolitan areas often describe much larger areas, in some cases up to 50 kilometres.

2.1 Research questions

This paper addresses four main questions: What types of urban developments can be distinguished at the rural-urban fringe in the Netherlands? What are the morphological structures of recent urban developments

on the regional scale? How do the urban developments relate to policy ambitions to keep urban areas compact? And finally, what are future challenges for policy makers and urban planners concerning urban developments at the rural-urban fringe?

In the first part of the paper we will briefly describe the main drivers of urban deconcentration and related environmental, social and spatial effects. Subsequently, we will give a short overview of the history of relevant spatial policy in the Netherlands. In the following section, we will introduce seven significant types of urban developments at the rural-urban fringe and analyse three regions showing different patterns of urbanization. Finally, we will summarize the most important findings and conclude with identifying challenges for policy makers and urban planners on the local, regional and national scale.

2.2 Drivers of urban developments at the rural-urban fringe

In the past decades urban developments at the rural-urban fringe have accelerated in response to growing welfare, global economic forces, improved transportation links and enhanced personal mobility. This has made it possible to live and work increasingly farther away from city centres, while retaining all the advantages of central city location. In Europe today, even where there is little or no population pressure, a variety of factors are still driving urban deconcentration. Suburban residential, recreational and commercial developments are attractive for people, companies and municipalities for many reasons. Residential projects on suburban locations offer affordable houses with gardens, that are especially attractive for families with children. For companies, initial investment costs for suburban real estate locations are relatively low compared to inner city locations. Moreover, locations at the urban fringe offer good accessibility, especially for motorized vehicles. Furthermore, suburban developments have been an important source of income for municipalities and project developers in the past decades. The development of new commercial areas enabled municipalities to attract new companies and employment, and project developers could earn money with land transactions and the development of residential and business projects. On the regional and national level, the government has been facilitating these developments by financing the road, rail and public infrastructure serving new locations at the rural-urban fringe.

2.3 Effects of urban deconcentration

As described above, urban developments at the rural-urban fringe have economic benefits and offer space for commercial, residential and recreational functions. However, urban deconcentration causes a number of negative environmental, social and spatial effects. There is a general consensus that dispersed urban developments have been putting pressure on the environment. Due to the larger area consumed by suburban neighbourhoods compared to inner-city neighbourhoods, more farmland and wildlife habitats are displaced per resident (Benfield et al. 1999). Furthermore, international studies show that suburban residents generate more per capita pollution and carbon emissions than their urban counterparts because their increased personal mobility and a higher car dependency (Fuller and Crawford 2011). In the Netherlands, suburban residential areas have a relatively high density compared to other countries. Nevertheless, car-ownership and traveling distances are higher compared to inner-city neighbourhoods (Snellen et al. 2005). Next to environmental issues, suburban developments have other costs. For example, the cost of providing and maintaining streets, utilities, and other public facilities to suburban communities is significantly higher than for high-density residences in a city. Urban sprawl also separates classes of people. According to Dam et al. (2010) suburban residential developments increase segregation by income and ethnical background. Moreover, suburban developments can have significant negative impacts on neighbourhood vitality and the accessibility of the recreational land surrounding urban areas. From a more qualitative point of view, the loss of open landscapes and the lessening contrast between city and countryside are negative effects of suburbanization. Next to that, the urban fringe is frequently cut through by infrastructural bundles that create spatial barriers, resulting in spatial fragmentation. As a result, many areas at the urban rural-fringe are perceived as cluttered (Veeneklaas et al. 2006).

2.4 Current transitions and future expectations

At the present time, the rural-urban fringes in the Netherlands still have a predominantly green character (MNP 2007, Vreke et al. 2007, Piek and De Niet 2010). However, due to the developments mentioned above, urbanization is increasing rapidly. At the rural-urban fringe, various land-use functions fight over the scarce amount of space. Natural and agricultural areas have lost space to benefit the urban functions of

housing, employment and recreation. It is expected that pressure at the rural-urban fringe will remain strong in the future (Ritsema van Eck et al. 2009). Moreover, the recent liberalization and decentralization of the spatial policy in the Netherlands is expected to accelerate the shift towards the rural-urban fringe, and to make regional differences even bigger since more responsibility concerning spatial planning is given to regional and local authorities (PBL 2011). Additionally, the current financial and real estate crisis has brought an end to the large-scale and top-down planning approach that has dominated urban developments in the Netherlands in the past decades. In this context it will be necessary to take a closer look at small-scale and organic approaches to transform and develop urban areas (Buitelaar et al. 2012 and Tennekes and Harbers 2012). Considering the ongoing pressure at the urban fringe, recent changes in spatial planning policy, and ambitions to create more sustainable urban areas in the future (European Commission 2011), planning and (re-)designing areas at the rural-urban fringe is a significant challenge for policy makers and urban planners.

3 TAMING URBANIZATION: SPATIAL POLICY IN THE NETHERLANDS

In the Netherlands, the national spatial policy has had great influence at the urban developments in the country. To get a better understanding of urban – and suburban – spatial morphology it is important to have a look at the history of national spatial policy and leading concepts of spatial planning. Since more than sixty years Dutch planners and policy makers have strived for compact forms of urbanization. The aim was to keep the existing cities compact in order to avoid extensive and uncontrolled urban sprawl. In various Dutch national spatial policy documents different strategies to achieve compact urban developments have taken a prominent position (Nabielek et al. 2012). In the following passages the most important concepts and strategies are briefly described.

3.1 Buffer zones

Already in the years following the Second World War, planners and policy makers feared that cities would grow towards each other, leaving little green space in-between. Therefore, protected buffer zones were introduced in the First National Policy Document on Spatial Planning (1960). These buffer zones restricted urban developments in these zones. The first two buffer zones were located between Amsterdam and Haarlem (Spaarnwoude) en between Rotterdam and Delft (Midden-Delfland). Over the following 50 years the strategy of 'green' restriction zones was extended and further elaborated.

3.2 Clustered dispersal

Moreover, the Second and Third National Policy Document on Spatial Planning (VROM 1966 and 1978) introduced the concept of 'clustered dispersal' and 'growth centres'. This concept was guided by the idea to limit new urban expansion at the urban fringe by creating new towns that were located at a distance of 10 to 30 kilometres to the bigger cities. Some of these new settlements were completely new (e.g. Almere to the northeast of Amsterdam) and others were linked to existing small towns or villages (e.g. Zoetermeer to east of The Hague).

3.3 Compact city

In the beginning of the 1980s, the concept of 'clustered dispersal' became more and more criticised, as the new towns were dominated by a residential character and showed a lack of urban qualities, such as density, cultural diversity and mixed functions. Furthermore, the big cities like Amsterdam and Rotterdam were faced with population decline and growing socio-economic problems. The reaction to this was a re-orientation on the existing big cities that was framed by the concept of the 'compact city'. In this concept the focus shifted from urban expansion to revitalizing and densifying existing urban areas. The aim was to limit new urban suburbanization on the urban fringe. The Forth National Policy Document on Spatial Planning (VROM 1988) was based on the concept of the 'compact city'.

However, this document should not stop suburbanization. In the following period large-scale suburban neighbourhoods (so-called Vinex-locations) were planned as part of the supplement to the Forth National Policy Document on Spatial Planning (VROM 1991). These residential neighbourhoods were precisely planned in a top-down manner with relatively high densities and good access to public transport. Nevertheless, the sheer scale of developments led to massive urbanization in some parts of the rural-urban fringe, especially in the Randstad. As a consequence, the population of inner city areas should continue to

decline (Nabielek 2011). Moreover, the economy was growing strongly and municipalities were developing new commercial zones at the fringes of their cities. However, it is remarkable that large out-of-town shopping malls could be avoided due to a very restrictive policy concerning retail developments.

In the following National Policy Document on Spatial Planning, the so-called 'Nota Ruimte' (VROM 2004) the focus shifted towards urban networks and urban developments on the regional scale. This document set specific goals for so-called 'concentration areas' around greater urban conurbations and 'urban densification' in existing urban areas. Furthermore, valuable green areas were protected by national buffer zones, a national ecological network (EHS) and national parks. However, this document also left more space to local authorities and the private sector to develop residential and commercial areas.

3.4 Liberalization and Decentralization

The most recent National Policy Document on Spatial Planning SVIR (I&M 2012) strongly focuses on economic growth and large-scale infrastructural investments. Spatial planning is decentralized to regional and local authorities and national planning strategies, such as the national buffer zones, the national ecological network, urban concentration and densification, have been abolished. Therefore, it can be expected that the decentralization of the spatial policy will accelerate urban developments at the rural-urban fringe.

4 SPATIAL DEVELOPMENTS ON THE RURAL-URBAN FRINGE IN THE RECENT PAST

The previous paragraphs have described drivers of urbanization on the periphery of cities in the context of spatial policy in the Netherlands. This paragraph will provide an insight into quantitative and qualitative aspects of the developments at the rural-urban fringe. We used two approaches to the urban fringe: a strictly delineated definition to facilitate calculations based on GIS analyses and a looser approach to facilitate qualitative analyses of urbanization patterns in the region surrounding the city. In the qualitative analysis, we will describe seven types of urban developments in closer detail. Before turning to the morphological particularities, however, we will present the results of our quantitative analysis of the rural-urban fringe that maps out important land-use changes in the Netherlands.

4.1 Quantitative analysis

In the quantitative analysis we have made a distinction between existing urban area, rural-urban fringe and countryside. For this distinction we have used the definition of Hamers et al. (2009). This definition assumes that the size of the urban fringe depends on the size of the urban area: the larger the existing urban area, the broader the urban fringe becomes. In this quantitative approach, the broadest urban fringe in the Netherlands (for the urban area Amsterdam–Zaandam) is 2 kilometres wide; the narrowest urban fringe is only a few hundred metres wide. While Lucas and Van Oort (1993) used a relatively traditional concentric shell model, Hamers et al. (2009) also took explicit account of urbanization near motorway slip roads, both in the immediate vicinity of cities (circles with a radius of 1800 m) and at larger distances (circles with a radius of 900 m). Finally, the dynamics of the urban fringe are important. Due to the expansion of the urban area, the urban fringe has shifted outwards through the years. During the 1996–2003 measurement period, the urban fringe made up 14 % of the land area of the Netherlands, compared with 9 % in the existing urban area and 77 % in the countryside.

To analyse the spatial developments, we used a GIS analysis of the land-use statistics from Statistics Netherlands (Bodemstatistiek, CBS) to compare the developments in housing, commerce, recreation and nature in the three areas mentioned above, for the period 1996–2003. This comparison showed that by far the majority of developments in housing, commerce and recreation took place at the rural-urban fringe (see Figure 1). For housing, the development per square kilometre at the rural-urban fringe was over 5 times greater than that within the urban area and nearly 14 times greater than in the countryside. For commercial developments, the area at the urban fringe expanded eightfold compared with the rural-urban area and became 12 times larger than in the countryside. The area of recreation also increased the most in the rural-urban fringe: per square kilometre with nearly 6.5 times that of the countryside. In the city, recreational areas actually decreased. The increase in land use for housing, employment and recreation at the rural-urban fringe took place at the expense of space for nature and especially agriculture.
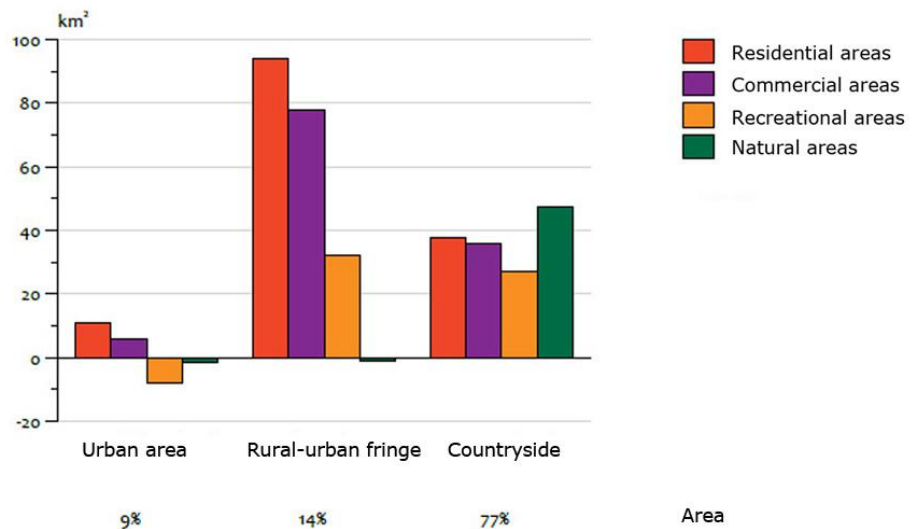
Fig. 1: Land-use changes in the Netherlands 1996-2003

4.2 Qualitative analysis: seven types of urban developments at the rural-urban fringe

Figures alone offer an insufficient basis for urbanization policy for the rural-urban fringe. For this purpose, qualitative insight into the spatial developments is also required. Which types of land-use functions seek the urban fringe, and which spatial patterns are created as a result? Before we show spatial patterns on the regional scale in the following paragraph, we present seven types of urban developments in greater detail that are specific for the recent past (see Figure 2): large-scale residential areas (Vinex-locations), small-scale residential areas, commercial areas, peripheral office parks and retail centres, recreational areas and shadowland (in-between areas). We have selected and analysed these types based on field research and literature studies. In the qualitative analysis we have studied urban developments in a larger area than the strictly delineated zone of the quantitative analysis discussed above.

4.2.1 Large-scale residential areas

Housing is one of the most dominant urban functions in the rural-urban fringe. The residential areas that are built in the recent past are primarily the large-scale suburban neighbourhoods that were planned as part of the supplement to the Fourth Policy Document on Spatial Planning (VROM 1991). Some of these neighbourhoods are planned for more than 30.000 inhabitants. These neighbourhoods can either create a new ´edge´ of existing concentric cities or have such an independent position in the urban network that they serve as new centres of a polycentric urban region (Lörzing et al. 2006, Boeijenga and Mensink 2008). A concentration of large-scale residential areas can be found in and around the four largest cities in the Randstad: Amsterdam, Utrecht, The Hague and Rotterdam. Examples of such residential areas are the neighbourhoods Ypenburg (close to The Hague), Carnisselande (close to Rotterdam), Leidsche Rijn (close to Utrecht) en Almere Buiten (close to Almere).

Although there is in general a wide variety of housing typologies and styles, these so-called Vinex-locations recently are criticized for their monofunctionality and inflexibility concerning the future urban transformation task. The large housing stock, that is developed at the same time, could also become obsolete (and thus a major transformation task) in the same period of time. Furthermore, not all areas are provided with good public transport connections and are mainly designed for motorized vehicles.

4.2.2 Small-scale residential areas

Small-scale residential developments lay scattered in the urban fringe, mostly in the vicinity of small villages and cities. They can predominantly be found in more rural areas, such as the Groningen region. Common examples of these kinds of residential areas are small neighbourhoods with detached houses. More particular

examples of these residential developments are ´exclusive´ residential neighbourhoods that are designed for certain target groups, often higher-income earners. They are characterized by clear boundaries towards their surroundings and distinctive (themed) architecture (Nabielek 2009). In some cases the residential function is a combination with recreational functions (e.g. golf course, harbour).

Although there is a growing number of residential neighbourhoods with an enclosed character in the Netherlands (Hamers et al. 2007), compared to gated communities in the United States or South America, the scale of the developments is much smaller and the gradation of enclosure relatively soft (e.g. by stretches of water). Nevertheless, these developments are examples for an increasing trend in the housing market that leads to increasing segregation by income and ethnical backgrounds.

4.2.3   Commercial areas

Next to housing areas, there is a noticeable large area for commercial purposes. Between 2000 and 2006, the total urban area has been growing with approximately 150 km² and a large part of it (60 km²) has been developed for commercial use Ritsema van Eck et al. (2009). In the area of employment, it is traditionally the nuisance-causing businesses (noise, stench) that are located at the urban fringe. However, many other types of businesses have also found their way here, especially those that need a relatively large amount of space and that must be accessible by vehicle. Many business estates have been developed in the in the immediate vicinity of motorway junctions and exits. They often fill up the leftover areas between the motorway and housing areas. In some areas, however, commercial parks are located at a larger distance of existing urbanized areas, for example the area of Schiphol airport. The extend and type of the development has led to severe critic of the Dutch society. On the regional scale, there are complaints about the ´filling up´ of open spaces (mostly along infrastructure) and the lessening contrast between city and countryside. On the local scale, business estates are characterized by a very functional design and lack basic urban or architectural qualities (Van der Gaag 2004). Furthermore, business estates without a connection to public transport that are designed for vehicles have a negative impact on the environment as they increase pollution and carbon emissions. Another problem is the growing number of decaying business estates with vacant plots and buildings.

4.2.4   Office parks

In recent years, there has been a strong growth of office parks at the rural-urban fringe in the Netherlands. Headquarters of national and international companies used to be located in the city centre but today one can find them increasingly on the urban fringe of big and medium-sized cities and along motorways (Hamers & Nabielek 2006). Statistically, office parks often belong to the category ´business estates´, but spatially their dynamic development and architectural layout is different. Between 2000 and 2006, the number of peripheral office clusters has been increasing significantly in comparison with other employment areas, namely with 26 per cent compared to 3, 5 per cent of all employment areas. In a spatial sense, the total surface area of office parks is relatively small. Office parks have, however, usually are eye-catching structures with high-rise buildings that are visible from far away. Some office parks are carefully designed in relation to their surroundings including a park-like setting that is accessible for the public. Examples are the office park Papendorp at the motorway junction Oudenrijn (Utrecht) or De Hoef at the motorway junction Hoevelaken (Amersfoort).

Currently, there is a record of vacant office space in the Netherlands. In 2012, more that 7 million m2 of office space was vacant, that is almost 15 per cent of the total amount of office space in the Netherlands. New peripheral office parks contribute to the high vacancy rate because they attract firms that are already settled in office buildings elsewhere in the Netherlands. Furthermore, office parks are primarily designed for car access and therefore foster commuting. They therefore entail a negative impact on the environment in general and in particular on their surrounding (noise, pollution).

Large-scale residential areas (Vinex-locations)

Small-scale residential areas

Commercial areas

Office parks

Retail centres

Recreational areas

Shadowland (in-between areas)

Fig. 2: Seven types of urban developments at the rural-urban fringe

4.2.5 Retail centres

The development of commerce near motorways on the urban fringe is especially apparent: commerce on the urban fringe as a whole has already grown much more than in the cities, but at motorway locations, the development is even greater. There has been a particularly striking increase in the number of large garden centres and in furniture centres in existing and new out-of-town retail centres such as 'factory outlets centres' and 'retail parks' (Hamers and Nabielek 2006). However, compared to other European countries, it is remarkable that large out-of-town shopping malls could be avoided due to a very restrictive policy concerning retail developments.

In general, retail areas have a very functional layout. In most of the cases, the public space is poorly designed and dominated by parking spaces. Like business and office parks, they put pressure on the environment by

contributing to the increase of car traffic. Furthermore, peripheral retail centres can have a negative effect on the existing retail structure in, for example, inner city locations. Therefore, the matter of new peripheral retail centre is highly political. In 2009, a referendum of the population of the city of Tilburg has stopped the development of a large shopping mall on the northern edge of the city.

4.2.6 Recreational areas

As stated previously, the area for housing and employment at the urban fringe has increased the most. In addition, the area for recreation is also growing. Recreational land use can have both a 'red/urban' and a 'green/rural' character. There is a difference between buildings or structures with a recreational function (indoor) and outside areas with a recreational function (outdoor). Examples of the first group are ski halls, thermal baths, mega cinemas and examples of the second group are sports grounds, allotment gardens, natural areas and parks. Indoor-facilities are mostly located in the vicinity of motorways and are equipped with larger parking areas as they sometimes have high concentrations of visitors. In the category of outdoor-facilities, the growing number of larger peripheral golf courses is particularly striking. Between 1998 and 2006 the total area of golf courses has increased from 1.300 to 7.300 hectare (Schuit et al. 2008). A third important category is the clustering of vacation homes, mostly concentrated in recreation parks.

The footprint of indoor recreational facilities is much smaller than outdoor recreational functions. However, large-scale and 'stony' buildings and complexes, such as large indoor playgrounds built in open areas, can negatively affect the original landscape around the city. Other developments are more compatible with the landscape, such as the construction of bicycle paths. Another problematic issue is the construction of so-called vacation villages – a cluster of vacation houses – because they contribute to the urbanization of rural areas.

4.2.7 Shadowland (areas in-between)

In-between areas are characterised by administrative and spatial fragmentation. In many cases, large-scale infrastructure is cutting through these areas and new, established, small and large functions lay like randomly distributed in the area. This so-called ´Shadowland´ can be often found in the urban fringe. It is characterised by the coexistence of different functions that have little in common (Frijters et al. 2004). Shadowland has an organic, unplanned layout and the quality of public space is mostly poor. Shadow land is therefore often perceived as ´untidy´. On the other hand, these areas offer opportunities for small-scale local activities for which there is currently little space in the inner city such as artist ateliers, allotment gardens and sport fields. In recent years, however, many Shadowland areas have been transformed into (among others) business parks or commercial areas.

The usual way to transform Shadowland is mostly by demolition and new building. In doing so, however, local activities that may have a positive effect on the area in the long term are banished. A more sustainable way to transform Shadowland could be to strengthen the local identity and landscape qualities and to improve (public) transport connections.

5 REGIONAL COMPARISON

In this part of the paper, we will analyse the morphological patterns of recent urban developments on the rural-urban fringe in three Dutch regions: The Amsterdam region, the Rotterdam-The Hague region and the Groningen region. These three regions were selected because they show different types of urban regions. The Amsterdam region is an example of a monocentric city region in which smaller cities are clustered around a dominant city. The Rotterdam-The Hague region has a polycentric structure with to big cities of more or less the same size. Finally, the Groningen region is an example of a monocentric medium sized city in a rural region. On the regional scale we can get an impression of the scale, location and spatial patterns of urbanization at the rural-urban fringes. On the maps we can distinguish where the urban expansions are compact and where they show a dispersed structure.
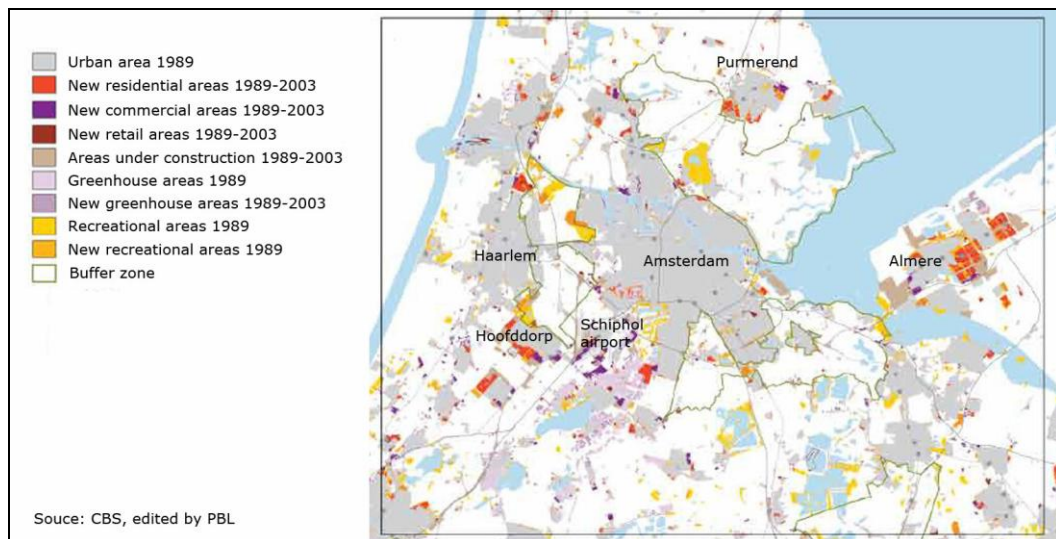
Fig. 3: Urban developments 1989-2003 in the Amsterdam region

5.1 Amsterdam region

With its monocentric structure, the city of Amsterdam is a typical example of a compact European city. Together with the surrounding smaller cities, it forms a polycentric region in which Amsterdam clearly takes a central and dominant position. The map of the region (see figure 2) shows that there have been very few urban expansions on the fringe of the city in the past 20 years. The map shows that Amsterdam is surrounded by green buffer zones that have successfully protected these areas from suburbanization. Furthermore, in the south of Amsterdam, the airport and the related noise contour has limited possibilities for residential expansions areas. In the surroundings of the airport, however, the map shows a strong dynamic of new business locations.

Looking at the urban developments in the Amsterdam region, it can be argued that the developments are in line with the national concentration policy. The city has very much kept its compact character and the green buffer zones have protected Amsterdam from growing together with neighbouring cities. However, the smaller cities in the surrounding, such as Haarlem, Hoofddorp and Almere, show much larger suburban developments. Because the city of Amsterdam could not expand on its edges, these expansions have shifted towards locations at a greater distance of the city. In the southwest of the Amsterdam region we can see that a ring of continuous urbanization emerging between smaller cities. Moreover, decentral locations in the regions, such as large-scale expansion areas around the newtown of Almere (more than 30 kilometres away from Amsterdam), have put serious pressure on the road system in the Amsterdam region. If we look at the urban developments at the rural-urban fringe on the local and on the regional level, we can conclude that the concentration policy has had positive as well as negative effects on the region.
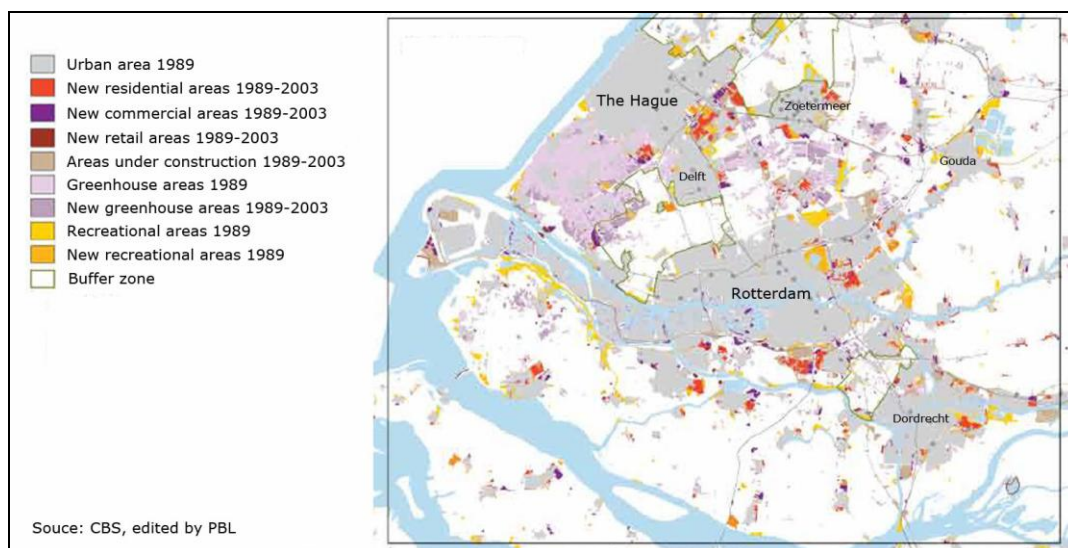
Fig. 4: Urban developments 1989-2003 in the Rotterdam-The Hague region

5.2 Rotterdam-The Hague region

The Rotterdam-The Hague region can be described as a polycentric urban region with two big cities. With 600.000 inhabitants Rotterdam is slightly bigger than The Hague (500.000 inhabitants). Smaller cities in this region are Delft, Zoetermeer, Gouda and Dordrecht. Furthermore, the region is characterized by large areas of greenhouses for the production of vegetables. The map of urban developments in the region (see Figure 4) shows there has been almost no urbanization between Rotterdam and Delft. In this area, the open landscape has been protected by the national buffer zone of Midden-Delfland that has been established in 1960. However, there have been strong urban dynamics in the area between Rotterdam, Zoetermeer and The Hague. The urban developments are a combination of residential and commercial (mostly greenhouses) functions. In these areas, a new local railwayline has been established in to connect Rotterdam with The Hague. New residential neighbourhoods were constructed along this line. This has led to a fragmented, spread out morphological pattern that is quite unsusual in the Netherlands. Furthermore, we can see a number of new large-scale residential areas in the Rotterdam-The Hague region. These areas are located at the urban fringe of the cities. In Rotterdam and The Hague, these large 'Vinex-locations' were built on the 'other' side of the motorway. In these cases, the motorway forms a strong spatial barrier in the urban structure.

5.3 Groningen region

The city of Groningen has, like the city of Amsterdam, a monocentric structure. The urban expansions on the urban fringes in the period between 1989 and 2003 in the Groningen region (see figure 5) are comparably modest and mainly concentrated around Groningen and surrounding small towns. The majority of peripheral developments are new residential neighbourhoods that are situated concentrically around the historic towns, directly next to established urban areas. However, the small town Assen seemed to have faced a relatively strong growth in the recent past. In comparison the size of the existing town, the new development areas on the western and northern side of Assen are relatively large; on the western side, over the A28 motorway, there is a new residential area (Kloosterveen) and a large golf course. In the east of Assen, the National Landscape Drentsche Aa has prevented urban expansions.
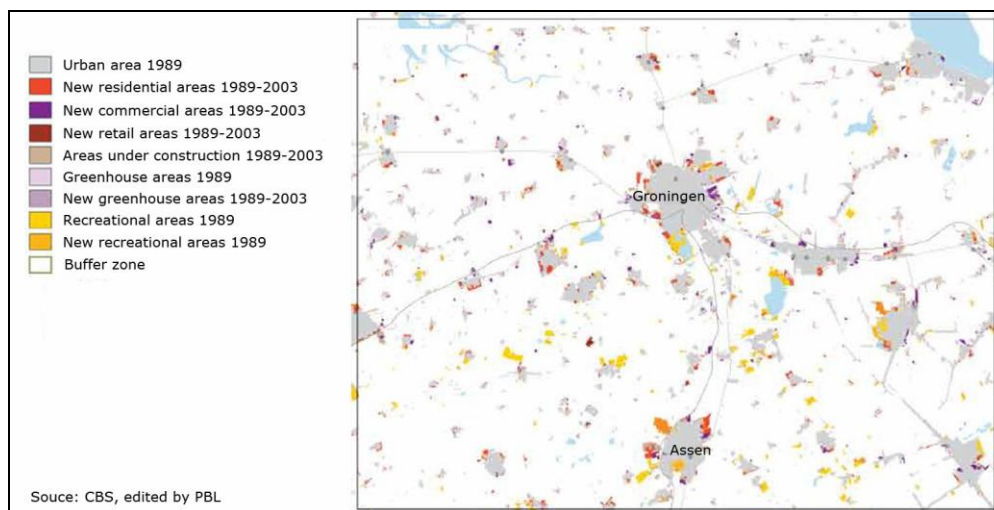
Fig. 5: Urban developments 1989-2003 in the Groningen region

6   CONCLUSIONS

Looking at the urban developments in the Netherlands in recent years, we can question how they relate to the aim of keeping urban structures compact. We can observe a strong shift towards a highly urbanized rural-urban fringe. In general, we can observe that new suburban residential areas are rather compact and are located close to cities, whereas new commercial and recreational areas show a more fragmented pattern. Paradoxically, at the local level, urban compaction policy seems quite successful, whereas at the regional level, local developments add up to traditionally unwanted urban development patterns. The maps in this paper show that diverse local expansions can result in contiguous urbanized regions. Moreover, we can see

significant regional differences. In more rural areas, such as the Groningen region, the new urbanization shows a very compact structure. However, in regions with a more polycentric urban structure, such as the Rotterdam-The Hague region, we can see that spaces between cities and villages have been filled up with new urban developments that show a much more fragmented morphological character.

With an outlook on future spatial planning tasks at the rural-urban fringe, it will be important to anticipate on regional differences due to specific regional developments and conditions. For example, the expected spatial need for housing and employment in the north and the south of the country is expected to be much lower than in the Randstad. Therefore, generic planning concepts appear to be inadequate for steering urbanization in the desired direction. The recent liberalization and decentralization of spatial policy in the Netherlands is in line with this observation. However, it can be expected that the liberalization will strengthen the trend of an increasingly dispersed urbanization and will make regional differences even bigger. In this context, re-designing existing suburban areas and planning new developments on the rural-urban fringe raises some complex policy and design issues on the local, regional and national scale.

6.1 Challenges on the local scale

The qualitative analysis and the maps in this paper show that many recently developed urban areas at the rural-urban fringe are characterized by function separation and single functionality. As a result, from a morphological perspective, the urban fringe clearly differs from inner-city locations, where, for example, housing and businesses are mixed together within the same area much more frequently. At the urban fringe, there are many new areas with divergent functions located next to each other as distinct spatial entities. In many cases these entities are separated by infrastructural bundles (often large-scale) that create spatial barriers, resulting in spatial fragmentation. In addition, the barrier effect of infrastructure (together with aspects such as large business estates) limits the possibilities of urban residents to reach the countryside easily, for example, for recreation.

Considering ambitions to create more sustainable and more liveable urban areas in the future, it is an important challenge to improve the quality of existing and new areas at the rural-urban fringe. In many urbanized regions in the Netherlands, urban, recreational and natural programmes will occur in combination in the future, which is a challenge not only for regional and local planning but also for local design. Therefore, local authorities, urban planners and architects should pay attention to developments at the rural-urban fringe and come up with strategies to create multi-functional areas with shared facilities, to improve connections between separated functions and to upgrade the identity of places on the fringe by, for example, supporting small-scale local activities that have a positive influence on their environment. Concerning commercial functions attracting many visitors, such as retail centres and recreational areas, a relevant task is to improve the quality of the public space in such areas. Finally, in times of decentralization and financial crisis it will be necessary to have a closer look on inventive small-scale and bottom-up strategies to enhance the quality of areas at the rural-urban fringe.

6.2 Challenges on the regional level

Within the region, parties must take account of differing urban, recreational and environmental tasks for each municipality. For example, one centre can be faced with severe green restrictions, while another can accommodate urban expansion more easily. To acquire a sharper image of the specific planning and design tasks, the spatial needs, together with the conditions for urbanization and the policy and nuisance restrictions, will have to be mapped out region by region. If a region wants to deal with problems as successfully as possible and take advantage of opportunities where possible, then planning will require cooperation at a regional scale. It is advisable to develop an urbanization strategy for the rural-urban fringe that transcends municipal boundaries, that focuses on the regional interest and that provides room for sub-regional differences. Within such frameworks, integral regional development projects can then be implemented at a lower scale. Although transcending municipal boundaries has, in the past, proven to be a formidable challenge (competition still seems to be more widespread than collaboration), experience with such an approach is currently being gained in various regions of the Netherlands, in terms of long-term strategic planning and (temporary) changing governance alliances.

6.3 Challenges on the national level

An important question is how increasing dispersed urbanization will affect the most urbanized regions in the Netherlands, in terms of both the economic performance of cities and the efficient use of existing infrastructure that are important policy objectives of the national government. For instance, whereas urban growth can lead to the desired agglomeration effects, increased urban sprawl can negatively affect various aspects of the environment and the quality of living (which is a basis for an attractive business climate). One way or another, a balance will have to be struck between a certain 'critical urban mass' that is needed to reach agglomeration effects and some form of urban containment that will guarantee desired levels of quality of living (e.g. clean air, proximity of natural areas). The outcome will differ from region to region, depending on the amount of space needed for urban land use as well as regional decisions on where exactly urban development will be allowed to take place: within existing urban areas, at the urban fringe or further out. In a quantitative sense alone, urban planning will be an enormous task (especially in the Randstad). Moreover, in the light of issues such as the loss of open landscapes, the lessening contrast between city and countryside and poor accessibility of the recreational land surrounding urban areas, there is an additional qualitative task that should not be underestimated. To face this challenge successfully, the urban fringe requires special attention. Sector-based policy for housing, employment, infrastructure, recreation and nature will remain necessary, but an integral spatial policy is also required where the possibilities and limitations are viewed in relation to each other, transcending the boundaries between policy dossiers.

7 ACKNOWLEDGEMENTS

8 REFERENCES

AUDIRAC, I.: Unsettled views about the fringe. Rural-urban or urban-rural frontiers? In: O. Furuseth and M. Lapping, eds. Contested countryside. The rural urban fringe in North America. Ashgate, 7–32. Aldershot 1999.
BENFIELD, K., M. RAIMI, and D. CHEN: Once There Were Greenfields. Natural Resources Defense Council. London 1999.
BOEIJENGA, J. & J. MENSINK: Vinex Atlas, Uitgeverij 010. Rotterdam 2008.
BRYANT, C., RUSSWURM, L., and A. MCLELLAN: The city's countryside. Land and its management in the rural-urban fringe. Longman. London 1982.
BUITELAAR E., S. FEENSTRA, M. GALLE, J. LEKKERKERKER, N. SOREL and J. TENNEKES: Vormgeven aan de Spontane Stad: belemmeringen en kansen voor organische stedelijke herontwikkeling. PBL Netherlands Environmental Assessment Agency. The Hague 2012.
DAM, F. van, G. BOLT, S. BOSCHMAN, P. EKAMPER, R. van KEMPEN & P. PEETERS: Nieuwbouw, verhuizingen en Segregatie; Effecten van nieuwbouw op de bevolkingssamenstelling van stadswijken. PBL Netherlands Environmental Assessment Agency.. The Hague 2010.
EUROPEAN COMMISSION. Directorate General for Regional Policy,. Cities of tomorrow – Challenges, visions, ways forward. . Publications Office of the European Union. Luxembourg 2011.
FALUDI, A. and A. van der VALK: Rule and order: Dutch planning doctrine in the 20th century. Kluwer Academic. Dordrecht 1994.
FURUSETH, O. and M. Lapping: Introduction and overview. In: O. Furuseth and M. Lapping, eds. Contested countryside. The rural urban fringe in North America. Ashgate, 1–5. Aldershot 2006.
FULLER, R. and CRAWFORD: Impact of past and future residential housing development patterns on energy demand and related emissions, Journal of Housing and the Built Environment 26 (2): 165–83. London 2011.
FRIJTERS, E., D.HAMERS, R. JOHANN, J. KÜRSCHNER, H. LÖRZING, K. NABIELEK, R. RUTTE, P. van VEELEN & M. van der WAGT: Tussenland, NAi Uitgevers/Ruimtelijk Planbureau. Rotterdam/The Hague 2004.
GALLENT, N., Andersson, J., and M. Bianconi: Planning on the edge. The context for planning at the rural-urban fringe. Routledge. London 2006.
HAMERS, D.: The fringe in focus. A mosaic of urban milieus as the basis for a regional planning approach to urban development. In: Proceedings of global visions. Risks and opportunities for the urban planet, 5th conference of the International Forum on Urbanism (IFoU), Singapore: 2011.
HAMERS, D. and K. Nabielek: Along the fast lane. Urbanization of the motorway in the Netherlands. In: C. Wang, Q. Sheng, and C. Sezer, eds. Proceedings of the International Forum on Urbanism 2006 in Beijing: modernization and regionalism: re-inventing urban identity, Volume 1. Delft: IFoU, 274–281.
HAMERS, D., K. NABIELEK, M. PIEK and N. SOREL: Verstedelijking in de stadsrandzone. Een verkenning van de Ruimtelijke opgave. The Hague: PBL Netherlands Environmental Assessment Agency.
I&M, Dutch Ministry for Infrastructure and Environment: Structuurvisie Infrastructuur en Ruimte. The Hague 2012.
LUCAS, P. and G. Van OORT: Dynamiek in een stadsrandzone. Werken en wonen in de stadsrandzone van de agglomeratie Utrecht. Utrecht: Koninklijk Nederlands Aardrijkskundig Genootschap/Faculteit Ruimtelijke

Wetenschappen Rijksuniversiteit Utrecht 1993.

LÖRZING, H., W. KLEMM, M. van LEEUWEN & S. SOEKEMIN: Vinex! Een morfologische verkenning. NAi Uitgevers/ RPB Netherlands Institute for Spatial Research.. Rotterdam/The Hague 2007.

MNP Netherlands Environmental Assessment Agency: Natuurbalans 2007. Bilthoven: MNP Netherlands Environmental Assessment Agency. Bilthoven 2012.

NIROV (Netherlands Institute for Planning and Housing), Bouwen aan de randen van de stad. The Hague 2008.

NABIELEK, K.: A morphological analysis of Enclosed Residential Domains in the Netherlands. In: Proceedings of the 5th International Conference of the Research Network "Private Urban Governance & Gated Communities", University of Chile, Santiago de Chile 2009.

NABIELEK, K.: Urban Densification in the Netherlands: national spatial policy and empirical research of recent developments. In: Proceedings of global visions. Risks and opportunities for the urban planet, 5th conference of the International Forum on Urbanism (IFoU), Singapore: 2011.

NABIELEK, K., S. BOSCHMAN, A. HARBERS, M. PIEK and A. VLONK: Stedelijke verdichting: een ruimtelijke verkenning van binnenstedelijk wonen en werken. PBL Netherlands Environmental Assessment Agency. The Hague 2012.

PBL Netherlands Environmental Assessment Agency: Nederland in 2040: een land van regio's – Ruimtelijke verkenning 2011. PBL Netherlands Environmental Assessment Agency. The Hague 2012.

PIEK, M. and DE NIET, R.: Groene stadsranden en verstedelijkingsdynamiek. In: PBL Netherlands Environmental Assessment Agency, ed. Staat van de ruimte 2010. PBL Netherlands Environmental Assessment Agency, 169–184. The Hague 2010.

PIEK, M., et al.: Snelwegpanorama's in Nederland. Rotterdam/The Hague: NAiPublishers/RPB Netherlands Institute for Spatial Research. Rotterdam/The Hague 2007.

RITSEMA VAN ECK, J. and H. FARJON: Monitor Nota Ruimte. De eerste vervolgmeting. Rotterdam/The Hague/Bilthoven: NAi Publishers/RPB Netherlands Institute for Spatial Research/MNP Netherlands Environmental Assessment Agency. The Hague 2008.

SCHUIT, J. van der, H. van AMSTERDAM, M. BREEDIJK, L. BRANDES, E. FICK & M. SPOON: Ruimte in cijfers 2008. PBL Netherlands Environmental Assessment Agency. The Hague 2008.

SNELLEN, D., H. HILBERS & A. HENDRIKS: Nieuwbouw in beweging. Een analyse van het ruimtelijk mobiliteitsbeleid van Vinex. Rotterdam/The Hague: NAiPublishers/RPB Netherlands Institute for Spatial Research. Rotterdam/The Hague 2007.

TENNEKES, J. and A. HARBERS: Grootschalige of kleinschalige verstedelijking? PBL Netherlands Environmental Assessment Agency. The Hague 2012.

VEENEKLAAS, F., DONDERS, J., and I. SALVERDA: Verrommeling in Nederland. Wageningen UR. Wageningen 2006.

VREKE, J., et al.: Natuur en landschap voor mensen. Achtergronddocument bij Natuurbalans 2007. Wageningen: WOT Natuur & Milieu, Alterra and MNP Netherlands Environmental Assessment Agency. Bilthoven 2007.

VROM: Derde Nota over de Ruimtelijke Ordening. Sdu Uitgeverij. The Hague 1978.

VROM: Vierde nota over de ruimtelijke ordening,. Staatsuitgeverij. The Hague 1988.

VROM: Vierde Nota over de ruimtelijke ordening extra, deel 1. Ministerie van VROM. The Hague 1991.

VROM, LNV, VenW en EZ: Nota Ruimte; Ruimte voor Ontwikkeling. Sdu Uitgeverij. The Hague 2004.

The Slums Affect the Future of the Metropolis

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1   ABSTRACT

This work is part of a research in progress: in particular it is aimed to tackle the problem of uncontrolled city growth. Urban sprawl has recently become a critical issue not only from the spatial point of view, but also for overcrowding.

The main objective of this study is to point out the need for a proper planning of the largest urban areas in the world by means of a strategic project. Also, the need for a functional organization of the so-called slums is worth considering.

Slums are usually left out from the well-organized urban system. Although they can easily be identified within the city, they are not formally recognized from the perspective of soil occupation and the related social issues.

In the light of this, planners are increasingly given important responsibilities as well as a set of different tasks. In fact, besides the multi-disciplinary approach, they should deepen the correlation between space and the population.

The explosion of megacities, along with the prospect of further settlements in the world, involve a mixture of people, cultures, religions, education, interests, and technologies which undermine the traditional planning methodologies. In fact, this situation affects the functional integration and the development of a participatory process.

This research in progress would provide new methods and new models so as to analyze the phenomenon, both large-scale and the small-scale aspects.

2   MIGRATION TO THE CITY

2.1 Population growth

The world population is rising very fast, in fact, now about half live in urban centres. Census data in 2010 indicate that cities are home to 3.5 billion people, which is 50.5 percent of the world. The growth of cities is one of the most significant phenomena of our time. Most of this massive urban growth will take place in Asia, Latin America and Africa. The total population presents one overall measure of the potential impact of the country in the world and within its territory. In general the movement of large masses of the population is determined by the hope of improving their living conditions.

This rapid and massive urbanization poses serious problems for countries in the developing world that need to find means and policies to provide essential services to their growing populations. „When cities fail to satisfy these basic needs, it creates areas known as slums, which usually lack drinking water, safe sanitation, durable living space, or the safety of a lease" (Worldwatch Institute, 2012).

Migration in the cities poses complex problems with regard to the management and governance of urban areas in fact the rate of growth in demand for goods and services will become much higher than that expressed by the capacity of government and response from the authorities.

The result of this differences will be the rapid expansion of slums that are the most obvious expression of urban poverty.

2.2 Slum's space

„Probably in the world there are more than two thousand slums with a population living there that ranges from some hundreds to more than one million" (Davis, 2006).

The comparison between the most recurring settlement typologies points out the lack of an organic pattern and technically functional to the settlement. The layer building in following times takes to the occupation of all the available spaces, without any distance, heights, road space regulation, and the environment safeguard.

A first reading of the settlement pattern in relation to the city leads to the following graphic synthesis (Fig.1):
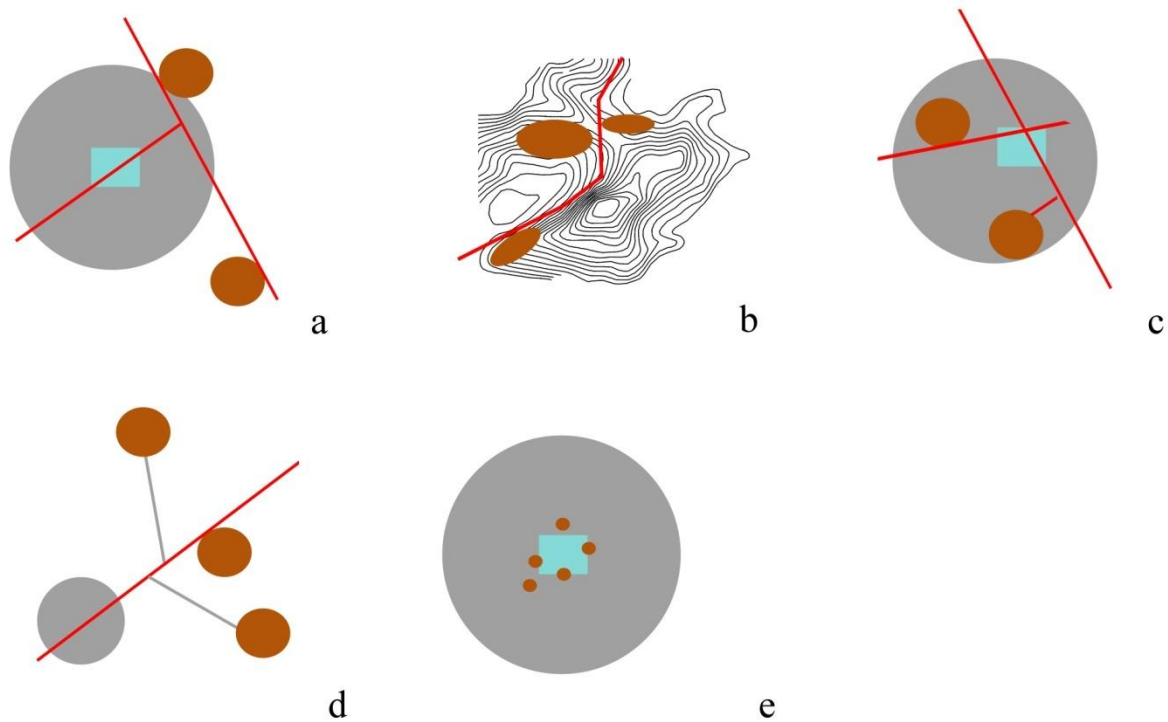
Fig. 1: Graphic synthesis of the types of slum

Peripheral slums (Fig.1.a): they take a side position compared to the urban centre, they are often next to a road infrastructure linking to a financial and productive centre of the city.

Hillside slums (Fig.1.b): are characterized by the precariousness of the training site. Generally these are the surroundings of the steep hills (for example favela of Rochina a Rio de Janeiro), alluvial soils, overall areas with a high risk of natural disasters.

Inner city slum (Fig.1.c): they are located in the empty spaces of the existing urban structure (for example Dharavi slum in India) or they are incorporated in the city process of expansion.

Satellite slum in the wide area (Fig.1.d):they are far away from the city (for example, refugee camps) next to a main road or to secondary roads linking to the urban centre.

Gentrification (Fig.1.e): they are typical suburbs and urban centres areas. They are characterized by a cycle "degradation – requalification, and they are used alternately by the immigrant population and high-income population.

In "Planet of slums" Mike Davis represents the comparable models of rational choice that can be found in all cities (Table 1). He identifies a number of specific types of ownership and settlement and also he said: the table below is „an analytic simplification useful to set a global comparability, but it does not take into consideration locally important characters".

City centre	Periphery

1   Formal
    1.1 blocks
       1.1.1   " second hand "
       1.1.2   built for the
           poor
    1.2 public housing
    1.3 hostels, dormitories, etc
 	
2   Informal
    2.1 occupants
       2.1.1   authorized
       2.1.2   abusive
    2.2 people on the sidewalks
	1) Formal
	    a) private rental
	    b) public housing
	
	2) Informal
	    a) private housing estate
	      i) owner - tenant
	      ii) landholder
	    b) occupants
	      i) authorized
	  ii) abusive
	3) Refugee camps

Table 1: Typology of slum (Source: Davis, 2006)

It is difficult to take an action for a reconversion apt to guarantee the minimum civil living standards, without a strong action able to dimension the population density and the use of soil for public and collective aims. If the conditions to move outside the slum part of the overcrowded inhabitants do not come up, it will be easy to think about the only option of widen the building action areas. It is probably also one of the reasons why the slums do not come into the strategic projects of great areas. Those projects that should express a strategic vision of the metropolis and a sustainable mission of the territory infrastructure, supported by a financial policy of public intervention.

3 TWO EXAMPLES OF REFERENCE: DHARAVI (MUMBAI) AND ROCHINA (RIO DE JANEIRO)

To get a first evaluation of the relationships on the wealth status of the population, it is indicating a data that compares the recorded urban population with that one which we assume to be informally settled in the slums.

(Table 2). Two significant examples that are examined here are: the case of Dharavi slum in Mumbai and the case of favela Rochina in Brazil. The two examples are not comparable to each other in terms of differences for the population structure, types of urbanization and cultural factors but they have also analogies in the economic aspects, settlement growth, poverty, humiliation, degradation. However, there are differences on the typological profile: settlements, or favelas, in Brazil are made of masonry, with much better anthropological and relationship-wise factors; however, in India slums are constructed with metal and recycled materials. Even the actions and the state hand that point to give answers to the seriousness of the problem are different. The efforts, even if just occasional, like those taken or taking place at the moment in the Rochina's favela, are characterised by the goal to project proposals that will allow to improve the environment quality without great changings of the settlement, but especially to give a positive hope to the inhabitants. It is as well important to point out that in India there is a common policy to accept the state of things as they are to enjoy "the induced effects", in a relationship cost and benefit between city and slum; in Brazil the state of things is different under this aspect because the contest exploitation is less clear.

Country	• Urban population (thousand)[1]	Percentage living in slums (%)	Slum population (thousand)	Year
India	341247	32,1	109540	2007
Brazil	163462	28,0	45769	2007

Table 2: Urban population and slum population (Source: UN-Habitat)

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1 United Nations Department of Economic and Social Affairs Population Division – World Urbanization Prospects: The 2007 Revision

3.1 The case of Dharavi in Mumbai (India)

India is an ancient nation and more than a billion people live there, one sixth of the world population. Mumbai, also known as the "city of dreams" is the financial heart of the country. The mirage of wealth caused a population explosion: in ten years the population increased from 9 to 14 million people. This has led to an overcrowding of colossal proportions and to the creation of one of the Asian largest slums: Dharavi (Fig. 2). Mumbai suffers from one of the most desperate urban poverty than any other part of the earth.

„The reality is that over one half of Mumbai's population live in conditions of abject poverty, squalor and deprivation (...) the poor live in overcrowded slums and hutments, on pavements, along railway tracks, beside pipelines, under bridges, on ill craned marshlands and in other vacant spaces available to them. Although not strictly categorized as "slums", many others live in relatively old and dilapidated single room tenement chawls (..) The slums and hutments are located in highly polluted and unhealthy environments as a result of proximity to industrial emissions and effluents, and/or from poorer sewage, drainage and irregular garbage clearance" (Byrne, 2001).

Fig. 2: Slum of Dharavi in Mumbai (India) (Source: http://news.bbc.co.uk).

In the slum of Dharavi a million people live in less than two square kilometres. The state capital of Maharashtra, in the south west, is both an economic centre and the poorest place in the entire India. In the eighteenth century, Dharavi was a fishermen's island and slum, it subsequently emerged from the mud without any planning and infrastructure. Although it is impossible to live there, it still is a place full of life. Among the slum and narrow constraints there is a „ city within a city". Inside Dharavi, divided into sectors, in fact, work activities such as: plastic recycling, metal processing, textile take place. These activities made the slum community economically independent. „India is full of human energy and talents which could be positively gathered without too much bureaucracy, (Gleaser, 2011).

3.2 The case of favelas in Rio de Janeiro (Brasile)

„Brazil presents a very contradictory image to the outside world. The seductive face of Brazil is represented by its music, soap operas, football, innovative cities like Curitiba, and, of course, the delirious aphrodisia of Carnival. However, Brazil is also the daily violence of its cities and the misery of its countryside. It has the world's highest national ratio of socioeconomic inequality" (Davis and Monk, 2007).

Rio de Janeiro is one of the biggest cities in the world and there are more than 600 favelas, most of them are in the north and west parts of the urban centre. In the south, on the contrary, it is located what is considered by most the biggest bidonville of Brazil and of Latin America in general, Rochina's favela. It is a detached administrative region which stretches for 1,44 square kilometres. It arose at the beginning of the thirties, at first it was made of a few wood or recovered materials huts, basic facilities, like water and electricity were illegal. Nowadays, however, most of the buildings are built with bricks. Just like in many other favelas the

inhabitants live from informal productive activities, with a high unemployment rate that is one of the highest in the country. In addition to that the same inhabitants suffer a condition of discrimination and isolation.

In Rio de Janeiro there have been several attempts to improve the favelas: projects to make better housing conditions, to redevelop the landscape, services and networks (Fig. 3).

Fig. 3: Project of Arch. Frederic Druot to the favela of Rochina (Rio de Janeiro).

Starting from a precise diagnosis of the urban organisation and of the existing buildings, the project recommended by the Architect Federic Druot, aims at transforming and adapting a situation of fragility by rebuilding the existing precarious housing.

The objective is: to offer smarter, brighter, more comfortable surfaces providing the housing of basic services.

4 CRITICAL ECONOMIC AND PARADOXES

4.1 Cultural factors: indicators of perspectives and integration

„The fastest and most dramatic process of urbanisation in history takes place in the marginal areas, illegal settlements and slums of the metropolitan areas of the developing countries. Because of globalization and of the unequal development million of people are forced to live in a physical and social misery that is reaching a point of idealogic disaster" (Schmidt, 1998).

The traditional planning must take into consideration the consequences of the metropolis expansion and of the perspectives that come from further settlement aggregations. They take place through a mixture of different populations, cultures, religions and technologies. The possibilities of creating a condition of functional integration and of a shared development seem to be rare. In its historic evolution, the city tries to keep in itself all its qualities by defending its own social and economic features. This is the reason why mass immigration is seen as a threat for the cultural identity of the consolidated groups and a factor of pollution of the reached quality of life. The difficult relationship between residents and immigrants has a negative effect on the city organisation. Informal settlement, or slum, suffers discrimination between the welfare state and poverty. The social and cultural contradictions are due to an uncontrolled growth and they appear also in the building typologies and in the urban pattern.

4.2 Determinants economic factors: GDP

„A nation's GDP (Table 3) rates is the sum value of all goods and services produced in the country. This is the measure most economists prefer when looking at per-capita welfare and when comparing living conditions or use of resources across countries" (IndexMundi, 2010).

„Cities are the motors of economic growth and social development; they claimed the industrial and commercial development around the world" (Dogan – Kasarda, 1988), where new forms of activities and economic organization evolve and acquire a greater value. Metropolis are, therefore, responsible of a significative portion of the Gross National Product and the main sources of development opportunities. Although the metropolis economic development is linked to the informal economy, which grows through the companies working there, in part or totally, out of the legal system, ignoring any health, environment and labour security regulations.

The informal employment is a widespread phenomenon, especially in development countries where growth is strong for the presence of immigrants. They are the poorest part of the society and they accept extreme working conditions. The levels of informality vary from country to country: in Brazil, for example, „informal economy accounts for 40 % of the national GDP (compared to 13 % in China and 23 % in India)" (McKinsey Quarterly, 2011). The size of these realities is incredible. Often activities which characterize the informal market are: recycling plastic, manufacturing, ceramics.

The informal sector generates many micro companies almost always strictly connected to the productive cicle of the great companies which are part of the productive system projected into the local market and above all on the international one.

„In the developing countries the high weigh of the informal work reduces their capacity of gaining benefits from an opening to trade and it creates poverty traps for those working temporarily" (ILO, 2009).

Even though trade contributes to the world's growth and development, it does not take to better working conditions. In order to create new quality working positions, the opening of trade should necessarily come together with national appropriate policies. It is, therefore, particularly evident because, in a time of crisis like the present, thousands of workers have found a place in the informal economy.

Fig. 4: plastic recycling in the slum of Dharavi (Mumbai) (Source: www.newfractals.net)

Country	GDP (Gross Domestic Product) (Billion $)	Year
India	4,515	2011
Mumbai	**209**	2008
Brazil	2,324	2011
Rio de Janeiro[2]	**96**	2011

Table 3: Gross Domestic Product (GDP) (Source: CIA World Factbook, 2012)

4.2.1 The Gini index for inequality

One of the largest impacts of the economic crisis are social inequalities. These last can be measured by the Gini coefficient, which measures the deviation from the wealth (or consume) among people inside a country, through a value equal to 0, which represents the absolute equality, and a value equal to 100 which defines the absolute inequality (Table 4).

Country	Gini Index	Year
India	36,8	2005
Brazil	59,3	2009

Table 4: Gini Index (Source: World Bank, 2011)

A social policy in Brazil has had a significant impact on the reduction of inequalities in the country. Strong changings have taken place, particularly during the eight years of Lula's presidency (2002 – 2010) Who, for the first time has included the poor people in the economy, leading the country to a strong lowering of the poverty rates. Furthermore, this changing is connected to the supported development plans. Among which

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2 http://www.ibge.gov.br

Borsa Familia: a benefit given to mothers exclusively supplied with the guarantee of a regular school attendance of their children. The strong changings, which are taking place in the country take it to be an important symbol of an attempted development which aims at cancelling poverty and reduce inequalities. .

4.3 Slum productivity

The informal economy will be a permanent character of the metropolis economy in the near future, as strictly connected to the massive arrival of immigrants. Paradoxically the breaking of the balance between city and slum could lead to a lowering of GDP and to the unemployment of the slum workers.

„In 2007, the Ministry of Finance, the Government of India, constituted a High Powered Expert Committee to examine various aspects of making Mumbai an International Financial Centre. GDP in Mumbai (estimated in PPP terms) was $209 billion in 2008 that makes GDP per capita at $10,800" .

The incidence of the city on the country's GDP is 4.63 %.

„Mumbai needs to become the first world city that can attract the brightest minds of the world by being an attractive place to live, work and play" (High Powered Expert Committee on Making Mumbai an International Financial Centre, 2007).

In Dharavi is case, it is clear how it can be convenient to keep a mass of "precarious balances", in a reality of social and structural contrasts rather than running the risk of the same metropolis "medium term" breakdown. In an international competitiveness environment if the game rules between the established city and the slum's system, in some way egoistically efficient, were modified.

5 CONCLUSION

Either from an architectural or urban point of view, it is taking place a deep historical changing „an overcrowded city can survive in two different ways either new building areas are created or new ways of using the existing ones are invented" (Mehta, 2006).

The urban area organization should take into account the political, social, economical and infrastructural elements which, through a difficult mediation path of interests at stake, which are the core of the strategic urban planning. This is a task that the central and municipal governments bring forward even though they are aware of the more and more sudden changing of indicators and of coordinates to which refer. Taking also into consideration the fact that, the will to increase the effect of the development indicators, in order to improve the collocation in a world context, is so strong to become a priority in the urban and social choices.

On the basis of the work done so far, the research aims at improving the knowledge between the urban methodologies and of the urban sociology to evaluate if it does exist coherence between the settlement models and the land policies able to face the slum topic. In particular they want to understand to what extent the general planning models (linked to the American city) can still be effective for the problems solution and to redefine the indicators between land and population, between cubic meters and rooms, between services and community needs. Furthermore, it aims at finding the most suitable solutions according to the political and regulations situation (democratic, participating, representative democratic, oligarchic, monarchist, authoritarian) with the land potential.

6 REFERENCES

Beck U.: Che cos'è la globalizzazione. Urbino, 2010
Byrne D.: Understanding the urban. New York, 2001
Davis. M.: Il pianeta degli slum. Milano, 2006
Davis M. Monk B.: Dreamworlds of neoliberism. Evil paradises. New York, 2007
Dogan M., Kasarda J.: The Metropolis Era. Newbury, 1988.
Glaeser E.: Triumph of the city, New York, 2011.
Mehta S.: Maximum city: Bombay città degli eccessi. Torino, 2004.
Rodrik D.: La globalizzazione intelligente. Bari, 2011
UN-Habitat.: The Challenge of Slums, Global Report on Human Settlements, 2003

The Taming of the Shrew: Coping with Illegal Settlements in Belgrade, Serbia

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1 ABSTRACT

One of the most important aspects of sustainable planning today is sustainable land use and managing city growth. Urban sprawls, regardless of reasons causing their spread, are considered as one of the biggest problems in the development of cities in developing countries.

Belgrade has been and is witnessing a wide spread illegal housing and settlements in its suburban areas during a long period. This paper will explore the genesis and growth of illegal settlements in Serbian capital, with the aim to present the specificity of informal housing areas, to give general recommendations for its improvement and to offer a possible approach for taming its further growth.

Starting points are the analysis, typology, spatial distribution and overall impact of illegal housing settlements in Belgrade territory on one hand, while on the other hand the theoretical background, related to the sustainable urban growth and sustainable urban land use will be presented.

Furthermore, the paper refers to the methodological framework given as the choice of aspects that should be treated in the process of integration of illegal settlements, while regulatory framework will point out the issues related to the shaping of settlements as liveable places. Conclusion remarks will emphasize the benefits and constraints of the chosen path for the integration process. [1]

2 ON CHALLENGES FOR DEVELOPING COUNTRY CITY, SUSTAINABLE LAND USE AND CITY GROWTH

Though the theoretical framework of sustainability concept is well known, it is significant to emphasize the importance of the issues especially addressing developing countries. According to the latest Global Report on Human Settlements prepared by UN-HABITAT, entitled Planning Sustainable Cities (2009: xxii-xxiii), there are five current and future global urban challenges, namely: demographic, environmental, economic, social-spatial and institutional. Many argue that 21st century urban planning must take place with a full understanding of these factors and emerging forces leading to new spatial configurations.

Alarming demographic challenges refer to the global trends of world. About a sixth of the world's population now lives in slums, with projections suggesting this number could double to two billion over next 20 years (UNDP-HABITAT, 2003). In 2008, over half of the world's population lived in urban areas and this proportion is projected to rise to 70 % by 2050, with almost all of this growth confined to the developing world. The annual urban population increase in developing regions is anticipated to rise to 53 million (2 %), compared to a mere 3 million (0.49 %) in developed regions. The principal problem associated with demographic trends in developing world is frequent inability of governments to provide adequate infrastructure, institutional support and public services, as well as (most critically) to generate sufficient revenues to fund these needs.

The most significant environmental challenge confronted to the cities globally is climate change, with the poorest being the most vulnerable to this threat. As recent Global Report on Human Settlements (UNDP – HABITAT, 2009: xxii) explains, high urban land and housing costs are pushing the poorest population into areas that are prone to flooding, landslides and other natural disasters, especially slums and other informal settlements. This exposure is considered only partly due to natural forces, since it can be avoided or greatly minimized by improved urban development and land use planning.

Another significant challenge is the environmental impact of the world's excessive dependence upon fossil fuels, particularly in urban areas for daily domestic use, industry, construction and especially for transportation. Dramatically increased motorization in the developing world has fuelled a form of low-

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density development associated with urban sprawl. Since urban areas are predicted to occupy only 1.1 % of the earth's land surface in 2030, and given that urban regions may consume between 5-7 % of the total arable land by 2030, another principal problem is the forecasted aggregate loss of arable land providing important recreational and environmental services for urban communities.

The Global Report on Human Settlements (UNDP-HABITAT, 2009: 31) suggests that the recent global economic recession had a number of important economic implications for urban areas in the developing world and beyond. These include (a) general shrinkage of economic growth, leading to less funding being available for urban development and capital projects, especially for poorer developing economies; (b) higher levels of unemployment; (c) an increase in poverty levels following the rise in unemployment, which, if compounded by anticipated food price hikes and increased energy costs, will contribute to greater income inequalities and subsequent increased social and political instabilities.

Local and global forces of all kinds (economic, technological, political etc.) in recent decades have shaped urban areas in such way that spatial forms have tended toward increased fragmentation, separation and specialized functions as a result of economic drivers of change that typically lie outside the control of local government (UNDP-HABITAT, 2009: xxiii). This is especially the case in cities in the developed world, but increasingly so in developing world as well. Cities with increasing differences between high-income and lower-income areas are common in developing countries, with at one extreme, high-income gated communities being developed and, at the other extreme, enclaves of poverty and ethnic communities emerging. An additional phenomenon in developing country cities is the expansion of informal (often illegal) communities, many of them being slums, both within the city and on the urban periphery in locations that lack the most basic infrastructure, and where land prices and rents are, as a consequence, very low and more affordable to the lower-income population.

The last, but not the least on this list is institutional challenges. The responsibility of undertaking and delivering urban planning is traditionally associated with the public sector, both within the developed and the developing world. The institutions to which these planning responsibilities are typically assigned have long been under-resourced and are therefore problematic in the developing world. Urban planning has often been seen as unaffordable (and therefore unrealistic) and an obstacle to economic development and market freedom, sparking, among other things, a distrust of public sector master planning, as opposed to private sector. According to the recent Global Report on Human Settlements (UNDP-HABITAT, 2009), significant transformations in local government have recently taken place, much of them influenced by globalization. That had led to the urban political system evolving from 'government' to governance'. As the wider economic role of urban centres and their governments has drifted from geographically bounded administrative roles, the need to rescale the city-region level and introduce multilevel and collaborative governance has become increasingly apparent in many parts of the world. Another global trend has been in the area of participation. Communities have become increasingly unwilling to accept passively the planning decisions of politicians and technocrats that affect their living environments. However, within the cities in both developed and developing countries, "delivering consensus" is becoming more difficult, as societal divisions have been increasing, partly as a result of international migration and the growth of ethnic minority groups in cities, and partly because of growing income and employment inequalities that have intersected with ethnicity and identity in various ways.

Bearing all above in mind, the World Bank has recently launched the Urban and Local Government Strategy (World Bank Institute, 2012), which advocates a new paradigm aimed at harnessing urbanization for growth and poverty reduction. It states that cities, if well managed, are desirable assets to economic growth and governments must plan and act in the interests of their communities. The Strategy unfolds along several lines considered critical for cities and local governments in decade ahead, namely:

- City management, finance and governance, focusing on core elements of the city system;
- Urban poverty and slums – making pro-poor policies as priority in cities;
- Enabling urban economic growth;
- Urban planning, land and housing, encouraging progressive land and housing markets;
- Promoting a safe and sustainable urban environment, having in mind climate change and disaster management;

- Efforts to integrate the "green" and "brown" agendas;

- Effectively linking urban land use planning, urban development and infrastructure planning;

- Undertaking planning in peri-urban areas and at the regional level, particularly in the case of regional metropolitan areas and megacities.

According to the global organizations such as UN HABITAT, UNDP and World Bank, development priorities of the developing country cities must be:

- Minimizing urban sprawl and developing more compact cities served by public transport;

- Reliable infrastructure and services, including water supply, waste management, transport and communications, energy supply;

- Affordable access to land or premises in appropriate locations with secure tenure;

- A healthy educated workforce with appropriate skills;

- An enforceable legal system that ensures competition, accountability and property rights;

- Appropriate and adequately resourced regulatory framework which defines and enforces non disciplinary, locally appropriate minimum standards for provision of safe and healthy workplaces and places to live;

- Promoting equal access to services and fair and equitable provision of services;

- Advancing social integration by prohibiting discrimination and offering opportunities and physical space to encourage positive interactions;

- Assuring gender and disability sensitive planning and management;

- Political will and support in the delivery of sustainable visions, transparent administrative structures and processes and adequate and sustained institutional capacities;

- Relevant and effective regulations for the sustained management and revenue generation of urban development services.

Urban land use planning, as important component of urban planning can contribute significantly in addressing the major urban challenges discussed if led by well-informed policies based on sustainable development principles and supported by well thought out and managed follow-up actions and investments. As it is well-known, urban land use planning is based on premise that city areas have land use functions, which are typically undertaken by city authorities who apply enablement and intervention measures targeted at different types of activities the land areas accommodate, attract and generate.

Some most significant issues of the role of land use planning in addressing urban challenges are below:

- Compact urban form, which is important in reducing urban energy consumption, particularly through density and transportation efficiency; subsequently, compact urban form also reduces almost all negative emissions and saves the time and money (by reducing travel costs and congestion, increasing work efficiency, etc.). There is also a strong bond between urban form, climate change and pollution.

- Land use can help in risk assessment and reduce vulnerabity of city structure by channelling growth away from potential natural hazard areas, such as slides, coastal areas subject to sea rise etc.

- Efficient land use can help preventing disease spread, due to more efficient traffic and adequate infrastructure, above all good water supply and sewage system.

- Land use related to the city economy: Infrastructure costs per housing or work unit are much lower if urban construction land is used efficiently and benefits are associated with the density, degree of contiguity and nodality (Asian Development Bank, 2005). On the other hand, economic productivity can be facilitated through cluster development (localization, agglomeration of activities and logistics process).

- Efficient land use prevents over-consumption of agricultural land and natural environment, subsequently increasing the agricultural production and the quality of environment (e.g. by preserving forest areas).

- Spatially efficient cities can deliver affordable housing, accessible to working places, education facilities and places for leisure, and it is important for low-income city population.
- Effective land use management ensures security and social mixing and benefits to the urban poor.
- Land use planning can contribute to the local culture by maintaining the cultural landscape. Moreover, it can be important tool in enhancing cultural development through providing the space for cultural exchange, such as vibrant city centres.

At the end of discussion about sustainable urban land use, it is necessary to emphasize that land use is regarded more as a product than as a driver of economic performance. A city's function and the level of economic development play a very important role in determining the city form. The level of the overall functional development and diversification of the city and its socio-economic environment also determine land use.

The role of urban use planning, as it was stressed out above, has a leading role in taming the city growth and managing the appropriate economy of city construction land and it can help a lot in dealing with problems of informal and illegal settlements and their integration in regulated city structure.

3 ILLEGAL HOUSING AND SETTLEMENTS IN BELGRADE

3.1 General characteristics of Belgrade development

Belgrade, the capital of Serbia, is defined as an organizational, administrative, service, educational, scientific and cultural centre. Among the most vibrant economic sectors of Belgrade core area is: construction industry, processing industry, wholesale centres, as well as financial services and insurance companies and other business related activities. The economic profile of Belgrade is both oriented to the inner market as well as to the wider scene, aiming to be competitive in the country and region. Being by far the most vibrant city in Serbia over a long period, due to its diversity of economic activities, Belgrade has been and still is a great demographic magnet. According to the official statistical data, 22.5 % of the country's population lives in the city, but unofficially there are more than 25 % of country population. Such trends have never been positive neither for Belgrade, making an enormous pressure about employment and housing, nor for the rest of Serbia, leaving many towns without adequate workforce and creating negative demographic situation.

According to the Master plan of Belgrade 2021, the future of Belgrade development is oriented to fostering touristic, cultural and business potential of Belgrade by development along riverfronts. In the wider area, especially along main traffic corridors (such as highway) there is a great potential for development of creative economy – industrial eco parks, smart zones etc. Still, there are many insufficiently used possibilities, like development of tourism, culture and nodes, related to the position and intersection of European traffic corridors 7, 10 and 11.

Though city development policy is not oriented to and is not officially supporting the informal housing and economy, it is estimated that informal economy takes as much as 30 % of economic activities, mostly in the field of retail, services, catering, manufacture and even construction industry (supporting building of informal settlements). At the same time, informal housing takes almost 44 % of housing areas in Belgrade. Despite the fact, there are perfect brownfield locations in wider centre of Belgrade, (such as location Ada Huja), with good spatial development chances, the city growth unwillingly turned to the agriculture land at the outskirts of the city.

Some of the main issues related to the land use and city growth in Belgrade are:

- Illegal and unplanned settlements, which have grown and spread intensively over the Belgrade territory during more than 2 decades, with the exception of historical centre of Belgrade;
- Generally insufficient and /or weak infrastructure equipment in metropolitan Belgrade area, with the exception of core area and New Belgrade; urgent problems for the city as whole are related to the waste disposal and treatment of wastewater;
- Unfinished and insufficient traffic network, mostly manifested in lack of transit roads, bridges and mass public transport;

- Inadequate use of the most attractive areas and locations in the city, especially in the river coastal areas;
- Unequally dispersed greenery and the lack of real green network;
- Chaotic growth along the main traffic corridors.

The problem of Illegal and unplanned settlements in Belgrade region is strongly related to the other problems of city development, sometimes being a cause, but more often being a consequence of complexity of spatial, economic, social and political issues.

3.2 Belgrade illegal settlements – genesis, growth, characteristics and specificities

Although the genesis and growth of illegal settlements in Belgrade have been researched a great deal, it is not possible to form a unanimous opinion about its genesis and growth. Many authors (Hirt, 2009, Petovar, 2005, etc.) claim that the most important illegal growth in Belgrade happened during the 90s, though it goes way back to the 80', even 70', when one of the largest informal settlements in the Europe, Kaludjerica (at the North eastern periphery of the city) by that time started its expansion. The causes for the initiation of the informal growth of the city as well as its further unexpected spread and forming many settlements at Belgrade outskirts are different and are related to the specific socio political context.

The very start of the informal settlements in Belgrade, according to our research, happened during the socialistic period, in late 70' and continued in 80'. The mentioned demographic pressure on Belgrade, as the capital of former Yugoslavia, was enormous. As Mihaljevic pointed out (Mihaljevic, 1992), there was a process of "Belgradization" going on in Serbia and wider. Since the politics supported the idea of concentration and centralization of industrial, business, administrative and other activities, Belgrade had to cope with a great deal of new citizens. At one point, Belgrade took as much as 27 % of total population in Serbia. Having that in mind, it is in a way understandable that the city and its institutions could not enable decent habitation for such great number of people in short time. Great share of the new population have resolved their housing problems by getting an apartment in typical socialistic multi-family units in New Belgrade and other new settlements out of the city core. But also a great deal of new workforce was still in urgent search for place to live, so the pressure on the outskirts of Belgrade has begun, in the new form and typology of private, mostly one-family houses. During the 90's, the transition brought about fundamental changes in the sphere of housing ownership and planning regulation, encouraging private ownership, as well as the real estate market. Furthermore, the 90's was marked by extreme economic crises and high poverty of most of its inhabitants and had the negative effect on the city development (Simeuncevic, Mitrovic at all, 2012). Public sector stopped investment in housing production and maintenance, so the number of dwellings built per year dramatically declined (Vujovic, Petrovic, 2007). On the other hand, market prices of the housing in the city were too big for most citizens and new migrants to the city, economically exhausted by sanctions, inflation and unemployment. As a result, for many Belgrade's citizens and migrants the only chance for acquiring accommodation was private building of modest huts on the periphery of Belgrade (Zegarac, 1999).

The further demographic growth of Belgrade (from 1.4 to 1.6 million of inhabitants, according to the Statistical Office of the Republic of Serbia, 2002, unofficially even to 2 million), has induced the informal sprawl of Belgrade. There was a great deal of illegal construction on agricultural land on the fringes of the city, as well as in the areas inside city borders on the urban construction land designated for public use. Although the overall metropolitan area of the city has remained mostly the same, the percentage of non-built land (agricultural land, green and protected areas) has drastically decreased (Simeuncevic, Mitrovic at all, 2012). The problem was severely aggravated by the influx of approximately 200.000 refugees from the other parts of the former Yugoslavia who have settled in Belgrade. The informal and illegal construction became dominant form of housing development in Belgrade city, ignoring the urban plans and legal frame. After 2000, the share of single-family housing building decreased compared to the total number of new housing, but the informal one-family housing still remains significant.

Since the overall study of the informal growth in Belgrade has never been made, there are no exact data about it, so the estimations vary. For example Janic (1998) estimated there were about 150.000 illegal housing units in Belgrade, while others say that only 20 % of the buildings in the peripheral areas were actually regulated by some urban plan (Djukic, Stupar, 2009). Third approximation is based on the number

of applications for the legalization – 147000 illegal buildings (Petovar, 2005). We cannot take these numbers as final, since not all the owners of the informal housing applied for the legalization, while on the other hand the overall spatial analysis of the area and the approximate density increases the figures for more than 25 %.

The largest informal housing settlements of Belgrade are situated at the North Eastern and Southern Belgrade outskirts, as well as on the left Danube riverbank, expanding deeply to the north. There are other smaller settlements and scattered informal housing groups all over the city borders and within the city structure. In most settlements relatively convenient terrain for building prevails, with the exception of left Danube river bank. There is still a decent share of green areas. The concentration of buildings is the highest along the main traffic corridors. Dominant land use is for residential areas – approximately 90 % of total surface, but there is significant share of non-residential land use, such as retail, services and other commercial activities, mostly concentrated along the main traffic corridors. Traffic network is irregular and insufficient. Except the electrical network the infrastructure mostly does not exist. Some parts of the settlements are provided with water supply. Streets are narrow, without drainage and often are lined with large slope, so driving is difficult during winter period. There are almost no sidewalks for pedestrians. Since all kinds of transport overlap in a narrow corridor, safety is low. In the future, street regulation could be very difficult since it would cause massive demolishing of houses facing such streets in order to provide safe width of streets and sufficient place for infrastructure equipment.

One of the main problems about informal settlements' land use structure is lack of public spaces and services, such as schools, health and children day care facilities, which are a direct effect of illegal building process and absence of regulatory plans. Although the Town Planning Institute of Belgrade has started the draft version of regulatory solutions for whole Belgrade territory including these areas in 2011, it is not yet brought to public.

Urban structure of such housing areas is irregular and spontaneous. There is no firm urban matrix with defined size of blocks or parcels. Parcels are often irregular and of insufficient size, not enabling good orientation and position of a house towards neighbouring houses. Therefore, privacy is often threatened since the space between houses is very narrow. Architectural design shows the spontaneous nature of building – houses are simply designed and in most cases without any particular characteristic of style. Decorations are rare and often inappropriately applied. The interior organization also lacks good architectural design but housing units are functional in its simplest meaning. Unfortunately, there are no reflections to the traditional Serbian housing.

There is a variety of social background of the informal housing dwellers. In the first group there are citizens of modest socio-economic background who have moved from other parts of the country in search for employment in Belgrade and they live and own smaller one-family units. Second group are refugees and people who have moved from other ex-Yugoslavian republics during civil war in 1990s and their economic status vary, so they live both in big houses – villas, as well as in smaller ones. Third group consists of residents – housing tenants of lower economic status who live in bigger houses, but rent the apartments, while the owners of these houses are of different background. Approximate socio economic structure of the population, given above, has significantly influenced the formation of settlements and size structure of the buildings.

Concluding, it is easy to say that instead of being respective residential area, with high quality of life, great green areas and good urban pattern with minimum of planning intervention, informal housing areas are mostly perceived as impersonal and disharmonized residential area, being neither quite urban, nor rural settlements.

3.3 Typology and spatial distribution

As it was mentioned earlier, informal settlements occupy 44 % of total housing area in Belgrade, according to the research of authors of the paper (2012) [2].

Surface	Share in housing areas in Belgrade	Share in Belgrade Master plan for 2021.
5,521 ha	43.9 % of total housing areas (12,575 ha)	7.1 % of total surface treated by MP (77,602 ha)

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[2] Research is done as a part of research project "Research and systematization of housing development in Serbia, in the context of globalization and European integrations, with the aim of housing quality and standard improvement" (TR 036034), financed by Ministry of education and science of Serbia.

Table 1: Share of informal settlements in total Belgrade territory

Belgrade informal settlements show great diversity in size, urban structure, quality of buildings, as well as in social and economic structure of its inhabitants and ownership. Even their legal status differs – some have grown completely spontaneously, while the others have continued some form of urban regulation of the surrounding. Form and structure of illegal housing often reflects the lack of proper urban and architectural design. Illegal housing does not care much about the neighbourhood – there is rare or no adjustment to the position of other buildings, public space or traffic and infrastructure corridors.

Spatial distribution is relatively even in the sense that, except for the city core and New Belgrade, every other part of the city has some kind of informal settlement. Total number of settlements is not defined, but the authors estimate there are 29 settlements of different size, position, spatial-physical characteristics and other specificities. The picture shows the spatial distribution on the territory of Belgrade Master plan for 2021 (Town Planning Institute of Belgrade, 2003), which is done before the plan was adopted (approximately in 2002).
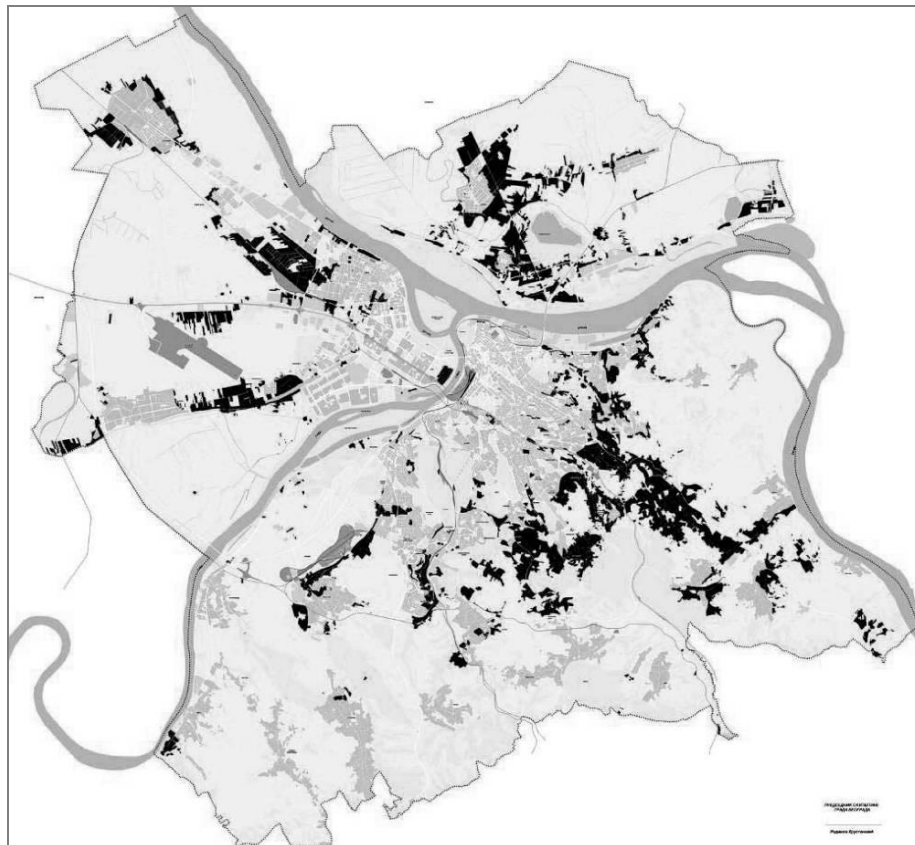
Fig. 1: Distribution of informal settlements in Belgrade, according to Belgrade Master Plan 2021. (Dark areas present informal settlements)

Probably the most appropriate term for these settlements is 'informal', rather than 'illegal', as the houses mostly have their house number and address, land ownership, streets with solid cover, water supply electricity. They mostly lack sewage and drainage system, building permit and proper entry to the lot. Public transport is also a significant problem, especially to children and elder population.

Apart from above analysed settlements, there are 120 small Roma settlements with much less quality of life, houses that can hardly be classified as solid, mostly without any infrastructure. Social integration of these settlements is difficult but some improvements have been made lately.

The table shows the variety of settlements, their position in the city structure and main characteristics:

Name	Position	Main characteristics
1. Borča (approx.2/3)	Northern	Plain terrain, stable, high level of ground waters; street matrix partly formed and regulated, one-family housing, mixed with partly regulated legal multi-family housing settlement
2. Krnjača	Northern, by Danube left bank	Plain terrain, very high level of ground waters, street matrix partly formed, one-family housing, mixed with industry, retail and other commercial activities
3 Višnjica and Višnjička banja (approx.1/2)	North, by Danube right bank	Hilly, slope, very unstable, irregular streets and matrix, one-family housing, mixed with regulated legal multi-family housing settlement
4. Karaburma (partly)	North-eastern, close to the wider continually built Bg area	Hilly, slope, slightly unstable, street matrix partly formed and regulated, mixed with regulated legal multi-family housing
5. Mirijevo (approx.1/2)	Eastern, close to the wider continually built Bg area	Hilly, by and on afforested area, street matrix partly formed and regulated, mixed with regulated legal multi-family housing
6. Mali Mokri Lug	East-South-eastern, close to the wider continually built Bg area	Hilly, stable, one-family housing, street matrix partly formed
7. Kaluđerica (approx.1/2)	East-South-eastern, close to the wider continually built Bg area	Hilly, stable, one-family housing, street matrix partly formed, but mostly irregular, largest settlement, partly, mixed with retail, services and other commercial activities
8. Leštane (approx.1/2)	East-South-eastern	Hilly, stable, one-family housing, street matrix partly formed but mostly irregular, mixed with retail and services
9. Vinča (major part)	Eastern, by Danube right bank	Plain, high level of ground waters, one-family housing, street matrix partly formed, mixed with retail and services
10. Boleč (approx.1/2)	East-South-eastern	Mostly plain, street matrix partly formed, one-family housing, mixed with retail and services
11. Veliki Mokri Lug	South-eastern,	Hilly, stable, one-family housing, street matrix partly formed but mostly irregular
12. Settlement between the highway and Medaković 3	South-eastern, close to the wider continually built Bg area	Hilly, stable, one-family housing, street matrix partly formed but mostly irregular, mixed with regulated legal multi-family housing
13. Padina	South-South-eastern, close to the wider continually built Bg area	Hilly, stable, one-family housing, street matrix partly formed but mostly irregular
14. Kumodraž	South-South-eastern	Hilly, stable, one-family housing, street matrix partly formed
15. Jajinci	Southern	Hilly, stable, one-family housing, street matrix partly formed but mostly irregular
16. Trošarina (partly)	Southern, close to the wider continually built Bg area	Hilly, stable, one-family housing, street matrix partly formed
17. Kanarevo brdo (partly)	Southern, close to the wider continually built Bg area	Hilly, stable, one-family housing, street matrix partly formed, mixed with regulated legal multi-family housing
18. Miljakovac 3	Southern, close to the wider continually built Bg area	Hilly, stable, one-family housing, street matrix partly formed but mostly irregular, by and on afforested area, mixed with regulated legal multi-family housing
19. Manastirska šuma	Southern, close to the wider continually built Bg area	Hilly, stable, one-family housing, street matrix partly formed but mostly irregular, by and on afforested area
20. Resnik (partly)	Southern	Hilly, stable, one-family housing, street matrix partly formed but mostly irregular, by afforested area
21. Kneževac (major part)	Southern, close to the wider continually built Bg area	Hilly, stable, one-family housing, street matrix partly formed, mixed with regulated legal multi-family housing and industry
22. Makiš	South-western, close to the wider continually built Bg area, Sava river right bank	Plain, one-family housing, street matrix partly formed but mostly irregular
23. Železnik (outskirts)	South-South-western, close to the wider continually built Bg area	Hilly, stable, one-family housing, street matrix partly formed, mixed with regulated legal multi-family housing and industry
24. Bele vode	South-South-western, close to the wider continually built Bg area	Hilly, stable, one-family housing, street matrix partly formed, mixed with regulated legal one-family housing
25. Staro sajmište	Western, close to New Bg core area	Plain terrain, stable, high level of ground waters; street matrix partly formed
26. Ledine	West-North-western	Plain terrain, stable, one-family housing, street matrix partly formed
27. Altina	North-western	Plain terrain, stable, one-family housing, street matrix partly formed but mostly irregular
28. Zemun (partly)	North-western, Zemun core area	Plain terrain, stable, one-family housing, street matrix partly formed
29. Batajnica (outskirts)	North-western	Plain terrain, stable, one-family housing, street matrix partly formed

Table 2: Illegal settlements on the territory of Belgrade

4 GENERAL RECOMENDATIONS FOR THE IMPROVEMENT OF INFORMAL SETTLEMENTS AND WAYS TO TAME ITS FURTHER GROWTH

Recommendations and suggestions for improvement of informal urban areas in Belgrade reflect the idea of comprehensive approach to the solution, realistic according to habitants and economic conditions of city:

- Adopting the set of special laws and regulations referring the urban planning aspect of these settlements and including urban upgrading principles and indicators. They would enable the infrastructure and traffic equipment of the most of the illegal buildings and settlements with

minimum of investment. The regulations would also refer to the lower standards and 'softer' criteria than the ones defined for the rest of the city territory.

- Intensifying the production of urban land use plans for these parts of the territory, which will be the legal basis for the construction of necessary transportation, including public transport, utility and social infrastructure. The appropriate timing for making plans as well as fast implementation is crucial for the process of 'taming' the illegal – informal settlements. Planning action should quickly respond to the building initiatives, no matter if they are legal or illegal (World Bank Institute 2012).

- Definition of special fiscal instruments exclusively for these city areas, so that the citizens can do their commitments according to their realistic economic possibilities (e.g. lower payments for the use of urban construction land and infrastructure).

- Intensifying the displacement of areas with low sanitation conditions and which cannot be upgraded. (Some of them are even a threat for health conditions and social safety). It is also necessary to provide areas for displacement in urban land use plans, as well as the areas where these citizens could organize some of the economic activities that will enable them economic survival and social integration.

- In the context of climate changes, it is necessary to plan public facilities, which would provide the shelter for the most threatened groups of people, such as refugees.

- Having in mind that settlements lack social infrastructure, especially education facilities, it is necessary to enable the introduction of additional lines of public transportation or school buses that would allow children a relatively quick and safe access to schools. In this regard, it is necessary that regulatory plans provide for adequate street widths for the movement of school buses. As for the day care facilities for children, is necessary to foster building of affordable private units, since there is no chance to provide public construction land in already dense built informal areas.

- Planning the sports and recreation facilities and areas, as well as other public places, meeting the social and other needs of youth and children. The implementation should involve facilities in private sector, as well as public private partnership in this field.

- Finally, the most important recommendation refers to the set of future actions for planners and city government: a/defining the city border in order to prevent further re-use of agricultural land out of the city territory; b/fast planning action (regulatory plans) with the aim to provide planned areas for further residential needs of the city within the city border; c/preservation and acquisition such planned areas for traffic and infrastructure equipment, using the model of public and private partnership.

5 CONCLUDING REMARKS

Informal settlements in Belgrade, a city in developing country can be understood though the power/failure of public sector, legislative framework, economic conditions (Huchzermeyer and al. 2006) and institutional capacity, as well as through the complex socio-political conditions. Taming the informal city growth of Belgrade requires different approach.

In the context of sustainable urban planning it is important to emphasize mutual dependence between land use and growth of the city on one hand, and ecological, social and economic development on the other. In the case of Belgrade, its correlation is even more obvious since the spatial consequences of imbalanced 3E are more than visible. The urban planning should focus to be strategic rather than comprehensive, flexible rather than end-state orientated, action and implementation oriented, stakeholder and community driven rather than expert driven. It also has to be reflective of emerging concerns and focused on the outcomes, which are locally sensitive and dependent upon stakeholders.

Wise governance instead of governing as a way of implementing institutional sustainability will result in balanced land use planning and inner city growth, replacing the practice of spreading and widening the city territory.

6 REFERENCES

ASIAN DEVELOPMENT BANK, JAPAN BANK FOR INTERNATIONAL COOPERATION, WORLD BANK: Connecting East Asia: A New Framework for Infrastructure. Tokyo, 2005.

DJUKIC, Aleksandra, STUPAR, Aleksandra: Unplanned Settlements, (Un)Expected Problems: 'Green' Solutions for Low Carbon Serbia?, Porto, 2009.

JANIC, Miodrag: Osnovni program za preporod Beograda-Beograd. Beograd, 1998.

MIHALJEVIC, Gavrilo: Ekonomija i grad.Beograd, 1992.

PETOVAR, Ksenija: Urbanizacija bez urbanosti – bilanca rasta gradova u Srbiji, In: Sociology and Space, Vol. 43, Issue 3, pp. 725-749. Beograd, 2005.

PETROVIC, Mina: Cities in Transition: Experience of Developed Countries in the Last Decades of XX Century, In: Sociologija, Vol. XLII, Issue 3. Beograd, 2000.

PETROVIC, Mina: Cities after Socialism as a Research Issue. Discussion papers (LSE – South East Europe series), DP34. London, 2005.

PICHLER-MILANOVIC, Natasa: European Urban Sprawl: Sustainability, Cultures of (Anti)Urbanism and »Hybrid Cityscapes«, Dalian, 2008.

TOWN PLANNING INSTITUTE OF BELGRADE: Master plan of Belgrade 2021, Belgrade, 2001-2011.

TSENKOVA, Sasha: Beyond Transitions: Understanding Urban Change in Post-Socialist Cities, In: S. Tsenkova, Z. Nedovic-Budic (ed) The Urban Mosaic of Post-socialist Europe, pp. 21-50. Heidelberg, 2006.

TSENKOVA, Sasha: Venturing into Unknown Territory: Strategic Spatial Planning in Post-Socialist Cities. In: Urban Challenge, pp. 83-99. Ljubljana, 2011.

UN-HABITAT: Global Report on Human Settlements: Planning Sustainable Cities. London, 2009.

VUJOVIC, Sreten, PETROVIC, Mina: Belgrade's Post-Socialist Urban Evolution: Reflections by the Actors in the Development Process. In: K. Stanilov (ed.) The Post-socialist City: Urban Form and Space Transformations in Central and Eastern Europe after Socialism. Volume 92, pp. 361-383. Dordrecht, 2007.

WORLD BANK INSTITUTE: Urban and Local Government Strategy. 2012.

WORLD BANK INSITUTE: Sustainable Land Use Planning: How Land Use Planning Contributes to Sustainable Urban Development, presentation script. 2012.

ŽEGARAC, Zoran, ARSIĆ, Vukoslav: Programi unapređivanja javne infrastrukture. Beograd, 1999.

6.1 Bibliography

SIMEUNCEVIC RADULOVIC Sanja, MITROVIC, Biserka, RALEVIC, Miodrag, DJUROVIC, Mladen: Informal Growth of Housing in Belgrade under the Impact of Transition to Global Economy. Milano, 2013.

Timeless Modernity, Shifting Ideologies: a Vibrant Street in a Distorted Reality?

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1 ABSTRACT[1]

The focus of the paper is on the relation between a traditional and a modern concept of street design and regulation, which have been overlapping and upgrading/degrading for decades.

The case of the Boulevard of Jurija Gagarina in New Belgrade will be used as an interesting example of a street constructed during the 1960s. The original modernist idea, reflecting the socio-economic background of the socialist epoch, is still recognizable in impressive prefabricated housing blocks, shaped according to the ideas of the Athens charter and the Modernist movement. The street, originally planed as an important transit artery with surrounding housing and green areas, started to transform its landscape during the period of transition (1990s). The position, available empty space and already provided infrastructure have directed a new tide of changes, attracting attention of city authorities, investors and entrepreneurs. The intensity of activities has increased, new office/commercial/housing units were constructed, but all these transformations have not been supported by the planning concepts which would improve the overall condition and quality of life in this area. Driven by the logic of economic efficiency and profit, the transformation of the Boulevard of Jurija Gagarina has also tackled the sensitive issues of spatial organization, social cohesion, redefined urban needs and questionable sustainability.

Therefore, the paper will discuss recent changes and trends which opened some new questions of urban durability, modernity, efficiency and environmental awareness, simultaneously emphasizing a need for an integral approach, adjusted to a new dynamic and multiplying demands of/for the future.

2 INTRODUCTION

New Belgrade, a unique urban entity designed and developed in the ex-Yugoslav capital after the WWII, has been a focus of attention of numerous professionals and researchers since its construction (Backovic, 2009; Blagojevic, 2007; Eric, 2009; Milakovic, Vukmirovic, 2011; Perovic, 1985; Waley, 2011; etc). Built between two historical cores – Belgrade and Zemun, the area was not spontaneously developed as an extension of the urban fabric. Instead, it was supposed to be an example of a total design and a radically different approach which reflected the power of the state and its new ideology. Conceived as a symbol and a spatial manifestation of a young, progressive and multicultural society, New Belgrade occupied the left bank of the river Sava, enabling the expansion of Belgrade on an empty terrain which was not burdened by any mental or physical heritage. The principles of continuous development of the (traditional) city were substituted by the ideas of the Modern movement, but the development and transformations of its structure have been influenced by a complexity and specificity of the general social, political and economic background, confirming the ambivalent character of the Yugoslav society and responding to changes and challenges generated by transition and globalization.

The case of the Boulevard of Jurija Gagarina represents a good example of shifts and turbulences on all levels of Yugoslav/Serbian society, a testimony of planning ideas, efforts and failures, but also an expression of urban vibrancy, dynamism and uncontrolled forces which could be identified in a contemporary city.

3 SHAPING A MODERN(IST) FRAMEWORK

Designed under the strong influence of CIAM and the Modern movement, the original streetscape of New Belgrade followed the principles of the Athens Charter. Consequently, the traditional development of street space was 'strictly prohibited', continuously built facades of street corridors were avoided, and open mega-

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blocks with free-standing structures and a lot of 'sun, space and greenery' were promoted. This approach changed the basic, traditional morphology and the size/scale of urban blocks and streets, focusing on car-oriented transport. Pedestrian spaces were situated inside blocks, as separated public zones, enabling free movement and recreation of inhabitants.

However, the change of ideological circumstances has influenced significant transformations of the urbanscape of New Belgrade, implanting additional features into purified modernist pattern. Nowadays, we can identify four street forms defined by the level of dependence/correlation between blocks (buildings) and street regulation – (1) building structures perpendicular to a street creating a rhythm with deep penetration of vistas in the block, (2) structures parallel to a street, with large sidewalks and green pathways between buildings and streets, (3) individual, dominant structures built on the corners of blocks and (4) 'meander' structures in the central part of a block creating a dynamic secondary routes for pedestrian movement.

The example of the Boulevard of Jurija Gagarina represents a specific area of New Belgrade which was designed according to the official plans. However, its development was shaped by conflicting social, political and economic interests. Since New Belgrade occupies the central position of Belgrade, the area around the Boulevard was initially planned as a mostly industrial area, only partially habitable (Урбанистички завод ИОНО града Београда, 1951). However, subsequent amendments from 1965 changed the original idea imposing completely residential development (Figure 1). The main artery – the Boulevard of Jurija Gagarina, has become the backbone of the area, which consists of several types of open blocks.
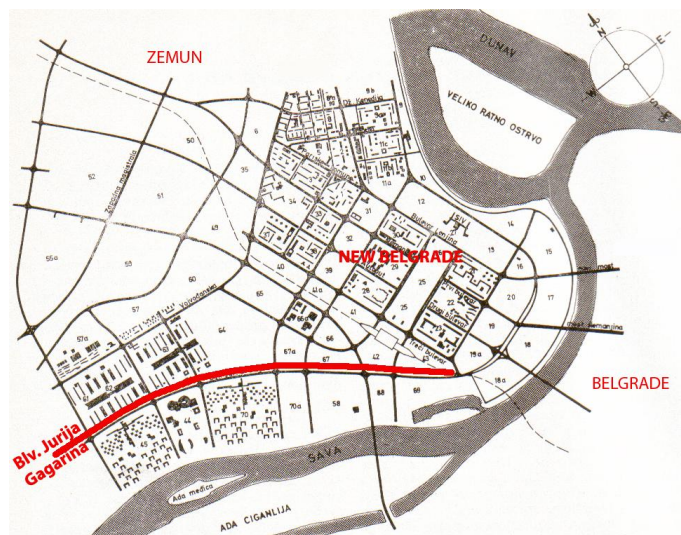
Fig. 1: The position of New Belgrade between two historical cores – Belgrade and Zemun. Red line marks the Boulevard of Jurija Gagarina in a zone initially planned for industry, but transformed to a residential area.

Initially, blocks 45 and 70 were the only residential blocks in New Belgrade placed on the river bank, while Block 44, located between them, was built in the 1980's. [2] Both blocks have identical spatial organization, with two types of elements/buildings positioned (and copied) in a park setting. The part of the block toward the river consists of lower residential buildings (up to 4 storeys) in the shape of a horseshoe, while the other part, next to the Boulevard, is composed of orthogonal, freestanding solitaires (up to 15 storeys). The structures are grouped in four zones, with two main pedestrian passages in between – a promenade parallel to the river and the second one, perpendicular, with clustered services, education facilities (primary school and kindergarten) and a local community center. These additional activities and their structures create a central space, as a focus of social life and interaction. The size of each block is 800x800m, while car accessibility to buildings and parking spaces is provided by few internal streets/blind alleys (Figure 2).

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[2] Competition for these blocks was announced in 1965. The award-winning work is from Slovenia, authors Ivan Tepeš and Velimir Gradelj.
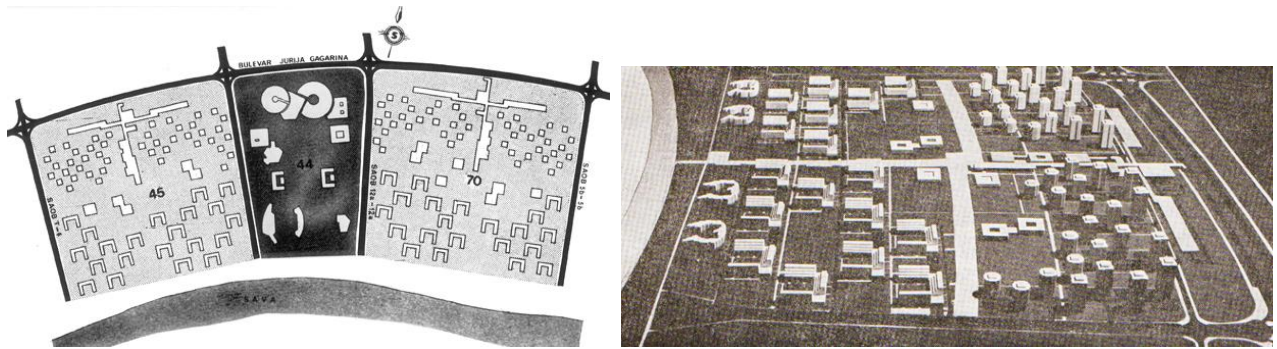
Fig. 2: Initially planned structures along the Boulevard of Jurija Gagrina – (left) the model of block 45; (right) the plan of the south part of the street (blocks 45, 70 and 44).

Blocks 61, 62, 63 and 64 have a different composition, but they are all designed in the same manner. [3] The basic urban concept represents a symmetrical macro-composition, consisting of two regular series of residential buildings, linked by the axis where the center is planned. The height of buildings decreases from the axis to the Boulevard of Jurija Gagarina.

All four blocks have a strict segregation of vehicular and pedestrian traffic – the first one is planned on the ground level, while pedestrian movement is placed above, integrating public/free space with access to residential structures. The connection between the axial center and buildings via passages was also planned, creating micro-ambiances as public spaces for social interaction (Figure 3).
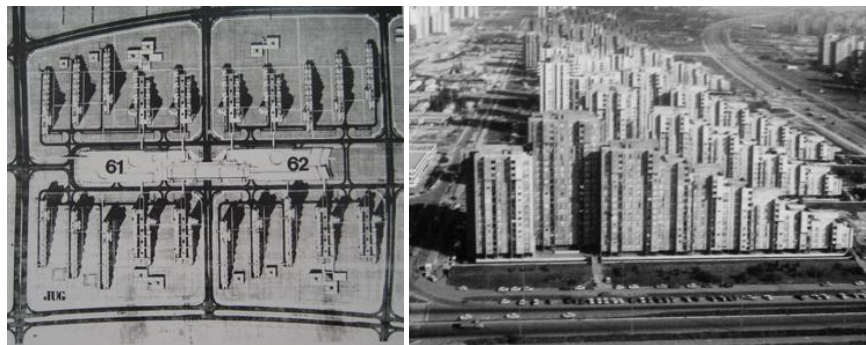
Fig. 3: The initially planned structures along the Boulevard of Jurija Gagarina: (left) blocks 61 and 62 – plan, (right) typical block.

Since it was envisioned as a transit route, the Boulevard of Jurija Gagarina is wide 60 metres, with 6 car-lanes, 2 tram-lanes and large green buffer zones between roadway and buildings (Figure 4). However, since this area remained on the outskirts of the city, with prevailing residential activities and without construction activities around/at the end of the street, it actually acts as a highly frequent access road to existing residential buildings.

Fig. 4: The Boulevard of Jurija Gagarina before the transformation.

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[3] The competition was announced in 1971. The winning proposal was designed by Darko Marusic, Milenija Marusic and Milan Miodragovic.

From the environmental point of view, the concept was made to fulfill main needs of comfort for the residents. By decreasing the building height towards the river, the majority of apartments are facing the south, and the basic laws of insulation and ventilation are met. From an economic aspect, the realization of this comprehensive project was possible only by industrial type of construction, i.e. prefabricated buildings. Within the socialist system, which existed before the 1980s, the state was the only and principal investor.

4 FACING THE TURBULENCES

The beginning of the 1980s was marked by the crisis of economy which also influenced the efficiency of the Yugoslav self-management socialism. Changed conditions and general instability of the system and society also triggered a number of other processes which finally led to the disintegration of Yugoslavia in 1991. Simultaneously, the economy started its shift to an open market, introducing privatization, decentralization and deregulation. Urban planning lost its centralized character causing a hyper production of detailed plans by different offices, without the influence of the Town Planning Institute of Belgrade. New architectural and planning paradigms were embraced by the professionals inclined to post-modern flows, while modernist models lost their importance in a changed socio-economic context (Vujošević, 2004).

Local authorities ignored previous models of development, refusing to define long-term strategies and visions. They mostly accepted and followed ad-hoc decisions enabling uncontrolled commercialization of urban space. The architectural and planning profession lost its significance affecting a degradation of urban environment with increased social and spatial segregation (Petrović, 2009). Consequently, during the last decade of the 20th century, the process of transition was visible in urban planning as a unique paradox – decisions were actually centralized, but their implementation (and legitimacy) was achieved by a number of decentralized decisions from various actors/participants in a planning process. This situation created a fertile ground for different malversations and uncontrolled private accumulation while the importance of public good was neglected (Vujošević, 2004). Therefore, urban planning represented an uncoordinated set of fragmented interventions, 'justified' by the lack of funds, regulations, tools for implementation and, above all, well-defined, comprehensive development concepts. The contradictions of the new system were reflected in architecture as well, shaping a new landscape for transitional flows.

New Belgrade, as a valuable and well-positioned urban resource, became one of the targets which attracted attention of numerous investors. Offering empty (unused) spaces and well-developed infrastructure it gradually reshaped its socialist image and generated a new identity. The urban tissue was invaded by new activities and structures which were not in accordance with the original concept, but in spite of its inconsistent, hybrid style, this part of Belgrade increased its significance and value (Petovar, 1989). The morphology of New Belgrade was changed, the inherited modernist legacy was negated but the current situation confirms the transformation potential of the space, as well as its flexibility for the future economic, social and spatial challenges.

Streets of New Belgrade changed their physiognomy too. The Boulevard of Jurija Gagarina was no longer considered a transit street, but as a social arena, which needed a formal and functional continuity. The construction of new buildings started during 1980s, when first small-scale shopping malls appeared along the street, in the former green areas. However, the significant transformation started after 2000, when foreign investments were intensified and a number of European and global corporations arrived to Serbian market. New Belgrade was recognized as a perfect site for business, services, exclusive residential buildings and – new shopping malls.

Introduction of a postmodern paradigm launched a different design concept which promoted a traditional model of street. However, a gap between planning profession and economy produced a specific scenery which followed the original plan from 1965 but adjusted to new regulations and indicators generated from contemporary trends and economic turbulences. Therefore, the Boulevard of Jurija Gagarina was gradually transformed into a compact urban tissue, with high density and decreased green areas/open spaces. These changes do not represent the outcome of planning visions, strategies and procedures which should improve a general environmental quality (Bajic Brkovic, 2009). Instead, they are a consequence of different investments which used the flexibility (i.e. insufficient determination) of the uncompleted modernist framework.

5 OVERLAPPING THE PATTERNS

The present constellation of power, interests and needs in the Boulevard of Jurija Gagairna mirrors 'the crisis of non-concept'. The new development is clearly visible along the street and the open spaces of housing blocks are occupied by the commercial drive of private capital, expanding its boundaries into the public areas (Figure 5). Demarcation lines are set between physical structures that represent two epochs creating a distorted image of this area. It is nowadays full of contradictions, which coexist and overlap, creating a surreal environment (Stupar, 2006).

The streetscape of the Boulevard of Jurija Gagarina has changed its density, function and overall narrative which had been visible for almost half a century. In search for a new continuity, its empty land has been filled with buildings which created a scenery for a traditional urban streets, but without any pattern or organized scheme it is hard to achieve a unity of architectural expression (Milakovic and Vukmirovic, 2011). Furthermore, there are several problems which could be identified in the main aspects of urban life – (1) physical – referring to spatial and functional organization; (2) social – implying a different use of space and the attitude of users toward change, and (3) economic – related to the validity of new structures and a balanced development.

Fig. 5: The Boulevard of Jurija Gagarina after the transformation.

In terms of physical environment, the construction of new buildings mainly threatened both the public space along the Boulevard and the space inside blocks. The current and planned construction activities are already beyond originally proposed capacities, while the new high rise buildings do not respect original rules of positioning, orientation, vertical regulation and environmentally responsible morphing. The level of comfort and the ecological quality of urban life is decreased. Meanwhile, the higher density of inhabitants and users caused a significant increase of the number of cars which made the existing parking capacities insufficient. Consequently, the open public spaces and pedestrian areas have been used as informal parking spaces which – to a certain extent – have even been legalized.

From a social perspective, the main problem is related to the altered use of open public spaces where we can identify a clash of two opposing concepts – the modernist model, which promotes the internal space of a block as a gathering place suitable for contacts, relaxation and recreation, and the post-modern model, which underlines the importance of a street for public life. The opinions of users are also divided – for some of them the usurpation of public space and a conflict between old and new structures only degrades physical, social and environmental quality of the space, while other users support introduction of new structures and activities which would complement already existing residential character of the area. In spite of this ambivalent perception of the space, the general opinion is positive because both groups appreciate a new daily dynamic which enables a simultaneous functioning of both spatial elements – blocks and streets.

The sustainability of the Boulevard and its surrounding area is also questionable. The intensification of activities has increased employment possibilities and enabled higher dynamic of economy and market, but the introduced activities are not evenly distributed and they still do not provide a satisfactory balance and a variety of services. Consequently, some office and commercial spaces remain without tenants which only confirms the lack of spatial and economic strategies which would stabilise supply and demand.

Finally, the factors of environmental quality and energy efficiency are mostly neglected which represents a serious warning and a problem for all users and space-consumers. Obviously, the ad-hoc shaping of a space does not consider problems generated by climate changes, which is also a result of low environmental consciousness. Therefore, the imperative of the future development of the Boulevard of Jurija Gagarina

should be adjustment to current climate conditions and global environmental trends, which is – again – a mission achievable only via comprehensive strategic plans and actions. In the meantime, ad-hoc approach could be used for environmental vibrancy as well, especially for the application of various biophilic elements which increase a general environmental quality and create new competitive advantages for this area.

6 CONCLUSION

The transformation of the Boulevard of Jurija Gagarina has been the metaphor of discontinuity and a materialization of all turmoils which ex-Yugoslav and Serbian society have faced since the 1990s. The overlapping concepts, unsynchrnonized actions and conflicting interest have shaped the morphology of this space, creating a confusing urbanscape and a distorted image of anticipated modernity. Disregarding original ideas and urban regulation, but benefiting from their generous spatial formations and available empty space, the latest phase of aggressive and often uncontrolled urban intensification has also brought an unexpected vibrancy to previously dormant residential area. However, the newly created urbo-economic system is not a stable one and it needs a proper tuning to contextual changes which should guarantee its long-term sustainability.

During the last two decades, the flexibility of the 'modernist' space has been brutally tested and – confirmed, but the accumulated problems and actual local and global challenges demand immediate, resolute and forward looking strategies and actions. Therefore, the future of New Belgrade, its mega-blocks and boulevards, should be defined in a well-balanced framework able to provide enough environmental and social benefits for different categories of residents and users, while remaining a hot-spot for all contemporary, innovative and creative impulses able to ensure its further 'modernity'.

7 REFERENCES

BACKOVIĆ, Vera D.: Socio-prostorni razvoj Novog Beograda nakon 1989. godine. Beograd, 2009.
BAJIC BRKOVIC, Milica: Urban Transformation of Belgrade: Challenges and Opportunities for Sustainable Development. In Innovation and Creative Spaces in Sustainable Cities, edited by Milica Bajic Brkovic. Belgrade, 2009.
БЛАГОЈЕВИЋ, Љиљана: Нови Београд: оспорени модернизам/New Belgrade: Contested Modernism. Београд, 2007.
VUJOŠEVIĆ, Miodrag: Racionalnost, legitimitet i implementacija planskih odluka. Novije teorijske interpretacije i pouke za planiranje u tranziciji. Beograd, 2004.
ERIĆ, Zoran (ed.): Diferencirana susedstva Novog Beograda: projekat centra za vizuelnu kulturu MSUB / Differentiated neighbourhoods of New Belgrade: project of the centre for visual culture at MOCAB. Beograd, 2009.
MILAKOVIC, Mira, VUKMIROVIC, Milena: New Life of Modern Cities: Transformation and Renewal of Public Spaces in New Belgrade. In: REAL CORP 2011: Change for Stability: Lifecycle of Cities and Regions. Edited by Manfred Schrenk, Vasily V. Popovich and Peter Zeile. Essen, 2011.
PEROVIĆ, Miloš: Iskustva prošlosti/Lessons of the Past. Beograd, 1985.
ПЕТОВАР, Ксенија: Друштвено-економске основе развоја Новог Београда. Београд, 1989.
PETROVIĆ, Mina: Transformacija gradova: ka depolitizaciji urbanog pitanja. Beograd, 2009.
STUPAR, Aleksandra: (Re)symbolizing the Modern Heritage: A New Identity for a Prosperous Future? In 42nd Isocarp Congress: Cities Between Integration and Disintegration. Istanbul, 2006.
URBANISTIČKI ZAVOD BEOGRADA: Generalni plan Grada Beograda 2021. Beograd, 2003.
УРБАНИСТИЧКИ ЗАВОД ИОНО ГРАДА БЕОГРАДА: Генерални урбанистички план Београда 1950. Београд, 1951.
WALEY, Paul: From modernist to market urbanism: the transformation of New Belgrade. In: Planning Perspectives, Vol. 26, Issue 2, pp. 209-235. London, 2011.

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Touristic Potentials of Open Space Heritage – 4 Case Studies in South East Europe

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1 ABSTRACT

Landscape and open space is where "cultural history and architectural practice" (Meyer 1997: 73) meet. Hence they are an expression of the culture and society of their time. Yet the meanings of each period overlap and are expressed in different ways. Since the 1962 recommendation of UNESCO in Paris (UNESCO 1962), a change in the definition of monument-related spaces and objects has intervened, a shift in focus from the created object to the significance of the location (BURRA Charter 1999). The question if this present meaning, encompassing all levels, can be exploited for tourist concepts is currently being evaluated on the basis of four case studies in the EU-funded CultTour project (CultTour 2012).

This paper describes the "attractive" — in the actual sense — features beyond the superficial, visible susceptibility to conservation that distinguish open spaces and which of these features can be integrated into a tourism master plan for the city and region. Furthermore, we will investigate how these hidden characteristics can be communicated and made visible in an imaginative, exciting way. This requires in the first place, a thematic framework to which other gardens, open spaces and objects can be added and visited as part of a theme route. But the focus will also be on the type of communication by which history and folklore can be perceived and passed on. Eyal Weizman, an English architectural forensic claims that such sites create their own stories; that it was only a matter of finding the right translation. (Weizmann 2012: 9). Thus the aim is "to shape perception that makes a difference between raw matter and landscape". (Shama 1995: 10)

In order to determine and analyse the open spaces, we resorted to historical research, landscape architectural surveying and graphic analysis, video analysis and an indexed analysis of interviews. The properties were analysed from a qualitative perspective.

This article will focus on the analytical methods, the allocation of the properties resulting from the qualitative analysis and on the various levels of meaning of the open spaces. This represents a partial result of the research project.

2 INTRODUCTION

This paper presents initial results from the project co-financed by the European Union: "CultTour: (garden) heritage as focal points for sustainable tourism". In this research project, open spaces and gardens in South East Europe were examined in regard to their cultural significance and combined at a later stage to establish themed routes for tourism purposes. The starting point are four pilot sites which were explored by an international team consisting of landscape architects and tourism experts. At all four sites, Alexandroupoli (Greece), Veliko Tarnovo (Bulgaria), Avrig (Romania) and Taranto (Italy), abundant traces of intensive change throughout history are found.

According to Elizabeth Meyer, landscape and open spaces are generally of a cultural heritage value which interacts with sculpted reality (Meyer 1997: 73). This interaction is not restricted in time to a certain period; rather it creates at any time sculpted spaces with multifaceted meanings. Landscape architecture and garden design fit into this overall context. "Landscape architecture as such is a rather hybrid than binary activity." (Meyer 1997: 50). 'Binary thinking', in other words, the polarity between historically relevant and historically irrelevant events impedes understanding the complexity of open spaces. In the context of the project we therefore argue that a touristically attractive cultural heritage site is not restricted to the marketing of a distinct space but also a way of communicating information and of perceiving geographic places.

The basic objective of the spatial analysis is to define the characteristic features of the open space, to assess the potential of the open space and the interpretation of the open space from the perspective of the project 'CultTour' – seeing garden and open space culture as the motor for sustainable tourism development.

Therefore, quite generally, correlations must be established from the facts to see and understand the open space in its historical, spatial and social context. Hence the view to the outside is not only essential and substantial for the purposes of monument conservation; the environment also acts as an integrative component of the site on the inside (Böhme 1996).

Fig. 1 SEE Programme Area

3 THE MEANING OF THE SITE

The various layers of meaning of an open space have been elaborated repeatedly in academic writings, while emphasising the role of the perceiving persons. (Schama 1995; Meyer 2008 and 1997; Treib 1995 et al.). Marc Treib, for example, has pointed out the meaning of the cultural background of the designers as well as of the users: "[M]eaning condenses at the intersection of people and place, and not alone in the form the designer's idea takes. Thus design can be perceived as a semi-permeable layer between 'intended perception' and 'perceived intention' in times of growing social differentiation." (Treib 1995). This approach makes it possible to create a nexus between the intention behind the historical design and its current use and function.

The project is at the fault line between the perception of open space and the cultural garden heritage of South East Europe. The focus is on four countries whose cultural garden heritage is perceived very differently by local experts and is known to a varying degree. The majority of the involved project partners had a conventional picture of historically valuable open space in mind, focusing on garden heritage sites to the exclusion of other types of open spaces, in particular public space. Yet the four pilot sites show how important these open spaces are in the daily life of the locations concerned. Thus the focus spanned from heritage significance to open space usage. Accordingly, it was necessary from the outset to explore the pilot sites in different ways and to reflect their perception from different positions. Recording methods such as landscape architectural surveys, expert interviews and cartographic, photographic and video recordings were used in addition to background research on the sites. Nowadays, the sites meet vital open space functions; as a result, their historical meaning is less obvious than their everyday use. The sites are rooted in different landscape contexts. Three spaces are integrated into an urban space, while the fourth one forms part of a rural environment. Moreover, they are in different states of maintenance. The question if and how they should and could be earmarked for conservationist renewal is not answered uniformly by the partners in the project. On the one hand, historical revival is proposed — for example, in the case of the former baroque palace gardens of Brukenthal in Avrig where baroque festivals take place— while in other cases, minor superficial changes — as in the urban green belt in Veliko Tarnovo — suffice.

The survey of the open spaces serves to explore the meaning of individual elements, spatial situations and narratives. These meanings may serve as the basis for means to integrate them into tourist concepts. To obtain information beyond the physical space, questions relating to the genesis of the site, its current function and meaning, the specificity of the location in the context of the landscape as well to the future projects of persons responsible were explored.

These issues cover the essential objectives of the project. In a second step, the levels of meaning were abstracted from the analysis and reviewed to determine how they might fit into tourist concepts.

4 METHODS

The methods presented here show several approaches an open space inventory. They are chosen to provide mulitlayered results for a twofold of recommendations and implementations. On the one hand they deliver a basis for practical measures to maintain the heritage value and at the same time safeguarding the actual usage. On the other hand they are a basis to develop touristic models and tools for re-utilisation of garden and open space heritage sites in South East Europe. The collection of data (survey) covers spatial, structural, plant and historical traces and uses. It consists of historical research, qualitative expert interviews as well as empirical field research. To analyse the surveys from a multi-layered perspective, data were generated on the one hand in different ways, going beyond the traditional surveying in the form entering data in existing maps. On the other hand, the data were analysed with different qualitative and experimental methods based on language, drawings and moving images.

The expert interviews consisted mostly of partially structured guideline interviews that were analysed qualitatively. The partial structure left room for additional emerging questions. This additional scope resulted in new perspectives and made it possible to spontaneously respond to and deal with specific situations. For the purposes of the analysis, the transcribed texts were encoded by assigning the contents to theme field. This procedure permits a qualitative comparison. Experts were dealing with regulations for protection and management and development of garden and open space heritage sites. The results of the interviews give insight into the existing framework and make it possible to formulate recommendations for structural changes.

The elements and conditions in the sites were recorded in simple, schematic drawings. Steenbergen (2008) describes graphic reproduction as copying. The abstraction during the process of transfer represents an interpretation step. Thus the situation is abstracted and filtered, revealing eventually that which is perceived to be the essential. In doing so, perception and selection are open to interpretation.

The transfer of site features into simple maps is similar to mapping. Compared to a conventional survey, a reduction takes place in this case, which results in the remaining features becoming more clearly visible. A weighing takes place, and correlations become evident.

The video analysis is based on the method developed by Christoph Girot with four different recording techniques each. The four variants are: long video sequences, slow walks, shooting in quick passing and recordings altered by editing or trick manipulations. (Girot 2010). Video analysis is understood to be the experimental part of the assessment of the site, which is influenced by the existing situation and the events taking place there. Statements are made, which can be related to the overall effect, the activities and sequence of spaces. By using video analysis spatial transitions are clearly displayed. By lining up the single video-stills of the states of transition the theatrical composition of site is traceable and communicable.

Historical research is carried out by studying the literary sources, historical maps and photographs, engravings, postcards, letters and paintings. In this way, through the collection, presentation and juxtaposition of the documents and contents it is possible to arrive at the genesis of the sites.

The empirical research provides a comprehensive understanding of the site. The abiotic and biotic properties of the site itself are examined and described as well as its integration into the adjacent, urban and regional surroundings. The functions and uses in interaction with the historical features reveal the specific character and context of the garden or open space.

5 EMPIRICAL EVIDENCE

The pilot sites provided the empirical data. The results of research, observation, interviews and surveys make it possible to interpret the layers of meaning of the sites.

The following section will illustrate by way of example how the different layers of meaning of the park of the Villa Peripato in the Apulian city of Taranto on the Ionian Sea were determined.

5.1 Levels of meaning – Components of a cultural change in meaning

5.1.1 Archaeological component

Archaeological finds are tangible legacies of people. Their reconstruction can manifest the cultural significance of a site. A. Ressa, the conservation officer of the city of Taranto, draws attention to these

hidden historical witnesses in the interview: A. RESSA: "Villa Peripato is a very important site, not only for the vegetable species in the garden or for the design of the garden which is typical for the 19th century. Not only for these cultural reasons, but also because Villa Peripato develops on a certain height (altitude level), on a higher part. This means that below Villa Peripato there are many levels of historic findings. There are a lot of archaeological findings. It is a very important archaeological site because of its height".

These specific archaeological findings emerged when the foundations for an annex to the open-air theatre built in 2004 were excavated. First scientific photographs of the excavations were taken, but then the places of discovery were filled again, ostensibly for a lack of funds to properly process and professionally display them. Another important consideration may have been that using parts of the garden site for an open-air theatre may have appeared more attractive than presenting an archaeological site. Anyway, it is part of the aim of project to make these distant historical artefacts accessible for presentation purposes and for the status of the site as a historical garden heritage. The lower-lying layers of the areas of the archaeological finds illustrate one of the layers of meaning of the park. It is hidden, yet known and thus part of the narrative of the location.

This level can be marketed for tourist purposes through the existing images of the historical mosaics.

Fig. 2: The excavation site before the construction of a toilet facility for the open-air theatre

5.1.2 Spiritual component

In the 13th century, a convent was built next to the garden of the Villa Peripato. Historian Cosimo D'Angela reported about it in the expert interview: "So, in the 13th century the Prince of Taranto wanted to create a convent in that area, dedicated to St Antonie. Since it is a higher part in the city, this area was called the posilipo, which is another area in Naples which means 'the higher part'. (...) The archbishop of the town built a private part here at the higher part of the town. During the construction of his house, the remains of Greek findings were found. Next to the Greek theatre, there was a temple of Dionysus. We have some draft about this discovering, that states the present of the temple and the Greek theatre. These drawings were made by a French traveller. They are available at a French bibliotheca, Paris. They have been published. The entire remains of Greek findings have been sold to King Gustav of Denmark, and they are in Copenhagen."

Christian religious buildings were often built on the sites of ancient Roman or Greek temples. Thus the Villa Peripato has always been a place of superior religious significance and forms part of a historical spiritual meaning for hundreds of years. The convent can be integrated into a tourist concept.

5.1.3 Social and economic components

For users, the meaning of the park has continuously changed. The conservation officer, Ressa, explains the atmosphere of the original garden of the villa. "Villa Peripato, like all other Villas of the cities, was like a dream (paradiso) at the beginning." When it was created in the 18th century by Beaumont Bonelli, it was an expression, typical of that time, of the eternal longing for paradise.

In the 19th century, when it was given the appearance that is still visible in part today, the Villa Peripato was also an important and regular meeting point for the wealthy middle class. The garden offered space for social interaction, as in a society salon, and was the platform for discussing economic and business matters, as A. Ressa explains in the interview: "The characteristic of Villa Peripato is based on a different way of life imposed by the middle class at that time. New interests, new way of life, new life in the city and so on (...). While at the beginning it was the meeting point of the middle class, it was a respectable place in a certain

way. Generally only middle class people went here. Here the cultural and economic life of the city was decided." According to Ressa, the garden changed once again after the period of industrialisation:"During the past [centuries, note of the author], the population grew, but the middle class got fewer. For this reason, the role of Villa Peripato has changed. Then, around 1950/1960 the situation changed because the middle class became fewer and Villa Peripato started to be used also by other social classes. Villa Peripato was more and more used by poorer people. In this way the idea of Villa Peripato changed. Since there was this contrast between the old city and the new city with Villa Peripato with all the green, from a cultural point of view, poorer people considered Villa Peripato as a beauty-farm, because of the presence of all the plants and so on. It was a healthy place. Their children were playing in the garden. In this way, it was difficult to control Villa Peripato. People started to make damages. There was vandalism and so on. Rich people did not feel safe anymore. For this reason they decided to close Villa Peripato"

The historical analysis and the analysis of use by means of mapping result in a spatial overlapping of several eras: According to historical sources, the large rondel was already created before the World War II (cf. the plan from the period of 1915 to 1925), but the American occupying forces turned it into a skating rink, according to historian D'Angela. Today, the rondel is mainly a very popular meeting point for adolescents and young adults. In winter it is used as an ice-skating rink. Thus the rondel, which was only added at a late stage to the development of the garden, became an important garden element dating from a later period than its establishment due to the new forms of usage. Through the available and actual types of usage, these time shifts can also be experienced by outside visitors.
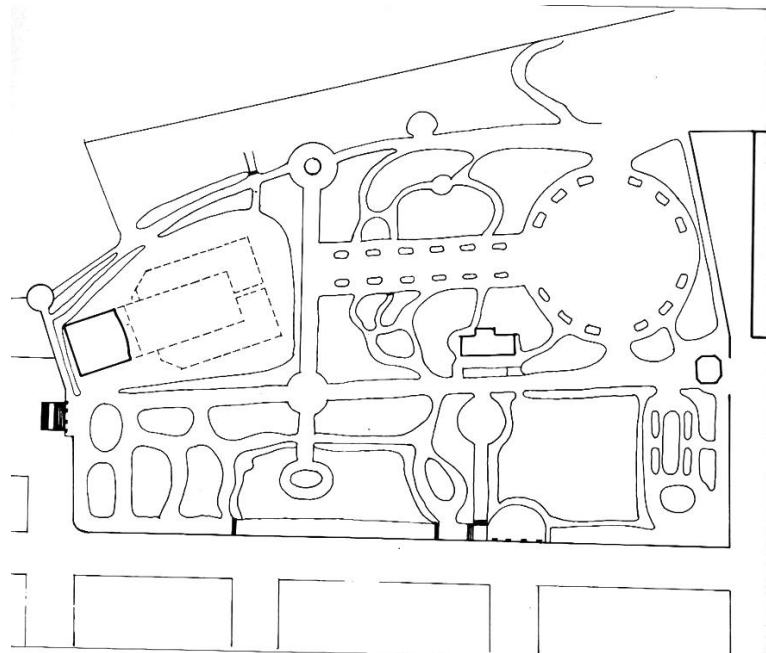
Fig. 5: Plan around 1915/25

5.1.4 Design component – exemplified by the context of the surroundings

In spatial analysis, the open space is examined beyond its boundaries in the context of its surroundings. The open space is part of a larger (urban) landscape. The spatial analysis illustrates the actual integration and location of the site in this landscape, the visual connections that result from it and the spatial effects created from the outside. The analytical method of copying reveals the distinctive position of the open space on the terrain edge to the bay.

Fig. 3: Highlighting the terrain edge by copying

This makes it possible to highlight the significance of the open space of the Villa Peripato for the recognition value of the more recent historic city centre of Taranto.

Historical research has revealed that park was initially designed (around 1860) as a belvedere/viewpoint. It overlooked the "Mar Piccolo", the bay to the north-east. There were probably two terraces, at least one of which can still be seen on a historical photograph (cf. Fig. 4).

Fig. 4: Terrace overlooking Mar Piccolo, probably around 1930.

The spatial analysis shows that the present high plant density at the terrain edge forms a very distinctive, closed spatial boundary. The alley along the lookout area passes along a green wall, instead of the historical canopy for enjoying the view. The interaction with the lake created by the viewpoint was turned into a border zone. This offers individual user groups the advantage of being able to extract themselves from social control.

5.1.5   Atmospheric component – exemplified by historical fragments and retreats

Through the analytical method of mapping it became apparent that a significant number of landscape architecture traces and historical garden remains can still be found in a particular section of the park.
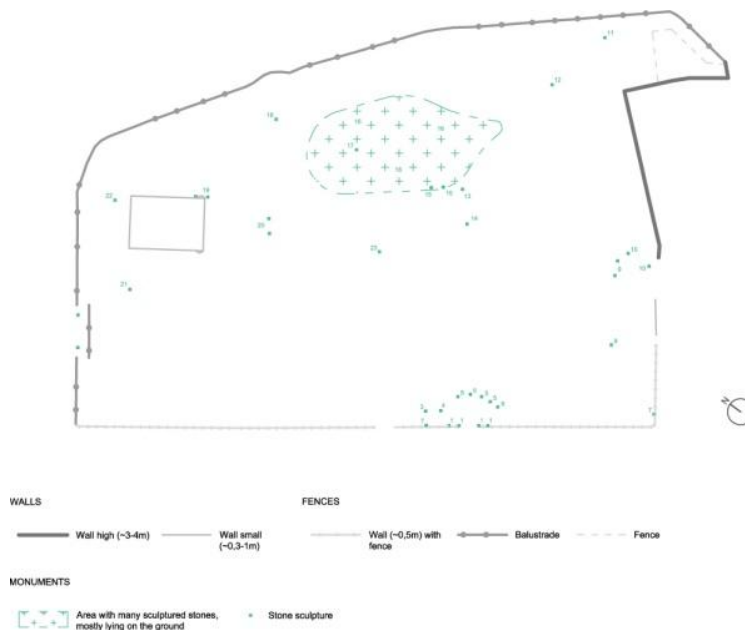
Fig. 6: Walls, fences, monuments of the Villa Peripato

5.1.6   Components of movements and atmospheres – video recordings

A relatively new method of analysing open spaces is the viewing and interpretation of video recording taken in the field. The analytical observation of the site using this experimental method of analysis has revealed an additional layer of meaning of this specific section of the garden of the Villa Peripato. This can be seen from the video analysis as used in the project:

With this method a retrospective impact on the analysis method embarked on before could be discerned. Prior to the first on-site video recordings, the following methical foundations for the video shooting were

prepared: The video shootings were to be carried out in four different modes (long video sequences, video sequences taken during a slow walk, recordings shot in quick passing and recordings altered by editing or trick shots), based on "The Margins of Vision" by Christoph Girot (Girot 2010). Despite this classification of the recordings, the subjective perspective of the person who holds the camera remains: "Video is a modern instrument, which appears as an automatic and detached view in peoples´ lives. But do not forget that there is still a subject behind the camera. In simple terms: it is hand made!" (Girot 2010). That much was clear already before the start of the shooting. Yet once in the field, it became obvious that strict adherence to the four recording modes would prevent addressing the actual and specific characteristics of the site. This is evidenced by the results of the video recording methods at the four pilot sites:

The camera meanders through the park of Villa Peripato in Taranto on an unstructured, random route, similar to a walk. Yet the walking trail is not lost in thought, it takes numerous side glances into hidden niches and discrete corners of the park. The recorded version created on site symbolises the substantial heterogeneity of the site. It stands for looking and searching, getting lost, getting back on track and immersing oneself in this space.

In the Italian "Giardino Publico" of the Villa Peripatothe experimental analysis process using video footage has shown that the specific section of the park where numerous historical fragments are located is precisely the section which has a very withdrawn, remote character with an intimate atmosphere. Hence, a future presentation of the testimony to the historical significance of the park could be realised in this section of the site, since it also offers the opportunity for an unobstructed pursuit of the tracks of the cultural heritage.

Fig. 7: Video still: Historical fragment in the remote section of the park of the Villa Peripato

6 CONCLUSION

The analyses of the layers of meaning of the site presented here are based on conventional site survey methods and are purposely expanded with experimental methods. It is clear that such a mix of methods provides results on different levels. For tourist concepts, these specific results may contain direct information and proposals for action, such as visualisation of the historical mosaic. At the same time, it becomes clear that the interpretation of the entire culture heritage meaning cannot be done without blending and overlapping these results. For a comprehensive communication with visitors, separate narratives can be combined into new tales, as exemplified by the rondel of the Villa Peripato. At the moment when these different levels of interaction come together, the open space under review develops into an independent phenomenon that is hidden from superficial glances, arousing curiosity and stimulating imagination. However, further research into the relevance of the open space for the surrounding urban structure and its society resulting in profound overall narratives were only possible in conjunction with site-related insights. This is true especially if the tourist concepts are based on routes still to be established. Thus the surrounding location is not only to be understood — according to Marc Treib — as an "intersection of people and place", but also as part of the site's historical, spatial and socio-cultural context. Thus the shift from a created object to the meaning of the site (BURRA Charter 1999), as it is reflected in the current discussion of the cultural heritage, is taken into account.

These layered meanings will result in specific touristic products for the sites in order to show their touristic value as an example for the SEE region.

7 REFERENCES

Böhme, C.: Historisches Grün als Aufgabe des Denkmal- und Naturschutzes. DIfU – Berlin, 1996.

CultTour – Cultural garden and open space heritage as a focal point for sustainable tourism – is a transnational project, approved under the South East Europe (SEE) Transnational Cooperation Programme of the European Union and is carried out with scientific partners TU Berlin, IMC Krems and BOKU Vienna and partners providing pilot sites in Greece, Bulgaria, Romania and Apulia/Italy.

Girot, C., Wolf, S.: Blicklandschaften, Zurich, 2010.

ICOMOS: The BURRA Charter, by ICOMOS in Australia, 1999.

Licka, L.: Studienblätter zur Landschaftsarchitektur, Institute of Landscape Architecture, Vienna University of Natural Resources and Life Sciences, 2011.

Meyer, E.: The Expanded Field of Landscape Architecture. In: Thompson, George F. and Steiner, Frederick R.: Ecological Design and Planning, p. 73. New York, 1999.

Meyer, E.: Sustaining Beauty. The Performance of Appearance, in: Journal of Landscape Architecture, p. 6-23, Munich 2008

Shama Simon: Landscape and Memory, p. 10. New York, 1995.

Steenbergen, C.: Composing Landscapes: Analysis, Typology and Experiments for Design, Basel, 2008.

Treib Marc: Must Landscapes Mean? In: Swaffield, S.: Theory in Landscape Architecture, p. 89-101, Philadelphia 2002,

UNESCO: Recommendation Concerning the Safeguarding of the Beauty and Character of Landscapes and Sites. Adopted by the General Conference of UNESCO at the 12th session in Paris, France, 11 December 1962.

Weizman, Eyal: Forensic Architecture: Notes from fields and Forums, p. 9. Kassel, 2012.

Fig. 1: http://www.southeast-europe.net/en/about_see/participating_countries/, 26/2/2013.

Fig. 2: http://archeotaranto.altervista.org/archeota/taras78/lacitta.htm, 11/2/2013.

Fig. 3: Schwaba, M.: Factbook zur landschaftsarchitektonischen Bestandsaufnahme "Villa Peripato", Vienna University of Natural Resources and Life Sciences, 2012.

Fig. 4: http://www.betasom.it/forum/index.php?showtopic=35746&st=30, 14/2/2013

Fig. 5: Diliddo, Isabella Dott., Presentation during Local Survey of CultTour in Bari, 2012.

Fig. 6: Schwaba, M.: Factbook zur landschaftsarchitektonischen Bestandsaufnahme "Villa Peripato", Vienna University of Natural Resources and Life Sciences, 2012.

Fig. 7: Schwaba, M.: Factbook zur landschaftsarchitektonischen Bestandsaufnahme "Villa Peripato", Vienna University of Natural Resources and Life Sciences, 2012.

Transnational Planning Support by the European Geodata Infrastructure INSPIRE

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1 ABSTRACT

In the INSPIRE initiative of the European Union a common spatial data infrastructure is being developed, which in a few years will support the Europe-wide, standardised access to spatial data from different thematic areas. In this context, a special activity is the specification of various data exchange formats, based on the OGC standard GML. Though INSPIRE primarily aims at environmentally relevant data, many of the themes are also relevant for spatial and urban planning. In this context, the paper presents the two INSPIRE data formats for "Buildings" and "Planned Land Use".

2 INTRODUCTION

In the INSPIRE (Infrastructure for Spatial Information in the European Community) initiative (EU 2007), a pan-European spatial data infrastructure is being developed. In a few years the service-based access on geodata from different functional areas will be possible. This not only comprises visualisation services like Web Map Service (WMS), the pan European exchange of geographic vector data via Web Feature Services (WFS) or Download Services shall be possible as well. For this purpose, standardised data exchange formats based on Geography Markup Language (GML 3.2.1) are being developed for a number of thematic areas.

Though INSPIRE primarily aims at the environmental area, this development is also highly relevant for supporting transnational urban planning or spatial planning. Spatially related planning in any case needs a suited representation of the actual state. For this, it is not sufficient only to provide a suited visualisation model, an automatic interpretation of the data in simulation or analysis tools should also be possible. The semantically enriched, two- or three-dimensional INSPIRE data model for buildings (INSPIRE BU) facilitates the trans-border exchange of information on a city's building stock. It is expected that such data in future will be an important basis for computer based, spatially related planning processes.

The INSPIRE data format for the planned land use (INSPIRE PLU) aims at representing the results of planning processes in Europe-wide standardised, semantically enriched data format. It is intended that this format facilitates different governmental levels. The range of the supported planning instruments goes from Construction Plans at the development area level (i.e. a few km2), over Zoning Plans at the area of a municipality or a group of municipalities (i.e. several hundreds of km2), up to Structure Plans at regional, state or country level (i.e. several thousands of km2).

The paper first of all will give an overview of history, actual status and time schedule of the INSPIRE initiative. Afterword, the main emphasis will be placed on presenting and discussing the two data formats INSPIRE BU and INSPIRE PLU. The structure of the data models will be presented, and the spectrum of the considered planning-relevant data is discussed. In this context, a number of Europe-wide standardised classification schemata for, e. g. land use categories are of special importance. Finally, the relation of the INSPIRE data formats to comparable international standards (CityGML) or German national standards (XPlanGML) is addressed.

3 THE EUROPEAN INITIATIVE INSPIRE

The European initiative INSPIRE aims "at the establishment of the Infrastructure for Spatial Information in the European Community (...) for the purposes of Community environmental policies and policies or activities which may have an impact on the environment" (EU 2007). This European directive, which meanwhile has been adopted as national legislation in all European Community (EC) Member States, lists 34 relevant thematic fields, segmented into three packages (Annex I – Annex III). Legal basis for the initiative, ensuring that the spatial data infrastructures of the Member States are compatible and usable in a community and trans boundary context, are five Implementing Rules in the areas:

- Metadata – Description of data and services;
- Data Specification – Interoperability of spatial data sets and services;
- Network Services – Specification of performance criteria for download, discovery, transformation and view services;
- Data and Service Sharing – Regulations on access to spatial data sets and services;
- Monitoring and Reporting – Definition of indicators for quality management of spatial data and services, and specification of common provisions for monitoring and reporting.

Though the development of the Implementing Rules is not yet finished, it is obvious that many areas of public administration are affected by INSPIRE. The INSPIRE directive does not require collecting new spatial data, but under special conditions spatial data have to be delivered "INSPIRE-conform" in future. These conditions are: The data are available in digital form, a national law imposes the responsibility of a public authority to collect and distribute the data, and the data can be assigned to one of the relevant thematic areas. This especially means that the specified visualisation and download services have to be supported, and that the data must be delivered in the corresponding data format.

Standardised data formats for the Europe-wide, interoperable exchange of spatial data are being developed for all INSPIRE themes. The formats for the 9 themes in Annex I have already been published at the end of 2010, and the development of the remaining data specifications for Annex II and Annex III is nearly finished. It is expected that the corresponding Implementing Rules will be adopted in October 2013. Based on this decision, the following roadmap for the implementation of INSPIRE in the Member States can be expected:

- From October 2015, all spatial data sets affected by INSPIRE, which have been created or significantly changed after adoption of the Implementing Rules, must be facilitated INSPIRE-conform.
- From October 2020, all spatial data sets affected by INSPIRE have to be facilitated INSPIRE-conform.

The implementation of the INSPIRE directive will surely have a strong impact on the activities of public authorities in Europe, and it will cause high personal and financial efforts. On the other hand, the possibility for a Europe wide, interoperable access to spatial data provides a high potential for improved or even new public services, especially in the area of trans-border urban or spatial planning. The spatial data infrastructure which will be available in a couple of years potentially can be used for several purposes in spatially related planning processes:

- Provision of restrictions or constraints influencing the planning process. This thematic area is e.g. tackled by the INSPIRE topics "Natural Risks Zones" (INSPIRE-NZ 2012), "Elevation" (INSPIRE-EL 2012) and "Protected Sites" (INSPIRE-PS 2009).
- Provision of data on the actual state of the build-up environment. This thematic area is supported by the INSPIRE topics "Buildings" (INSPIRE-BU 2012), "Transport Networks" (INSPIRE-TN 2009) and "Production and Industrial Facilities" (INSPIRE-PF 2012).
- Provision of spatially related planning documents and corresponding cartographic representations, which is supported by the INSPIRE topic "Planned Land Use" (INSPIRE-PLU 2012).

The paper is focusing on the two thematic areas Buildings (chapter 5) and Planned Land Use (chapter 6). The central goal is to present the two corresponding data formats, in order to show which planning relevant information in future is provided by the European spatial data infrastructure.

4   COMMON PROPERTIES OF THE INSPIRE DATA FORMATS

It was a central goal of INSPIRE that the data formats cannot only be used stand-alone, also a problem-suited combination must be possible. Furthermore, in order to facilitate implementation, a common basic structure for all data formats is intended. Therefore, all data models are specified as conceptual models in form of UML class diagrams, based on a common Generic Conceptual Model (INSPIRE-GEN 2012). This generic model itself is based on the family 191xx of ISO norms.

From the conceptual models, encodings in form of XML-schemata are automatically generated using common encoding rules (INSPIRE-Encoding 2012). These rules internally use the GML 3.2 (OGC 2007) and GML 3.3 (OGC 2012) encoding rules for the UML to XML-Schema transformation, and define a few INSPIRE specific rules. The latter mainly concerns the classification of attributes as "mandatory", "optional" and "voidable". While a mandatory attribute must be specified and an optional one may be specified or not, a "voidable" attribute is a mixture of both. Normally, voidable attributes must be specified at least once, but if the corresponding information is not available or unknown, the value may remain empty, but the reason for this has to be stated explicitly.

5   THE INSPIRE DATA FORMAT FOR BUILDINGS

In the INSPIRE specification, buildings are defined as "constructions above and/or underground which are intended or used for the shelter of humans, animals, things, the production of economic goods or the delivery of services and that refer to any structure permanently constructed or erected on its site" (INSPIRE-BU 2012). The specification mentions a number of important use-cases which were considered during the development process. Among these are statistics and census, safety (natural risks, human risks, rescue management), environment (air, noise or soil pollution, energy efficiency, preservation of national heritage), and infrastructure planning or management. A building may be composed of building parts, defined as "a sub-division of a building that might be considered itself as a building" (INSPIRE-BU 2012). Because the modelling of building and building part is identical, only the term "building" is used subsequently.

The INSPIRE BU format can be used with four different profiles, whose dependencies are shown in Figure 1
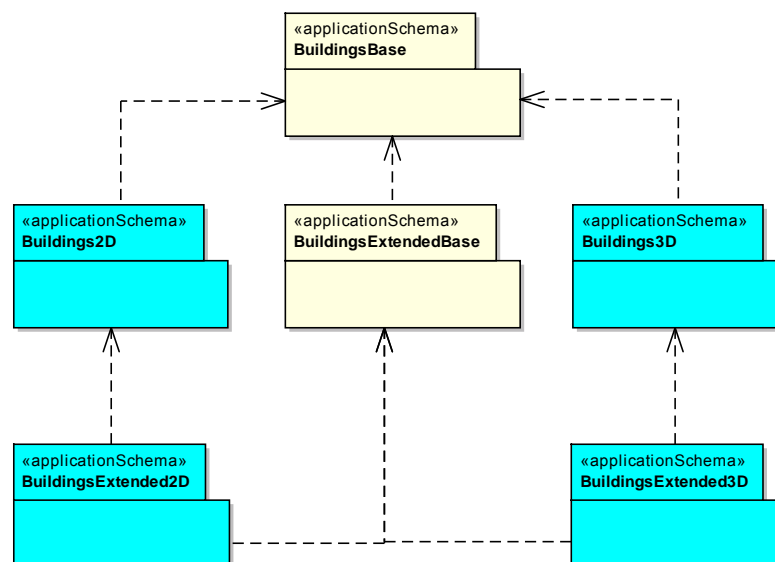
Figure 1: Profiles of the INSPIRE BU data format

The two core profiles (Building2D and Building3D) represent buildings with a reduced set of (normally optional) semantic attributes, which are provided by the (abstract) schema BuildingBase. The following information can be expressed:

- Classification of status (e.g. "functional" or "planned"), nature (e.g. "castle", "church" or "stadium") and current use of a building;

- Important dates in the building's life cycle: Date of construction, of last renovation and of demolition;

- Elevation of the building relative to a well-defined surface (e.g. geoid or water level);

- Height of the building, defined as difference between a well-defined lower reference (e.g. ground level) and a well-defined upper reference (e.g. top of construction);

- Name of the building;

- Information on the building structure: Number of storeys above ground, number of dwellings and number of building units.

The Building2D profile geometrically represents a building as 2D or 2,5D surface (see fig. 2a). A mandatory attribute specifies which element of the building (e.g. "above ground envelope" or "roof edge") was captured by the surface. The Building3D profile additionally supports a 3D representation of the building's exterior shell in three different Levels of Detail (LOD) (see fig. 2b). The INSPIRE specification uses the LOD concept of CityGML (CityGML 2012), which means that LOD1 represents the vertical extrusion of a horizontal surface, LOD2 a geometrically generalised representation, and LOD3 a geometrically exact representation.

In the profiles BuildingExtended2D and BuildingExtended3D, both based on the abstract schema BuildingExtendedBase, the corresponding core profiles are semantically enriched. The profiles support the representation of an OtherConstruction, which is defined as "self-standing construction not fulfilling the definition of a building". Additional attributes are provided, regarding

- the connection of the building to public infrastructure (gas, water, electricity, sewage);

- information on the building's energy performance and installed heating system;

- cadastral information (e.g. address or parcel);

- material information;

- detailed information on the storey structure above and below ground, including data on storey height, floor and window area, and the number of dwellings belonging to a storey;

- real estate information (official area and value).
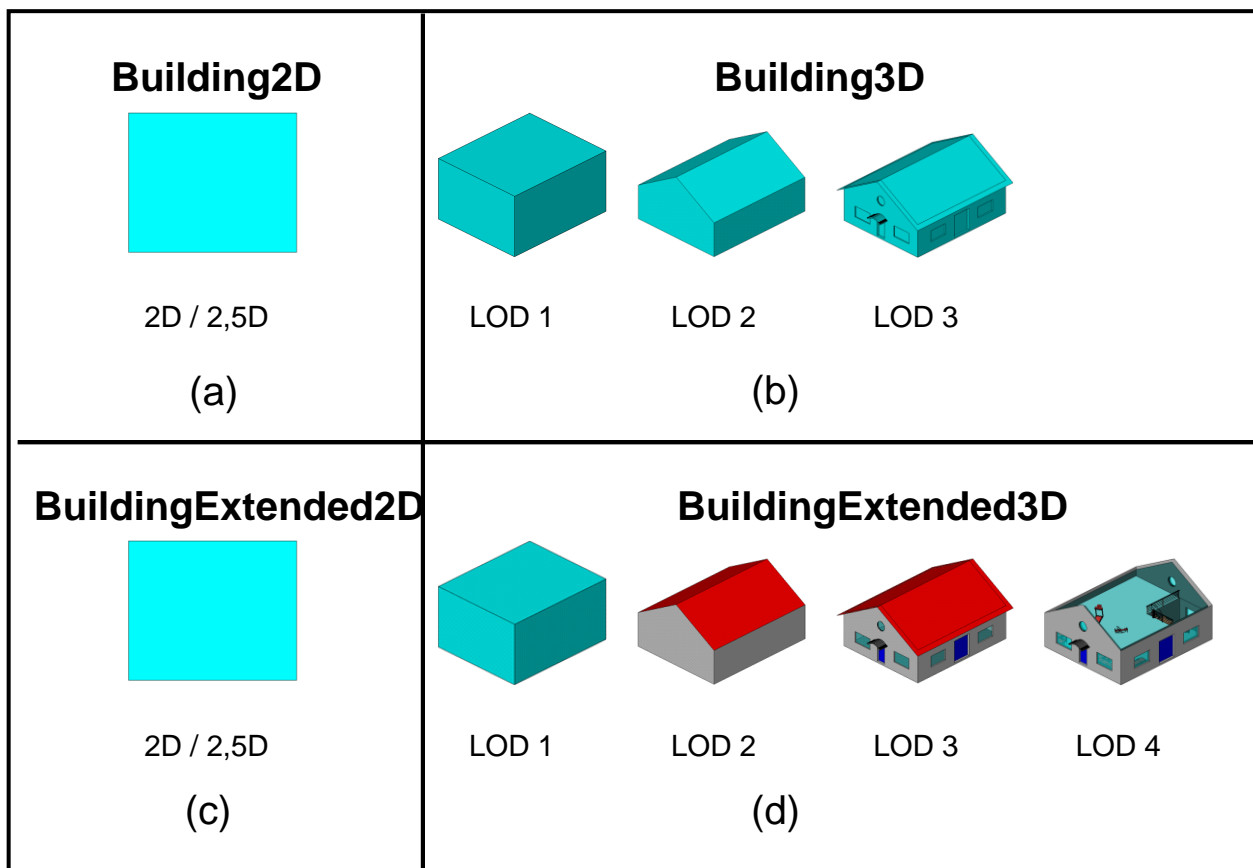
Figure 2: Representation of a building in the four INSPIRE BU profiles

Apart from the extended set of attributes, the representation of buildings in the profiles Building2D and BuildingExtended2D do not differ (see fig. 2a and 2c). This is not the case for the 3D profiles. The BuildingExtended3D profile (see fig. 2d) comprises the whole CityGML Building module and therefore provides, in addition to a purely geometric representation in four different LODs, classes for a semantic classification of the building's exterior shell by BoundarySurfaces. This means that every part of the

geometry is classified as RoofSurface (building roof), WallSurface (building facade), GroundSurface (building ground plate), OuterFloorSurface (part of the exterior shell with orientation pointing upwards) OuterCeilingSurface (part of the exterior shell with orientation pointing downwards) or ClosureSurface (virtual surface used for closing buildings which are not totally enclosed). Furthermore, external constructions or external devices attached to the building may be represented as Installation. In LOD3 or LOD4, BoundarySurfaces may refer to Openings representing doors and windows. In LOD4, also a geometrically and semantically representation of the building's interior structure is possible.

6   THE INSPIRE DATA FORMAT FOR LAND USE

In the relevant EC directive INSPIRE PLU, Land Use is defined as "Territory characterised according to its current and future planned functional dimension or socio-economic purpose (e.g. residential, industrial, commercial, agricultural, forestry, recreational)" (INSPIRE-PLU 2012). Land Use is split up into two different types: Existing Land Use, which objectively depicts the use and functions of a territory as it has been and effectively still is in real life, and Planned Land Use (PLU), which corresponds to spatial plans, defined by spatial planning authorities, depicting the possible utilization of the land in the future (INSPIRE-PLU 2012).

The scope of the INSPIRE PLU specification is giving the exact spatial dimension of all the elements a spatial plan is composed of. Spatial planning is performed at several governmental levels and the cartographic expression of the regulation differs in its graphical expression as well as the concepts that are represented. The specification distinguishes between three different types of plans (INSPIRE-PLU 2012):

- Structure Plans at a level of a wide area (several thousands of km², i.e. a country, a state, or a region), which outline the spatial structures and development in pursuance of spatial planning goals.

- Zoning Plans at a level of a municipality or a group of municipalities (i.e. several hundred of km²) cartographically representing the zoning and supplementary regulations (such as easements). Zoning refers to a partition where the planned land use is depicted. Supplementary regulations overlap the zoning where it exists and provide additional information and/or limitations to the development of the area.

- Construction Plans at a development area level (i.e. few km²) cartographically representing the actual geographical objects that will be created such as building, parking lots, gardens.
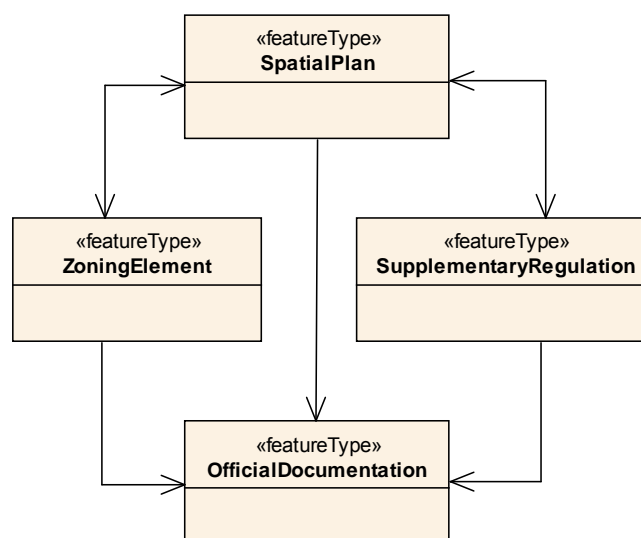
Figure 3: Basic structure of the INSPIRE PLU data model

The basic structure (without attributes) of the INSPIRE PLU data model is shown in figure 3. There are four different feature types: SpatialPlan representing a spatial plan as a whole; ZoningElements representing planning elements of the zoning layer; SupplementaryRegulation for additional planning elements overlapping the zoning layer, and OfficialDocumentation representing documents or raster images, assigned to the plan as a whole or to single elements.

6.1 Representation of a Spatial Plan – SpatialPlan

A mandatory attribute of the class SpatialPlan is the surface geometry, outlining where the planning document is valid. Additionally, every planning document must have a unique identification, an official name or title, a classification to which level of the public administration it belongs (infraLocal, local, supraLocal, infraRegional, regional, supraRegional, national)), and a classification of the plan type according to national legislation. If available, additional information can be given: Temporal restrictions on the legal validity of the plan, an indication of the status of the planning process (adoption, elaboration, legalForce, or obsolete), a reference to the background map that has been used for construction the plan, and important dates during the process of establishing the plan.

6.2 Representation of zoning objects – ZoningElement

The class ZoningElement represents elements of the zoning-layer, which specify a unique dominant land use for all parts of the planning region. The elements therefore must have a geometrical representation by one or more non overlapping surfaces. For classifying the dominant land use, two schemata represented as hierarchical CodeLists are used: The Europe-wide standardised "Hierarchical INSPIRE Land Use Classification System" (HILUCS), and additionally an EC Member State specific classification schema (LandUseClassificationValue). Additional attributes of class ZoningElement indicate, whether the regulation is legally binding or not, and support the formulation of numerical values or texts, explicitly restricting the indicated land use. By this, e.g. a maximal value for the floor space ratio or a certain roof type may be stipulated.

The HILUCS schema is one of the standard's central components, being used for existing as well as planned land use. It has a hierarchical structure with 98 entries on maximum three levels of hierarchy. Due to the definition of "Land Use", mostly economic classification criteria are used. The first level contains the six categories

- Primary Production: Agriculture, forestry, production of raw materials;
- Secondary Production: Manufacturing industry;
- Tertiary Production: Services, including culture, recreation and sports;
- Transport Networks, Logistics and Utilities;
- Residential Use;
- Other Use, including economically unused land and water areas.

On the next two levels of hierarchy, these categories are refined. As an example, urban parks or other areas used for recreation purposes have to be assigned to the Tertiary Production area, sub-category Culture, Entertainment and Recreation Services, and sub-sub-category Open Air Recreational Areas.

For the HILUCS-classification of zoning information, there are multiple possibilities:

- The specification of one or more HILUCS-values without priority or weighting;
- The specification of several values with specified priorities;
- The specification of several values with quantitative weighting.

The specification states that always the most detailed classification or classifications, which are consistent with the intended land use, must be used.

6.3 Representation of additional information and limitations: SupplementaryRegulation

Any other spatially related content of the plan not belonging to the zoning layer is represented as SupplementaryRegulation. The attributes of this class mostly correspond to ZoningElement attributes. In particular, there are two hierarchically structured classification schemata for the semantic meaning of a SupplementaryRegulation: A Europe-wide standardised schema (SupplementrayRegulationValue), and a specific schema for every EC Member State (SpecificSupplementaryRegulationValue). Geometrically, a SupplementaryRegulation may be represented by points, lines or surfaces either.

In comparison to HILUCS, the SupplementaryRegulationValue schema is more complex and contains 159 categories on 4 levels of hierarchy. The top-most categories differentiate regulation into the themes

- Impact on environment;

- Risk exposure (natural and technological risk areas);

- Heritage protection;

- General interest (this category e. g. comprises easements);

- Land property right (restriction on the usage rights of land property owners);

- Regulations on buildings (restrictions on position, orientation and size of buildings);

- Local, regional, state development policies;

- Social health choices;

- Regulated activities (permitted, restricted and prohibited activities);

- Other supplementary regulations.

6.4 Representation of additional documents and raster images: OfficialDocumentation

As only class of the INSPIRE PLU data model, OfficialDocumentation has no explicit spatial relationship. It is used for assigning textually formulated regulations, raster images, official documents, or legal texts to a plan (SpatialPlan) or to specific elements of a plan (ZoningElement, SupplementaryRegulation).

7   GENERATION OF INSPIRE PLU ON BASE OF THE GERMAN STANDARD XPLANUNG

In the project XPlanung (Benner et al. 2007), the GML-based standard XPlanGML (Benner et al. 2010) has been developed, supporting the exchange of planning documents like Bebauungsplan (BPlan), Flächennutzungsplan (FPlan) or Regionalplan (RPlan), based on German national legislation (BauGB, BauNVO, ROG). On national level, XPlanGML thus supports the same type of information as INSPIRE PLU on European level. Implementation and usage of XPlanung are under way (Krause 2010) and on the technical level there are strong similarities between both standards. Therefore, it is obvious to use XPlanung for the implementation of the INSPIRE directive.

Spatial planning documents are generated with many different software systems. An effective way for producing INSPIRE-conform versions of spatial planning documents is to proceed in two steps (fig. 4): First to produce a XPlanGML version of the plan, which is automatically transformed into INSPIRE PLU in a second step. In order to proceed in this manner, transformation rules between XPlanGML and INSPIRE PLU need to be defined, ensuring that a valid, INSPIRE-conform data can be generated, representing the central content of the plan.

Figure 4: Automatic transformation of spatial plans into the INSPIRE PLU format

It turned out that the transformation XPlanGML ☐ INSPIRE PLU is principally possible, and that the major part of the national planning information can also be expressed in the European data format, but the transformation rules are quite complex (Benner 2013). Figure 5 shows as example the zoning plan (FPlan) of Hamburg visualised on basis of an XPlanGML and an INSPIRE PLU model with nearly identical content. The cartographic representation of the XPlanGML model is based on the German Planzeichenverordnung, for the INSPIRE model the portrayal rules of the specification (INSPIRE PLU, 2012) were used.

However, not in any case the total content of a BPlan or FPlan can be transformed. Exceptions are restrictions on the height of buildings, which need a precise definition of the lower reference (e.g. ground surface) and upper reference (e.g. ridge height). This specification is not possible with the INSPIRE PLU

syntax. For all XPlanGML Presentations Objects, supporting a problem suited, automated visualisation of a spatial plan, there also exist no counterpart in INSPIRE.

A major deficit of the INSPIRE PLU format is the fact that it does not support any relations between different SpatialPlan objects. XPlanGML supports such relations with the special semantic meaning, that a certain plan modifies, eventually only partial, another plan. This allows keeping the spatial plan and subsequently occurring modifications to be hold in separate data sets, which is common practice in German planning authorities. However, because the INSPIRE data format does not support this feature, for an INSPIRE-conform deliverable the different plan need to be integrated in one XPlanGML data set.

XPlanGML   INSPIRE PLU
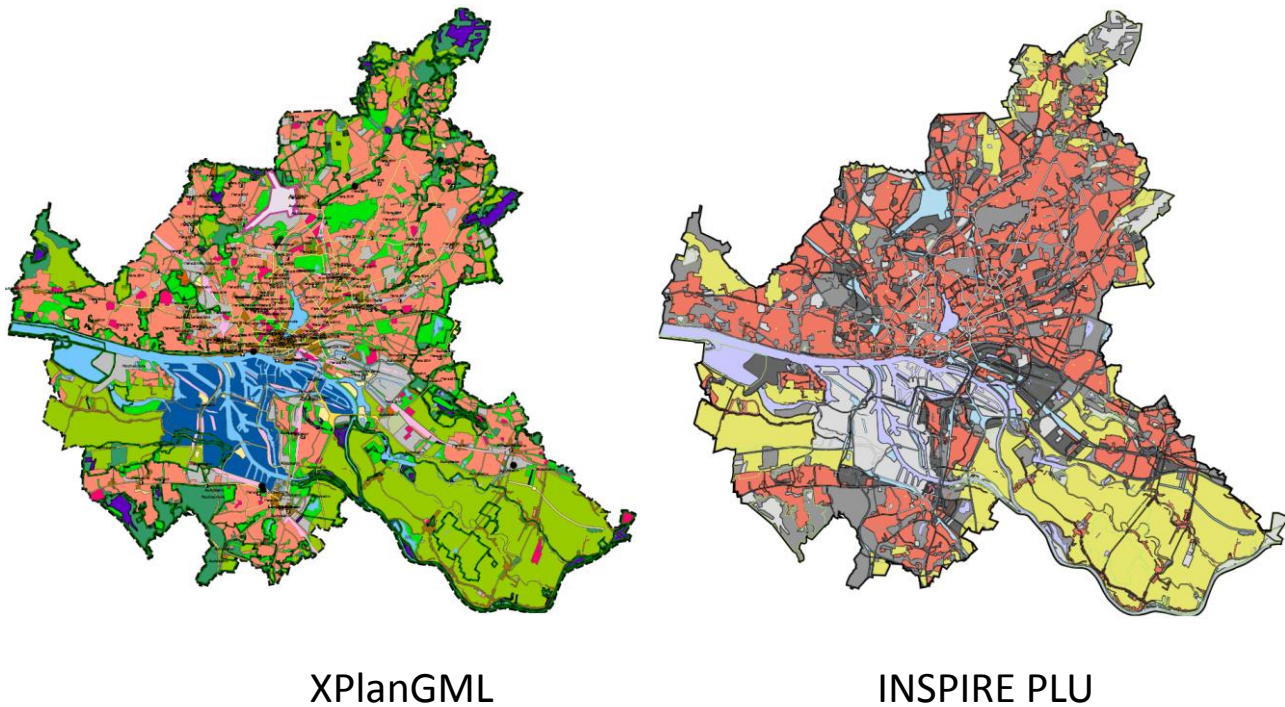
Figure 5: FPlan of Hamburg in XPlanGML and INSPIRE PLU format

8   SUMMARY AND OUTLOOK

In the INSPIRE initiative, the development of a trans-European Spatial Date Infrastructure is under way. In a few years, the Europe-wide access on spatial data from different thematic areas via standardised Internet services shall be possible, as well as the interoperable data exchange based on standardised exchange formats. Many of the thematic areas falling under the scope of INSPIRE are relevant for urban planning and should in future be used to support transnational planning activities.

During the last years, 34 different data exchange formats have been developed. Two of these, the INSPIRE data formats for modelling buildings (INSPIRE BU) and planned land use (INSPIRE PLU) were presented in the paper. The INSPIRE BU data supports four profiles with strongly varying functionality. The differences on the one hand affect the geometrical representation (two- or three dimensional), and of the other hand the amount of semantic information a building may contain. The profiles allowing a three dimensional geometrical representation of the building's geometry use central concepts of the international standard CityGML, e. g. the LOD concept or the classification of different parts of the building's exterior shell as thematic BoundarySurfaces. The main differences between the European and the international standard are that INSPIRE BU supports more non-geometrical, semantic attributes and explicit 2D geometry.

The INSPIRE data format for planned land use (INSPIRE PLU) is designed to support spatial planning documents of various governmental levels. The data format represents a spatial plan as a whole, two different types of spatially related elements of a plan (zoning elements and supplementary regulations), and elements like textually formulated regulations, raster images or legislation texts without explicit spatial representation. Central instruments for specifying the intended land use are four different classification schemata represented as hierarchical CodeLists. Two of them, the "Hierarchical Land Use Classification System" (HILUCS) for zoning elements and the "SupplementaryRegulationValue" system for

supplementary regulations are Europe-wide standardised and centrally managed by the EC. As not every speciality of national planning law can be expressed with these schemata, two Member State specific schemata (LandUseClassificationValue for zoning elements and SpecificSupplementaryRegulationValue for supplementary regulations) are provided. Every regulation in a spatial plan may optionally use these schemata, in addition to the mandatory classification due to the central schemata.

The paper finally illustrated the relation of the INSPIRE PLU data format with the German national standard XPlanGML. It turned out that rules can be specified; enabling an automatic transformation of most parts of XPlanGML represented plans to INSPIRE PLU. Some concepts of XPlanGML like explicit data supporting plan visualisation have no counterpart in the INSPIRE format, the corresponding information therefore will not be available on the European level. This causes problems in the context of modifying plans. The German planning legislation and the XPlanGML standard allow that a basic plan and subsequent modifications of this plan can be stored and exchanged as separate data sets. Because the INSPIRE PLU format has no concept for this, an integration of basic plan and modifications needs to be performed prior to the XPlanGML to INSPIRE PLU transformation.

It is expected that the specification of all INSPIRE data formats will be finalised soon, and that the corresponding Implementing Rules, defining the Europe-wide legal basis for the activities, will be adopted in the second half of 2013. For the actual implementation and usage of the Spatial Data Infrastructure, still a lot of work has to be done on European as well as national level. So, registry services supporting the different CodeLists need to be implemented on European and national level. A lot of EC Member State specific CodeLists still have to be specified, and transformation rules defining the mapping between exiting standards like CityGML and XPlanGML and the INSPIRE standards need to be defined.

9 REFERENCES

BENNER, J., KRAUSE, K.U. (2007): XPlanung – Ein GIS-Standard zum Austausch digitaler Bauleitpläne. In: Flächenmanagement und Bodenordnung (fub), Band 6/2007, S. 274 – 280, 2007.
BENNER, J., EICHHORN, T., KRAUSE, K.-U., KIRCHENBAUER, V. (2010): Konzepte länderspezifischer Erweiterungen standardisierter Objektmodelle am Beispiel des Standards XPlanung in der Freien und Hansestadt Hamburg. In: M. Schrenk, V. Popovich, P. Zeile (edrs.), Proc. REAL CORP 2010, pp. 375 – 282, Vienna 2010.
BENNER, J. (2013): Von XPlanung zu INSPIRE – Automatische Erzeugung von INSPIRE Planned Land Use Daten aus XPlanGML. To appear in: Allgemeine Vermessungs-Nachrichten (avn), Band 119, 2013.
CityGML (2012): OGC 08-007r2, OpenGIS® CityGeography Markup Language (CityGML) Encoding Standard, version 2.0.0, 2012
EU (2007): Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE), 2007.
INSPIRE-BU (2012): D2.8.III.2, Data Specification on Buildings, 2012.
INSPIRE-PLU (2012): D2.8.III.4 Data Specification on Land Use, 2012
INSPIRE-NZ (2012): D2.8.III.12 Data Specification on Natural Risk Zones, 2012
INSPIRE-EL (2012): D2.8.II.1 Data Specification on Elevation, 2012
INSPIRE-PS (2009): D2.8.I.9 INSPIRE Data Specification on Protected Sites, 2009
INSPIRE-TN (2009): D2.8.I.7 INSPIRE Data Specification on Transport Networks, 2009
INSPIRE-PF (2012): D2.8.III.8 Data Specification on Production and Industrial Facilities, 2012
INSPIRE-GEN (2010): D2.5: Generic Conceptual Model, 2010.
KRAUSE, K.-U. (2011): Stand der Einführung von XPlanung in Norddeutschland. In; M. Schrenk, V. Popovich, P. Zeile (edrs.), Proc REAL CORP 2011, Essen 2011.
OGC (2007): OGC 07-036, OpenGIS® Geography Markup Language (GML) Encoding Standard, version 3.2.1, 2007.
OGC (2012): OGC 10-129r1, OGC® Geography Markup Language (GML) — Extended schemas and encoding rules, version 3.3.0, 2012

Urban Coastal Environment and Management Policies in Attica

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1 ABSTRACT

Nowadays, the coastal area of the Attica region faces many problems that degrade natural resources and the quality of life of the residents. In addressing these problems, the European Union has issued several directives and guidelines for actions taken at a local and regional level.

The research refers to the urban sprawl of cities on the coastal environment and its repercussions. Specifically it focuses on the problems of coastal cities as well as the policies that have been implemented to address these problems by taking into account the directives of the European Union.

To carry out the research, land use plans, legislation for regulations land use, statistical data and existing surveys, are used. Also a research in situ and a method of personal interviews with the persons who are responsible for dealing with the problems that coastal municipalities are facing and the policies which have been implemented in order to face them, took place.

The research showed that the coastal area of the Region of Attica has a great economic and environmental significance for enhancing the quality of life for residents. The degradation of natural resources is continuing, despite the policies that have been implemented up-to now. Thus, the search for new policies and measures as well as the active participation of citizens for an integrated management of the coastal urban environment are necessary.

2 INTRODUCTION

Nowadays, the proportion of European citizens that live in urban areas stands at 80 % and most of it is concentrated in the coastal area (CEC, 2004). Coastal cities face many environmental problems that degrade the natural and cultural resources, having as a result serious repercussions on quality of life and the sustainability of these areas.

According to the Sixth Action Programme for the environment, the main issue concerning urban areas were the management of the urban environment, sustainable transport, construction and urban planning and harmonization of different policies in accordance to the instructions of the European Union (EC, 2007).

Additionally, the Seventh Programme proposes the research for the urban environment to focus on innovative urban management, reconstruction of the human environment, promotion of cultural heritage, environmental risk assessment, energy efficiency, renewable energy, safety and protection.

Urban areas are currently called upon to play an important role in reducing greenhouse gas emissions and adapting to that decrease. The basic guidelines involve sustainable use of natural resources, waste production prevention, recycling waste, saving energy, using renewable energy sources, proper land-use planning, at protection of soil, water, air end other (CEC, 1997).

Also, urban areas play an important role in achieving the objectives of the EU strategy for sustainable development and are both economic drivers and areas where entrepreneurship and investments take place.

Regarding coastal urban development, the European Union is pointing out that: (OJE, 2009).

- The distribution of land uses in the coastal zone should be balanced and the unnecessary and the excessive concentration of urban development should be avoided.

- Priority should be given to public services and activities that require immediate proximity to the sea.

- The development of spatial plans and programs that cover the urban development and socio-economic activities as well as and other relevant sectoral policies should be secured.

- The linear extension of urban development should be limited and a new transport infrastructure along the coast should be created.

Taking the above into account, the present work refers to a research in coastal urban areas. As a case study the coastal urban area of Athens is selected. The problems which this particular area presents, the policies

that have been implemented until today, as well as the measures that have been taken for protection and its upgrading were investigated.

3 METHODOLOGY

To complete our study, legislation for regulations land use, statistical data and existing surveys and land use plans, are used. The study is based on a survey in situ and a series of personal interviews with officers of the municipality who are responsible for dealing with the problems that coastal municipalities are facing and the policies which have been implemented in order to face them, took place. Also, a geographic information systems (GIS) is used.

4 THE COASTAL REGION OF ATTICA

The coastal region of Attica has an area of 3092.9 Km2 and covers 81.22 % of the total area. According to the nomenclature of Territorial Units for Statistics (NTUS), belongs to category NUTS II. In this region lives 4,335,110 inhabitants, a number that corresponding to 62.09 % of the total population in the region of Attica (HSAG, 2012a) (Fig.1).
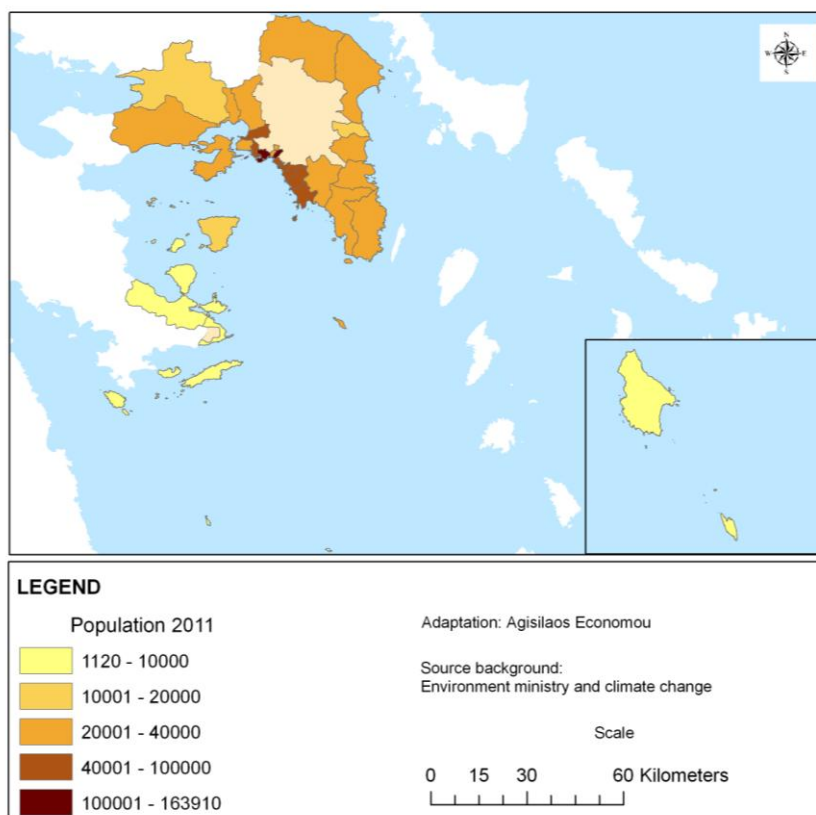
Fig.1: Population in the region of Attica.

The importance of the coastal region of Attica is great because:

- It presents good climatic conditions, mild and wet winters and relatively warm and dry summers, a high rate of sunshine and an average annual temperature ranging from 16 oC to 18 oC (HNMS, 2012).

- It presents great biodiversity. Many areas are included in the lists of the European Union as a highly valued landscapes, habitats Corine, area Natura and National Parks. The main areas that have been included in the protection Network are the Mount of Parnitha, the area of Oropos and the estuaries of Asopos, the area of Schinias, Vravrona, Sounio with the Islet of Patroclus, the mount of Hymettus, the Vouliagmeni lake and the National Park of Parnitha (Fig. 2).

- It has remarkable natural resources, such as the plain of Mesogion and Marathon.

- It has remarkable cultural resources such as global monuments, Temple of Poseidon (Sounio), Temple of Amfaias (Aegina)

- It includes a great number of sports facilities and Olympic facilities that were created to serve the 2004 Olympic Games. The Olympic projects are not sufficiently utilized so it order to contribute to tourism development.

- The region of Attica includes four ports of National Importance (Piraeus, Eleusis, Rafina and Lavrio) which are associated with the Trans-European Transport Network. It also includes the largest airport in the country Elefterios Venizelos, airport, which establishes the region of Attica as a primary national and international hub of Greece.

- It presents a strong growth of coastal areas driven by residential and tourism development. Tourism is oriented to tourism for water recreation in coastal areas (Fig. 3).
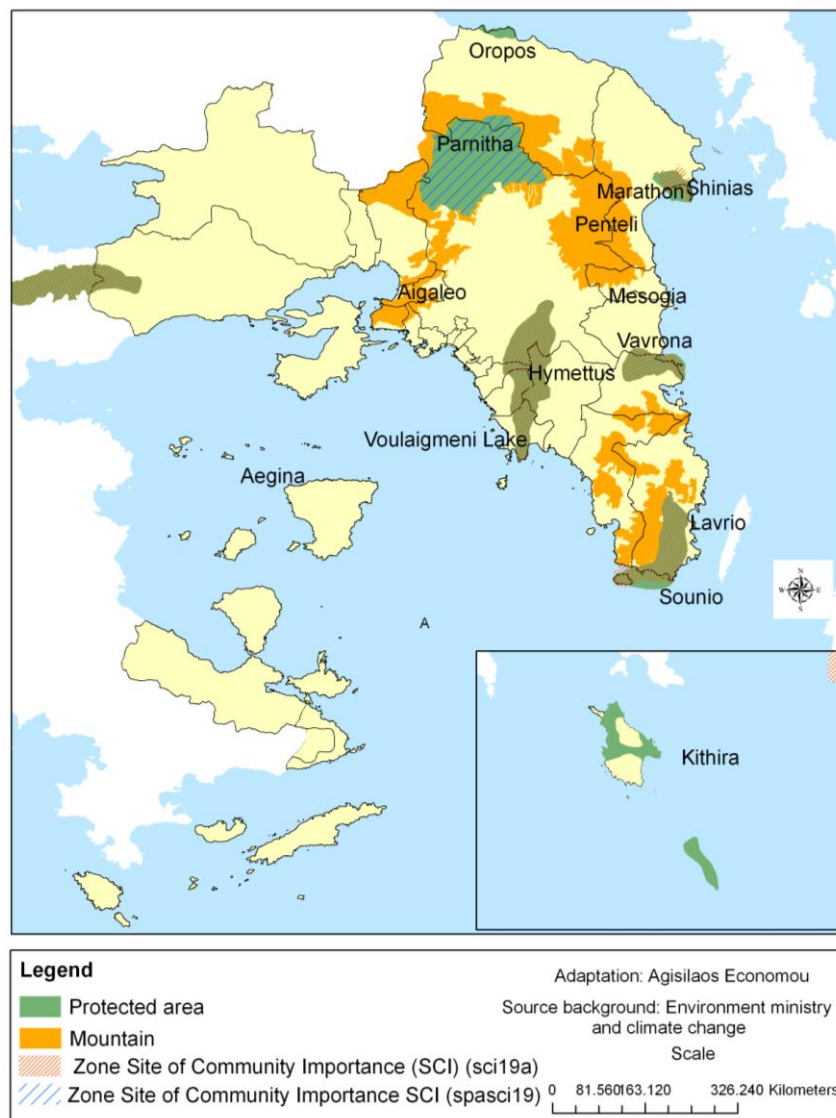
Fig 2: Protected areas in the Region of Attica
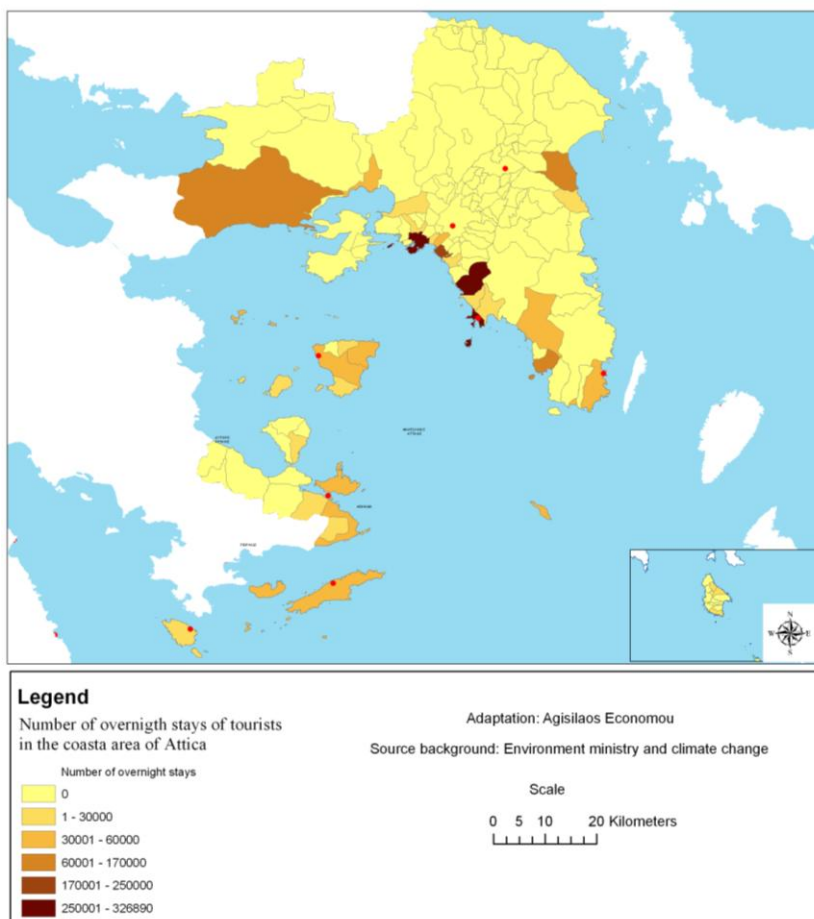
Fig .3: Number of overnights stayes of tourist during the year 2009 in the coastal area of Attica

According to the statistics data, the number of overnight stays in the coastal area of Athens presents an upward trend during the period time 2005 – 2009 (Fig. 4). The higher number of overnight stays of tourists is presented in coastal municipalities with have remarkable hotel potential.
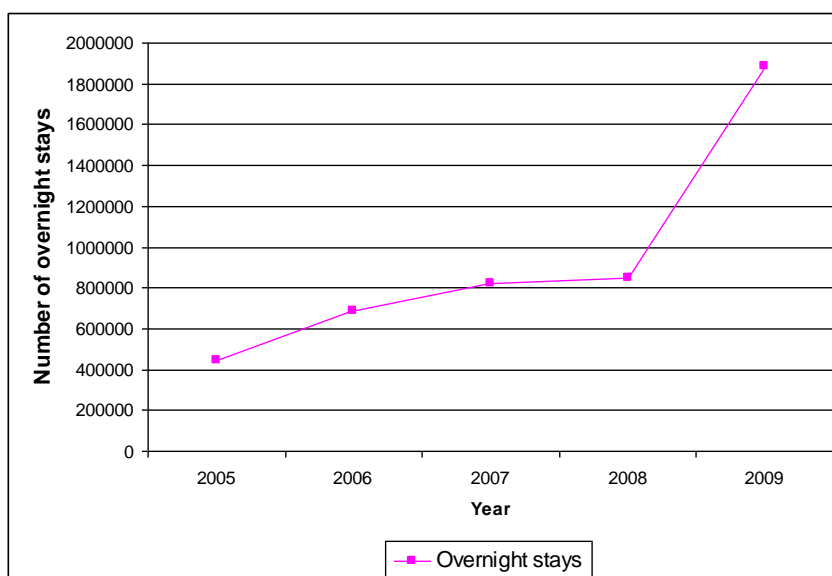
Fig.4: Number of overnight stays of tourist during the period 2005-2009 in the coastal area of Attica (HSAG, 2012).

The results showed that the municipalities of Piraeus, Glyfada, Vouliagmeni, Faliro and Megara present the higher rates of tourism, in contrast to other areas which present fewer overnights stays. It is underlined that, the tourists movement in the Municipality of Piraeus is supported by passenger and commercial traffic of the port. Also, the area of Glyfada is a center for entertainment and commercial traffic for the southern suburbs

and an attraction pole thanks to its beaches. Vouliagmeni presents big hotel units due to the large area of beaches and the remarkable natural environment that it has.

4.1 Problems in the coastal urban area

The urban environment of Athens faces a number of problems associated with the evolution of the urban network and the spread of the conurbation Region. The reason for this expansion was the degradation of the central area of Athens.

This fact has a result to push residents to look for new housing near the center which also present remarkable natural resources.Thus, the coastal area of Attica and especially from the area of Paleo Faliro to Vouliagmeni, became a place for the accommodation of people who look for a better quality of life.

In this survey an interview with the staff that is responsible for coastal municipalities from Moschato to Vouliagmeni, took place. Our research aimed to identify the main problems that the area presents and which are officially registered by the responsible authorities which manage them. The survey showed that:

- The coastal road has cut off the coastal area of the urban fabric.

- There are incompatible land uses in the coastal zone.

- •The Presidential Decree that determines land uses and limits of construction, has not been applied except from the Alimos area.

- A little recycling rate (20 %) has taken place in some municipalities.

- There is a lack of solid waste transfer stations, resulting in the increase of transportation costs.

- Circulatory problems (noise, congestion) due to the continuing increase of cars, the lack of parking and the fact that the means of stable track do not serve all areas of the Capital, appear.

- Noise pollution from nightclubs is presented.

- The involvement of many authorities often creates problems for regulations of land uses.

- Land use intensity problems and increasing pressures for the expansion of construction in search of new residential areas, are presented.

- The inadequate flood protection system, the sewage, wastewater ,and rainwater problems, as well as the covering of the two rivers of Attica, Kifisos and Ilisos and the excavation and construction in their streams, had as a result the appearance of flooding phenomena.

- The land use plans do not cover the entire area so that areas which are outside the plan undergo heavy pressures to expand construction.

However, it is noted that the region's coastal area presents remarkable natural resources, despite the large construction development that it suffered from the 60s and onwards (Fig. 5). Nowadays, natural resources are receiving heavy pressure from the continuous construction and the high intensities of land uses.
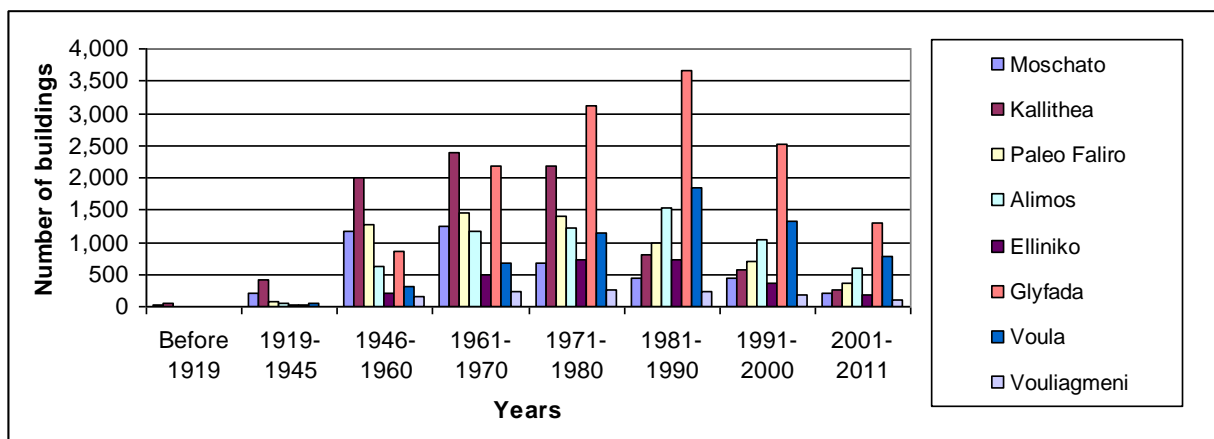
Fig.5: Building in coastal area of Attica (HSAG, 2010).

4.2 Construction in the coastal area of Attica

Many of the above problems occur in the rest of the coastal area of Attica, with different intensity. For example, coastal areas in the eastern region, face wastewater problems due to their remoteness from the major sewage treatment plant in Psyttalia and the lack of sewage treatment plants.

Other areas face problems of illegal construction (area of Sxinia) and other area face degradation problems due to the existence of industries (Area of Aspropyrgos). Also, coastal areas host ports and shelters, which are threatened with pollution due to the movement of boats.

A large number of areas are under protection status, due to their natural and cultural resources. Nowadays these areas are threatened by human activities such as forest fires, logging, illegal construction, construction expansion and others.

Green problems also appear on dense urban areas. Many of these areas have a low proportion of green areas per inhabitants, while the lack of open spaces as well as their improper utilization, makes the situation worse.

However, there are also examples of actions such as regeneration, planting, cleaning of the area and others that have upgraded many areas and have improved the quality of life for their residents .

A typical example is the area which hosted the Olympic works. The supporting works that have been constructed in order to serve the Olympic Games, have contributed significantly in improving the environment and the quality of life.

It is underlined that apart form the environmental problems, many areas present other problems such as unemployment, poverty, immigration and crime. According to the latest statistical data of the National Statistical Service, in the region of Attica, the unemployment rate for the third quarter is 26.8 % (HSAG, 2013).

From 2009 until today, due to the global economic crisis, the Attica region shows a decline in all sectors. Moreover, the poor fiscal policy had as a result the swelling of the external debt of the country, which has affected the region's economic growth and the welfare of its residents.

The tough fiscal policy and the cut-backs in the public sector have major economic consequences on the private sector as well, resulting in reducing incomes and job losses. Thus, intra-regional disparities such as demographic inequalities, rising unemployment, population movements in search for work and others, increase. The economic crisis has affected the construction activity in this specific area, which is currently in decline.

4.3 Measures in order to face problems and growth prospects

The measures which are proposed to address the problems in the study area are:

- Implementation of legislative decrees
- Utilization of areas with present remarkable natural resources.
- Increase recycling and expansion of recycling programs
- The utilization of natural resources (wind and solar). Nowadays, taking into account the installed capacity (wind and solar) in the region of Attica, it is found that the penetration rate of electricity production from renewable energy sources is very small. This means that there is great potential for expansion of both photovoltaic systems and wind farms, especially in areas with significant wind resources.
- Rehabilitation of degraded areas
- Traffic regulations and take measures for noise pollution.
- Expansion of sewerage and rainwater networks.
- Creation of bicycle routes and encouragement of people to use more environmentally friendly means of transport such as cycling.
- Better use of beaches, protection from arbitrary structures, cleanliness and development of other maritime activities.
- Utilization of open spaces and increase of green areas.

- Increase on the use of natural gas and expansion of the existing gas network, with the aim of reducing emissions of air pollutants

- Utilization of abandoned areas in order to limit construction

- Connecting the beachfront with the urban fabric (subterranean access)

- Utilization of all Olympic sports facilities which are located in the coastal area (organized sporting events, exhibitions, use by the local residents).

- Use of public property. Nowadays at the coastal region of Attica there are large areas of open space that could be used appropriately by attracting new businesses or even by creating green spaces.

- Strengthening of tourism development, by means of upgrading hotel accommodation in order to provide high quality services.

- Strengthening of rural economy. In the Attica region there are many areas that could be used appropriately and increase agricultural production.

- Creation of additional wastewater treatment plants for areas that have none, as it is necessary for water pollution prevention.

4.4 Other actions and measures

In the region, 94 General Urban Plans have been approved. Also, Development Control Zones have been approved for areas that are outside the boundaries of these plans, and laws relating to the permitted land uses in protected areas have been passed. Such examples are the area of the mount of Egaleo, Hymettus, Penteli, Lavreotiki and Parnitha.

Many works in the coastal area have been funded by European programs. For example, in the period 1994-1999, the Region of Attica was supported with 950.1 million euros for projects that were included in the Regional Operation Programmes (ROP) for Attica. The ROP for Attica projects were focused on priority axis, such as human resources, support in productive activities in the region, transport infrastructure improvement, improvement of the quality of life and technical assistance.

Also, the coastal area is supported by the National Strategic Reference Framework (NSRF) for 2007-2013, which aims to stimulate the development of better quality of life, strengthen accessibility infrastructure and infrastructure in general, increase competitiveness and revitalize urban areas (MDCITN, 2007).

5 CONCLUSION

By recording the current status quo, the advantages and disadvantages' of the study area, the following conclusions have been reached.

The main features of the coastal urban environment in the Region of Attica are, unregulated urban sprawl, traffic problems, insufficient urban and suburban green areas, lack of public open spaces, air pollution, poor sanitation rainwater and wastewater infrastructures, and shrinkage of the unstructured urban environment.

As noted above, the coastal area has remarkable natural resources. These natural resources are currently receiving heavy pressures from human activities and are threatened by degradation. The measures that have been taken through the spatial plans for land use regulation and restriction of construction, are not sufficient. There are many areas that are outside these land use plans, which are under heavy pressures from existing land use intensities many of which have been degraded.

The survey showed that new measures and new actions are necessary for further protection of the coastal area. The conservation of natural resources is a top priority, because it is due to them, that the coastal areas will remain sustainable. Otherwise, by degrading the natural resources, in addition to the degradation of the quality of life, these areas lose the advantage for economic growth, as well.

Nowadays, due to the economic situation of the country, new initiatives for the growth of the economy which is in recession, are sought. The conservation and utilization of natural resources, of such favored by nature regions, such as the coastal urban area of Attica, is becoming particularly important, as this area is a valuable asset on many levels.

6 REFERENCES

CEC (COMMISION OF THE EUROPEAN COMMUNITIES), CEC (Commision of the European Communities):Towards an urban agenda in the European Union. COM(97) 197 final, pp.3-17, Brussels,1997.

CEC (COMMISION OF THE EUROPEAN COMMUNITIES), CEC (Commission of the European Communities). Communication from the Commission to the council, the European Parliment, the European Economic and Social committee and the committee of the regions: Towards a thematic strategy on the urban environment, COM(2004) 60 final, pp.1-56, Brussels, 2004.

EC (EUROPEAN COMMUNITIES), EC (European Communities). Integrated Environmental Management, Guidance in relation to the thematic strategy on the urban environment, Technical Report 2007-013, pp.6-22, Luxembourg, 2007.

HNMS(HELLENIC NATIONAL METEOROLOGICAL SERVICE), HNMS (Hellenic National Meteorological Service): Meteorological data of weather station in the area of Elliniko. Athens, 2012.

HSAG (HELLENIC STATISTICAL AUTHORITY OF GREECE), HSAG (Hellenic Statistical Authority of Greece). Statistical data: Tourism movement in the region of Attica. Athens, 2012.

HSAG (HELLENIC STATISTICAL AUTHORITY OF GREECE), HSAG (Hellenic Statistical Authority of Greece). Press Release:The Labour Force Survey third quarter 2012, pp.1-9, Athens, 2013

HSAG (HELLENIC STATISTICAL AUTHORITY OF GREECE), HSAG (Hellenic Statistical Authority of Greece). Statistical data: Building in Attica, Athens, 2010.

HSAG (HELLENIC STATISTICAL AUTHORITY OF GREECE), HSAG (Hellenic Statistical Authority of Greece). Statistical data: Demographic data: Population and Housing cencus 2011. Athens, 2012a.

MDCITN (MINISTRY FOR THE DEVELOPMENT, COMPTITIVENESS, INFRASTRUCTURE, TRANSPORT & NETWORKS), MDCITN (Ministry for the development, comptitiveness, infrastructure, transport & networks): Regional Operational Programme Attica 2007-2013, pp.1-298, Athens, 2007.

OJE (OFFICIAL JOURNAL OF THE EUROPEAN UNION), OJE (Official Journal of the European Union): Protocol on Integrated Coastal Zone Management in the Mediterranean. L34/19, pp.1-10, Brussels, 2009.

Urban Health in India: a Challenge to Policy Making

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1 ABSTRACT

Urban health has received relatively less focus compared to rural health in India, especially the health of the urban poor. Rapid urbanization has been accompanied by an increase population in urban slums and shanty towns, which are also very inadequately covered by basic amenities, including health services. This paper presents existing and new evidence that shows that health inequities exist between the poor and non-poor in urban areas, even in better-off states. The lack of evidence-based policies that cut across sectors continues to be a main feature of the urban health scenario. While the problems of urban health are more complex than that of rural health, this paper argues that it is possible to make a beginning fairly quickly by (a) collecting more evidence of health status and inequities in urban areas, and (b) correcting major inadequacies in infrastructure – both health and non-health – without waiting for major policy overhauls.

2 INTRODUCTION

The share of the urban population in global population has crossed the 50 percent threshold in the year 2009 (Keating and Natella 2012). By 2030 urban population will be more than 60 percent of the global population (UN 2006). Urbanization rate is rapidly increasing in Asia, South America and Africa. More than 95 percent urban growth will occur in developing countries, with over 60 percent occurring in Asia (McGee 2011). South Asia will see the largest growth with an increase of urban population by more than five times (USAID 2006). Over 2001-2011, the growth of urbanization (2001-2011) was 31 percent in India, which is somewhat lower compared to other south Asian countries (Dutta and Noble 2004). However, given that around 31 percent of the total population lives in urban town and cities (Census 2011), in absolute terms more than 377 million people live in urban areas in India. Out of world's ten largest urban agglomerations, three are in India (Delhi – 22,157,000; Mumbai – 20,041,000; and Kolkata – 15,552,000) (World Demographic Profile 2012). Projections suggest that India will have more than 700 million urban populations by the 2040s (GoI 2011), with continuous increase of urban population in Class 1 towns or cities with 100,000 or more population.

Urbanization is an important indicator of economic development and social transformation. Rapid urbanization potentially creates enormous economic advancement and gives an open environment to the urban as well as rural communities to prosper in a modern way (Redman and Jones 2004, Ding 2009, FIG Commission 3 2010). However, there are significant environmental, social and public health implications of a burgeoning urban population in cities and towns ill-equipped to deal with such rapid change. The first visible impact of this process is the formation of slums and shanty towns which results from cities not being able to accommodate migrants in habitable areas well-served by basic amenities.

Evidence exists to indicate that lack of basic infrastructure like proper water supply, electricity, sanitation and health facilities including health coverage lead to outcomes such as increases in infectious diseases and limit access to adequate health care (Kessides 1997, Gupta and Guin 2012). However, the impact of this on the health of the urban poor continues to be somewhat sparse.

Rapid urbanization, therefore, calls for major shifts in approaches to tackle urban health issues that recognize the dichotomy that exists between the status of the urban poor and the non-poor. To what extent has India been able to make this shift in policy? This paper explores to what extent India has been able to carry out this shift in its policy by carrying out an exploratory analysis of the current urban health issues, the policies that exist to deal with urban health, and implications for the future.

3 DATA AND METHODS

India has no national database on the health of the urban poor, indicating lack of proper recognition of this issue at the policy level. The clubbing together of slum and non-slum populations under the label "urban" prevents a proper analysis of health outcomes. While further regional and geographic nuancing is possible, at the very least it is important to do separate analyses for rural, urban slums and urban non-slum areas. The usual rural-urban analysis is inadequate in the current context of rapidly changing urban scenario, which is

increasingly bringing to focus the almost parallel sub-economies of original and earlier settlers and later migrants (WHO 2011, ICSU Planning Group 2011).

The only comprehensive source of statistics on disease patterns in India is the Central Bureau of Health Intelligence (CBHI) under the Ministry of Health and Family Welfare (MoHFW). However, the report on health status indicators (MoHFW 2010) does not separate disease data by residence for communicable diseases – a serious omission that prevents analysis of even rural-urban trends. There are a few others sources of national data like the National Family Health Survey (NFHS) and the District Level Household Survey (DLHS) that do some disease reporting by residence, and these can be cross-tabulated by economic status to get some insights into how the urban poor are faring. The subsequent analyses are based on a variety of sources such as these, in an attempt to do a situational assessment of the health situation in urban India.

4 EMPERICAL RESULTS

4.1 Changing Disease Patterns in India

India has been witnessing an epidemiological transition with increasing burden of both communicable and non-communicable diseases. Around 52 percent of total life years lost is caused by communicable disease, with 35 percent from non-communicable disease and the remaining from injuries (WHO 2012). While morbidity and mortality from NCDs are rising quite rapidly, communicable diseases still remain a very important part of India's disease profile. The top 5 causes (among infectious and parasitic diseases & respiratory infections) by estimated Disability Adjusted Life Years (DALYs) lost in India are: lower respiratory infections, diarrheal diseases, childhood-cluster diseases, tuberculosis and HIV/AIDS, indicating the fairly preventable nature of the current disease profile in the country (WHO 2009), signifying the potential role that rapid urbanization can play in the current disease profile of the country.

4.2 Urban and Slum Population in Indian States

Census 2011 (Government of India 2011) indicates that among the major states, Tamil Nadu and Kerala have the maximum share of urban population to total population (48.4 % and 47.7 % respectively). In fact, other major states like Maharashtra, Gujarat, Karnataka, Punjab, Haryana, Andhra Pradesh (AP) and West Bengal (WB) all have share of urban population above the national average of 31.1 percent. Interestingly, Jharkhand, Chhatisgarh and Orissa have fairly low share of urban population. However, owever, Hodfdfhjfh do these states also have a high share of slum population in their urban areas, compared to other states? The National Sample Survey (NSS) Office of Government of India conducts nationally representative surveys periodically on a variety of topics. Table 1 is based on the 65th Report of the NSS on the characteristics of urban slums in 2008-09.

The table shows only those states that have significant slum populations. Among these Maharashtra has the maximum share of slum population in India (34.7 %), followed by Andhra Pradesh (10.7 %) and West Bengal (10.3 %) respectively. The other states listed are also high in slum population compared to the rest of the states not listed in this table. It is important to note the presence of three Empowered Action Group (EAG) states in this group: Madhya Pradesh (MP), Orissa and Uttar Pradesh (UP). Clearly, high share of urban population in total population need not always indicate high ratio of slum populations.

In India, notified slums are those that are recognized by municipalities, corporations, or any other local authority, and are, therefore, under policy ambit, at least on paper. By comparison, non-notified slums have almost no legal standing, making these vulnerable to policy omissions. Greater the share of non-notified slums in total slums, greater will be the possibility of inadequate policy targeting and greater will be the vulnerabilities to a variety of shocks, including health shocks.

As Table 1 shows, almost all the states except AP have 50 percent or more slums that are non-notified. Orissa has as many as 68 percent of the slums in the non-notified category. This brief analysis throws up the possibility of bigger and economically better off states like Maharashtra contributing to the disease burden in the country. However, mere presence of a large slum population is not a sufficient; whether the states can effectively deal with the various ramifications of having significant slum populations is explored below.

States	Notified slum (%)	Non-notified slums (%)	State share of slums in India (%)
Andhra Pradesh	75.5	24.5	10.7
Delhi	33.8	66.2	6.4
Gujarat	40	60	6.9
Karnataka	49.7	50.3	4.6
Madhya Pradesh	34.3	65.7	4.5
Maharashtra	54.5	45.5	34.7
Orissa	32.3	67.7	4
Tamil Nadu	50.7	49.3	6.9
Uttar Pradesh	55.7	44.3	4.9
West Bengal	49.1	50.9	10.3
All India	50.6	49.4	100

Table 1: Percentage of notified and non-notified slums in different states & India. Source: NSS 65th Round on "Some Characteristics of Urban Slums 2008-09", (2010)

4.3 Basic Amenities in Urban Slum Areas

Are states are able to provide the slum areas with basic amenities like water, electricity, sanitation and facilities like schools and hospitals? We look at four basic indicators: (a) water-logging during monsoon months, (b) presence of latrine, (c) garbage disposal arrangement and (d) presence of hospitals, all of which can potentially lead to health hazards, especially the spread of infectious diseases.

For notified as well as non-notified slums, Orissa, Tamil Nadu, Gujarat and UP are doing quite poorly in terms of basic amenities (Table 2). Some of the other states like West Bengal and AP are also not doing that much better. In absolute terms, all the four indicators are much worse for non-notified slums compared to notified slums, in all the states. If these amenities were the only determinants of health outcomes, then all the states listed should show unfavourable outcomes. Clearly, the economic development of the state also matters in this context. Before we turn to a more nuanced picture of development in these states, we present some evidence on inter-state differences in health outcomes.

States	Notified Slums				Non-notified Slums			
	Waterlogged during monsoon	No Latrine	No Garbage disposal arrangement	No hospitals within 1 KM	Waterlogged during monsoon	No Latrine	No garbage disposal arrangement	No hospitals within 1 KM
Andhra Pradesh	18	8	3	41	43	27	40	69
Delhi	14	0	0	10	77	11	20	46
Gujarat	59	39	62	52	53	48	33	60
Karnataka	45	0	0	19	28	17	15	56
MP	24	18	48	85	81	24	24	20
Maharashtra	37	1	3	45	58	6	6	47
Orissa	99	49	33	67	38	36	48	75
Tamil Nadu	57	27	12	34	56	40	39	83
UP	60	1	16	47	66	16	54	86
West Bengal	52	13	11	55	40	10	22	71
India	41	10	10	46	54	20	23	58

Table 2 : Basic amenities in slums, by type of slums. Source: NSS 65th Round on "Some Characteristics of Urban Slums 2008-09", (2010)

4.4 Selected Health Outcomes Across States

4.4.1   Infant and Under-5 Mortality Rate: Sample Registration System (SRS)

Concerns have been raised about India's ability to meet the Millennium Development Goals (MDGs) and the unresponsiveness of the infant mortality rate (IMR) to further prevention efforts (Deolalikar 2005, Paul et al 2011). Relatively much less focus has been on the extent to which urban India contributes to the lagging IMR and MMR in the country. How are states placed in terms of IMR and U5MR, two important indicators of the MDG goals? Table 3 presents the 5 worst performing states for IMR and U5MR based on the SRS Bulletin (SRS 2011).

Clearly, Assam, Orissa, UP, MP leads the group of laggard states on these indicators. States formerly part of UP, MP and Bihar (Uttarakhand, Chattisgarh and Jharkhand) also fall in the same category. That this Empowered Action Group (EAG) of states are doing poorly is not a surprise, given their other socioeconomic indicators. The states are doing well are led by Kerala, but there remains a large gap between Kerala's performance and the other states. For example, in 2010, IMR in Kerala was 13, followed by Tamil Nadu at 24. While this scenario pertains to mother and child health, it will be interesting to see whether similar patterns are observed for other diseases as well.

	Worst performing major states	Best performing major states
Infant Mortality Rate	MP, Orissa/ UP, Assam, Rajasthan, Chattisgarh	Kerala, Tamil Nadu, Maharashtra, Delhi, West Bengal, Punjab
Under-5 Mortality Rate	MP, Assam, UP, Orissa, Rajasthan	Kerala, TN, Delhi, Maharashtra, WB
Maternal Mortality Rate	Assam, UP/Uttarakhand, MP/Chattisgarh, Bihar/Jharkhand, Orissa	Kerala, Tamil Nadu, Maharashtra, AP, West Bengal

Table 3: Performance of states in IMR, U5MR and MMR. Source: Various bulletins of Sample Registration System, India

4.4.2   Central Bureau of Health Intelligence (CBHI)

CBHI is the only source of national health data, it was important to use it to see the trends, with the caveat in mind that the data is based on less than full reporting across states. The National Health Profile 2010 reported by the CBHI indicate that among the various communicable diseases, acute respiratory infections and acute diarrheal diseases reported the highest cases during 2010. In addition, pulmonary tuberculosis, malaria, enteric fever, pneumonia and gonococci infection are the other diseases that saw more than 100,000 cases. Among these, pulmonary TB reported the maximum number of deaths. While the data the data is not presented by residence, the high cases of these infectious diseases in the country does raise the very real possibility of contribution of areas such as slums contributing to the total case load.

An analysis of the top 5 states contributing to water-borne and vector-borne communicable diseases in the last 10 years indicate that Orissa has been in the top position in vector-borne diseases. Other states like Jharkhand, West Bengal, Chhatisgarh, Madhya Pradesh have also been frequently in this group, and even bigger states like Maharashtra have shown up more than once in the top 5 list. For water-borne diseases, AP, Karnataka, Maharashtra, West Bengal showed up frequently in the top 5 for the last 10 years. While the data does not report prevalence, presumably high burden states would definitely drive the total disease burden in the country.

In sum, the evidence on MDG indicators and other infectious diseases indicate that while the EAG states continue to do poorly on all fronts, states like Maharasthra and West Bengal do not seem to be doing as well if other indicators like infectious diseases are looked at in terms of total case load.

4.4.3   Other Evidence on Disparities in Health Outcomes

There is mounting evidence that the health outcomes for the urban poor and non-poor are highly unequal even in the better off states. Evidence from an 8 city study (IIPS 2009) indicates that IMR for slums and poorest quintile are always worse than those for the city as a whole as well as non-slum population. The study included cities from the better-off states like AP (Hyderabad), Maharashtra (Mumbai) and Tamil Nadu (Chennai). Similarly, stunting was seen to occur at a much higher rate among the city poor and slum-dwellers compared to others. Similar evidence of inequality between urban poor and non-poor women in terms of their health status also now exists from a variety of sources (Agarwal 2011). As for service delivery,

available evidence does indicate that, for example, antenatal visits were much lower at 54.2 percent for the urban poor compared to the 83.1 percent for the urban non-poor (UHRC 2007).

As for home deliveries and vaccinations, a 4 city recent survey conducted among 2000 households covering 10,929 individuals in Ludhiana, Jaipur, Mathura and Ujjain on access to health services indicated lack of government facilities and services, a very high preference for private health facilities, high expenses in both private and public facilities and a perception that private facilities were offering high quality services (Gupta and Guin 2012).

We contend that even economically better off states need to watch out for infectious diseases where both urban and rural areas remain vulnerable. Due to the very nature of congested areas such as slums, states like Maharashtra, AP and West Bengal – that are dealing with such large settlements – need to be alert to relatively adverse health outcomes from such areas, in both maternal/child health as well as infectious diseases. Evidence exists to indicate that overcrowding makes outbreaks of respiratory diseases such as tuberculosis much more likely (Shetty 2011). Other studies have documented that urban areas contribute about 15 percent of the total malaria cases in India and are primarily associated with construction activities and migrant population (Dash et al. 2008). Continuous construction activities and increasing slum populations with poor sanitation have been contributing to increasing cases of malaria in urban areas (John and Thomas 2011). While the CBHI show a sharp increase in dengue cases in the last 4 years, there is enough evidence of frequent outbreaks of dengue in urban areas. It is now well known that dengue is more prevalent in urban and semi-urban areas, particularly in Asia, with mosquitoes breeding water storage containers in households (Sommerfeld 2011).

Below we present some fresh evidence from the DLHS-II on TB and Malaria for rural and urban areas as well as by economic categories in Figures 1 and 2. Clearly, the top contributors for both the diseases are the EAG states. To compare with more developed states, two major states that contribute significantly to the total disease load have been taken as well. In terms of estimated prevalence the North-Eastern (NE) states top the list for both malaria and TB, but do not necessarily add significantly to the total disease burden in the country. However, Orissa has a high prevalence as well as it contributes a high share to the total malaria cases in India. Apart from NE states and Orissa, Madhya Pradesh, Chattisgarh and Maharashtra also have high prevalence compared to the other remaining states. For TB, the major states with high prevalence are Bihar, AP, West Bengal and UP in that order.

Figure 1 show that the all-India estimated TB prevalence per 100,000 population was 366 for rural areas compared to 225 for urban areas respectively in 2002-2004, indicating fairly high burden of TB in urban areas. However, if we look at prevalence among economic categories, we see that the prevalence of TB among low income groups is highest relative to the middle and high income groups for both rural and urban areas. Looking at these high burden states, one can see that the low economic categories had a higher prevalence in almost all the states including economically better off states like AP and to a lesser extent for Maharashtra for both rural and urban areas. For example, in urban areas of UP, Bihar and MP the prevalence is significantly high among the low economic categories.
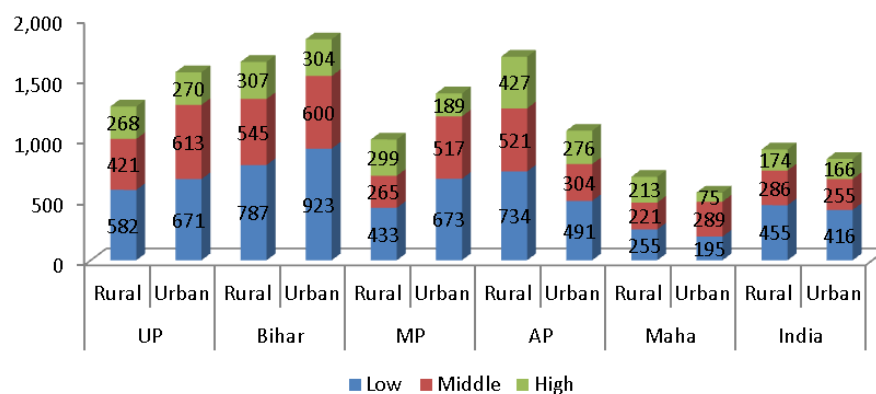
Figure 1: Persons suffering from TB (per 1,00,000 population) by Economic Class in Selected States. Source: District Level Household Survey-3, Govt. of India, 2007-08.

Similarly, Figure 2 for malaria shows higher prevalence for rural areas, but within both urban and rural areas, the prevalence is relatively higher for low economic categories. Again, this is true in most cases except for urban UP (where the middle economic category has slightly higher prevalence compared to the low category).
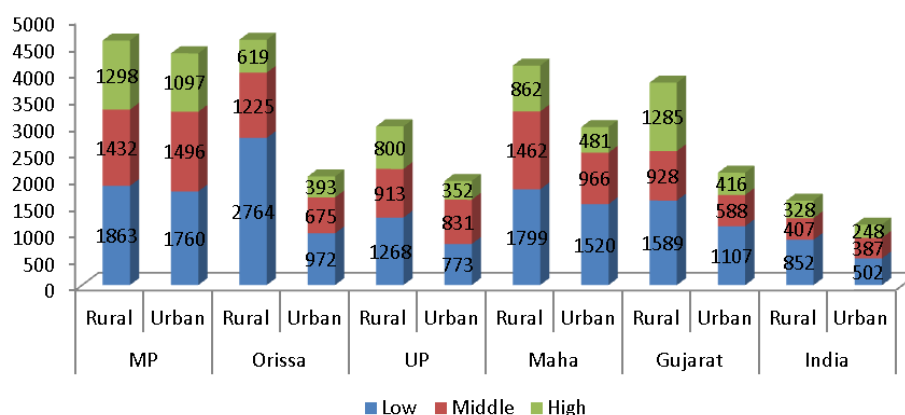
Figure 2: Persons suffering from Malaria (per 1,00,000 population) by Economic Class in Selected States. Source: District Level Household Survey-3, Govt. of India, 2007-08.

4.4.4 Socioeconomic Development and Health

Clearly, while a complex issue; urban health would definitely be impacted by the level of development of states by varying the extent to which states will be able to carry out prevention and control. Basic statistics on per capita GDP, poverty, inequality and female literacy rates in all the states mentioned in the previous discussion are presented in Table 4.

Major states like AP, Gujarat, Karnataka, Maharashtra are doing relatively much better on all the economic development fronts compared to states like MP, Orissa and UP; these also have a much higher per capita expenditure on health, unlike the three other states. Clearly, the health outcomes in these states are expected to be relatively better despite concerns like large slum population and lack of suitable amenities for such populations. In other words, the relative welfare of the worse off in these states is better than the welfare of similar individuals in poorer states. This is supported by evidence that indicates, for example, that neonatal mortality among urban poor in Maharashtra was 21 compared to that in MP, which was at 54.8 (Agarwal 2011).

States	Per capita SDP 2011-12	Poverty (2004-05)	Lorenz (relative rank of states indicated in parenthesis)		Female literacy (2011 Census)	Per capita health expenditure
			Rural	Urban		
Andhra Pradesh	71540	29.9	0.261(27)	0.360(28)	59.7	402
Gujarat	75115	31.8	0.236(18)	0.305(12)	70.7	320
Karnataka	69493	33.4	0.241(21)	0.338(23)	68.1	405
MP	32222	48.6	0.277(31)	0.366(29)	60.0	214
Maharashtra	83471	38.1	0.232(16)	0.378(33)	75.5	351
Orissa	46150	57.2	0.249(24)	0.354(26)	64.4	303
Tamil Nadu	84058	28.9	0.255(25)	0.323(18)	73.9	421
UP	29417	40.9	0.229(15)	0.377(32)	59.3	269
West Bengal	55864	34.3	0.221(13)	0.376(31)	71.2	292
India	60972	37.2	0.270	0.362	65.5	

Table 4: Basic Statistics on Per Capita GDP, Poverty, Inequality and Female Literacy Rates in All States. Source: Directorate of Economics & Statistics of respective State Governments, and for All-India -- Central Statistics Office

5 DISCUSSION AND POLICY IMPLICATIONS

It is critical to collect and analyze data that would enable evidence-based policy-making around urban health. There is a need to separate the health outcomes as well as mapping of health services for urban and rural areas, and within urban areas for the poor and the non-poor. The peculiar nature of urban habitats necessitates cross-cutting and multi-sectoral policies that can be effective only if backed by solid evidence on status and reasons for health disparities and access to services.

The need for a more nuanced health policy that is more consistent with the regional and local realities is not new (Gupta & Mitra 2002, Peters et al 2003). The fact that increases in income in urban areas does not necessarily ensure improvements in living condition are now increasingly being recognized (Madhiwalla 2007). The Planning Commission's report of the Steering Committee On Urban Development For Eleventh Five Year Plan (2007-2012) states that "Due to burgeoning urban population growth, the big cities viz., metropolitan (million plus) and mega cities are under severe strain particularly in terms of making access to infrastructure services to the inhabitants. Overall the urban dwellers in the country have low access to infrastructure services such as water supply, sanitation, power supply and solid waste disposal" (Eleventh Five Year Plan 2007-12). In December 2005, the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) was launched to give focused attention to integrated development of urban infrastructure and services in select 63 cities with emphasis on provision of basic services to the urban poor including housing, water supply, sanitation, road network, urban transport, development of older cities etc. However, it has been argued that the progress has been slow, though some cities did benefit greatly from the focused attention. The reasons for slow progress have to do mainly with inadequate financing, governance and capacity especially at state levels (Ahluwalia 2011).

There remains too little focused attention on urban health. While much of the ills come from the inadequacies and inefficiencies recognized above, the government still has no proper implementation plans for the urban health. The planned National Urban Health Mission (NUHM) visualized in 2010 (Government of India 2005) has yet to take off, and while there are indications that the government may revise the earlier NUHM blueprint (ToI 2012), it is not clear what the timeline on this will be and how soon one can expect serious policy actions. In any case, there is no evidence that serious urban health data collection is going to precede the launch of such a mission, raising concerns about its effectiveness.

Generally, the state of policymaking in India's health sector is very evident by the recent stand-off between the Ministry of Health and Family Welfare and the Planning Commission around proposed meager allocation to the health sector in the 12th Five Year Plan and its interpretation of the role of private and public sector in the report of the High Level Expert Group (HLEG) on Universal Health Coverage(PTI 2012, Nigam 2012). Clearly, the coordination that is required to make that quantum jump in citizen's health across ministries and sectors is lacking as of now. The multiplicity of authorities for urban development in general, and therefore, for health specifically makes the challenges even harder. The HLEG's report on universal health coverage itself has been criticized for being somewhat of an academic wish list of things that should be righted in the health sector without an operational plan attached to it (Rao 2012, Baru 2012), yet again preventing an immediate operationalization of a sound health plan for the country.

There are some bright spots however, in the form of non-government organizations taking the lead together with government bodies to improve basic amenities in urban poor areas as well as making sure that accessibility to health services improve in such areas. The use of public-private partnerships in improving availability and accessibility of health services is now quite visible and usual (Ghanashyam 2008). That such models are also coming into urban areas is relatively less well-documented and known; there are examples of organizations such as Urban Health Resource Centre (UHRC) – a well-known organization working on the health of the urban poor – teaming up with government bodies in urban areas like Agra to propose models that can work to increase accessibility and availability of health services (UHRC 2012).

The most recent example of such public-private partnership (PPP) is the Government of National Capita Territory of Delhi's (GNCTD) Mission Convergence Programme, locally called Samajik Suvidha Sangam. This USAID funded programme is an innovative public-private partnership that teams up with local community organizations to improve the health and well-being of the urban poor of Delhi (USAID 2012).

However, it is not clear whether such instances are scalable and replicable to address the humongous problem of urban health, which must remain the primary responsibility of the government. It is probably

relatively easier to fix the supply side issues of health care in urban areas than to stem the flow of migrants or curb urbanization. If urbanization is going to continue in the pace it has, the government authorities cutting across multiple sector must wake up to the fact that the health issues go beyond the responsibility of the health departments. Having said that, the departments of health in states and the MoHFW must realize how severely inadequate the supply of health facilities and services are in the urban areas. Most recent reports indicate that there are 1083 Urban Family Welfare Centers[1] (UFWCs) and 871 Health Posts[2] (HPs) catering to 377,105,760 (Census India 2011) urban population of the country, which translates to one UFWC/HP per 192,992 urban population, compared to the norm of 1 centre for every 50,000 population, indicating severe accessibility issues (MoHFW 2006, Agarwal et al 2007). Other estimates indicate the need for an additional requirement of 500 urban health and family welfare centers to meet the current needs of urban poor (ASSOCHAM 2009).

Rectifying this does not require big missions or five year plans. The lack of vision and planning around urban health on the one hand and lack of accountability from those who are in-charge of all the civic amenities on the other will probably ensure that urban health would continue to contribute a disproportionate share to the total disease burden of the country.

6 REFERENCES

Agarwal, S., Satyavada, A., Kaushik, S., & Kumar, R.. Urbanization, urban poverty and health of the urban poor: status, challenges and the way forward. Demography India, 36(1), 121-134, 2007

Agarwal, S. The state of urban health in India; comparing the poorest quartile to the rest of the urban population in selected states and cities. International Institute for Environment and Development (IIED), 23(1), 13–28, 2011

Ahluwalia, I. J. High Powered Expert Committee Report and Recommendations, 29th September 2011

ASSOCHAM. (2006). InfoChange India News & Features. India's urban poor need 40 mn houses, 500 health centres: ASSOCHAM report. Pune: InfoChange India News & Features; 2008. Available at: http://infochangeindia.org/200801236839/Urban-India/News/India-s-urban-poor-need-40-mn-houses-500-health-centres-ASSOCHAM-report.html. Accessed April 10, 2009.

Baru, R. V. A Limiting Perspective on Universal Coverage. Economic and Political Weekly, XLVII (8), 64-66, 2012

Census India (2011): paper 2[http://censusindia.gov.in/2011-prov-results/paper2/data_files/india/paper2_at_a_glance.pdf]

Dash, A.P., Valecha, N., Anvikar, A. R., & Kumar, A. Malaria in India: Challenges and opportunities" Journal of Bioscience, 33(4), 583–592, 2008

Deolalikar, A. The Millennium Development Goals for India: How Attainable?" in Raghbendra Jha, ed., Economic Growth, Economic Performance and Welfare in South Asia, Palgrave Macmillan, 2005

Ding, C. Policy and Planning Challenges to Promote Efficient Urban Spatial Development during the Emerging Rapid Transformation in China". Sustainability, 1(3), 384-408, 2009; doi:10.3390/su1030384

Dutt, A., & Allen G. N. Challenges to Asian Urbanization in the 21st Century, The GeoJournal Library, 75, 1-18, 2004

Dye, C., Trunz, B.B., Lönnroth, K., Roglic, G. & Williams, B.G. Nutrition, Diabetes and Tuberculosis in the Epidemiological Transition. PLoS ONE , 6(6), 01-07, 2011

Eleventh Five Year Plan (2007-12): Report of The Steering Committee on Urban Development for Eleventh Five Year Plan (2007-2012)

FIG Commission 3. Rapid Urbanization and Mega Cities: The Need for Spatial Information Management. FIG Report no. 48, 2010.

Ghanashyam, B. Can public-private partnerships improve health in India? The Lancet, 372(9642), 878-879, 2008

GoI[Government of India]. National Urban Health Mission, Framework for Implementation. Ministry of Health and Family Welfare. Government of India, 2010

Gupta, I., & Mitra, A. Basic Amenities and Health in Urban India. The National Medical Journal of India, 15(1), 2002 (Supplement).

Gupta, I., & Guin, P. Health Status and Access to Health Services: A Study of Four Slums. In "Well-being of the Urban Poor: Assessment and Policy Issues. A Study of Slum-Clusters in Jaipur, Ludhiana, Mathura and Ujjain". Report submitted to the Ministry of Urban Development, Government of India, 2006.

ICSU Planning Group. Report of the ICSU Planning Group on Health and Wellbeing in the Changing Urban Environment: a Systems Analysis Approach. International Council for Science, 2011, Paris

Paul, J., & Melvyn, T. Mosquitoes back with a vengeance. Times of India 26 July 2011.

Keating, G., & Natella, S. Opportunities in an Urbanizing World. Credit Suisse 2012.

Kessides, C. World Bank Experience with the Provision of Infrastructure Services for the Urban Poor: Preliminary Identification and Review of Best Practices. The World Bank, 1997

Madhiwalla, Neha. Health Care in Urban Slum in India. National Medical Journal of India,20(3), 13-14, 2007

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[1] It provides family welfare services in urban areas since the early 1950s, and is equipped to provide contraceptive supplies. Based on the population covered by each UFWC, it is classified in three types, and has different staffing patterns. Type I covers a population of 10-25 thousand, Type II between 25-50 thousand and Type III above 50 thousand.

[2] It was introduced in 1983 with a view to provide service delivery outreach, primary health care, family welfare and MCH services in urban areas. Unlike UFWC, it is also classified into four types; A, B, C and D, but with lesser population.

Makanaka. India's 2011 Census – the states and their prime numbers.2011 http://makanaka.wordpress.com/2011/05/11/indias-2011-census-the-states-and-their-prime-numbers/

McGee, T. Urbanization Takes on New Dimensions in Asia's Population Giants, PopulationReferenceuureau, 2011, .http://www.prb.org/Articles/2001/UrbanizationTakesonNewDimensionsinAsiasPopulationGiants.aspx?p=1 (connected 1.4.2011).

MoHFW [Ministry of Health & Family Welfare]. National Health Profile 2010. Central Bureau of Health Intelligence. Nigam A. Health Ministry may submit its own draft chapter to Plan panel. Business Line, 12 August 2012.

MoHFW [Ministry of Health & Family Welfare]. Draft Final Report of the Task Force to Advise the National Rural Health Mission on "Strategies for Urban Health Care". New Delhi: Ministry of Health & Family Welfare; 2006. Available at: http://mohfw.nic.in/NRHM/Task_grp/Tg_index.htm. Accessed April 10, 2009.

Paul, V. K., Harshpal, S. S., Mavalankar, et al. Reproductive health, and child health and nutrition in India: meeting the challenge. The Lancet, 377(9762), 332–349, 2011

Peters, D., Rao, S., & Robert, F. Lumping and splitting: the health policy agenda in India. Health Policy and Planning, 18(3), 249-60. , 2003

PTI. Plan Panel to revisit health chapter in 12th Plan after furore., 2012

Rao, S. Long on Aspiration, Short on Detail. Economic and Political Weekly, XLVII (6) , 12-16, 2012

Redman, C. L., & Jones, N.S. The Environmental, Social, and Health Dimensions of Urban Expansion. Population-Environment Research Network cyber seminar. 2004

Shetty, P. Health care for urban poor falls through the gap. The Lancet, 377(9766): 627-628, 2011

Sommerfeld, J. Dengue vector control research completed in Asia: 5 year initiative focused on eco-bio-social strategies. World Health Organization 2011. [http://www.who.int/tdr/news/2011/dengue-control/en/]

SRS [Sample Registration System]. SRS Bulletin, 46(1): 1-6 , 2011

ToI[Times of India] . National urban health mission on PM's agenda. 1 July 2012

UHRC. Agra Urban Health Program. 2012 [http://www.uhrc.in/index.php?module=ContentExpress&func=display&ceid=3&meid=-1]

USAID. Urban Development: Recent Additions to the USAID Library, 2006

USAID. Making the Indian Health System Work for the Urban Poor. Strategies for extending financial risk protection and a continuum of health care. USAID. August 2012.

USAID Library. Urban Development: Recent Additions to the USAID Library, 2006

WHO [World Health Organization]. Global Health Risks: Mortality and Burden of Disease Attributable to Selected Major Risks, 2009

WHO[World Health Organization]. India: Health Profile, 2010 [http://www.who.int/gho/countries/ind.pdf]

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Urban Heat Islands – Strategy Plan Vienna

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1 BACKGROUND

"Heat all over Austria" – "Dog days of summer in Vienna" – "Survival tips for the heat wave" – "This week is getting hot" – "Cooling in the city". These have been the headlines in the Austrian but also European media in the past few years accompanying the summer in Vienna (Allex et al., 2011). Many studies already refer to the increase of heat days (daily maximum temperatures of at least 30° C) and heat periods in cities with dense building and few green spaces (Formayer et al., 2008). Kysely et al. (2000) define heat periods as a minimum of three consecutive days with a maximum temperature of at least 30° C. The period is considered to be continuous if the maximum temperature of each succeeding day is not less than 25° C, and the average maximum temperature during the entire period does not fall below 30° C (Kysely et al., 2000). The increasing of the daily maximum temperatures also leads to an increase of very warm nights (tropical nights).[1] This is important, because the minimum night temperature has more impact on the wellbeing of the people as well as the increase in mortality than the daily maximum temperature (StartClim, 2006). As shown in figure 1, in August 2001 the evening temperatures of Vienna were already around 20° C or even higher, especially near and in the city centre.

A comparison of the number of hot days in the period 1961-2010 showed an increase for Vienna by an average of 9.6 to 15.2 days. Also for the number of summer days (25° C or more) in Vienna climate models calculated a 30 to 50 percent increase of summer days for the period 2071 to 2100 (ZAMG, 2012) which can result in a rise of the Urban Heat Island phenomenon.

Vienna is a dynamic and growing city. Forecasts expect an increase in population to over 2 million by 2030. Urban expansion and re-use of large brownfield sites will be particularly relevant in this respect (MA 18, 2012). Densification of the urban structures without additional measures, however, increases the UHI effect.

Urban Heat Islands concern both urban residents and tourists. Persons who have to spend much time in open space as well as health-impaired and elderly people are, however, particularly affected by the impacts. This becomes manifest, for example, in a reduction of activity due to heat (Dune et al., 2013). According to a study by Robine et al., the 2003 heat wave caused around 70,000 deaths across Europe (Robine et al., 2008).

In relation to these developments and trends, the city of Vienna has early and strategic decided to elaborate options for mitigating or preventing these effects and to take part in an international research project.

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[1] Nights with a minimum air temperature higher than 20°C are regarded as tropical nights (ZAMG, 2011).
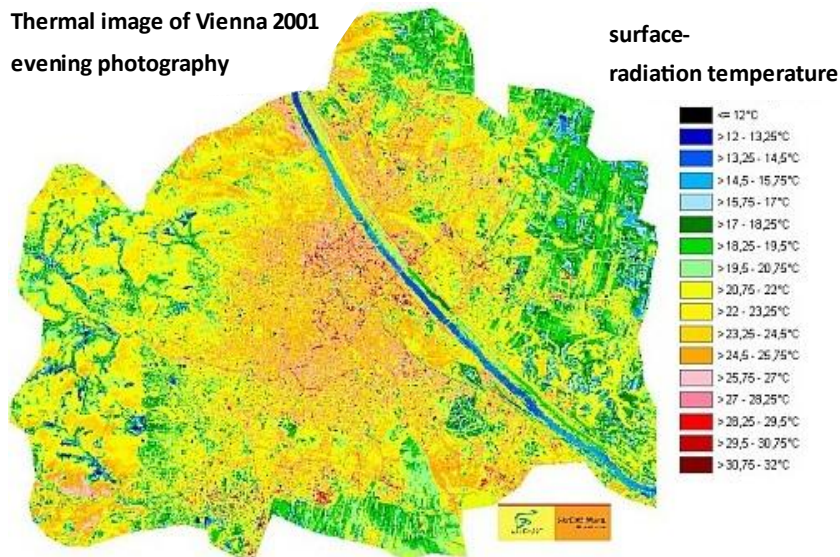
Fig. 1: Thermal image of Vienna, August 15th 2001, 20 – 22 h (City of Vienna)
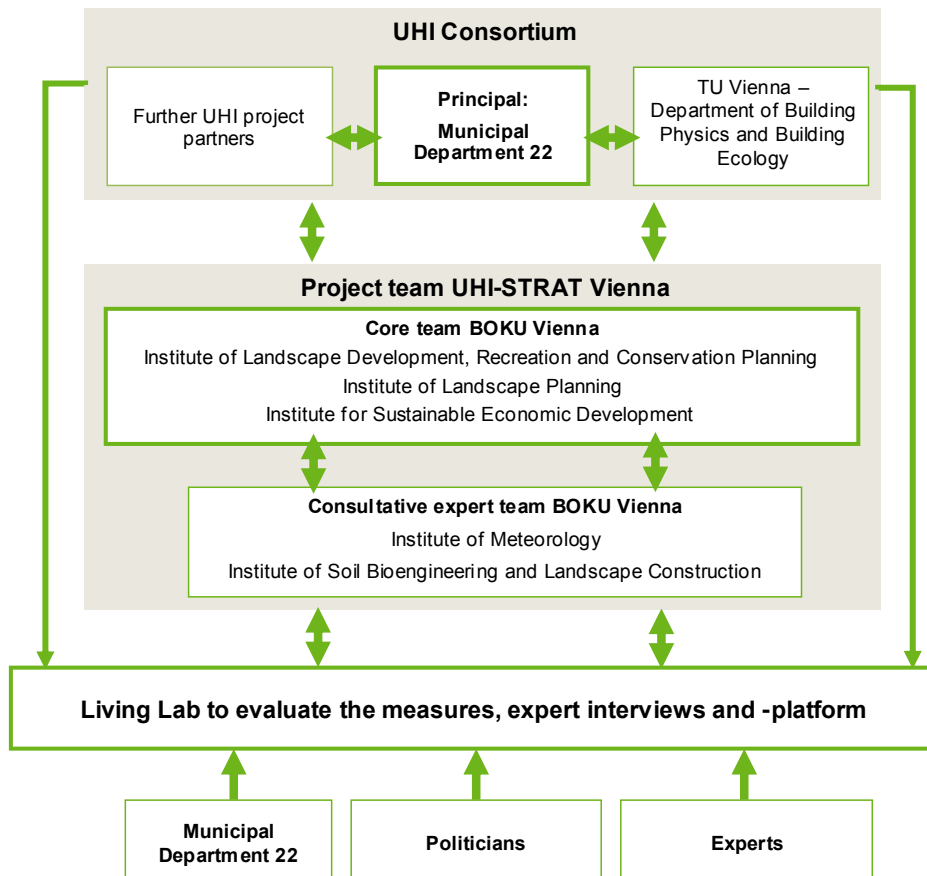
Fig. 2: Organisation of collaboration and networking

2 AIMS OF THE PROJECT

The project "Urban Heat Islands – Strategy Plan Vienna" is part of the international CE (Central Europe) project "Urban Heat Islands – Development and application of mitigation and adaptation strategies and measures for counteracting the global Urban Heat Islands phenomenon" (duration 2011-2014). Within the framework of the international project eight metropolises are examined. Along with Bologna/Modena, Venezia/Padova, Stuttgart, Lodz/Warsaw, Prague, Budapest and Ljubljana, Vienna is one of the study areas.

The aim of the project "Urban Heat Islands – Strategy Plan Vienna" is the identification of measures and adaptations to reduce the negative aspects of urban warming. The intention is to develop a strategic plan for the City of Vienna to implement urban and open space planning measures as well as urban ecology measures

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that reduce the negative aspects of urban warming. Based on planning tools and instruments of the different control levels of urban planning and development, possibilities of action for the City of Vienna and in addition, opportunities to raise awareness and promote acceptance of measures that reduce urban heat effects will be identified.

The scientific approach is based on inter- and transdisciplinary cooperation. Figure 2 gives an overview of the collaboration and networking in the project. On the one hand, the core team of the UHI-STRAT project is integrated in the overall CE-UHI project, and on the other hand, the UHI-STRAT team cooperates closely with the relevant departments of the City of Vienna and scientific experts. The findings obtained during the project work are reviewed in expert workshops for their relevance and applicability in the everyday management of the City of Vienna.

3 WORKFLOW AND METHODS

In methodological terms, the project includes a mixture of planning, urban ecological, socio-scientific and economic methods. The applied research project is carried out in close cooperation with the responsible municipal departments of the City of Vienna and consists of six main work packages (WP). Figure 3 provides an overview of the UHI-STRAT workflow. First results of WP 2 (Identification and evaluation of relevant measures) and WP 3 (Verification of the control levels and their tools & drafting of proposals for urban planning tools) are described in this paper. The additional work packages have not processed yet.
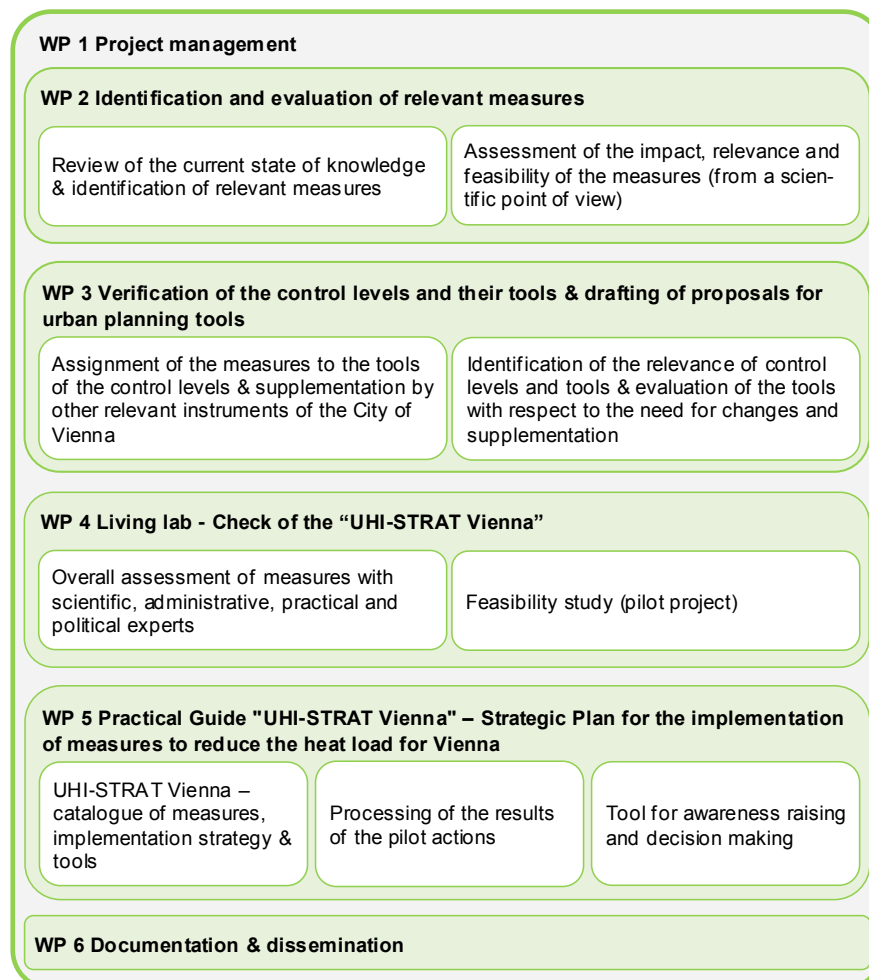
Fig. 3: Workflow "UHI-STRAT Vienna"

4 IDENTIFICATION OF RELEVANT MEASURES

The elaborated measures are of different temporal relevance. In the short term, preventive measures such as heat warning systems can be established or the individual behaviour of people can be changed by providing information. Other approaches such as the increased consideration of UHI effects in urban planning or an

adaptation of the building technology have a long preliminary lead time, i.e. in many cases they cannot be implemented that fast, but are characterized by a long-term impact.

In the project, measures are defined which refer to information and public relations or which can be implemented either by planning tools (e.g. overall concepts of urban planning, zoning and development planning) or by technical or structural means.

Technical measures to reduce UHI effects

Based on the previous knowledge and preliminary studies of the project consortium UHI (including the measures identified by the Environmental Protection Department Vienna, Municipal Department 22) and the project team UHI-STRAT Vienna, measures for the City of Vienna were identified, using a simplified SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis (e.g. Terrados et.al., 2005). These have been supplemented by relevant measures that have been investigated in a comprehensive literature search of scientific papers. The catalogue of measures thus compiled serves as a basis for further work steps.

Fig. 4: Possible measures to reduce UHI effects (Allex, Damyanovic, Reinwald)

A total of about 370 possible measures have been identified so far by the UHI-STRAT Vienna team. Some examples are shown in figure 4. The measures can be roughly classified into technical and non-technical measures and categorized by subject area. The identified technical measures, for example, were summarized into the following categories (figure 5). The summarization of the non-technical measures information and public relations as well as control levels and instruments is currently in process.
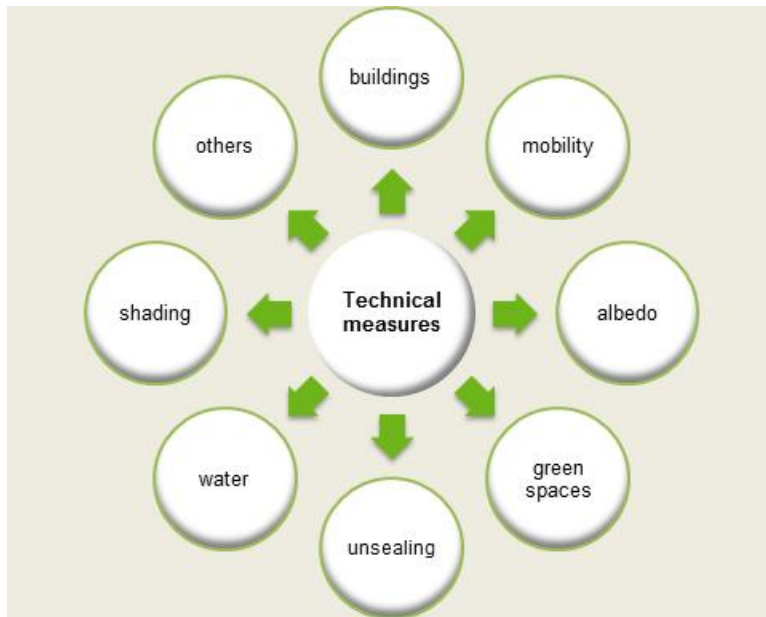
Fig. 5: Categories of technical measures

To each category, measures as well as associated explanations and instructions were assigned. Table 1 shows an example of the catalogue of measures concerning the category "buildings".

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category	UHI-STRAT – technical measures	Nr.	measures – explanations & instructions
buildings	active/passive cooling of buildings (e.g. ventilation, long-distance cooling, component activation, insulation, ...), (temporary) use of brownfield sites as green and open spaces	1	comfort ventilation (system, providing a constant supply of fresh filtered air)
		2	cross ventilation
		3	night ventilation
		4	solar cooling
		5	ventilation systems – cooling of the incoming air by low ground temperatures
		6	geothermal cooling technologies
		7	thermal component activation / concrete core cooling
		8	reduction of the percentage of glass facade
		9	thermal insulation, thermal renovation
	shading devices on buildings (e.g. blinds, sliding shutters, photovoltaic systems, ...)	10	shading devices on buildings (e.g. blinds, sliding shutters, …)
		11	shading roofs (e.g. by photovoltaic systems)
	water cooling of buildings	12	roofs with water cooling / Blue Roofs
		13	vertical cooling surfaces on buildings

Table 1: Excerpt from UHI-STRAT catalogue of measures – technical measures

The categorized and summarized measures will be evaluated with regard to their impact, relevance and implementation according to the categories: climate (micro-/mesoclimate), urban ecology (biodiversity/quality of life), feasibility (e.g. in the control of the City Council of Vienna, private/public, new/old stock, long-term realisability > 5 years/ short-term realisability: within 5 years) and acceptance (politicians, builders, residents) during the next work steps of the project. The assessment will be based on scientific evidence and will lead to a categorized ranking, so that both quantitative and qualitative results can be incorporated in the assessment.

Subsequently, the identified relevant measures will be analysed and evaluated under consideration of their efficiency in terms of urban planning, open space planning, urban ecology and economy. This assessment is essentially based on scientific knowledge from literature research. In addition, the evaluation results will be cleared with representatives from the fields of landscape ecology as well as urban and landscape design. The impact on the physical and mental quality of life of the people will be assessed by expert interviews. Aspects of ecosystem services, such as the habitat function, will likewise flow into the urban ecological assessment. The measures will thus also be evaluated in close relation to the conservation and enhancement of biodiversity.

The variety of possible options for action of all stakeholders and actors will be further structured and analyzed by economic criteria. Through the systematic environmental-economic approach of view, an involvement of perspective of the users can be achieved. In this context, interviews will be conducted to determine the acceptance of measures and the amount of the hypothetical individual willingness to take action themselves. This allows a qualitative assessment of costs and benefits of the elaborated measures.

The review of selected relevant measures takes place in an iterative process. Depending on the topic, experts of the project team with expertise in the relevant subject areas (e.g. planning, economics, meteorology...) will be consulted for the development of criteria for each measure or category.

Furthermore, expert interviews with people outside the project team will be conducted.

5 ASSESSMENT OF (EXISTING) REGULATIONS, TOOLS AND INSTRUMENTS

In the first step, all relevant legally binding and non-binding levels of control and tools for implementing the various measures to reduce heat effects have been identified and analysed.

Moreover, the relevance of the control levels and the individual instruments identified before will be evaluated under the aspect of urban planning, open space planning and urban ecology based on the effectiveness and importance in the implementation of the measures. In order to ensure sustained implementation of the "UHI-STRAT Vienna", experts from responsible Municipal Departments are involved in the process for information and expert interviews.

On the basis of this, suggestions will be made for modifications and extensions of the instruments and tools for implementation.

The City of Vienna's relevant tools to reduce UHI effects

The possibilities and instruments to implement UHI measures are manifold. They range from a legal basis to strategic programmes and approaches, different planning processes and procedures all the way to direct granting of subsidies or regulation by standards. Furthermore, they may be differentiated by the level of regulation. There are already approaches and tools on EU[2] , Austrian[3] and Viennese[4] level dealing with climate change – especially the increase of temperatures – or UHI phenomena directly.

Considering the importance of superior strategic approaches such as the urban development plan or the climate protection programme and the requirement of legal implementation, planning processes which lead to the development of overall concepts of urban planning or master plans, zoning and development planning, developer competitions as well as granting of subsidies have turned out to be essential points of reference and tools.

The level of urban master plans in particular has major influence on further planning and project development steps. In the City of Vienna this planning level has successfully established itself as (informal) planning tool. At this level different public and private interests can be coordinated – especially also in view of a market-driven urban development (MA 21B, 2010). In master plans and urban planning concepts the prerequisites for further planning steps are created (MA 18, 2013). The consideration of UHI matters at this level is important in order to have a basis for further implementation (especially as regards zoning planning).

The zoning and development plan is an essential tool in the City of Vienna, serving to establish a legally binding framework for development. In this planning document all future uses and the type of development of urban areas are bindingly codified. Analyses of this tool show that already with the possibilities in existence urban heat effects can be reduced. Also the realisation of zoning so far shows that climate relevant aspects have already been partly considered or used as justification for planning decisions. Apart from orientation, height and dimension of buildings, legal provisions regarding e.g. tree planting, the degree of soil sealing and development as well as green roofs can be implemented mandatorily.

Another essential level at which the City of Vienna can exert influence on the quality of development structure represents the so-called developer competitions. These have been carried out in Vienna already since 1995. From 200-300 accommodation units onwards, public invitations to tender are issued in subsidised housing for reasons of quality control (Liske, 2008). Apart from architectural and planning qualities also economic and ecological aspects have to be considered. Moreover, these competitions are partly carried out with reference to specific thematic focuses – social topics such as multi-generational or integrative housing as well as constructive topics such as passive house or multi-storey timber construction. In the case of publicly funded projects, the City of Vienna has major influence on the built quality.

It is also by granting subsidies that the City of Vienna has the possibility to control quality in terms of reducing UHI effects. In doing so, two major approaches are being pursued: the support of courtyard and vertical greening as well as the greening of roofs. These have among others micro-climatic impacts and facilitate the implementation of UHI-relevant measures (MA 22, 2013).

6   DISCUSSION OF FIRST RESULTS

In the course of research for the UHI-STRAT catalogue of measures a variety of different measures (~ 370) has been identified. On the one hand, these concern different scales (city-wide to single objects) and disciplines (e.g. engineering biology, architecture, materials research, public relations), on the other hand, different time frames will become effective in the implementation of short-, medium- and long-term

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[2] E.g. Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment, Directive 2002/91/EC on the energy performance of buildings, Thematic Strategy on the Urban Environment, 2nd European Climate Change Programme …

[3] E.g. Federal Law on the presentation of an Energy Performance Certificate (BGBI. I Nr. 137/2006), Austrian federal climate strategy, klima:aktiv – the Austrian climate protection initiative …

[4] E.g. Vienna residential construction and renovation act, Strategy Plan for Vienna, The City of Vienna's climate protection programme …

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measures. Thus, in order to coordinate the various measures, detailed knowledge about their effects, impacts and corresponding action is needed.

Due to the different levels at which the measures are to be classified, a variety of actors and sectors are affected. An important issue in the realisation of the measures, therefore, is the inclusion of the different perspectives of the actors involved in the implementation, who come from the public, the semi-public and the private sectors. A huge difference in acceptance regarding the implementation of the measures is to be expected from the departments responsible for the implementation as well as from policy makers and citizens. For example, the introduction of a driving ban in the settlement area would indeed be a very effective measure for the motorised private transport, which due to the expected low acceptance, however, is not feasible. The assessment of the impact, relevance and feasibility of the measures must therefore be carried out from the perspective of all stakeholders.

For a better understanding a cost-benefit analysis is helpful, which makes it easier for stakeholders to assess the direct monetary benefits of the measures and the willingness of the population to accept or pay for additional measures.

In order to develop and implement the UHI strategy plan an environmental analysis of the Vienna City Administration has been carried out. The outcome was that a total of 4 administrative groups, 13 municipal departments, 5 superior units and institutions related to the City as well as the 23 districts were affected in their scope of operation or should take part in developing the UHI strategy plan. In addition, an analysis has been conducted of the different planning levels and tools that could be useful for the implementation of the elaborated measures. It turned out that all kinds of different legal regulations, strategic programmes and projects, spatial concepts, master plans as well as planning processes and procedures, granting of subsidies or standards have an influence on the development and implementation of measures to reduce UHI effects. Numerous planning levels and (legal) matters are affected.

The reduction of UHI effects is a "longitudinal and cross-sectional matter". The chronological sequence of a planning process has to be taken into account and the different levels of decision making and tools have to be adjusted and implemented in a coordinated way in order to reduce UHI effects successfully.

Furthermore, planning which is partly carried out separately (regarding e.g. nature conservation, zoning, public space, streets) and the individual steps of a planning process – from the creation of a master plan to zoning and development planning as well as project development all the way to the concrete construction – lead to intersections. These have to be transformed into junctions in order to consider necessary qualities in planning and design that contribute to the reduction of UHI effects – from the first strategic planning to the concrete implementation. An intensified cooperation and coordination therefore is of major importance.

There are also partly conflicts between the different strategic aims of the City of Vienna regarding urban planning and development and the approaches to reduce UHI effects. Competing interests have to be balanced – between measures to adapt to climate change such as fresh air corridors or larger green spaces in cities, and other political and planning aims such as densities suitable for the location or city of short distances.

Yet there are synergies as well between measures to adapt to climate change and other strategic aims of the City of Vienna. Planting activities, for example, create cooling effects but also support improved rain water storage or an increase in biodiversity.

An important aspect of the discussion is the evaluation and development of effective measures such as information and involvement of the residents as well as the establishment of information and early warning systems. It is assumed that the political commitment and the acceptance by the population will support a sustainable implementation of the defined measures. Therefore the cooperation with scientific, administrative, practical and political experts is given high priority in the whole project.

The results will be processed in a practical and hands-on guidance thread. The guide will consist of the following three modules

(1) Summary of policies and measures and the results of the evaluation

(2) Representation and processing of the two pilot actions

(3) Creation of a tool for awareness raising and decision making

and will address the scientific society, politicians, decision-makers, the administration as well as the general public.

The reducement of UHI effects on the inhabitants of the City of Vienna is challenging regarding the mainfold driving forces causing UHI effects as well as the broad spectrum of mitigation and adaption measures. To develop a balanced set of effective measures, which meet the needs of the City of Vienna, a multilevel and multidisciplinar approach is needed.

But before concrete measures are developed and implemented a mainstreaming of the topic is necessary. Awareness rising is required to show which effects and impacts climatic changes and increasing densification of the city have on the entire population and the quality of life of the citizens of Vienna. It is also important to show that with existing instruments and measures steps against UHI effects can be set effectively.

7 REFERENCES

Allex, B., Brandenburg, Ch., Liebl, U., Czachs, C., Gerersdorfer, T. (2012): Kommen Wien-Touristen ins Schwitzen? Die Auswirkungen von Hitzetagen auf das Freizeit- und Erholungsverhalten sowie das Besichtigungsprogramm von Städtetouristen. In: Climate Research Initiative AustroClim, Climate Change Centre Austria CCCA, Climate and Energy Fund in cooperation with the University of Natural Resources and Life Sciences, Vienna. Proceedings 13. Austrian Climate Day.

Dunne, J.P., Stouffer R.J., Jasmin J.G. (2013): Reductions in labour capacity from heat stress under climate warming. Nature climate change. Advance online publication. Published online: 24 Feb. 2013 (www.nature.com/natureclimatechange). DOI: 10.1038/NCLIMATE1827

Formayer, H., Haas, P., Hofstätter, M., Radanovics, S., Kromp-Kolb, H. (2008): Räumlich und zeitlich hochaufgelöste Temperaturszenarien für Wien und ausgewählte Analysen bezüglich Adaptionsstrategien. Endbericht einer Studie im Auftrag der Wiener Umweltschutzabteilung – MA 22 der Stadt Wien gemeinsam mit der MA 27 – EU-Strategie und Wirtschaftsentwicklung, 82.

Kyselý, J., Kalvová, J., Kveton, V. (2000): Heat Waves in the South Moravian Region during the Period 1961 – 1995. In: Studia geoph. Et geod. 44 (20000), 57-72. Prague.

Liske, H. (2008): Der „Bauträgerwettbewerb" als Instrument des geförderten sozialen Wohnbaus in Wien – verfahrenstechnische und inhaltliche Evaluierung. Vienna.

MA 18 – Stadtentwicklung und Stadtplanung (Hrsg.) (2013): Handbuch Gender Mainstreaming in der Stadtplanung und Stadtentwicklung. Werkstattbericht Nr. 130. Vienna.

MA 18 – Stadtentwicklung und Stadtplanung (Hrsg.) (2012): Stadt bauen – Beispiele für und aus Wien. Werkstattbericht Nr. 124. Vienna.

MA 21B – Stadtteilplanung und Flächennutzung Süd-Nordost (Hrsg.) (2010): Planung als Prozess. Gestaltung dialogorientierter Planungs- und Beteiligungsprozesse. Werkstattbericht Nr. 109. Vienna.

MA 22 – Wiener Umweltschutzabteilung / „ÖkoKauf Wien" Arbeitsgruppe 25 Grün- und Freiräume (2013): Leitfaden Fassadenbegrünung. Vienna.

Robine, J.M., Cheung, S.L., Le Roy, S., Van Oyen, H., Griffiths, C., Michel, J.P., Herrmann, F.R. (2008): Death toll exceeded 70,000 in Europe during the summer of 2003. C. R. Biologies 331, 171–178.

StartClim (2006): Untersuchung zur nächtlichen Abkühlung in einem sich ändernden Klima. Studie im Rahmen von StartClim 2005.A1b, durchgeführt vom Institut für Meteorologie (Universität für Bodenkultur) und Institut für Umwelthygiene (Medizinische Universität Wien, ZPH).

Terrados, J., Almonacid, G., Hontoria, L. (2005): Regional energy planning through SWOT analysis and strategic planning tools. Impact on renewables development. Renewable and Sustainable Energy Reviews 11 (2007), 1275–1287.

Zentralanstalt für Meteorologie und Geodynamik (ZAMG) (2011);
http://www.zamg.ac.at/klima/Klimawandel/Klimazukunft/Extremwerte/; accessed on 02.06.2011.

Zentralanstalt für Meteorologie und Geodynamik (ZAMG) (2012): http://www.zamg.ac.at/cms/de/klima/news/hitzetage-werden-immer-haeufiger; accessed on 19.02.2013.

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CENTRAL EUROPE
COOPERATING FOR SUCCESS.

Urban Infill as Strategy for Social Housing Stock

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1 ABSTRACT

In Italy, especially in large urban centers, the public building stock represents a large portion of the consolidated city that is in a state of disrepair due to the aging and to the processes of degradation and marginalization.

In addition to the well-known difficulties derived from residential prevalent use in these residential complexes, however, there is a considerable number of spaces at ground floor raised on "pilotis", places designed for the community but nowadays spaces of transit, without a specific destination use and without specific qualities, residual or abandoned in most cases and therefore perceived as dangerous by the inhabitants.

A departmental research conducted on the case of Rome and developed at DIPSA of the University of Roma Tre has highlighted the problems common to Piani di Zona made accordingly to Law n.167/1962 but also the potential for transformation of space porches free.

From this research, the international design competition PASS- Plan for Social and Sustainable Housing – has identified the project themes from which to increase, and specify, the number of flats, to achieve a sustainable energy behavior of existing buildings, with the 'overall goal of initiating a process of wider redevelopment, as well as the procedural steps through which the institution ATER Roma in an exemplary manner is beginning the process of upgrading the complex Tiburtino III.

The contribution of the report is to present and share the issues identified, the specific competition procedure used and the results obtained, such as references to a possible and practical method of intervention in the consolidated city.

2 INTRODUCTION

In 2010, the Housing Association of public housing stock in Rome (ATER- Roma) has adopted the main elements of a long process of research undertaken by the Department DIPSA Roma Tre University on the subject of redevelopment of public housing stock built in Rome, launching the international design competition PASS – Project for Social and Sustainable Housing.

From a first phase of the investigation it was found that the residential housing stock realized with the first Plans for Economic and public housing (PEEP) presents many porches spaces (approximately 222,000 square meters), today underutilized and devoid of quality, a second phase has made it clear that these spaces, together with those present on the roof top of the buildings, if properly converted, could accommodate new functions or increase the housing stock of public assets.

Fig. 1: Buildings at Tiburtino III in Rome.

For the important implications of this analysis and application of recent regional standards, the case study of the plan area Tiburtino III (Fig. 1) was chosen from ATER Roma as a framework for testing an international design competition.

3 THE ITALIAN SCENARIO

The Italian public social housing stock has been built mainly in three phases. The first historical period coincides with the decade known as post-war reconstruction period (1945-1950), in which huge public investments were applied. The intent was to rebuild more than one million rooms destroyed by the war.

Between 1950 and 1970, the State supported new housing developments by extensive investments. In the social sector the first important resolution was the INA-CASA programme (part of the Employment Act 1949). In a six months time, 649 building sites were posed. When the plans were fully completed 2.800 dwellings per week were realized, enabling to give house to 560 households a week.

With the aim of employment of often underqualified personnel, all the technological innovation was expressively restrained in these programmes; all the INA CASA districts are characterized by small buildings, small neighbourhoods and vernacular themes.

A second important national programme is given by the GESCAL Trust Funds (GEstioneCAse Lavoratori) between 1967 and 1973.

Both the two programmes are at the base of a widespread homogeneity for typological and constructive solutions within the Italian building stock of those early years.

A first variety is introduced with the housing programmes in several larger cities that follow the national law on social housing in 1962. In the city of Rome i.e. most of the public housing stock planned between 1960 and 1980 has been realized using two programmes of 1967 and 1985 based on the said law (Piani per l'Edilizia Economica e Popolare, P.E.E.P.). The P.E.E.P. instruments allowed the realization of 67 districts with a total of 551.073 rooms equivalent to 44.085.840 cubic meters of built volume. P.E.E.P. districts are built by prefabricated system, present tall buildings with a lot of public space.

Public social housing is also designed for an abstract model of the average family, an idea that we can no longer recognize in today's society. Young couples, the elderly, extended families are just some of the new users who need accommodation.

3.1 Academic reaserch at University of Roma Tre

The Dipartimento di Progettazione e Studio dell'Architettura of University of Roma Tre (DIPSA) has focused its researches on rehabilitation of the housing stock built in Rome under the first programme law n. 167 of 1962.

An initial fact-finding investigation[1] on a residential complex has identified the main issues of the aging building stock and the possible strategies to be applied not only to solve the obsolescence of the building elements but also to counter the deterioration of the city: marginality, monofunctionality, low maintenance etc.

The procedures identified in order to obtain an organic project that redesign entire look of the district Tiburtino III chosen as case study are: interventions at the base of the building, the wrapping, the roof and re-distribution of existing dwellings. The district shows all the characteristic signs of decay, abandonment and isolation common to many other public districts made in those years.

A subsequent research undertaken by Barbara Del Brocco (2008) has investigated the potential for transformation of the free spaces at the base of buildings, recurring theme of architecture of public districts. The ground floors, generally designed with porch, conceived as places of community, are rapidly transformed in areas without a precise destination and without quality, transit sites becoming neglected or, at worst, residual spaces avoided by the people because they are perceived as dangerous. The research investigates possible transformations of these spaces in relationship to the environmental and social context, particularly by infill development with selected functions. These interventions, with its point and one-off

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[1] Collaboration for the research "Innovative intervention of rehabilitation of public housing stock". Coordinator prof. arch. Andrea Vidotto, DIPSA Dipartimento di progettazione studio dell'architettura, Università Roma Tre. B. Del Brocco, M. De Matteis, C. Frazzoni, M.L. Olivetti. S. Pollak, F. Riccardo.

approach, could constitute a "micro-network" spread in the urban fabric in order to start a bigger process of urban regeneration. The objective of this investigation is to stimulate local Administrations, Housing Associations, inhabitants and media to consider porch floor an important resource for renovation of housing stock, and, if it will be conveniently filled, it could become the flywheel of outskirts rehabilitation.

Research shows that the ground floor can be considered a resource for the transformation of the stock of public housing built with the first PEEP between 1967 and 1985 in Rome. In particular, the porch floor appears to be a recurring theme of architecture built in those years, although it declined in different ways and in spite of specific conditions.

In the first we have tried to determine the amount of free space at the foot of the buildings available for processing. The lack of collaboration ATER and, perhaps, the real inability to know the areas of overall porch floor of their assets, has meant that it was necessary to adopt an alternative strategy.Assuming that the architecture is an expression full of technical regulations has been proposed a cross-reading of public housing with the laws and regulations that have generated to determine the amount of space available for processing.

If ground porch floor takes its origin from the "5 points of Architecture" of Le Corbusier, it is important to find out its first appearance in social housing stock in Italy. So it is of prime importance to analyze the principal laws and regulations on social housing in Italy, especially in Rome chosen as context of reference of research.

4 EVOLUTION OF SOCIAL HOUSING IN ITALY

4.1 The urban block and the garden city (1900-1930)

With Luzzatti Laws n. 254/ 1903, the Italian government intervenes directly in the field of social housing, in fact, after this law enables public and private bodies and cooperatives in moral or autonomous institutions to build housing. The goal is to promote and coordinate the philanthropic and spontaneous initiatives.

In the first period of expansion after the unification of the country the reference model is the city block, and social housing, sets against private construction, differs from these in terms of habitable, greater distance between the buildings in a same block, the greater amplitude of the courtyard in order to respond to new requirements for ventilation and natural lighting, such as Testaccio in Rome by Magni (1910-1913) (Fig. 2).

Fig. 2: Testaccio in Rome by Magni (1910-1913)

The language of social housing is almost identical to that of private construction: basements, architecture, pilasters and cornices are common to both nineteenth-century taste.

If the language remains the same, the urban grid pattern gives way to garden city, as Garbatella (1926) (Fig.3) or Aniene (1920).
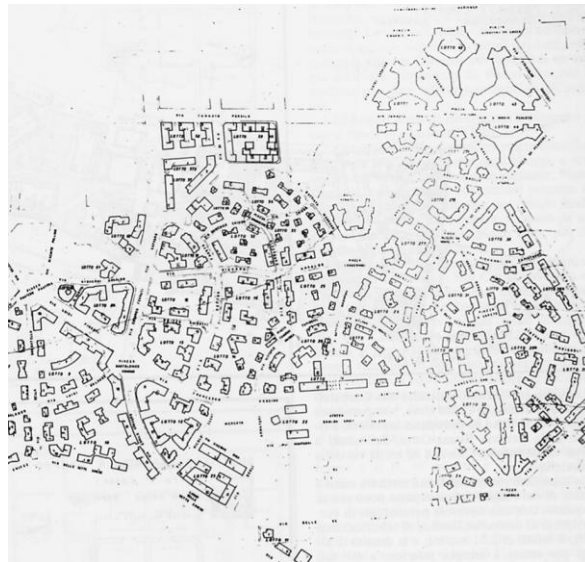
Fig. 3: Garbatella in Rome (1926)

The basement rooted to the ground, for structural reasons, is characterized by small windows and rusticated in some cases with the presence of shops and stores, the dwellings start from the first floor.

In Europe the principles of the Modern Movement begin to assert and in Italy is called Rationalism; the social housing in Rome, however, is not affected by these influences.

The 1930 season marks the end of the largest residential building and in 1939 there is a drastic reduction of the decorations.

From that moment, the role of Housing Association will always be more tangential to the functioning of the market and increasingly influenced by urban policy of fascism. The area of intervention will be to immigrants and their barracks or some of the people expelled from districts with the most rapid liberalization of rents and the intensification of the politics of demolition.

4.2 The INA-CASA programme – The first seven years 1949-1956

With the aim to solve simultaneously the problem of unemployment and the house comes into force the Law n. 43 of 28 February 1949 "Employment growth plan working", known as the Law Fanfani or INA-CASA Programme. The INA CASA Programme (1949-1963) can be divided into two periods of 7 years each. To support the design, the INA CASA prepares a manual consisting of 4 issues, 2 for every seven years. The famous Italian architect Adalberto Libera will be the curator of the first 2 issues and be supported among others by Gorio and will be design office manager from 1949 to 1954 and later consultant.

The first volume of "Suggestions, rules and schemes for the preparation and presentation of projects – Announcements of competitions" (INA CASA, 1949) presents a set of blueprints for 4 building types: multi-storey building, isolated multi-storey building, one-storey row house and the row house.

The second " Suggestions, examples and standards for urban design. Projects Type " (INA CASA, 1950) shows a series of Anglo-Saxon and Scandinavian examples, such as garden city and new empirism.

If the internal organization of the accommodation suggested by the manual reflects the studies of the Modern Movement, urban facilities recommended are more bound to respect the site and the history of the country.

The two Guidelines text-books contains several suggestions for designers and they allow dwellings at ground floor. We can assert that Unité d'Habitation of Tuscolano designed by Adalberto Libera in 1950 is the only realization with porch floor in Rome in that period.[2] (Fig.4).

4.3 The INA-CASA programme – The second seven years 1956-1963

From 1955 INA CASA starts a revision of standards for the design, following the referendum and surveys of recipients of housing, and organizes a conference attended by the most important exponents of Italian

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[2] We can notice that Libera is the designer of other two semipublic districts with porch floor, Villaggio Olimpico 1957 and Decima district 1960 and he is also one of the architects involved into guidelines working out.

architecture, including Adalberto Libera and in 1956 publishes the third booklet "Guide for the examination of the INA CASA projects to be implemented in the second seven years.

Fig. 4: Unité d'Habitation of Tuscolano in Rome -Adalberto Libera in 1950

Tall buildings are not allowed more than 3 floors, flats at ground floor are forbidden unless measures to avoid introspection and the unpleasant effects of moisture. Therefore recommend that the basement floors are at least 60 cm above the ground level, below which there are well-ventilated basements. It is encouraged to use the ground floor for remittances for local scooters and bicycles, or areas for children's play (INA Casa 1956, p.12).

In this period we found in Rome only two buildings with porch floor: the 1957 Ponte Mammolo by Vaccaro who has worked with Libera, and the 1958 Acilia by Del Debbio.

4.3.1   In search of pilotis: a hypothesis

In the projects of Adalberto Libera is common the use of porch floor at the ground floor; for him is an essential sign of innovation, as he asserted during a conference in Florence .

The porch floor, in the architecture of public housing in Rome, appears for the first time in 1954 in the Unité d'Habitation of Adalberto Libera at Tuscolano III. It can be found in other projects prepared by the architect: project of the district Pineto in 1957 with eng. G. Vaccaro; project of the residential district at Grottaperfetta in 1957-60 with the other architects Monaco and Luccichenti; Olympic Village in 1957-1960 designed with Cafiero, Monaco e Luccichenti e Moretti; and the district INCIS at Decima in 1960-1966 with Cafiero, Guidi e Moretti.

It is important to note that Vaccaro, who had worked with Libera in the project for the neighborhood Pineto in 1957, is the author of the other district of the second seven years of INA CASA programme in which appear the porch floor, Ponte Mammolo (1957-62). Libera has been manager of the technical office of INA CASA from 1949 to 1954 and then plays the role of outside counsel, but in the first two volumes of Suggestions for the design there is no reference to porch floor. However, we should consider the incessant search for Libera on Unité d'Habitation, especially when compared with Le Corbusier's theories.

So we can easily state that the appearance of the porch through the second seven years of INA CASA is primarily due to the architect Adalberto Libera.

4.4 The ten-year plan GESCAL (1963-1973)

With the end of the INA CASA Plan are established GESCAL Trust Funds (GEstioneCAse Lavoratori) for the implementation of the ten-year plan. The Law 60/1963 establishes the Central Committee with responsibility for overall planning and management of houses for workers . In 1963 is enacted GESCAL technique legislation with the primary objective of addressing, through detailed provisions, the implementation of action plans in the building of districts named Piani di Zona.

The technical legislation incorporates some topics of the rules of the INA CASA Plan, in particular reaffirms the prohibition to have ground floor accommodation and, in fact, requires the arcade at the ground floor of buildings. The architect Pietro Barucci, in an interview (Del Brocco 2008, p. 79), says that the porch floor inside GESCAL technical standards can be considered a "victory" of architect Moroni, designer of Spinaceto, one of the districts built in this period, who insisted that this sign of modernity was inserted in the rules.

The Article n.27 affirms "Ground floors in the covered area, free spaces surrounded by walls, shall not be less than one third of the total area of the building, and allow ample communication between the areas surrounding the buildings". The ten years Programme of GESCAL (1963-1973) and its technical Regulation confirms the prohibition to build dwellings on the ground floor and it forces the passing portico.

The law n.167 1962 sets up the Piani di zona (districts), where local administrations has to locate areas for social housing. The first programme, in Rome i.e., allows the realization of 67 districts, 21,1 millions of residential cubic meters equivalent to 273.487 rooms.

Other national laws modify the way of designing buildings: the law n.513 of 1977 and n.457 of 1978. They reduce common spaces and passing porch disappears. The introduction of the "virtual height", an abstract value, suggests to have ground floor on pilotis close to cellars or small stores.

4.4.1 First Plan for and Economic and social Housing in Rome

In 1962 Law 167 is enacted, it requires municipalities with populations greater than 50,000 inhabitants to prepare Piani di zona (districts), for public housing and in the same year in Rome is adopted the new General Master Plan. Two years after, February 26, 1964, the municipality of Rome launches its first Plan for Economic and social Housing (PEEP). The program identifies 70 areas to house 700,000 people covering an area of 5,000 hectares. The plan will be subsequently reduced to 460,000 rooms and at the end (1985) it will be realized only 270,000 rooms. It is the greatest plan in Italy.

We can identify three main stages in the schematic that coincide with three different approaches to the design of new neighborhoods.

In the startup (1968-71) is very strong the influence of utopias of mega-structuralist movement and all the projects, including Spinaceto Tor de Cenci, Casal de Pazzi Nomentano, Tiburtino, represent a formalization of the "town-design", urban design in large scale

In the first neighborhoods the passing porch is always present, as noted by the critic Sergio Lenci "earned in those years, a standard abstract, which acted negatively, as, for example, to prescribe the general adoption of the porch on the ground floor. This rule has caused hectares of arcades unnecessary, harmful to the creation of urban spaces in the maintenance and management has not been attributed to the individual, but was entrusted to institutions that have given up immediatly." (Bossalino and Cotti, 1992).

The 70s, central phase, are characterized by large "architectural objects", a large building types that integrate their internal spaces and service spaces. This is the case of Corviale, Laurentino and partly Vigne Nuove in which seems to end the morphology of the whole configuration of the main building, in a coincidence between building type and morphology of the" urban "part".

The third generation of districts (1977-1980) sees the presence of two opposing trends project: the first that refers to previous research on the large urban signs Torrevecchia, and a second looking for a relationship with the urban fabric of the traditional type.

The research investigates only the districts made with the GESCAL technical Regulation up to 1977. So If we exclude the last period, the districts built of up to 1977 in Rome are 25 and the porch floor according to the legislation had to be equal to 25 % of the built-on area, amounts to 222,000 square meters. These space is empty and available to be transformed and can be filled with new selected functions.

If we take into account that all these settlements still suffer the lack of public services , principally due in the first phase to the unwillingness of the administration to take charge of management and in the intermediate stage, the lack of funding. We can conclude that the huge surface of empty space at the ground floor can be used to regenerate all the district.

5 CASE OF STUDY TIBURTINO III IN ROME

Tiburtino III 15 bis (1972-75) is one of the districts built during the law n.167 and it has been chosen as a specific case of study in order to check the interventions in relationship with the goals. Its empty spaces at ground floor are: not fully utilized; in most of cases neglected and dirty; not well lighted; often place of micro-criminality; only in one case are maintained by inhabitants. (Fig. 5)

The research takes into account the recent investigation made by CRESME-Center for Economic Research Social Market for Building and Land-, on suburbs of Rome (AeT. and CRESME, 2007) in which it emerges

a new demand of residential quality in the areas build under the social housing law of 1962 n.167. It expresses a demand of maintenance of old housing stock on one hand, and on the other hand a demand of facilities.

Fig. 5: An example of empty space at ground floor at Tiburtino III

The facilities wished by inhabitants are: Office for Fiscal Adviser; Office for administrative practice; Energy point and advisory services for energy saving; kindergarten for children; bicycle rent.

The available surface of the district, less than 25 % of built-on area is 2.000 sq. If we consider that for 1784 sq to rehabilitate it is necessary about 890.000 €.

A final phase of the investigation has probed the possibility of involvement of the inhabitants. The desire to take care for these spaces was already inherent in the district, are in fact many of the signs that reveal a desire for redemption of collective space: limited appropriations, fences consist of vases, chairs arranged so well. A two-month workshop was led eventually with students at the school of Arts located in the district. They, left free to interpret the empty spaces at the ground floor along the main street, have identified the first functions to be placed and then have showed elementary but effective proposals for redevelopment.

6 INTERNATIONAL COMPETITION

In March 2010, ATER Roma (Housing Association of Rome) welcoming the opportunity to reuse the free spaces at the ground floor of the buildings, with the support of the Lazio Region and from the new provisions of the regional legislation, has given the world the professional challenge of providing a concrete and feasible answer about the densification of the consolidated city, launching the procedure of the international design competition, whose care and scientific organization was assigned to DIPSA.[3] The international design competition PASS – Plan for Social and Sustainable Homes is an application of the specific results of a long process of research undertaken by DIPSA – Department of Design and study of Architecture of University of Roma Tre on the topics of rehabilitation of public housing stock in Rome. Thanks also to the new regional law – Piano Casa- that allows the increases in cubic volume to regenerate the public urban stock.

The competition is coherent with regional regulatory guidance that allow the intervention on existing buildings with the aim of increasing the housing supply in the area of public social housing.

Subject of the international design competition "PASS – design for sustainable social housing" is the redevelopment of the portion of E.R.P. (Public Housing) compound located in P.d.Z. (District Plan) n. 15 bis – Tiburtino III – lots included between via Grotte di Gregna and via Mozart – through gain of approx 120 new public housing units, new services equipment for the district, redevelopment of public spaces, integrated interventions to improve the energetic behavior of existing buildings (consisting in approx 450 housing units), in order to improve housings living quality, the energetic performance, innovate equipment systems for a sustainable management.

Some 50 project proposals developed by groups of professionals, have declined in different and innovative ways the architectural quality, with the issues of energy sustainability, environmental and economic.

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[3] SCIENTIFIC CONSULTANCY OF COMPETITION PROCEDURE UNIVERSITY ROMA TRE- DIPSA – Department of Design and architectural studies- Scientific Coordination and drafting of Preliminary Design Document: arch. Mariella Annese, arch. Barbara Del Brocco. Technical and administrative planning arch. Mariella Annese.

The exchange of professional experience has reopened the cultural debate about re-densification the consolidated city and has generated several ideas on how to transform public housing stock.

The competition was won by the group led by the Spanish office Espegel-Fisac, with other two winning projects (2nd place by the group led by SMTstudio Associates Architects, 3rd study Molestina Architekten), and 3 mentioned (Parasite study, NEXT architects , 3TI Progetto italia).

Characteristic of the winning project is to undermine the rigid system of Tiburtino III filleting the courtyards and public space with the ground floor of the buildings, set at 70 cm, with an organic design with ramps.

As for the new housing, penthouses on floors and porches have been proposed distinct types (Fig.6).On the roof there are two types of composition: the first type, located on the exterior of the buildings sector, has a configuration introverted, with its areas shielded from the terrace surfaces and distributed along "corridors bright", so as to give each of them a direct relationship with the open space in private rooms at the second type, provided on the inner buildings of the complex, all rooms have aggregated around a patio, a private open space from which you access the housing units (quote of the Roman impluvium houses) .

The unit plans at porch floor, however, is formed instead of a central core that contains all the technical installations and wetlands, while the living spaces open onto private terraces, private conceived as ideal extension of the public green in front of the rooms bed, facing instead on areas behind, protected by vegetation belts. For the redevelopment of the existing facades has been proposed a modular prefab that clips to the existing structure, a ventilated flat panels. In correspondence of the lodges and the windows, the system allows to create "blades" openable and closable to adjust the amount of solar radiation, the ventilation and the level of external view.

Fig. 6: The project of Espegel-Fisac

The project 2nd place (SMTstudio Architetti Associati) gives to the public space a dominant role. The open spaces between the buildings are transformed into parterre replacing the vehicular traffic, reorganized on the fringe. The design of the paving trace the footprint on the ground of buildings and detects the insertion of several programmable functions according to the needs of the inhabitants (Fig. 7). The base, particularly in the courtyard, it expanded into squares conceived as outdoor living rooms that resolve differences of quotas by improving accessibility through the fitting of a plane sloping green that covers the volumes of the existing cellars. To obtain the shielding for private open spaces, the dwellings at porch floor are obtained by reformulating the existing service volumes, volumes that become translucent colored, strongly recognizable. On the roof, however, the settlement system involves the aggregation of prefabricated modules with a clear formal identity of pitched roofs, configure a new urban fabric held together by a kind of main street and small public squares in height.

The proposal of the Molestina Architekten firm, 3rd place, begins from a careful analysis of the site in terms of use of space and from the belief that the evident signs of obsolescence must somehow be preserved, even put on display. For this reason, the project envelops all built in a new polycarbonate skin that gives a new identity to the neighborhood, while preserving the visibility of the status quo (Fig. 8).

The "greenhouse" defines a unique space, penetrated by light and air, transitional space between public and private, it becomes a meeting place for residents which also contributes to the energy balance of buildings; plants that grow in it improve the microclimate and purify the air and, depending on the season, connote the

look through colors and scents . With regard to housing, those places in the plans arcades are characterized by high flexibility: each unit has secured a double cross ventilation, exposure to light and great views. The accommodation located on the roofs are equipped with balconies on both sides and are open on the greenhouses of the common terraces.

Fig. 7: The project of SMTstudio Architetti Associati

Fig. 8: The project of Molestina Architekten firm

7 CONCLUSION

The result of the competition, contrary to what is usual, has been followed with the award to the winning team of the assignment for the final design, which ended in 2011. Waiting for regional funds for subsequent phases of design and construction, an initial assessment of the whole process can be expressed.

The great variety of proposals received and the wealth of presented architectural solutions evidence that reflection on possible intervention in the city built is very large and full of themes and facets. The procedure of the design competition also proves to be the ideal range for a fertile exchange of professional experience on the issues, but also an opportunity for research institutions and the policies to define effective collaborations and partnerships, through which assume a survey methodology and of concrete intervention in the consolidated city.

8 REFERENCES

AeT., CRESME : Abitare la periferia – Edilizia pubblica e trasformazione urbana – la domanda di servizi nelle periferie. Camera di Commercio Industria Artigianato a Agricoltura di Roma. Roma, 2003
Annese M., Del Brocco B. (a cura di,): Catologo del concorso internazionale di progettazione "PASS – Progetto Per Abitazioni Sociali e Sostenibili". Roma, Gangemi Editore, 2012
Annese, M. Del Brocco, B.: Trasformazione edilizia e riqualificazione urbana. Il concorso PASS per Tiburtino III a Roma. L'industria delle costruzioni, n.423, 116-121. Roma, 2012.
Bossalino F., Cotti A.: Roma anni '90, l'edilizia pubblica e la nuova forma della città. Roma: Sapere 2000, 1992.
Del Brocco B. (dattiloscritto,): Interventi innovativi di riqualificazione del patrimonio edilizio residenziale. Il piano pilotis una risorsa per la trasformazione. 2008
Di Biagi P.: La periferia pubblica: da problema a risorsa per la città contemporanea. In Belli A. (a cura di, 2006). Oltre la città: Pensare la periferia. Napoli: Cronopio2006.

INA CASA: Piano Incremento Occupazione Operaia. Case per Lavoratori, Suggerimenti norme e schemi per l'elaborazione dei progetti. Bandi di concorsi, fascicolo n. 1, Roma. 1949
INA CASA: Piano Incremento Occupazione Operaia. Case per Lavoratori, Suggerimenti esempi e norme per la progettazione urbanistica. Progetti tipo, fascicolo n. 2. Roma. 1950
INA CASA: Piano incremento occupazione operaia. Guida per l'esame dei progetti delle costruzioni INA CASA da realizzare nel secondo settennio. Fascicolo 3. Roma: TI.BA. 1956

Urban Planning Implications of Changing Land Use Structure of Metropolitan Lagos, Nigeria

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1 ABSTRACT

The changing land use structure of metropolitan Lagos has many implications on the land use prospects of the city. The nature of the implications manifests in various shades of socio-economic, physical and environmental dimensions. This paper unravels the different dimensions of the changing land use and their implications on land use development of the city. The paper discusses the nature of the changes and their implications on land use type's namely residential, commercial, industrial, educational and institutional, religious, circulation, parks and recreational land uses. The research methodology involved the collection of primary and secondary data. Data were collected on determinants of urban land use which the paper classified into economic, sociological, cultural, environmental, infrastructure and institutional factors. A total of 755 questionnaires were administered to collect data on determinants of land use in order to establish their influence on Lagos changing land use structure. The application of factor analysis and principal components analytical techniques shows that infrastructure and economic factors are the major factors influencing land use in Lagos. Also, there exist high levels of correlation between these variables, influencing land use of Lagos. The research concludes that significant distortion of the Lagos Metropolitan Master Plan has taken place which led to the unforeseen physical land use structure problems. The paper suggests that there is urgent need for the preparation of new land use development plan for Lagos with special attention to provision of infrastructure and economic policies that will improve the people's quality of life. There is also need to improve the land use administration of the city, harmonization of the roles of various levels of land use management agencies with adequate provisions for citizens and stakeholders participation in the planning process. Electronic planning permit approval system should be introduced. This will improve the time for approval of land use plans and prevent official corruption as the need for physical contacts between prospective developers and planning officials will be eliminated.

2 INTRODUCTION

Studies on the problems and prospects of metropolitan areas are usually of great concern to scholars and policy makers. This has been confirmed through the works of many researchers such as in the work of Mabogunje (1968) who examined the distribution and characteristics of residential districts in Lagos. He noted that areas that are districts in social and physical patterns can be found in Lagos. These areas are classified into low, medium and high quality residential areas. Also Ayeni (1979) researched into the spatial interaction and structure of residential areas in Lagos. Sada (1979) attempted a study of land use classification of cities in developing countries. He identified four major physical divisions of cities in developing countries. These are the Government Reservation Area (GRAs), which in most cities generate positive effects, because they are always planned. The second are the private layouts which often generate both positive and negative effects as the quality of life in the area depends upon the monitoring system by the planners. The third is the old traditional residential areas and the fourth the uncontrolled and unplanned fringe residential areas. The last two types he stated are notorious for their negative effects on development due to overcrowding and urban sprawl. Frishman (1979) examined the growth pattern of cities under the Hausa-Fulani, the British rule and the Independent Authority. Specifically on Kano he noted that the growth of the city was determined by the nature of land tenure law in contrast with the European and American cities. Use of land in Kano was mixed in every area and segregation by income and wealth did not occur. Instead, each ethnic group developed her own sub-city, as own sector and expanded outward along its fringe. Okpala (1981) study was on residential mobility in Nigerian cities with Enugu and Onitsha as case studies. The study by Okpala (1981) showed that residential mobility plays a very important role in the smooth functioning of urban housing market. Residential nobility facilitate the phenomena of filtering down process which is very important in improving access to urban housing.

In a study by Okewole (1997), on environmental restructuring in Bodija Estate, Ibadan, increasing environmental restructuring in the planned residential estate, was found to be due to the fact that the designed environment does not satisfy residents aspiration. Adindu and Ogbonna (1998) study was on the nature of urban expansion with Owerri as case study. They concluded that the future growth of the city

depends on the nature of the fringe areas as Owerri city development is circular in nature. Omirin (1998) analysis of residential land accessibility in Lagos showed that there exists an interplay of many factors most prominent among which are low rate of new housing production, increasing competition in the demand for cheap accommodation in the metropolis, drastic fall in the exchange value of the naira vis-avis the currencies of foreign countries from which most building materials are sourced. Other recent research works on Nigeria urban land use include the study by Oyesiku (2002) on the city consultation process paradigm and urban poverty alleviation in which he concluded that the incidence of poverty in the developing countries is on the rise and very remarkable in sub-Sahara Africa, having serious implications for the world and regional economy, growth and physical development. Fawehinmi (2002) researched into property conversion in Nigeria with Akure as case study. He concluded that property conversion is essentially economic to the extent that it is predominantly done for profit maximization. To discourage this phenomenon he suggested that the national economy should improved as this will stimulate commercial property development. Efforts should also be made to increase the supply of formal rental units, as this is the only way to reduce the dominance of the formal property market. A research on the implication for land market transactions, globalization or investment and land market was carried out by Aluko and Amidu (2005) in which they concluded that globalization depends on a well functioning land market, the availability of land, information, secure tenure arrangements and appropriate registration or recording system. Oduwaye (2006) researched on the effects of globalization on Lagos cityscape and concluded that formal commercial land uses are reducing while massive informal commercial land use are now in fragments and predominantly along major roads. Ofogba (2011) study on land tenure in Nigeria stated that there is much of overlap of functions in the land administration process resulting in confusion of rules. Alade and Oduwaye (2012) identified capacity building on urban land use management as a major constraints to land use efficiency in Nigeria.

In the light of the foregoing, there is no existing work on the implications of land use changes in Lagos, thus this paper essentially investigates of the implications of the present fragmentation and abuse of land use in metropolitan Lagos. It unravels the consequences of this on the quality and optimum utilization of scarce lands in metropolitan Lagos. In a situation where land, the most fundamental resources of all is being developed and exploited without critical and scientific assessment, it is imperative that land use planning and development should become of prime concern of the Lagos community and the government. The pride of place desired by efficient urban land use planning development, administration and development control has been stressed by many urban land use scholars and practitioners. For example, Olajuyin (1997) reiterated the need for efficient town planning practice and professional responsibility in Nigeria. Ibitoye (1997) also presented a similar view in his study on intra-regional planning implications on the provision of physical and social facilities in local government headquarters and their settlements in Ondo State of Nigeria. Makinde (1998), analysis of the state and local government roles within the context of the Lagos State Urban Regional Planning Board and Town Planning Authority, Edict, 1997 concluded that there is need for efficient and smooth inter-government relationship at all levels in order to achieve efficient land use planning and development in Lagos. In line with the view of Makinde (1998); Kadiri (1998) identified the need for good relationships between the state and the local planning authorities as basic prerequisite for successful land use planning in Lagos. The import of these planning experts centered on the fact that land use planning problems in Nigeria cities is more of management and administration of land use. There is need to appreciate the consequences of uncoordinated and unethical practices in the area of land planning, control and development. Specifically this paper discusses the physical development process of different land uses with residential, commercial, industrial, educational and institutional, circulation, parks and gardens. The implications of the present physical development process in Lagos are also discussed with suggestions on how to improve the present nature of physical development.

3   THE CASE STUDY AREA AND RESEARCH METHODOLOGY

Lagos Metropolis is located in the south-western part of Nigeria. It is the largest metropolitan area in Nigeria (Ayeni, 1979). Lagos metropolis lies generally on low lands, with about 17500 hectares of built-up area. The approximate population of this area is more than 18 million people. The projected population by the year 2015 by the United Nations is 24.5 million. The projected average population density of the built-up area of Lagos metropolis is about 20,000 people per square kilometer. The significance of the role of Lagos is due partly to her historical and cultural background and partly to her former role as the seat of the Federal government. It also owes its growth and development to European colonial influence.

The data used were from both primary and secondary sources. A total of 755 questionnaires were administered covering all categories of land use types in the study area. Data collected were analyzed through the use of correlation analysis with the aid of Spearman's correlation to establish the relationship between socio-economic characteristics of respondents and land use in the study area. Further analysis on the determinants of residential land values was done with the use of principal component technique. The outcome of the analysis shows that out of the six variables economic, sociological, cultural, environmental, infrastructure and institutional factors, infrastructure and the economy are the major factors influencing land use in Lagos.

4 DETERMINANTS OF URBAN LAND USE

There are many factors influencing urban land use. These factors can broadly be classified into six. They are social, cultural, economic, environmental, infrastructure and institutional factors (Litclifield, 1974). Socio-economic factors influencing urban land use can be viewed from the sociological, geographical, and economic perspectives. To the sociologist, it is the human being, his psychology, which is the key to the process structure and pattern. Other specific social factors influencing land use are quality of neighbourhood, security, prestige, taste, ethnic and social factors. The geographer places emphasis on such things as relief, elevation, climate, location and geology. The economist suggests that it is the economies, which are to be obtained from using a particular piece of land, for example from its accessibility, and centrality that influence land use. The economist also considers the issue of scarcity, demand, nature of use, agglomeration economies, expected revenue, speculation and intervening opportunities. Also cultural factors influencing land use include ethnic origin, religion and tradition. Rapoport (1977) noted that individual aspiration to achieved culturally derived satisfaction, also affect land use.

Environmental factors influencing land use are nature of environment, climate, soil, topography, drainage and quality of water bodies. For example, topography affect amenity ranking though this could vary from family depending on their composition and preference. Topography could have a bearing on land use through its effects on development cost. Also the nature of existing land uses such as seaport, airport, institutions and business areas which generate employment increase demand for land and therefore property value. Critical to urban land use decision is also the level of infrastructural facilities in different parts of the city (Litclifield, 1974). The influences of these factors have been supported by Ayeni (1979), in his study on Lagos during which he attempted a study on the spatial interaction and structure of Lagos. Also in a study by Olaore (1981), during which he established the land value trend in Kaduna, the influence of infrastructural facilities was also confirmed. Basically the following facilities are critical to determination of urban land use, namely, access roads, good drainage, electricity and public water supply. Where these facilities are adequately available, the land values will be high in such areas. Institutional factors affecting urban land use include local customs, traditions, law, organizations and other institutions of human society. Among planning instruments which influence land use are the master plan, zoning regulations, rent laws, land acquisition policies, sources of title and type of tenure.

5 DATA ANALYSIS

The research analyzed the determinants of land use in Lagos with the use of principal components analytical technique (see Table 1). Since the principal components technique produces components in descending order or importance, therefore its adoption in this study is an aid in reducing the variables into fewer numbers which account for as many possible variations among the original variables. The results of the application of these techniques are discussed in the following section.

VAR1	Economic factors as a factor influencing land use
VAR2	Sociological factors as a factor influencing land use
VAR3	Cultural factors as a factor influencing land use
VAR4	Environmental factors as a factor influences land use
VAR5	Infrastructural factors as a factor influencing land use
VAR6	Institutional factors as a factor influencing land use

Table 1: Variables used in Factors Analysis. Source: Field Survey, 2012

Table 2 shows the correlation matrix of the linear association between the variables. The coefficient that is + 0.500 or greater shows a high level of co-variation between the variables involved. Also, coefficient ranging between + 0.400 shows the moderate level of correlation, while those between + 0.100 and + 0.200 indicate a weak level of correlation. Those lower than +0.100 shows little or no linear correlation.

Variables	1	2	3	4	5
1	1.00				
2	.709	1.000			
3	.530	.633	1.000		
4	.722	.504	.594	1.000	
5	.693	.512	.601	.582	1.000
6	.711	.495	.482	.703	.762	1.000

Table 2: Matrix of Correlations. Source: Field Survey 2012

First, it is necessary to state that 95 variables were used for the analysis. For the purpose of this paper the six variables have been isolated as basis of analysis in this study, thus the moderate level of correlation observed in Table 2.

The results obtained in the matrix of correlation in Table 2 shows that all the variables have high degree positive relationships with one another. This is a confirmation of the validity of the determinants of urban land use as established in literature. The score on the relationship between infrastructure and institutional factors shows the highest positive association with a figure of .762. This means that improvement in infrastructural facilities especially roads has been due to pronounced institutional support in the study area. Also the relationship between the following recorded very high degree of positive relationship: economic and sociological factors (.709), economic and cultural factors (.722), economic and institutional factors (- 711). The implications of the above is that improvement in institutional support and infrastructure will be expected to bring about sustainable land use, while improved economic situation will result into effective implementation of planning regulations and land use. Generally the lowest correlation interrelationship figure recorded as .504 is for the relationship between sociological factors and environment. This is still within the range of high coefficient level of co-variation. This means that all the factors identified as basic to influencing land use in Lagos have high level of co-variation relationships.

A further analysis of these variables was done through the application of principal component technique aimed at making each factors independent of each other.

Factors Number	Eigen Value	% of Variance	Cumulative % of Variance
1	4.231	60.471	60.471
2	1.742	17.134	77.605

Table 3: Extraction of Initial Factors (Components)

Table 3 shows the result of the extraction when the six variables (determinants of the land use) were subjected to principal component analysis. The six factors have been reduced to two which give accounts of all the other factors. The first components are renamed infrastructural facilities and the second component renamed economic factors. It can be observed in Table 3 that the first factor has an Eigen 4.231 which is the relative magnitude of variance accounted for by the first variable. Usually the first Eigen value accounts for the highest variance in the data set. The first components also explain 60.471 percent of the variance in the data, while the first two components account for 77.605 percent of the variance in the data. As discussed earlier that the aim of the principal components is that of data reduction, thus not all the components or factors influencing land use in the study area are retained in the final rotation solution. The first two components which account for 77.605 % of the variance is retained. This is based on the criterion that the two factors components have at least 5 % of the total variation based on Spence's specification (Spence, 1968).

Variable		Factors	
		1	2
VAR5	Infrastructure Facilities	.871	.263
VAR1	Economic Factors	.862	.157
Eigen Values		4.286	1.264
% of Total Variance		60.141	17.314
Cumulative % of Total Variance		60.141	77.455

Table 4 revealed the component loading for each primary variable of each of the components when they are subject to varimax rotation. Note: Loading that is equal or greater than 0.40 are considered to be high.

The interpretation of the loading is the same as it was done is the correlation coefficients. Factors loading of 0.401 and more are considered to be high. This is also in agreement with Spence (1968) who considered 0.40 as a cut off level for high factor loading. Based on this, the first factor which accounts for 60.141 of the total variance loads highly on both infrastructural facilities and economic factors, whereas the second factors which accounts for 17.314 % of the total variance loads relatively low on both infrastructural facilities and economic factors with figures .263 and .157 respectively. The implication of these figures is that

infrastructural facility improvement and economic factors are highly related in factor 1, while they are weakly related in factor 2. The implication of this is that where there is improvement in infrastructural facilities there is expected to be improvement in economic variables, usually this will manifest in form of increase in revenue on landed properties.

6 LAND USE DEVELOPMENT PROCESS IN LAGOS METROPOLIS

The land use and settlement pattern of Lagos in the last twenty-five years can be highlighted through the review of different land use categories namely: residential, industrial, commercial, industrial, educational and institutional, religious, circulation, parks and recreational areas.

6.1 Residential Land Usr

The noticeable major determinant of residential development in Lagos is that of accessibility infrastructure (road) and land value. This is in agreement with what has been identified in literature and these are among the variables identified and analysed through the principal component technique. The land value could be in terms of rent, cost of purchase of apartment/house and cost of residential land plot. Motorway corridors are major determinants of urban residential growth. The Lagos-Badagry, Lagos-Abeokuta and Lagos-Epe expressways attract indiscriminate physical development in all directions. The nature of the indiscriminate development is further compounded due to the mass land acquisition by both the state and federal government, which in most cases are not followed up with appropriate schemes through which the people can easily purchase land and develop in compliance with such schemes. Thus, illegal land development, predominantly of residential use continue to spring up in response to ever-rapid population growth especially in the fringe areas of the metropolis. The phenomenon is common in the urban fringe of Isheri in the north; Ikorodu and Ajegunle in the north east; Ojo-Badagry Axis in the south-west; Alagbado, Ipaja in the north/west and Lekki region in the south-east. However it does not mean that all residential buildings springing up in these areas are not approved by relevant government planning agencies of either the local, state or federal government. The case is that most of these structures are not in approved layouts. Some of them are also on acquired government lands.

Land which residential building can be built without contravening exist planning regulations are scarce or are not in accessible locations therefore, the policy of government towards residential land development should be re-examine to take care of these noticeable deficiencies. Another type of residential units and support facility phenomenon is the filling-in of existing un-used spaces especially in older inner city areas. For example the second Republic civilian government (1979-83) regime in an effort to achieve the policy of Universal Primary Education (UPE) was confronted with acute shortage of classrooms. The government embarked on quick response through construction of classrooms on available urban open spaces. These spaces were areas earmarked and use as public open spaces and recreational areas in many residential neighbourhoods. Thus urban open spaces have virtually been eliminated from the Lagos landscape.

6.2 Commercial Land Use

Lagos is not only the leading commercial nerve center of Nigeria but also that of West Africa. Lagos metropolis, has the potential of becoming the leading Africa center of trade. Many areas specifically earmarked in the metropolitan Lagos master plan for commercial development have not been developed. This has been due to the low level of economic activities in the country generally. Hence, the demand for high quality commercial premises, which could have emerged from such schemes, could rather be low. Therefore these have led to a situation where illegal conversions of buildings especially those along major roads and streets have generally been embraced by property owners. This is common in residential areas especially in traditional core areas and high-density residential areas. Lagos is presently characterized by commercial ribbon street development such that virtually all high-density areas are in a chaotic state with indiscriminate mix of commercial, light industry, transport and religious land uses. The phenomenon of chaotic land use mix deserves special attention in any future regional and master plan scheme of Lagos. Also, existing commercial places especially markets mainly under local government administration in the city are being expanded without due compliance with appropriate planning regulations such as car park requirement, set-backs among others.

6.3 Industrial Land Use

Except for the new Ikorodu Estate and Lekki Free Trade Zone there is no new industrial estate development in the last two decades. Again, the reason for this is not farfetched. It has been mainly due to the economic downturn of the country and government's lukewarm attitude. Existing industrial premises are characterized by sealed up factories, factories being converted to mere warehouses and to religious worship centers especially churches. The reasons for this is that the operation of most of the existing factories require very huge amount and the import liberalization policy of government in compliance with globalization principle has made local production unprofitable, thus manufacturers prefer importation of finished goods. The few operating factories are not operating at full capacity of their installations. The implication of this is that there has not been remarkable industrial land expansion in the city. This will require special attention, as industrial operation is the engine of growth and development because of their multiplier effects on income, savings and development of other land uses. However, the Lekki Free Trade Zone implementation construction commenced recently. Judging by the political will and commitment by the Lagos State Government there is prospect for the physical manifestation of the idea.

6.4 EDducational and Institutional Land Use

As earlier mentioned in the section under residential land use development, the state government encouraged the development of physical structures to provide more classrooms mainly at the primary and secondary school levels. Also the liberalization of education at all levels in which the private sector is allow to establish and manage educational institutions has increased substantially the land area occupied by educational uses. However, land space for most of the private sector educational institutions are through the conversion of existing buildings especially residential to educational uses. Few buildings are approved and constructed for educational use. Most of the new buildings specifically approved for educational uses are on plots earmarked for residential apartments thus compromising appropriateness and efficiency of location of educational facilities. Any meaningful future plan of the city should detail the pattern of their locations and enforce planning standard requirements of existing educational facilities at all levels. This problem is more pronounced with nursery/primary, vocational and secondary schools.

Institutional land uses also witnessed significant landmark effects in two areas the construction of the new Lagos State Secretariat at Alausa and the movement of the nation's capital to Abuja. Therefore, the spillover effects of the state secretariat on other land uses has been remarkable. Ikeja, the location of the State Government Secretariat has witnessed tremendous growth of commercial and institutional uses while traffic congestion has become a major problem. In the case of the seat of the Federal Secretariat at Ikoyi, the area has witnessed significant drop in traffic due to the movement of the seat of Federal Government to Abuja. The establishment of the Lagos State University in Ojo has its impact on trip generation and distribution, around the Ojo origin. Aside from these three major landmarks of institutional changes, Lagos has no other significant institutional land use changes.

6.5 Religious Land Use

Historically, this has always been part of residential facilities in the land use structure of Lagos except for few religious locations within commercial districts such as in Lagos Island and Ikeja. The major and significant phenomenon recorded in this land use class has been tremendous development of religious places in every nook and corner of the city especially in built-up residential areas. Churches and mosques are the most prominent features. An average of about ten places of worship of various sizes can be observed per square kilometer of any built-up residential area except in government and private estates. The number is higher in high-density residential areas. This is a major problem especially when consideration is given to the mode of worship with loud speakers, which are installed outside the buildings, thus generating high level of noise during services. Other problems arising from these unapproved places of worship include vehicular congestion and heavy human traffic problems of which car parking is a major aspect.

6.6 Circulation

By the turn of the 19th century bridges constructed mostly of timber had been completed to link Lagos Island with Iddo known as Carter Bridge and Denton Bridge, both are no longer in existence. Both bridges have been replaced by new dual carriage ways with concrete median separators. The Lagos railway started under the management of the Nigeria Railway Corporation in 1896, with its terminus at Iddo. The rail lines run in a

north-south direction and still maintains the steel track of the pre-colonial type. It still maintains the steel gauge tracks of the pre-colonial type. Road network development started in the second half of the 19th century with the initial opening up of the Marina. The administration of governor Glover opened up the Broad Street in Lagos. He also linked up then Victoria Street (now Nnamdi Azikwe Street) with the mainland in 1866. By 1900 the city had about 15 kilometers of road over which horse drawn carriage were pulled. By 1946 two main arterial roads of greater Lagos had become prominent links with the hinterlands. They are the Ikorodu Road and Agege Motor Road both of which run in north-south direction with the Agege Motor Road running parallel with the railway line.

Road network in Lagos can be classified into three broad types namely the expressways, major arterial roads and other roads which serve as access and collector roads. Existing express roads are Ikorodu Road, Fusho Williams Avenue-Agege Motor Road-Abeokuta Express Road and Apapa-Oshodi-Oworoshoki Express Road. The complex network of bridges on the Lagos lagoon connect various parts of the island to the mainland with the most important line being Eko Bridge which links the commercial core of the Idumota on the island to Oyingbo in the mainland with a length of about 11/2 kilometer. The Third Mainland Bridge completed in 1991, is about 10 kilometer long. It is reputed to be the longest bridges in Africa. It links the Oworoshoki end of the mainland to various parts of the island of Ikoyi, Victoria and Lagos Islands. The Third Mainland Bridge is the busiest of all the bridges with a peak periods of between 7-10a.m and 4-30p.m, respectively during the working days on Monday to Friday. It has increased tremendously accessibility and economic activities in Lagos. The Lagos-Ibadan Expressway is in the northern boundary of the metropolis. It serves as the major link of vehicular traffic out of Lagos to other parts of Nigeria. The Lagos-Epe Express and the Lagos-Badagry Express Way located and runs towards the east in the south/east and the latter towards the west in the south-west are also major traffic routes. The recent commencement of the construction of light rail running parallel to the Lagos-Badagry expressway will enhance development along this region. Two airports serve Lagos, Murtala Muhammed Local and International Airports with both of them located at Ikeja, the capital of Lagos State. Also two major seaports serve Lagos. They are the Apapa Wharf and the Tin Can Island Port. They are both linked with the Apapa-Oshodi Expressway.

6.7 Lagos Parks and Recreational Land Use

Prior to the development earlier mentioned regarding educational institutions, the construction of schools on open spaces were common in the late 1970's. Ample parks and open spaces existed in Lagos despite the fine texture of the urban morphology. During the colonial periods more attention was devoted to the development of Ikoyi as a garden suburban coupled with the development of private commercial and club recreational grounds such as the Race Course now Tafawa Balewa Square, the King George IV Stadium now Onikan Stadium, the Ikoyi Golf Course and the Government House Garden, the National Stadium and the recently completed Thunder Balogun Stadium at Surulere. The earlier forms of European gardens which later influenced greatly the present landscape style of Lagos existed before colonization. They were the gardens and plantations developed around the traditional forts built by the European Merchants. They were mainly utilitarian gardens devoted to the cultivation of exotic food crops and fruit trees. Few of them had summer houses. During this time the forces and taste influential to the development of Renaissance gardens in Europe were already at work. Some of these early gardens had traits of the garden styles peculiar to the countries of the European merchants who built them.

The colonial landscape of Lagos will not be complete without the mentioning of the government reservation area (GRA). The principle of the GRA development can best be illustrated by the description given to its by Lord Lugard in 1904. According to him the European Reservation Areas now known as GRA should be developed as a cool fruit and flower garden where one could sit on a shady verandah in the privacy of one's own home. Extensive public open spaces with recreational grounds and sports field would be near both office and home, reached by shady pathways. The GRA's were the European government version of the garden city in Nigeria. The products of these are houses to be seen in the older GRA's such as in Ikeja. They were built in the then remote areas but have been surrounded by built-up neighbourhoods due to urban sprawl.

After independence in 1960, new landscape features continued to reflect the British styles. Many landmarks to commemorate the independence anniversary were built in form of statues and gardens. The early post-colonial landscape features include the Tinubu Square fountain, the remembrance arcade and the Tafawa

Balewa Square. The Ibrahim Babangida Boulevard Obelisk was built in 1991. Unfortunately, modern Nigerian landscape movement started in Lagos, today it has very little to show for it in the area of public gardens and parks. Existing parks and open spaces can be found along Lagos Marina which has been blighted by the construction of hard concrete fly-overs. The beaches of Bar Beach, Lekki, Badagry are areas that should be improved. A few recreational grounds and local parks have been developed in recent times by private clubs, social and non-governmental organizations and many private residential estate developers. These renewed efforts should be sustainable through government facilitation effort. Recently government embarked on city-wide massive landscaping and this has significant impact on the greenery of Lagos. Many new parks are constructed, among which are Gani Fawehinmi and Moshood Abiola Garden.

The "Nigerian Urban Planning Decree No. 88, 1992" is a rescue mission legal framework which should substantially improve the quality of the environment in all parts of Nigeria including Lagos. The establishment of the Lagos State Urban Regional Planning Board and the various Local Planning Authorities will no doubts lead to sound land use planning in all parts of Lagos. The prospects of good landscape rest solely on the local planning boards. Local Planning Authorities should exercise the enforcement power provided in the law establishing them in order to achieve remarkable level of land use compliance by the public. Reduction of taxes and levies by government for environmental friendly organizations could be used as incentives to encourage environmental improvement.

7 DISCUSSION ON LAND USE CHANGES IN LAGOS

Land use changes have been gradual over twenty-five years and sporadic in the past ten years across the entire Lagos Metropolis. However, the genesis of the dynamic land use structure has a humble beginning as at 1910. The society was simply not properly monitored because there was no formal planning authority in place. Thus spatial coverage of Lagos was limited around the present day Lagos Island Local Government Area.

The land use structure has changed from the former simple pattern to a complex pattern. This was as a result of intense and widespread urbanization. Though, as at this period planning and development activities were guided adequately by the Lagos Executive Development Board that later transformed to Lagos State Development and Property Corporation. Socio-economic characteristics played major roles in the ordering of the land uses. The result of this was segregation of human settlements based on socio-economic status. The spatial extent of Lagos Metropolis has greatly increased, likewise intensity of land use. The land use pattern that ensured in 1970 revealed a linear settlement pattern using the major roads and the railway line as points of origin. Again, the land use structure had a central business district in Lagos Island and the intensity of use has also improved. In the 1980s land use structure for a potential metropolis has ensured. The land use structure before the preparation of Lagos State Regional Master Plan and subsequently Metropolitan Lagos master plan was beginning to generate attention because there were widespread urban problems as a result of uncoordinated urban development and inadequate development control. The roads network was extended and improved upon to cater for the prevailing urban problems. The districts were characterized by diverse socio-economic conditions (such as income, population density, building conditions, poverty level, development potentials, economic base and predominant land use). A multi-nuclei urban center was in its embryonic stage. The spatial coverage was largely influenced by population size and development needs. Lagos Metropolis witnessed one of the highest levels of urbanization between the periods of 1980 to the present time. This is due to globalization trend in economic activities fuelled by advancements in science and technology in the area of information technology, the global economy, telecommunication, resources utilization and management.

Specifically, the most noticeable effect of globalization within Lagos cityscape is radical shift in the land use pattern. The high dependency of the city economy on imported goods, has led to a massive depletion, within a decade, of industrial enterprises with its attendant erosion of job opportunities. While industrial land uses are decreasing however, alternative uses, chief among which are religious in nature, are rapidly taking the place of industries, churches especially are in the forefront. It is thus a common phenomenon to see churches occupying entirely an area hitherto used as factory or partially occupying a significant portion of such premises. Such religious places have their peculiar complementary accompaniments such as weekly heavy traffic. Many commercial premises in different parts of the city have also given way to religious land uses. The reason for this is that churches seems in the prevailing circumstances, to be the land use capable of

affording the rents demanded by property owners, the service sector having been economically weakened as it were, by forces of globalization. These phenomena can be described as change of use of existing buildings.

Change of use of existing land use zoning plan is common feature. The city is now dotted with uncomplimentary land uses in many areas. This is common with uses such as multistory office blocks within residential neighbourhoods. This is contrary to basic urban land use theories, which discourage intrusion into privacy of residential areas. This aside from being an intrusion into household's privacy is also a security risk. The heavy traffic which accompanies such invasion also violates residential neighbourhoods. Aside from multistories within residential areas, petrol filling stations and fast food outlets are other common features observable within the Lagos cityscape. Surprisingly however, most of these anomalous land uses have the approval from appropriate government planning agencies. In a sense, physical planning contradictions in the city are exigent response to the negative impact of globalization on Lagos economy. With industries being frustrated out of business and jobs drying up, government revenue through company tax and personal income tax is correspondingly dwindling. In search of new sources of revenue, government, it may be argued, is forced into unorthodoxies in revenue generation. Since these new uses are capable of paying the necessary levies, taxes and other financial returns to government naturally, they are supported by government. It is however mandatory for these new uses to apply for change of land use, process the new building plan, pay specific fee for the changes as well as pay company and personnel taxes. Thus the changed landscape is the result of economic needs on the part of government and individuals. Again as identified in literature and confirmed in the analyses economic factors and institutional variables have significant influences on the Lagos land use structure. The influence of infrastructure is more pronounced, especially with its negative effects on industrial land use.

With the decline in the formal sector of industrial and formal service industries, the informal sector has emerged as the dominant feature of the cityscape. Usually in the form of scattered small-scale service points. The bulk of the informal sector usually operates along major roads and within neighbourhoods. This sector has also assumed the services formally provided by supermarkets, furniture sales shops, electronic stores, hardware shops etc. Following the demise of the formal sector, which these units of business were a part, it is important to reiterate here that the collapse of these formal service units is due to globalization, which has eroded local industries, which used to produce the goods sold at these shops but which can no longer do so because of their non-competitiveness within a globalize economy. Since the informal sector can afford to offer similar services at lower prices made possible by relative lower overheads, of the doubtful quality of the goods, they become the only available avenues for consumer, even at high risk. The Lagos streetscape is dotted with small scale sale shops offering a wide range of services from household items, electronics, furniture, hardware, and cobbling, packaging and sundry cottage manufacturing industries. In the market sector hawking, itinerant salesmanship and home trading thrive while in the service sector catering, telephony service, hair-care, vulcanizing, motor mechanic etc dominate. The city landscape is in fragments of dirty production and service points with no regard for land use zoning. As with changes in land uses, the informal sector is now a major source of revenue for government at the local level. Informal enterprises are closely monitored to pay sales tax by local government authorities. It can be concluded therefore that the informal sector is currently a major provider of employment in Lagos.

All these have profound impact on the land use structure that ensured. Presently, a multi-nuclei urban pattern has emerged with its spatial coverage extending greatly into the hinterlands. The recent land use trend produces lateral expansion into neighbourhoods sub-urban centers (Mowe, Ikorodu, Sango-Ota, Okokomaiko, Ajah etc). The possibility of a conurbation is being studied with regards to other urban center such as Sagamu, Abeokuta, Ifo among others within the next ten years. The land use structure has grown to a very complex nature with associated dynamic urban problems.

8 PLANNING IMPLICATIONS OF FINDINGS AND SUGGESTIONS

The only major comprehensive master plan of Lagos was prepared in 1985 but unfortunately the detailed district plans were never prepared. The master plan was reviewed two years ago but attempts to prepare a new one has not been initiated. The uncontrolled urban sprawl prior to the preparation of the master plan continued. Rapid development continues to feature prominently especially at the northern part where land is firm and not as water-lodged as it is in the southern end where this led to high cost of physical development. The Lagos-Badagry, Lagos-Ibadan and Lekki-Epe expressways continue to attract physical development

indiscriminately in all directions. The nature of expansion is further complicated by government mass land acquisition policy which is not followed up with appropriate schemes through which the people can purchase land and develop in compliance with legal requirements. Therefore illegal structures continue to spring as the increase populations have to respond to natural need for shelter.

Previous government policies do not improve the situation as illegal building owners are made to pay penal fees which they are always ready to pay. Therefore unplanned neighbourhoods continue to emerge. Tremendous invasion of the suburb in many-regions such as Lekki in the south-eastern part continued. Towards the north-west, the situation in Ikotun, Ipaja, Agege, Abule-Egba, Ojokoro are worse mainly with residential buildings. Towards the north-east the nature of the riverine serves as a check against indiscriminate construction. Nonetheless pronounced illegal building constructions are common. All these do not necessarily mean that buildings are not approved by the planning authorities. Land on which people can build without contravening existing regulations are scarce, therefore the policy of government towards land development deserve immediate overhaul, if the people are to build houses without contravening planning legislations. The second types of development are the filling-in of the existing un-used spaces within the urban fabric. Abuse has been from both government and the people. For example the second republic civilian regime in an effort to achieve the policy of Universal Primary Education (UPE) was confronted with acute shortage of classrooms. It embarked on quick response through construction of classrooms on available urban open spaces earmarked as public recreational spaces in old neighbourhoods layouts. The state civilian government has filled in such spaces with classrooms blocks in virtually all parts of the metropolis. Thus, virtually all open spaces in the urban fabric disappeared leaving no meaningful community recreational open spaces in Lagos Metropolis. Today Lagos appears practically full of hard landscape in the built-up areas without any appreciable neighbotirhood open spaces, neither parks nor gardens. This has serious consequences on the recreational life of the inhabitants.

Most of the negative observations such as conversion of open spaces to other uses, non-implementation of plans, abuse of planning standards can only be overcome through the preparation of either a new master plan or preparation of schemes at local or subject plan levels eventhough piece meal district plans are currently embarked upon by the government. This will require sustainable strong political will and building of appropriate human capacity, modernization of development approval and monitoring system. There is also need for effective public participation. The complexities surrounding the mechanism sustaining Lagos physical development have become more difficult to understand.

9 CONCLUSION

From the discussion above it is clear that appreciable physical development have taken place in Lagos from the pre-colonial period to the present lime. A critical study of the land use shows that they have largely been influenced by western styles. The indigenous planners are yet to come-up with distinct style rooted in our traditional land use planning. However we can appreciate the complexity of the problem through the historical background of modern education in Nigeria which was based practically on British background. Also other problems that should be resolved in order to overcome the present constraints include adequate finance, social factors, manpower, cultural factors, geomorphic and legal problems. Majority of the people are poor therefore emphasis should be on functional physical development such as prevention of flooding, housing, environmental sanitation, parks and gardens, paved pedestrian walkways, tree planting amongst others.

10 REFERENCES

Adindu, G. O. and Ogbonna, E.F, (1998). The Dilemma of Urban Expansion: Case Study of Owerri, Journal of the Nigerian Institution of Town Planners, XI, 43-55.

Alade, W. and Oduwaye, L (2012): A Review of Planning Education and Research in University of Lagos. OOU Journal of Engineering and Environmental Studies, 3 (1): 5 – 11.

Aluko, B.T and A. R. Amidu, (2005). Globalisation, Land Tenure and Land Market Transition in Nigerian. Proceeding of Globalisation, Culture and the Nigerian Built Environment 11,25-30

Ayeni, B., (1979). Concept and Technique in Urban Analysis, London: Croom Helm.

Aderibigbe, A., (1975). Lagos: The Development of an Africa City. Lagos: Longman

Fawehinmi, A. (2002). Property Conversion in Nigeria: A Case Study of Conversion in Akure. The Lagos Journal of Environmental Studies 4(1) 52-60

Frishman, O., (1977). The Spatial Growth and Residential Location Pattern of Kano, Unpublished Ph.D. Thesis, North West University, Department of Economics Evanston Illinois.

Kadiri, W.A. (1998): Past. Present and Future Challenges of Physical Planning in Lagos State. Seminar Paper on implementation of Lagos State Urban and Regional Planning Board and Local Planning Authority Edict 199 7. The way Forward, Lagos State Ministry of Environment and Physical Planning. 10-31.

Ibitoye, O.A. (1997). The Intra-Regional Planning Implications of the Provision of Physical and Social Facilities in Local Government Headquarters and their Borderland Settlement in Ondo State Nigeria, Ife Planning Journal. 1(1) 97-106 Litchfield, N. (1974). Economics of Planning Development. London Estate Gazette.

Mabogunje, A.L. (1968). Urbanization in Nigeria. London: University of London Press.

Makinde, R. (1998). State of Local Government Role with the Context of the Lagos State Urban and Regional Planning Board and Town Planning Authority Edict, (1997), seminar Paper on Implementation of Lagos State and Regional Planning Board and Local Authority Edict 1997: The Way Forward. 1-12.

Miller, N. (1963). Aspects of the Development of Lagos, the Nigeria Fields, Lagos.

National Population Commission, 1991. National Population census, Government Press, Abuja.

Oduwaye, L. (2006). Effect of Globalization on Lagos Cityscape. Research Review 22 (2): 37-54.

Ofogba, V. (2011). Investigation on Land Tenure in Nigeria in Improving Land Sector Governance in Nigeria, Implementation of the Land Governance Assessment Framework ed. Adeniyi P. O. 186 – 188.

Okewole, L., A. (1998). "Environmental Restructuring in planned Residential Setting: The Case of Bodija Estate". Ife Planning Journal, 1 (1) 97-106.

Okpala, C. (1981), Residential Mobility in Nigeria Cities: An Explanatory Analysis, in Nigeria Institute of Social and Economic Research Monograph Series No. 18,Ibadan.

Olajuyin, L.O (1997), Town Planning Practice and Professional Responsibility, Ife Planning Journal, Obaferni Awolowo University, Ile-Ife. 1(1) 39-48.

Olaore, G.O,(1998). Values of Land and Rentage of Shelter in Nigeria Urban Areas: A Case Study of Kaduna. Niser Monograph Series No 19, Ibadan.

Omirin, M.M. (1998) Land Accessibility and Low Income House Building Activity in Metropolitan Lagos, Lagos Journal of Environmental Studies. 1,76-91

Oyesiku, K. (2002). City Consultation Process Paradigm and Urban Poverty Alleviation. Journal of the Nigerian Institute of Town Planners, XV 85-96

Oyesiku, K. (2002). From Womb to Tomb, 24 Inaugural Lecture of Onabanjo University Ago Iwoye Nigeria.

Rapoport, A. (1977) Human Aspects of Urban Form Towards A Man-Environment Approach to Urban Form and Design. New York: Pergamon Press.

Sada, P.O. (1979) Residential Land Use in Lagos. The Relevance of Traditional Models. Africa Urban Notes,2(1) Lagos.

Spence, N.A. (1968). A Multi-factor Uniform Regional of British Countries. Regional Studies 2, 81-104

Valuation Cycles Of Pre Industrial Townscape

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1 ABSTRACT

The townscape is the morphological expression of urban life in its local individuality and its historical complexity. It has a holistic structure, and the formative parts penetrate to different degrees. Human conscio¬usness always evaluates the urban physical structu¬res anew. The aesthetic and documentary component will change with the spirit of the time.

The shape of occidental towns was formed in pre-industrial building periods through

- a high degree of continuity of the ground plan patterns since the times of settlement
- an adaptation of the architectural styles of the pre-industrial eras in a specific local manner.

Whereas in pre-industrial times the physiognomy of occidental towns was characterized by high degrees of persistence, there were more degrees of freedom between radical transformation and adjoining regulations in the further development since the beginnings of the industrial era. These topics brought the fundamental question about the reflection of pre-industrial townscape due to the later building periods. In a heuristic manner the model of a cycle theory has been tested for the change of paradigm.

The fundamental fact of the evaluation is the identification of almost two synchronic cycles, which started with a period of disregard and later turned into a period of adaptation of the local architecture. The inner break of the two cycles in Central Euro¬pe can be dated about 1957, the inner changes around 1900, and around 1970 with slight changes in different regions. The two cycles show some similarities in their inner development. However, in the second cycle the proceedings for disregard were characterized by a more drastic vigour, and the instruments to main¬tain tradition were much more careful.

In analogy of both cycles, one could visualise that the present confession of the public towards the hi-storic repertory of forms may lose its fascination, and a change to a third cycle will take place. There are opinions that a certain inflationary protection of monuments and a much less creative architecture of adaptation has arisen from the genius loci. In the present time, the human-interest pretence of history is even effective, nevertheless it is not only contrary to historic mentality, but may also be the germ that at any time could cause people to turn away from history again.

2 INTRODUCTION

The townscape is the morphological expression of urban life in its local individuality and its historical complexity. The configuration has a holistic structure and the formative parts penetrate to different degrees. Human consciousness always evaluates the urban physical structures anew. The townscape itself may be a significant viewpoint of such an evaluation .The aesthetic and documentary valuation will change with the spirit of the time, or to quote Faust in Johann Wolfgang von Goethe's drama:

"What you call the spirit of the time

is in reality the own spirit of men

in which the times are mirroring themselves".

The shape of occidental towns was mostly formed in pre-industrial building periods by means of:

- a high degree of persistence of the urban pattern got underway after the time of settlement
- the adaptation of the architectural styles of pre-industrial eras, in a specific local manner.

There were more degrees of freedom between radical transformation and homogenizing regulation at a later date. These given facts should be followed by the fundamental question about the reflection of pre-industrial townscape due to the later building times. In a heuristic manner, the hypothesis of a twofold cycle has been tested for a change of paradigm, with respect to the further influence on the traditional townscape.

The immediate past, the perspective of which is often not seen very clearly due to a lack of distance, was often fiercely criticized. In the analysis, the adaptation of the townscape tradition swung between "yes" and

"no" and therefore, a detached attitude is taken, particularly as a momentary point of view could prove to be a transitional one.

The findings are based on an analysis of the townscape of selected occidental urban cores in Northern und Central Europe. This paper will explicate the model of the town of Lübeck, former Head of the Hansa, the core of which is particularly suitable for such a consideration, for three reasons:

- the town centre has been changed only in such a way that the pre-industrial shape is highly persistent up to the present day, despite impacts of urbanization.
- precise order and functional conciseness in the townscape could suggest the possibility of a later interference in a normative comparison in the present building fabric.
- local literature and planning material could elucidate epochal intentions regarding the townscape.

3 THE CASE OF LÜBECK

The configuration of the townscape of in the core of Lübeck results, on the one hand, from a continuity of only few planning ideas during a time of intensive settlement in the Late Middle Ages and, on the other hand, from an increasing lassitude as a consequence of a lack of economic growth forces during the early modern times. The townscape of Lübeck on the hill between Trave and Wakenitz was fixed by a precise urban pattern, not schematic, but nearly regular:

- Types of streets

The only incomplete regular network consists of backbone streets, rib-streets, and transverse streets beset by fringe streets and it is additionally extended in the more peripheral areas by aisles (Gänge) into the blocks.

- Types of plots

The pre-industrial pattern of plots is formed out of elongated broader and narrower non- standard plots whose former backside plots are cut off in many cases, as small plots to the borders of the streets and as plots of the Gänge within the blocks.

- Types of houses

The pre-industrial stock of houses of civic building blocks exposed to these streets consists of big and small gabled houses as well as of eaves houses exposed to the streets and Gänge. The houses of the different building phases are differentiated by modified division into compartments and changing architecture of the facades within almost unchanged constructions.

- Street space

The continuous alignment out of mostly the same types of houses with façades of different building phases results in widened cross profiles and curved longitudinal profiles in connection with the relief in well-proportioned and fully changing arranged spaces of streets.

- Roof space

The dominant attribution of the gabled and eaves houses to the forms of the street produced due to the ascending relief, is a sliding overlapping scale of almost equally oriented roof ridges into a roof space that is almost only disrupted in its uniformity in the backbone streets and along the north-western fringed streets.

- Skyline

As the basis for the topographically distinctive distribution of the monumental structures, the roof space is part of the skyline that is heightened in its impression by the surrounding watercourses and former fortifications.

Fig. 1: Lübeck Inner Core (May 2012, Ref.: http://www.zdf.de/ZDF/zdfportal/blob/4095768/1/data.jpg)

3.1 The First Evaluation Cycle

3.1.1   Period Of Disregard

In Lübeck, the beginning of urbanization coincided with the abolition of the function of the town gates in 1864. After a long period of economic stagnation, the community began to grow at an increasing pace. The degree of change was especially dependent on the capital at hand. In the expanding agglomeration, the city centre initially developed along the main roads of the old town. A construction boom began in the business area as well as on the periphery in a few speculative objects, such as tenement houses which replaced traditional houses. Most of the large scale public institutions were built on the sites of former cloisters and curiae – whose old building substance was often integrated.

Before the turn of the 20th century, in the Bismarck era (Hochgründerzeit), disregard the pre-industrial structures with new forms and on a large scale was considered liberation. Under most generous standards of building codes of 1865 and 1881, the density of the inner town expanded vertically rather than horizontally. The height of the houses was raised to such an extent that the scale of the traditional townscape was broken at many places. The new houses with tall and bare fire protecting walls were in disorder to the relatively homogenous sequence of houses in the streets. The steep tile roofs were mostly intermingled with the (nearly) flat ones of non-local materials. The facades of lavish historicism were broken by the almost plain front walls of the traditional houses. However, this was seldom the case with the speculative objects of tenement houses near the periphery, where simple facades with less ornamentation arose. The new large public buildings reflect international, more eclectic style elements. However, a crossover of traditional forms with a regional touch was not unusual in the process of vital history adaptation.

3.1.2   Period Of Adaptation

The construction periods from 1900 to 1950 are a strong commitment to tradition and a critical reaction to the intrusions of the Bismarck era. At the beginning of the 20th century, an awareness of the importance to continue the irretrievable historical townscape of the long established urban cores arose. This was not directed exclusively at the structures of highest historical and artistic value as in the past, but paid attention also to less significant buildings which bear witness to the pre-industrial period. The principle was adopted that an outstanding structure and its immediate environs enhance each other and that the townscape would be formed by the totality of all individual structures of different orders. With the "discovery" of the ensemble of buildings, entire historical city cores were declared monuments.

In Lübeck, the new appreciation of long-established culture was based on the complementary instruments of preservation of monuments and sympathetic architecture (Anpassungsarchitektur).

- In 1915, the first preservation order (Denkmalschutzgesetz) was passed and shortly thereafter, a significant number of pre-industrial houses were affected by the statute. The strength of the law lay in the fundamental preservation of the buildings; its weakness lay in the tight financial situation of the communes.

- The efforts to promote traditional architecture were underscored in 1901 with a "competition of facades" (Fassadenwettbewerb) which was announced by an "Association of Friends of Art". The outcome of 80 contributions was a locally specific metamorphosis of stylistic elements of historicism. However, a local traditional style (Heimatschutzstil) which was orientated on pre-industrial forms in a simple performance and only intended to emphasize the "traditional connections in character of the essential" soon became standard practice. In the 1930's, buildings of historicism so were classified as "construction sins" and some facades were "purified" of their décor.

From about 1900, the appreciation of tradition coincided with urbanization influencing the historical ground pattern more incisively. Plots were aggregated to larger units and streets were widened. The particular functional challenges which had repercussions on the townscape, apart from the growing location pressure on the main business streets, resulted from the following objectives:

- In 1905, in order to cope with the flowing traffic, several alignment plans (Fluchtlinienpläne) to broaden the streets were drawn up. In the process of new building construction, the main traffic streets were set back in conformity with the projected alignment.

- In 1935, a flexible programme for the comprehensive renewal of run-down districts away from the main streets was initiated, which materialised quite pragmatically when dealing with the established building substance. Front houses were rationally converted to flats while the building density in the inner blocks was substantially reduced.

Much of the original townscape was given up as a result of these measures, despite all the confessions of heritage preservation.

Since the 1920's, the potential preservation of valuable building substance was made possible by increased planning options. A counterbalance planning (Auffangplanung) was capable of influencing the location structure by stipulating the land use. In a protective manner, it was possible not only to divert the street traffic but also to relieve the city core structure. In this connection, the idea arose to relocate certain functions to semi-central locations outside the former town gates, but this could only be realised to a limited extent.

3.2 Second Evaluation Cycle

3.2.1 Period Of Disregard

In 1942, in Lübeck almost 20 % of the buildings in the core area, mostly in the main business streets, were destroyed by air-raids. The first decades after the war, the maxim was: city planning according to functional criteria. During the post-war reconstruction the following targets had priority:

- The historical core should become the main business centre again, although a semi-central location for many a function would have been sufficient that time.

- The historical core should be aligned to current flowing and stationary traffic, whereby in the long run, a system of peripheral roads should reduce the through traffic.

The widening of the streets, which occasionally occurred in the early 20th century by successive piecemeal replacement, was now tackled resolutely. Contrary to the former intention showing the frontage lines, the streets were now widened considerably. By re-groupment of plots and the coring of inner blocks, courtyards (Blockbinnenhöfe) were created, particularly for stationary vehicles. .

The consciousness of the city planners to restore the pre-industrial landscape still existed in the initial years following the war but could only put into action with considerable restrictions during the reconstruction of the inner core. The preservation was confined to the traditional isles (Traditionsinseln) and monumental buildings were reconstructed almost authentically.

The architecture of the new houses no longer represented the home style movement. The use of bricks for the facades and tiles for the (more or less) steep roofs still had a certain affinity with the building tradition. Most

of the gable-fronted houses were substituted by houses with the ridge parallel to the street. The new houses were sometimes wider. The traditional façade with separate inlets for the windows was frequently replaced by a flush façade with rows of windows. The sequence of the house facades often broke up the convention of traditional metric. The spatial patttern of the roofs, which were still traditionally steep, were changed to the extent that instead of many former gable houses the new buildings got ridges parallel to the streets.

The total break with tradition materialized at the end of the 1950's. With the dynamic economic development since the 1960's, the main business zone, which had experienced successive post-war reconstruction and local pressures, expanded into the neighbouring areas of the urban core. The types of construction followed multiple architectural styles with an international character using cubistic form and non-local material.

3.2.2   Period Of Adaptation

The attention to traditional townscape in Lübeck dawned again about 1975, at a time when the renewal of blighted areas of the old core became a current issue. Despite certain inner conflicts, a complex programme for the redevelopment concentrated on the following aims:

- The historical core shall be preserved completely in its cultural, historical and its townscape protecting elements.

- The historical core shall be promoted as a location for central functions for the population in the urban area and its hinterland.

- The historical core shall be increased in value as a location for potentially diverse models of flats which would be suitable for different population groups.

In this respect, the urban core as a monument was discovered for the second time and again, the reaction was to achieve a dualism of historical preservation and sympathetic architecture.

- The protection of historical buildings was extended. Many more objects were classified under the preservation order than in earlier times, even some that had been built during the industrial era, constructed before 1900.

- Sympathetic architecture was tried once again. Since 1981, after a period of vagueness, townscape regulations have been passed for public town space. Basically, it is the standardization of the types of buildings, the shape of the roofs and the structures of façades in their urban connection (Planungsgruppe mbH URBA 1977). The construction of the interior of the houses has seldom been laid down but every current building project is preceded by a total stock-taking.

During the realization of the programme, the consciousness for the authenticity of the townscape heritage has been sharpened. Defensive measures have been taken to influence the land use in order to facilitate the inner town preservation. Private traffic has been restricted considerably, in particular the through traffic in the core area. Substantial parking space has been established on areas of the waterfront at the fringe of the old core.

The revitalization of the core has resulted in a wave of public and private activities. The initial dispersion of objects brought about further initiatives in the neighbourhood and thus stimulated "snowball effects".

4   THE DUAL CYCLE: A COMPARISON

The fundamental fact of the evaluation is the identifica¬tion of almost two synchronic cycles, which started at a time from a period of disregard, and turned into a period of adaptation of the local archi-tecture. The inner break of the two cycles in Central Euro¬pe can be dated about 1957, the inner changes around 1900, and around 1975 with slight changes in different regions. When comparing several European cities, the analysis shows similar such periods that might only differ from each other by a short time lag. In times of economic prosperity and technical belief in progress, a distinct intermission materialized, while in times of depression, a growing uneasiness led to vital changes of mind.

The two cycles show some similarities in their inner course. However, in the second cycle, the proceedings for disregard were characterized by a more drastic vigour, and the instruments to maintain tradition were much more careful.

The two "periods of disregard" evolved differently, namely:

- The architecture in the time of historicism was lavish but it was rather meagre in the time of functionalism because the new construction techniques showed their rational effects.

- The multiplicity of new buildings broke up the structure of the traditional metric in both cycles. But still, the dimensional break was more radical through the second period.

The architecture of historicism, which was valued negatively in the first period of adaptation, was regarded in a positive way in the second period of adaptation. Nevertheless it is a kind of architecture that disregarded space and time in an ecclesiastical manner, similar to a current collage architecture, that has all kinds of historic motives available, but which are not derived from local tradition.

In both periods of adaptation, a dual strategy was applied to the cores, namely the heritage protection and the sympathetic architecture.

- The consciousness with a positive attitude towards the originality of the townscape and the instruments of preservation are pursued more consequently in the later cycle.

- The understanding of planning has also changed fundamentally in the sense of adequate townscape preservation, when contrary to former principles, now the defensive maxim is "form follows function".

- In the first period of adaptation, the interest in the townscape was only later linked with processes of urban redevelopment, however, in the second period of adaptation, urban redevelopment preceded and through its intervention in traditional structure, the question of preservation of heritage and sympathetic architecture was provoked.

5   ON THE WAY TO A THIRD CYCLE

In both cycles, the respective period of disregard was considerably shorter than the respective period of adaptation, which already manifests itself in the last cycle, too. In analogy of both cycles, one could visualise that the present public respect for historic repertory of forms might lose its fascination, and the preserving redevelopment would consequently wane, so that a change to a third cycle will eventually take place. There are opinions that a certain inflationary protection of monuments and a much less creative architecture of adaptation will arise from the genius loci. The arbitrary adaptation of any given pre-industrial design re¬sults in a pseudo-historic townscape in many places – even in places outside the historical districts. At the present time, the human-interest pretence of history is very effective. Nevertheless, it is not only contrary to historic mentality, but may also be the germ that at any time, as result of overreactions, will cause people to turn away from history again.

The cycle theory of a building conduct based on tradition manifests itself in comparable heuristic swings of the pendulum since the boom of the industrial age. The American city planner Albert Guttenberg postulates that, in principle, more attention should be paid to the cycle aspect of city development when he says:

"..planners ought to pay more attention than they do to the cycle aspect of their professions' history.." (GUTTENBERG 1990, p.694)

6   REFERENCES

ALBERS, Gerd, Wertewandel im Städtebau. Schriftenreihe des Camillo-Sitte-Fonds. Technische Universität Wien 3. Wien 1988.
ALKHOVEN, Patricia, The changing image of the city. A study of the transformation of the townscape using computer-aided architectural design and visualization techniques. A case study: Heusden. Eindhoven 1962.
BRIX, Michael (ed.), Lübeck. Die Altstadt als Denkmal. Geschichte, Wiederaufbau, Gefährdung, Sanierung. München 1975.
BURGER, Bert, GUTSCHOW, Niels, KRAUSE, Karl-Jürgen, Bebauungspläne und Ortssatzungen – Instrumente zur gestalterischen Erneuerung historischer Stadtkerne. Berlin 1978.
CARMONA, Matthew, Controlling urban design. Part I: A possible renaissance? In: Journal of Urban Design 1, pp. 47-73. Abingdon (Oxfordshire) 1996.
CARMONA, Matthew, HEATH, Tim, OC, Taner, TIESDELL, Steve, Public Spaces. Urban spaces. The dimensions of urban design. 3. ed., Oxford 2005.
CONZEN, M[ichael] R.G., The morphology of towns in Britain during the industrial era. In: J[eremy] W.R. WHITEHAND (ed.), The urban landscape: historical development and management. Institute of British Geographers. Special Publication 13, pp. 87-126, London 1981.
CURDES, Gerhard, Stadtstruktur und Stadtgestaltung. Stuttgart 1993.
GROPIUS, Walter, Tradition und continuity in architecture. In: Architectural Record 85, pp. 133-140, 151-156. New York 1964.
GUTTENBERG, Albert Z., A note on the idea of cycles in American Planning History. In: GERCKENS, Laurence C. (ed.), Proceedings of the Third International Conference on American Planning History, p. 693-704. Hilliard (Ohio) 1990.

LAFRENZ, Jürgen, Bewertungswandel typischer Stadtgestalt in den Altstädten von Lübeck und Stockholm. In: 44. Deutscher Geographentag. Tagungsbericht und wissenschaftliche Abhandlungen, pp. 157-167. Stuttgart 1984.

LAFRENZ, Jürgen, Bewertungszyklen vorindustrieller Stadtgestalt im Industriezeitalter. In: Die Alte Stadt. Vierteljahreszeitschrift für Stadtgeschichte, Stadtsoziologie und Denkmalpflege 16, pp. 39-57. Stuttgart, Berlin, Köln 1989

LAFRENZ, Jürgen, Bewertungszyklen im Traditionsverständnis der Stadtgestalt im Industriezeitalter. In: LICHTENAU, Bernfried (ed.), Städtische und ländliche Siedlungsarchitektur zwischen 1900 und 1960 in Mecklenburg und Vorpommern sowie anderen Regionen, pp. 44-53. Greifswald 1998.

LAFRENZ, Jürgen, Zyklentheorie zum Traditionsverständnis präindustrieller Stadtgestalt. In: Siedlungsforschung. Archäologie – Geschichte – Geographie 17, pp. 347-358. Bonn 1999.

LAFRENZ, Jürgen, Der Umgang mit tradierter Stadtgestalt im Rahmen der Stadterneuerung unter Berücksichtigung west- und ostdeutscher Stadtkerne. In: ECKART, Karl, NEUHOFF, Erhard, NEUHOFF Dieter (eds.), Das vereinigte Deutschland auf dem Weg in das 21. Jahrhundert, pp. 48-52. Braunschweig 2000.

LAFRENZ, Jürgen, Paradigma change for the reflection on traditional townscape at the turn into the 21st century. In: Journal of Planology 9, pp. 19-26. Nagoya 2003.

LEE, Seng-Jeong, Das Stadtbild als Aufgabe. Wege zu einer ganzheitlichen Stadtbildplanung. Stuttgart 1995.

MAFFROY, Salvain, CANIGGIA. Gianfranco, Die morphologische Betrachtungsweise von Stadt und Territorium. Eine Einführung in die Terminologie. Zürich 1988.

MULZER, F. Der Wiederaufbau der Altstadt von Nürnberg.1945 – 1970. Erlanger Geographische Arbeiten 31. Erlangen 1972

NITZ; Hans-Jürgen, Historische Strukturen im Industriezeitalter. – Beobachtungen, Fragen und Überlegungen zu einem aktuellen Thema. In: Berichte zur Deutschen Landeskunde 56, pp. 193-207. Remagen 1982.

PARFECT, Michael, POWER, Gordon, Planning for urban quality. Urban design in towns and cities. London, New York 1997.

PASCHKE, UWE K., Die Idee des Stadtdenkmals. Ihre Entwicklung und Problematik im Zusammenhang des Denkmalschutzgedankens. Mit einer Darstellung am Einzelfall: die Stadt Bamberg. Erlanger Beiträge zur Sprach- und Kunstwissenschaft 45, Nürnberg 1972.

PIEPER, Hans, Lübeck. Städtebauliche Studien zum Wiederaufbau einer historischen deutschen Stadt. Hamburg 1946.

PLANUNGSGEMEINSCHAFT MBH URBA in Zusammenarbeit mit dem Stadtplanungsamt Lübeck, Stadtbildanalyse und Entwurf der Gestaltungssatzung für die Lübecker Innenstadt. Stuttgart, Lübeck 1977.

RICHARDS, Jonathan, Facadism. London, New York 1994.

RUDEZ, Zrinka, Stadtraum – Prinzipien städtebaulicher Raumbildung. Politik und Planung 20, Köln 1988.

VALENA, Tomás, Beziehungen. Über den Ortsbezug in der Architektur. Berlin 1994.

Abandonded Churches in European Countries: a UK Perspective

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1 ABSTRACT

The ownership of churches greatly affects how they are dealt with when they are no longer required for regular worship. The Church of England, Catholic Church and Non Conformist churches have different processes and legislation that considers the redundancy of their churches.

We consider The Church of England's redundancy process. It has around 16,000 churches of which 12,000 are protected due to their historic importance. The Churches Conservation Trust (CCT) plays a key role in managing the redundancy of those churches of historic importance. CCT cares for those historic churches which no longer required for regular worship, if no other use can be found.

There are increasing pressures on CCT. It has an increasing portofolio of churches to manage while also suffering financial cutbacks. Therefore, as part of reducing the overheads and maintenance costs, CCT developed a process for the active reuse of historic churches. This seeks to re-unite the church with the community, not necessarily as a place of religious worship, but always with reference to this, as the buildings remain consecrated. Our approach considers three major areas; the potential to attract capital funding (grants, charitable donations or commercial investment); the ability of the building to bear architectural intervention and; the potential for the building to generate long term revenue and be self sustaining.

2 CASE STUDIES

Four case studies will be provided which show that a creative approach can result insuccesful regeneration in many different types of churches and local contexts:

- St Mary at Quay Ipswich, an urban site in a relatively deprived neighbourhoods http://www.visitchurches.org.uk/AboutCCT/Regeneratingcommunities/Projectsexamplesofourregenerationwork/AplaceforwellbeingrelaxationIpswich/ ,

- All Saints Benington, a rural deprived site http://www.visitchurches.org.uk/AboutCCT/ Regeneratingcommunities/Projectsexamplesofourregenerationwork/AthrivingheartforvillageBenington/

- St Nicholas Kings Lynn, rural town site http://www.visitchurches.org.uk/AboutCCT/ Regeneratingcommunities/Projectsexamplesofourregenerationwork/AculturalvenueKingsLynn/

- St John, Hanley, Stoke on Trent, urban commercial site

- http://www.midlandsheritage.co.uk/churches-chapels-etc/229-st-johns-church-hanley-stoke-trent.html

3 CONCLUSION

Our four very different case studies how community engagement can be harnessed to find sustainable futures for the churches. We highlight what has worked, what has been more challenging and how time consuming it is to develop these community based solutions. We conclude that the community element is central as church buildings have always been, on the most part, a resource for local people and they tell the story of that particular place. It is not just the continued presence of the church building in an area but also that building's continued relevance, in some way, to the local community which retains the cultural identity

4 THE CHURCH OF ENGLAND REDUNDANCY PROCESS AND THE CHURCHES CONSERVATION TRUST ROLE

4.1 When a Church Building Closes

When an Anglican (Church of England) Church has to close for whatever reason, lack of congregation, large repair bill, it is in the wrong place, then there needs to be a scheme created under the provisions of a piece of legislation called the Pastoral Measure 1983.

The Pastoral Measure is concerned with finding suitable alternative use for these buildings, many of which are protected (listed) buildings. The process is that the Diocese appoints agents to market the church building and try to find potential new uses. If a suitable use and purchaser is found then there is a public consultation. Secular planning permissions, either planning permission and/or Listed Building Consents, will be applied for and advice also given by the Statutory Advisory Committee of the Church Buildings Council. If no suitable use can be found and the building is of significant historic value then consideration is given to vesting the church building with the Churches Conservation Trust.

This process can take several years and the church building can be stuck in the "waiting period", a sort of church building limbo for this time. The maintenance of the closed church building is the responsibility of the Diocese but frequently they will only do the minimum necessary to maintain the building during which time the condition may deteriorate and there is no congregation to care for the building. If there are any local people to the church building who still have a connection, the "waiting period" can mean that this connection is lost as the local community are no longer responsible for it.

4.2 The Churches Conservation Trust

The Churches Conservation Trust was established in 1969 as the Redundant Churches Fund and was a partnership of church and state with both contributing, as they still do, towards the cost of the upkeep and repair of the portfolio that the Trust holds. Since 1969 the CCT has acquired 342 churches. Over the past several years the CCT has worked hard to generate more income outside those of the church and state, around £1.4m per annum is from the Church Commissioners, £2.9m from Department of Culture, Media and Sport and around £2m is self generated.

In order to cope with the continued growth of the portfolio, the CCT takes on at least one or two more historic churches each year, the CCT has developed a process for the active reuse of churches. This process seeks to re unite the church with the community, not necessarily as a place of worship, but always with reference to this. Our approach considers three major areas; the potential to attract capital funding (grants, charitable donations or commercial investment); the ability of the building to bear architectural intervention and; the potential for the building to generate long term revenue and be self sustaining.

4.3 The process

There are essentially 5 key stages our approach to community-led regeneration projects for our buildings, which aim to simplify the process for all partners, whilst creating strong decision-making evidence to take a project forward.

 Project start up – commissioning

- Establishing a project team
- Creating a memorandum of understanding about the partnership, its objectives and responsibilities
- Collecting important background information
- Establishing whether there are any existing ideas for the use of the church

Community profile and background research

This stage generates information on the people, the place and the opportunities for a church. A community profile is intended to provide a quick snapshot of local people and will enable the project team to better understand its community and their needs. It should also be used to provide an evidence base for future funding bids. The additional background research should help provide a further overview of an area's priorities and should include:

- Reviewing key documents for the area including any local plans
- Researching key local people and organizations that may need to be consulted on project ideas Initial consultation

The purpose of this stage is to generate further project ideas and to test reactions to any existing proposals. People should be consulted in a fun and accessible way, to reach as wide as possible audience. Consultation could take the form of:

- An open day that includes entertainment and consultation

- Surveys with local people
- Attending existing events to speak to people about the project ideas

Options development

Options development requires initial ideas to stand up to more robust testing. We develop mini-proposals for feasible ideas identified in the earlier stages, testing each against:

- capacity and interest from potential delivery partners – contacting and establishing links
- ability to generate capital – assessment of funding availability
- ability to generate revenue – an outline business plan
- scope for adaptation of the building – production of an Assessment of Significance by one of our Conservation Managers

The intention is that from this process, a preferred option will be established. More consultation may be required to establish the preferred option. Assuming there is a sufficient business case to move forward, this is then can be taken into stage 5.

 Full project development

This is the most detailed stage and includes:

- detailed business planning – producing a plan
- grant & finance applications – sourcing funding
- project development & design – designing and delivering any necessary adaptation works
- project management and operation – finalising clear governance structures

Once a project has been developed then it will need to be delivered and evaluated.

5   CASE STUDIES

The four cases below will show that a creative apporach can result in successful projects and that a failure to connect an historic church to the community can cause long term planning problems.

5.1 St Mary @ Quay, Ipswich, urban site

This church dating from c 1450 has been redundant since the end of the Second World War. It was brought back into use after the war as a home for the Boys Brigade until the 1970's when it became the responsiblity of the CCT.

The Church is located in the port area of Ipswich which has struggled over the last few decades and led to a major regeneration of the waterfront in the 21st century. This regeneration stalled due to the recession and the building is still stranded in a poor road scheme behind a partially regenerated waterfront.

In 2007 the CCT actively sought a partner to develop a project to secure the long term future of the church as there was a significant repair need for the building. A mental health charity, Suffolk Mind, became our partners in the project and we have developed a well being centre based around the concept that people repsond positively to good historic buildings. This is not going to be a centre for actue mental health care but rather to highlight the need for everyone to take care of thier mental health. All aspects of the project make reference to mental well being, even the proposed interpretation on the site.

The project has raised £5.5m to create a new build extension which will house the economic driver of the project, complimentary therapies and the main body of the church will be open to be used for events and cafe and other hires. The church will be available for the local community once more and will be regenerated before the regeneration area in which it sits. This shows the powerful combination of hertiage and community effort.

5.2 All Saints Benington, rural village site

This church was closed in 2003 and is in the "waiting period" still. The church closed as the population was declining as well as the church attendance. There was also a large repair bill for the repair of the roofs which

ensured its' closure. The local community formed a Building Preservation Trust in 2007 in order to find a use for the church. In 2009 the CCT started to support the Benington Community Heritage Trust (BCHT).

All Saints Benington is a church dating from the early 13th century and sits in a small rural village located on a busy main road. The traffic is all through traffic. The local shop has closed, the pub has struggled to find a tenant and butchers shop is now up for sale. The village also hosts a village hall.

The CCT have asssited the BCHT by taking them through the process outlined above to try to establish how the church building might be used for the benefit of the local community whilst still respecting the historic building. Following considerable community consultation and hard work the project has now raised over £2m to create a mixed use (including a church use) for the historic church. The church will remain in community ownership and will have a sustainable economic and social purpose.

5.3 St Nicholas, Kings Lynn, rural town site

This is the largest chapel of ease in England and was rebuilt c.1380-1415. This Perpendicular style chapel is vast and due to a declining congregation it closed and was passed to the CCT in 1989. Due to the scale of the building there are considerable repair needs and also for the building to have a more postive community ownership. Although there are a group of people in the community who do care for the building they need to expand their membership and attract new people. The building also needs to find some way to raise more income to support its' long term maintenance needs.

Once again the CCT has worked with the local community to develop a project for greater community use of the building for concerts and events, using the process outlined above. This project has now raised around £2.5m with over £210,000 being raised locally. This money will improve the building for concert use and repair the roofs as well as seeing the installation of solar panels to help with the long term energy costs for the building.

5.4 St John Hanley, Stoke on Trent, urban site

This is an 18th Century church in Hanley. The church was closed in the late 1980's and very soon afterwards a shooping centre was built adjacent to this church. The shopping centre effectively blocks out this church which has been something of an urban blight. There has been a real struggle to find a use for the building due to large strucural problems and the location. Finally the building was sold to a developer in the 2008. There is an estimated cost of £1.5m to bring the building back into use and convert to restaurant use.

There has been opposition in the community for the commerical solution proposed for this building and consent has been denied to re house the peal of bells in the tower. This leaves the building without a use and demonstrates how not engaging with the community is a danger to the future of historic church buildings.

6   CONCLUSION

Our four very different case studies how community engagement can be harnessed to find sustainable futures for the churches. We highlight what has worked, what has been more challenging and how time consuming it is to develop these community based solutions. We conclude that the community element is central as church buildings have always been, on the most part, a resource for local people and they tell the story of that particular place. It is not just the continued presence of the church building in an area but also that building's continued relevance, in some way, to the local community which retains the cultural identity.

Abandoned and Re-Used Churches in Germany

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1 ABSTRACT

Abandoned and reused churches are a current societal issue that has achieved considerable public attention in Germany. A growing number of churches, other buildings in the parishes or land owned by the church have been on offer for sale more frequently in the past years. Caused by a decline of church members in the last decades the result is a continuous shortage in the available budgets, which are necessary to maintain the property. The general treatment of abandoned churches is discussed among professionals in a broad way with different perspectives. One of the main problems is to find appropriate solutions which suit the different participants who are involved in the process of reuse. To keep the church building maintained a form of mixed use is a necessary solution. Within this process new forms of cooperation between the different participants are developed to create a mix of different usages.

2 INTRODUCTION

In Germany churches are vacated or not used to their whole extent. Main reason for this trend is the declining number of church-goers. An excess amount of sacred buildings ensues, all of them in need of new uses in accordance with the building substance. The Protestant and the Catholic Church have to find functional solutions which are structurally and economically sustainable.

In the near future both of them will not be able to maintain their property economically.The scope of follow-up uses is broad and ranges from changes or extension of use to demolition as a last solution.

There are diverse types of churches and parishes. Two main differences are for example the position of the church building in town is variable or the financial framework of a parish. This leads to an inability of finding standardised solutions, making spacial context and involved player's vital components in the process.

3 SITUATION OF THE CHURCHES IN GERMANY

Both churches have abundant spaces at their disposal: The Protestant Church owns approximately 75'000 buildings of which about 21'000 are churches and chapels. Out of this number over 16'600 are listed buildings.[1] The remaining buildings serve profane uses: as rectories, trust homes, nurseries etc. The Catholic Church owns approximately 60'000 building of which about 24'500 are churches and chapels. Out of this number over 23'000 are listed buildings. [2] The preservation, the restoration and the maintenance, especially of the listed buildings, effect major costs[3].

The high percentage of listed buildings put into focus the immense cultural value of parish buildings while causing high maintenance costs. Plus, these buildings need to answer to new standards like accessibility as well as user demands like heated service rooms and state of the art utilities management.

The number of church-goers is declining. In between 2007 and 2010 both congregations have lost nearly a million members each.[4] The chief factor of influence is the demographic change, whereat other factors like lost faith and deficient identification with the church also present important figures. In the long run this decline will cause lower church tax gains and as a result severely affect the financial situation of the churches. We can today assume that in 30 years time the Protestant Church will have lost a third of her

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[1] EKD 2012: 35

[2] EKD 2012: 35

[3] Around 12,3 % oft he anual budget by the Protestant Church in Germany is invested in the maintanance and enovation of church building.

The total amount is 1,23 billion euros. (Dagmar Reiß-Fechter (Hrsg.) Kirchliches Immobilienmanagement - Der Leitfaden (2009), p.40)

[4] Statistisches Bundesamt, Statistisches Jahrbuch 2012, p.65, The churches have 23,9 million (protestant) and 24,6 million (catholic) members.

members and half of her current tax income[5]. A similar development is to be expected from the Catholic Church.

Already only a small part of members takes part in church activities. Only 4% of Protestants in Germany regularly attend Sunday service and 14.8% of Catholics attend the Holy Communion. [6]

This trend is expected to carry on in the future. The impacts of this development are still small at this stage. Only 202 protestant churches have been sold and 75 have been demolished between 1990 and 2010. [7] [8] In the past 242 catholic churches been taken out of use. Only 30 of them have been demolished. The expectation is that around 3% of have all catholic churches will be loosing their function as a sacred place.[9]

4 CONSTRUCTIONAL SOLUTIONS FOR CHANGES OF USES

The existing excess amount of vacant buildings in both congregations makes them unable to put their whole property to good use and forces them to develop solutions and concepts for their extended use. Apart from constructional operations which require financial investments, organisational concepts for more dense or extended uses are being researched. Well known are the following:

- Organisational solutions: By merging multiple rectorates single church buildings can be used more efficiently and to a heightened capacity. To extend this way of usage, communal functions can be added and combined in church buildings.

- Densification of uses: various parochial functions previously accomodated in profane buildings are transferred into church buildings. This way of integrating and densifying church-related uses reduces the number of local church buildings in the long term. [10]

- Extension of use: New functions are added inside the church buildings. This can be achieved temporarily, for example with a profane usage during the week and a sacral usage on the weekends (example Kulturkirche Hamburg Altona[11]), as well as spacially by dividing the sacral room (example Müncheberg). For many churches this can be the first step to a thorough reuse. [12]

- Reuse of churches[13]: The complete change of a sacred to a profane use of the church building markes the last step. Hereby conflicts ensue mainly out of the kind of use and the resulting constructional transformations.

- Closure: If no further use can be found, a sensible temporary solution can be the preservation and closure of the building.

- Demolition as a last solution: To prevent a damage of the church image by alien uses, the parish can also choose to demolish the church building.[14] [15]

In practice of reuse of a church there are little differences between the two congregations[16]. The main difference between the catholic and the protestant church is that the Catholic Church is a sacred place, which can only be used by a profane user after a process of desecration has taken place.[17]

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[5] H. Adolphsen 2006:30

[6] Fisch 2008:20

[7] Matthias Schulz 2013: p.108-110

[8] Evangelische Kirche: Gebäude und Predigtstätten http://www.ekd.de/statistik/kirchen.html (03/11/2013)

[9] Deutsche Bischofskonfernz(2012):34

[10] H. Adolphsen, A. Nohr (Hg.)(2006):5

[11] KulturKirche Altona GmbH http://www.kulturkirche.de/ (03/20/2013)

[12] Fisch(2008):132

[13] There are several published guidelines, which intend to support parochies to develop methods how to use their church building, e.g. Evangelische Kirche von Westfalen (Hrsg.), R. Miermeister, U. Moggert-Seils, K.H. Schanzmann, H. Schröter: Kirchen umbauen – neu nutzen – umwidmen, Bielefeld 2004. http://www.ekvw.de/service/dokumente

[14] Zusammenfassung der Regeln der EKD von Wolfgang Huber 2004 . W. Huber, p. 42 f

[15] Beste (2010):61

[16] The most important difference is that in the Catholic church is not allowed to share the sacred room with a profan user.

[17] Deutsche Bischofskonferenz (2003):26ff.

5 POSSIBLE RE-USES OF CHURCHES

New uses of churches are judged differentially in society, depending on their adequacy. In case of sacred buildings most people perceive almost any kind of reuse as degradation. [18] The bad popularity of reuses originates from the high value of church buildings as icons of identification in the general opinion. The question of compliance cannot be answered unambiguously. Futural usage by other congregations or congregational institutions[19] [20] is possible, although many parishes (both congregations) rather (tend to criticise and) disapprove of a transformation into a mosque.[21]

Thinkable solutions are for example cultural uses (exhibitions, concert venues, lecture rooms, libraries), offices and other work spaces (studios, workshops). Also examples for accomodation, sports venues (e.g. climbing walls, gymnasia, wellness or baths) as well as gastronomy or hotels can be found. Parishes and citizens tend to rather accept the various forms of cultural uses and most of them are spatially compatible with the sacral spatial structure. Alas, not all abandoned church buildings can be reused this way.

Churches are not only a predominant component of a village or township as a building; they first and foremost take on an important role as a communal institution. In line with national urban development politics the recently concluded cooperational project „Kirche findet Stadt" [22] made it clear that by bringing together multiple stakeholders more sustainable solutions can be found. Churches with all their structural and social potentials present important partners in the development of use concepts on village or district level.

The communal perception and judgement of the reuse with focus on the symbolical value of the building presents a central element of the discussion. The more unique and larger the iconicity, the harder an adequate follow-up use will be found. [23] It will be easier to accept a new use for a post-war church in an urban quarter than for a listed central city church. Aside from the sort of use public accessibility takes on an important role as well. A reuse as a concert hall or museum will be well-received because public accessibility remains possible. A major difference is made between church-related and unrelated uses. Church-related reuses on behalf of the congregation or superior congregational institutions are much better tolerated, also mixed usages or sacral custom solutions such as "city churches"[24] or youth churches. In summary, commercial solutions are looked upon with great reserve, for example has the transformation into a gymnasium for a congregational school as St. Maxim in Trier been much better received than a non-congregational reuse such as a climbing wall venue.

The discussion about adequate forms of use can not be ended concordantly. It is expected that the rising number of vacant sacral buildings will heighten the acceptance for profane solutions.

6 CONCLUSION

The broad range of church building types in a specific local context refuses standardised solutions. Albeit, there are various subjects that need to be investigated more closely to yield possible solutions:

- The impeding demolition could be avoided in most cases if the pressure was taken down on the process of transformation. An interesting aspect was brought forth by the new eastern states of Germany to temporarily shut the buildings down and thus take them from the real estate market. This way their impression in the urban space can prevail.

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[18] Fisch (2008):67

[19] Aus Grundsätze für gottesdienstlich genutzte Gebäude http://www.ekir.de/bauberatung/umnutzungen/beschluss-der-kirchenleitung.php (03/20/2013)

[20] They have to be a member of the „Arbeitsgemeinschaft Christlicher Kirchen in Deutschland". http://www.oekumene-ack.de/index.html

[21] Hasse (2013) Kirche" Abriss manchmal besser als Moschee" im Hamburger Abendblatt vom 09.02.2013, http://www.abendblatt.de/hamburg/article113501393/Kirche-Abriss-manchmal-besser-als-Moschee.html (03/10/2013)

[22] Diakonie Deutschland (2013): Kirche als zivilgesellschaftlicher Akteur in Netzwerken der Stadtentwicklung, http://www.kirche-findet-stadt.de/ (03/12/2013)

[23] EKIR(2013): Arbeitshilfe für Umnutzung und Entwidmung von Gebäuden „Weniger ist mehr": Neues Leben unter dem alten Kirchturm http://www.ekir.de/www/service/7CD9B17FCB65496884693852C8172210.php (03/10/.2013)

[24] Citykirche is an oecumenical project of churches, which are usually located in the inner city. The aim oft he project is to motivate passersby to visit the church or to have a short rest.

- The significance of church buildings in an urban context is also a visual one. They make great impact on the townscape and are often found in central locations where they vitally add to local identification and genius loci.

- Strategies of reuse differ and depend on their application in cities or in rural areas. The significance of a church building is usually higher in villages which complicates profane reuses.

- A church building inventory should be established on a communal level. [25] The goal should be the portrayal of all disposable spaces for the community and their individual use intensity and capacity. New concepts and strategies for reuse can subsequently be found in cooperation with all congregations.

Not only do both churches have to think about spatial and architectural concepts, they also have to be open to new concepts in their church work. Only then they will stand a chance to preserve the church as buildings and as an institution and fill them with life anew.

7 REFERENCES

Adolphsen, Helge (2006): Kirchen haben kein Verfallsdatum. In: Bauwelt 2006, 27.01.2006 (5.06) p. 30 – 32.

Adolphsen, Helge; Nohr, Andreas (2006): Glauben sichtbar machen. Herausforderungen an Kirche, Kunst und Kirchenbau ; Berichte und Ergebnisse des 25. Evangelischen Kirchbautages, 29. September bis 2. Oktober 2005 in Stuttgart. Hamburg: MKH, Medien Kontor Hamburg.Beste, Jörg (2010): Modellvorhaben Kirchenumnutzungen. Ideen, Konzepte, Verfahren ; sechzehn Beispiele aus Nordrhein-Westfalen. Düsseldorf.

Deutsche Bischofskonferenz (2003): UMNUTZUNG VON KIRCHEN - Arbeitshilfe 175. Beurteilungskriterien und Entscheidungshilfen. Hg. v. Sekretariat der Deutschen Bischofskonferenz. Online verfügbar unter http://www.ctu-uk.cz/downloads/NBK_Umnutzung.pdf, 16.03.2013.

Deutsche Bischofskonferenz: http://www.dbk.de/katholische-kirche/katholische-kirche-deutschland/aufgaben-kath-kirche/bildung-wissenschaft/kunst-kultur/ (03/09/2013).

Deutsche Bischofskonferenz (2012): Katholische Kirche in Deutschland. ZAHLEN UND FAKTEN 2011/12. Hg. v. Sekretariat der Deutschen Bischofskonferenz. Bonn (Arbeitshilfen 257). http://www.dbk-shop.de/media/files_public/lhbfthqu/DBK_5257.pdf, (20.03.2013).

Diakonie Deutschland – Evangelischer Bundesverband im Evangelischen Werk für Diakonie und Entwicklung e. (2013): Kirche findet Stadt. Kirche als zivilgesellschaftlicher Akteur in Netzwerken der Stadtentwicklung Erfahrungen - Handlungsempfehlungen - Perspektiven. Berlin. http://www.kirche-findet-stadt.de/pdf/downloads/KfS-Dokumentation-2013_web.pdf, (03/09/2013).

Dissmann, Christine (2011): Die Gestaltung der Leere. Zum Umgang mit einer neuen städtischen Wirklichkeit. Bielefeld: transcript.

EKIR(2013): Arbeitshilfe für Umnutzung und Entwidmung von Gebäuden „Weniger ist mehr": Neues Leben unter dem alten Kirchturm http://www.ekir.de/www/service/7CD9B17FCB65496884693852C8172210.php (03/10/2013).

Evangelische Kirche (2012): Zahlen und Fakten zum kirchlichen Leben. Unter Mitarbeit von Evangelische Kirche. Hg. v. Kirchenamt der EKD. Hannover. http://www.ekd.de/download/broschuere_2012.pdf, (20.03.2013).

Evangelische Kirche: Gebäude und Predigtstätten http://www.ekd.de/statistik/kirchen.html (03/11/2013)

Fisch, Rainer (2008): Umnutzung von Kirchengebäuden in Deutschland. Eine kritische Bestandsaufnahme. Bonn: Deutsche Stiftung Denkmalschutz.

Hasse, Edgar S.: Kirche" Abriss manchmal besser als Moschee" im Hamburger Abendblatt vom 09.02.2013, http://www.abendblatt.de/hamburg/article113501393/Kirche-Abriss-manchmal-besser-als-Moschee.html (03/10/2013)

KulturKirche Altona GmbH http://www.kulturkirche.de/ (03/20/2013)

Reiss-Fechter, Dagmar (Hg.) (2010): Kirchliches Immobilienmanagement - der Leitfaden. Unter Mitarbeit von Thomas Erne (Autor) Wolfgang Schäfers (Autor) Wolfgang Huber (Autor). 2. Aufl. Berlin: Wichern-Verl.

Statistisches Bundesamt (2012): Statistisches Jahrbuch 2012. Kapitel 2 - Bevölkerung, Familien, Lebensformen. Hg. v. Statistisches Bundesamt. Berlin https://www.destatis.de/DE/Publikationen/StatistischesJahrbuch/GesellschaftundStaat/Bevoelkerung.pdf?__blob=publicationFile, (20.03.13).

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[25] Beste (2010):65

About Historical Centers: Is the Trend towards Decor Really Irresistible?

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1 ABSTRACT

We argue that the projects in the historical centers of European cities are characterized either by truth, either by authenticity and either by spectacle (décor). There is always a formatting of space and behaviors, but for culture or entertainment. This is confirmed when companies using Internet, which are specialized in the industry of "events", manage historical monuments. Also, a monument can be used for entertainment, as if it was a piece of décor. To deal with the topic of the limits of the trend towards décor (in historical centers) we use the ideas of the French philosopher Lipotevsky. In a society with three characteristics, democracy, individualism and consumption, when in a group tastes and desires are shared, it can obtain decisions in accordance with the preferences of its members. Therefore the set of the projects in the historical center of some city should be somewhere inside a triangle truth – authenticity – spectacle. It is because if there is need of entertainment, there is also a need of authenticity. This ambiguity exists for a long time in tourism and architecture.

2 INTRODUCTION

We see in the historical centers of the large European cities two trends at work, which are in conflict:

- One is preservation of Heritage. The goal is Culture.

- The other is adapting the city to décor (fairs, parades, urban scenography, "events" …). The goal is entertainment.

In any case, some space and behaviors are formatted. A space is formatted either for culture either for entertainment. This is confirmed when companies, using Internet, specialized in the industry of "events", manage historical monuments. More, historical monuments can be used for spectacle, and the preservation of Heritage leads to … décor. Therefore there is this question which is posed: what are the limits to the trend towards décor?

We deal with this topic in this paper.

One can present some features of the two trends in a kind of tableau:

	Heritage	*Décor*
Personalities and professionals	*Julien Benda[1], Marcel Poete[2], Guy Debord[3], Viollet le Duc, professionals of Heritage preservation*	*Barneys[4], advertisers, specialists of marketing, specialists of scenography*
Kinds of places and examples of sites	*Museums, cultural quarters, historical cities.* *Cité de Carcassonne, Mont Saint Michel …*	*Thematic parks, quarters devoted to entertainment.* *Euro Disney Land, Las Vegas …*

Our method will be to use examples, which allow showing three trends:

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[1] Julien Benda was a French philosopher. He thought that intellectuals have to tell the truth, always. He quoted the famous French philosopher Renan: "one has always to tell the truth, no matter the price".

[2] Marcel Poete was a French urban planner. He set out the notion of "Mysticism" of a city. It means that all the monuments of a city "translate" some chosen values: the Religion, the King, the Nation, Science … He was a proponent of the value of reconciliation of social classes.

[3] In his book "Comments on the Society of the Spectacle" Guy Debord tells how "the Spectacle" hampers "historical knowledge" and imposes the "perennial present". Also, he speaks of "irrefutable fake". According to him, the Spectacle is the consequence of Medias in the context of mass consumption boosted by advertising. Guy Debord was a proponent of self-organization and autonomy.

[4] This intellectual was a forerunner in the twenties, when he argued that any method efficient to sell goods was good. He invented the modern tools of advertising and marketing.

- The choice is between two formattings (of space, of behaviors). The "historical truth" has to be interpreted. There are rival doctrines. And décor corresponds to some formatting: the reactions of consumers are conditioned by Medias and specialists of shows (and scenography).

- A trick is that décor can follow Heritage. One knows how to use historical settings to mount entertaining shows. Therefore the preservation of Heritage can finally lead to décor.

- There is a limit to the adaptation of the City to décor. To show it we shall use the ideas of the French philosopher Lipovetsky.

The limit between Heritage and décor is blurry. In the Conclusion we show that this ambiguity is not new: it exists for a long time in the case of tourism and architecture, for instance.

3   HERITAGE OR DÉCOR? SOME EXAMPLES

We shall present four examples.

3.1 "The birthplace"

It is the title of a short story from the famous American novelist Henry James. A guide is in charge of the visit of the house where a famous poet is born. There is nothing interesting to view, so he is asked to imagine and tell attractive anecdotes. Being honest, he refuses. But after some reflection, he accepts and all the people are pleased: himself (he wins more money), his wife, the proprietaries of the house and … the public (more tourists visit the house). Even if it is irony, the spectacle wins, no matter the historical truth is.

3.2 The House of Slaves

The so-called House of Slaves is in the Gorée Island in Senegal, near Dakar. According to the guide Joseph Ndiaye, who launched it, it was there that thousands and thousands of people left their country to America on ships, to be sold as slaves. The historians deny: the house belonged to a rich Senegalese woman having a dozen of servants, the only slaves in the house, and Gorée was only a marginal center of slave trade. Now Joseph Ndiaye is dead but the tourists are still told this story. Clearly, it is spectacle (not truth or authenticity).

3.3 Illumination of cathedrals in France

One started to illuminate the Notre Dame de Paris cathedral with funny colors (purple, pink …), but it ceased soon. Instead, the illumination highlights the architectural features of the monument. But the spectacle had its revenge, which concerned other cathedrals in France. Thanks to chemical analyses of the remaining pigments, researchers discovered the real colors with which the statues of the façades of the cathedrals were painted in the Middle Ages. Using very much sophisticated cameras one projects these colors on the façade of cathedrals (like the cathedral of Amiens) while there is an aesthetic and historical comment, and music which are listened to. The spectacle has been a great success for ten years. In this case, it is historical truth the winner, not authenticity or spectacle. Indeed, it is an entertaining spectacle, but in accordance with historical truth.   Note that historical truth is preferable to authenticity. If we believe what the historian Leon Poliakov tells in his book "The history of anti-Semitism", the Mysteries played on the squares of cathedrals in the Middle Ages were vulgar, violent and anti-Semitic. They were great success, all the people living in the city attending them, except … the robbers. Also, Viollet le Duc suggests that every year the cathedral was given to the populace for a few days, and strange actions occurred. For all these reasons, today the choice of historical truth seems preferable to the choice of authenticity.

Today the gothic monuments are restored in accordance with a doctrine set out by Viollet le Duc.   To explain the influence of Viollet le Duc is easy. There is no reason to not apply the ideas set out by the American sociologist HS Becker in his book "Art worlds" to the milieu in charge of preservation of Heritage. This milieu is made up of several groups, each of them having a role (architects, artists, craftsmen, critics, administrators …). This milieu is pleased with two Viollet le Duc's ideas: the necessity of popularity (of restored monuments) and the role of architects in the past. Viollet le Duc praises the role of the group of architects at the time of gothic art (from twelfth century to fifteenth century). Even, he uses the Hegelian parable of the Master and the Slave. They were commoner, secular, working and talented people. They greatly contributed to the recovery of Europe in the twelfth and thirteenth centuries. They triggered the rise of building castles, palaces, city halls etc. Before, there was Roman Art, which was remarkable, but was not

unified and monastic. Gothic art was useful to the unity of France, triggered by the power of the King. Viollet le Duc died in 1879, he did not see modern art and that is why he thought that gothic art was the best of art in France (with a short period in the beginning of the seventeenth century). Further in the paper we shall describe the rules of "good style" according to Viollet le Duc.

3.4 Napoléon Peyrat: a mix of deeply thought history and poetic imagination

Napoleon Peyrat is a famous French historian of the nineteenth century. Being born in the South of France and protestant, he was fascinated by the heretic people having lived in this region (Cathars, Protestants) and studied their history. He "discovered" the role of the castle of Montségur, which was the headquarters of the Cathar church from 1232 to 1244. After the Treaty of Paris (1229) the lands belonging to the Count of Toulouse were no more secure for Cathars, and many of them found a refuge in the castle. They surrendered in 1244, many of them being the victims of the Inquisition. Peyrat discovered also the deep penetration of the Cathar religion in the society of this region, and the role of women among the believers. But he imagined the role in the Cathar church of a Countess of Foix, Esclarmonde. He imagined an underground Montségur, room, crypts, "holy pools" etc. More seriously, he imagined the story of a "second Montségur": according to him, around 1330, the last Cathars, hundreds of men, women and kids, died because of hunger and thirst, walled in the cave of Lombrives, in the valley of Ariège. They preferred this fate to abjuring their faith. Their bodies were covered by limestone and stalagmites etc. According to Peyrat, this kind of suicide was common among Cathars, but this also has been never proved. When Peyrat has imagined stories, no documents or clues have been found by historians, since his death in 1881. But the guides told tourists the story concerning Lombrives. Only in the fifties and sixties the story was removed from guidebooks. Today the guides only evoke the legends concerning the cave at Lombrives. Napoléon Peyrat has done very much to launch touristic sites in the region of Ariège: it is justified in the case of Montségur, and Mas d'Azil (a site with a cave where Protestants victoriously resisted the troops of Louis XIII in 1625, an event studied by Peyrat), but not in the case of Lombrives. This is an example of historical truth winning.

Today Internet is popular for twenty years and there has been some thought on rumors. One can use, to understand how a rumor is diffused, a word (the "buzz"), a metaphor (the "snowball") and a notion (viral process). The notion of viral process shows how a rumor is disseminated, benefitting from several variants (or changing forms), each of them being adequate to some group which believes the rumor and propagates it. Historianshave ideas on the process of dissemination of the rumor on the cave at Lombrives. These ideas are set out in a book which presents the communications at a congress on the works of Napoléon Peyrat (Cabanel and De Robert, 1998). The process could have been:

- First, a tale which concerns the cave at Lombrives is published in a local review.
- The guides at Lombrives tell the tourists the story, but presenting it as a true story.
- Napoléon Peyrat visits the site, believes the story told by the guide.
- He has the idea of a similar story, but which would concern Cathars. If the first story (which concerns robbers) is true and believed, the similar story (on Cathars) will be believed.
- He imagines the story of the Cathars at Lombrives, and tells it in his book onCathars.
- The readers of the book of Napoléon Peyrat believe the story on Cathars.
- Etc.

These examples show that the struggle between authenticity, historical truth and spectacle is very ambiguous. It results in historical truth or spectacle winning, depending on circumstances.

4   THE IDEAS OF LIPOTEVSKY AND THE LIMITS TO THE TREND TOWARDS DÉCOR

According to the French philosopher Lipovetsky, there has been during the second half of the twentieth century a Revolution which was democratic, egalitarian and individualistic (Lipovetsky, 2000). Individuals make the choices they want: in their personal affairs, as consumers, when political and social stakes are considered (since they are part of an Opinion omnipotent because of the influence of Medias) … The rights of minorities (sexual, ethnic …) are respected. When there is some stake, a majority appears and decisions are taken which protect the rights of individuals and groups. For instance, consumers are protected against the bad quality of products. Now we can speak of the conflict between Heritage and décor. There are

contradictory needs. A large city has to be vibrant, allow entertainment. But there is also a need of authenticity and memory. As the destruction of monuments is unconceivable, the alternative, if one wants to adapt the city to décor, should be to imagine a new identity for them, to speak of them in a new way thanks to marketing and Medias. [5] But people do not like lies and mystifications. Therefore the trend towards décor in the historical centers should be limited. The result could be neither the "mystical" city in the Marcel Poete's meaning (displaying some chosen value thanks to every monument), neither a city completely devoted to spectacle.

Lipovetsky thinks that cinema pervades Society. Theway in which it deals with topics, relying on drama, hyperbole, spectacle and stars, is imitated in many fields of social life, including urban planning (Lipotevsky, 2011). For instance, one can imagine a city covered with high towers, each of them being a hallmark of the city and having a characteristic and funny shape, and an identity of "personality" built up thanks to marketing and Medias … Surely, the adaptation of the City to décor owes very much to cinema. But the complete adaptation of the city to décor, scenography and cinema seems improbable.

5 CONCLUSION

We argue that the set of the projects in the historical center of large European cities, should be somewhere inside a triangle authenticity – historical truth – spectacle. In other words, these projects should remain in some ambiguity.

This ambiguity exists for a long time in the fields of tourism and architecture.

5.1 The ambiguity exists in tourism

Tours are not a quest, except in rare cases. Tour as a quest has been defined by the German philosopher Keyserling (a well-known intellectual at the time of the Weimar Republic): "I toured around the world to find myself". Exceptions are, for instance, Goethe [6], Liszt [7], and Nietzsche [8]. There are several traditions, concerning guidebooks. Of course, each of them has been founded. One can take the example of the Stendhal's travel books [9]. If one considers his confidences, it is only a mix of false and true. But errors and even plagiarism are forgiven when he speaks of art. When he examined the social, historical and political conditions of culture, he was a forerunner, his works heralding those of Burckhardt and Nietzsche. He had a deep intuition of what is production of culture (in the case of books, paintings, statues …) one century before the Frankfort School's works. He initiated a tradition for guidebooks. Even in the fifties, when car and photo were popular, a well-known French writer, Gabriel Faure [10] wrote the guidebook "Aux lacsItaliens" ("At the Italian lakes"). The goal of such a guidebook is, besides giving practical advices, to trigger the sharing of tastes.Problems of aesthetics are posed and discussed, the author displaying his own choice. Indeed there is a spectrum of guidebooks, from the diary or travelogue (today it is called "travel writing") to the guidebook giving only impersonal and objective advices. But there is always some formatting (of the vision of the visited country). An example of a tradition for guidebooks is the guidebooks examined by Edward Said in his book "Orientalism". They present people in Oriental countriesin the same way: they have a great past but their present state is poor and dull, they are passive, fatalist, lazy, sensual, either very much loyal either deceitful etc.

In any way the modern guidebooks (including those on Internet) describe (if they do not recommend) spectacles for tourists: fairs, parades, carnivals, scenography [11] and thematic parks … This shows the ambiguity in tourism. The guidebooks pay attention to what is authentic, true or spectacular in the countries visited by tourists.

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[5] In Paris, a little park à la Indiana Jones will be seen, soon.

[6] The poet was initiated into beauty of art thanks to a tour in Italy.

[7] The musician, who became a monk when he was old, made tours in Italy in the same spirit than a pilgrim.

[8] The philosopher touring in Italy was ill and his only preoccupation was to achieve his works.

[9] One of themis "Promenades dans Rome" ("Walks in Rome") which was the most popular book from him, during his life.

[10] He was not the famous French musician Gabriel Fauré. They were friends and toured Italy together.

[11] To obtain a nicer view of the monument, one changes the surroundings.

5.2 The ambiguity exists in architecture

The aesthetics of authenticity postulates that the best is when the monument remains exactly what it was before its restoration. Thus it remains the same in the imaginary. One often quotes the restoration of the castle of Haut Koenigsburg in Alsace, in France, by the architect BodoEbhardt, around 1900.

The proponent of the aesthetics of historical truth is Viollet le Duc. He interprets the style of the architecture of a particular time, thanks to a doctrine. The historical and social context is taken into account. The success is when the solutions of the problems are made visible by the architect, these problems being the program of the monument (or building), its stability, how it is integrated in the landscape, and the choice of the materials which are used … Decoration and color and even some scenography have their role. Also, the "scale" (today the human being), geometrical proportions and symmetry, matter. For instance, Gothic Art displays the equilibrium of pressures and counter-pressures, decoration (dramatic statues, local plants on capitals) and color completing the scenery.

It is not Viollet le Duc, but his followers, who were criticized for having changed the restored monuments, too much.

The conflict between authenticity and historical truth remains. Architects specialized in the restoration of monuments have accepted some principles which are set out in the Chart of Venice (1964):

- The changes have to remain visible thanks to some signs (for instance one uses another material than the material used to build the monument, when one makes changes during the restoration).
- The changes have to be reversible.
- The original state of the monument should be respected if it is possible.

Also, traditional and local materials should be used.

When big changes in historical centers of cities are considered, the choice of authenticity, truth or spectacle is a stake which is often intertwined with other ones.

For instance, in many cities of Northern Italy, inhabitants like Heritage. But they also want to keep the conditions of life in the city, as they are. They do not wish their city attracting too many tourists. It is as if they feared attractive Heritage leading to décor. The outcome is a reasonable exploitation of the resource that Heritage is.

6 REFERENCES

CABANEL Patrick and DE ROBERT Philippe.L'oeuvre de Napoléon Peyrat (The Napoléon Peyrat's works). Paris. 1998.
JAMES Henry. The birthplace. New York. 2012.
LIPOVESTKY Gilles.Le crépuscule du devoir ("The twilight of duty"). Paris. 2000.
LIPOVESTKY Gilles.L'écran global: du cinéma au smartphone ("The global screen: from cinema to smartphone"). Paris. 2011.
SAID Edward. L'orientalisme ("Orientalism"). Paris. 2013.
STENDHAL. Promenades dans Rome (« Walks in Rome »). Paris. 1997.
VIOLLET LE DUC Eugène. Entretiens sur l'architecture (Talks on architecture). Paris. 2011.

Are the Netherlands Shrinking or Just Changing?

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1 ABSTRACT

Since the 1990's years we have seen a sharp year to year growth in the production of real-estate in the Netherlands. The realization of 80.000 houses a year for instance was considered just as normal as the year on year increase in the value of those same houses, or any type of real-estate for that matter (Shenk, Gool: 2010). But since the start of the financial crisis in the summer of 2008 and soon thereafter the economic crisis that followed real-estate prizes have started to decline at an ever rapidly rate. As a direct result the demand for new houses has dropped dramatically and homeowners and institutional owners of real-estate are being confronted with losses when selling their property. Combined with the stricter rules concerning mortgages the demand for real-estate is even stronger declining.

This is in sharp contrast with the last 20 years when rising prices for real-estate where taken for granted. But this change is not being fuelled by economic and financial processes alone. There is also a demographic and labour shift in the Netherlands that causes a regional concentration of employment in the more urbanized western part of the Netherlands, also known as the Randstad. Young people are moving away from the more rural areas in the periphery of the Netherlands and relocating where there are more possibilities in finding employment. Increasingly the country is developing at two different speeds where the western part of the country is still growing both economically and demographically and the more rural areas located in the eastern and southern part of the country have to deal with a shrinking population. Direct result of this shrinking population is of course a shrinking real-estate market and a strong decline in the number of houses being realized in those regions that have to deal with a shrinking population. This has been made worse by the economic and financial crisis. And lastly and most importantly there is a demographic shift caused by the generation that was born just after the Second World War, also known as the Babyboom-generation. All these economic, financial, demographic, urban and social processes are influencing our cities and villages throughout the country and therefore the real-estate market. The question can therefore be asked if the Netherlands, after decades of growth, are now in a process of decline or a process of change? Or are the decline and change strongly intertwined with each other and should they be considered as one?

At the moment it is clear that the spatial effect of a regional shrinking population and the related economic consequences are being strengthened by the way the Dutch finance and subsidize their houses. The majority of the homeowners have their home fully mortgaged firstly because of lack of direct financial means and secondly made possible and stimulated by the Dutch regulations and rules concerning financing real-estate. A Dutch homeowner with a mortgage applies every year for a tax-refund based on the paid interest on their mortgage during the year before. This refund has stimulated ownership in the Netherlands, made even more attractive by the taken for granted year to year increase in value of real-estate and therefore the apparent minimal risk there was for the homeowners. This has led to a situation where, on average, houses were being sold 5 to 10 years (TU Delft: 2010) after buying it. The profit made on the sale of the house was then used to buy a new and more expensive house. This process has been the engine behind the strong real-estate market of the last 2 to 3 decades, but the engine is no more. The financial crisis and the economic crisis that followed suit have brought the market to a crashing standstill. The decline of the real-estate market has been made even worse by the surfacing effects of the demographic transition. The shrinking economy and lower demand because of it made selling your house and ever increasing daunting task. Next to a shrinking demand in general it is becoming ever more difficult to get a new mortgage caused by a direct shortage of available credit and secondly because in a lot of cases the actual value of the house is less than the original mortgage. The traditional Dutch system of using the profit of the sale of your house to buy a newer and bigger house is no more and is replaced by the realization that unless you have savings you can no longer change houses as easy as before. All this has led to stagnation in mobility of the Dutch, both on the real-estate market as on the labour market while at the same time there is re/urbanisation by both labour and people.

To summarize there is at the moment an exceptional situation in the Netherlands where the economic stagnation and demographic change strengthen each other and the influence they both have on the Dutch real-estate market. Houses are harder to sell, especially in the shrinking regions and the drop in value is an

obstacle for owners to get e new mortgage. At the same time we also see a shift in labour where both business and the labourers themselves increasingly move away from the rural periphery and relocate in the more urbanised parts of the country, mainly the Randstad. This shift in labour causes the real-estate market to shrink even more at a local/regional level with further stagnating mobility of homeowners and vacant houses and other buildings as a consequence that leads to even less labour and a declining attractiveness of the region leading to an even greater relocation of labour and people. Selling your real-estate is being hindered by both the demographic change and the economic crisis and this particularly the case in the periphery of the Netherlands (CBS: 2011) and the real-estate market in the Netherlands seems to be grinded to standstill for ever. But is this indeed the case? This paper will identify the different processes that are at work at the moment and the relation there is between them. How is the Dutch real-estate market being affected by the economic and financial crisis and what role are demographic changes and apparent re-urbanization playing in this process of decline and shrinkage in one part and growth in the other part of the country? What does this all mean for our cities and villages and is there a real-estate market left in the near future?

2 DEMOGRAPHIC DEVELOPMENT IN THE NETHERLANDS

Before the role and influence of the demographic changes on the real-estate market and the re-urbanisation can be explained we will look more closely at the demographic development of the Netherlands over the last couple of decennia. The Dutch population as a whole will grow on the long term. In sharp contrast with the before mentioned shrinking population it is expected that the current population will grow from 16,7 million people to almost 18 million people in the year 2040. After that the population will slowly stabilize (CBS, 2012).
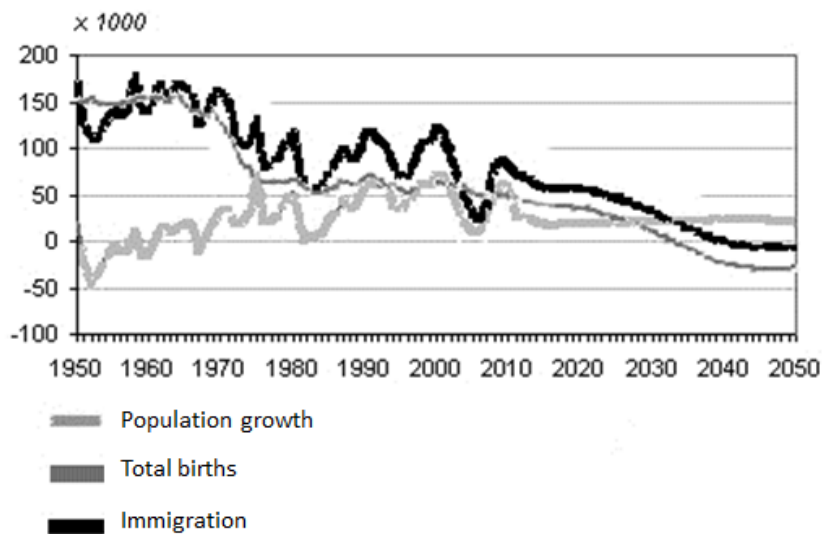
Fig. 1: Development of the population (CBS, 2011)

This prediction of lasting growth of the total population is in sharp contrast with the forecasts for regions located in the rural periphery of the Netherlands. Therefore it can be concluded that there is national demographic growth and local demographic shrinkage at the same time. The Netherlands are showing signs of being a country with clearly two different paces of developments. This development is not new in the Netherlands, the national spatial program published in 1966 already spoke of precisely such a process. The national program tried to mitigate the expected consequences only to discover a couple years later that this process never had gotten foothold and a period of unprecedented growth had arrived.

Another important demographic change is the ageing of the general population. The build-up and the division by age is shifting at the moment to a large group that's 65 years old or older. This particular group is at the moment 16 % of the total population but in the near future this will increase to 20 % of the total population and some cases even higher. The group in the age 0 to 20 years old will be a stable 20 % of the population during the same period. The increase in people over 65 years old will come at the cost of the population between 20 and 65 years old, the most economically active persons. This group will consistently be under 60 % of the total population. In absolute numbers there is an increase of 2.500.000 people over 65

years of age also the age when people retire from work. And with this ageing population we see an increasing effect on the economy, interest rates and health costs. (Eurostat Baseline, 2011).
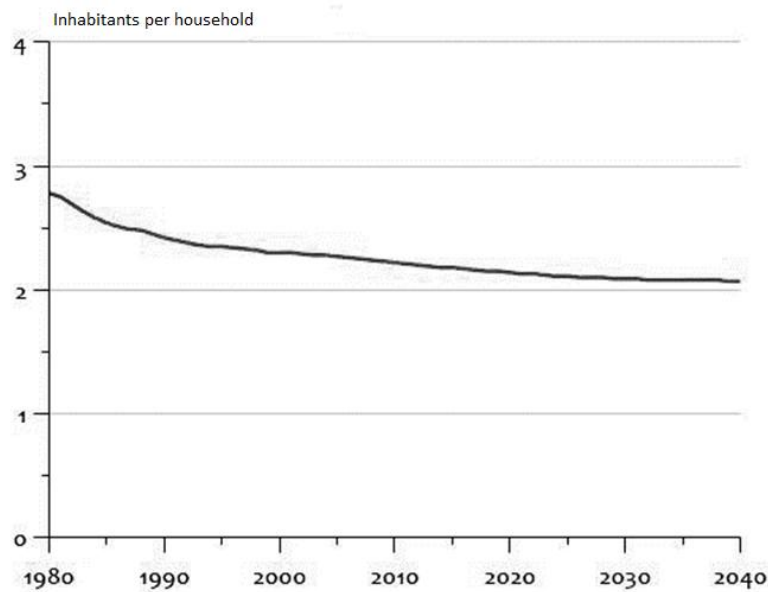
Fig. 2: Inhabitants per household (CBS 2011)

So how is it possible that the Dutch population is shrinking and growing at the same time while at the same undergoing a process of increasing ageing of the population. To clarify this seemingly complicated process a closer look needs to be taken at the immigration and birth-death statistics. In the period between 1995 and 2011 there is a clear surplus in immigration, not only caused by family reunification but also because the positive economic situation created a demand for labourers (CBS, 2012) that was bigger than the local availability. The immigrants did not come from the traditional countries as Morocco, Surinam and Turkey but increasingly from other European countries (Buursink, 2013).

Next to immigration there are also more people being born each year then people passing away and this of course has a positive influence on the population growth. On average the population in the Netherlands increases by 40.000 persons a year when looking at the difference between births and deaths. The cause is twofold, over the last years the average number of children per woman has risen from 1,7 children to 1,8 children. But an even bigger influence is the quality of healthcare and the Dutch healthcare in particular (Demos, 2009).
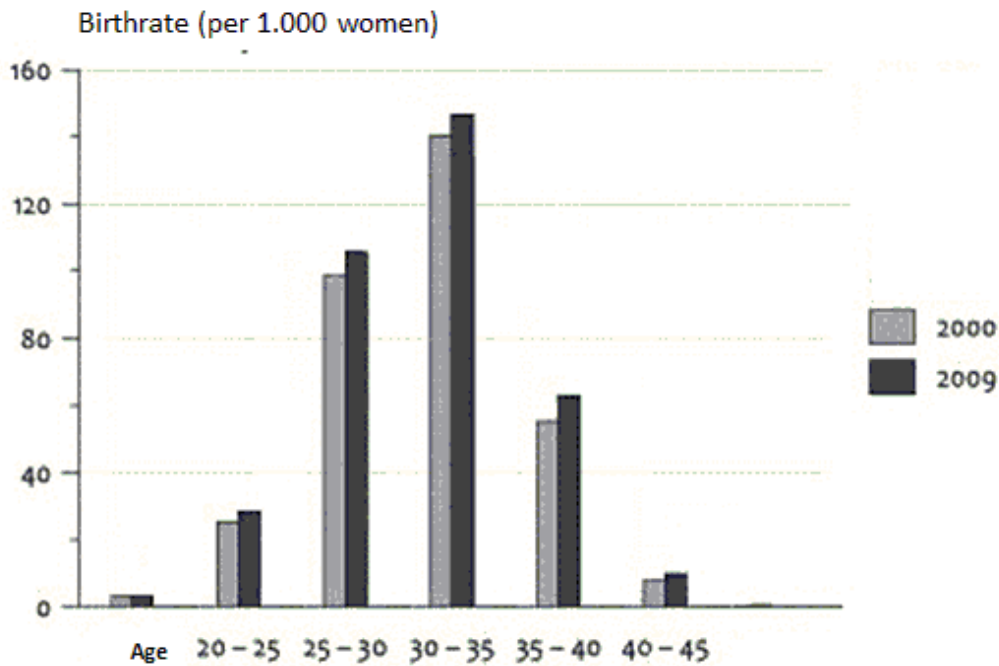
Fig. 3: Birth rate (CBS 2011)

The numbers indeed show that the general population will keep on growing for the coming years, from 16,7 million people to 18 million in the year 2040. But still the public debate in the Netherlands is being dominated by the general idea the population is in fact shrinking. Looking at the regional forecast 2010 as published by the Planbureau voor de Leefomgeving it is clear why this general opinion is dominating the debate in general and the in the press in particular. The reason is the local and regional differences in population build-up. During the period between 1998 and 2010 the rural areas like the northern part of Groningen of Limburg already showed a clear decline in actual growth of the population. This decline is expected to continue and will be focused mostly in regions outside the Randstad. The Netherlands will be divided between a densely populated and economically strong urban area (the Randstad) with urban connections to the larger urbanized areas in the more distant areas and the periphery of the Netherlands that will shrink both in population as in economic weight. Most affected are those regions that have a long tradition of agricultural production or where in the past the economy has shifted strongly, like when the coalmines closed in the 1980's. At the same time there is an increase in the number of households since the 1998's because the average occupancy of houses or average size of a Dutch household has dropped to 2.2 persons per household (CBS 2007).When a population is shrinking and growing at the same time it is interesting when this process is accompanied with a rising of the number of households. This increase in number of households is caused by a combination of the ageing of the population and social changes in general. As more and more people belonging to the babyboom generation pass away the number of 1 person households within this demographic category will rise. Together with social changes like divorces and more different ways of living together the demand for one-person houses will increase over time. The combination of increasing relocation to the Randstad and the rising demand for one-person houses will strengthen the real-estate market in the more urbanized areas in the Netherlands while the market in the periphery will shrink.

3 HOUSING SUPPLY SINCE 1990

In order to fully explain the current status of the Dutch real estate market a closer look needs to be taken at spatial and tax policy developments since the 1990's. Over the last two decades the Dutch housing market was one of the most dynamic in Europe in terms of both number of houses developed on a yearly basis as well as the year to year increase in the value of houses. After the end of the Second World War there was a shortage in available houses and somewhere in the region of 500.000 houses needed to be (re)build or repaired (van der Cammen & de Klerk, 2010). Since the end of the world war the Dutch spatial policy has been strongly focused on rebuilding and solving the shortage of available houses. One of the largest and most influential projects aimed at building houses is the VINEX-program of the 1990's that was a direct

result of the implementation of the Fourth National Policy Document on Spatial Planning (VINAC) and its supplement the VINEX. This building program was devised during a time where the economic situation was not all that different from the one the Netherlands and Europa are in at the moment.

During the recession between 1979 and 1984 Dutch policymakers and politicians tried to define what spatial planning could contribute to the economic recovery. The central theme of the Fourth National Policy Document on Spatial Planning (VINAC, 1988) was internationalization, economic perspectives, opportunity development and improving existing qualities. In short the VINAC tried to prepare the spatial development for the 21st century from an economic perspective. The focus on improving the most important economic sectors by the national spatial policy was an important change (Wagenaar, 2011). Improving the locational factors for (inter)national businesses and the strengthening of the Dutch transport and distribution sector were the key elements within the spatial policy (Klundert, 2008). Due to policy changes and early elections the VINAC never got implemented and the new government added two new tasks to spatial planning in the Netherlands. Next to the before mentioned tasks Dutch Spatial policy should also deal with the increasing use of automobiles and spatial and environmental problems needed to be approached integrally. Proximity and secondly accessibility became therefore leading in new developments (Klaassen, 2000).

The VINAC and VINAC tried to find an answer to the apparent huge demand for houses and labor. According to research 835.000 houses and 530.000 jobs needed to be located in the period between 1995 – 2015 and most of the demand was located in the Randstad. The Dutch planning system needed to be prepared to facilitate the expected huge rise in mobility and adopted the rule proximity first and accessibility second. This translated in focus on existing urbanized regions as prime candidates for the expansion of cities and after those options where explored the edges of the city. "Proximity first" also became the rule for the search for new work locations and a new typology was developed for labor locations where the type of accessibility was used to categorize all labor locations. To support the policy as stated in the VINEX the government added several charts that showed for each province and city-region the possible locations for expansion combined with the transportation network, both existing and planned. Such a level of detail was never before being done. The message in the VINEX was clear: build as much as possible in and on the edges of existing cities that have good connectivity in order to improve urban vitality and environmental qualities. As a direct result Dutch cities showed an enormous expansion in the following year, especially at the edges of the existing urban fabric because of the better connectivity when comparing to the city centers. Secondly investments in the city center and the improvement to the urban quality of cities in general caused land values in the inner-city to rise making the locations situated at the edges of the cities even more attractive for development.

When in the 1990's the Dutch economy started to grow again it led to an increasing decentralization of the government and a greater role for the market. Secondly the demand changed from quantity to quality because of the growing wealth of the Netherlands as a whole and its inhabitants of course in particular. The recently politically accepted VINEX was not capable to accommodate and facilitate the changing market. As a direct result of these political and economic changes real estate development increasingly became the sole responsibility of municipalities and developers alone. Developers increasingly bought grounds destined for building projects and traded those with the municipalities for the right to develop the location. Local governments more and more were forced in the role of being the subsidizer and project developers and corporations the actual developer. This combination of decentralization and a bigger role for the market led to a decreasing influence in the actual spatial development by (local) governments (Bureau Beerschot, 1999). As such the VINEX-program changed into an integrated planning concept that got fragmentally implemented and directed by the market instead of the government. The market dictated both quality as well as the quantity of the housing development. The VINEX program is therefore synonymous for too little quality and too much quantity. Since implementation of the VINEX, in 1995, on average 50.000 houses a year have been built. Sometimes this number was even as high 100.000 a year. In general the developments can be divided in two different categories, namely the redevelopment of the old inner city harbor areas with a focus on high density development while in the rest of the country there was a more traditional expansion by the development of large numbers of single family homes.

Fig. 4: Impression Kop van Zuid (Stefan Netsch)

Fig. 5: Impression VINEX neighbourhood (Stefan Netsch)

4 CONSEQUENCES

For more than a decennium the Dutch real estate market was used as an economic instrument by the Dutch policy makers "to build the Netherlands out of the economic crises". Fueled by low interest rates the different Dutch governments were able to buy large quantities of land with the goal of developing it. The governments sold the land to the developers and in return they took care of the infrastructural development of the location. This is one of the major problems nowadays. While the governments are responsible for the infrastructural development of the location the developers were only committed and responsible for the

building program. In a market under the influence of an economic recession governments no longer have the financial means to develop the infrastructure and as a result they are held responsible by the developers.
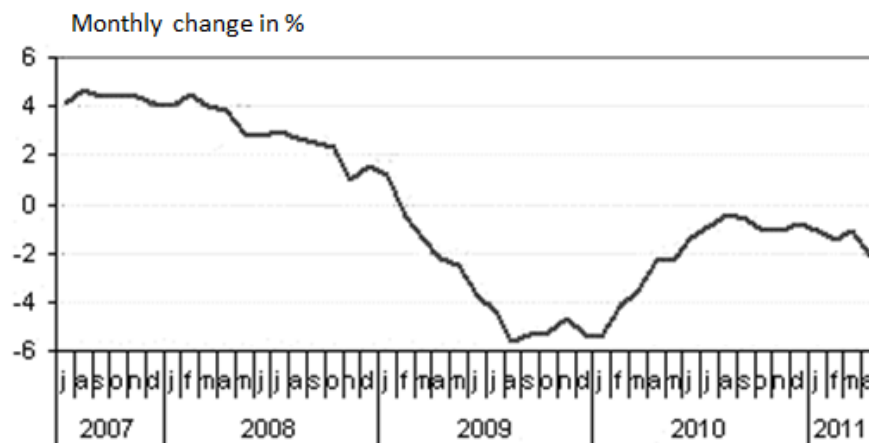
Fig.6: Build houses and sold houses (CBS 2011)

As a result of the economic crisis combined with the financial risks governments took on the Dutch real estate market there are now roughly 60 municipalities facing bankruptcy (Jacobs, 2011). Land bought in economic good times with the aim of turning it into land to be developed is not sellable anymore. As a result many municipalities are facing negative balance sheets because the real estate prices have dropped and the market has come to a standstill while the investments are already made.

There are many reasons why the Dutch real estate market has come to a standstill. As before mentioned Dutch spatial policy helped create an unhealthy market. But also the financial market and the Dutch consumers have contributed to the present day crisis. The Dutch private homeowner has enjoyed a very profitable tax refund ever since the end of the 1970's. The same way policymakers used spatial policy as a means to improve economic growth the tax system was designed to improve home ownership. Both instruments were instrumental for the economic growth the Netherlands needed so much. Dutch home owners got a tax refund on the interest paid for their mortgage and as such banks and financial institutes advised potential home owners to invest savings in their own real estate. After all, the home owner got a tax refund every year and real estate prices will increase year by year. The average mortgage in the Netherlands has risen over the years to 107 % of the actual value of the real estate (Elsevier, 2012). Not only you were able to loan more then you owned you only needed to pay the interest of the mortgage. After all after 30 years the value of the home you just bought will be significantly higher than the original mortgage. As mentioned before the Dutch policymakers implemented this tax rule in order to promote home ownership in the Netherlands. The combination of spatial policy and tax benefits led to an exploding real estate market that showed year after year that the notion of always rising real estate prices to be true. Over the last 10 to 15 years this has led to a 300 % rise of the value of real estate (CBS, 2011) and home ownership became the natural and financially most sensible goal for every Dutch. And after you bought a house you bought a new one, often more expensive, every 5 to 10 years. After all it was just a matter of selling the old house with a profit and use the profit to buy a new, more expensive house. The apparent scarcity of new houses, fuelled by the tax system and spatial policy, gave the Dutch the opportunity to buy ever more expensive houses.
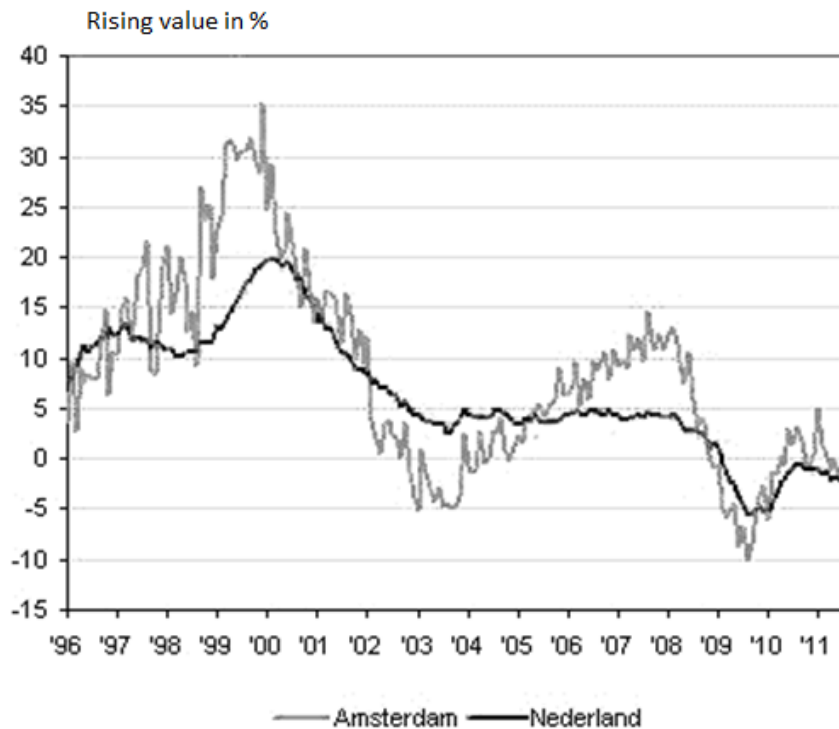
Fig 7: Value of houses in Amsterdam and the Netherlands (CBS 2012)

This process of year to year growth in real-estate prices and parallel the increase of the average total mortgage came to an end with the financial crisis in 2008. The resulting economic crisis has resulted in less available credit and stricter rules concerning the capital buffers made the financial institutes more and more reluctant to sell people mortgages. This has led to stagnation of the real estate market because housing prices started to drop and building projects to be postponed or cancelled.

Especially in the economic les developed regions in the periphery of the Netherlands the results of the shrinking real-estate market can be seen. Because there are less economic opportunities those regions often fall in the category of shrinking regions but now the combination of economic crisis and dropping real-estate prices makes it harder to leave those regions in search for a new home and often a new job in the Randstad. But selling your home for less than the mortgage value is almost not possible in the Netherlands and if you are able to sell your house you have to accept the fact you are left with a debt to the bank. In general people with jobs are financially capable to relocate to other parts of the Netherlands leaving older people behind.

The consequences of the Dutch financial system in times of crisis combined with huge demographic changes concerning the ageing of the population and demographic shift of labour from the periphery to the Randstad are all contributing to the present day standstill of the real-estate market. The question still remains are the Netherlands and the real-estate market in particular just shrinking or are they changing.

5 THE CHANGING REALESTATEMARKET

It is reasonable safe to assume that the economic recession is of temporarily nature. But when the economy starts to grow there are still the demographic changes like the ageing of the population and the demographic and labor shift to the more urbanized parts of the country influencing the market.

When looking at the population in general there is no problem with a shrinking population The Netherlands are still growing and are predicted to keep growing till about 2030. This growth is fueled by immigration and the positive birthrate. But on a more local scale there is a strong divide between shrinking and growing regions and this process has started well before the economic crisis. The shrinking population cannot be explained by demographic change but is just a matter of economic opportunities.

So local and regional orientated shrinkage of the population is expected to continue and will offer the real-estate market huge challenges to deal with. Empty buildings, low real-estate prices, less infrastructure and cancelled building programs are the results of this process. This process will fuel itself because the shrinking population means less income for the local government and therefore less financial means to keep important

functions in the community. This will in return lead to more people leaving, an increasingly ageing population and less people working. As a result the local real-estate market will shrink.

Fig. 8: Shrinking population and real-estate (www.veendammer.nl, 2012)

As mentioned before the population as a whole will keep on growing, mainly in the western part of the country. Predictions are that over the years 1.500.000 people will be in need of a home in the Randstad. The demand for new homes will also be more strongly focused on the cities instead of the VINEX neighbourhoods of the past. Therefore the Dutch real-estate market will have two faces for the coming years, both shrinkage and growth at the same time.

The biggest problem the market needs to face is the changing demand typology of houses. The VINEX program was strongly focussed on developing the single family home. The ageing of the population and the risen popularity of living in the city will increase demand for high density housing. Over the past decades the realization of high density housing was neglected because of denying the changes in demographic composition of the population by focussing on general data concerning population growth. Also the ever increasing housing prices, fuelled by the financial system in the Netherlands, has kept the focus on the development of single family homes on new building land.

6 CONCLUSION

To answer the question will there be a real estate market left in the future, the answer is yes. The new market will be like the two sides of a coin. On one side there will be a shrinking market, located in the periphery of the Netherlands. The process of locally shrinking population will continue and will lead to a locally very challenging real estate market that has to deal with shrinking and changing demand, empty buildings and low incentives for investment. On the other side there are those regions that will keep on growing where the market needs to cater for in increasing demand in both low and high density housing. The market needs to refocus on the city again because the huge development plans for new low density houses, like the VINEX neighbourhoods, will be something of the past. Instead there will be a focus in intensifying the existing urban centres and transformation of buildings within the city limits in order to accommodate the changed demand by the shift demographic and labor shift and the ageing of the general population.

The paradox is that in the 1960´s there was fear for a divide in the Netherlands where the periphery would shrink both economically and demographically and the Randstad would grow both economically and demographically. Fearing uncontrolled growth of the cities Dutch policy makers tried to accommodate and counter the threat of uncontrollable city growth by appointing regions and municipalities that should develop and expand in order to accommodate this growth (Ministerie van Ruimtelijke Ordening 1966). It was these

plans that would 15 years later mature in the VINEX-program that would in the end lead to the present day situation.

7 REFERENCES

Boeijenga, Jelte; Mensink, Jeroen u.a.(2008): VINEX Atlas, Rotterdam.

Cammen, Hans van der; Klerk, Len de (2010): Ruimtelijke Ordening en Planologie, van grachtengordel tot VINEX-wijk, Huoten Antwerpen.

CBS (6 oktober 2009): Bevolking daalt in kwart Nederlandse gemeenten, CBS Den Haag.

CBS (30 mei 2012): Bijna 18 miljoen Nederlanders in 2040, CBS Den Haag.

CBS (12 oktober 2011): Forse bevolkingsgroei in de Randstad tot 2025, CBS, Den Haag.

CBS (27 september): Daling huizenprijzen in vier grootste steden minder sterk dan elders, CBS Den Haag.

CBS (2012): Prijsindex Bestaande Koopwoningen, CBS, Den Haag.

Coen van (2011): De onzekere toekomst van de pensioengerechtigde leeftijd, Centraal Bureau voor de Statistiek, Den Haag.

Daalhuizen, Femke; Boschman,Sanne ; Groot, Carola de; Dam, Frank van(2011): Strijd om de plattelandswoning?, Tijdschrift voor de volkshuisvesting Nr.4:48-53.

Dam, Frank van; Groot, Carola de;Verwest, Femke (2006): Krimp en ruimte – Bevolkingsafname, ruimtelijke gevolgen en beleid; NAI Uitgevers Den Haag.

Dam, Frank van; Verwest, Femke (2010): Van bestrijden naar begeleiden: demografische krimp in Nederland, PBL Den Haag.

Dam, Frank van; Haffner, Marietta (2011): Langetermijneffecten van de kredietcrisis op de regionale woningmarkt; PBL Den Haag.

Elsinga, Marja, Jong-Tennekes, Martijn de, Heijden, Harry van der (2011): Crisis in de woningmarkt, TU Delft, Delft.

F&C Investments (3 mei 2012): Marktvisie, behoort Nederland nog steeds tot de sterkste eurolanden?, F&C Amsterdam.

Hen, Paul de (2012): Rijk, op papier. Nederlandse huishoudens zijn vermogend, Elsevier, nr. 2 14 januari 2012.

Kosterman, Ron (2012): Nu pas voelt bouw crisis, Elsevier, nr. 8, 26 februari 2011).

Jong, Andries de (2007): Regionale huishoudensprognose 2005 – 2025, CBS-PBL.

Jong, Andries de; Duin, Coen van(2011): Regionale bevolkings- en huishoudensprognose 2011–2040: sterke regionale contrasten; CBS-PBL.

Jong, Andries de; Duin, Coen van(2011): Regionale prognose 2009-2040: Vergrijzing en omslag van groei naar krimp; CBS-PBL.

Koopmann, Marnix (2010): Krimp en woningmarktbeleid, Tijdschrift voor de volkshuisvesting Nr.6:11-16.

Latten, Jan; Kooiman, Niels (2011): Aantrekkingskracht van regio's en demografische gevolgen; CBS.

Ministerie van Infrastructuur en Milieu (2012): Structuurvisie Infrastructuur en Ruimte, Nederland concurrerend, bereikbaar, leefbaar en veilig, Den Haag.

Ministerie van Ruimtelijke Ordening (1966): Tweede Nota over de Ruimtelijke Ordening in Nederland, Den Haag.

Ministeries van VROM, LNV, VenW en EZ (2006): Nota Ruimte, ruimte voor ontwikkeling, Den Haag.

Renes, Gusta; Jókövi, Margit (2008): Doorstroming op de woningmarkt van huur naar koop, NAI Uitgevers Den Haag.

Schenk, Leonhard; Van Gool, Rob: Neuer Wohnungsbau in den Niederlanden. Konzepte Typologien Projekten; München 2010.

Prof. Dr. Schnabbel, P (2009); Groei en krimp in Nederland, Demos nr.1:1-3.

Telegraaf (27 dec 2010): Drukker in de Randstad.

Thissen, Martin; Burger, Martin; Oort, Frank G.(2010): House Prices, Bubbles and City Size in Erim Report Series Research in Management.

Toussaint, Janneke (2010): Eten gepensioneerden hun woning op?, Rooilijn Nr. 4:246-253.

Veer, Mark ter; Boschman,Sanne ; Verwest, Femke(2011): De krimpregio's van de toekomst; Demos Nr. 8:5-8.

Verwest, Femke; Dam, Frank van; Daalhuizen, Femke(2010): Het nieuwe wonen: Het krimpende platteland rekent zich rijk, geografie 11/12:42-45.

Verwest, Femke; Dam, Frank van (2010): Demografische krimp en regionale economie, Rooilijn Nr. 4:508 – 513.

Verwest, Femke; Sorel, Niels; Buielaar, Edwin(2010): Krimp vraagt om veranderingen Woningvoorraad; Demos Nr.1:7-9.

Verwest, Femke; Sorel, Niels; Buielaar, Edwin(2010): Regionale krimp en woningbouw – Omgaan met een transformatieopgave, NAI Uitgevers Den Haag.

Warbroek, Boudewijn (2009): Krimp deelt Nederland in tweeën, Binnenlands Bestuur 4 september.

Wagenaar, Cor (2011): Town Planning in the Netherlands since 1800, 010 publishers Rotterdam.

ARGUS: a Personalised Guidance System to Improve Autonomy of People with Visual Impairment in the City

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1 ABSTRACT

People with visual impairement have striking needs for trustfully navigation systems enabling for efficient mobility services, mainly considering safety and autonomy. Navigation technologies are being implemented in innovative personal navigation devices, but existing products fail because they lack accuracy and do not provide a suitable and efficient man-machine interface adjusted to this user segment, or rely on costly infrastructure.

The ARGUS project focuses on a satellite based navigation (GNSS/EDAS – EGNOS Data Access System) terminal for people with impaired visually capabilities, guiding them along pre-defined tracks using specifically designed HMI (Human Machine Interface) such as tactile, acoustic and haptic signals. It introduces the opportunity to develop an innovative guidance support system for visually impaired people based on the provision of a virtual-lead-line perception to the end user that can be perceived and followed. This will provide "track navigation" instead of the classical "waypoint or route navigation" which is used for car navigation or people with all visual capabilities.

This system will be also usable for professional, scientific and sport activities developed in reduced visibility scenarios that could require accurate guidance on normal or emergency situations, as well as for other people working in reduced visibility environments needing guidance and assistance.

This paper explains the features of the ARGUS device and expands on the Proof of Concepts that was carried out with the potential users.

2 INTRODUCTION

Almost 300 million people in the world are visually impaired. About 90 % of the world's visually impaired live in developing countries, and about 65 % are aged 50 and older, with an increasing elderly population in many countries, more people will be at risk of age-related visual impairment.

The global response to prevention of blindness have had specific results in areas of progress over the last 20 years including prevention, eye care servicies, development of policies and strategies, campaigns to raise awareness, and stronger international partnerships with engagement of the private sector and civil society.

But this global response has also had one of the main areas of progress on the developmentet and implementation of technical assistance to the users. Despite the technology state of the art many questions remain open concerning autonomous navigation, acuracy, integrity.

3 MAIN OBJECTIVES OF THE PROJECT

The ARGUS project focuses onto the development of a service platform and a satellite based navigation terminal for people with impaired visually capabilities, to guide them along a pre-defined track, using acoustic and audio-haptic signals. In this sense, the ARGUS system provides a virtual guidance rope for blind and partially sighted persons or people working in environments with low visibility (emergency and rescue services, etc.). Based on GNSS systems, ARGUS acts as a leading climber providing a safety rope to the persons following, leaving for them a secure path.

The main goal of the project is to develop a GNSS based mobility service for people with impaired visually capabilities, to guide them along a pre-defined track, using acoustic and audio haptic signals, which meets

the level of accuracy, integrity and reliability they need in urban and outdoor environment for improving their day to day life autonomy.

ARGUS project primarily retrieves benefits from satellite navigation services and technologies to increase the level of positioning accuracy and reliability as well as the level of service availability. But the ARGUS project will also develop a whole set of services aimed at pragmatically support visually impaired people in their day-to-day life mobility. For this purpose, some specific objectives are considered:

- To build up a commercial navigation product for visually impaired people which guides them with acoustic and audio-haptic signals along a secure, pre-defined track. The positioning component uses satellite based positioning

- To develop tactile signals, acoustic and audio-haptic ones, for providing a non-visual track perception and mental map of the path, and supporting the guidance of visually impaired people along a pre-defined track.

- To develop an application for authorised third parties. With the application software, stored pre-defined tracks can be transmitted to the user terminal on demand.

- Provide an intelligent navigation and guiding portable device to support ageing population and visually impaired people.

- Provide updated data through a public Web services sharing information collected by ARGUS users with other ARGUS users or with general public

4   HOLOPHONIC SYSTEM

What is "binaural"?

Binaural sounds create the illusion that sounds produced by stereo headphones come from specific directions and distances, based on the interaural differences (arrival time and amplitude between the ears). This allows users perceiving 3D sound positioning, which can be used to guide visually impaired persons following a route (controlled via GNSS) giving a sense of 3D navigation.

To understand what binaural hearing is, we must know how we perceive the sound from those two "inputs", our ears.

The sound waves with their directionality and their amplitude make our ear/brain system locate sounds using our two ears. We use three different cues between our ears when locating a sound source: level, phase and spectrum (loudness). These differences are used in the ARGUS Project to generate virtual sounds creating another reality layer, corresponding to the direction that the user must follow. Although, none of these differences acts alone, the spatial location depends on many factors such as sight, location awareness, experience, environment, and even the state of mind are important for sound localization.
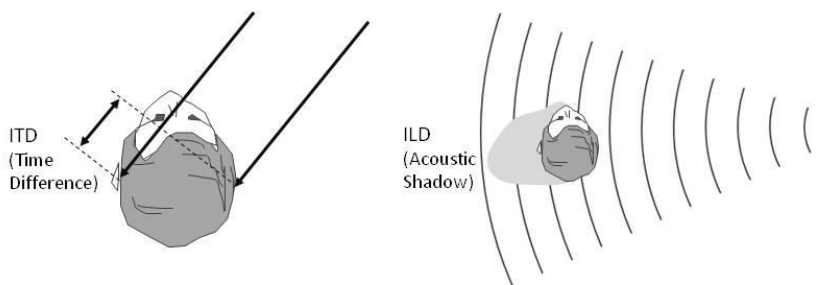
Image 1: Diagram explaining how sounds reach both ears in Holophonic system

The ARGUS User Terminal incorporates an Acoustic System, which receives the user's position from the Positioning Unit. The user perceives an additional reality layer of useful information, giving all the necessary stimuli to guide users naturally through a virtual pathway. Not just with a virtual 3D sound, but also with detailed audio descriptions of Points of Interest, services, and many environmental information.

Users can customize the system choosing among different sounds and adjusting parameters like volume, or speed of sound. Others will be automatically set up depending on the usage context and environment. The system will self-adjust its loudness to be heard but not disturbing in any area.

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In addition to the navigation system an online service will support in-situ routing assistance and a web-based collaborative environment including a social network will be used.

5 USER REQUIREMENTS GATHERING

The ARGUS project tackles a problem faced by many people with visual impairment in getting from one place to another. The project team wanted to check that the initial assumed user requirements were correct and if not to suggest alternatives. A survey was conducted using a questionnaire answered either in a face-to-face interview or online. There were 82 replies in total coming from Spain, UK, Germany, Italy and Austria.

Additionally to the user requirements, use cases were identified as well. The results of the questionnaires were analyzed and then discussed at a user workshop at UK.

The user survey of requirements showed that there was a need for a system, which would enhance the mobility and independence of blind and partially sighted people.

The main points of emerging from the survey were:

- The monetary value of such device and how it should be paid for.
- Users will not use ARGUS alone but as an aid to route finding.
- The security and safety of such a vulnerable group is important.
- Most beneficial when used in conjunction with public transport information.
- The helpfulness of a sound interface had to be validated by a Preliminary Proof of Concept test.

The survey confirmed the main requirements initially proposed for ARGUS.

6 WIZARD OF OZ PROTOTYPE

In parallel to the user requirements, the ARGUS team has developed a tool that allows testing the system setting up different parameters to configure the binaural sound and different User Interface options in an easy way. The Wizard of Oz tool helps to validate requirements, and can be also tested to train test subjects.
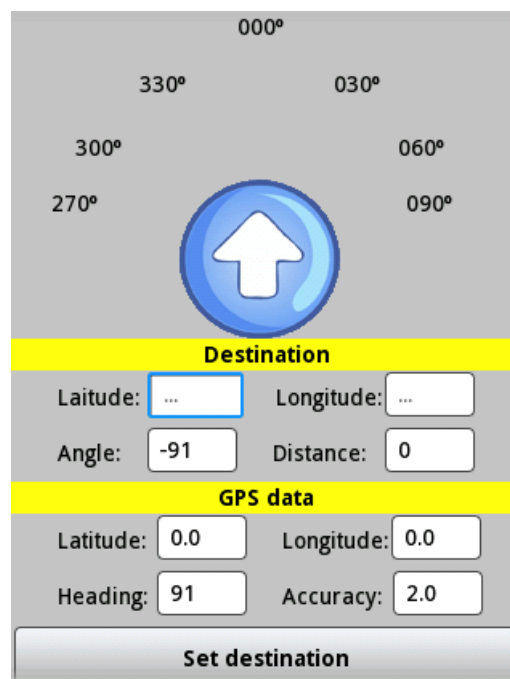
Image 2: Screen of the Wizard of Oz application

7 USER TERMINAL

Within ARGUS, the users play a major role. Based on interviewing sessions with them, the matter came up that they do not want another device but use their Smartphone.

Due to the fact that current Smartphones do not support the position accuracy and integrity required in ARGUS, the project decided to develop a separate localization and navigation module as a black box without

any visual user interface. The localization and navigation module is aimed at providing information like the high accuracy position, heading and velocity to the Smartphone supplying the precision needed by the ARGUS device.

The main user interface is realized in the ARGUS application on the Smartphone which is capable of guiding the user along pre-defined routes, using acoustic 3D sounds and haptic signals, and allowing Internet access for remote service supply and navigation position augmentation. Finally, it has to be stressed that the application for the Smartphone has been designed in order to be portable to current dominant mobile platforms such as Android, iOS and other mobile OS.

Key localization features:

- Position augmentation for precise positions.
- Quality check to indicate position accuracy.
- Safety-relevant integrity check.
- Additional measurements to bridge GNSS signal outages.

Image 3: User Terminal diagram: GNSS + Localization and navigation module + Binaural Guidance + Smartphone

8 ARGUS WEB SERVICES

The route calculation is one of the main ARGUS features. In order to generate the route from the origin to the destination, two options are available: pre-recorded tracks that can be used and a routing algorithm that calculates the best path to reach the destination from the origin point.

The optimal route is determined taking into account the restrictions or preferences of stored POIs. Pre-recorded tracks can be natural routes which are available in the multilayer cartography, or those previously generated by other users of the ARGUS system and published on the social network for other users to make use of them.

Furthermore, routes can be supplied with surrounding protection levels areas through the web-based application. The GEOCorridor® function enables additional route supervision by providing the possibility to define safety zones around given routes. An alarm is generated if the user leaves the safety zone marked by the GEOCorridor® function.

Additionally, by means of the dedicated social network, users can include their feedback and publish their experiences while using the ARGUS system. This personalized annotations become part of the multilayered data, thus the route calculation algorithm can consider it in further path generations.

9 PRELIMINARY PROOF OF CONCEPT TESTS

Preliminary Proof of Concept [PPoC] user tests have been carried out in Paderborn (Germany) in September 2012.
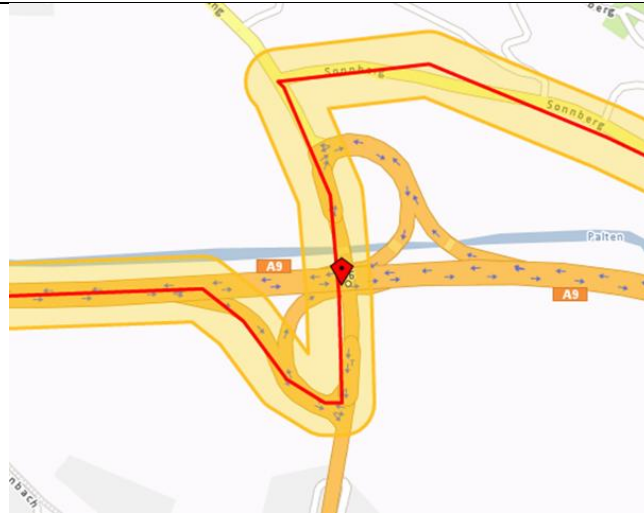
Image 4: map section with a route surrounded by a safety zone

A preliminary functional prototype with basic functionalities and using beta developments was tested by four expert users with different visual impairments who participated in these tests to technically assess the concept and to feed the project with the results obtained.

The outcomes of this PPoC have been very encouraging. All users successfully accomplished assigned navigation tasks, and low deviations from control points were achieved.

Only 5 minutes training on users was required to obtain good performance with the ARGUS system.

Key citation: "Before the test, I have to admit, I was very sceptic that this would work. I was very positively surprised after the first test with the Vibe. The headphones still allowed me to hear ambient sounds without missing the direction from where they were coming and the guidance sounds were not interfering with the ambient sounds. The navigation itself was very easy to follow and so precise that I hit two of the cones marking the track to follow. The GPS signal communicated via the binaural sounds was steady and kept me straight on the path to follow"
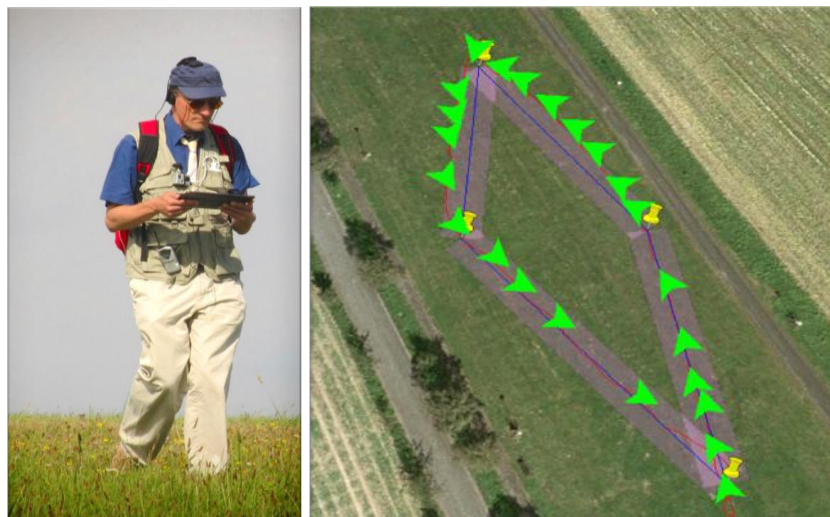
Image 5: User and route of proof of concept test

10 CONCLUSION

During testing and conversations with the potential users, most said that they would be interested in buying the ARGUS solution.

The interesting thing about the ARGUS product is that it will enable a larger accessibility of users to the city as it is useful to various sub-users groups.

ARGUS for most users will not be an alternative to the solutions already used, but an additional aid to support confidence and autonomy when moving around the streets.

It will not eliminate the use of some available solutions like the cane or the guide dogs. The cane will still be useful for detecting the closet obstacles but ARGUS will mean an additional aid to support confidence and autonomy when moving around the streets. Persons with guide dogs outlined that the system would allow them to choose additional ways to their destination instead of relying only on the trained route of the guide dog"

For example, ARGUS is of interest also for people with guide dogs. They outlined that the system would allow them to choose additional ways to their destination instead of relying only on the trained route of the guide dog. This does not imply that the ARGUS solution will be able to substitute a guide dog; it recognizes obstacles and guides them around road works while the ARGUS system would take over the guidance. Furthermore they outlined that they even would like to use ARGUS when walking accompanied by an assistant.

Even on familiar routes the system would make their lives easier, as it is a comfortable way to find the right directions without the need to count meters or crossings which is exhausting, especially after a long day at work.

The system significantly reduces the required mobility training of people with visual impairments since they can walk unfamiliar routes alone – even for the first time.

11 ACKNOWLEDGEMENTS

12 REFERENCES

http://www.projectargus.eu
http://www.haptimap.org

Attract-SEE – Assessing Territorial Attractiveness in South East Europe. Establishing a Common Territorial Monitoring Framework

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1 ABSTRACT

According to ESPON "ATTREG" project, "attractiveness is intended as the interaction of a complex set of characteristics based on the presence/absence of certain forms of Territorial Capital with the attraction of various "audiences". Effective territorial monitoring system of territorial capital assets and better coordination among different development and sectoral policies are basic conditions for achieving territorial cohesion and territorial development goals on transnational, national, regional and local level. The South-East-Europe project ATTRACT-SEE will support policy makers to achieve better coordination of territorial attractiveness policies – based upon place-specific assets – as well as their implementation and evaluation. The aim of the project is to establish a framework concept of territorial attractiveness at SEE scale as well as to develop tools useful for policy makers to enhance the quality of decisions concerning territorial cohesion and growth.

Firstly, a common territorial monitoring framework will be established, based upon a shared concept of "territorial attractiveness" as well as upon its assets. The objective is to create a model of a monitoring system suited to the needs of policy and decision makers, in view to provide outputs useful for supporting policy development and implementation. Through the establishment of a shared system of indicators, the model will then be applied to monitor territorial quality and attractiveness. Secondly, a policy coordination process will be designed, promoting, supporting and actively moderating participation and involvement of policy and decision makers from different sectors and administrative levels.

Concrete outputs such as a common territorial monitoring framework, transnational as well as trans-national/national/regional territorial quality and attractiveness reports, policy coordination process handbook, and stakeholder involvement workshops will create and/or strengthen permanent stakeholder networks in spatial and regional planning.

The paper gives an overview of the design of this research project and the implementation of a territorial monitoring system for South-East Europe. It focuses on the question on how to describe territorial attractiveness. It presents considerations and first results on the description of a concept of territorial attractiveness which will be the basis for the definition of common monitoring indicators.

2 BACKGROUND

2.1 Regional characterisitcs

South-East Europe is one of the most heterogenous and complex regions in Europe. Transformation processes and new boundaries have changed political, economic, social and cultural patterns and relations. The region has been undergoing a fundamental change in economic and production patterns since the 1990s. While some regions, especially the capital cities, are adapting well to the new challenges, others are trying to re-orientate themselves. Significant for the programme area are regional disparities in terms of economic power, innovation, competitiveness and accessibility between urban areas and rural areas. In the European transportation network, South East Europe is acting as a bridge between North, South, East and West Europe. The existing networks however cannot keep pace with the rise in demand and the increasingly

demanding standards specifications. A large number of instruments and concepts like the Trans-European Networks (TENs) and the Pan-European Transport Corridors cross the area, but need to be further developed. There are rivers suitable for freight transportation, maritime borders and the Danube, an important international inland waterway and integrating factor in many fields, such as transport, trade and environment. South East Europe is characterised by broad biodiversity and natural resources of high environmental value. The potential for the use of environmentally friendly technologies and the assets for future economic and social development are the strong points of the area, but inherited environmental damage has to be addressed as well (URL 1). Current challenges and driving forces for the spatial development are growing impact of globalization and structural changes after the recent economic crisis, demographic and social challenges and the (upcoming) EU-integration (EU 2011).

Figure 1: South-East-Europe according tot he SEE Transnational Cooperation Programme (Source: URL 1).

2.2 Territorial Cohesion of the European Union

Based on the Territorial Agenda 2020 of the EU one major objective of the European cohesion policy has been to strengthen economic and social cohesion. The main issues of cohesion are to (URL 2):

- Capitalise on the strengths of each territory so they can best contribute to the sustainable and balanced development of the EU as a whole;

- Manage concentration – Cities have both positive and negative impacts – intensifying innovation and productivity at the same time as pollution and social exclusion;

- Better connect territories – People should be able to live wherever they want, with access to public services, efficient transport, reliable energy networks and broadband internet throughout the territory;

- Develop cooperation – The effects of climate change and traffic congestion do not stop at traditional administrative borders, so new forms of cooperation are needed between countries and regions. The EU Strategy for the Baltic Sea Region and the EU Strategy for the Danube Region are examples of new, macro-regional approach;

- Foster Urban-Rural linkages.

2.3 Current situation of monitoring in South-East-Europe

In practice, the implementation of the objectives of territorial cohesion is partly slowed down because of a lack of coordination between decision makers from different sectors and administrative levels. For example, there is only little awareness of how sectoral decisions can influence the region as a whole. Even though a number of good practices exist on local or regional level, harmonised methodologies and tools to analyse and monitor the spatial development and spatial trends are missing on national and transnational level. Nevertheless, monitoring can provide useful results for the establishement of evidence-based and strategic developments. A monitoring system is a tool for a comprehensive observation of the implementation of territorial and sectoral policies (ROYAL TOWN PLANNING INSTITUTE 2008; UNITED NATIONS 2007) and the need for a common monitoring system, transparent planning and decision making as well as stronger cooperation between regions is growing. These requirements were in the centre of discussion at several transnational workshops and conferences such as at the conference on "Potentials of territorial

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cohesion in western Balkan" organized in 2010 by the Ministry of Evironment and Planning in Slovenia. A second impulse was given one year after in Ljubljana during an event organized between the South-East-Europe Programme and the project Plan4all (URL 3) that contributed to the harmonization of spatial planning data according to INSPIRE – the European Directive for the establishment of a spatial data infrastructure in Europe (URL 4). In this context the question rises how a monitoring system can be established in South-East-Europe.

3 ATTRACT-SEE PROJECT ACTIVITIES AND STATUS OF THEIR REALIZATION

3.1 Project aims and structure

The project Attract-SEE – Assessing Territorial Attractiveness in South East Europe deals with the above question. The aim of the project is to develop a transnational monitoring system that supports the establishement of policy coordination framework in concerned regions and to develop tools for policy and decision makers enhancing the quality of their development decisions. It is funded under the European South-East-Europe Programme between October 2012 and September 2014. The consortium has ten project partners. These are Geodetic Institute of Slovenia (lead partner), CEIT Alanova (Austria), Office for National Economic Planning (ONEP) (Hungary), Emilia-Romagna Region (RER) (Italy), Ministry of Infrastructure and Spatial Planning (MzIP) (Slovenia), The Regional Environmental Center for Central and Eastern Europe (REC) (Slovenia), Republic Agency for Spatial Planning (RAPP) (Serbia), Network of Associations of Local Authorities in South-East Europe (NALAS) (Former Yugoslav Republic of Macedonia), Institute of spatial planning of the Koprivnica-Križevci County (ZAVOD) (Croatia) and Federal Ministry of Physical Planning (FMPU) (Bosnia and Herzegovina). Further one associated, strategic partners from the EU, and several observers are involved in the project.

Project Attract-SEE is designed out of two parallel in several worksteps interlinked activities. First tier of activities is set out to develop a common territorial monitoring framework (TMF) applicable in partner countries and regions. Second tier of actions is developing and facilitating a policy coordination process promoting interaction among territorial monitoring and policy making. Stakeholders involved into a policy coordination process – mainly through project`s workshops – will participate in designing TMF providing their needs for information, their expectations as the manner in which territorial information could be presented in the most suitable way.

The project consists of six work packages (WP), covering the transnational project and financial management (WP1), communication activities (WP2), common territorial monitoring framework (WP3), attractiveness of SEE territories (WP4), development of common territorial monitoring reports (WP5), and policy coordination (WP6). WPs are divided into several activities which are being implemented in parallel. The project started 1st October 2012. According to the timeline of the project (first period of five is finished), most of the activities have been started and some of them have already been finished. Activities in WP2 started with the common project visual identity. The project website (http://www.attract-see.eu/) and some promotion material were prepared, too. The Project Communication Strategy is in preparation. Creation of the common territorial monitoring framework (WP3) has started with an overview of the EU territorial monitoring best practices. ESPON (URL 5) Programme and EUROSTAT (URL 6) solutions (e.g. NUTS classification), INSPIRE Directive (eg. data harmonization and interoperability models) will be applied. The Inquiery on Territorial Monitoring Systems was delivered to all the project partners and results were analysed to get the common denominator of needs, expectations, and feasibility of the project implementation. Common set of attractiveness indicators for SEE region is being prepared. The final version of the Report on Territorial Attractiveness (WP4) was prepared and is presented in the text below. Development of the common territorial monitoring (WP5) started with collecting information on spatial datasets. Data overviews for each country/region involved were prepared. Their analysis got answers concerning available spatial datasets in SEE region. Dataset sources, dataset regulations, accessibility of datasets, and dataset maintenance periods were explored. Policy Coordination Process Handbook (WP6) is in preparation and will serve as a common methodological support for all the project partners.

Based on the analyses of existing monitoring systems in partner countries as other good practices TMF will be developed in the project, supporting observation of existing territorial development and territorial trends.

TMF will define overall process of territorial monitoring including data gathering and analysis, indicator preparation and calculations and territorial report preparation.

A transnational attractiveness synthesis report will be developed as the project output. Territorial reports provide information and knowledge on territorial structures, potentials and trends. The report will be based on the quantitative results from the analyses of established harmonised indicator system on the territorial level of the partner countries and regions. Where applicable and available, data for other SEE countries will be used and presented. Project aims to inform policy and decision makers and draw their attention about wider territorial picture and encourage them to take it into account when developing and implementing various sectoral policies. The report will be presented to stakeholders at the transnational level at the transnational stakeholder involvement workshop, which will be organised alongside the final project conference.

In different pilot areas more detailed separate territorial reports will be prepared on the basis of available indicators and on the basis of existing national/regional analysis in the field of territorial attractiveness and quality. In order to ensure comparability of reports on transnational level, common methodology for territorial attractiveness report will be used. This methodology will define draft content and form of the report. The policy coordination process is very important result of the project and is described in next chapter.

3.2 Project stakeholder involvement

The policy coordination process is expected to result in a more long term coordination network. To support the activities a Policy coordination handbook will be prepared at early project implementation stage and aims to guide territorial development experts in establishing stakeholder networks, and in coordinating the process in their pilot areas with engageing stakeholders. This document will define the strategy for involving stakeholders: the aproach, the principles and guidelines for implementation. It will also present the benefits, the drivers and the barriers for effective involvement.

Equipped with appropriate knowledge and skills, and following the methodology defined in the policy coordination process handbook, the relevant project partners will develop the stakeholder involvement plans in each project region/country. In fact these documents will be the action plans for implementation of stakeholder involvement in practice. Stakeholder involvement will be implemented at national workshops. Each partner should organize four national workshops where objectives and results will be discussed and verified. Such a concept of stakeholder involvement will enable regular verification of intermediate results and will strenghten the stakeholder networks.

4 DEFINING TERRITORIAL ATTRACTIVENESS

4.1 Concept and operational implications

"Attractiveness": what are we talking about? Although more and more frequent in development plans, programmes and other policy documents, not always the appeal of the word goes together with a clear meaning. Attract-SEE assumed as a starting point the previous ESPON ATTREG Project (URL 7), that after considering several European case studies, provided a framework definition of attractiveness "as the interaction of a complex set of characteristics based on the presence/absence of certain forms of Territorial Capital with the attraction of various "audiences" varying in their level of transience in place from long-term residents as working population to short-term visitors and some hybrids mobilities between the two". In this sense, attractivess becomes "a place-specific asset that guarantees some kind of socio economic stability", referred to the different dimensions of Territorial Capital (Environmental; Economic and Human; Anthropic; Socio-Cultural and Institutional Capitals).

According to Attract-SEE partners, this perspective attributes to the concept of attractiveness a clear "territorial" dimension. In concrete terms, territorial attractiveness grounds on a mobility concept and implies the capacity of a place to attract and retain subjects from other places, due to its advantageous features. We can consider that building an "attractive region" needs to focus two complementary dimensions:

- the home internal side, made of quality settlements and ecosystems, able to regenerate social cohesion, reproduce knowledge, create decent jobs and make good value of entrepreneurship: it is key for retaining citizens, skilled workforce, enterprises, etc. already living in the "place";

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- the external side, made of international acknowledgement of these territorial qualities, linked to the capacity to attract and hold talents and investments, to attract visitors/tourists for different purposes (culture, nature, business, etc.) and ensure their "loyalty" as availability to return to the "place".

This approach allows to operationalize the concept within EU cohesion policy and to make it assessable at SEE scale, considering both the trans-national perspective and the internal one, at country/region scale.

4.2 Methodology

The methodological approach to reach this objective included three steps, developed complementarily and through three operative tools adopted and provided to project partners (PPs) and to stakeholders.

Step 1 focused on the assessment of the concept of "Territorial Attractiveness" adopted by PPs country/region, making specific reference to official Spatial Policy Documents (strategic and/or operational Plans and Programmes). For the purpose it has been developed a "Tool of Inquiry" addressing on one hand the territorial monitoring systems in use in partners' countries/regions and the identification of specific best practices and on the other focusing on the concept of attractiveness adopted, the supporting assets and the specific indicators utilised. The questionnaire was provided by e-mail.

Step 2 was aimed at assessing the answers provided by partners on the concept of Territorial Attractiveness according to their relevant strategic and/or operational Plans and/or Programmes as well as at identifying the assets considered as strategic. The results were subsequently re-elaborated and returned to project partners and to project international stakeholders during the Ljubljana conference and partner meeting (December 13-14, 2012). During these events partners were provided with a first outlook of the concepts of Territorial Attractiveness in use in each context while a first characterization of the concept was attempted, specifying in particular the features that explain the actual meaning of Territorial Attractiveness ("attracting whom, where, how?"). Secondarily, a preliminary classification of the Territorial Capital assets to be considered was presented. The potential relationships between local visions/policies adopted by partners and the main EU strategic documents for development were also explored (i.e. EU 2020 and the Territorial Agenda 2020).

Step 3: international stakeholders and partners were asked to express their opinion on the relevance of the Territorial Capital assets identified for Territorial Attractiveness assessment, to obtain a revised picture of the concept and a framework of the assets to be considered, adjusted to the perspectives of each partners. This was done using two types of questionnaire aimed at evaluating the relevance of any asset, including the possibility to suggest the introduction of new assets considered relevant. In particular, international stakeholders questionnaire (directly distributed during Ljubljana Conference) were asked to provide a "qualitative" assessment of the assets identified (in terms of relevance/non relevance) while partners questionnaire (sent by e-mail) provided a "quantitative" assessment (assets ranked from 1 to 5, according to a growing relevance) as well as a double level of assessment, to be held at national and transnational level.

After a wide debate, the assets indicated by partners were grouped into macro-themes and put in relation with specific target groups ("audiences"), in view to give evidence to their different level of interest in each assets and – in some cases – to the real trade-offs (see tab. 4.1 in the next paragraph). Attract-SEE partners are presently facing the job to identify proper indicators for attractiveness assets, to be considered at trans-national and national scale, in view to produce, in the forthcoming months, specific reports that will pave the way for the establishment of a Common Territorial Monitoring Framework.

4.3 Results of the work process

First of all, Attract-SEE partners agreed on some specific features of the concept:

(1) Quality of places gains high importance: cohesion/inclusiveness, culture, public services, effective governance are key for attracting and retaining a specific "audience". E.g. in the case of cities seen as "engines of regional development", attractiveness depends not only on the sum of its structures and infrastructures but also on its capacity of attracting and retaining people.

(2) Territorial scales and diversity of places are the key to assess attractiveness: it is on diversity that depends the generation of flows from one place to another and the effectiveness of different strategies – such as specialization or balance of mixed factors – depends on the context and dimension of the area considered.

(3) Drivers for "attractiveness" are different: Territorial Capital assets should thus be considered in relation to "who is attracted by what". E.g.:

- environmental capital, including good climate and a high quality landscape, attracting "silver migrants";

- economic/knowledge capital – concentrated in core European cities – attracts both investments and talents;

- social inclusion capacity as well as good governance arrangements reinforce flows of migrants, both new citizens and enterprises, facilitating the birth of new initiatives by "contamination" of ideas and resources,.

(4) "Plurality" of needs/expectations grounds the demand for diversified policies targeted to different actors that, while commonly looking for "quality of places", do not always share the same concept of what quality actually is, e.g.: natural and/or cultural tourism development policies may strongly conflict with heavy infrastructure policies (e.g. industrial/logistic poles), if pursued on the same territory. This calls for "good governance" of spatial development processes, also ensuring the management of objectives trade-offs.

(5) (Un)stability of factors of attractiveness: positioning of the territories should rely on stable features that allow a long term strategy but, while some drivers for attractiveness may prove to be volatile (e.g: big events) if not included in a wider vision, also the same understanding of territorial attractiveness may change. E.g.:

- many territories become very "fragile" after 2008 crisis, with social capital supporting innovation capacity of a local system (e.g. an industrial district) breaking down;

- knowledge capital may be attracted elsewhere as well as financial capital, according to more favourable conditions;

- climate change can determine strong changes in territorial quality and make e.g. a territory less attractive for tourists/visitors; financial crisis can make the management of cultural/natural resources less reliable discouraging both fruition and the implementation of proactive environmental prevention policies.

Targets / TC asset		Companies/ Investments	Tourists	Residents	Migrants
Environmental capital					
Environmental quality	Environmental quality (air, water, waste, greenhouse gases, etc.)		x	x	x
Territorial/ecosystem integrity	Territorial/ecosystem fragmentation		x	x	
	Biodiversity		x	x	
	Risk management	x		x	
Natural resources and energy	Natural resources management (renewable/non renewable)			x	
	Energy management (fossil fuels / renewable resources)	x		x	
Anthropic capital					
Urban quality	Access to public services	x		x	x
	Towns/settlements revitalisation/networking			x	x
	Urban health/liveability /env. services			x	x
Landscape quality	Visual attractiveness		x	x	
	Landscape diversity		x	x	
	Balanced urban-rural relations			x	
Infrastructures	Local/global accessibility	x	x	x	x
	Basic infrastructures for daily life (to be detailed:)	x	x	x	x
Socio-cultural capital					
Culture	Cultural heritage		x	x	
	Multiple cultural services		x	x	x
Quality of life	Welfare/Cost of living	x	x	x	x
	Social equity/poverty reduction			x	
	Multicultural integration			x	x
	Sense of belonging/citizenship			x	
	Gender mainstreaming			x	
Economic/human capital					
Knowledge & Innovation	Research	x			x
	Education/capacity building	x		x	x
	Attracting/holding competences	x			x
Employment	Employment	x		x	x
Specializations / Key	Diversified economic activities/services	x			

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sectors					
Tourism	Attractiveness of tourism system	x	x		
Investment Promotion	Foreign investments attraction	x			x
	Quality business locations/services	x			
	Partnerships relations	x			x
Population	Population growth, % pop in age 15-64 years			x	x
Institutional capital					
Governance	Effective governance arrangements	x		x	
International relations	Cross-border cooperation	x			x
	Internationalization	x			x

Table 1: Matching assets with different group of targets.

To conclude, "Territorial Attractiveness" is not an absolute concept: "attractiveness" of a territory can change according to the targets and the assets of the Territorial Capital considered and positioning a territory in its external context implies a matching between specific assets and targets to attract. These two orientations have to be related to the different goals/visions of the overall territorial development strategy.

5 MONITORING FOR SPATIAL DECISIONS

5.1 Building territorial monitoring tool

Public policies and other sectoral/strategic decision-makers need monitoring tools to continually and easily follow-up and understand effects and trends within local, regional, national and/or transnational levels produced by their actions and plans, which are aimed at sustainable and balanced territorial development.

From spatio-temporal perspective, these monitoring tools should provide platform for collection and storing various types of data and information on different territorial development conditions, statuses and events through time periods; from public policy process perspective, monitoring tools should support territorial development knowledge creation, using analysis, comparison, interpretation and presentation methods, needed for informed and timely decision-making. Due to described territorial development character and needs of policy creation and management process, territorial monitoring tools are usually supported by GIS technology advantages, which are in some cases further enhanced by particular expert or decision-making systems (based on multicriteria analysis or system dynamics approach).

Therefore, following the EU's Territorial Agenda 2020 aimed at territorial development cohesion by appropriate policies development and implementation throughout member and candidate/neighbouring states/regions, Project would propose territorial monitoring tool that should support territorial attractiveness policies and decision-making processes coordination within the South East Europe region.

5.2 Design and implementation of the monitoring framework

In building monitoring tool for attractiveness policy development/implementation and coordination within the project area, both social and technical dimensions of common information platform would be considered and designed to involve each project partner country's specifics, on one side, and to provide basis both for local as well as SEE-wide attractiveness development decision-making process, on the other.

Starting from the current territorial development practices of project partners as well as SEE Programme objectives and EU initiatives falling within the technical and social domains of the project scope, common territorial monitoring framework (CTMF) would be built. Its outlines would be positioned among the relevant European initiatives and programmes results and recommendations, like ESPON, INSPIRE/Plan4all and other relevant approaches (OECD, UN).

On the technical side of common territorial monitoring tool for attractiveness assessment, project partners would develop as outputs:

(1) Common methodology for territorial attractiveness indicators identification based on OECD and UN approache's principles "pressure, state, response" for those events or processes identified as relevant for attractiveness development within each project partner's territory and SEE in general. Also, policy interrelation matrix would be developed for policy effects evaluation and strategic decision-making against identified attractiveness trageting values and groups; and

(2) Common data and metadata model for territorial attractiveness indicators definition based on INSPIRE/Plan4all recommendations and data specifications, and adjusted to project partners' existing

experience as well as specific needs. Additionally, interpretations of attractiveness indicators' values would be done against relevant ESPON projects' results. On the social side of territorial attractiveness monitoring tool for SEE, national stakeholders communities consisting of policy and other sectoral/strategic decision-makers would be involved in the project acitivies at the four workshops during the project duration. The main objectives of those workshops are to present project aim, activities and results to stakeholder communities, but also to build capacity in domain of territorial monitoring results understanding and utilization, building thus ownership over the project outcome and its results' sustainability.

Finally, based on gap analysis of existing territorial monitoring experience in each project partner against developed CTMF, sustainability of the project results would be additionally secure by action plans where each partner would identify steps needed for achieving territorial monitoring goals.

6 OUTLOOK

The results of Attract-SEE should be used by politicians and decision makers to improve cooperation and networks between European countries, to support territorial cohesion and development in South-East-Europe. Next steps of Attract-SEE are the finalisation of the design of the common monitoring framework, the final definition of monitoring indicators based on a defined methodology, and the development of the common data model. The main aspects of all project phases are a policy coordination process as well as the involvement of stakeholders.

7 REFERENCES

Europäische Union (2011), Territoriale Agenda der Europäischen Union 2020. http://www.oerok.gv.at/fileadmin/Bilder/2.Reiter-Raum_u._Region/4.Europ-Raumentwicklung/TA_2020_FINAL_DE.pdf (30.01.2013).
The Royal Town Planning Institute (2008), Measuring the Outcomes of Spatial Planning in England, Final Report.
United Nations (2007), Indicators of Sustainable Development: Guidelines and Methodologies.
Internet (04.03.2013)
URL 1: Region Süd-Ost-Europa: http://www.southeast-europe.net/en/about_see/participating_countries/
URL 2: Regional Policy – Territorial Cohesion: http://ec.europa.eu/regional_policy/what/cohesion/index_en.cfm
URL 3: Project Plan4all: http://www.plan4all.eu
URL 4: INSPIRE: http://inspire.jrc.ec.europa.eu/
URL 5: ESPON http://www.espon.eu/main/
URL 6: EUROSTAT: http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/
URL 7: ATTREG – The Attractiveness of European regions and cities for residents and visitors, Applied Research 2013/1/7, http://www.espon.eu/main/Menu_Projects/Menu_AppliedResearch/attreg.html

CentropeSTATISTICS – Interactive Creation of Maps and Charts

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1 INTRODUCTION

The Centrope region is situated at the mutual borders of Austria, the Czech Republic, Hungary, and Slovakia. Its aim is to foster cultural, ecologic and economic development in an area that had to suffer enormous disadvantages during the decades of existence of the Iron Curtain and is now ready to catch up.

To help planners and stakeholders to get an overview of the Centrope region, the geoportal CentropeMAP went online in 2005 and was soon extended by a cross-border statistics database which is linked to the map view. This powerful tool allows you to convert statistic data into easily legible thematic maps and various types of charts on the fly.

CentropeMAP is an online geoportal, which means it collects web map services (WMS) from all parts of the Centrope Region and presents all these services to the user compiled into one single map. CentropeMAP emphasises on datasets that are of interest for spatial planning and similar professions, comprising multiple data layers from the fields of biota, boundaries, elevation, imagery/base maps, inland waters, planning/cadastre, structure, and transportation.

Planners and stakeholders receive a great help from maps. Also, statistic data is important to analyse a region. So why not combine maps and statistics and create a combined view of statistic data directly in a map? CentropeSTATISTICS joins data from the regions Vysocina, Jiho-moravsky, Bratislavsky, Trnavsky, Györ-Moson-Sopron, Burgenland, Lower Austria, and Vienna and features readymade thematic maps as well as an expert mode which gives full access to the whole Centrope cross-border statistics database. Note that you can also download these data and, for example, use it in a spread-sheet. Almost all datasets are collected in a time series so that the development of the region can be explored in yearly steps since 2001; the data range comprises various fields like population statistics, population development and projection as well as land use, educational statistics, tourism or migration.

2 THE BASIC MODE

The CentropeSTATISTICS Basic Mode allows you to create a couple of thematic maps which have been predefined by the CentropeMAP team. It is mainly for quick queries or for people who do not have much experience in creating thematic maps or charts from statistic tables.

All available statistics themes are collected in a menu tree on the left part of the CentropeSTATISTICS window. After selection, it may take a couple of seconds until a map preview appears in the right half of the window. In the meanwhile, the theme you selected is prepared to be displayed as web map service image in the CentropeMAP window. Now you can hit the "Create Map" button. The map, which has been precalculated in the background, is now brought into the CentropeMAP window, and the CentropeMAP window is automatically brought to your desktop.

3 THE EXPERT MODE

3.1 Creating maps and charts

The CentropeSTATISTICS Expert Mode gives you full access to the whole Centrope cross-border statistics database, you can download these data and set several options while creating your thematic map or chart. The expert mode is meant for planners, statisticians and other professionals who know how to create meaningful thematic maps and charts.
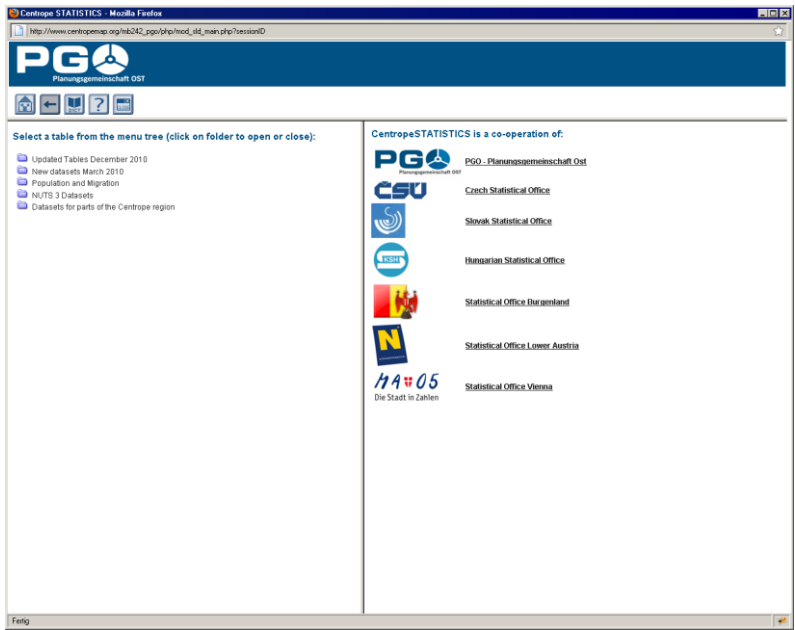
Fig. 1: CentropeSTATISTICS start screen.

Looking at the CentropeSTATISTICS Expert Mode start screen, you will see that it is divided into three parts. At the top you have the title bar with some buttons, and below the screen is divided into a left and a right half. If you like, you can resize the whole window or move the grey border that separates the left and right screen parts. All available statistics themes are collected in a menu tree on the left part of the CentropeSTATISTICS window. To select a theme, click on it. After your click, the availability form is loaded into the right half of the statistics window. It shows you which attributes are available for selection. In most cases, this will be the year only as we tend to prepare the statistics table in a way that similar themes are shown in separate tables and not altogether in one large table. Another example for an attribute to be selected is whether the number shall be shown as absolute values or, for instance, per 1,000 inhabitants.
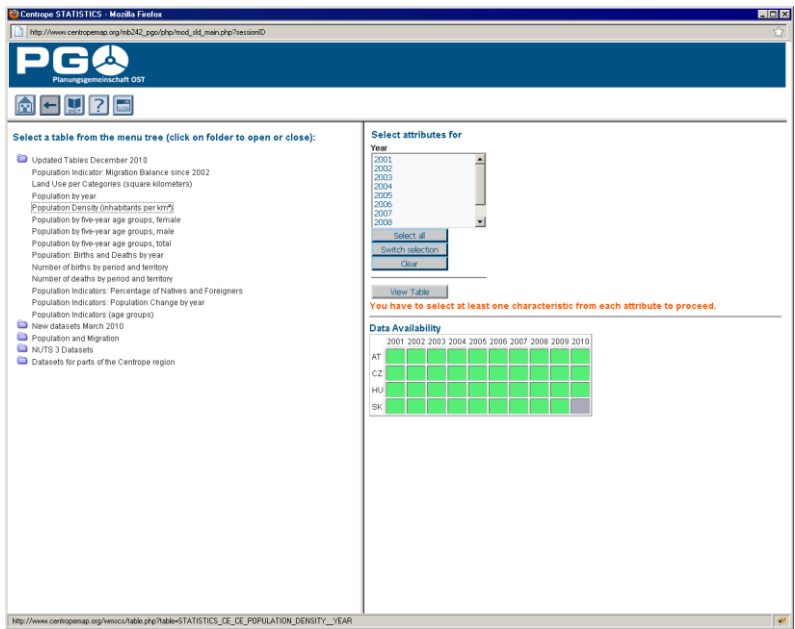
Fig. 2: CentropeSTATISTICS start screen after table selection.

A green square means that data is available, a grey square indicated that data is not available in a certain part of the Centrope region for a certain year. Clicking the "View Table" buttons opens the selected table in the statistics window. The division between left and right half of the window does not exist further on.
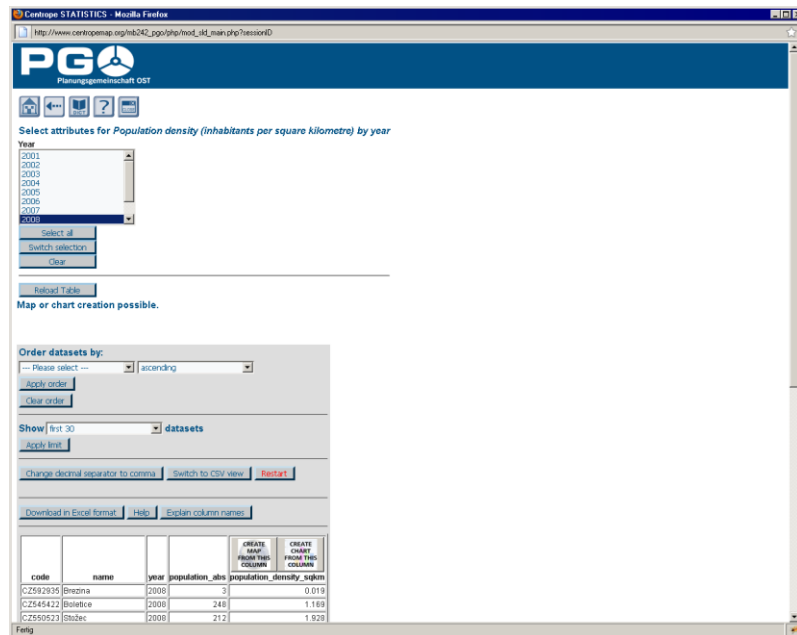
Fig. 3: CentropeSTATISTICS table view.

From this point, you are ready to

- create maps,
- create bar/line/point charts,
- create pie charts,
- create symbol maps.

The result may look like this:
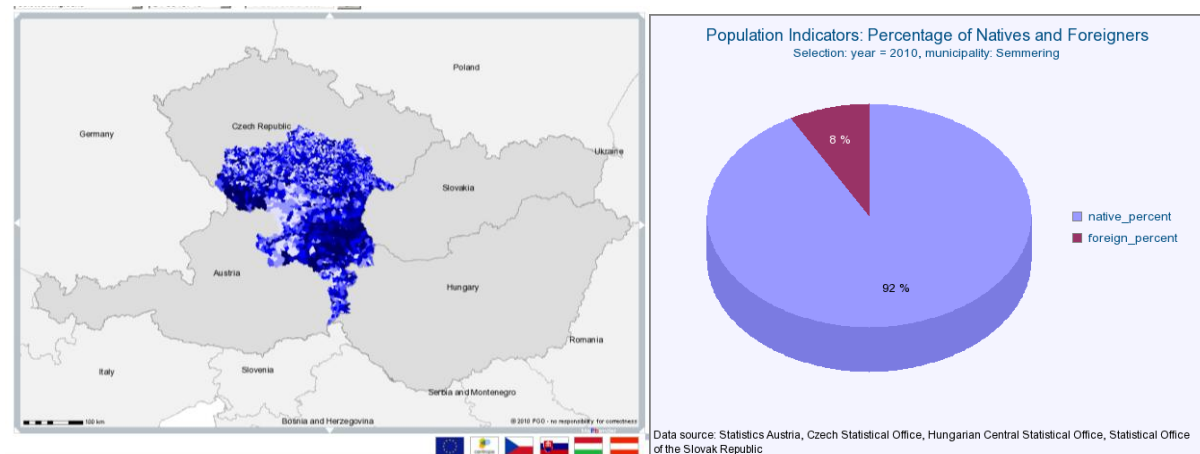
Fig. 4: Example results: thematic map (left), pie chart (right).

3.2 Working with user-defined tables

You are not restricted to the given tables in CentropeSTATISTICS. There is also a possiblity to combine data from more than one table, put it together in a custom table, and even calculate your own indicators. First of all, if you want to work with a custom table, you have to create one. The "Create custom table" button is situated below the table tree menu on the start page of the CentropeSTATISTICS expert mode. After table creation, if you press the "View custom table" button, the same happens as if you selected any other table from the menu tree. It is still empty, so in the next step you have to add columns to your custom table. Return to the start page and select any table you want from the menu tree. Open it as usual. You can see that an additional button appears on the top of each column: "Add to custom table".

Map calculations and map output are done only for the geographic intersection of the data added to your table. E. g. if you add a column containing data for the whole Centrope region and another column with data

for whole Austria, all following operations will only be performed for the Centrope part of Austria. If you try to add a column which would set the intersection to null, CentropeSTATISTICS will notice this and prevent you from adding this column.
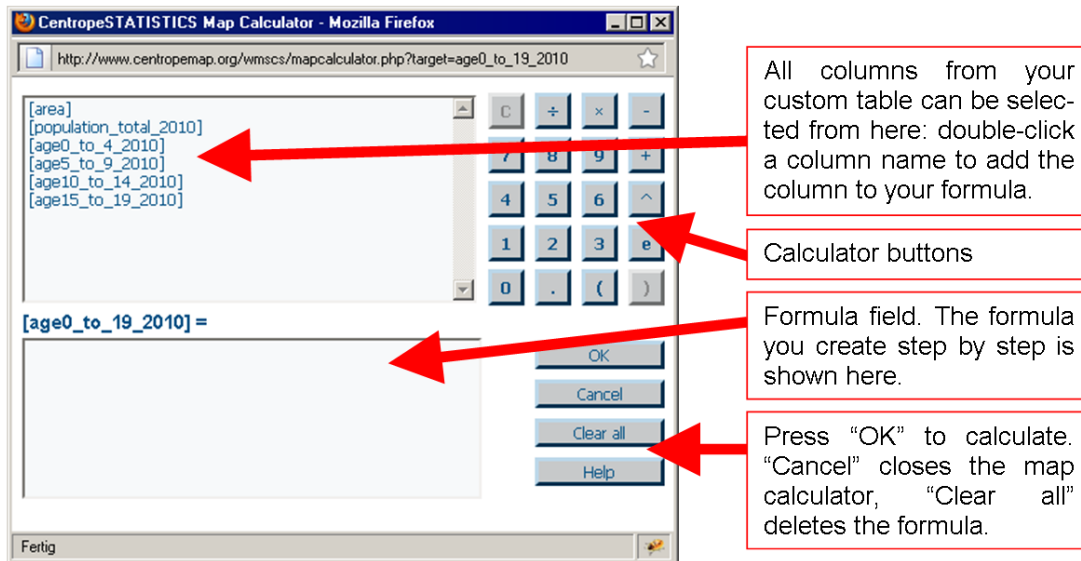
Fig. 5: The map calculator.

The map calculator works similar to any standard desk calculator. The "C" button lets you undo your last calculator action, i. e. remove a digit, an operator or a column name from the formula field. If you press "OK", the formula will be checked for errors and executed, resulting in a new column within your custom table.

4 PERSPECTIVES

Behind CentropeMAP and CentropeSTATISTICS there is a cross-border database for both geodata and statistics. This database is growing – slowly, but steadily. Approximately twice a year experts from all partner regions meet to discuss the further extension of this database. For various reasons, the extension of the cross-border database is not an easy task:

All incoming datasets have to be checked on their compatibility and comparability with existing data. This is extremely important for statistical data because it has to be verified that datasets from different countries were collected in the same way before they are put together in one table. Otherwise, they cannot be compared with each other.

This situation may improve in the future: The statistic offices of the partner regions are more and more following guidelines of the European statistical office EUROSTAT, so their data output is automatically comparable between different regions and countries. Data delivery from each EU country to Eurostat has already been running for many years; however, these datasets are not on municipality level but often on a quite rough regional level which is good for a pan-European point of view, but to general for the Centrope region.

5 WEBLINK

http://www.centropemap.org

Cities for All: All-Inclusive Collective Urban Spaces for the Public – a Case of a Successful Interactive Model

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1 ABSTRACT

In theory bringing a diverse range of the public together into a locality in a city and satisfying a broad spectrum of expectations is what public spaces are designed to satisfy. However, in reality this has proven to be a challenging task for both designers and planners. There are predominant factors that determine who would spend their time in a public space and to what extents they would be satisfied with their time spent. Those include age, gender, ethnicity, social class, needs, wants and personal preferences to just name a few.

Having encompassed a wide range of activities, all-inclusive urban spaces may impose substantial costs to the city from inception through to the completion stages. However, such spaces can successfully be launched, and reimburse their costs, if they are carefully set up to absorb the mass of their peripheral communities and inhabitants on a regular basis. Offering relief for senior citizens, amusement for the youngsters and toddlers, entertainment for the teenagers, all in chorus, provide interactive atmospheres that resonate with the initial purposes of all-inclusive public spaces.

This paper aims to investigate Niruye-Havaei, an established urban square, in Tehran as one of the most successful exemplars in provision of an overarching urban public space, overcoming the aforementioned problem. The paper begins with general background information of the place and the space, and the communities in the surrounding vicinities, and how they have been formed over the years and how they are in a dynamic interaction with each other, leading to introduction of such successful pattern. Utilising overt and covert participant observation (ethnography) methods, it will then contemplate on the potentials of place and space, and explores how the entire urban district has been 'orbitalised' around this featured space and why it has found such a prominent role in the area. Finally, it concludes with a framework model for all-inclusive public spaces and suggests its application to similar situations for acquiring a record of success in urban developments.

2 ON PLACE AND SPACE: THE OPENING

'There is no specific theory of space, but quite simply a deployment and specification of the theory of social structure, in order to account for the characteristics of the particular social form, space, and its articulation with other historically given, forms and processes' (Castells 1977:124). Castells (1983) had to retract from his radical Marxist take on space to assert that space is in fact the society itself as opposed to a reflection of the society (Hubbard 2004).

Despite being heavily criticised by Manuel Castells, for naively equating spatial propinquity with social emancipation (Hubbard 2004:74), 'as if there were no institutional organisation outside arrangement of space' (Castells 1977:90), Henri Lefebvre played a pivotal role as a theorist of social space with critique of the 'Everydayness' as a soul-destroying feature of modernity, when the social interaction takes place in the material environment. His critique developed from domestic life in a household to the neighbourhood and to the urban life where his reading of 'the urban' conforms to the Hegelian form in a phenomenological sense. In his view 'the urban' is social 'centrality' where capitalist's aspects intersect in the place even for a short period of time; what contradicts with Castells' dichotomy of place and the space of flows (Castell 1977 in: Shields 2004:209). The 'City-ness' in his view, Shields (2004) asserts that, is the simultaneous gathering and dispersing of goods, information and people. In 'The Production of Space' (1991) and 'Writing on Cities' (1996), Lefebvre departs from a synchronic discourse on space to a diachronic one where culture finds a quintessential role as a result of the history of change.

Lefebvre's 'abstract space' of capitalism was later on challenged by Bourdieu's advocacy for habitus; a vague but authentic, and culturally-rich 'place' (Bridge 2004:60). Later works attempt to investigate the validity of the concept within the fast pace of globalisation by investigating it at different levels. Leach (2002) and Dovey (2002) for instance explore the relationships between habitus and formation of identity by

highlighting the architectural profession as a responsible party for reproducing the dominant social divisions through forms of 'place-making' (Bridge 2004)

Drawing on Alfred Schutz (Schutz and Luckmann 1974), Bauman (1993: 145) maintains that our very sense of objective, physical space derives from the 'phenomenological reduction of daily experience to pure quantity, during which distance is "depopulated" and "extemporalised"' (in: Clarke and Doel 2004). They continue to state that cognitive spacing derives from modernity's desire to master space; to determine a place for everything and ensure that everything is in place – so that surveillance might readily reveal whatever is 'out of place' (Clarke and Doel 2004:36)

'Spaces of dispersion' which draws a principle, a meaning, a spirit, a worldview, an overall shape, etc. – what Foucault categorises as 'all phenomena' – around a single centre; a space of dispersion deployed by a general history (Foucault 1972:10 in Philo 2004:124) is perhaps Foucault's most important contribution to the formation of space and place in the post modernity era beyond his concept of power and theory of governance. The interactions across time and space was later used by Giddens (1984 in Warf 2004:130-132) as time-space distantiation as a fundamental concept to exertion of power; in his 'structuration theory', more ontologically than epistemologically though.

3   THE USE AND THE PURPOSE OF THE PUBLIC SPACE

Carmona et al. (2008) categorise the benefits of the public space into 'economic' i.e. positive impact on property prices (Colin Buchanan and Partners 2007, Luttik 2000, Peiser and Schwann 1993 and CABE 2005a), boosting commercial trading (DoE and ATCM 1997) or regional economic performance (Frontier Economics 2004), land value and investment (Luther and Gruehn 2001, Phillips 2000); 'human health' by encouraging exercise (Hakim 1999, Diabetes Prevention Group 2002, Slattery et al. 1997, Grisso et al. 1991), influence a longer life (Takano et al. 2002), providing space for formal and informal sports and games (Woolley 2003, Woolley and Johns 2001), reducing stress and enhancing mental health (Hartig et al. 2003, Halpern 1995) and child health (Taylor et al. 2001); 'social' by delivering learning benefits to children (Fjortoft 2001, Taylor et al. 1998), nurturing social and cognitive skills (Pellegrini and Blatchford 1993), reducing crime and asbo (McKay 1998, Conolly 2002, Painter 1996, Loukaitou-Sideris et al. 2001, CABE 2005b), promoting neighbourliness and social cohesion (Baulkwill 2002, Massey 2002, Quayle and Driessen van der Like 1997, Kuo et al. 1998, Appleyard 1981), providing venues for social events (Schuster 1995), reducing child mortality by avoiding car-dominated environments (Living Streets 2001, Maconachie and Elliston 2002), providing venues for social interchange and supporting social life of communities (Mean and Tims 2005, Dines and Cattel 2006, Jones et al. 2007, Watson 2006); and finally 'Environmental' by encouraging the use of sustainable modes of transport (Gehl and Gemzøe 1996, 2000), improving air quality through reducing heat island effects, pollution and water run-off (Littlefair et al. 2000, Whitford Ennos and Handley 2001, Shashua-Bar and Hoffman 2000, Upmanis 2000) and creating opportunities for urban wildlife to flourish (Shoard 2003).

Figure 1: Public Space, the Kit of Parts (Carmona et al. 2008)

Similar to the division developed for Urban Amenity Indicators for New Zealand by Bell (2000: 21), Carmona et al. (2008: 9) conceptualised three key dimensions that together define the character of the public space:

- The key elements that constitute public space – in other words, the 'kit of parts';
- The particular characteristics of public spaces – the 'qualities' that different spaces possess;
- The range of socio/economic and physical/spatial contexts – or the 'context for action'.

The key elements of the public space or the 'kit of parts' are developed into four key elements as seen in Figure 1:

4   THE DECLINE OF THE PUBLIC SPACE

Carr et al. (2009:67) assign the 'flight' to the suburbs and 'abandonment' of the centre cities to the mid C20th boom in economy which provided the middle class with an opportunity to move out from the cities to the suburbs with a dream of owning their affordable private outdoor green spaces.

A general decline in public space realm has been realised by most scholars who have written on the issue (Carmona et al. 2008). They continue to state that the reasons recognised and solutions recommended are commonly very diverse. The administrative of many best-known cities choose to concentrate their efforts on what they tend to refer to as over-management of public spaces, what results in commodification of space (Sorkin 1992, Boyer 1994, Zukin 1995, Loukaitous-Sideris and Banerjee 1998). Others mainly emphasise what is understood as under-management of the public space as a consequence of poorly designed and insecure public spaces. Public spaces of the latter have been described, rendered and criticised in Jacob (1961) and Newman (1973) among many others who explain the relationships between the design/planning quality and the quality of neighbourhood, and the public space.

5   NIRUYE-HAVAEI 2ND SQUARE: A CASE OF AN INTEGRATIVE MODEL

The public space subject to this study is an urban square which combines a wide variety of 'kit of parts' – both physical and non-physical – mostly for the local users. In addition, it also acts as a traffic node in form of a city roundabout where the local traffic merges with the commuters' flow to work which starts or ends somewhere in the neighbourhood and passes through this traffic node.

There is no doubt that the quality of buildings, landscape or infrastructure – the three physical compartments of the 'kit of parts' – is very ordinary if not lower than average and by far even less sophisticated than what the city and local authorities normally expect them to be. For example, urban design of the square is not even to the level to be considered as a 'design'; the buildings surrounding it and their façades are average developers' works, meaning that there is no sign of significantly cultivated artistic aspects or architectural merit. On the other hand, the issue of noise as a result of passing-by traffic and the significant number of mopeds seems to be unsolvable. Since there is a unanimous covenant on lack of high quality of the aforementioned compartments – buildings, landscape or infrastructure – the main question of this research arises as to: what actually makes this case so worthwhile, viable and workable.

Figure 2: Map of Tehran and Niruye-Havaei neighbourhood. Courtesy of Google Map

Located in north-east part of Tehran, Niruye-Havaei is a part of Borough 13 in modern Tehran. It has a background history as a Qajar Royal hunting ground (known as Doshan-Tappeh), scattered settlements in form of small villages and one of the new urban developments outside the old city fortress of 1889, and a formal new urban district for over 70 years in its today form. It is named after an air force base which is located to the north of the neighbourhood (See Figure 2).

Some twenty years ago, the square which had a series of tall fences around, with four entrance gates to keep it safe over nights for years, like many others lost its protective barrier through Tehran's municipality act of revitalisation of public spaces. As a result the space became open to the public day and night. Once the fences came down, the square, equipped to an ample of lamp posts, was kept luminous, and night police patrolled regularly to make the area safe and secure. Although the whole area was considered to be fairly safe at the time, the initial safety belt plan successfully minimised the gangs' and drug dealers' opportunities to accommodate in the square and its vicinity. The closest similar public space with a level of importance nowhere near that of Niruye-Havaei 2nd Square, is the 1st Square, where the size, the scale, the level of intervention and socio-cultural exchange between the users are significantly lower (See Figure 3). Despite the close proximity of the two squares, the 1st square never found such a crucial and intra-regional role as of the 2nd squares. In fact the 2nd Square has found such social 'centrality' way beyond the mere intersection of the capitalist's aspects in brief periods of time; a centre for orbitalisation of the urban context deep into the urban texture behind the physical boundaries of the square surroundings. The orbitalised urban district around the square interact with it in more than three dimensions of the space but also in the fourth dimension of time, fifth of memories and sixth of cross-gender, cross-generation, cross-cultural interaction of the spatial user groups.

Figure 3: Map (left) /Aerial view (right) of the vicinity indicating 1st and 2nd squares locations in Niruye-Havaei. Courtesy of Google Map

After the revitalisation act, the 2nd square was mainly used as an urban park with limited uses, scopes and activities, similar to its role before the act; central pond and fountains, sitting areas around the pond, outer pedestrian ring, sitting benches, working together as a public leisure space. During the next 15 years, the municipalities were given more devolved task and autonomy resulting in dedicated budget for restoration of public spaces centrally managed through a newly established organisation known as Tehran's Beautification Organisation. What was first added to the public spaces was in form of seasonal and temporary ornaments, festive decorations, planters and planting beds and hangers. Gradually some of the temporary decoration and landscape ornaments turn into more permanent ones. Added to those were some renewed infrastructures and some new proposed functionalities on a trial and error basis, some of which became permanent over a period of time, while the other less successful ones were modified, abandoned, or replaced. Ultimately what can be seen today is a merger of the resultant of what has been experienced over the past 20 years spreading in over 12000 m2. Children's playground, aquarium, a book sale booth, a sandwich shop, equipped exercise areas, chess tables, ping pong tables, canopies, vegetation and plantation repository, local community centre, free blood pressure and blood sugar monitoring station are the permanent functions, spaces and services in this square. In addition a mobile police station is located in south part of the square to provide local security (See Figures 4-11).

6 SPATIAL ANALYSIS

This costly project was surveyed over a period of 70 days spread over from mid-September to mid-March, during which there were 28 people present in mornings, 56 in afternoons, in weekdays, 200-250 in the weekends, with the lowest record of a minimum of 12 during the coldest days of the year 2012. The space was used for local chess, backgammon and playing card leagues up to midnight during the warmer seasons. After the school hours the user population will be added by the school pupils. All the above figures exclude the users of the aquarium, the local community centre, book stall, and the sandwich shop.

Figure 4: Table Tennis area. Figure 5: Children's Playground.

Figure 6: Aquarium (left) and book sale booth (right). Figure 7: One of the several canopies for daily gathering

Figure 8: A grandfather with his granddaughter. Figure 9: Senior citizens and teenagers playing chess, cards and backgamon in a cold day

Figure 10: An aged man exercising in a cold morning. Figure 11: The central pond and fountains of the square

While being self-sufficient in a sense, the square also works interactively with the local shops including a pharmacy, a bakery, a confectionary, several banks, and news agents, etc. which adds to liveability, usability

and comprehensiveness of users' demographic pattern during the different hours of a day, transforming 'public place' to 'public space' and transferring the vibe and ambience of the public space into several blocks deep into the urban fabric surrounding the square (See Figure 12). This has resulted in creating temporary car parks around the roundabout and reduction of the vehicle traffic speed improving the livelihood and the pedestrian use of the space. Moreover, this has added to diversification of the ethnographies using what the square has to offer, from those who can access it on-foot to those driving in from more distant neighbourhoods.
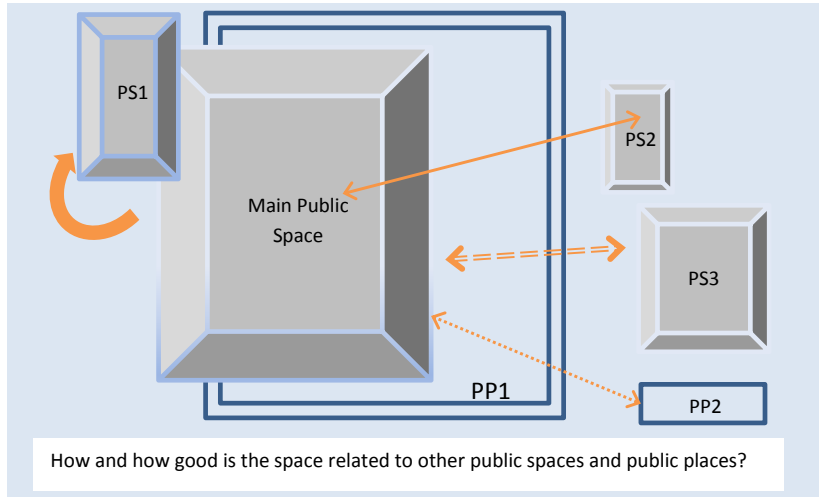
Figure 12.

The spatial variation, and diversification of fucntionalities absorbs a broad range of spatial users groups meaning that users in different age brakets, genders, backgrounds, having various tastes and spatial expectations find their needs and wants (at least partialy) fulfilled simultaneously with those of the others' within one urban setting (See Figure 13). This simultaneity provides an atmosphere for different users groups to share their spatial use experience, for instance grandparents can and do use the space at the same time as their very own grandchildren with very little conflict of interest priorities if any and maximum coalition between the spatial user groups. This has turned the square into a 'social hub' for senior citizens where they can enjoy a lively interaction with other spatial users, fresh air, outdoor exercise and sports or simply the companionship of their friends or family members. This not only has helped renew the links of the senior citizens to the society but also has integrated their roles, values and benefits into the space dimensions and facilitated a context to use their potentialities towards creation of socio-cultural sustainability (See Figure 14). This interaction has been developed into and between other spatial users groups.
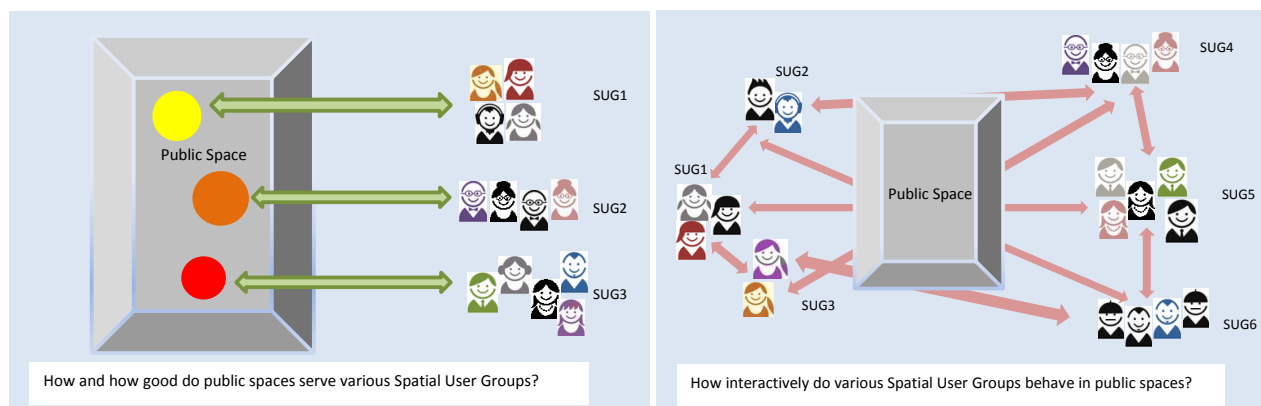
Figure 13, Figure 14.

7 CONCLUSION

Although under-management or over-management have been understood to be the main reasons for the decline in the urban space, it seems that the main reason for urban space decline lies in the principles and approaches to the 'Production of Space', where production of a socio-cultural space is achieved through

maximising of the functionality with an aim to increase the absorption of the masses and to encourage the diversification of the spatial user groups. This means if and when the public space is to be able to offer satisfaction for its local community, it will need to be successful in absorbing the mass; what differs fundamentally from the quality in the mere design process as it is classically understood. All-inclusiveness of the urban space will mean creating equal and wider opportunities for participation of all parties to keep the public space lively. To provide an all-inclusive solution for prevention of the urban space from decline, the planners and designers should develop a systematic feedback loop to transfer the learning experience of the public space from the post-occupancy/operation stages into planning and design stages.

A theory of 'Orbitalisation' of the urban district around a public space was drawn where the dimensions of space are developed beyond the traditional three dimensions further into what the effect of time, experience and diversification of the spatial user groups is added to the collective memory of the urban space; what is conveyed through means over and above the physical entities of the space.

8 REFERENCES

Appleyard, D. (1981) Livable Streets, Berkeley, CA, University of California Press.

Baulkwill, A. (2002) 'Lots of conviviality', The Garden, September 2002: 693–7.

Bauman, Z. (1993) Postmodern Ethics, Oxford, Blackwell

Bell, K. (2000) Urban Amenity Indicators: The Liveability of Our Urban Environments, Technical Paper No.63 – Urban Amenity, Wellington, New Zealand Ministry for the Environment.

Boyer, C. (1994) The City of Collective Memory: Its Historical Imagery and Architectural Entertainments, Cambridge, MA, MIT Press.

Bridge, G. (2004) 'Pierre Bourdieu', In: Hubbard P., R. Kitchin and G. Valentine (eds.) Key Thinkers on Space and Place, London, Sage, pp. 59-64

CABE (Commission for Architecture and the Built Environment) (2005a) Does Money Grow on Trees? London, CABE.

CABE (Commission for Architecture and the Built Environment) (2005b) Decent Parks? Decent Behaviour? London, CABE.

Carr, S., M. Francis, L.G. Rivlin and A.M. Stone (2009) Public Space, Cambridge, Cambridge University Press.

Castells, M. (1977) The Urban Question: A Marxist Approach, London, Edward Arnold

Castells, M. (1983) The City and the Grassroots: A Cross-Cultural Theory of Urban Social Movements, Berkeley, CA, University of California Press

Clarke, D. and M. Doel (2004) 'Zygmunt Bauman', In: Hubbard P., R. Kitchin and G. Valentine (eds.) Key Thinkers on Space and Place, London, Sage, pp. 33-39

Colin Buchanan and Partners (2007) Streets Paved With Gold: The Real Value of Good Street Design, London, CABE

Conolly, P. (2002) 'The human deterrent', Regeneration and Renewal, 4 December: 16–17.

Diabetes Prevention Group (2002) 'Reduction in incidence of type 2 diabetes with lifestyle intervention or Metformin', New England Journal of Medicine, 346: 393–403

Dines, N. and V. Cattell (2006) Public Spaces, Social relations and Wellbeing in East London, Bristol, The Policy Press.

DoE (Department of the Environment) and ATCM (Association of Town Centre Managers) (1997) Managing Urban Spaces in Town Centres: Good Practice Guide, London, HMSO.

Dovey, K. (2002) 'The Silent Complicity of Architecture', In: Hillier, J. and E. Rooksby (eds.) Habitus: A Sense of Place, Aldershot, Ashgate, pp. 267-280

Farr, E. R. P. (2013) Spatial Mass-Customisation: Mass-Customisable Urban Spaces and Spatial Entities, In: Piroozfar, P. and F. Piller (eds.) Mass Customisation and Personalisation in Architecture and Construction, Abingdon, Routledge (Taylor and Francis)

Fjortoft, I. (2001) 'The natural environment as a playground for children: The impact of outdoor play activities in pre-primary school children', Early Childhood Education Journal, 29(2): 111–17.

Foucault, M. (1972) The Archaeology of Knowledge, London, Tavistock Publications

Frontier Economics (2004) Quality of Place and Regional Economic Performance, London, Frontier Economics.

Gehl. J. and L. Gemzøe (1996) Public Spaces, Public Life, Copenhagen, The Royal Danish Academy.

Gehl, J, and L, Gemzøe (2000) New City Spaces, Copenhagen, The Danish Architectural Press.

Grisso, J.A., K.L. Kelsy and B.L. Stom (1991) 'Risk factors for falls as a cause of hip fracture in women', New England Journal of Medicine, 324: 1326–31.

Hakim, A.A. (1999) 'Effects of walking on coronary heart disease in elderly men: the Hondulu Heart Program', Circulation, 100: 9–30.

Halpern, D. (1995) Mental Health and the Built Environment, London,Taylor and Francis.

Hartig. T., G.W. Evans, L.D. Jamner, D.S. Davis and T. Garling (2003) 'Tracking restoration in natural and urban field settings', Journal of Environmental Psychology, 23(2): 109–23.

Hubbard, P. (2004) 'Manuel Castells', In: Hubbard P., R. Kitchin and G. Valentine (eds.) Key Thinkers on Space and Place, London, Sage, pp. 72-77

Hubbard P., R. Kitchin and G. Valentine (eds.) (2004) Key Thinkers on Space and Place, London, Sage

Jacobs, J. (1961 [1984]) The Death and Life of Great American Cities: The Failure of Modern Town Planning, London, Peregrine Books.

Jones, P., M. Roberts and L. Morris (2007) Mixed Use Streets: Enhancing Liveability and Reconciling Conflicting Pressures, York, The Policy Press.

Kuo, F.E., W.C .Sullivan, R.L. Coley and L. Brunson (1998) 'Fertile ground for community: Inner-city neighborhood common spaces', American Journal of Community Psychology, 26(6): 823–51.

Leach, N. (2002) 'Belongings: Towards a Theory of Identification with Space', In: Hillier, J. and E. Rooksby (eds.) Habitus: A Sense of Place, Aldershot, Ashgate, pp. 281-299

Lefebvre, H. (1991) The Production of Space, Trans. Donaldson-Smith, N., Oxford, Basil Blackwell

Lefebvre, H. (1996) Writing on Cities, Trans. and eds. Kofman, E., and E. Lebas, Oxford, Basil Blackwell

Littlefair, P.J., M. Santamouris, S. Alvarez, A. Dupagne, D. Hall, J. Teller, J.F. Coronel and N. Papanikolaou (2000) Environmental Site Layout Planning: Solar Access, Microclimate and Passive Cooling in Urban Areas, Watford, BRE.

Living Streets (2001) Streets are for Living, The Importance of Streets and Public Spaces for Community Life, London, Living Streets.

Loukaitou-Sideris, A. and T. Banerjee (1998) Urban Design Downtown: Poetics and Politics of Form, Berkeley, CA, University of California Press.

Loukaitou-Sideris, A., R. Liggett and H. Iseki (2001) 'Measuring the effects of built environment on bus stop crime', Environment and Planning B: Planning and Design, 28(2):255–80.

Luther, M. and D. Gruehn (2001) 'Putting a price on urban green spaces', Landscape Design, 303: 23–5.

Luttik, J. (2000) 'The value of trees, water and open spaces as reflected by house prices in the Netherlands', Landscape and Urban Planning, 48(3/4): 161–7.

Maconachie, M. and K. Elliston (2002) Morice Town Home Zone: A Prospective Health Impact Assessment, Plymouth, Health and Community Research Programme, University of Plymouth and the South West Devon NHS Trust.

Massey, H. (2002) 'Urban farm', Landscape Design, 313: 40–1.

McKay, T. (1998) 'Empty spaces, dangerous places', ICA Newsletter, 1(3):2–3.

Mean, M. and C. Tims (2005) People Make Places: Growing the Public Life of Cities, London, Demos.

Newman, O. (1973) Defensible Space: People and Design in the Violent City, London, Architectural Press.

Painter, K. (1996) 'The influence of street lighting improvements on crime, fear and pedestrian street use after dark', Landscape and Urban Planning, 35(2–3): 193–201.

Peiser, R.B. and G.M. Schwann (1993) 'The private value of public open space within subdivisions', Journal of Architectural and Planning Research, 10(2): 91–104.

Pellegrini, A.D. and P. Blatchford (2002) 'Time for a break', The Psychologist, 15(Part 2): 61–3.

Phillips, P.L. (2000) Real Estate Impacts of Urban Parks, Issue Paper, Washington, DC, Economic Research Associates.

Philo, C. (2004) 'Michel Foucault', In: Hubbard P., R. Kitchin and G. Valentine (eds.) Key Thinkers on Space and Place, London, Sage, pp. 121-128

Quayle, M. and T.C. Dreissen van der Lieck (1997) 'Growing community: A case for hybrid landscapes', Landscape and Urban Planning, 39(2/3): 99–107.

Schuster, J.M. (1995) 'Two urban festivals: La Mercé and First Night', Planning Practice and Research, 10(2): 173–87.

Schutz, A. and T. Luckmann (1974) The Structures of Lifeworld, Trans. Zaner, R.M. and H.T. Engelhardt Jr., London, Heinemann

Shashua-Bar, L. and M.E. Hoffman (2000) 'Vegetation as a climatic component in the design of an urban street: An empirical model for predicting the cooling effect of urban green areas with trees', Energy and Buildings, 31(3): 221–35.

Shields, R. (2004) 'Henri Lefebvre', In: Hubbard P., R. Kitchin and G. Valentine (eds.) Key Thinkers on Space and Place, London, Sage, pp. 208-213

Shoard, M. (2003) 'The Edgelands', Town and Country Planning, May:122–5.

Slattery, M.L., Potter, J. and Caan, B. (1997) 'Energy balance and colon cancer – beyond physical activity' Cancer Research, 57: 75–80.

Sorkin, M. (ed.) (1992) Variations on a Theme Park: The New American City and the End of Public Space, New York, Hill and Wang.

Takano, T., K. Nakamura and M. Watanabe (2002) 'Urban residential environments and senior citizens' longevity in megacity areas: The importance of walkable green spaces'. Journal of Epidemiology and Community Health, 56(12): 913–8.

Taylor, A.F., A. Wiley, F.E. Kuo and W.C. Sullivan (1998) 'Growing up in the inner city: green spaces as places to grow', Environment and Behaviour, 30(1): 2–27.

Taylor, A.F., F.E. Kuo and W.C. Sullivan (2001) 'Coping with ADD – the surprising connection to green play settings', Environment and Behaviour, 33(1): 54–77.

Upmanis, H. (2000) 'The park has its own climate', Swedish Building Research, 2: 8–10.

Warf, B. (2004) 'Anthony Giddens', In: Hubbard P., R. Kitchin and G. Valentine (eds.) Key Thinkers on Space and Place, London, Sage, pp. 129-135

Watson, S. (2006) Markets as Spaces for Social Interaction: Spaces of Diversity, York, Policy Press.

Whitford Ennos, A.R. and J.F. Handley (2001) 'City form and natural process: Indicators for the ecological performance of urban areas and their application to Merseyside, UK', Landscape and Urban Planning, 57(2): 91–103.

Woolley, H. (2003) Urban Open Spaces, London, Spon Press.

Woolley, H. and R. Johns (2001) 'Skateboarding: The city as playground', Journal of Urban Design, 6(2): 211–30.

Zukin, S. (1995) The Cultures of Cities, Cambridge, MA, Blackwell.

Competitiveness Factors of Higher Education Institutions, with Particular Respect to Hungarian Cities

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1 ABSTRACT[1]

The world is in a continuous change. People lived according to different norms in different periods, with the development of technology, the accelerated time people's learning and knowledge have required/demand a continuous change. Learning and knowledge have played/play an accentuated role in the development and everyday life of mankind. Education, and especially tertiary education is still in a key position today, when in its strategies Europe is laying emphasis on the fact that knowledge and innovation could be the driving force of competitiveness. (Tamándl 2012)

The world's tertiary education – including the Hungarian tertiary education system as well – has undergone a huge change in the last two decades. Functions which are said to be traditional have changed significantly, the supply range has transformed – it is offering new things for both the students and the teachers -, it is playing different roles in the life of people, professions, careers, as well as in that of the regions. (Fábri 2005) The carriers of knowledge are the institutions of higher education. Encouraging innovation and innovation have priority, because they contribute to development. That is the reason why it is necessary to create harmony between the needs of companies and the output of educational institutions. (Filep 2009) The domestic regional science is increasingly turning towards tertiary education; moreover, competition as a new factor has appeared in the life of universities. New institutions have shown up on the supply side (private, religious, non-profit, foreign), while on the demand side professions, trade groups are being created, or are disappearing from the "spotlight". (Rechnitzer 2010) Institutions, performers are multiplying knowledge as well as innovation have begun decentralization, and they are more and more integrating into the local, regional economies, as a result of which the structures of this process have also entered the phase of transformation. (Grosz-Rechnitzer 2005)

Taking he above ideas into account, it can be declared that the alteration of the economy and the society, namely the phenomenon of globalisation has impacted the segment of tertiary education and it has resulted in its transformation. There is a competition going on for the free capital, more exactly today it is a crucial issue which region or area can attract the capital necessary for the production of products and high technology (Barakonyi 2009), in the process of which higher education institutions can play a significant role.

One of the most important structural problems of the national tertiary education is the weakness and disability of the relationship between the education and the labour market, the inadequate nature of the information flow between the two spheres. The demands of the labour market are not built in the content, output expectations and requirements of courses offered by universities and colleges, although there is a need for the information systems revealing the labour market position of graduates, for objective ranking methods and for conveying information about the labour market to the students. Efficiency, economy, transparency and traceability are irreplaceable elements of the operation of higher education institutions in the 21st century. The Hungarian higher education institutions can become competitive in the uniform European Higher Education Area only if they necessarily employ the latest ICT-based (Information and communication technology) services. The planned activities make possible to modernize the control and management systems of the institutions in order to make them efficient and flexible, with the support of IT devices, moreover, they can help the efforts aiming at the introduction of modern, integrated services.

In recent years several experts have analysed and presented that in Hungarian tertiary education the geographical location of institutions can mean an advantage and a disadvantage as well, namely the capital represents the leading role from every aspects (number of students, range of courses, etc.) Until now there have not been any rankings or indicators with the help of which institutions could have been compared. In order to be able to decrease the differences of the above analysis, the causes of the difference have to be explored. By setting up the competitiveness model, we are presenting the indicators, the categories according

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to which the institutions on the countryside can be as competitive, or even more competitive than universities in the capital.

Due to their huge numbers, the competition between the institutions – both in space and size – is definitively considered to be lively on the relatively small Hungarian higher education market. The regional commitment of the institutions on the countryside are supposed to be higher than those in Budapest where the institutions have significant national scope and they also have needs to appear at an international level. (Kovács 2012)

2 RESEARCH METHODOLOGY

With the research we are trying to find the answer to questions like how the present position, competitiveness of European universities can be connected to their role in the region, how rankings can be used in determining the quality of institutions, how the results of graduate career tracking researches (output indicators) can be interlinked with university rankings, and what kind of positive effect can be derived from such a new kind of ranking.

In the last years, decades – similarly to more fields – rankings have appeared in the tertiary education as well, which make international comparison possible. (Shanghai Academic Ranking of World Universities – ARWU, Times Higher Education World University Ranking, World's Best Universities Ranking – US News and World Report, CHE University Ranking, U-Multirank ranking, Performance Rankings of Scientific Paper for World Universities, Webometrics Ranking of World Universities) University rankings have and can have an important role in justifying or confuting the governmental, institutional, corporate and family decisions made on the supply and demand side of tertiary education services. The appearance of rankings have been followed by numerous debates, which mainly questioned the methodology, criteria and indicators of these lists, although most of them have agreed in the fact that at present this is the best method to measure the competitiveness of higher education institutions from a professional and scientific aspect. Besides these, the rankings can be fixed in value in the long run only if they represent the institutional quality, prove to be capable of comparing the scientific level of institutions, can reflect the position of universities in the competition for students and resources; moreover, they provide exact information about graduate feed-backs and the value of the degree.

More and more theoretical and practical research is dealing with the competitiveness of countries, regions, both internationally and nationally. There are several examples showing that – besides enterprises and nations – the question of competitiveness is present in today's tertiary education. There is a competition for the students, teachers, R&D work and for the finances necessary for the education. In the previous year I tried to set up a model suitable for the measurement of university competitiveness on the basis of a special methodology, the pyramid model of competitiveness by Lengyel (2010). The third chapter is presenting the further consideration, methodological elaboration and test of the model. In the model I mostly relied on the textual accounts of the NEFMI, the AVIR, the Educatio Nonprofit Kft., the OTDT, the TEMPUS Public Foundation, the OH, the FTT[2] and the higher education institutions. While setting up the model, from a methodological point of view I found it important to base it on an economic theory, to make it consequent from a mathematic-statistic point of view, to direct it to the method of achieving competitiveness and the future development of competitiveness. Among the further aspects I considered the fact that it should be suitable for the comparison of higher education institutions, and should be useful for the purposes of scientific research and practical application. From a technical aspect I considered transparency, extensive nature, authenticity, usability (informal and research) and proportionality important. The tertiary education competitiveness model has a greater spectrum than the existing – either Hungarian, or international – rankings. Taking the above points into account I classified the 42 indicators into 3 basic categories and 5 basic factors in which the indicators of the trifold unity of education, research and service. The basic categories contain the student-, alumni- and labour market satisfaction, and I characterized each of the basic categories and the basic factors with more indicators. We carried out the examination with nine selected institutions. The three basic categories and the five basic factors were each characterized by more indicators. We summed up and took the average of the standardised (transformed to a scale between 0 and 1) values of

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[2] NEFMI – Ministry of National Resources, AVIR – Data Warehouse-based Management Information System, OTDT – Council of National Scientific Students' Association, OH – Educational Authority, FTT – Higher Education and Research Council

the indicators belonging to the same basic category (and basic factor). The final static measurement of competitiveness was carried out by considering the indicators of the basic categories and basic factors with the methodology specified weighting, and then the final result was developed by transforming the resulting values between 0 and 100 once more.
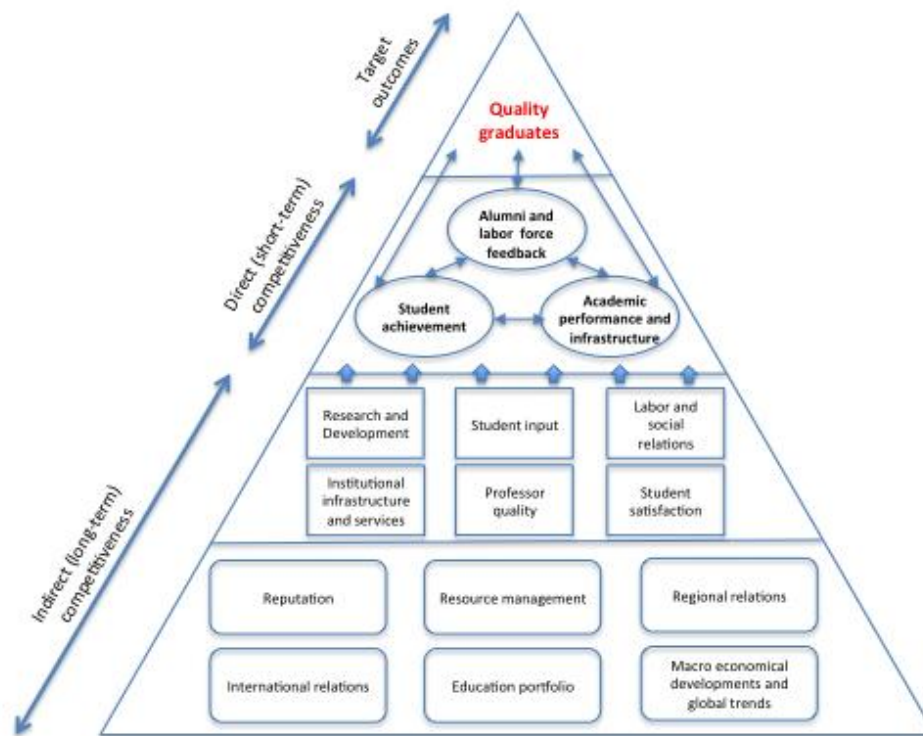
Fig. 1: Ranking of higher education institutions on the basis of the competitiveness model. Source: Filep-Kovács-Tamándl 2010.

Although no comparative examination of universities, higher education institutions have been made on the basis of the method, we still consider it a model which can have results in national and international researches as well by collecting the data if it is used systematically All this can mean the possibility of the comprehensive expansion of the research.

3   RESULTS OF THE RESEARCH

In recent years, similarly to other sectors, competition has also appeared in tertiary education. It is marked by the fact that besides state institutions more institutions (mainly private, non-profit, and religious ones) have been established. Institutions have made attempts to refresh the range of their courses with new methods (distance learning, e-learning). Parallel with this, as a result of socio-economic trends majors, professions have been appreciated and depreciated, new fields of professions have been given more attention. Students' expectations have been transformed and institutional services, institutional infrastructure, distance from the place of living, and future possibilities of work close to the institution have appeared with greater emphasis in the selection of institutions.

Institutions on the countryside have to struggle with the additional difficulty of a bigger significance given to institutions in the capital by the professionals. What aspects could or can be behind this statement? The number of institutions on the countryside has decreased while the number of state instituions has remained practically the same, the number of institutions in the capital has slightly increased, which can be explained by the integration. The leading role of institutions in the capital is permanent concidering the number of students (nearly 40 % of students study in the capital) and the diversity of courses, furthermore they can put pressure on politics forming tertiary education due to their importance. (Rechnitzer 2009)

Under the above circumstances, I have undertaken the task to verify with the competitiveness model the fact that rural institutions can compete and sometimes stay ahead in the competition of the universities in the capital.

Previously we had a review of the competitiveness indicators of the 9 selected universities in detail; furthermore, their positions on the basis of the tertiary education competitiveness model can also be seen. The cumulated results are included in Table no. 1 and Figure no. 2.

Name[3]	BCE	BME	DE	ELTE	NYME	PE	PTE	SZE	SZTE
Basic categories	5.	4.	3.	1.	9.	7.	6.	8.	2.
Basic factors	5.	1.	2.	4.	9.	8.	6.	7.	3.
Competitiveness (total)	*5.*	*1.*	*3.*	*4.*	*9.*	*8.*	*6.*	*7.*	*2.*

Table 1: Position of higher education institutions on the basis of the competitiveness model
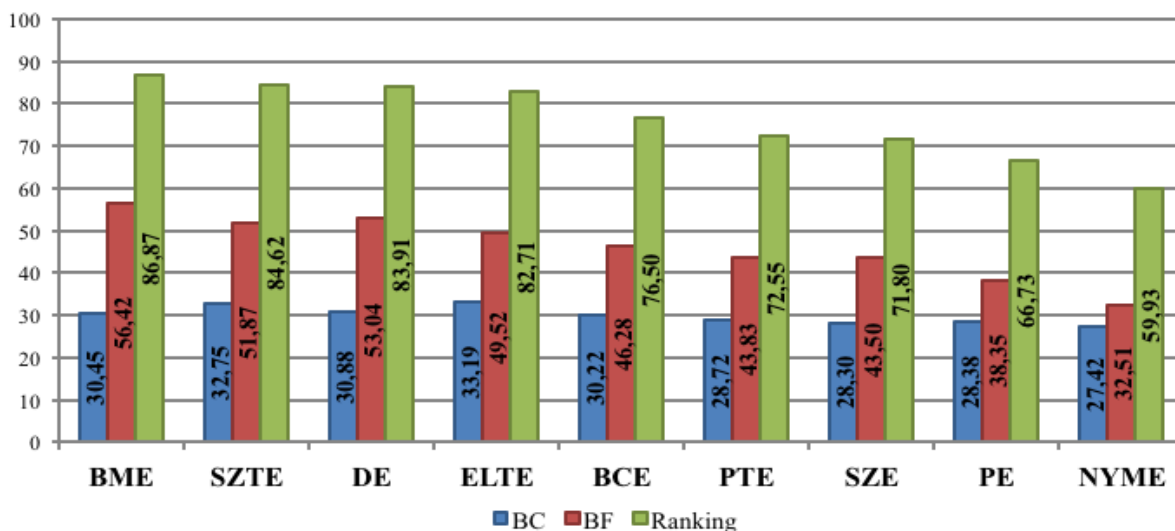
Fig. 2: Ranking of higher education institutions on the basis of the competitiveness model

The basic categories and the basic functions of competitiveness verified the asumption. By four out of the eight categories of competitiveness rural institutions had the best performance. In relation to the basic categories and the basic factors, we can tow-two rural institutions among the three best ones. In the first three places of the final ranking there are again two rural universities (SZTE, DE), with their final points just slightly less than the leader of the ranking, the BME (2-3 points less).

To sum up, rural universities can compete with the institutions in the capital regarding tertiary education indicators and competitiveness. Hungarian institutions, independently of their geographical location (either in the capital or in a rural city) can be equally competitive, namely the regional position does not always adversely influence the competitiveness.

4 CONCLUSION

The higher education institutions are taking an increasingly bigger role in the development of their regions and cities, in turn, the the cities and regions are also making attempts to do their best for the economic, social and cultural development of tertiary education. From the point of view of the university regional role-taking is important because in this way it has the opportunity to show its contribution to the civil society, and can verify its values formed by education and research with which it repays the investments of society. However it must be noted that not every Hungarian higher education institution has only regional embeddedness. The greater institutions in the capital (ELTE, BME, BCE) have nationwide coverage and relationships, while regional binding is characteristic of the rural institutions (SZTE – Szeged, SZE – Győr, DE – Debrecen, PE – Pécs).

Collecting data was the most difficult task during the application of the tertiary education competitiveness model set up on the example of the pyramid model. Many data cannot be found at institutional or national level, which makes the analysis and the testing of the model more difficult. The time series study, related to a longer period, would provide more information about the processes, but in that case less data can be taken

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[3] BCE – Corvinus University of Budapest; BME- Budapest University of Technology and Economics; DE – University of Debrecen; ELTE – Eötvös Loránd University; NYME – University of West Hungary; PE – University of Pannonia; PTE – University of Pécs; SZE – Széchenyi István University; SZTE – University of Szeged

into consideration and the data selection at the suitable level has to be well devised. Thus the resulting analysis reflects a static state, which shows the given state projected to the nine higher education institution, but the time series study is necessary and it has to be carried out in the future.

There have been and there are still studies abot competitiveness carried out in a lot of fields (comparison of countries, regions, cities, professional fields, enterprises, etc.) in both national and international literature, but it is a novel attempt to compare universities, higher education institutions on the basis of indicators, and to define and determine their competitiveness despite the existence of several tertiary education rankings.

It is clear on the basis of the data of higher education institutions that the increase and competitiveness of the Hungarian tertiary education differs from institution to institution and it changes unevenly. On the basis of these ideas I believe that it is especially important for experts and certain offices and administrative organizations (NEFMI, Educatio, ÁSZ, KSH) to cooperate in the interest of the success of future comparisons, as exact and extensive samplings, surveys and analyses are inevitable in order to get authentic data.

In summary it can be said that the modell and the GCTS survey offer a unique possibility to reveal the labour market position of young graduates, it has an indisputable national significance, and it points at young people's social background and lifestyle, labour market opportunities, intention of further trainings, and with the annual repetition of the survey, there will be a possibility to follow up on the tendencies. It is not easy to find a way as it requires considerable efforts from leaders, teachers and researchers as well. (Szekeres 2008)

5 REFERENCES

BARAKONYI, Károly: Egyetemi kormányzás Magyarországon. Kézirat. PTE KTK. Pécs. 2009.

FÁBRY, György: Egyetemek mérlegen – hallgatói vélemények. Educatio. Budapest. 2005.

FILEP, Bálint: Magyarországi nagyvárosok versenyképessége és térségszervező funkciói. Doktori értekezés. Széchenyi István Egyetem. Győr. 2009.

FILEP, Bálint – KOVÁCS, Zsolt – TAMÁNDL, László: A felsőoktatási intézmények versenyképessége Magyarországon és azok mérésének dilemmái. Tanulás – Tudás –Gazdasági sikerek. Széchenyi István Egyetem. Győr. 2010.

GROSZ, András – RECHNITZER, János: Régiók és nagyvárosok innovációs potenciálja Magyarországon. Magyar Tudományos Akadémia Regionális Kutatások Központja. Pécs-Győr. 2005.

KOVÁCS, Zsolt: Munkaerőpiac és felsőoktatás az észak-dunántúli térség példáján. Széchenyi István Egyetem. Doktori értekezés. Győr. 2012.

LENGYEL, Imre: Regionális gazdaságfejlesztés. Versenyképesség, klaszterek és alulról szerveződő stratégiák. Akadémiai Kiadó. Budapest. 2010.

RECHNITZER, János: A felsőoktatás térszerkezetének változása és kapcsolata a regionális szerkezettel. Educatio. 18. évf. 1. pp. 50-63. Budapest. 2009.

RECHNITZER, János: A felsőoktatás regionalitása, a régiók és a felsőoktatás. In: Törőcsik M. – Kuráth G. (szerk.): Egyetemi marketing. Marketing a felsőoktatásban. Pécsi Tudományegyetem. Pécs. 2010.

SZEKERES, Tamás: A magyar felsőoktatás a felvételi tükrében. Felsőoktatási Műhely. 2008/II. szám. Budapest. 2008.

TAMÁNDL, László: A felsőoktatási intézmények versenyképességi tényezői, különös tekintettel a diplomás pályakövetésre. Doktori értekezés. Széchenyi István Egyetem. Győr. 2012.

Construction of Spatial Memory Demolished Historic Architectural Context after 1972 Earthquake in Managua, Nicaragua

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1 ABSTRACT

In commemoration of the 40th anniversary of the earthquake in the city of Managua, proposes the construction of historical spatial memory with survivors of the tragedy, taking as reference the enhancement of the architectural context earthquake demolished after December 23, 1972 to facilitate the exchange of social imaginary urban generation.

It has a collection of little known historic architectural context demolished by the earthquake of 1972 affected, allowing the assembly of an Urban Observatory in digital format by creating a Web site featuring virtual reconstruction of demolished buildings, located within demolition area given by the National District regulator urban management at the time.

This research is developed in an interdisciplinary context, between the Faculty of Science, Technology and Environment comprising areas of Architecture, Information Systems and Graphic Design, in conjunction with the Institute of History of Nicaragua and Central America (IHNCA) all these instances of the Central American University (UCA).

It is conceived as a retrospective cross-sectional study, which modeled an architectural context that ceased to exist shortly after the 1972 earthquake rebuild oriented so volumetric demolished buildings, adding personal experiences occurred in them. Also considered a documentary research methodologies associated with qualitative, to show the historical memory of a natural event that shocked the residents of Managua.

Resumption four dominant theoretical elements, such as the architectural context, comprising the built product of socio-cultural development of a historical moment, conditioned by the natural and urban environment that surrounds (Silfa, 2009); historical spatial memory, as a reference for the symbolic construction of historic centers (Rodriguez, 2008) which is an imaginary scenario, understood as the accumulation of experiences that facilitate the exchange of various generational residents as the work of Cornelius Castoriadis and finally the concept of urban observatory proposed by UN-HABITAT (the UN Programme for Human Settlements) that guides the generation of information and comprehensive analysis stimulates actors to boost sustainable urban processes.

1.1 Objectives

(1) Establish criteria for the analysis and presentation of digital information to demonstrate the construction of historical memory of the architectural context demolished after the 1972 earthquake.

(2) Develop georeferenced information with volumetric three-dimensional models of architectural context demolished after 1972 earthquake in Managua.

(3) Collect the urban experiences of the people who interacted in the architectural context demolished after 1972 earthquake in Managua, as a contribution to the construction of historical memory of the city space.

(4) Create a virtual space that contains an urban observatory, for the interaction of the people of Managua, in the construction of historical memory of vanished architectural context by the 1972 earthquake.

2 METHODOLOGICAL DESIGN

The investigation concerns four phases, namely: exploratory, inquiry, operational and digital processing. Each is different corresponded procederes, which are explained below, see figure.

2.1 Exploratory phase

Announced by different authors to recognize the capabilities to produce a product for virtual disclosure of information processed ..

2.2 Phase of Inquiry

It includes the development of documentary research, highlighting the processing and analysis of bibliographic information, journalistic and photographic detected in the acquis IHNCA, 10 buildings were selected taking into account:

- Buildings should be studied within the demolition area given by the National District regulator urban management of the time in the city of Managua.
- Socially recognized urban facilities by reference in the city, demolished between 1973 to 1974.
- Most photographic resources, which facilitate virtual reconstruction.

2.3 Operational Phase

Corresponds with the rise of georeferenced data in the context of the study area using specialized equipment lifting (GPS) processing in Arc Gis program, activity in parallel with the development of virtual volumes, modeled Sketch-up program.

As part of the construction of a social imaginary of the inhabitants of the city destroyed by the seismic event, we propose two focus groups, the first, is to record the experiences arising from the interaction with the buildings analyzed by participants.

The second focus group aimed at validating the results of the research presented in digital format in order to recognize whether the processed information is accessible and manageable from handling personal Web site.

2.4 Phase Digital Processing

This phase consists of virtual product design from the processed data product of documentary research, as designated technical specifications for programming Web page, and the design requirements of the line of sight.
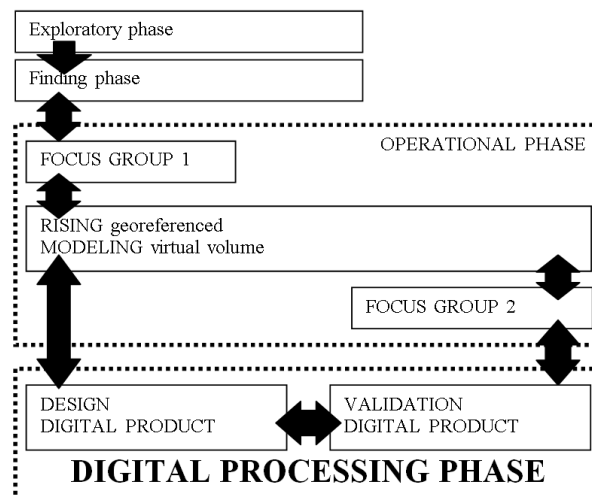
Fig. 1: Graphic of the research process

3   CONCLUSION

The Urban Observatory is organized by presenting the context of the city of Managua before, during and after the earthquake in 1972, resumed technical documents and documentary evidence the organization of the city, its seismic characteristics, audiovisual collects information from damage caused by the earthquake and proposals for rebuilding the city, adding newspaper articles from major newspapers of the city that evidence of the demolition process and specifically the city of the buildings in study, then describes the content of each of these sections in the urban observatory.

1972 Urban Context

Accurately set forth the context, sociopolitical, socioeconomic, sociocultural Managua earthquake to date, this highlights the city as the capital of Nicaragua, home of state powers, the main commercial and financial center of country as well as the setting for the dissemination of national culture.

Reference is made to the buildings covered in the research, within its urban context highlighting, where land uses are located in urban regulatory function of the time and the same location in their respective neighborhoods and its location in the urban pointing streets and avenues. This evidenced by aerial photos showing accurately tabulated data.

The section addresses an urban context where the network equipment characterizes the city concentrated in the area affected by the quake, highlighting public spaces recognized by villagers. The city was provided with drinking water supply, storm drainage, mains, telephone and telegraph, many of these services were modernized with the cotton boom in the 1950s.

3.1 Seismic Context

Are given as contrasted two PDF documents, which provide the geological environment of the city of Managua, "Seismology and tectonics of Nicaragua", lecture by Mr. Freddy Marin Bendaña in 1974 and "Seismic microzonation of Managua" by National Institute of Territorial Studies (INETER) in June 2000, which present the seismic history and current seismicity, and an analysis of the geology and tectonics. The latter is reflected in the study of soil amplification and seismic hazard Managua and illustrates the numerical simulation of earthquakes.

Exposed in PDF format refers to the technical analysis presented by Carlos Santos Berroteran, which highlights the occurrence of a seismic event of major involvement in the center of the city of Managua, it is noteworthy that the document would begin to publish in the newspaper La Prensa on December 23, 1972 day the quake struck.

3.2 Managua Earthquake

Displays the seismic event as natural disaster from a technical perspective, showing the natural physical affectations in the environment, through the reports submitted comments. Also presented showing resilience to earthquake legal action in urban governance dictate the time during the first six months for the recovery of the city, are highlighted here the management of international aid, demolition debris and supposed reconstruction of the city.

We report annotated so the damage report, from a quantitative and qualitative, of the damages, this is evidenced by the presentation of audiovisual material submitted by Mr. Nicolás López Maltez, which evaluates only human pain in seconds it caused, and the transformation of the city from a dynamic urban center, by virtue of their national capital, a destroyed environment, vacuum, inert.

Incorporated in PDF format from the daily news of the period March 1973 to October 1974, the newspaper La Prensa, stands out as the historical media, political opposition to the Somoza government of the time. But the daily news, official organ of the Somoza government, presented in terms of meeting agenda by the national government, the intervention process of the historical center of the city affected by the quake. Both emphasize the process of insertion into everyday life by people in the city and the demolition of the various buildings.

3.3 Historical Memory Space

We describe the buildings in study, by presenting technical work name, location in the central area of Managua, to recognize access roads, main location photos, pre and post earthquake, and now, also the stylistic , that define it. The following table presents the studies highlighting buildings, city location, usage and stylistic nomination:

No.	Buildings	Location	Us3	Nomination Stylistics
01	Club Managua	Core Foundation	Recreative	Neoclassical
02	City Hall	Core Foundation	Municipal Government	Neoclassical
03	Office of Pacific Railroad	Core Foundation	Administrative	Eclectic
04	Calasanz College	San Sebastián	Education	Funcionalist
05	Church San Antonio	San Antonio	Religious	Eclectic
06	Divina Pastora College	San José	Education	Funcionalist
07	Boer Market	Boer	Trade	Funcionalist
08	Casa Mantica	Trade Mall	Trade	Funcionalist
09	Male College "La Salle"	Trade Mall	Education	Neoclassical
10	Central Institute Ramirez Goyena	El Caimito	Education	Funcionalist

Table 1: Location of buildings in study as location, usage and stylistic nomination

It shows a different lane period photographs that show the works from the beginning, highlighting some remodeling over time, are photographs of the damage by the earthquake, and the evidence of the demolition process. These photographs were supplied by the Institute of History of Nicaragua and Central America (IHNCA).

Each building shows a virtual model, based on observation of photographic resources, it is about building a qualitative assessment based on the interpretation of each of the items that we offer photos, taking up elements of architectural composition and structural logic.

The building-product of a virtual modeling is georeferenced Mercator coordinate system with WGS84 datum, currently used at official level in Nicaragua. These are located in the updated maps of Goole Earth, allowing for a virtual tour of the center of Managua, integrating the buildings disappeared in the quake, the current environment of the city.

3.4 Annotated Bibliography

In order to provide information to the researchers on the subject of Managua earthquake in 1972, the Institute of History of Nicaragua and Central America (IHNCA) shows his collection, organizing it according to the number of titles by subject, are set out below: Nicaragua -History, Planning, Engineering, Geology, Seismology, Geography, Economics, Literature, public health, Testimony, Tourism, Education, Architecture.

4 REFERENCES

Baltodano Pallais, Newton, Aspectos médicos del terremoto de Managua de 1972. -- Managua: [s.n.], 1973. 44 p.: fotos b y n. (IHCA/N 614.875 B197a)

Bautista Lara, Jorge, La Urbanización de Managua: el terremoto de 1972. Derecho urbano municipal. -- Managua: PAVSA, 2008. 217 p. (IHNCA/FN 711.4 B352)

Burton, Richard P, Report on the role of urban decentralization policy in post-terremoto Nicaragua: to INCAE Centro de Asesoramiento, March, 1974. -- Managua: [s.n.], 1974. ii, 66 h. : CDros., mapa (IHCA/FN 307.76 B974)

Campos Meléndez, Silvio, Un pueblo y su conductor: terremoto de Managua 1972. -- Managua: San José, 1973. 151 p.: il. (IHN/FN 904.5 C198)

Campos Meléndez, Silvio, Un Pueblo y su conductor: terremoto de Managua 1972. -- Managua: San José, 1973. 174 p. : fotos b y n. (IHCA/N 904.5 C186)

Chavez, Víctor M. Isosistas de Managua: terremoto del 23 de diciembre. -- Managua: MEIC, 1973. 20 h : fotos b y n. + 1 mapa (IHCA/FN 551.22 C512)

Fressard, Oliver, El imaginario social o la potencia de inventar de los pueblos. Consultado el 30 de mayo de 2008

Gelmam, William, Managua : un resumen del programa de reconstrucción post-terremoto. -- [s.l.] : [s.n.], [s.f.]. 23 p. : CDrs., gfcs. + 3 mapas.
(IHCA/FN 904.5 G319)

Incer Barquero, Jaime, Geografía ilustrada de Nicaragua : con un apéndice sobre el reciente terremoto de Managua. -- Managua : Editora y Distribuidora Nicaragüense, 1975. 255 p. : fotos b y n. (IHNCA/ FN 917.285 02 I37)

Instituto Centroamericano de Administración de Empresas (INCAE). Nicaragua
Valores y características de la propiedad urbana pre-terremoto. -- Managua: [INCAE], 1975. vi, [59] p. : CDros (IHCA/FN 333.337 I59)

López Maltez, Nicolás, Managua 1972: 1972-1997 25 aniversario del terremoto que destruyó la ciudad Santiago de Managua, capital de Nicaragua, el 23 de Diciembre de 1972. -- Estados Unidos: Biblioteca del Congreso, 1997. 120 p. : fotos b y n.
(IHNCA/FN 551.22 L864)

Nicaragua. Ministerio de Salud Pública, Encuesta sobre algunos efectos demográficos y de salud del terremoto de Managua. -- Managua : Imp. Nacional, 1974. 67 p. : CDros. (IHCA/N 614.42 N583e)

Nicaragua. Comité Nacional de Reconstrucción Económica Instituto Centroamericano de Administración de Empresas (INCAE)
Evaluación preliminar de daños a consecuencia del terremoto de Managua – 23 diciembre, 1972. -- [Managua] : [s.n.], [1973]. 26 p (IHCA/FN 551.22 N583)

Ortega R., Giselle, Reconstrucción histórica y gráfica de Managua anterior al terremoto de 1972. -- [Managua] : UNAN, 1976. [ca. 60] p.: il., planos
(IHNCA/FN 972.85 O77)

Relaciones obrero-patronales y la situación post-terremoto / José Víctor Moreno G. [et al.]. -- Managua : [s.n.], 1974. 76 h. : CDros. (IHNCA/MON-NI 1974 0001)

Rodríguez, Francisco, Construcción de Ciudadanía, Memoria Histórica e Identidad Espacial Universidad de Oriente, Bolívar, Venezuela 2008

Silfa, Alberto, El Contexto en la Arquitectura, consultado en Slideshare Sep 03, 2009.

Solís Martínez, Edgard, Cronología socio-política de un terremoto: panorama de una esperanza. -- Managua: Imprenta Litho-Disco, 1973. 140 p.
(IHNCA/FN 972.850 52 S687)

Tijerino, Gustavo, Album cronológico: el terremoto más bárbaro de la historia. -- [s.l.] : [s.n.], [s.f.]. t.2. (IHN/FN 904.5 T568)

Tijerino, Gustavo El Terremoto más bárbaro de la historia. -- 2a ed. -- [s.l.] : [s.n.], [s.f.]. 114 p. (IHCA/N 904.5 T568a)

Tijerino, Gustavo El Terremoto más bárbaro de la historia. -- [s.l.] : [s.n.], [1974?]. 110 p. : fotos b y n. (IHCA/N 904.5 T568)

Vice Ministerio de Planificación Urbana, Informe de Gestión del Viceministerio de Planificación Urbana VIMPU Año de 1974

CURe MODERN – Monitoring of Infrastructures in Cross-Border Regions

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1 ABSTRACT

Every era had its specific building culture and infrastructures that need continous monitoring to sustain it. In order to be able to do that, a reliable database is required but is not available up to date. Many buildings of the sectors of transport infrastructure for example were built 50 years ago and are now requiring massive investments for maintenance. The problem is even more relevant in regions close to the border, because infrastructures like streets are cross-border, legal regulations and data sources differs from country to country. To find a solution for this problem, this is the aim of the project CURe MODERN. This project, supported by the European program INTERREG IVa, aims to show, by which approaches a comprehensive monitoring of these buildings by non-destructive methods could be deployable. Project partners besides the department CPE of the University of Kaiserslautern are Fraunhofer Institute, Centre d'Études Techniques de l'Équipement de l'Est, European Research and Project Office GmbH (Eurice), Rogmann Ingenieure, Landesbetrieb Straßenbau Saarland and the Eurodistrict SaarMoselle. Focus of content is to develop different monitoring approaches for spatial infrastructures. On a local scale, this embraces various kinds of non-destructive testing. Potential testing methods are terrestrial surveyings and laserscanning as well as airborne photography are used for inventory and 3D-modelling. The regional scale needs a webbasesd GI-system analysis in order to achieve a comprehensive database as well as a tool to visualize the data for decision makers. Furthermore, the aim of this project is the foundation of a regional competence network even for innovative technolgical approaches and for regional classification in the aspect of planning.

2 REGIONAL CONTEXT

The issue of monitoring infrastructure became increasingly more relevant in recent years in the perspectives of planners. This is especially true for cross-border areas, because the relevant infrastructures embrances national and administrative boundaries. However, there is often a lack of data for the respective objects in these areas. The INTERREG IVa project "CURe MODERN" is using new and innovative technologies to develop both regional and local approaches to testing and monitoring of infrastructure and cultural structures. The consortium for this project is made up of the Department of Computer-aided planning and design methods at the TU Kaiserslautern (CPE), in cooperation with the Fraunhofer Institute for Nondestructive Testing (IZFP) in Saarbrücken, the French authority for roads in Lorraine (CETE de l'Est) in Metz, the state office for roads in the Saarland (Landesbetrieb für Straßenbau), Rogmann Ingenieure and the Eurodistrict SaarMoselle. Besides the technical and methodological approaches also an intensive knowledge exchange is planned. In this perspective, a joint competence center for cross-border cooperation between research and industry and public authorities will be initiated.

3 PROJECT

The project will focus on exemplary objects, which are relevant in the regional context for developing new and innovative monitoring approaches. There has to be a common understand for the situation of the infrastructure as well as for comprenhensible collection of the different legal circumstances from the planning and building sector. The used technologies include a variety of innovative recording techniques such as airborne photogrammetry with UAVs (Unmanned aerial vehicle), photogrammetry or terrestrial laser-based scanning. Furthermore, some concepts about how to share this information with relevant decision takers will be examinded.

The test subjects were picked in order to achieve as complementary as possible approaches of testing methods. For the representative cultural buildings, a church in Metz/France (Eglise Ste. Thérese) as well as a restored castle in Manderen/France (Château Malbrouck) was chosen. Both are reflecting a different building style which is exemplary for monitoring purposes. The focus for monitoring transport infrastructure was especially put on bridges in the project area. The first examination objects are the "Grumbachtalbrücke", which is placed on a German highway and a bridge on a national street in Rosbruck/France. The first project

focus lies on the examination of the two bridges. In a first step, a model of the object will be developed out of the various data sources (electronical property data and innovative non-destructive surveying methods) in order to use it for further elaborations of the potential damages. This data will available on a self-developed, web-based information system.

3.1 Non-Destructive testing methods for the bridges

The subsequent pictures show the first object for the examination. Based on legal property data, a 3D-model was built. In a next step, an UAV (Unmanned aerial vehicle) will be used to take detailed pictures of damages at the construction. Furthermore, the Fraunhofer Institute will conduct some concrete testings in order to get information about performance of the pre-stressed concrete. These results will be visualized with the 3D-model for politicians and decision takers to have a fundament, how to act on further reparations of the object.

Fig. 1: 3D-Model with a sufficiently level of detail for a damage localisation (Own source)
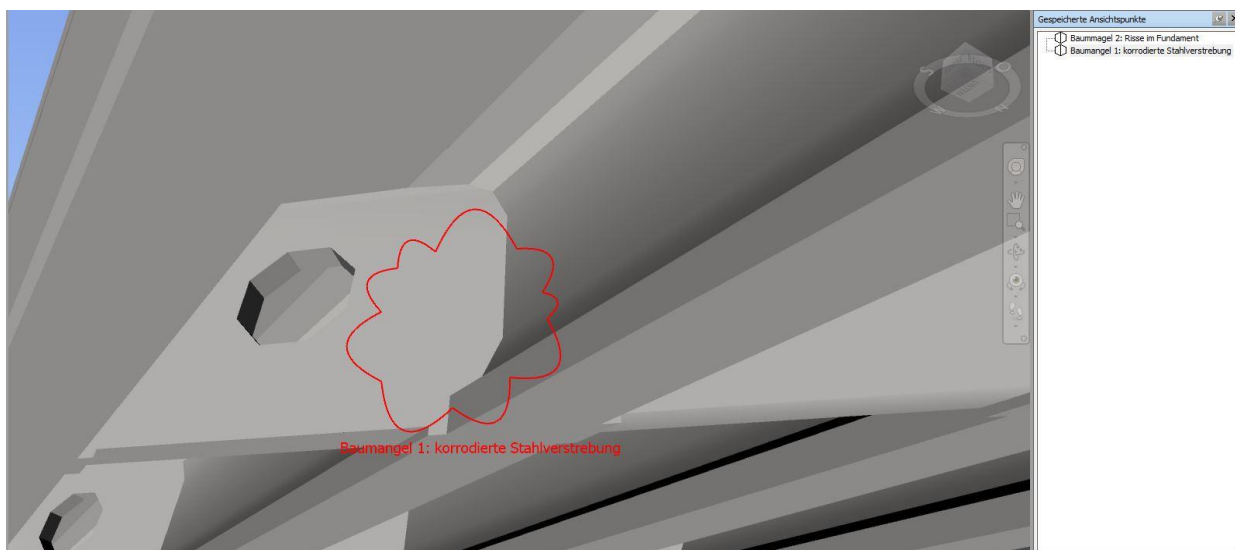
Fig. 2: Screenshot from Autodesk Navisworks for visualizing construction damages (Own source)

3.2 Web-Based-GIS & Database for project buildings

Parallel to the tests of the various objects, a web-based plattform with a common database is developped. The web interface allows besides the official website (www.cure-modern.eu) access to geographical information of the project area as well as relevant information for the test objects. The goal is to develop a common tool which gives information about the local conditions of the different buildings. Besides security-critical data, all data could be downloaded as geographical dataset or as textfile.

The technical realisation is completly founded on open-source-sofware. Geodata and attributes are store in a PostgreSQL/PostGIS-database, witch is richly equipped with geoprosessing funcitonality. Furthermore geoserver renders and provides our data as WMS, gives a writeable acces through WFS-T and enables an flexible data. On the clientside, openlayers ist configured as a web-based interface. It's javascript-library is able to allow various kinds of requests. Both Geoserver and Openlayers are developed and promoted as OSGeo-projects. The subsequent picture shows the web-plattform with its basic functionalities which will be extended in the future.
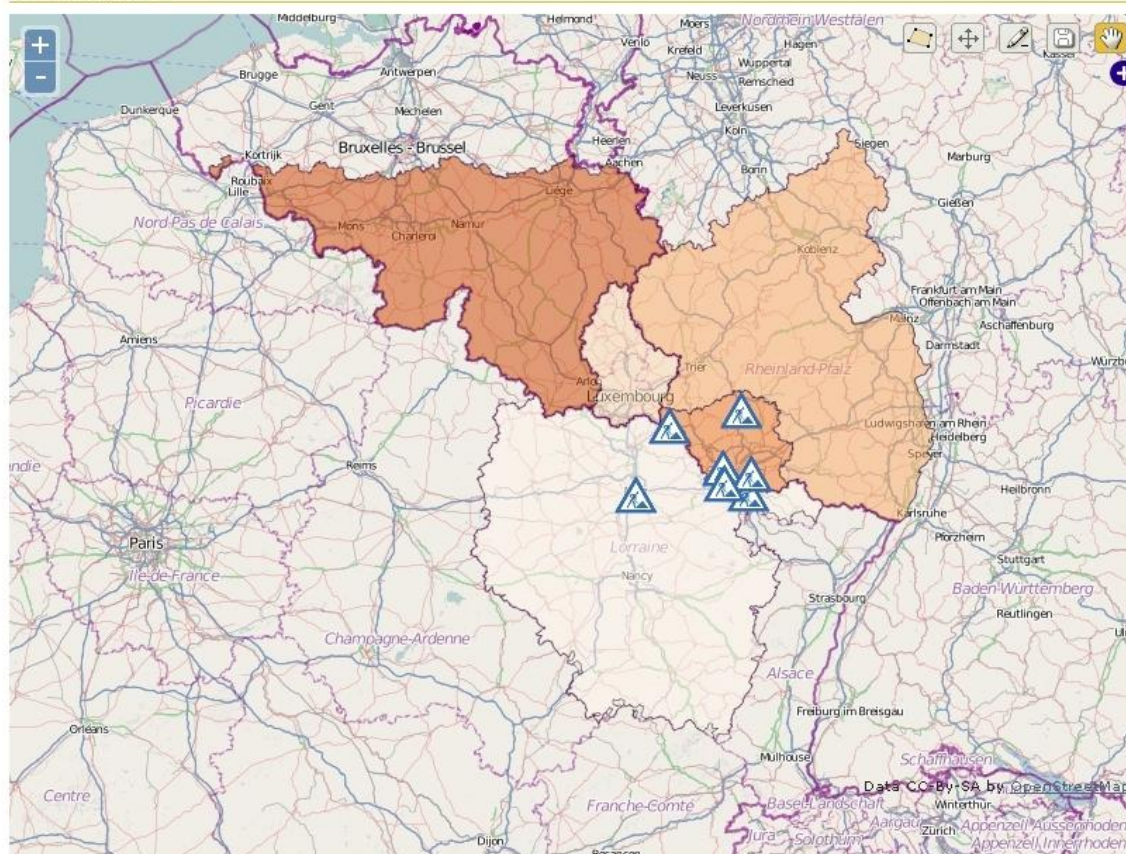
Fig. 3: Web-Interface CURe MODERN (Own source)

4 CONCLUSION

The important fact of this project is the cross-border approach for the monitoring methods. Whereas innovative testing methods for various kinds of buildings have been previously developed, the situation in the project region with many partners is much more complicated. Hence, aim is besides new technical solutions and potential benefits for homogenization of legal regulation is to learn from each other and develop cross-border monitrong approaches.

For the upcoming project time, more innovative and non-destructive test methods will be realized with the presented and planned study objects. In addition, new testing methods (airborne laser and radio scanning for example) will be developed. The common cooperation should be strengthened by cooperative work at a Wiki as fixpoint for the project related knowledge. Based on this, the foundation of the regional competence network will be accelerated and the scientific discourse will be pushed forward by a conference in Nancy (France) in March 2014.

Visit www.cure-modern.eu for further information.

Data Representation Dynamic Model for Distributed Urban IGIS

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1 ABSTRACT

In the article a dynamic distributed model of data presentation for creation of municipal economy distributed managment systems on the base of intellectual GIS technologies is offered. Decisions on submission of actual data for solving end users tasks, organization of data processing, data analysis, supporting interaction of various system components taking into account structure of municipal economy data and its great volume that meet modern standards are described.

2 INTRODUCTION

Hic et nunc (with lat. Here and Now). The modern computer user does not want to wait for a long time, does not want to enter initial data received from different places, does not want to look for a place where he (or she) can solve his problems. Information systems serving these users must comply with the principle of semper et ubique (with lat. Always and everywhere). Modern systems should not only provide decision support, but also a set of following possibilities. To extract necessary information from newly appearing data sources. To integrate information immedeately into existing information space. To transfer results to any place wherever a user can be. To predict his intentions and prepare the result in advance and with maximum quality. To such systems municipal services management systems undoubtedly refer. Functions that are carried out by the system are various and thus they are implemented in different subsystems. The majority of them have been developed during a long period of time, without any general idea or a plan. Because of functions distrubution and absence of the system management concept it is extremely difficult to provide hight quality solution of main tasks, such as rational use of city resources, coordination of city services work, safety of different types of human activity in conditions of dynamically changing situation. All this, finally, defines effectiveness of modern cities and megalopolises management. There is an objective need for development of a urban system that allows to integrate separate components by building a uniform data and knowledge space, and a need in universal tools for processing and analysis of continuously received diverse information. All this, finally, defines effectiveness of modern cities and megalopolises management.

3 GOALS AND REQUIREMENTS

The managment system of municipal services belongs to category of decision-making support systems. The main goal of such systems is to help users, that make decisions in difficult conditions, in complex and objective analysis of subject activity in the form of decision making process support [1]. Life cycle of a decision is a set of processes which are carried out from the moment of situation emergence to its permission. Life cycle of a decision consists of the following top level stages:

(1) Initiation – a stage that realizes the mechanism of decision making start point. As a cause for the beginning of the stage situation emergence is considered.

(2) Planning. Stage of decision making.

(3) Implementation. Stage of decision implementation.

(4) Assessment of results. Stage of implementation completion, analysis and storage of results.

At the same time several interacting cycles can be realized. New cycles are build on the basis of in advance prepared templates, but there is an opportunity to change the structure and contents of the cycle stages in dynamic when cycles are executed. The course of life cycle is considered as changes of state of the decision information model. As methodology of system development IDEF standards [2] are used.

For effective management of municipal services a system must be able to solve the following tasks:

(1) To execute continuous modeling of managed object; it allows at each timepoint to provide qualitative estimations of object current and predicted states for timely identification of various situations.

(2) To support interaction with various sources of information for maximum decreasing of the degree of uncertainty about managed objects states and providing results obtained by the system to other consumers of information.

(3) To provide adequate representation of information about managed objects states and about possible development of the situation to the user.

For the successful solution of the system tasks the following requirements are to be fullfilled:

(1) The system and all its components have to be distributed. Duplication of connections with information sources is to be provided for continuous obtaining of information. For operative modeling of unexpectedly arisen situations it is necessary to involve maximum amount of computing resources. To allow users working in various places client applications of the system have to function on various platforms, including mobile platforms.

(2) The system has to be adaptive. The main directions of system adaptiveness are defined by features of managment systems. First of all it is necessary to carry out newly arising tasks with minimum expense. Besides, depending on completeness, volume and features of analysed data the system has to apply various mathematical models. There also must be an opportunity to provide interaction with new sources of information in the shortest possible time at the expense of automatic information search that satisfies information requirements.

(3) The system has to be safe. It is necessary to provide mechanisms of the system stable continious functioning. The system has to reveal constantly internal and external threats and to use software and hardware solutions for effective prevention of threats and restoration of the system functionality and integrity. For this purpose a plan [3] has to be made. The plan is realized by aprocess that includs: analysis of functionality threats, updates of restoration strategy, adaptation of threats prevention and system restoration mechanisms, testing and state analysis.

The enumerated problems can be solved by the system at the expense of continuous situation modeling. The modeling is base on application of dynamic information model.

4 DYNAMIC INFORMATION MODEL

Dynamic information model reflects existing business processes of objects life cycle related to situations and allows to receive adequate estimates of situations at each timepoint. The situation is considered as a certain change in time and space of objects properties state and relations between objects that demand attention of the system [4]. Dynamic information model implements top levels of JDL model. Modeling is carried out not on the request of an operator, but continuously in case computing resources are available. Depending on degree of uncertainty of situation objects state and requirements to operationability more rough or exact mathematical methods are used. Methods can be applied if correct input data and parameters are defined [5].

Dynamic information model is based on three subsystems (Fig. 1).

(1) Subsystem of static information model. The subsystem is intended for providing access to business objects. It contains all set of objects, their properties and relations between objects [6]. The model is constructed on the basis of ontologies.

(2) Subsystem of business processes. The subsystem is intended for organization of decisions life cycle. It allows describing and carrying out sequence of interacting tasks. Interaction between functions is provided by making changes in business objects. It is build according to Business Process Definition Metamodel [7].

(3) Modeling subsystem. The subsystem is used for building models that reflect managed objects states and allows making estimates of situations development. Models are represented in a form of business process scenarios. Modeling subsystem contains two components:

(3.1) Simulation modeling subsystem. One of the subsystem's tasks is visualization of progress of spatial distributed business processes. The subsystem represents business logic platform providing uniform integrated framework for managing rules, working streams and processing events. As an example of such framework Drools [8] can be considered.

(3.2) Mathematical modeling subsystem. The main objective of the subsystem is organization of a cycle of situations assessment at the expense of use of scientific based mathematical concepts and heuristic

algorithms. The cycle represents a process of organization of interacting methods performance (the output data of one is input for another) that solves the task of identification and quantitative assessment of the situation.
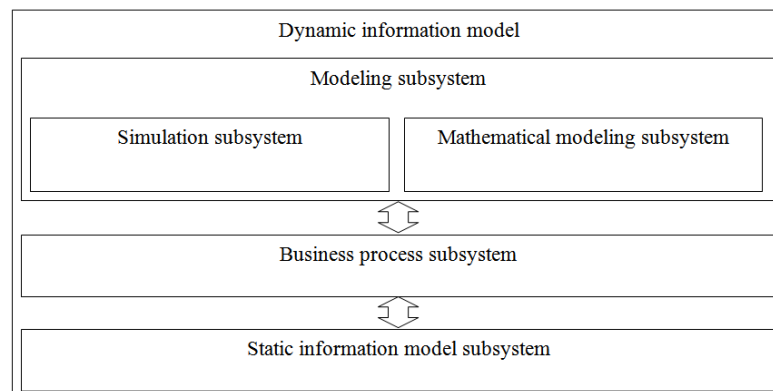
Fig. 1. Structure of dynamic information model

4.1 Static information model

The base of static information model is a unified model of information presentation (UMIP) [9]. The model provides access to all business objects that are used in applied business logic of the system. The structure of the model is based on the known principles of object-oriented paradigm. UMPI is a structure of entities describing subject domain in a form of a set of classes and objects, each of which possesses a set of properties that characterise them. A class represents a description of set of objects with similar behavior inherited from parent classes and extanded. These objects are called instances of a class. Objects of a class are described by a set of properties. For each property following characteristics are usually defined: name, type and value. Instances of classes are objects possessing all properties defined in a class. An object can belong to several classes and, respectively, it possesses all characteristic properties of the classes. Each property (object property or class property) has a complicated structure that contains: property unique identifier, property name, property description, set of property values. Property value can be multiple and single, contain simple data and links to other objects. Key types of objects of static information model are given in Fig. 2.

4.2 Business-process model

The subsystem of business processes defines an order of business functions execution. The subsystem allows describing and carrying out sequences of interacting functions. Interaction between functions is organized by modifying business objects. Process is a basic element of life cycle stages. It represents a set of interconnected tasks aimed to change a decision information model. Processes implement a unified interface providing methods to process and analyze input and output data, management and control mechanism and mechanism for interaction with other processes. Business processes are built on the basis of the following elements and relations connecting them:

1.   Objects of management flow

1.1.   Activities

1.2.   Events

1.3.   Gateways

2.   Relations between objects of management flow

2.1.   Flow sequence

2.2.   Flow message

2.3.   Association

3.   Objects of life cycle products

3.1.   Main product

3.2.   Management product

3.3.   Information product

4.   Associations of objects
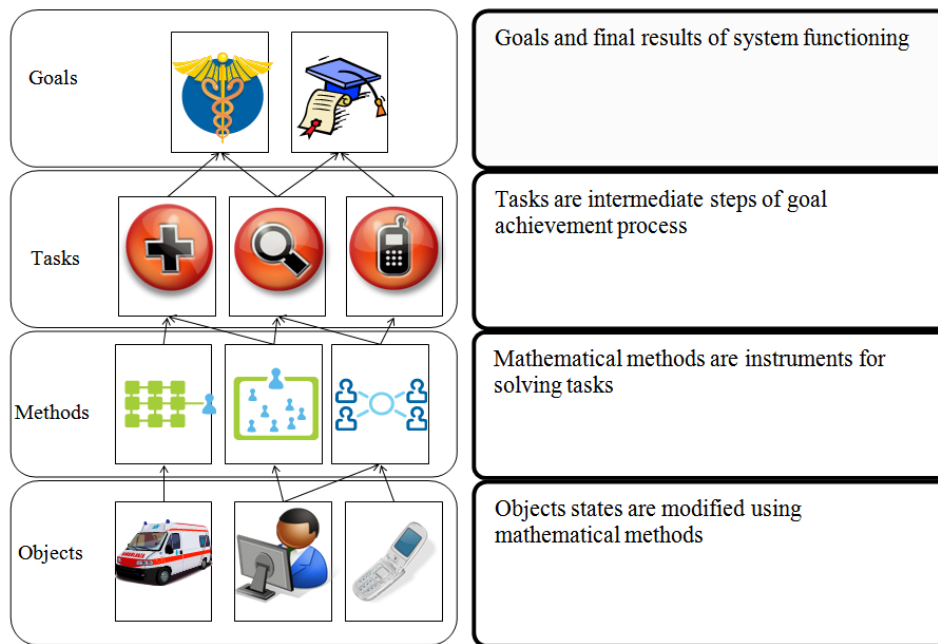
Fig. 2. Objects types of static information model

Activity is a basic element of a business process. It is an operation of generation, modification of state and destruction of life cycle products. Activities can be executed sequentially or in parallel, they can be dependent and independent.

Event is an element of process management that impacts on a process flow. Two types of events are considered – external and internal. External events are caused by factors that are outside of a process model. Internal events are results of changes in a management product state.

Gateway is an element that defines dependences in activities sequence. Using gateways consecutive and parallel activities are defined, selection of activities execution sequence is supported.

Flow sequence defines relations between activities and events connecting them in one sequence of activities. Flow sequence set describes an order of activities performance.

Flow message defines external actions which lead to event generation. It is a relation connecting management product or external object and an event.

Association is a relation connecting set of objects that is not an interaction or management relation.

Product is a result of activities execution. It is a container that changes its state while performing activities. It must match the information model of the product.

Information product is a product, which state does not influence a decision life cycle course.

Management product is a product a defined states of which can cause occurrence of internal events.

Main product is a result of performance of decision life cycle. It is an object generated in the beginning of decision life cycle. Main product can be considered as management product.

On the basis of dynamic information model decision-making support system is developed.

4.3 Modelling subsystem

Modeling subsystem supports two modeling approaches – simulation approach and mathematical modeling approach. Simulation approach assumes definition and execution of simulation scenarios [10]. Scenario can be formally defined as an algorithm that is a sequence of stages and solutions. Algorithms can be executed by expert systems. Stage is an aggregate of elementary actions executed sequentially or concurrently. Solution is a point where the process flow can alter to one or another direction depending on some conditions emerged at the given moment. Scenarios can alter the state of the information model objects. Scenarios are

represented as texts written in special scenarios' language, and scenarios repository is a documentary data base. An aggregation of developed scenarios is considered as a part of knowledge base.

Mathematical modeling subsystem is aimed to process large volumes of heterogeneous data, including quantitive and qualitive data, as well as measurements time series. Data can be successfully (at the desired time and with the desired precision) processed only if automated adaptive data processing approach is used, that means that processes are built in dynamics taking into account all available related information. For building adaptive processes on the base of IGIS two components are required. The first essential component is a library of algorithms that must be sufficient for solving user problems. It is also necessary to provide possibility to performed algorithms in an automatic mode. To support automatic execution of algorithms functions for defining algorithms input parameters and functions for results estimation must be defined. The second component is a library of exploratory data analysis algorithms that provide additional priory information about structure and characteristics of the data being processed. It is used together with the knowledge available to system for selecting algorithms for building processes. Both components include a wide range of statistical and data mining algorithms.

5   INFORMATIONE INTERACTION MODEL

Effectiveness of decision-making support system significantly depends on possibility of interaction with external information sources for the maximum decrease of degree of uncertainty about managed object and possibility of trasfering results of tasks solutions to the place where a user is located. In modern conditions there is a huge number of various systems potentially capable to be suppliers and consumers of necessary data. There is a number of problems that have to be solved. The first problem is that initially interaction of all these systems was not supposed. The second problem is the organization of the optimal (on time and cost) route of information passing. The third problem is that suppliers of information can be switched off, faulty, occupied with solving other tasks. To overcome the specified problems the system has to be designed in the following way.

Lets connsider a set of existing information nodes. A node carries out one business function. Business function can be realized on the base of information that is available in the node or is received from any other node. It is important to note that quality of such information can be different. A knot can have information necessary for other knot for executing its business function. Such information is received from sensors that are connected with the node or is earlier received from other nodes. A node can transform information when new information is received, make harmonization, integration and merge of data [11]. A node can transfer information to any other node connected to the supplier node by channels. Nodes and channels can be switched on or switched off, be occupred solving other tasks. For information transfer, storage and transformation certain resources are spent. It is necessary to organize information exchange between knots so that spent resources for business function execution with necessary quality will be minimized (Fig. 3).

Resources consist of the following costs and times parameters with defined weights (quality of information and probability of the corresponding task solving is taken into account):

(1) building rout for information transfer;

(2) information transfering;

(3) information transformation;

(4) information storage;

(5) possibilities of a node.

Weight coefficients are recalculated for each node proceeding from success of the previous operations.

Dynamically changing routes of information passing between nodes can balance system loading and provide its fault tolerance.
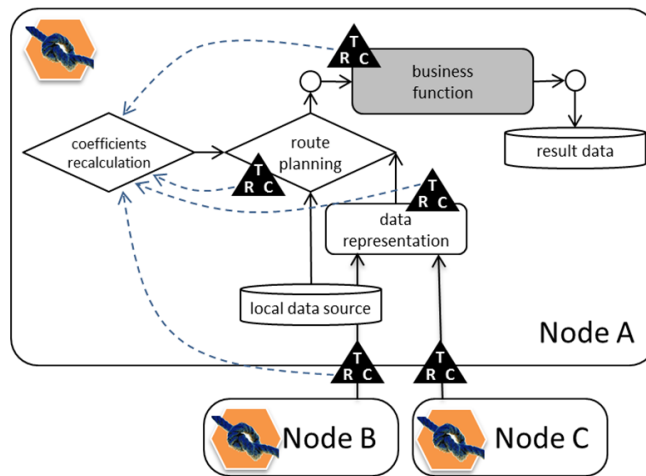
Fig. 3 Information interaction of nodes

6   SYSTEM STRUCTURE

Decision making support system contains following components (Fig. 3):

(1) Management organization component;

(2) Mathematical methods library;

(3) Simulation and modeling component;

(4) Situations management component;

(5) Component for support of external relations and interactions;

(6) Settings and audit component;

(7) Decision information model access bus.

Functional subsystems are realized in the form of program modules that interact only with decision information model access bus.
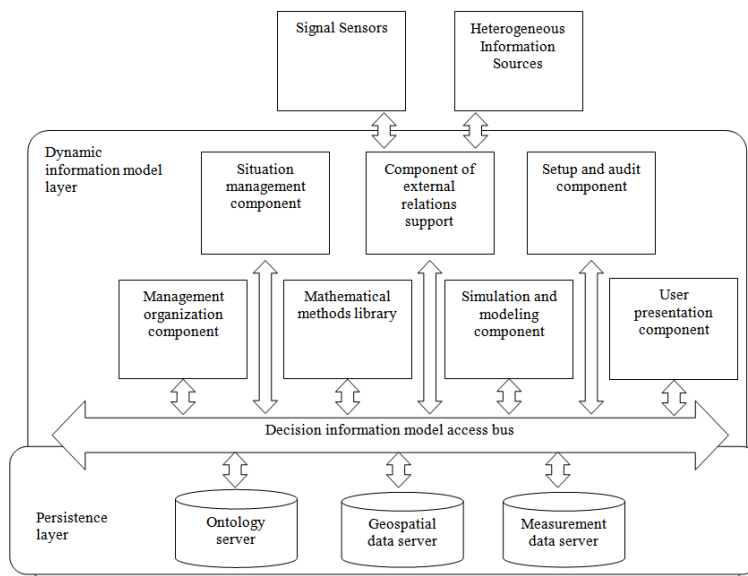
Fig. 3. System structure

7   CONCLUSION

Application of dynamic information model of data presentation along with intellectual GIS technologies for development of municipal economy distributed management systems provides:

(1) Integration at information level of various subsystems, each of which solves one or several tasks of municipal services management. It will allow creating a uniform system of municipal services.

(2) Access to the actual data on municipal economy in conditions of dynamically changing situation at the expense of continuous data acquisition from all accessible data sources and operative data processing.

(3) Possibility of making full and objective analysis and estimation of situations, arising in the sphere of municipal services, and also formation of well-founded decisions on situations management at the expense of application of mathematical and simulation modeling methods.

(4) Convenient working environment for end users due to using GIS technologies.

It is suggested to develop municipal economy distributed management systems on the base of ONTOMAP [11] System that is Surveillance & Recognize Systems for information Support and Automation of Activity Information Centers` Staff that is based on IGIS technologies and nowadays is efficiently used in naval bases, command and information centers.

8 REFERENCES

1. Keen, P. G. W. Decision support systems: an organizational perspective. Reading, Mass., Addison-Wesley Pub. Co. ISBN 0-201-03667-3, 1978.
2. Integrated DEFinition Methods, http://www.idef.com/Home.htm.
3. Business Continuity Plan. ISO 22301, http://www.ready.gov/business/implementation/continuity.
4. Endsley , M. R. Toward a Theory of Situation Awareness in Dynamic Systems, Human Factors Vol. 37 No. 1 pp. 32 – 64, 1995.
5. Vitol A., Zhukova N., Pankin A. Model for Knowledge Representation of Multidimensional Measurements Processing Results in the Environment if Intelligent GIS, Springer, Conceptual Structures for STEM Research and Education, Springer-Verlag Berlin Heidelberg 2013, pp.266-276. Co. ISBN 978-3-642-35785-5, 2013.
6. Pankin A. Integration of Heterogeneous Data Streams Circulating In Management System, Information Fusion and Geographic Information Systems 2005, International Conference Proceeding, Saint-Petersburg, pp.95-100, 2005.
7. Business Process Model And Notation (BPMN) Version 2.0, http://www.omg.org/spec/BPMN/2.0/PDF/.
8. Drools – The Business Logic integration Platform, http://www.jboss.org/drools.
9. Pankin A., Kuzeniy V. Data Harmonization in CIS. Information Fusion and Geographic Information Systems. International Conference Proceeding, Saint-Petersburg, pp.63-76, Springer-Verlag Berlin Heidelberg 2009, pp.63-76. Co. ISBN 978-3-642-00303-5, 2009.
10. Popovich V., Potapichev S., Sorokin R., Pankin A. Intelligent GIS for Monitoring Systems Development.// Proceedings of CORP2005, February 22-25, 2005, University of Technology Vienna, 2005.
11. Popovich V., Pankin A., Ivakin Y.. Data for GIS. // Proceeding of CORP2006, February 13-16, 2006, Congress Center Vienna, 2006.
12. www.oogis.ru

Development of the Border Territories within the Framework of National Development Plan for the Republic of Kazakhstan

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1 ABSTRACT

Kazakhstan is located in the Central Asia and borders with CIS countries (Russian Federation, Kyrgyzstan, Uzbekistan, Turkmenistan and Azerbaijan) and with People's Republic of China.

12 provinces from 14 in the republic are border territories, acting as the potential centers of economic activity and integration of Kazakhstan into world economic system.

Capacity of border territories of the Republic of Kazakhstan, first of all, is based on the strong state support aimed at their program purposeful development.

The conducted research was undertaken within the limits of the development of the first National Development Plan of the Republic of Kazakhstan (hereinafter – National Development Plan). Development of the border territories, transboundary infrastructure, management of transboundary natural elements (e.g. water and mineral resources) in the conditions of open economic activity, external economic processes has a direct impact on both functional and spatial planning structure of population distribution, environmental management, distribution of production forces, etc.

The border territories of the Republic of Kazakhstan were studied and analyzed, while aiming the transition to integrative model of cooperation of border territories on the basis of implementation of joint territorial projects. This demands modernization of the developed system of planning on the basis of consolidated sustainable development of the border territories of the Republic of Kazakhstan.

2 INTRODUCTION

2.1 Description

The Republic of Kazakhstan is located in the Central Asia and borders with CIS countries (Russian Federation, Kyrgyzstan, Uzbekistan, Turkmenistan and Azerbaijan) and with People's Republic of China (Fig.1).

12 provinces from 14 in the republic are border territories, acting as the potential centers of economic activity and integration of Kazakhstan into world economic system.

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3 DEVELOPMENT OF THE BORDER TERRITORIES AND THE ISSUE OF POPULATION DISTRIBUTION IN THE REPUBLIC OF KAZAKHSTAN

One of the main objectives of the development of the border territories is an improvement of the system of population distribution. Proceeding from the big extent of the border territories and the need of preservation of their familiarity, it is necessary for the Republic of Kazakhstan to realize the measures for preservation and development of economic potential and infrastructure of border settlements, to increase the administrative importance of large settlements of border areas that has to stop outflow of the population and in the long term to strengthen external immigration from neighbouring countries: Russian Federation and states of Central Asia.

For achievement of this purpose in average and long-term prospect it is necessary to solve such problems as prevention and minimization of negative consequences of migratory processes; provision and protection of the rights and interests of migrants; stimulation of inflow of foreign experts with high innovative potential by simplification of an order of attraction of foreign labour of high qualification and regulation of qualitative structure of attracted foreign labour; stimulation of return of ethnic Kazakhs, former citizens of Kazakhstan living abroad; assistance and help in the accelerated adaptation and integration of immigrants and another.

Fig. 1: The borders of the Republic of Kazakhstan

Important steps in the solution of migratory policy are suppression of illegal migration, introduction on boundary posts and other points of the modern technical means providing monitoring of illegal stay of immigrants in the territory of the country; harmonization and systematization of the national legislation with CIS countries in the field of migration.

The first step on a way of the development of border territories of Kazakhstan within the National Development Plan is overcoming of existing information gap with border territories of neighboring countries. In this regard the defining role is played by formation of information networks and creation of the general cross-border databases on the basis of use of Systems of Support of Planning which will promote in the long term creation of new forms of cross-border systems of population distribution.

Subsequent development of the border networks of settlements in the status of objects of self-government will allow having a number of social and economic effects, including:

development of the cultural cooperation;

common use of the settlements entering into a uniform complex of demographic, cultural and educational and industrial potential of a network of settlements;

formation of a uniform labor market and optimization of placement of infrastructure objects, educational and scientific centers;

formation of effectively working transport system.

For the realization of the above described positive results as a basic planning elements of network information integration of border systems of population distribution in the Republic of Kazakhstan and adjacent countries allocation of two basic frameworks organizing territorial border interaction of the country with adjacent areas are offered:

social-and-ecological information framework;

infrastructure and economic information framework.

The social-and-ecological framework is aimed at the allocation of optimum population distribution where rational use of planning conditions allow sufficient use of human and natural resources at which further economic development can be reached.

There are three city-forming elements showing efficiency criterion of the population distribution of the border systems:

placement environment;

social density of population distribution;

ecological interaction of the settlements.

The first city-forming element of a social-and-ecological framework is an environment of placement of border settlements which allows allocating nodal from the point of view of natural stability of the settlement. Environment affecting on the placement of border settlements can be considered on the basis of such indicators as their neighbourhood in relation to existing protected natural territories, water, mountain and forest systems – in turn bearing key natural risks of formation of emergency situations.

In practice of environmental management around the world a great value gets an allocation and development of the systems of special protected natural territories and objects which play an important role in the sustainable development of the regional systems of population distribution. In whole or in part withdrawn of economic use, they represent special spaces of natural self-restoration of environment of dwelling.

The indicator of the neighbourhood of protected natural territories can include a number of components, such as the area, extent of use for a pasture of cattle, tourist and recreational activity, the importance for environment self-restoration, etc.

The infrastructure and economic framework is aimed at information of allocation of the basic centers of economic activity and the need of development of their binding key lines of transport and infrastructure interaction, thus the main analytical role of this framework is monitoring and regulation of process of involvement of border territories of Kazakhstan in economically effective cross-border interaction with border territories of the adjoining countries, namely:

information identification of not populated territories and their definition in the status of "An ecological reserve" will allow to make revaluation of value of land resources: provided with infrastructure, a manpower (population) and natural territories and also to create the common long-term goals of border cooperation in the environmental protection sphere;

information support of complex long-term decrease in anthropogenous pressure upon natural complexes, at the expense of development "A unified plan of rational management of environmental management of a border network of settlements", directed on:

decrease in the level of all types of pollution of the main natural components – water, air, soil and subsoil;

rational use of all types of natural resources;

recultivation and improvement of the broken lands, etc.

On the basis of the historical analysis for a sustainable development of settlements a need of the accounting of specifics of formation of certain border territories of Kazakhstan was revealed.

4 ECOLOGICAL CONDITIONS OF THE BORDER TERRITORIES OF THE REPUBLIC KAZAKHSTAN, THE ISSUE OF CROSS-BORDER POLLUTION

Within the complex development of the National Development Plan special attention is paid to the development of planning proposals of the development of the border territories, as one of the key vectors of improvement of the organization of the territory of the country, including ecological condition of border territories of Kazakhstan, development of measures for the solution of problems of cross-border pollution.

Disintegration of the Soviet Union in 1992 led to considerable deterioration of the situation in the field of environmental protection. Division of an economic mechanism led to a stop or to considerable deterioration of technical and financial conditions of a set of the enterprises. In the conditions of the rigid crisis of investments and operational means, nature protection measures and technologies were significantly weakened.

At the same time there was a disintegration of a control system by environmental protection. Besides, before the countries there was a number of problems of environmental protection in border territories and cross-border basins of the rivers where remained, and often – environmental problems became aggravated, but the institutional basis for their effective decision was lost.

Specific feature of cross-border problems is the impossibility of their permission efforts of the certain state, or higher efficiency of joint actions, in comparison with autonomous national, or bilateral activity.

Within complex development of the National Development Plan the main cross-border problems of the Republic of Kazakhstan and adjacent countries for justification of recommendations about the perspective measures, submitted on the solution of problems of cross-border pollution are considered.

Realization of the following nature protection actions for the stabilization of an ecological condition of border territories of the Republic of Kazakhstan and the adjacent countries is necessary for the solution of cross-border environmental problems:

expansion of the international relations in the field of improvement of an ecological situation of cross-border territories;

implementation of interstate control in the field of the protection of the land and water resources, behind observance by subsoil users of rules of ecological safety;

implementation of interstate control in the field of protection of land and water resources, behind observance by subsoil users of rules of ecological safety;

development of the documents on introduction of the general quotas of environment pollution for the border territories of the adjacent countries in the conditions of carrying out geological exploration;

formation of the general network of environmental monitoring behind the preservation of the cross-border archaeological and natural monuments and development of joint documents on the organization of cross-border reserves.

At the expense of the state and local budget of adjacent territories of the states to develop a system of steady financing of nature protection actions in the cross-border territory.

For the solution of environmental problems of the border territories of the states fully realize accepted regional programs on rational environmental management and environmental protection. Development of a joint program of economic development of the border areas of the states.

Creation of the conditions necessary for providing normal life and activity of inhabitants of border regions of the states, maintenance of historically developed communications and contacts in production, social, cultural, household and other spheres by means of introduction of the simplified procedure of crossing of border on the basis of special admissions of long using.

5 CONCLUSION

As a world experience shows, the key advantage of the developed border territorial associations is their influence on spatial optimization of the territory, including:

Intensification of joint development of border infrastructure, transport, trade and other service systems;

Integration of the market of consumers that promotes an increase of economic capacity of the border territories of the both countries under the condition of joint efforts on the directed investment orientation.

Transition to the cooperation model of cooperation aimed at the development of the border territories on the basis of implementation of joint territorial projects, demands modernization of the developed planning system on the basis of offered approach of consolidated sustainable development of the border territories of the Republic of Kazakhstan.

6   REFERENCES

LAW OF THE REPUBLIC OF KAZAKHSTAN "About architectural, town-planning and construction activity in the Republic of Kazakhstan", July 16, 2001.
THE MESSAGE OF THE PRESIDENT OF THE REPUBLIC OF KAZAKHSTAN – THE LEADER OF THE NATION NURSULTAN NAZARBAYEV TO THE PEOPLE OF KAZAKHSTAN "Strategy "Kazakhstan-2050": new political policy of the taken place state", December 14, 2012.
RESOLUTION OF THE GOVERNMENT OF THE REPUBLIC OF KAZAKSHAN No. 222 "About the approval of the rules of the development and coordination of the National Development Plan of the Republic of Kazakhstan", March 4, 2011.
ORDER OF THE PRIME-MINISTER OF THE REPUBLIC OF KAZAKHSTAN, No. 106-o "About the approval of the plan of the measures on complex development of the National Development Plan of the Republic of Kazakhstan for 2011-2013", August 10, 2011.

Disaster Prevention Planning and Disaster Preparedness for Earthquake

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1 ABSTRACT

There are differences between earthquakes and other natural disasters:

- Enormous damage

- Occurrence of a very short time (as much as a few seconds) to allow the deal to eliminate

- Destruction of vast areas, sometimes hundreds of square kilometers covers

- Threats of aftershocks, which often takes more than one year

Causes of loss and damage in Iran

- Increasing number of cities in Seismic areas,

- Uncontrolled development of cities, so many faults in urban areas have been

- The city's population density increased the number of earthquake victims,

- Increase the quality and quantity of municipal installations and facilities increasing financial losses due to earthquake

- Despite the lack of planning for placement in seismic active regions of the world,
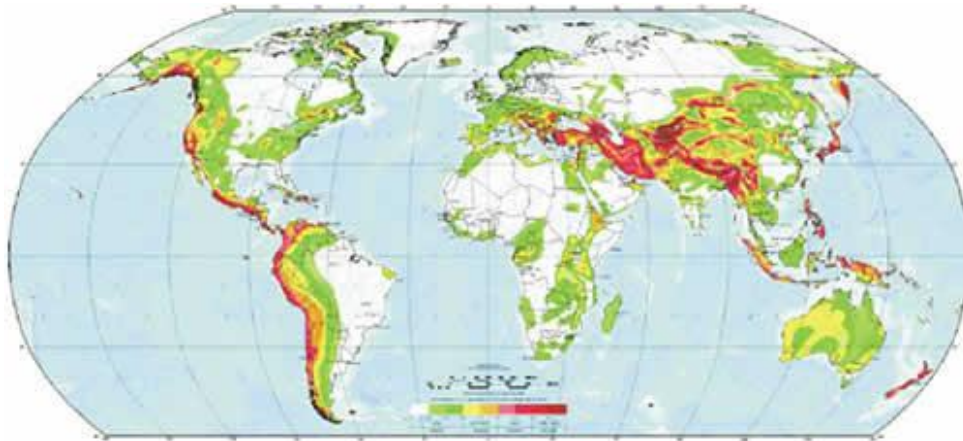
While the earthquake is much more than building blocks. City Form, The spatial distribution

Spatial and landuse compatibility and performance of building systems, appropriate network access and efficient hull design of streets and city views, open space ratio of width to height distribution are effective in reducing the vulnerability of the earthquake.

1.1 Disaster Management

Disaster management is a continuous and dynamic science. It's branch in management so includes planning organizing leadership and control.

Disaster management is usage sciences by the systematic observes of disasters and analysis them, and consider tools that can be prevented by disasters. (if it's possible) and reduced its impact, quick responsed and improved. Cycle of disaster includes 3 parts.

Before disaster, during disaster and after disaster. Each part includes some actions such as prevention reduction, Preparation, relief, organizing and improvement.

1.2 Planning in different stages of disaster

Natural, social, finance, skeletal differences in different communities likelihood of disaster has caused that different countries different experiences.

For achievement useful plane model in disaster management in a city must be done:

(a) Definition of overall goal and other operational objection consider:

- Immunizations must be provided in the side against earthquakes.

- control the situation after the earthquake, such as health status or utilities provided to victim and survivors of the disaster and secondary control and vulnerability.

- Safety and social and economic organization of survivors.

- Suitable ground for post-crisis measures including regulation of regeneration and redevelopment and job creation.

(b) identifying current situation of organs such as identifying all organs and resources of them.

(c) identifying barriers and environmental aid and organizations to deal

(d) determine necessary actions and operational goals and forecasting methods, time and location and person ,department and organization and necessary resources with the maximum flexibility to deal with potential incidents occur.

Planning is done in 3 stages.

1.2.1   Before the crisis

Prevention: This planning is not possible for all kind of disaster such as earthquake then it means reduce adverse effects.

Reduction effects: This kind of planning includes package of acts to minimize the damage caused by an accident and the purpose of it is reducing adverse effects of the crisis. For example limitation of landuse in harmful fields or development techniques building Strength against earthquake Specific regulation to encourage the use of new techniques of building construction

Static actions: Action such as the development or application of the building code criteria such as classification buildings and zoning of urban and regional planning, Landuse, tall Building Safety Laws.

Dynamic actions: Action such as public education, Develop programs to improve the quality of housing

Safe movement of people in vulnerable areas and diversification of economic activities to find substitutes for those who are vulnerable to accidents include

Disaster preparedness planning:Disaster preparedness planning will underpin all responses after crisis and Includes an estimate of immediate needs and identify resources to meet those needs that Urban management organizations, governments and citizens to act with speed and efficiency are necessary in the present.

1.2.2   during the crisis

First aid plan (the immediate short-term actions): this stage begins 3-7 days after earthquake

Temporary Housing (expending steps): begins After 1 month

1.2.3   after the crisis

Immediate Relief: includes survive injuries, Nutrition, shelter

Reorganizatin: from fifth day to third month after earthquake

Reconstruction: of the third month after earthquake

1.3 Disaster management and Urban planning

Crisis management is the process of urban planning in the five periods are:

First moments of disaster of its time scale is in seconds or at most minutes.

Second stage: the escape and refuge. Sustained physical injuries caused destruction and loss of life.

Third stage: the relief and rescue operations in the early hours of the onset and persists for weeks

forth stage: the establishment of the interim period from the first day until many months.

Fifth stage: Elimination of the destruction caused by the earthquake and reconstruction operations and involves purge.

1.4 The role of urban design in crisis

"Singer" and "Lynch" more flexible forms of urban open spaces are compact.

"Banerjee": More on transportation networks, infrastructure, municipal services and facilities, the city is safe.

But most urban form of flexibility, in terms of efficiency or fairness is the best option. As a result,

Looking through the process of research and urban design professionals may be treated in three ways:

(a) The concept of vulnerability in the broader social and ethical dimensions, etc. The traditional method of estimating earthquake hazard maps in terms of economics and engineering go beyond saving.

(b).Earthquake scenario developed and determines the relative vulnerability of different regions of the human dimensions of hazards and estimated damages to be considered And priorities for action or improvement are identified and are given in the form of increased resistance

(c) Implementation strategy, in terms of improving existing programs, building and land use regulations are proposed and evaluated.

2 ACTING FAST IS MOST IMPORTANT IN DISASTER MANAGEMET AND IT CAN BE USEFUL TO REDUCE INJURY AND DAMAGE.

I want to show how locations of some of strategic building can be useful to reduce time chart.

2.1 Management and police unit

Municipal Building is located at the center.

If there is enough open space around the building.

The location of the building has good access to the region.

Electricity and water tower is not located within the zone.

Large-scale industrial users of chemicals plants and nuclear reactors, and have a great distance.

Authorized to establish land uses in the vicinity of residential, commercial and hospital.

Natural edges and cut the gap to be deep.

Municipal building a simple plan (in terms of geometry) to allow escape in case of disaster relief assistance to clients and the access is easier.

The building is situated in a grade 2 arterial approach.

Construction site on a secure site with the earthquake risk is low.

In high-risk sites should be located as far away from them.

The atmosphere is building in the center.

Structure is associated with wide sidewalks.

Space the side walls of the staircase should be retrofitted.

Long corridors inside the building as possible and not be easy to open and access.

Municipal buildings and open spaces for public parking near the temporary settlements is

2.2 Fire Station

Tower of Power and Water Resources aerial firefighting services right away have.

Away from hazardous sites have.

Arterial streets are associated with the fire services degree.

Shows the degree of fire in a street collection centers are located.

Open fire in the center, there is enough for helicopter landing.

Fire services are built on low-risk sites.

Access to a range of 5 to 8 minutes to have its hinterland.

Resource for emergency water storage and its hinterland have size scales

The edges are the natural and urban cuts.

Centers, clinics and hospitals have easy access to the fire.

Priority neighborhood centers, fire and police administration of the land.

2.3 Health centers

The low tissue density in urban centers (with respect to scale and its hinterland) is placed.

Tower of Power and Water Resources Center right away have

Scale industrial centers of heavy industry and chemical plants and nuclear reactors have a great distance.

Neighboring residential treatment centers, the first priority should be utilized. The neighborhood, education, commercial, cultural, administrative function whereas the same is not permitted.

Approach confirms a positive gathering centers communicate.

Centers are located in the passageway collector grade.

Stay away from high-risk sites.

Centers to be built in place of low-risk sites.

Edges, and cuts away from the city.

Nodes aren't located busy urban centers.

Find it in the middle of the land allocated to be built around them to be completely open and

Construction of the center is not connected to another building.

Centers have easy access to the fire.

The center is located in the stairwell space.

Side wall of the staircase space is retrofitted.

Inclined planes and ramps instead of stairs is used.

Wide stairs and into the main building of the hospital is simple

Adjacent to outdoor centers are enough to destroy the possibility of the use of this space is used for center field.

Open space near the helicopter landing centers exist.

2.4 Open space

Open spaces have a minimum area of 2500 square meters in extent, depending on the area of hinterland can be changed.

Open spaces with high dimensions are scattered across the region.

The edges of the cuts are urban.

Open spaces are located adjacent to the water tower and electrical biographies.

Regarding open space, texture and appearance of the city, the fighting identity.

Open spaces in the neighborhood of the battle.

The streets are open spaces rides between locations.

Health facilities within the open spaces are considered.

Network of open spaces with water and electricity, and sewage disposal facilities are.

2.5 Residential buildings

The maximum occupancy rate of the building 50.

Building height to length ratio is equal to one yard minimum.

Building staircases and corridors to reach the open air .

The centers are located in the stairwell space.

Cavity side walls of the staircase are retrofitted.

Tower of power and water supplies, air space be reserved.

Away from Utilization of industrial-scale heavy industry and chemical plants and nuclear reactors.

Away from the natural edges.

Regulations, building codes and retrofitting buildings to be considered.

Uneven and not plating material and may not be used in any way harmful.

Outside of the building is the perfect escape.

The intermediate spaces such as hallways at least used to be.

Away from construction sites is prohibited (due to earthquake, nearby faults and soft alluvial sediments and soils in terms of soil type and groundwater level above).

Hydrant installations such as power stations and substations to be close.

Easy access to building and window openings.

3 CONCLUSION

Order to locate a suitable model, the characteristics which must affect the vulnerability of a city, and how performance can be identified and their impact must be examined.

In addition, the user's position and the reasons for their vulnerability and the wider Nhvhbaztab (damaging the land adjacent to the other users) must also be determined. Combination of these sets of factors can be found in the user-specific strategies. Primary factor affecting the level of vulnerability is the location. In this regard, various parameters such as the location of faults, slope, soil type, water table, topography and ground motion (seismic potential) are introduced, which measures the vulnerability of any kind involved.

These indicators can be summarized in the following table that the weight of the index, the importance of user variables:

Recognition	Strategy	Criteria
Identify the location of the user according to nearby seismic faults and potential	-Geology -Seismic studies -Studies to determine faults	Compliance boundary faults (according to the type of use case will be provided) Avoid construction in areas that have high seismic potential. Such areas devoted to green space. Strict avoidance of high population density in the areas of construction land
Natural characteristics of the location	-Studies of soil material - Studies slope - Studies of ground water level	Avoid construction in areas where there is the possibility of liquefaction
Radius of influence cognitive user access based on	- Distance of the radius of access and proximity to the center - To determine the influence of land - Determine the location of any user	Adopt the broad, central and convenient for easy access
Understanding how specific user access. Related pathways were late (roads between cities)	Determine optimal routes to access Criteria: . Safe routes (heterogeneous differentiation pathways and risk factors) . Short route (time and space) . Pleasant paths (mental peace) . Pathways readability (comprehension location)	-Given the importance of land use planning is the main route selection. - Separate access off the roadway and determine specific Hrymhay - Avoid mixing tracks user access with heavy transit traffic - Avoid creation of the access tortuous
Identify of the specific pathways	- Criteria of buildings away from the wide thoroughfares Ykdygrnsbt - Criteria of buildings setback from the sidewalk to the street width	-Sidewall height to width ratio of way - Use the wide thoroughfares
Identify of the adjoining land	- In terms of land adjoining or contaminates that can cause interference to the following terms are going to be difficult and the adjacent land. - Traffic congestion (volume-using population.	Create a central area and Prevention and community center on the same land
Recognition of enclosed land (Floor -Area)	Evaluation of internal conditions and the placement of physical (density and storage space built into a piece of land)	During the height of the building is a courtyard in North homes Pass on the south side of the wall is the width of a ford
Identify materials used in the manufacture of building land	Evaluate the strength of materials, construction and design of the user	- Compliance with Building Regulations 2800 or any new e-Syn is available for resisting earthquakes. - Structural provisions for retrofitting
For determining the location	To give priority to the rescue	Evacuation and sheltering of quick and easy access to nearby open spaces and safe

Stages of analysis of applications Vrsydn criteria for reducing the seismic vulnerability

4 REFERENCES

ABDOLAHI, Majid: Disaster Management in the cities, Tehran, 2002

HABIB, Farah: Role of form in minimizing the risks of earthquakes. Tehran, 1991.

ITSUKI, Nakabayashi: Urban Planning Based on Disaster Risk Assesment, Japan, 1993.

Economy out of the Big Lights: the Issue of Mono-Cities in the Republic of Kazakhstan within the Framework of National Development Plan for the Republic of Kazakhstan

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1 ABSTRACT

The problems of mono-towns, unfortunately, are very urgent for many countries of the former Soviet Union area. Mono-town is the city or town where the main part of its industrial production and working population is concentrated on one or several city-forming enterprises. These enterprises tend to have single profile and raw material orientation which define all economic and social processes happening in the city.

The main reasons of mono-towns' issues are the decrease in output and stop of activity of city-forming enterprises as a result of exhaustion of a source of raw materials of the extracting enterprises, low competitiveness of production, outdated technologies at the city-forming enterprises, and the rupture of technological chains connected with disintegration of the Soviet Union.

The major objective of the development of mono-towns is an achievement of their sustainable social and economic development in average and long-term prospective. In order to tackle these issues there is a need to develop complex measures taking into account specific problems of mono-towns and features of their branch orientation affecting production and social aspects of their development.

Planning decisions should be about improvement of the existing system of population distribution and modernization of production capacity of mono-towns which result from negative consequences of transitional and crisis processes of economy.

Planning development decisions of mono-towns would constitute major spatial elements of the organization of the country which promote modernization of the general planning framework within the National Development Plan for the Republic of Kazakhstan.

2 INTRODUCTION

2.1 Description

The problems of mono-towns, unfortunately, are very urgent for many countries of the former Soviet Union area. Mono-town is the city or town where the main part of its industrial production and working population is concentrated on one or several city-forming enterprises. These enterprises tend to have single profile and raw material orientation which define all economic and social processes happening in the city.

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Planning decisions should be about improvement of the existing system of population distribution and modernization of production capacity of mono-towns which result from negative consequences of transitional and crisis processes of economy.

2.2 Brief history

The main reasons of mono-town' issues are the decrease in output and stop of activity of city-forming enterprises as a result of exhaustion of a source of raw materials of the extracting enterprises, low competitiveness of production, outdated technologies at the city-forming enterprises, and the rupture of technological chains connected with disintegration of the Soviet Union.

Emergence of mono-towns in Kazakhstan happened in various ways. For instance, the mining centers during the development usually acquired the manufacturing industry enterprises and therefore some of them turned into mono-towns.

At the moment mono-towns in Kazakhstan is possible to group in the following way:

- the towns with primary development of a mining industry;

- the towns with primary development of manufacturing industry;

- the towns with primary development of electricity generation;

- the towns with primary development of mechanical engineering, construction, light and food industry;

- the towns industrial and transport centers;

- the towns which are carrying out functions of the improving centers, tourism;

- the towns of scientific and experimental centers;

- the towns with primary development of processing agricultural production;

- the towns which have lost industrial and nonindustrial function

2.3 Analysis of mono-towns' conditions

Industrial production in mono-towns is characterized by specialization on one-two branches, and other branches are developed slightly, or the industrial enterprises in general are absent. Decrease in output or stop of the city-forming enterprises led to the general deterioration of social and economic situation in the towns.

Owing to disintegration of a common economic space of the former Union and market transformations, the majority of mono-towns fell into decay, their production base was completely destroyed, former city-forming enterprises are closed and declared by bankrupts.

During the years of reforms in many mono-towns industrial production was curtailed or reduced to a minimum. Especially it concerns the towns of the extracting profile which situation considerably worsened owing to decline in production, exhaustion of stocks of minerals, decrease in demand for production.

The mono-towns in the areas of the development of new oil and gas fields in the west of Kazakhstan have the highest growth rates of industrial production, large volumes of investments and the relatively high income of population.

At the same time the depressive small towns of the extracting profile which situation was considerably worsened owing to decline in production because of exhaustion of stocks of minerals, decrease in demand for production are allocated.

Future development of the towns of the industrial direction is connected with improvement of structure of economy by diversification and expansion of structure of their functional specialization. In the towns with an extracting industry where production of raw materials is already inefficient, it is expedient to develop new productions which would compensate reduction of workplaces in the main production.

Requirements of modern industrial production to technology, the equipment, existence of the qualified labor, infrastructure became complicated. In this regard mono-towns with manufacturing industry, as a rule, have no conditions for the organization of large modern industrial enterprise. In these towns it is necessary to develop the small enterprises with high level of particular and technological specialization.

The smallest industrial outputs per capita have the centers of agricultural areas.

The manufacturing industry enterprises in mono-towns stand idle or are partially loaded because of low competitiveness of products, lack of demand, remoteness of sales markets and high tariffs for transportation. Their situation is aggravated physically and the obsolete equipment, loss of qualified personnel as a result of migration.

Development of small business in mono-towns with depressive economy is interfered by a low production and consumer demand, inaccessibility of financial and credit resources caused by absence at businessmen of liquid mortgage property.

2.4 Employment and unemployment

Topical problem of many mono-towns is discrepancy of structure of production and economic base to requirements of market economy. Technological backwardness and wear of the fixed business assets of the majority of the enterprises of the small towns, accruing staff deficit, and their low professionalization slow down further development of the small cities. Stabilization in the industry and economy as a whole

demanded existence of professional shots, first of all technical officers, and introduction at the enterprises of new technologies led to increase of requirements to a skill level of workers.

On a labor market of mono-towns remains both quantitative and qualitative discrepancy of supply and demand of labor. Thereof there is a need of taking measures to reproduction of personnel potential on a new qualitative basis, proceeding from prospects and priorities of development of urban economics.

2.5 Production and social infrastructure

Unsatisfactory condition of production infrastructure is one of the key problems, constraining development of mono-towns. Especially sharply there is a problem of transport remoteness and bad condition of highways.

Remoteness from large sales markets, city agglomerations, a transport issues complicate development of such towns. They are connected with regional centers the highways demanding considerable rehabilitation works.

The low technological level of highways, accident rate of certain bridges and communications leads to decrease in high-speed opportunities of transport, increase in a transport component in the cost of goods and services, losses when transporting agricultural production.

Remoteness and bad quality of highways have except economic and social consequences, such as youth outflow, decrease in a cultural standard of living of the population.

2.6 Ecological situation

Ecological consequences of industrial development of mono-towns are pollution of atmospheric air, chemical infection of soils, surface fresh waters and fish stocks in reservoirs, increase of an incidence of the population.

Sources of ecological issues are:

congestions of cindery dumps, spontaneous dumps and lack of city treatment facilities;

bad condition of sewer networks and the fields of a filtration located near the towns;

large volumes of dumps and tailings dams of the mining enterprises;

emissions of polluting substances from the numerous small boiler rooms working at firm fuel.

3 MAJOR ISSUES AND DIRECTIONS OF THE DEVELOPMENT OF MONO-TOWNS

3.1 The main issues and factors constraining development of mono-towns

The analysis of economy and the social sphere of mono-towns allowed allocating the main problems inherent in them such as:

- lack of effective strategy and programs of development of the mono-towns;
- lack of funds for development, dependence on higher budgets;
- low level and quality of life;
- high unemployment rate;
- high dependence on the city-forming enterprises;
- high percent of wear of objects of production and transport infrastructure in combination with big remoteness of many towns from the regional centers;
- shortcoming of skilled workers and experts of all branches of economy;
- environmental problems.

3.2 General directions of development of mono-towns

The complete program of development of mono-towns has to define the main strategy of development of the mono-towns of the country, defining the financing sphere which finally has to be carried out from republican and regional budgets. Concrete measures for development of each town have to be provided in regional programs of development of the mono-towns.

The main directions of development of mono-towns are:

- improvement of structure of economy by diversification and creation of an optimum combination of the enterprises of various size and branch accessory;

- expansion of structure of functional specialization of the towns;

- development of mineral raw material resources available near the mono-towns;

- territorial organization of social infrastructure for availability increase to the population of main types of services;

- reproduction of the population and personnel potential;

- territorial organization of infrastructure of support of subjects of small business.

Each mono-town needs to be studied in details. The main directions of development of mono-towns have to be defined taking into account their mineral and raw and agrarian resources, the production and labor potential, a favorable geographical position.

Effective Usage of Short-Term Parking Zones by Offering Real-Time Information on the Utilisation of Parking Lots

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1 ABSTRACT

In many cities area-wide short-term parking zones were introduced to reduce traffic in search of a parking place and to enhance the life quality. Nevertheless, in many cities with parking restrictions the volume of traffic is still high and parking search traffic is one reason for this problem. Previous attempts aim to overcome this issue by guiding drivers to the next available parking space. These systems are expensive and politically controversial, because they indirectly encourage car use. On the other hand, a pre-trip information service informing road users prior to departure about the occupancy of parking spaces at the destination could have a higher steering effect and encourage people to use alternative transport means. Based on these assumptions a real-time information system for the occupancy of short-term parking zones was developed and tested in two areas in Vienna (Austria). Instead of relying on roadside infrastructure this system uses position data of the mobile phone parking service as an indicator of the occupancy of parking zones. In addition, the potential of two more data sources to improve the reliability of forecasts was tested: model-estimated traffic flow data and counts of short-term parking customers in parking garages. The prediction model was developed and validated with an empirical parking survey. This novel technology helps to administer the scarce resource of parking space in urban environments more effectively and supports people in choosing sustainable transport modes.

2 INTRODUCTION

In recent years the automobile industry and academic researchers developed numerous driver assistance systems (Pellecchia et al., 2005). For example, several techniques have been evolved, which provide drivers with real-time information on the occupancy of car parks. However, developing an analogous information service for on-street parking spaces is much more demanding, because entries, exits, and parking spaces are less well defined and inappropriate for counting. In table 1 different approaches are listed, which have been developed to provide this information.

System	Function	Disadvantages
Vehicle detection with panoramic street images	Use of laser-ranger finder and a line-scan camera taking epipolar-plane images	Delivers only static snap-shots, but no real time information. (Hirahara and Ikeuchi 2003)
Linked parking meters	Parking meters identify free parking spaces via infra-red sensors, the meters are connected with each other via radio frequency transceivers	Impractical system to cover large areas, electrical infrastructure necessary, high deployment and maintenance costs (Sifuentes et al., 2011)
Wireless sensor networks with autonomous sensor nodes	Sensors or induction loops identify free spaces and communicate via radio frequency transmitters; information is available on mobile devices or VMS,	High costs for equipment and maintenance (Federal Highway Administration, 2007; John Markoff, 2008)
Vehicle to vehicle (V2V) communication	Protocols can be used by vehicles to share information about available parking spaces via V2V communication	Only for cars equipped with the necessary expensive techniques
Community-based system	Enables users to indicate (release) free on-street parking spaces and to find these spaces via a mobile app	Requires high share of market penetration to provide a complete picture

Table 1: Approaches for the development of a real-time information system on the occupancy of on-street parking spaces

Up to now detection of on-street parking spaces relied on area-wide infrastructure on street or within vehicles, which causes high costs. Such systems are also controversially discussed, because they aim at navigating drivers quickly to the next free parking space and making car use more convenient. It is therefore more preferable to inform road users early about the current and predicted parking situation at the destination. A reliable forecast of the occupancy could support the use of other alternatives (public transport, Park & Ride) and reduce parking search traffic at the destination.

3 STUDY IMPLEMENTATION

The objective of the study was to develop a non-invasive real-time information system for the occupancy of short-term parking zones, which operates without the need for roadside infrastructure (see Figure 1). Instead of showing the status of individual parking lots, it aims to provide a sufficiently accurate description and reliable prediction of the parking pressure in a broader target area. Three existing real-time data sources were tested for their usability in such an information system:

- position data of short term parking customers, who buy their electronic parking ticket with their mobile phone using an SMS payment service;

- counts of short-term parking customers in car parks in or close to the target area;

- traffic flow volumes derived from more than 300 automatic counting sites in Vienna.

The city of Vienna was chosen as case study area. In the inner city district, parking search traffic amounts to 20 % of total traffic, at peak times up to 90 %. The city offers an SMS payment service for short-term parking fees, which is called "HANDY Parken". More than 40 % of all short-term parkers pay their ticket by using this service. Each electronic ticket generates information about the duration and location of a parking transaction and is therefore expected to provide an indicator for the number of parked vehicles and the total occupancy in an area. The two further real-time data sources were tested concerning their influence on the reliability of the forecasts. The real-time occupancy model was developed and calibrated with data of an empirical parking space survey in two test areas in Vienna. The study was to form the basis for an online prototype, equipped with a visualisation on Google Maps and a data-interface for integration into existing travel information services.
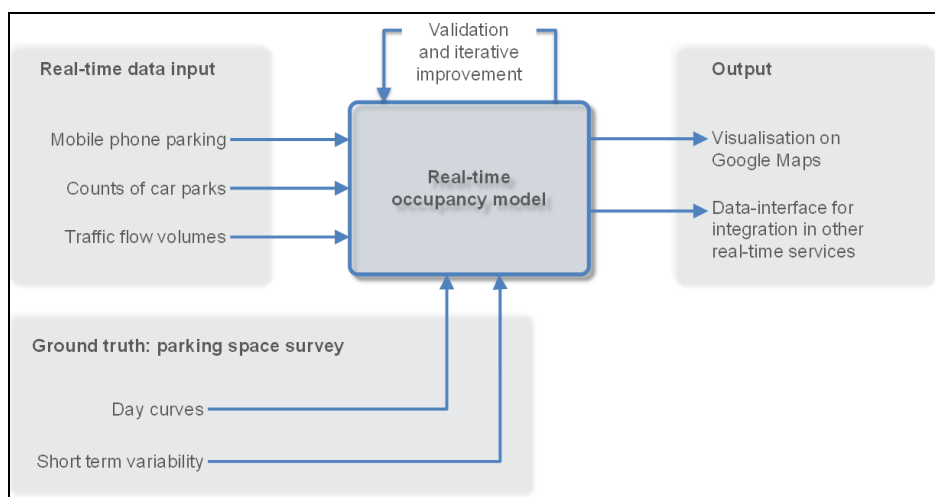
Figure 1: Data flow in the real-time occupancy model

3.1 Real time data sources

The HANDY Parken service has an agreement with mobile network operators (MNOs), the largest of which participated in the research project. Reading out all SMS-tickets booked in a given time interval is technically and legally feasible, but for the model also the coordinates of the active network cell from which the mobile phone sent the HANDY Parken SMS was necessary. Due to data protection concerns, the responsible officers of the MNO decided against a data transfer despite an initial agreement. As a consequence, the HANDY Parken data could be made available for calibrating the model, but is currently not available as real-time information source for operation. The counts of short-term parkers in the car parks were obtained by an agreement with five of the six car park operators in the test areas. The provided data included separate counts of long term and short term parkers entering and exiting the car park throughout the duration of the parking space survey. Traffic flow data is already collected at a central point, where they feed into a transport model. A data exchange protocol has been defined, enabling data exchange at any time.

3.2 Parking space survey

A parking space survey has been conducted in order to obtain a 'ground truth' for calibrating and validating the occupancy model and to estimate the day curves of vehicles, which have a permanent parking

permission, any other special permission, or no permission at all (fee dodgers). This survey was necessary because parkers without a HANDY Parken ticket leave no electronic trace for real-time indication. The survey was conducted in two test areas with a total of 3,000 parking spaces. The areas have different characteristics concerning the residents-visitors ratio, supply of on- and off-street parking, spatial functions, and demographic structure. The survey was carried out in three periods in February, March and April 2012. The demand of parking spaces was observed periodically every 30 minutes from 8 am to 10 pm. Each parked vehicle was registered along with the type of parking permission: permanent permission, fill-in ticket, or no visible permission. The latter could be fee dodgers or users of the mobile parking service. In order to distinguish between the two, we recorded the license plates of these vehicles and checked them against the HANDY Parken database, which allowed us to determine, how many cars in a certain part of the test area had valid electronic tickets during the observation period.

Based on this survey it could be shown that there are strong differences in the day curves for both test areas. The share of short-term parkers is approx. 40 % in the city centre (area 1), whereas it is only 20 % in the residential area (area 2). The occupancy in the city centre is highest during the day and during the opening hours of pubs in the evening, whereas the residential area shows the highest occupancy in the morning before the residents leave and in the evening when they are back.

4 RELATIONSHIP BETWEEN REAL TIME DATA AND OCCUPANCY RATE

4.1 Counts of short term parking customers in car parks

Several correlations of car park data with parking space occupancy were computed, but no systematic relationship between car park inflow and parking space occupancy were found. This indicates that the car park inflow is no suitable indicator of the occupany rate. The commonly held view that the garage inflow indicates an overflow of on-street parking demand was not confirmed by the survey data.

4.2 Traffic flow volumes

Traffic flow data from 830 major roads in the Vienna region was examined. The data were derived from a traffic model, which uses data of more than 300 automatic counting sites in the city. In order to check the suitability of the traffic flow data for predicting parking space occupancy, the correlation coefficients between the traffic flow and mean occupancy rates was computed. It turned out that there is no significant relationship between traffic flow data and parking occupancy rates. The flow data were therefore not included as input for the real-time occupancy model.

4.3 Mobile phone parking data

As mentioned earlier, the mobile network operator refused to provide the location data of mobile phone parkers for privacy concerns. However, for the vehicles observed in the parking space survey this information could be derived from the HANDY Parken database. The initial assumption was that mobile phone parkers are a congruent subset of all short term parkers, and that the latter can be added to the number of permanent parkers, which evolves according to its own independent day curve. Table 2 shows the relationships of the number of electronic tickets with other kinds of permissions and with the total occupancy rate.

Kind of permission	Area 1		Area 2	
	r	p	r	p
fill-in tickets	0.515	0.000	0.503	0.000
permanent permissions	-0.259	0.000	-0.269	0.000
cars without permission	-0.372	0.000	-0.418	0.000
all other permissions	-0.067	0.241	-0.238	0.000
total occupancy rate	0.659	0.000	0.115	0.043

Table 2: Correlation coefficients (r) and significance (p) between electronic parking tickets and other parking permissions in in 1st district (area 1) and 6th district (area 2)

Table 2 shows a strong positive correlation between the number of cars with electronic tickets and fill-in tickets, but a moderate negative correlation with permanent permissions as well as fee dodgers (without permission). As a result, the hypothesis that the number of permanent parkers evolves independently from short term parkers has to be rejected. Area 1 shows a high positive correlation between electronic tickets and total occupancy rate, whereas in area 2 the correlation is very low. The reason for this difference is the higher share of short term parkers in area 1, which results in a stronger relationship between electronic tickets and

total occupancy rate than in area 2. A linear regression model of the occupancy rate given the number of electronic tickets explains r² = 43.5 % of the occupancy rate variance in area 1 and only r² = 1.3 % of the variance in area 2.

4.4 Real-time model

In order to measure the improvement in prediction accuracy gained from the real-time information two reference models were defined. One was a constant average model, which is based on the assumption that the occupancy rate stays at a constant average level at any time; and the other was an average day curve model, which is based on the assumption that on all days the occupancy rate follows the average day curve. The second model accounts for 65.8 % of the variance of the occupancy rate in area 1 and 54 % in area 2, respectively.

Although, the real-time indicator has a lower explanatory value for the occupancy rate than the average day curve model, it might still improve the predictive power if added to the average day curve model. This was tested for estimations of the occupancy rate in a) the current time interval, b) in future time intervals, and c) in exceptional situations, where the occupancy rate differs strongly from the usual level.

A linear regression model taking into account the number of electronic tickets increases the fraction of explained variance of the occupancy rate in the current time interval by 10 % in area 1 and 1.7 % in area 2. The attempt to improve the prediction of the occupancy rate of a time interval in the near future was based on a linear model of the day curve of electronic tickets. A separate model was developed for both areas and subject to three cross-validation rounds. Within each round, two of the three survey weeks served for calibration, while the remaining week served for validation. The result was that the real-time indicator could in most cases not reduce the prediction error of the average day curve model.

However, the real-time model outperformed both reference models in exceptional situations. This could be shown for the Shrove Tuesday, during the first week of the parking space survey. In this particular case it turns out that the real-time model predicts the occupancy rate better than the average day curve model. The error improvement is strongest in the current time interval, but it still appears in predictions of future time intervals. This result indicates that the real-time information about electronic parking tickets might increase the accuracy of an occupancy model in situations, in which the demand of parking place deviates from the usual level.

5 CONCLUSION AND OUTLOOK TO MODEL APPLICATION

This paper reported on the development of a real-time occupancy model of short-term parking zones, which operates without roadside infrastructure. The following points can be concluded from the presented work:

- The number and location of electronic tickets of the HANDY Parken service can help to indicate and predict the occupancy rate in short term parking zones, whereas traffic flow data and counts of short-term parking customers in car parks show no significant correlation. Due to privacy concerns of the major mobile network operator this indicator is currently not available for online operation of the service.

- The occupancy rate of on-street parking spaces follows a recurrent pattern. An average day curve model thus predicts the occupancy at a given time interval very well and can hardly be outperformed by a real-time model which does not account for these daily patterns.

- However, unusual deviations from the day curve due to exceptional events can only be predicted by the real-time model.

The unavailability of the location data of electronic parking tickets is the result of data protection concerns of the Mobile Network Operator. However, the decision is subject to interpretation of the legal regulations, so that there is still a chance for a positive decision in a second attempt.

An elemantary way to make the information service available to the users would be a stand-alone webpage as shown in figure 2, where the user can choose the area and time for which the occupancy information shall be provided. A second option could be to integrate the service into existing information services. The end users' benefit of the information service is in either case a better knowledge of the current and predicted occupancy of on-street parking spaces at the destination in a short-term parking zone. It could also include recommendations for alternative options in case of high parking pressure such as off-street parking facilities,

intermodal transport, or public transport. It can serve as a role model for other cities, since mobile phone parking is state of the art in many European cities, and its use will increase elsewhere as well.
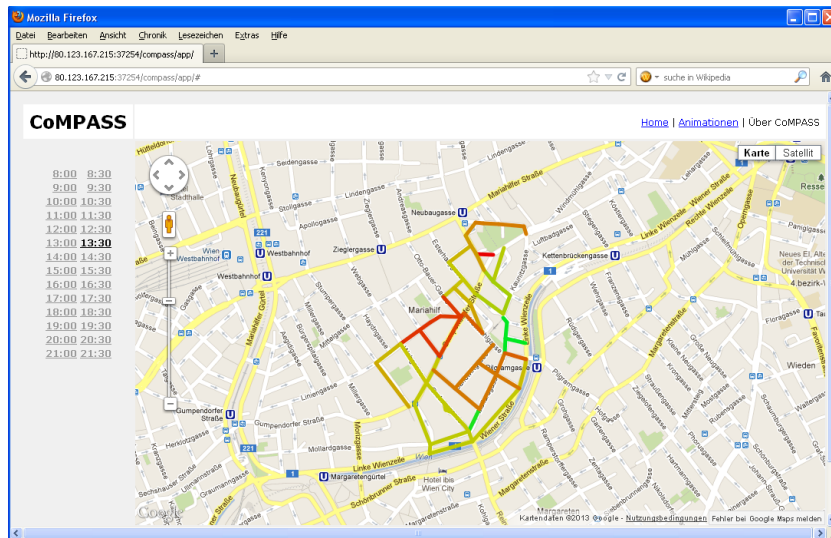
Figure 2: Internet information tool based on the real-time model

6 REFERENCES

Federal Highway Administration (2007). Advanced Parking Management Systems: A Cross-Cutting Study, U.S. Department of Transportation, Washington, DC, USA.

Hirahara, K., Ikeuchi, K. (2003). Detection of street-parking vehicles from panoramic street image, Proceedings Intelligent Transportation Systems, IEEE, 12-15 October 2003, Vol. 2, pp. 993 – 998.

Markoff, J. (2008). Can't Find a Parking Spot? Check Smartphone, Online: http://www.nytimes.com/2008/07/12/business/12newpark.html?_r=2&ref=business&oref=slogin&oref=slogin (10.01.2012).

Pellecchia, A., Igel, C., Edelbrunner, J., Schoner, G. (2005). Making driver modeling attractive, IEEE Intelligent Systems, Vol. 20, Issue 2, pp. 8-12.

Sifuentes, E., Casas, O., Pallas-Areny, R. (2011). Wireless Magnetic Sensor Node for Vehicle Detection with Optical Wake-Up, Sensors Journal, IEEE, August 2011, Vol. 11, Issue 8, pp. 1669 – 1676.

Energia e paesaggio al tempo dei cambiamenti climatici.

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1 ABSTRACT

Ambiente e paesaggio sono concetti che tendono a sovrapporsi e che in genere subiscono effetti analoghi dalle azioni dell'uomo. Tuttavia, con l'attivazione delle politiche di contenimento dei gas climalteranti, conseguenti alla previsione e alla percezione di cambiamenti climatici globali di entità catastrofica, iniziano ad aversi effetti divergenti sull'ambiente e sul paesaggio. Spesso gli impianti che utilizzano energie rinnovabili, e che quindi hanno effetti positivi sull'ambiente, comportano delle trasformazioni del paesaggio che se non ben gestite possono portare a rilevanti effetti negativi. I parchi eolici, i grandi impianti fotovoltaici, gli impianti idro-elettrici e a biogas e le coltivazioni per la produzione di biomassa costituiscono elementi il cui armonico inserimento paesaggistico richiede notevoli sensibilità progettuali.

La Convenzione europea del paesaggio ha spostato l'attenzione dai soli paesaggi di grande valore ai paesaggi di tutto il territorio, per cui occorre governare l'insieme delle trasformazioni dovute all'insieme di impianti, manufatti e infrasrtutture necessarie alla produzione, alla trasmissione e al consumo di energia.

L'articolo affronta il tema delle trasformazioni del paesaggio conseguenti alla diffusione delle fonti di energia rinnovabile in territori urbani, rurali e naturali a partire dalla relazione tra energia e paesaggio e quindi dai caratteri che i sistemi energetici assumono nei territori. Successivamente vengono illustrati i criteri per analizzare tale relazione e viene proposto un approccio innovativo per governare le trasformazioni del paesaggio dovute alla realizzazione di impianti, manufatti e infrastrutture per l'utilizzo di energie rinnovabili.

2 L'ENERGIA NEL PAESAGGIO E I PAESAGGI DELL'ENERGIA

Non esistono attività o processi naturali o antropici senza che vi sia la presenza di energia e quindi non esistono luoghi, territori o paesaggi non interessati da flussi energetici. All'interno dei paesaggi, qui intesi come "parti omogenee di territorio i cui caratteri derivano dalla natura, dalla storia umana o dalle reciproche interrelazioni", l'energia opera in modi diversi e assume differenti connotazioni, in funzione anche del tempo.

Vi è innanzitutto l'energia che influenza in modo visibile il paesaggio, vedi i manufatti, gli impianti e le attività necessarie per l'estrazione di combustibili e la produzione, la trasmissione e il consumo di energia.

Vi è quindi l'energia che influenza il paesaggio in modo indiretto, dai differenti caratteri insediativi che si affermano in territori con condizioni climatiche diverse, per cui nei climi freddi vi sono edifici compatti e chiusi per trattenere il calore mentre nei climi caldi vi sono edifici leggeri e aperti ai venti, ai territori e ai manufatti dove viene prodotta e conservata l'energia biochimica necessaria al metabolismo umano, cioè gli alimenti, alle infrastrutture stradali, ferroviarie, navali e aeree necessarie per consentire gli spostamenti di uomini e merci.

Vi è infine l'energia che si trova "incorporata" nelle componenti di un paesaggio, vedi ad esempio l'energia utilizzata in passato per la costruzione di manufatti, insediamenti e infrastrutture territoriali o le energie che hanno dato forma ai territori, a partire dalle energie tettoniche e gravitazionali.

Sono in genere considerati paesaggi dell'energia quei paesaggi che sono interessati in modo rilevante da manufatti e impianti necessari all'estrazione di combustibili e alla produzione, trasmissione e consumo di energia. Le infrastrutture energetiche costituiscono un fondamentale supporto per la nascita e lo sviluppo delle civiltà e hanno influenzato in modo rilevante l'evolversi delle città, anche se nelle trasformazioni del paesaggio urbano esse incidono in modo poco rilevante.

I paesaggi dell'energia possono essere distinti facendo riferimento alle diverse fasi che caratterizzano i processi di utilizzo energetico da parte dell'uomo, distinguendo le fonti energetiche non rinnovabili da quelle rinnovabili poichè per le prime le fasi di estrazione e di lavorazione dei combustibili comportano rilevanti effetti sull'ambiente e sul paesaggio – vedi le piattaforme per l'estrazione di gas e petrolio di terra e di mare, le miniere di carbone e di uranio, le raffinerie, gli impianti di arricchimento dell'uranio -, mentre per le seconde la relazione tra produzione e consumo di energia è fortemente integrata. Inoltre, la produzione di

biomassa per utilizzi energetici, che costituisce il principale combustibile rinnovabile, avviene in genere in modo armonico o comunque non traumatico con il paesaggio (vedi coltivazioni e aree boscate).

Vi sono i paesaggi contraddistinti dalle centrali termoelettriche e nucleari, le quali modificano il paesaggio in modo profondo, in genere aree aperte in prossimità di corsi e bacini d'acqua necessari per il raffreddamento dei fumi, alterandone i caratteri identitari ed estetici.

Centrale termonucleare

Da circa un paio di decenni questi impianti non sono più oggetto di interventi di mitigazione dell'impatto paesaggistico attraverso meccanismi di camuffamento, ma vengono pensati sin dalla fase iniziale del progetto come elementi di elevata qualità formale capaci di caratterizzare il paesaggio come importanti landmark.

Termovalorizzatore a Brescia

Vi sono i paesaggi delle grandi e medie centrali idroelettriche, le quali modificano fortemente i paesaggi montani, vedi l'eliminazione delle cascate, la realizzazione di invasi e condotte forzate, la scomparsa di luoghi anche abitati, ma che con il tempo formano dei nuovi paesaggi che spesso diventano suggestivi.

Centrale idroelettrica in Lombardia

Vi sono i paesaggi interessati dalle reti di trasmissione energetica, che in modo più o meno visibile innervano buona parte delle terre emerse e che interessano alcuni fondali marini. Caratterizzano questi paesaggi gli elettrodotti, i gasdotti, i distributori di carburanti, ecc.

Elettrodotto a Messina

Infine, l'illuminazione diffusa di strade e case ha negli ultimi 100 anni sempre più influenzato i paesaggi notturni locali, portando a modifica rilevanti, vedi le immagini notturne della Terra.

Europa di notte vista dal satellite

La transizione energetica, che sta avvenendo in questa fase storica, da un modello basato sulle fonti energetiche fossili a uno basato sulla prevalenza delle fonti energetiche rinnovabili, apre a possibili scenari sul tipo di forma che questo modello assumerà nella sua fase matura: si avrà una presenza diffusa della produzione energetica, dovuta a un elevato utilizzo di impianti di piccole dimensioni integrati nei luoghi in

cui l'energia viene consumata, oppure si avrà soltanto un maggiore equilibrio tra produzione diffusa e produzione concentrata?

Poiché gli impianti che utilizzano energie rinnovabili hanno in genere una capacità di produzione per unità di superficie molto più bassa degli impianti a combustibili fossili o nucleari, la loro diffusione va a interessare quantità di territorio e quindi di paesaggio molto più ampie. Questo fenomeno lo si riscontra in conseguenza dell'attuale forte impulso dato allo sviluppo delle energie rinnovabili, poiché si sta assistendo alla modificazione di numerosi paesaggi e alla configurazione di nuovi. In particolare, la strategia dell'Unione Europea si prefigge tre grandi obiettivi: la riduzione dell'entità dei consumi globali di fonti energetiche; la riduzione delle emissioni di gas capaci di alterare il clima; l'aumento della presenza di fonti rinnovabili nel totale delle fonti utilizzate.

Gli impianti di maggiori dimensioni vengono collocati in aree dove è possibile catturare maggiori quantità di energia solare, eolica e idrica, dove ancora non utilizzata. Essi possono trovarsi anche molto distanti dai luoghi di consumo, vedi ad esempio i grandi impianti fotovoltaici previsti nel deserto del Sahara a servizio dei paesi europei e gli impianti eolici off-shore. Queste esigenze, assieme alla necessità di una maggiore integrazione delle reti di trasmissione dell'energia elettrica a livello nazionale e internazionale per ridurre i costi energetici e i rischi di black-out, stanno portando a numerosi interventi di potenziamento, razionalizzazione e diffusione delle reti di trasmissione dell'energia elettrica. Inoltre, poichè la maggior parte delle energie rinnovabili funzionano a intermittenza in relazione alla presenza o meno di sole, vento o acqua, la connessione energetica tra luoghi lontani consente di avere una fornitura molto più stabile. Infine, la generazione diffusa di energia elettrica richiede una rete di distribuzione che non solo porti energia alle utenze, ma che dalle utenze ne possa ricevere. Questo comporta il miglioramento dell'estetica degli elettrodotti, per cui sono state pensate forme differenti per rendere i tralicci più belli e in armonia con i diversi paesaggi.

Progetto di Rosenthal-Dutton premiato al concorso "Tralicci del Futuro, Terna spa

Se gli impianti eolici, solari e idrici di medio-grandi dimensioni trasformano in modo rilevante i caratteri dei luoghi, agendo sui valori scenografici, estetici e identitari delle comunità interessate, la produzione diffusa di energia tenderà a sovrapporsi ai luoghi e ai manufatti dove l'energia viene consumata e queste modifiche, meno controllabili, potrebbero comportare dei piccoli ma diffusi effetti negativi soprattutto per i luoghi caratterizzati da una buona qualità del paesaggio, vedi ad esempio i centri storici.

La produzione energetica diffusa può avvenire in tre diversi contesti paesaggistici. Nelle aree di nuova costruzione e urbanizzazione, dove vi è la possibilità di una buona integrazione di impianti e manufatti energetici. Nelle aree edificate (retrofitting), dove gli interventi possono compromettere l'aspetto di singoli o più edifici di interesse storico e/o architettonico. Questo richiede una elevata sensibilità e capacità progettuale parallelamente al miglioramento di forme e materiali degli impianti. Ad esempio, le sempre più ampie possibilità di produrre energia elettrica con la radiazione solare diffusa consente di limitare la necessità di rispettare pendenze e orientamenti rigidi. Inoltre, la possibilità di avere spessori molto sottili delle superfici fotovoltaiche consente di ottenere interventi poco invasivi. Nelle aree non edificate, dove si diffondono sul territorio in modo spontaneo numerosi piccoli interventi senza che ne venga fatta una opportuna valutazione degli impatti sul paesaggio.

Un fenomeno connesso al paesaggio urbano e che ne modifica l'efficienza energetica è l'isola di calore, la quale è causata dalla limitata presenza di vegetazione e alla prevalenza dei colori scuri e opachi nelle superfici di strade ed edifici. Nelle zone temperate essa ha effetti parzialmente positivi in inverno ma piuttosto negativi in estate. Per ottenere dei miglioramenti significativi del micro-clima urbano e nei conseguenti consumi energetici, occorre aumentare la vegetazione non solo lungo le vie e nei parchi, ma anche sulle facciate e sui tetti degli edifici.

In generale, nella progettazione dei sistemi energetici emerge una visione conflittuale del rapporto innovazione energetica e paesaggio. Le nuove tecnologie vengono trattate come elementi estranei al progetto dando adito a due tipi di approccio, entrambi insoddisfacenti. L'approccio conservativo, caratterizzato da soluzioni di tipo vincolistico che individua paesaggi buoni da conservare e paesaggi degradati che possono essere trasformati con maggior libertà, così come tecnologie accettabili, perchè facili da mitigare o integrare, e altre no; l'approccio tecnicistico, che per rispondere all'emergenza energetica legittima qualsiasi tipo di intervento, soprattutto sulle aree considerate di scarso valore paesaggistico.

3 I CRITERI DI ANALISI DEI PAESAGGI DELL'ENERGIA

Le azioni e le strategie di tutela e di qualificazione del paesaggio vanno espresse in rapporto ai caratteri degli interventi proposti e al grado di "sensibilità" del luogo, salvaguardando gli elementi di connotazione, le condizioni di fruizione e la leggibilità dei complessi paesaggistici. Le azioni di tutela del paesaggio devono porre l'attenzione alle diverse trame relazionali (ecosistemica, storica, estetico-visuale, sociale) esistenti e future, considerandole quali strutture portanti del contesto stesso. La condizione alla base di ogni azione corretta sul paesaggio è quindi la conoscenza dei caratteri, delle identità e delle potenzialità paesaggistiche.

La complessità dei paesaggi non consente il semplice utilizzo nel processo progettuale di codici, linguaggi e repertori prestabiliti, ma richiede anche la sperimentazione di soluzioni capaci di individuare nuovi significati paesaggistici, dando origine ai nuovi luoghi della produzione, della trasmissione e del consumo di energia rinnovabile. Va considerata la complessità dell'insieme, in quanto non è solo il gradimento di singoli componenti a essere importante, ma anche il loro comporsi e il loro configurarsi che conferiscono a quanto percepito una "forma" riconoscibile che determina il carattere di un paesaggio.

L'analisi dei caratteri dei paesaggi energetici, comparata con i requisiti prestazionali dei sistemi energetici rinnovabili, fa emergere nuovi significati e potenzialità progettuali, per cui occorre considerare la possibilità di modificare la percezione e l'identità dei luoghi, riconoscendo quelle spazialità inedite funzionali a realizzare sistemi energetici che utilizzano quantità di energie non rinnovabili irrilevanti.

La matrice identitaria di una comunità e di un territorio prende forma e si modifica nel suo svilupparsi in connessione con i processi storici e sociali. Il concetto di identità non è quindi un valore precostituito, ma un valore in continuo divenire. Il problema è comprendere quali sono i gradi di libertà di un luogo e quindi i gradi di trasformazione che un paesaggio può sopportare. Occorre considerare l'azione e l'evoluzione come fattori di progetto, per cui il progetto di un impianto o di una infrastruttura deve considerare la possibilità di inserire, con sensibilità e inventiva, un nuovo elemento, senza per questo ledere l'immagine storica o rinunciare alla sensibilità contemporanea. Un ruolo centrale lo gioca il tempo, poiché con il passare degli anni un elemento innovativo può diventare un elemento costitutivo dell'identità di un luogo.

Passaggio fondamentale e preliminare a qualsiasi scelta di localizzazione e progettazione di un nuovo impianto è la conoscenza dell'insieme dei valori che connotano un paesaggio e dei valori che le popolazioni riconoscono come caratterizzanti il proprio ambiente di vita da preservare. Le modalità di analisi di un paesaggio variano in funzione dei caratteri dei luoghi e degli impianti (estensione, dimensione, forma e caratteri tecnici). In generale è necessario:

- leggere la morfologia del contesto, i suoi colori dominanti e le tecniche costruttive utilizzate in edifici e manufatti;
- riconoscere la presenza di punti e percorsi panoramici, di relazioni visive significative tra il sito di intervento e il contesto;
- comprendere gli elementi e le relazioni di tipo sistemico che ne connotano assetto e funzionamento dal punto di vista paesaggistico-ambientale;

- comprendere le vicende storiche che hanno portato alla sua costituzione e coglierne le tracce ancora riconoscibili, i segni, le trame, gli allineamenti, le suddivisioni territoriali, le relazioni tra gli elementi e tra elementi e contesto;
- comprendere i significati culturali, storici e attuali attribuiti dalle collettività a quei luoghi;
- valutare le dinamiche di trasformazione in atto con una proiezione verso il futuro.

La lettura delle connotazioni del paesaggio è necessaria alla comprensione delle modifiche che il nuovo impianto può apportare all'assetto paesaggistico consolidato al fine di governarne con piena consapevolezza le trasformazioni indotte, tutelando per esempio la continuità dei sistemi di relazione di varia natura, evitando di occludere o interferire con visuali significative o di entrare in competizione e mortificare elementi connotativi di particolare significato.

L'analisi del contesto richiede di considerare più scale territoriali, passando dall'analaisi degli aspetti più generali a quelli più particolari e viceversa. Ciò che a una scala di dettaglio può apparire come singolo elemento isolato, a scala più vasta si scopre essere parte di un sistema più ampio. Viceversa, aspetti di dettaglio che a scala vasta non si colgono, a scala ravvicinata mettono in luce connotazioni molto significative del luogo.

4 ENERGIA E PAESAGGIO: APPROCCI E CRITERI DI INTERVENTO

La crisi energetica, la ricerca di sempre maggiori livelli di efficienza energetica e l'incentivazione all'uso delle fonti di energia rinnovabili richiedono forti innovazioni tecnologiche e infrastrutturali che hanno come conseguenza delle continue e importanti modificazioni del paesaggio. Occorre favorire e supportare queste innovazioni anche orientandole verso la costruzione di nuovi "paesaggi energetici", tenendo conto delle componenti naturali e culturali e delle risorse umane, energetiche e materiali.

Un buon paesaggio energetico è il risultato di un'integrazione sistemica tra i fattori energetici e il paesaggio in cui la tecnologia viene considerata come elemento costituente il paesaggio alle diverse scale che, con la necessità di ridurre l'inquinamento e gli squilibri ecosistemici, diventa una funzione ecologica e sociale. Occorre superare la realizzazione episodica e casuale di impianti e opere e adottare approcci dove l'energia diventa parte attiva e positiva per il paesaggio stesso. Questo richiede l'uso di metodi di analisi e di valutazione e di criteri di progetto basati su un rapporto integrato tra paesaggio ed energia. Al riguardo, possono essere adottati due tipi di approcci, entrambi innovativi.

L'approccio integrato si basa sulla reinterpretazione del rapporto tra energia e paesaggio, in cui ogni apporto specialistico viene indirizzato nelle diverse fasi del progetto verso una sintesi che porta a un valore aggiunto rispetto alla semplice addizione fra le parti. La creatività progettuale e il sapere tecnico definiscono i limiti e le potenzialità per la costruzione di luoghi energeticamente sostenibili. Il rapporto tra utenti e innovazione viene facilitato grazie a progetti che sostengono l'integrazione visiva, funzionale, produttiva, spaziale e gestionale delle nuove tecnologie energetiche con gli elementi materiali e immateriali del paesaggio.

L'approccio rifondativo è orientato all'elaborazione di nuove soluzioni non solo tipologiche, figurative, spaziali e materiali, ma anche sociali. Gli obiettivi e le trasformazioni energetiche diventano l'occasione per favorire la formazione di nuove pratiche dell'abitare, fondate sulla cooperazione degli utenti, sull'impiego condiviso delle risorse, sui comportamenti virtuosi di comunità energetiche. Ad esempio, i nuovi quartieri ecologici gettano le basi per una diversa concezione dell'abitare, così come l'uso di nuovi dispositivi rivoluziona la composizione volumetrica e la costruzione degli edifici.

Solar City, Linz, Austria, 1992-

In entrambi gli approcci occorre promuovere la cultura della progettualità energetica diffusa verso la definizione di nuovi assetti insediativi, in sintonia con le specificità locali, culturali, tecniche ed economiche. Ad esempio, gli impianti medio-grandi non solo dovrebbero limitare i loro effetti negativi sul paesaggio, ma potrebbere diventare un fattore di interesse paesaggistico, sia come land-mark che come elementi di interesse tecnologico. Ad esempio, le wind farm possono assumere elevati valori estetici per le loro forme snelle, aerodinamiche e scultoree, per la solidità e modernità del design, per il senso di ordine che viene dalla coerenza e ripetitività di elementi di grandi dimensioni. Così come dal punto di vista simbolico la turbina a vento, che richiama i mulini a vento che per numerosi secoli hanno caratterizzato i paesaggi sia europei che di altri continenti, è un esempio di manufatto in armonia con la natura capace di utilizzare una risorsa rinnovabile.

Altamont Pass Windfarm, Northern California

Per mantenere una elevata qualità paesaggistica dei centri storici occorre adottare degli opportuni criteri di conservazione nell'inserimento di impianti solari. Da una parte la conservazione di monumenti e zone storiche dovrebbe far proprio un approccio moderno allo sviluppo delle energie rinnovabili, dall'altra gli specialisti in energia dovrebbero garantire una gestione moderna del patrimonio architettonico. Tra l'altro, l'impiego diffuso di fonti energetiche rinnovabili può costituire un fattore di recupero di piccoli insediamenti, spesso di interesse storico-culturale, situati in aree marginali.

L'energia può essere acquisita o risparmiata agendo sulla struttura, sulle forme, sui materiali e i colori di una città. Vi è una forte correlazione tra la morfologia urbana, intesa come organizzazione fisica e funzionale, e il comportamento energetico degli insediamenti, per cui da qualche decennio si stanno ricercando forme urbane virtuose in termini di conservazione e di acquisizione di energia.

L'armonizzazione tra tecnica e paesaggio nei nuovi paesaggi energetici di tipo concentrato e diffuso dovrà passare attraverso la loro integrazione sia a livello pianificatorio che a livello progettuale, per cui i piani e i progetti energetici dovranno tener conto dei criteri di trasformazione del paesaggio mentre i piani e i progetti paesaggistici dovranno considerare le necessità dei processi di produzione, trasmissione e consumo di energia. Sulla base dei caratteri del paesaggio, degli obiettivi energetici e delle esigenze tecniche, occorre scegliere l'atteggiamento che si intende adottare nei confronti del contesto. Si può preferire un approccio conservativo, adeguandosi il più possibile al sistema di relazioni e alle connotazioni (morfologiche, materiche, cromatiche, ecc.) del contesto, ricercando così la minima incidenza possibile dei nuovi manufatti, oppure un approccio innovativo, reinterpretando in modo attento relazioni e caratteri del contesto e proponendo nuovi significativi elementi di riferimento, comunque nel rispetto dei valori consolidati.

Non è possibile indicare a priori quale scelta effettuare, in entrambi i casi occorre assumere un criterio progettuale coerente dall'impostazione alla definizione di tutte le scelte: localizzazione, posizionamento dei diversi componenti, soluzione architettonica e scelte materiche e cromatiche, sistemazione aree contermini ecc. Più il progetto si orienta verso soluzioni formali e compositive innovative, più deve farsi carico di comprendere a fondo quali siano le alterazioni indotte sui sistemi di relazione e di connotazione consolidati, nonché verificare che l'introduzione del nuovo porti comunque a un assetto convincente e condiviso dei luoghi, nel rispetto dei valori pre-esistenti. Qualunque sia l'approccio scelto, occorre seguire alcuni criteri generali:

- i progetti devono sempre confrontarsi con le indicazioni di tutela, valorizzazione e riqualificazione del paesaggio sviluppate ai diversi livelli dalla pianificazione paesaggistica, tenendo in attenta considerazione la salvaguardia degli elementi e dei sistemi di prioritaria attenzione. Inoltre devono essere organicamente sviluppate nel progetto le aree contermini e le sistemazioni accessorie agli impianti;

- gli interventi vanno collocati in scenari di medio-lungo periodo, verificando la possibilità di completa rimozione degli impianti e le possibilità di riqualificazione complessiva del luogo in caso di cessazione della loro funzionalità;

- gli interventi che hanno una minima incidenza paesaggistica devono comunque essere oggetto di una attenta progettazione dei manufatti, così come la formazione di un nuovo paesaggio non può prescindere dalla valorizzazione di quello preesistente. In tutti i casi, le scelte cromatiche sono determinanti per l'integrazione paesaggistica dei manufatti.

- gli interventi di razionalizzazione comportano spesso l'eliminazione di alcuni manufatti e l'accorpamento di altri in progetti di nuova concezione che devono tendere a concentrare le reti su corridoi preferenziali, gli impianti su poli di nuova concezione, i piccoli impianti domestici su soluzioni centralizzate;

5 CONCLUSION

Ciò che viene collocato sul territorio determina una trasformazione del paesaggio e questa trasformazione segnerà per un tempo significativo l'assetto di quei luoghi e il permanere o interrompersi di relazioni sistemiche, simboliche e visuali. La realizzazione di un intervento è quindi l'occasione per riflettere sulle opportunità di valorizzazione di un luogo e di proposta di nuovi elementi qualificati integrati nel paesaggio.

La piena comprensione dei caratteri connotativi dei luoghi e il rispetto dei valori da essi rappresentati costituiscono la base di ogni progetto paesaggisticamente appropriato. Pertanto, prima di pensare alla minimizzazione dell'impatto sul paesaggio occorre pensare un'opera come parte integrante del paesaggio in cui essa viene inserita.

Un sistema energetico deve avere un carattere multifunzionale, cioè avere la capacità di generare un paesaggio energetico che diventa fattore economico positivo poiché capace di incidere non solo sulla produttività di un territorio, ma anche sulla qualità della vita delle popolazioni che vi abitano. L'elaborazione di strategie integrate per lo sviluppo energetico e la qualificazione del paesaggio richiede, a monte, una pianificazione dell'uso delle risorse energetiche rinnovabili che consideri l'insieme degli interventi necessari al sistema energetico di un territorio e individui il livello di utilizzo delle risorse rinnovabile disponibili.

Energy Poverty: Considerations for Socially Sustainable Shifts Towards Renewable Energy Sources

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1 ABSTRACT

Recent years have witnessed growing concern over a phenomenon long deemed extinct in Western Europe: energy poverty – a term referring to people's inability to sufficiently heat and light their homes – has re-entered the political agenda as an increasing number of people is affected all over Europe.

While this may be regarded as just one facet of poverty in an increasingly segmented society it is one deeply rooted not only in households' low recourses but also in high energy prices and insufficient energy efficiency of buildings. This triangle of drivers makes energy poverty a highly complex matter to deal with, starting from the very definition of the problem.

So far, no such definition is available in most of EU member states, let alone on European level. Accordingly, reliable statistical data on the scope of the problem is mostly missing. A scrutiny of existent propositions for the definition of energy poverty reveals that defining the problem in itself already implies a political statement on who is to be targeted in this respect.

This is even more so the case for the design of suitable measures of counteraction; While at the moment most of such measures aim at providing affected households with consultancy on energy saving behaviour this has to be regarded as just one step into tackling the overall problem.

Leaping further beyond, strategies against present and future energy poverty primarily have to aim at improving thermal standards of buildings as well as providing energy poor families respectively households with options to use renewable energy sources.

This paper investigates energy poverty in Austria with a special focus on gender issues and migrants.

2 BACKGROUND

Only recently, energy poverty has been recognized as an independent problem in the context of increasing energy prices in Austria. So far broad political and social discussion of this topic lacks existence. In Austria in 2010 313,000 people were not able to keep their dwellings sufficiently warm (STATISTIK AUSTRIA, 2011a), these are 3.8 % of the population of the twelfth richest country in the world.

„relative income poverty"is a generally aknowleged indicator of poverty risk. It refers to individuals living in households whose equivalised income is lower than 60 % of the national equivalised median income. In Austria around 1 million people, 12 % of the population, were at risk of poverty (after social transfers) in 2010 (STATISTIK AUSTRIA, 2011a). Deprivation is defined as an inability to participate in the reference society due to financial reasons. Financial deprivation is regarded as applicable as soon as two out of the following seven problems arise (Eurostat, 2013):

The household could not afford

- to face unexpected expenses
- to pay for mortgage, rent, utility bills or substantial instalments
- a meal with meat, chicken or fish every second day
- to keep home adequately warm
- visits to doctors and dentists
- to invite friends or relations to dinner once a month
- to buy new clothes

Even so income-based indicators of poverty and inequality are essential, they are not sufficient to satisfactorily reflect the diversity of living conditions. For that reason the EU portfolio of commonly accepted social indicators is extended to material deprivation measures. Material deprivation rate measures the percentage of the population which cannot afford at least three of the following nine activities and items:

- to face unexpected expenses

- to pay for arrears (mortgage or rent, utility bills or hire purchase instalments)

- a meal with meat, chicken or fish every second day

- to keep home adequately warm

- to go on holiday

- a television set

- a washing machine

- a car

- a telephone

People who can't afford at least four of these nine activities and items suffer from severe material deprivation.

Of course people at risk of poverty are confronted more often with an inability to afford fundamental needs than people who are not at-risk-of-poverty. Nevertheless, deprivation and poverty risks don't arise together automatically. Not all materially deprived people are at risk: around 45 % are in fact above the treshold of poverty risk. Therefore, factors other than low income seem to matter. One hypothesis is, that deprivation arises with a time lag to the occurrence of low income (savings are used up) and vice versa. On the other hand the current method for measuring poverty risk does not refer to the individual needs or costs of living.

In the absence of a specific definition for energy poverty in Austria, a household's inability to keep home adequately warm is used as an indicator for energy poverty.

Just like deprivation energy poverty – one of the nine features charcterizing material deprivation – is possible to occur in the absence of poverty risk. In Austria, 313,000 people suffer from energy poverty, but only 135,000 (43 %) of them suffer from severe material deprivation. Only 115,000 or 37 % of the people suffering from energy poverty are at-risk-of-poverty. 191,000 or 61 % have a middle income (60 % to 180 % of the median) an 7,000 or 2 % have a high income (STATISTIK AUSTRIA, 2011b).
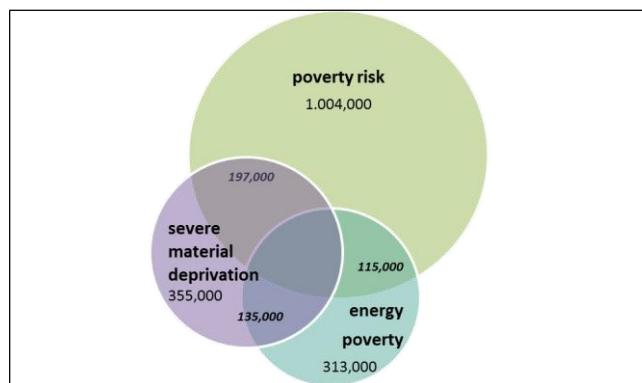
Figure 1: Overlapping of poverty risk, severe material deprivation and energy poverty (Source: STATISTIK AUSTRIA, 2011a)

Energy poverty has to be recognized as a special case of poverty: 115,000 out of around 1 million people at risk of poverty are affected by energy poverty – hence 198,000 people are regarded as energy poor, but not at-risk-of-poverty. Thus the reduction or prevention of energy poverty needs specific approaches.

Figure 2 shows the development of the share of people who cannot afford keeping their home adequately warm within the period of 2003 to 2011. It also differentiates between the group of people having an income of less than 60 % of the median income and the one having a higher income. The share of people who cannot afford keeping their homes warm fluctuates between 2.1 % in 2004 and 4 % in 2008. Nevertheless, the share of energy poor amongst the population with low income is at least double as high as amongst people with 60 % of median income or more throughout this time period. Figure 2 also depicts the annual inflation for the same period. As it can be seen, energy poverty among people are at-risk-of-poverty pretty much follows the development of prices. This is not true for the population with an income of at least 60 % of median income. People at-risk-of-poverty are also facing a higher risk of becoming energy poor when prices generally rise, because they are unable to compensate rising energy prices through saving elsewhere.
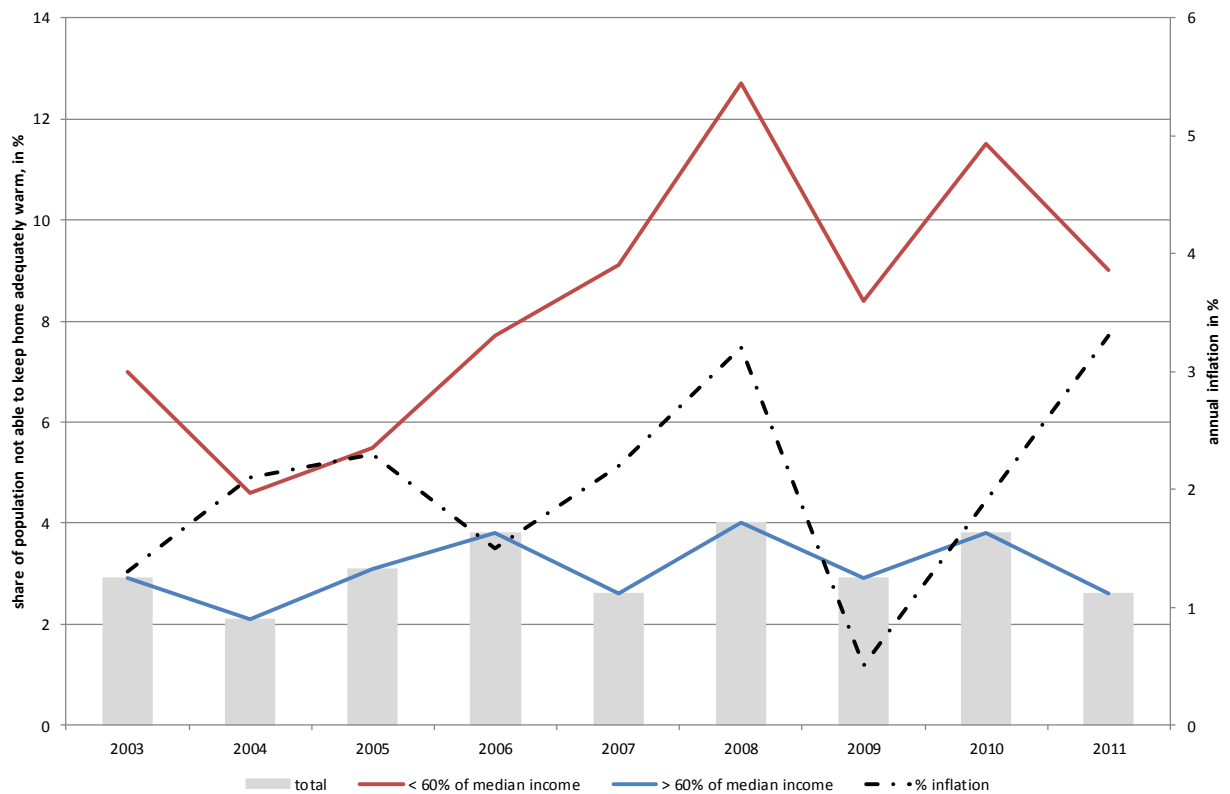
Figure 2: Share of population not able to keep home adequately warm and annual inflation 2003 to 2011 (Source: Eurostat, Statistics Austria)

57.4 % of the people aged 20 years and older not being able to keep their homes adequately warm are women, in the age group 65 years and older even 76 % (STATISTIK AUSTRIA, 2011b). As income is one of the drivers for energy poverty, elderly women are affected by a higher risk of energy poverty as their pensions are comparably low. Due to lower incomes from employment because of educational and occupational gender segmentation, less working hours and longer absence from work because of care for children and elderly, women´s economic situation is worse than men´s. Women´s economic disadvantages exacerbate in high age. (BIFFL, 2010)

Migrants are vulnerable to energy poverty in a twofold way: Firstly, migrants often have lower educational attainment levels and less professional experience wich leads – in combination with certain migration specific challenges like language barriers – to difficulties with labour market integration. Furthermore, they often have to cope with low incomes. Secondly, due to constraints on the housing market, migrants often have to rent relatively expensive appartements or houses which further diminishes their capability to absorb rises in energy costs.

28 % of the people suffering from energy poverty don't have Austrian citizenship. Among Austrian total population, the share of foreign citizens was only 10.7 % in 2010. This means that around 3 % of all Austrian citizens are energy poor, but more than 10 % of foreign citizens in Austria. The share of people not able to keep the home adequately warm is especially high (14 %) among people with a citizenship from a so-called third country, namely from outside the EU or EFTA.

3 CAUSES AND POSSIBLE IMPACTS OF ENERGY POVERTY

3 main factors are generally acknowledged to drive energy poverty: high energy prices, low incomes and insufficient energy efficiency of residential buildings.

Global energy demand increases constantly and is expected to continue to do so for future decades (GEA, 2012). Associated energy price increases have been well above general index raises during the last decade and are likewise due to be going strong for foreseeable future. Thus, there is hardly any relaxation in sight for this important driver of energy poverty. Quiet contrary, overly increasing energy costs represent the cause why energy poverty is not just one further problem for impoverished households and a mere side effect of

general poverty. Instead, it may well cause an otherwise sufficiently equipped household to be unable to cover its further expenses.

Figure 3 shows the development of prices for gas and electricity for household consumption as well as the development of general prices, namely the total HCPI (Harmonized Consumer Prices Index) and the one for accommodation, water, electricity, gas and other fuels between 1997 and 2011. Prices of gas and electricity for household consumption both excluding and (especially) including taxes strongly increased in the respective period. The HCPI for goods and services relating to housing rose much higher than the total HCPI – the rise in energy prices (also rents etc.) was higher than the rise of general prices within the last couple of decades.
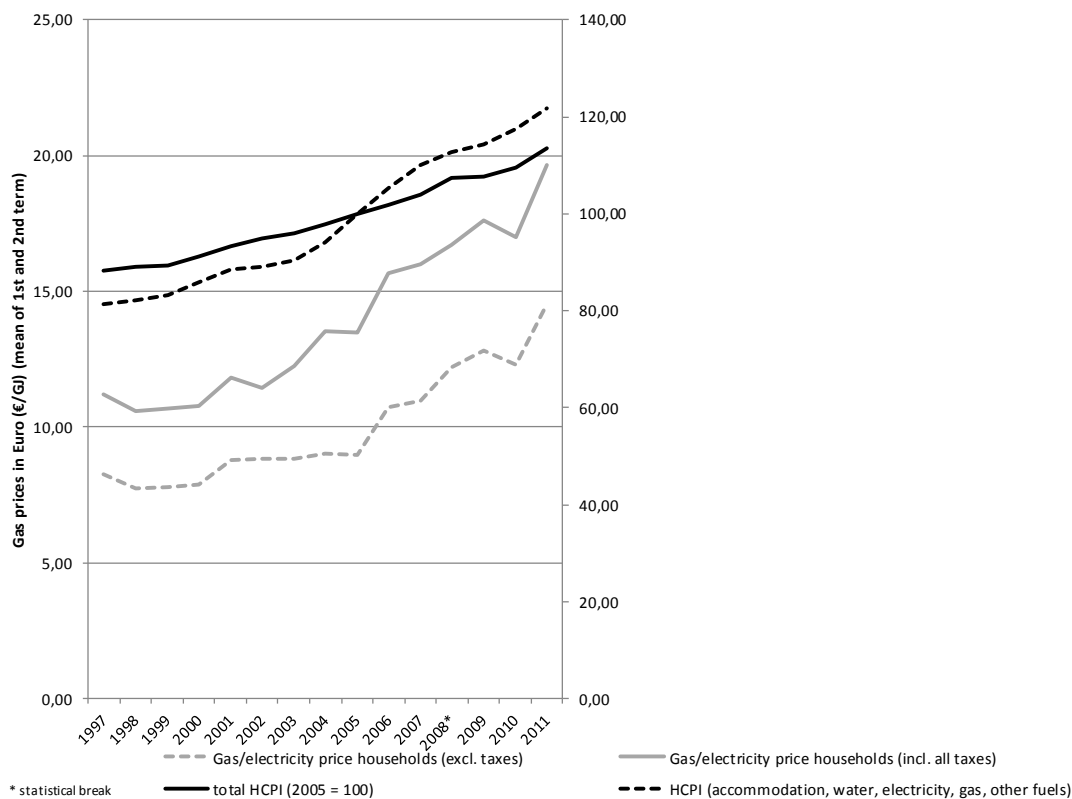
Figure 3: Gas and electricity prices for households and HCPI 1997 to 2011 in Austria (Source: Eurostat)

Of course low incomes also contribute significantly to energy poverty. The weakest social groups therefore are highest at risk of being energy poor; this especially refers to single mothers (and fathers), elderly (and chronically ill) persons and migrants. These groups tend to live on low income or even to rely solely on public subsidies and transfers. Expenses for heating and electricity as well as transport – a service which likewise strongly depends upon energy supply and pricing – therefore constitute a heavy burden for their budgets. But only 37 % of the people suffering from energy poverty are at-risk-of-poverty. This confirms that income is an important but just one out of three drivers for energy poverty.

Low income groups are often found to be living in urban rental districts as these settings tend to be the only affordable housing options for them. This is especially true for migrants who try to find jobs in urban industries. In many cases they find themselves excluded from social housing estates due to their foreign nationality. This only leaves private rental available to them as a housing market. These accomodations however tend to be located in buildings of minor quality, generally displaying insufficient energy efficiency. In Austria, less than a third of the total population lives in cities with 100.000 or more inhabitants. But among the people who are cannot afford keeping their home adequately warm, almost 50 % live in cities of the size of this category.

Badly insulated buildings represent the third important cause of energy poverty. Inhabitants of such buildings tend to spend more money on energy bills than other households do in relative terms. At the same time, these households have fewer opportunities to improve their situation as they lack legal means and financial resources for refurbishment. Such refurbishment of existent building stock, however, not only constitutes a

social necessity but also a highly desirable ecological measure in the light of green house gas emissions associated with leaky buildings.

Reducing their energy consumption often remains low income households' sole way of cutting expenses on energy. Cold homes and the associated health risks are a consequence; low temperature and moisture raise the danger of fungi formation, respiratory and chronic bronchial diseases are likely to inflict the affected inhabitants especially when very young or elderly. Increased winter mortality may partly be attributed to energy poverty. Furthermore, cold homes also further habitants' social isolation as it keeps them from inviting others and thereby revealing their actual living conditions which they often feel ashamed of.

4 DIFFICULTIES IN DEFINING ENERGY POVERTY

Properly defining the phenomenon of energy poverty constitutes a prominent prerequisite for an in depth analysis of the affected groups which is still missing today in Austria as well as in many other countries in the EU.

According to the most widely acknowledged definition (Boardman, 2012) a household has to be regarded as being energy poor if it has to spend more than 10 % of its household income on energy. There are discrepancies whether this includes heating only or whether lighting, warm water preparation and electricity are equally taken into account. No reference is made to mobility costs. However, a household's expenses on energy under this definition are not calculated on what is actually spent but rather what would have to be spent to keep it adequately warm. The term "adequately" herein makes reference to a WHO definition (WHO, 1987). Contrary, judging households by their actual bills would signify that those who already restrict their consumption in a way which might be unhealthy could be regarded as still not energy poor while in fact they clearly are.

This approach certainly leaves ample space for discussion; firstly, household's income resp. expenses have to be defined more clearly: Therein – to name just one point – it makes a significant difference whether housing costs (and public subsidies associated with them) are taken into account. Secondly, the limit of 10 % is based on rather empirical findings. In order to allow for comparison of different states with their respective socio economic situations the reference to national medians would be more suitable.

Finally, even the definition of "adequate" warmth is under discussion as it is argued that this may partly be an individual choice. More complex definitions of energy poverty therefore rely on a set of parameters to qualify not just energy costs but energy efficiency of buildings and heating devices alike. Furthermore, they may include indicators of how long and how severe people are affected by energy poverty (Mandl 2012).

The exact definition of energy poverty, complex as it might be, hence has to be regarded as a highly political issue which determines which groups of society are seen as most affected and which have to be chiefly targeted by alleviation strategies. Clearly, the energy poor are a highly heterogeneous group: it includes urban low income families in substandard rental housing as well as rural pensioners living in their own, depilating properties which they can't afford to improve.

As has been demonstrated above numbers on energy poverty for Austria and many countries in the EU are based only on individual appraisals of the persons affected. In the statistical investigation EU-SILC, the interviewees are asked, if they can afford to keep home adequately warm. No criteria are determined to categorize energy poverty in Austria according to objective aspects. The necessity of objective criteria is shown also by the volatile nature of the numbers of people not able to keep the home sufficiently warm in Austria, fluctuating from 313,000 in 2006 (3.8 %) to 214,000 in 2007 (2.6 %) to 333,000 in 2008 (4 %) to 237,000 in 2009 (2.9 %) and back to 313,000 in 2010 (3.8 %).

5 FUTURE CHALLENGES

For Austria a significant need in data ascertainment and research concerning energy poverty is identified. Only in the last years has this issue become a specific research field, mainly on the basis of qualitative studies and with a focus on energy consumption behaviour. A research gap concerning gender issues in the context of energy poverty in Austrian studies and projects exists. In international research projects on energy, poverty and sustainability, the application of the gender perspective is common issue as engendering necessitates being a common task for energy policies and for the fulfillment of social equity in sustainability and development. In general, the contexts of gender and energy are well elaborated on the international level,

but hardly for Austria. In terms of migrants' vulnerability to energy poverty in particular, little targeted research has been undertaken so far. Rather, it is generally assumed that comparably high energy costs due to inefficient housing and health problems related to cold and damp homes add up to their overall problems. Yet, this view fails to take into account the fact that future energy shortages will result in cost increases different from general inflation and thus will hit harder.

The interdependencies portrayed above clearly highlight the urgent necessity of increased energy efficiency in residential buildings. This necessity not only exists due to ecological considerations but very much so also for goals of social sustainability: keeping energy demands low due to increased energy effciency helps taking the burden of high energy bills off poor households' shoulders. Covering the remaining demand by renewable energy sources would imply to even go further: prices of energy from such sources may well be expected not to follow closely the prognosed increases in costs of fossil supplies.

Unfortunately however, things are not as simple as that; Firstly, as has been described above, low income groups tend to be those living in buildings least isolated

As Fig. 4 shows, 75.1 % of all people having more than 180 % of median income own either a house or a flat. Also within the group of middle earners, almost two thirds own their home. This picture looks totally different for people with low income (less than 60 % of median income): Less than a third of them is owner of the dwelling. More than a third lives in a rental house or flat. Another 16.7 % live in a public housing (council home). This is even more pronounced among those suffering from severe material deprivation (definition see above): 42.8 % of people suffering from severe material deprivation live in a rental house or flat and almost another third (27.7 %) lives in a council home.
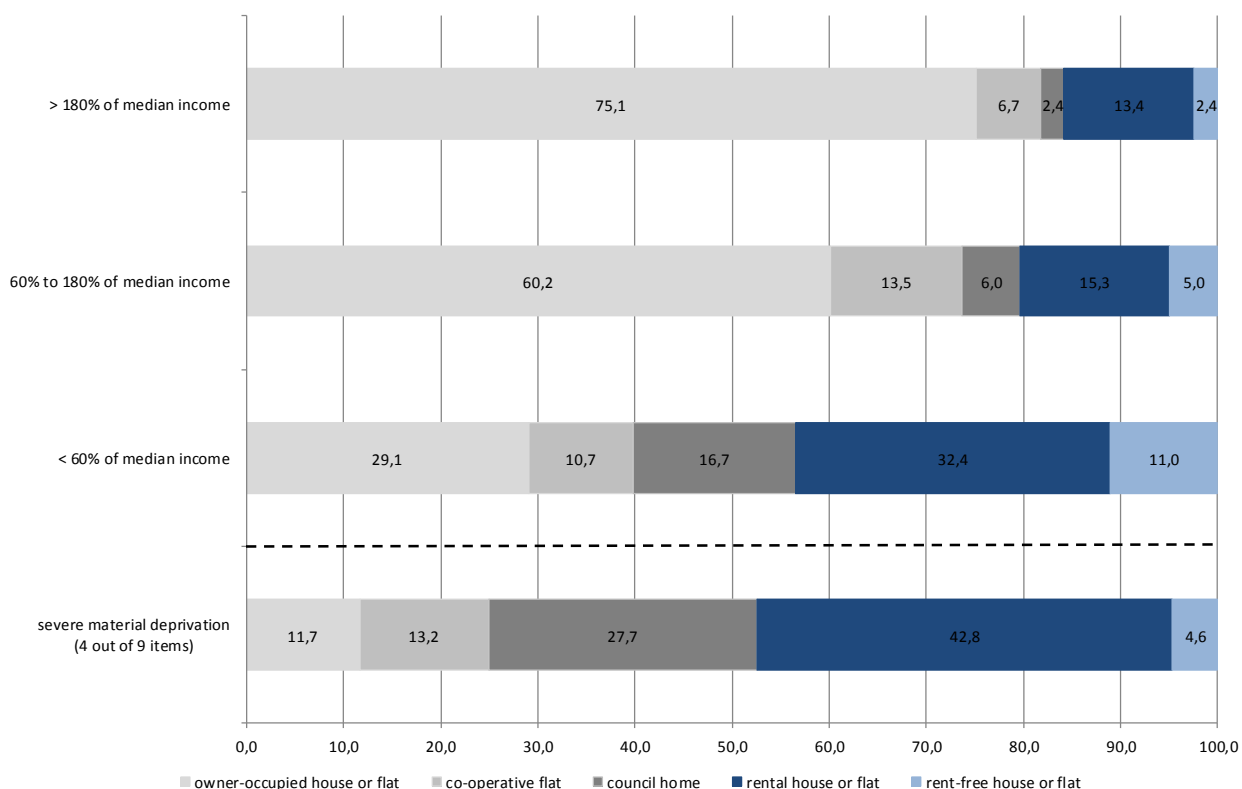
Figure 4: Legal position of home by income group and severe material deprivation (Source: Statistics Austria, EU-SILC 2011)

For people with low income, there are barely measures to change the situation they are on. In most cases, mere renters of their flats, not entitled to decide about any major improvement in their buildings's construction. They also lack funds to invest into such measures. Should their landlords decide to refurbish the property the renters run danger of being unable to cope with consequently increased rents. In such cases, low income inhabitants often have to leave the refurbished building and to look for another cheap flat elsewhere – most probably in just another inefficient building with high running costs.

Even if they manage to stay after refurbishment it is found that increases in energy efficiency often do not trickle down to renters: renting costs tend to include many fractions which are independent of actual energy consumption and reductions in this consumptions are seldomly reflected in real overall cost reductions.

Therefore, not only has energy demand of affected households to be reduced but the price of energy has to be kept to a minimum for people suffering from energy poverty. It is argued that energy from renewable sources holds the potential of doing so in the future. At the moment however renewable energies are rather associated with and blamed for increases in (electricity) price increases.

6 POSSIBLE OPTIONS TO ELEVATE ENERGY POVERTY

Among the driving causes of energy poverty it is low incomes and lacking energy efficiency of buildings first and foremost which are tangible for national policy. As a first measure, linking public subsidies with the quality of buildings which receiving households inhabit serves as a starting point for interventions, thereby making sure that these households do not have to suffer from health risks associated with cold homes.

This, however, is adviseable only if integrated into a broader strategy which aims at refurbishing least energy efficient buildings. Thereby CO2 emissions and energy costs should be reduced.

Only few low income households profit from improved energy efficiency standards which have been established for electric devices in Europe over the last years: most of the affected households still stick to old or second hand equipment. It is therefore not enough to wait for more efficient devices to "trickle down" to these social groups by way of second hand.

Concerning energy billing so called "reverse block tariffs are proposed: these provide energy at a comparably low rate up to a certain limit allowing households to cover their basic needs at affordable costs. Only above this limit do tariffs increase, thereby setting incentives even for better offs to economically use energy.

The most common approach in tackling energy poverty nowadays consists in advising and coaching affected groups in their behaviour regarding energy consumption. This should be backed by supplying them with energy efficient equipment. Furthermore, this approach is limited to the extent that changes in consumption habits are only partly reflected in reduced energy costs due to accounting mechanisms which strongly rely on basic costs. Energy bills are often facturated on a quarterly or even yearly basis only which makes it difficult to track impacts of behavioural changes on energy costs. Finally, such changes at best only hold potential to reduce part of the overall energy consumption as reducing heating demands is hardly possible in rented residential establishments.

The energy poor do not possess resources neither to refurbish their buildings nor to implement systems to harness renewable energy sources such as photovoltaic cells. Public subsidies aiming at the promotion of such technologies therefore exclusively benefit the better off. In consequence a gap threathens to open up between them and the weakest social groups not only in terms of resources but also in energy efficiency of their living conditions. Hence, strategies against present and future energy poverty primaryly have to aim at improving thermal standards of buildings as well as providing energy poor families with options to use renewable energy sources.

7 REFERENCES

Berger, T. (2012): Impacts of climate change upon sustainable cooling (and heating) strategies for office buildings in urban areas. Dissertation for obtaining a doctorate degree at the University of Natural Resources and Applied Life Sciences Vienna.
Berger, T. (2011): Energiearmut: Eine Studie über Situation, Ursachen, Betroffene, Akteure und Handlungsoptionen. Spectro gemeinnützige Gesellschaft für wissenschaftliche Forschung. Wien.
Biffl, G. (2010): Die ökonomische Situation der Frauen in Österreich. In: Federal Ministry for Women and the Civil Service: Frauenbericht 2010. Wien.
Boardman, B. (2010): Fixing Fuel Poverty. Earthscan. London and Sterling, VA
Boardman, B. (2012): achieving zero. Delivering future-friendly buildings. Oxford University Centre for the Environment, Oxford.
Bouzarovski, S., et al. (2012): Energy poverty policies in the EU: A critical perspective. Energy Policy, doi:10.1016/j.enpol.2012.01.033
Czerny, M. (2007b): Housing Construction and Renovation as a Tool of Eonomic Prosperity, Summary, Austrian Institute of Economic Research, Vienna.
Darby, S.J. (2011): Metering: EU policy and implications for fuel poor households. Energy Policy, doi:10.1016/j.enpol.2011.11.065
Dubois, U. (2012): From targeting to implementation: The role of identification of fuel poor households. Energy Policy, doi:10.1016/j.enpol.2011.11.087
Elbers, Ch. (3003): Micro-level estimation of poverty and inequality. Econometrica, Vol. 71, No. 1, 355–364.

Healy, J.D. (2004): Housing, Fuel Poverty and Health. A Pan-European Analysis. Ashgate Publishing Limited. Hants GB.

Liddell, C. et al. (2012): Measuring and monitoring fuel poverty in the UK: National and regional perspectives. Energy Policy, doi:10.1016/ j.enpol.2012.02.029

Moore, R. (2012): Definitions of fuel poverty: Implications for policy. Energy Policy, doi:10.1016/j.enpol.2012.01.057

Brunner, K.-M., et al. (2011): NELA. Nachhaltiger Energieverbrauch und Lebensstile in armen und armutsgefährdeten Haushalten. Endbericht. Wien.

Bundesministerium für Wirtschaft, Familie und Jugend, Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft (2010): EnergieStrategie Österreich. Maßnahmenvorschläge. Wien.

GEA (2012): Global Energy Assessment – Toward a sustainable Future, Cambridge University Press, Cambridge UK and New York, NY, USA and the International Institute for Applied Systems Analysis, Laxenburg, Austria.

Köppl, A., Wüger, M. (2007): Determinanten der Energienachfrage der privaten Haushalte unter Berücksichtigung von Lebensstilen. Studie des Österreichischen Instituts für Wirtschaftsforschungim Auftrag des Bundesministeriums für Verkehr, Innovationund Technologie. Wien.

Mandl, S. (2012): Energiearmut in Österreich: Erscheinungsformen, Ursachen und Strategien unter besonderer Berücksichtung der Definition. Wirtschaftsuniversität Wien

Österreichische Gesellschaft für Umwelt und Technik (ÖGUT); (2011): ZERsiedelt. Im Auftrag des Klima- und Energiefonds. Wien

Republik Österreich (2011): Klimaschutzgesetz – KSG. 106. Bundesgesetz zur Einhaltung von Höchstmengen von Treibhausgasemissionen und zur Erarbeitung von wirksamen Maßnahmen zum Klimaschutz. Ausgegeben am 11. November. Wien.

Schenk, M., Moser, M. (2010): Es reicht! Für alle! Wege aus der Armut. Deuticke Verlag. Wien.

STATISTIK AUSTRIA (2009): Umweltbedingungen, Umweltverhalten 2007. Ergebnisse des Mikrozensus. Wien.

STATISTIK AUSTRIA (2011a): Armuts- und Ausgrenzungsgefährdung in Österreich. Ergebnisse aus EU-SILC 2010. Sozialpolitische Studienreihe Band 8. Im Auftrag des BMASK. Wien.

STATISTIK AUSTRIA (2011b): Armuts- und Ausgrenzungsgefährdung in Österreich. Ergebnisse aus EU-SILC 2010. Tabellenband. Sozialpolitische Studienreihe Band 8. Im Auftrag des BMASK. Wien.

STATISTIK AUSTRIA (2011c): Volkswirtschaftliche Gesamtrechnungen. Hauptergebnisse. Wien.

WHO (1987): The Physiological Basis for Health Standards for Dwellings

FIFA World Cup 2018 – the Planning Challenge for Russian Cities

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1 ABSTRACT

11 Russian cities were chosen to host FIFA world Cup 2018. Their starting positions 6 years before the championship are very different. It seems that the Megacity of Moscow may host almost any large event at any time. From the other hand the city has been suffering for years from infrastructural shortcomings and incorrigible traffic problems.

Sochi and Kazan are cities most prepared for FIFA world Cup due to other coming sport events: winter Olympics in Sochi (2014) and World student games in Kazan (2013). All sport facilities and infrastructural projects will be completed 4-5 years before World Cup 2018 starts. So these cities probably will face the problem of maintenance surplus sport objects.

Other 8 cities including one of the largest European city St. Petersburg face the challenge they haven't ever faced before in their 20-years post-soviet history.

City's approaches to the "challenge 2018" are common – the main idea of the preparation period is to obtain more federal investments into local transportation projects. Current priorities for almost all cities start from new stadium construction (or total reconstruction). The next issue is network development that focuses mostly on focal projects like a new airport, street crossings nearby the stadium or parking facilities.

The aim of Local organizing committee (LOC FIFA 2018) and the federal company "Arena' founded to coordinate all construction activity – is to ensure the championship itself. The FIFA's claim to provide the heritage of the tournament is taking into consideration rather on the theoretical level.

The core task for all cities – to integrate "World Cup oriented" infrastructural projects with federal financing into own planning strategies, to consider the FIFA tournament as a «catalytic agent» for post-soviet city transformation. This idea is rather new for cities. At the same time planning projects for future stadiums causes wide public discussions in some cities from the point of long-term development – not the championship preparation.

The legal issue is also claiming attention. All cities have general plans worked out a few years ago. New stadiums appointed by FIFA, were not planned. Is it necessary to correct the general plan? Or the serious project like FIFA World Cup may inspire the city to real strategic planning – more sustainable and more resilient than traditional soviet regulatory-based planning?

The paper overviews all FIFA world CUP 2018 host cities focusing on significant construction and infrastructural projects that may excite structural transformations of every city framework. The paper attempts to pay cities' attention on planning aspects of "sports objects development" and related issues (like renovation, mixed use, public spaces) beyond transit systems, hotels and fan areas. Various local long-term development projects that can be pushed hand by hand with championship-oriented ones are explored.

2 FIFA 2018 HOST CITIES – THE OVERVIEW

FIFA local organizing committee had grouped all cities into clusters according to their location. We prefer another approach: the importance of the World Cup for every city. Four groups were distinguished. The championship for Small cities is a great event, for cities-Millionaires (above 1 million citizens) is a chance, for "Sport" cities is out of agenda yet and is an ordinary event for Capital cities

2.1 Small cities

Kaliningrad – extreme western city of Russia, is an enclave surrounded by new EC countries. Centre of promising resort region on the Baltic Sea. Population – 431 500.

The stadium was built in 1892 now seats 14000 people. Airport Khrabrovo failed to become an international hub a few years ago. Now is 18th in Russia. Public transportation system includes bus, trolley and shrinking tram networks. Hotel network is well developed both in the city and surroundings.

Plans for 2018 includes: new Stadium on the Lomse island close to the city centre together with the whole island housing and commercial development, fast tram ring, the tram network and water passenger transport extension, street network extension around the Lomse island, including 4-5 bridges construction across Pregola river, new energy supply facilities. Railway extension to the airport is the issue for discussion.

Saransk – the capital of Mordovia – the region with a highest level of social and political stability in Russia. Population – 298 000.

New stadium that seats 11500 people was built in 2004. Small airport operate only one route to Moscow. The city is not on the transit railway – only 3 long-distance trains daily. Saransk has well developed trolley and bus network and a very low level of hotel service – insufficient to FIFA minimal demand.

Plans for 2018 includes: new Stadium on a new site near the centre of the city, temporary terminal construction at the Airport, new hotels construction (about 2000 rooms), street network extension, housing development project near the stadium. City centre redevelopment is also declared by city authorities.

World Cup 2018 – is the great challenge and opportunity both for Kaliningrad and Saransk. Former Keningsberg had lost al the greatness of the Prussian capital. The city gets a chance to start its spurt towards the modern one developing the Lomse Island like HafenCity in Hamburg or Västra hamnen in Malmo. Saransk is too small and too provincial. The city is realizing several housing projects now based on soviet "microrayon" and strong functional zoning approaches. Probably Saransk may switch to present-day planning concepts and rise its appeal, but it should start strategic planning immediately thinking not only about the FIFA event but planning its own future in the whole.

2.2 Millionaires

Nizhni Novgorod (former name Gorky) – industrial city on the bank of Volga river. Capital of the Povolzhsky federal district. Has a good rail connection to Moscow. Population – 1 254 600 (decreasing).

The main stadium "Lokomotiv" seats 17000 people. The city has a wide range of sport objects an plans to build new ones – like the largest hockey hall in Russia. Airport "Strigino" is situated at the south-west end of the city and connected by bus line with the metro station. Nizhni Novgorod has two metro lines, bus, trolley, tram network and a cable-way to the city of Bor on the other side of Volga River. Railway station in the centre of industrial part together with metro station forms the main transportation hub. The city is lacking for hotels.

Plans for 2018 includes: new Stadium on a very significant place on the bank of Volga in the central part of the city, railway terminal reconstruction, two metro stations (probably more), 3 cable-ways, street network extension, road junctions and a tunnel, 30 new hotels. Railway extension to the airport is discussing.

Samara – one of the largest cities on the Volga river, forms Samara-Togliatti agglomeration. The centre of space science and industry. Famous for its historical centre dated by late 1800-s. Population – 1 198 000

The stadium Metallurg is old and uncomfortable. Airport "Kurumoch" (in top-10 Russian airports) is situated 40 km far from the city. Samara has one metro line (9 stations) but it role in public transportation system is minor. The city has extensive bus and tram networks. Also trolleys and route taxis. Railroad doesn't used for inner-city connections. Hotel network fit minimal FIFA requirement but need extension.

Plans for 2018 includes: new stadium on a new site far from the centre of the city, tram network extension and water passenger transport development, new cable-way, street and outer road network extension, road junctions and railway crossings. A new metro line (12 stations) and alternate airport connection by existing railway extension or new LRT construction are issues for discussion.

Volgograd – (former name Stalingrad) – one of the longest cities of Russia, stretches for about 90 km along the Volga River. Industrial centre in the South of Russia. Population –1 018 739.

The Central stadium is situated in front of the main landmark of the city (downhill towards Volga) – "Mamaev Kurgan" with the statue of Motherland. Gumrak airport is located about 13 km from the city centre. Volgograd is the unique city in Russia with Metrotram system launched in1984. It has 22 stations on one line length of 17.3 km. The city has also a separate tram network, buses and trolleys. Hotel network includes 84 hotels that rooms more than 3000 people.

Plans for 2018 includes: the new stadium is "Victory" on the same place of the Central stadium on the Volga' riverfront in the north-central part of the city, training camp in Maslovo on the over bank of Volga river, airport complex reconstruction, fast tram (Metrotram) network extension, transit road network near the stadium and west cargo traffic bypass around the city, hotel network development.

Rostov-on-Don – the capital of the Southern federal district, a major industrial, scientific and cultural centre in the south of the country, is often informally referred to as the "Gateway to the Caucasus". Population –1 099 500.

The main city stadium now is "SKA" that seats 11000 places. Rostov airport located inside the city 8 km far from the centre. They plan to close it after the new one will be completed. Rostov-on-Don is the only city in Russia with European gauge system (1435 mm). It also has trolley, bus and route taxi network. The city counts more then 40 hotels, motels and resorts for 3500 rooms.

Plans for 2018 includes: the new stadium construction on the left-bank of Don river opposite the main city embankment, training fields in the suburbs, a new international airport, reconstruction of one bridge over the Don River and construction of another one, two new road bypasses for transit transport to the south and to the west of the city, cable-way over the Don River. New metro network construction is the question for discussion.

Yekaterinburg – the largest city, industrial and economical centre of Ural region. The city's brand is epy largest number of skyscrapers among all Russian cities. Population – 1 377 700.

The "Central" stadium was opened after reconstruction in 2009, now seats 27000 people. Situated close to the central part of the city from west side. The new airport is 5th in Russia and was included in top 100 European airport in 2012. Connected to the city by the railway and highway. The city has one metro line, bus, trolley and tram network and unique transport for Russia – the city railway. A lot of hotels were constructed during last years.

Plans for 2018 includes: total stadium reconstruction (The stadium couldn't be demolished due to historical significance), 4 stations on a new metro line, Fast tram line, Street network extension with a few road junctions. About 25 hotels may be build if necessary. No planning projects developed yet.

All cities except Yekaterinburg are situated on great Russian rivers determine the historical planning structure and claims for new extension. Key words for Rostov-on-Don and Samada are city expansion and agglomeration development. Airport and interregional transportation networks development play a great role, the stadium construction on a greenfield forms a new central place for the whole region.

The main idea for other millionaires-cities is reconstruction and road network development. Projects will be more local, more detailed. Planners and architects may pay attention on public spaces, parks, waterfront, spatial and visual links between stadiums and city centres.

2.3 Sport cities

Kazan – city on Volga River, the capital of Tatarstan Republic – one of the most populated and economically developed regions in Russia. Population – 1 161 300.

The city is almost ready for the Summer Universiade 2013 (started on July 6, 2013). More than 10 new sports objects were build during last few years. New Stadium for 45 000 people is among them. Many infrastructural projects were also dated for the Universiade including extended street network reconstruction, traffic interchanges construction and a new railway connection to the airport. Kazan has one metro line, bus, trolley and tram network and no route taxis (untypical for Russia). Hotel network is well developed.

Plans for 2018 includes: launching city rail ring project, new transportation Hub development (railway terminal Kazan-2), street and network extension, a new metro line of 5-6 stations.

Sochi – the main and the most popular Russian sea resort. The Great Sochi is stretched out 140 km along the sea-side and includes several living communities (Sochi is the largest) separated by natural landscapes and resort development. Population – 343 300 is increasing 3-5 times during the summer.

The city is going to host winter Olympic Games 2014. Sports infrastructure (stadium "Fisht" for 40000 people) and traffic network projects (transit streets and road bypass, rail connection to the airport, etc.) are

completed or in last stage of construction. City has only two really working types of public transport: bus and rout taxi. Hotel network is redundant for any sporting event bus still is extending.

Sochi has no Plans for 2018. All development projects are concentrated on Winter Olympics. Water and energy supply systems development, completing traffic bypass for cargo transit and launching the city railway are the main ones. Development plans beyond 2014 are not discussing yet.

World Cup 2018 is not the key issue for planning discussions not in Kazan no in Sochi now. While Sochi is focused on tactical issues of 2014 Olympics, Kazan is almost ready for Universiade and tries to widen its "planning horizon" to 2018 and beyond.

2.4 Capitals

St. Petersburg was the capital of Russia in 1712-1918. The northern, sea and cultural capital of the country. The most "European" city in Russia. Population – 5 028 313.

Stadium "Petrovski" – the home one for the richest Russian football club Zenit was built in 1925 now seats 21000 people. The airport "Pulkovo" (3th in Russia) is situated close to the city but connected with it only by road network. St. Petersburg has 5 railway terminals, marine passenger terminal, 5-lines metro network and all types of public transport. Hotel network is well developed and includes a lot of small hotels.

Plans for 2018 includes: new Stadium on the place of Demolished Kirov Stadium on the west end of Kirovsky Island (project by Kurosava) may form a significant landmark in the city's panoramic view from the seaside. New terminal construction at the Airport and connecting it with the city by rail, metro or LRT line, construction of 5 metro stations on 2 lines, Street and road network extension.

Moscow is the capital of Russia, The largest mega city in Europe and one of the top-10 in the world. Population of the city is about 12 million people. The Moscow agglomeration population runs up to 16-17 million.

Moscow is implementing a lot of projects now: Smart city Scolkovo, Moscow agglomeration and new south-west development, transportation projects including rail ring and fast tram lines construction, vast metro network extension, Industrial sites redevelopment, etc. FIFA 2018 is among them but not the main one. They plan reconstruction of the main Moscow stadium "Luzhniki" and the new stadium "Otkritie Arena" construction on the north-west of the city.

3 CHALLENGES AND OPPORTUNITIES

World cup campaign has already started. Stadium design comes first. Dozens of architects had worked out their concepts of fantastic sport facilities. Networks development dreams goes next, focused on airports, rail and metro construction, kilometres of new streets, highways and road junctions. The most tempting time – cost assessment comes now.

3.1 Federal investment race

City's approaches to the "challenge 2018" are common – the main idea of the preparation period is to obtain more federal investments into local transportation projects. First evaluation of World Cup cost for Russian budget was estimated as 10 billion Euros. Now it rises to 15 billions. Cities' requests are the flip side of the process. Samara region has calculate detailed demand as 5,5 billions – only for one city.

While analysing preparation plans one can see a lot of expensive projects. Only some of them would be accepted. For example currently only two of metro network extension projects would be financed by federals: in St. Petersburg and N. Novgorod. What are criteria for project selection? Is it provision of a few football matches or significance for long-term city development?

3.2 Local initiatives

The main stream of federal financing would go via the regional governments – not municipalities. And what are the real cities' needs? It's amazing but almost all cities do not really need new large stadiums. Average attendance of football matches in Russia is about 10 thousand fans. Top matches can attract 20-25 thousand – not more. Present-day cities' needs are housing and network's development: roads, public transport, gas and water supply systems, etc. Coming back to Samara region demand one can see that 70 % of 5,5 billions

is necessary for road networks development, 11,7 % – for sports facilities and only 9.5 – for city improvement.

Most plans not strategically but problem oriented. The main problem for almost all cities is traffic. If you have traffic jams – you mast build more roads. Another approach – to integrate "World Cup oriented" infrastructural projects with federal financing into own planning strategies as a «catalytic agent» for post-soviet city transformation – is rather strange idea for cities' authorities.

3.3 Planning challenges

What about strategies? All cities have general plans elaborated 6-8 years ago (long before crisis came) they are out of date now in principal statements. As a result – all new stadiums were located ignoring general plans – in Kaliningrad, Samara, N. Novgorod, Saransk. Yekaterinburg has a city development strategy adopted in 2009. Samara has started its strategic planning last year. That is all.

Bad roads and lack of housing have been traditional problems for Russia for years but they are not critical now. The main problem is referred to demography. Volgograd and N. Novgorod are shrinking cities (N. Novgorod was stated by UN as one of the most rapidly depopulating cities in the world), Samara, Kaliningrad and Saransk are stable, Kazan, Yekaterinburg and Rostov experience minor growth in the last 2-5 years after the fall in the end of XX century.

Stagnating and shrinking cities in Russia are entering the era of competition for skilled human resources. They must learn how to attract people not only by construction of social objects and dwellings or solving current infrastructural problems but by improving city environment, widening range of possibilities in workplaces, education and rest. Cities need to implement new planning methods and approaches using the wide range of instruments including participatory planning, professional discussions, competitions, international cooperation etc.

4   PLANNING STORIES

Two case studies offer more detailed view on cities' planning challenges. Kaliningrad is famous for the wide public involvement in city long-term development discussions. Rostov-on-Don seems to face most serious spatial transformation in the nearest future.

4.1 Kaliningrad

Kaliningrad – former Keningsberg was demolished during the 2 World War and still has been looking for its identity for more than 60 years. The city never faced strategic challenges like World Cup 2018. Probably this was the reason for wide public discussions both concerning the championship preparation and city development started immediately after the idea to host football championship was announced in 2009.

First of all location of a new stadium was discussed. The FIFA commission's decision adopted in 2011 is still an issue for debate. The Lomse island is a swamp with average height 1,5-2 meters above the sea level. According to the general plan developed in 2004 the whole island except the western part was the recreation zone. The new stadium was placed in the middle part of the island. Some experts worry about negative geological and hydrological conditions that can complicate the stadium construction and increase its cost.
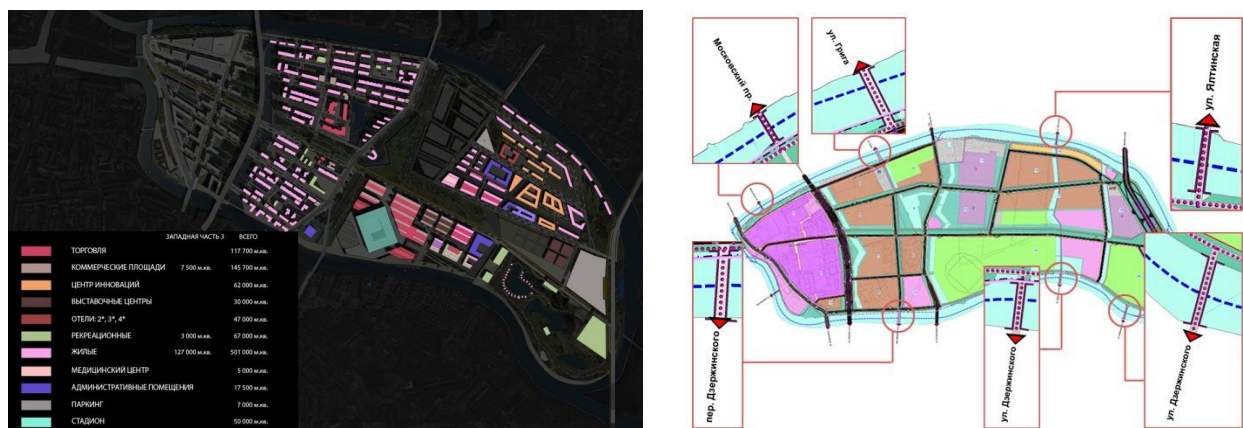
Fig. 1: Concept of Lomse Island development (left). Transportation scheme in the „Project of Planning" (right)

At the same time the stadium construction can stimulate development of the large territory about 220 ha close to the city centre. The concept of Lomse island development was created in the beginning of 2012. An official document „Project of Planning" was developed half a year later and caused a new round of debates. Somebody may see that blocks-based structure of the Concept was transferred to typical "microrayon-based" scheme with a rare street network. „Project of Planning" was criticized by a group of Kaliningrad architects but vas adopted by city authorities in march 2013.

New development of Lomse island based on today principles of green building, public spaces priority, low carbon emission and multi-use planning approach may help the city to start its spurt towards the modern-looking city and get a unique identity among Russian cities. Probably Kaliningrad needs to explore successful housing projects in middle-sized European cities like Västra hamnen in Malmo (Sweden) or Port Marianne in Montpellier (France).

4.2 Rostov-on-Don

Rostov-on-Don has surpassed almost all host cites by the number of proposed infrastructural projects on the threshold of World Cup 2018: construction of the new metro line, a new airport, cable-way, of the northern bypass around the whole city, bridge reconstruction and of course the new stadium on the left bank of Don river. World championship will make a qualitative leap in the city's development. Moreover, this opportunity can be considered in the geopolitical competition in southern Russia. It is a chance to get ahead of Krasnodar (also was a candidate to host WC 2018 but lost) as a leading city in the region.
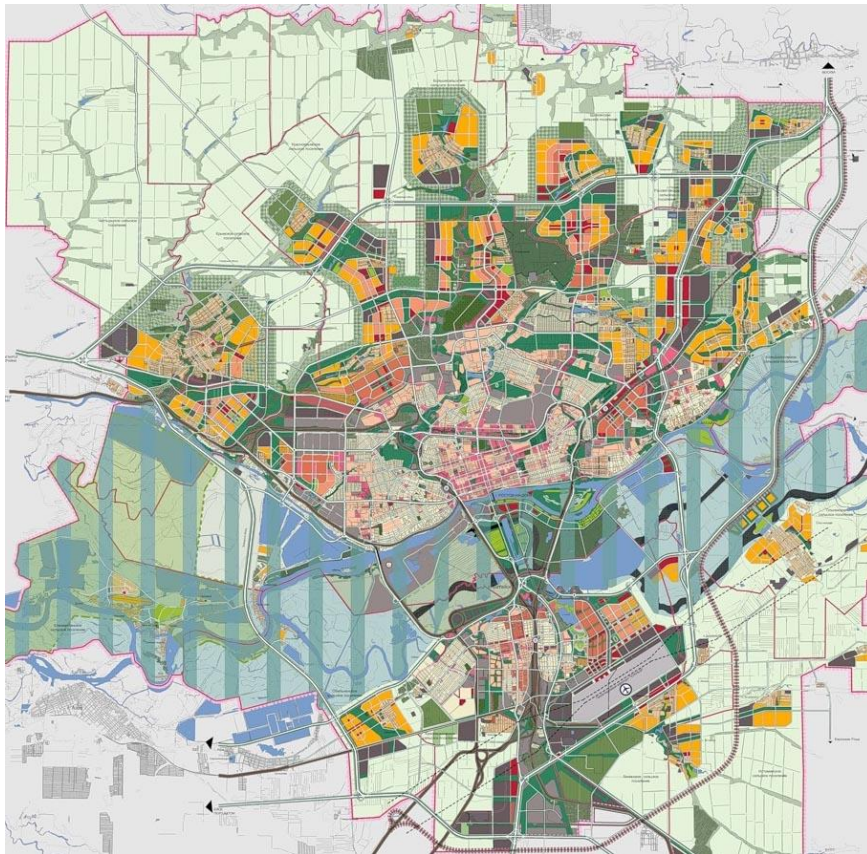
Fig. 2: Concept of the "Great Rostov" agglomeration

Investments in transportation network not only within the city but also in the adjacent municipalities will improve metropolitan planning structure of the "Great Rostov" and ensure the development of new "points of growth" for the harmonious territorial development. One of new focal points is the airport projected to the north-east from the city that can attract logistics and commercial development. Another one is a new stadium, whose active "life" would depend on the ongoing events.

In case of successful "Great Rostov" development most of active functions related to business, sports and recreation will transfer to the left coast to create more balanced city's framework. At the same time challenges of the "Great Rostov" may face a various risks.
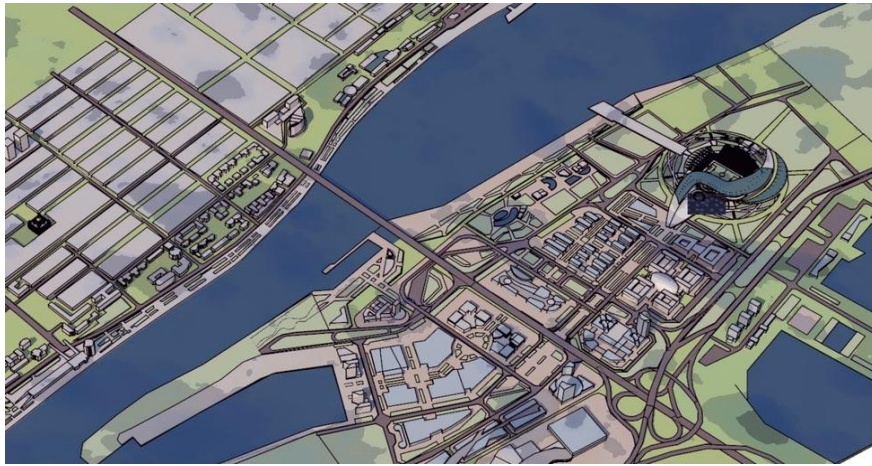
Fig. 2: 3-D model of new development around the stadium on the left bank of Don River

The left bank development conflict with the theory of a compact city and has a risk of limited connection between both sides of river by existing and planned bridges. Infrastructure development on the left bank may cause multi-stored economy class housing construction while most workplaces will remain on the right bank of the river.

Will "Great Rostov" slide to the notorious offering "affordable" housing in the new "active" areas, or the city can formulate the concept of a modern urban environment? What are the goals now and what is the vision? The question of urban policy focused on qualitative development remains open.

Globalization and Urban Land Use Planning: The Case of Lagos, Nigeria.

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1 ABSTRACT

Globalization and associated economic concepts are new directions of development raving the world. The concept will have enormous effects on all aspects of life ranging from economic, social, cultural and physical development of different regions of the world. It will however have more pronounced effects on large settlements especially in the cities. The mega-cities of the world of which Lagos is one will be influenced more than other categories of human settlements. This paper is a study of the emerging and potential effects of globalization on Lagos, the former Federal Capital of Nigeria until 1991 when the seat of national government was moved to Abuja in central part of Nigeria. Lagos is located along the Atlantic Ocean coastline in south-western part of Nigeria. It is also the most industrialized and the city with the highest population in Nigeria with a population of about 18 million on a built-up land area of about 22,000 Hectares. With the advent of globalization and privatization the land use system of Lagos has changed significantly, with the traditional land uses such as industrial premises reducing in floor areas, increase in religious land uses, public land use areas are reducing but with tremendous increase in commercial land use areas. Most of the commercial land use areas are in fragments and predominantly in form of small scale and informal commercial premises along major roads. The cityscape is engulfed with illegible streetscapes. This paper examines this physical growth trend of the city and offer explanation, upon which suggestions are offered on how to harmonize this changing city growth pattern with the advantages offered to human development by globalization.

2 INTRODUCTION

Most studies on urban land use planning are with emphasis mainly on city aesthetics administration, need for conservation and preservation of the city natural and cultural resources. Unfortunately there has been a dearth of research on the relationships between the city land use pattern and global economic policies. Among early studies on urban land use in Nigeria are the works of Falade and Kaigama (1992) who evaluated the urban landscape improvement strategy in Yola, Nigeria. The researchers investigated the contribution of the Yola Landscape Task Force (YLTF) to the improvement of Yola. Ademola's (2002) study was on the urban art aesthetics of Nigeria. He investigated the city as a work of art because like art it evolves as a means of enriching the quality of living by continually transforming the environment through creative organisation. Investigation of the outdoor communication media in Nigerian cities was carried out by Sheba (2002). The fact that the recent researches on urban structures in Nigeria have tended to dwell on the city aesthetics to the neglect of the economic forces shaping the city land use makes the need for an investigation on the economic variables influencing the city land use compelling.

Metropolitan Lagos is located in the southwestern part of Nigeria. It is the largest metropolitan area in Nigeria (Ayeni, 1979) consisting of 51 Local Government Areas. The Lagos Metropolis lies generally on low lands. Along the southern boundary of the study area is the Atlantic Ocean; in the west are Ojo and Ijanikin settlements. Lekki settlement forms the eastern boundary, while the northern boundary delineates the landmass of Ikorodu and Alagbado. The general structure of land use distribution shows that residential areas occupy the single largest proportion, 9,669 hectares (52.1 %), while commercial has 1,021 hectares (5.5 %), and industrial 1,448 hectares (7.8 %). Institutional and special uses constitute 2,784 hectares (14 %), transportation 3,340 hectares (18 %) and open spaces 520 hectares (2.8 %).

3 THE CONCEPT OF GLOBALISATION

Globalization is a concept which seeks to integrate various parts of the world into a global economic and global finance system has been a subject of considerable debate. The forging of a global economy is an intoxicating and momentous process, one of the major structural features of the contemporary age (Castells, 1992). The concept of globalization views the global economy as one, which works as a unit on real time on a plenary scale. It is an economic concept where capital flows, labour and commodity, markets, information, raw material, management and organization are internationalized and fully interdependent throughout the

planet. It corresponds to an attempt at contraction of space and time through development of new means of communication and information technologies across the planet (Hammouda, 2000). It is the process through which people, goods and services, trades, ideas and information flow across the borders of countries with ease (Asaju, 2002). Coincidentally urban planning is inescapably caught in this dynamics.

Globalization perceives the world as a trade unit without socio-political barriers and constraints. It is the process through which people; goods and services, trades, ideas and information flow across the borders of countries with ease (Asaju, 2002). This has been enhanced greatly by technological breakthroughs in the development of the computer and telecommunications. Globalization is characterized by liberalization of the world economies and economic activities to free them from institutional control and thereby foster and promote the free market mechanism, private enterprise, open competition, professionalism and excellence in corporate governance. It seeks to promote specialization and the principle of comparative advantage in the production of goods and services on a global scale. It is aimed at creating a new world economic order, efficiency, competitiveness, efficient allocations of resources, and speedy growth of the world economy. Generally the most pronounced effect of globalisation has been a shift in urban government policy from managerialism to enterpreneurism, which views the city as a product that should be marketed (Vliet, 2002). Therefore cities must appeal to global investors in urban planning. Unfortunately, cities that do not have the resources to attract outside interest and investment will even be more alienated and impoverished. Metropolitan areas such as Lagos arc the core areas for global competition; it is therefore necessary to strengthen them through greater authority and autonomy in land use resource allocation, through appropriate planning through innovative, more entrepreneurial and more participatory. Planning has a role to play by way of intervention, mediation and harmonization of the diverse interests attracted to the cities.

In the area of globalization little research work has been done in Nigeria. The little done so far has concentrated on the socio-economic dimensions of the concept. Since globalisation is implicated in the socio-economic variables of city development, economic variables it implied that globalization should have significant effects on the Lagos land use.

4 THE NATURE OF URBAN LAND USE PLANNING

Urban land use planning has a number of aspects which may be considered from different viewpoints. Therefore, any definition of planning that is adopted can only express one of the many aspects of planning activities. Planning is both a philosophy and a social technology; therefore it cannot be studied in isolation from other areas of social and pure sciences. Urban land use planning demands the study of variables representing different human efforts in achieving maximum opportunity for best biological and sociological environment for humanity. Its potential is a recurrent issue. The nature of problems confronting it is multi-disciplinary, thus to resolve these problems a multi-disciplinary approach is required (Oduwaye, 2006). It requires sharing of knowledge and skill on a scale which is still insufficiently appreciated. Planning as a discipline is a core area within overlapping fields of study. For example in the area of urban geography; planning inquires into spatial context while in urban economics and sociology the inquiry is non-spatial.

It is an attempt to reconcile the social and economic aims of private and public enterprises, Oia (1984), quoting from Keeble (1980) in "Principles and Practice of Physical Planning" defined physical planning as the act and science of controlling the use of land, the character and arrangement of buildings so as to achieve economy and secure convenience and beauty, Adeniyi (1978) defined physical planning as an act concerned with design, growth and management of physical environment in accordance with pre-determined and agreed policies whereby balanced social and economic objectives may be achieved. Planning is a science and art of movement of policies governing physical growth of towns. Generally, planning is traditionally concerned with the best use of land, maximum improvement of physical conditions that can be obtained within the limits of available resources, provision of beautiful and quality environment for habitation and conservation of natural resources, beauty, historical and architectural creations. These functions could be likened to the statement in Article II of the American Institute of Planners which describe the planning professionals sphere of activity as"... the planning of the unified development of urban communities and their environs and of the state, region and the nation as expressed through determination of the comprehensive arrangement of land uses and regulation thereof.

Urban planning, the object of discussion here involves the arrangement of spatial patterns overtime. Its fields impinge upon psychology, .scientific methods generally, upon general system theory, upon cybernetics, upon

operations research and logistics. Planning is future-oriented and thus optimistic, for it assures man's ability to control his own destiny, at least within certain limits. Planning involve man closeness with nature and with life. It is done by human beings for human beings. It is a human conception and seeks human decision and participation. The Nigerian Institute of Town Planners in her 1992 Information Handbook described town planning as an activity concerned with the spatial ordering of land use both in the urban and rural setting for the purpose of creating functionally efficient and aesthetically pleasing physical environment for living, working, circulation and recreation.

5   OBSTACLES TO FAR-REACHING ACHIEVEMENTS IN URBAN LAND USE PLANNING IN LAGOS.

Based on the level of urban planning in Nigeria, major obstacles confronting planning are discussed in this paper. First is ignorance on the part of government on the process involved in urban planning. This is fundamentally due to lack of plan upon which the environment should be managed. The use of plan as basic yardstick for planning has no alternative but this we have failed to accept. Towns and villages in Nigeria have no current master plan. Master plan will make the city efficient, increase economic viability, health, and build into it land use management strategies, it will draw up programmes to prevent flooding, embankment to protect flood plains, how to reduce ocean scourge among other issues on which government dissipate economic and financial resources (Oduwaye and Dekolo, 2005).

Political will on the part of the ruling class is a basic attitude for successful urban land use planning. Public ignorance and apathy are major obstacles' to the growth of urban planning awareness, protection and regeneration (Falade, 1999). Inadequate institutional frameworks, whereby there is over concentration of power in the hands of the federal government in determining the direction or evolution of policies for other levels of government is another problem. There is also multiplicity of agencies which most often degenerate into jurisdictional overlaps not only among the various levels of government but within the central government itself.

Non-implementation of existing planning laws to their fullest is another problem (Oduwaye and Ogundele, 2007). In many instances, existing laws are implemented based on how suitable they are to those who are in charge of their implementation at a particular point in time. Lack of equipment and fund is another problem. This is a recurrent problem in many areas of endeavor in Nigeria. Perhaps urban planning is having its own share of this national problem.

6   GLOBALISATION IN AFRICA AND SOME LESS DEVELOPED COUNTRIES

The global forces that impact upon African countries and cities have their origin in the historical relationships between the continent and the world economic system (Rakodi, 1997). This is further reinforced by the colonial control, which left an enduring political, economic and spatial legacy which influences city growth, administration and values. Despite these historical legacies, the global economic situation and globalisation in particular have started to evolve differential effects on African cities. Cities in Africa being relatively weak are unable to compete favourable with cities in developed countries in terms of productivity and foreign exchange capacities. As a result, indigenous people are unable to operate on large scale, and industrial capacity substantially weakened, forcing entrepreneurial migration to the service sector of importation of consumer products and retails sales. Africa generally exports mainly primary commodities, while a high proportion of manufactured goods are imported. This places Africa; development prospects at the mercy of the industrialized consumers of her primary export products. This reflects on the physical development of African cities. The dynamics of this economic influence on the city pattern have been documented in respect of Africa by O'Connor, (1983) and Simon (1997) and in the case of Latin America, Asia and the Caribbean by Potter (1993). European colonial influence was clearly of fundamental importance in this process, and especially in regions where decolonization is a recent event (Simon, 1997). It can be stated that the nature of urbanization in Africa has been strongly influenced by colonial policies. So also are the extent and dimensions of wealth or poverty, indebtedness or prosperity. The effect of this interplay of colonial and post-colonial experience in Africa is that Africa and in particular sub-Saharan African are rated as the world's poorest region. The rate of urbanization in sub-Saharan Africa in 1991 put at 31 percent was the least compared with other continents in the world, though there were considerable disparities among African countries.

The impact of globalisation on African cities has been examined by Rogerson (1995). He stated that most African cities have been left out of the globalisation process, the only notable exceptions being parts of North Africa and Mauritius. Effective participation in the globalised production system is determined by location and geopolitical significance, existence of strong and reliable state apparatus, technological and human resources, infrastructure and the ability of state to capture new opportunities. All these preconditions are not well established in sub-Saharan Africa. In the Arab world by the end of the twentieth century, five distinctive types of urbanization could be identified. The first class was the 'nouvcau riche' states which depended on oil exploitation such as Libya, Saudi Arabia, Bahrain, Qatar, Kuwait, the United Arab Emirate and Oman. These countries have about 90 per cent urban population largely due to high rate of immigration. However, cities in this region are mainly centres of consumption rather than production. About 75 per cent of employment in these states is in the service sector (Abu-Lugard, 1996). In Asia Indonesian economy initially depended on oil export. However, recent rapid expansions in manufacturing industries and large scale export of manufactured goods have had a profound effect on the level of spatial pattern of urbanization there (Hugo, 1991).

7   DISCUSSION OF FINDINGS

Despite remarkable history of planning laws and regulations from colonial period to the present time, coupled with appreciable public awareness on factors influencing land use in Lagos, yet Lagos presently lacks the basic conducive environment for globalisation to thrive. Lagos also lacks the competitive technology and human resource base necessary for a robust role in a globalised world. For Lagos, as for many cities in developing regions, the preconditions for global competition are unavailable. Such condition includes the capacity to develop "niche product", a capacity which requires flexibility in the production process. This can only be acquired through an appropriate organisational framework for technology and human resource.

Owing further to unstable and unreliable policy framework, poor state of infrastructure and security in Lagos, globalisation processes have been slow, with corresponding severe consequences for urban economies and environment. In terms of industrial investments and land use, Rakodi (1997) has noted that large foreign enterprises have continuously shunned Africa, with the result that while being devisely populated, African cities are not sufficiently industrialized. It is perhaps only the city of Johannesburg in South Africa that has any chance of attaining "world city" status in this decade (Rogerson, 1995). This derives in part from the city's conscious efforts at developing its financial and producer service sector; this also has to do with its interest in attracting offices of international organisations and developing a cultural strategy to image the city positively before foreign investors.

The formal economic sector in Lagos has been on a gradual decline due to need for restructuring created by globalisation. This is a common feature in sub-Saharan Africa, where regular urban wage employment opportunities constitute between 5-10 per cent of the urban work force (ILO, 1992). Recent studies show a decline from this range in Central African Republic (33.6 %) and Gambia (27 %). Similarly, formal wage employment in the public sector of these countries has been on the increase with massive retrenchments coupled with the declining absorptive capacity of the formal private sector. Abiodun (1997) has noted that at least 70 per cent of the unemployed in Lagos are aged between 15 and 29, while in Kenya according to House (1993), the age group mostly affected by unemployment fall between 20-29, or about 65 per cent of the unemployed.

Unfortunately for developing countries globalisation implies a new structure of global competition in a "global" market of "global" production complexes (Thirft, 1994). As a consequence, innovations in technology, such as micro-electronics, telecommunication, as well as other scientific discoveries are assuming even greater significance in world production systems than ever before. There has been tremendous growth in trans-national production and an increased openness and interdependence of national economies. Propelled by the momentum from advances in telecommunication and infrastructure, the total financial market has responded with a great leap forward. This can easily be noticed in Lagos where investment of trans-national companies particularly in telecommunication and transportation has positively impacted on, the Lagos urban economy and individual enterprises alike. At the national level the impact is evident in the intensification of international and local competition for markets and investments. It is also seen in the increase in the rate of employment into these new sectors. At the enterprises level, it has opened

up the need for adoption of new process technologies, a dynamic working system, and a shift towards flexible rather than mass production system.

The effects of globalisation on Lagos land use come as a mixed bag of positive and negative results. However, since it is a global trend it is better for Lagos to be well positioned to participate in it. Lagos within the context of African and particularly West African frame of reference is a leading city, which stands to benefit in the unfolding competition process through efficiency and job creation. Indeed, many cities in developing countries will be left out of the globalisation train because of their non-competitive status relative to their counterparts in the developed world. Naturally, this would affect development in the less developed regions negatively. The new character of international labour as a dichotomized realm of exporting and manufacturing economies means that the export oriented third world economies might increasingly be alienated in terms of industrialization. A further consequence of this would be the gradual depiction of industrial production land uses, import dependency of consumer nations of developing economies, and of course the dangerous socio-economic crises that possibly will result in future.

Specifically, the most noticeable effect of globalisation within Lagos cityscape is the radical shift in the land use pattern. The high dependency of the city economy on imported consumer goods, has led to a massive depletion, within a decade, of industrial enterprises with its attendant erosion of job opportunities. While industrial land uses are decreasing however, alternative uses, chief among which are religious in nature, are rapidly taking the place of industries, churches especially are in the forefront. It is thus a common phenomenon to see churches occupying entirely an area hitherto used as factory or partially occupying a significant portion of such premises. Such religious places have their peculiar complementary accompaniments such as weekly heavy traffic. Many commercial premises in different parts of the city have also given way to religious land uses. The reason for this is that churches seems in the prevailing circumstances, to be the land use capable of affording the rents demanded by property owners, the service sector having been economically weakened as it were, by forces of globalisation. This phenomenon can be described as change of use of existing buildings.

Change of use of existing land use zoning plan is also a common feature. The city landscape is now dotted with uncomplimentary land uses in many areas. This is common with uses such as multi-storey office blocks within residential neighbourhoods. This is contrary to basic urban land use theories, which discourage intrusion into the privacy of residential areas. This aside from being an intrusion in household's privacy is also a security risk. The heavy traffic which accompanies such invasion also violates residential neighbourhoods. Aside from multi-storey within residential areas, petrol filling stations and fast food outlets are other common infractions observable within the Lagos cityscape.

With the decline in the formal sector of industrial and formal service industries, the informal sector has emerged as the dominant feature of the city land use. Usually in the form of scattered small-scale service points. The bulk of the informal sector usually operates along major roads and within neighbourhoods. This sector has also assumed the services formally provided by supermarkets, furniture sales shops, electronic stores, hardware shops etc, following the demise of the formal sector, which these units of business were a part. It is important to reiterate here that the collapse of these formal service units is due to globalisation, which has eroded local industries, which used to produce the goods sold at these shops but which can no longer do so because of their non-competitiveness within a globalized economy. Since the informal sector can afford to offer similar services at lower prices made possible by relative lower overheads, of the doubtful quality of the goods, they become the only available avenues for consumers, even at the risk. The Lagos streetscape is dotted with small scale sales shops and points offering a wide range of services from household items, electronics, furniture, hardware, to cobbling, packaging and sundry cottage manufacturing industries. In the market sector, hawking, itinerant salesmanship and home trading thrive while in the service sector, catering, telephony service, hair-care, vulcanizing, motor mechanic etc dominate. The city landscape is in fragments of dirty production and service points with no regard for land use zoning.

Another major noticeable feature (on the positive side) induced by globalisation in Lagos is the emergence of trans-national companies especially in the area of telecommunication. Though some of the existing telecommunication companies are owned by Nigerians, their operations basically depend on the global network. With the liberalization of the telecommunication industry in Nigeria there has been a tremendous inflow of capital and services into Nigeria. The teledensity of the country and most especially of urban

centres has increased immensely from the situation prior to the telecommunication liberalization era. This has brought with it largely positive multidimensional effects, the most striking of which is the emergence of new employment opportunities. These opportunities within these telecommunication firms have activated a multiplier effect on other informal outlets in the form of outlets for sale of telecommunication components such as telephone handsets, batteries, among other components. It has also stimulated activity in the technical area of repairs, installations and sundry services.

The city has been significantly transformed by the installation, erection and conversion of existing buildings to fit into the new use of these global enterprises. This is more pronounced in the telecommunication sub sector where giant billboards are now corporate status symbols. This has generated bandwagon effects on other sectors by way of sharpening their sense of outdoor advertisement. Because these activities take place in space and specific locations, they have consequently contributed in opening up of hitherto undeveloped areas in the city. Inflow of capital into the country to support these services have been chiefly from foreign investors who possess the technology and the hard currency to make the desired impact on an increasingly reinvigorated domestic economy of towns and cities in Nigeria particularly Lagos.

8 RECOMMENDATIONS TOWARDS SUSTAINABLE LAND USE PLANNING IN LAGOS

Until recently, much of the development planning efforts in Nigerian rest largely on economic planning with very little regard to the implications of economic and social policies on physical planning (Adeniji, 1998). For few towns with master plans to guide their development there has been insignificant citizen involvement in the mist of rapidly changing socio-economic circumstances, thus making it extremely difficult to achieve the provisions of such plans. The results of this are settlements based on unsustainable yardsticks. This call for a more dynamic approach which will not only be the use of the plan-design but with adequate support of appropriate management strategies, such approach should be derived from the unique local situation from the area concerned. Based on this, the paper suggests the need to give consideration to the following in the attempt to achieve sustainable land use development in Lagos, in the era of globalization.

An area where a major effort has been made in the Lagos land use legislations is on provisions for public participation. What is presently lacking in that the public is not aware of these provisions. In order to benefit from the laudable efforts of governments through the various existing laws put in place to guide sustainable environmental development in general and enhancement of citizen participation, there is need to promote active participation of community leaders and planning advocacy practice.

There is no doubt that information revolution is sweeping across the globe. This will determine not only the way cities are managed but now they will proper and grow. Cities without the ability to cope with the modern age information system are destined to fall hopelessly behind and doomed to fail in an increasingly competitive world. This has serious implication on the growing information gap, between the "information rich" and the "information poor" nations. Access to information technology is important not only on how a city is managed but it is important on how local leaders communicate with their constituents. Lagos information strategies for development in the new global system must emphasize their connectivity, their information capacity and their ability to manage social integration. Cities switched-off the global information network system will be marginalized and ultimately impoverished.

Specific programmes such as "right to quality environment campaign" should be initiated at all levels of government to emphasis that quality environment is a right along with food, education, clothing and employment. Children environmental issue programmes and exhibitions in schools should be encouraged to tailor the minds of the children to their critical role in identifying solutions to environmental problems, thus influencing their development as they are highly vulnerable.

The concept of advocacy in planning should be given consideration in Lagos physical planning efforts especially through the formation of partnership by multidisciplinary group such as the town-planners, architects, surveyors and the lawyers coming together to form environmental advocate groups and consultants. This could also be done in form of non-governmental associations. Among the major merits of the advocacy planning concept are availability of richer ranges of plans, exposing government planners to expert criticisms, aiding the disadvantaged, education of the client and the government on planning. The politicians should be encourage by advocate group as the former could serve as invaluable planning agent because they form the bulk of representatives of the community at all levels of government decision making.

Thus, they are vital tools as advisers and presenters of planning information. Advocacy groups should also organize talk-shops with interests groups such as market women, drivers union, and other trade groups across the strata of the society during which people are to be educated about their roles, opportunities and how to contribute to make the environment livable. There is need to integrate the effort of theorist, government officials, private practitioners and private managers. These sectors will require a meeting point to exchange ideas. The thinkers whose theories are providing the intellectual brain for environmental planning and the investors whose investment affect and propel development should share ideas.

The process of capacity building should involve human resources development and institutional development in the area of urban governance, integrated environmental planning and management, awareness and involvement of local communities, promoting partnerships, capacity building of actors and stakeholders and replication of best practices. Also in order to make planning proposal acceptable to the people and carry them along it should be recognized that different environment are structurally different and cannot accommodate standardized formula or rigid methodologies.

A major step toward achievement of sustainable development in Lagos is the organization of sustainable practice exhibition through joint cooperation of the private sector and all levels of government. The exhibition will involve the identification, documentation and dissemination of best practices. Such best practice may be inform of actors initiatives or-projects that have led to tangible improvements in the quality of live and the living environments of the people in a sustainable way. Such exhibition will expose physical planning managers and communities to actors in other communities outside their areas and from this they will have opportunities to draw from such programmes that could be applied or adapted into their own communities.

There is need to identify and celebrate best practices in planning. This could be spearheaded by the Nigerian Institute of Town Planners in collaboration with allied professional groups and organizations. Also higher educational institutions may be in position as part of the organizers but the problem is that they too could be given awards in their area of planning practice which is teaching, research and publication. Such award should cut across many areas such as the best consultant of the year in environmental planning, best project proposal, best advocacy group, best government agency, best friendly environment, best sustainable environment, best new neighbourhood etc. This will go a long way in stimulating positive competition among players in the environmental planning within Lagos State.

To achieve, the basic aim of sustainable physical development in Nigeria the planning approval (permit) stage is a major determinant of the prospects of the environment. Though this has recently been termed planning permit; whereas the actual demand of the complex situation is that of management of planning approval or project for which permits are obtained since the planning permit is not the end in itself. It must be seen within the context of managing change in order to achieve the greatest benefit. Therefore the signifier of this new thinking is that development control (permit) should be changed and practiced as "development management". This should be supported with the adoption of the new practices that this change implies.

Land information is a critical element towards achieving sustainable physical environment; therefore there is need for free access to land information by the public at the touch of a computer button. This will provide invaluable information that will guide individuals, consultants, government and all stakeholders in environment planning and development. Like the Portal Planning merit, it will also eliminate human problems especially misinformation, delay and corruption.

9   CONCLUSION

This paper has presented the unfolding consequences of globalization on the land use fortune of Lagos. This has been done with emphasis on the influence of economic factors and policies on the structure and pattern of the city. It also presented the relationships between physical planning, the need for sustainable development and how appropriate planning can be used to enhance development. The paper present suggestions that will ameliorate the challenges unraveled.

10   REFERENCES

Abiodun. J. O., 1997. The Challenge of Growth and Development in Metropolitan Lagos in Rakodi ed., The Challenge of Africa: Growth and Management of its Large Cities. Tokyo: United Nations University Press. 192-225.

Abu-Lugard, J., 1996. Urbanization in the Arab World and the International System. In J. Gugher, ed., The Urban Transformation of the Developing World. Oxford: Oxford University Press London.

Ademola, A,, 2002. Urban Art and Aesthetics in Nigeria. The City in Nigeria. OAU Ile-Ife. Pp. 212-218.

Adeniji, J. 1998. Future Challenges of Sustainable Physical Development in Nigeria Ibadan: NISER: 227-279.

Asaju, A.S., 2002. Globalisation, Urban Property Market and the Search for Sustainable City Development. The City in Nigeria. OAUIle-Ife, Pp. 316-324.

Ayeni, B., 1979. Concepts and Techniques in Urban Analysis. London: Groom Helm.

Balchin, P.N.D., D. Isaac, and J. Chen, 1996. Urban Economics: A Global Perspective. New York; Pal grave.

Beall, J., 2002. Globalisation and Social Exclusion in Cities: Framing the Debate with Lesson from Africa and Asia. Environment and Urbanization IIDE, 14. 1: 41-51.

Castells, M., 1992. European Cities, the International Society and the Global Economy Amsterdam: Centre for Metropolitan Research, University of Amsterdam.

Falade, J.B. and B.B. Kaigama, 1992. An Evaluation of Urban Landscape Improvement Strategy in Yola, Nigeria. Triolog Journal Pp. 34-37.

Habitat, 1996. The Urbanizing World: Global Report on Human Settlement. Oxford: UNCUS and Oxford University Press.

Hammonda, H.B., 2000. Perspective on Globalisation and ils structure. Codestria Bulletin 1: 31- 38.

ILO, 1992. World Labour Report. Geneva: International Labour office.

NITP, 1992. Handbook of Urban and Regional Planning Lagos; NITP.

House, W.J. 1993. Urban self employment in Kenya: panacea on viable strategy? World Development 21: 1205-1223.

Hugo, G., 1996. Urbanization in Indonesia: city and countryside linked in Gulglier, G. ed., The Urban Transformation of Developing World, Oxford: Oxford University Press.

Ikekpeazu, P.O., 2004. Globalisation and Housing Development in Nigeria. The Impacts, Gains and Challenges. Ile-ife, Obafemi Awolowo University Press.

O'Connor, A., 1983. The Afrian City. London: Hutchinson.

Potter, R.B. and S. Lloyd-Evans, 1.998. The City in Developing World. Harcow: Longman.

Rakodi, C., 1997. Global Forces, Urban Change and Urban Management in Africa. In C. Rakodi, ed., The Urban Challenge in African: Growth and Management of its Large Cities. Tokyo: United Nations University Press. Pp. 17-73.

Rogerson, C.M., 1995. Looking to the Pacific Rim: production subcontracting and small scale industry in South Africa. International Small Business Journal 13:13: 65-79.

Oduwaye, L. and S. Dekolo. 2005. GIS Applications in Urban and Regional Planning, NITP Pp 118.

Oduwaye, L., 2006. Citizen Participation in Environment Planning and Management in Nigeria. Journal of Human Ecology 20 (1): 91-99.

Oduwaye, L. and K. Ogundele, 2007. Environmental Hazards in Metropolitan Lagos. Journal of Geography and Environmental Development, 3 (1): 85-93.

Sheba, JE., 2002. Outdoor Communication Media in Nigeria Cities. The City in Nigeria. OAU: Ile-Ife, Pp. 212-218,

Simon, D., 1997. Cities, Capital and Development: Africa Cities in World Economy. London; Belhaven.

Streeten, P., 1999. Globalisation and its impact on development co-operation. Development 42,3: 11-17.

Thrift, N., 1994. Globalisation, regulation, urbanization: the case of the Netherlands. Urban Studies 11: 365-380.

Vliet, W,, 2002. Cities in a globalisation world: from engines of growth to agent of change and urbanisation. NDE 14. 1: 31-40.

Governance in the Metropolitan Region: The Vienna-Bratislava Case

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1 ABSTRACT

The discrepancy between the de facto city and the de jure city has brought to the attention the pressing issue of metropolitan governance, either by instituting a specific body responsible for the whole territory or by strengthening cooperation among existing institutions.

The latter is currently the most preferred because of its flexibility and reduced operational costs, but how easy is it to implement?

The case of the Vienna-Bratislava metropolitan region, illustrates a particularly challenging example because of its cross-border condition, with no institution solely responsible for the management of the territory.

2 INTRODUCTION

It is widely known that 75 % of the population in Europe live in cities and that these have now sprawled beyond their administrative boundaries (EEA, 2006).

However, what is less known is that the new urban form that has been shaped, known also as peri-urban,[1] today nearly matches the surface of urban areas, with 48,000 km² against 49,000 km² (Piorr, 2011), which thus makes it at least statistically relevant.

This is why territorial cohesion, especially at the metropolitan level, has been strongly promoted by the European Commission from the European Spatial Development Perspective (1999) to the Territorial Agenda (2011). Cities need to look beyond their boundaries and towards their functional areas, cooperating with their neighbouring municipalities.

Metropolitan governance has therefore gained more importance over the past years, especially when having to manage projects of great interest to all parties, such as infrastructures (Forum of Federations and Committee of Regions, 2011).

But how does cooperation among municipalities work in metropolitan regions?

A very particular case in Europe is that of the Vienna-Bratislava region, a recently developed two-headed cross-border metropolitan system (Brzica, 2009), which covers 2 countries with 2 languages and 4 different spatial planning laws (Slovak, Viennese, Lower Austrian and Burgenland).[2]

But here is the big challenge: there is no sole institution managing this territory.

There is rather a 'Russian Doll' system of institutions responsible only for portions of the region and with different tools at their disposal for its management (STEP, 2005).

The paper will briefly outline some aspects of the current debate around governance; present an overview of the governance bodies acting on the territory and explain their competence and planning tools; conclude with considerations on the effects of metropolitan governance on the territory.

3 ABOUT META-GOVERNANCE AND GOVERNANCE

Governance can be so called when there is "interdependence between organisations; continuing interactions between network members; game-like interactions, rooted in trust and regulated by rules of the game negotiated and agreed by network participants; a significant degree of autonomy from the state" (Rhodes, 1997).

The European Commission's white paper on governance adds an additional perspective, promoting principles such as openness, participation, accountability, effectiveness and coherence (CEC, 2001).

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[1] Various European studies have researched upon the definition and functioning of peri-urban areas, that we can therefore define as the territory part of the Functional Urban Area (considered mainly on the basis of the commuter area) without the Urban Core, with an average population of 40 persons per km².

[2] It needs to be clarified that the Vienna-Bratislava region includes also part of Hungary, but there is currently no relevant cooperation and therefore little available data. For these reasons the article will not include the Hungarian part in the description.

Therefore when looking into governance there are a series of stakeholders involved from public to private that are organised in a manner that takes the form of networks, defined by Sørensen & Torfing (2009, p. 236) as "a stable articulation of mutually dependent, but operationally autonomous actors from state, market and civic society, who interact through conflict-ridden negotiations that take place within an institutionalised framework of rules, norms, shared knowledge and social imaginaries; and contribute to the production of 'public value' in a broad sense of problem definitions, vision, ideas, plans and concrete regulations that are deemed relevant to broad sections of the population."

Although there is a degree of spontaneity in the governance processes that is usually given by the contingency that brings the actors round the same table, this is also fostered by a framework of policies and financial mechanisms often referred to as 'metagovernance'. According to Sørensen (2006) this must allow coordination, coherence and integration within the fragmentation of structures of governance allowing at the same time its autonomy and self-regulation.

Metagovernance can take mainly four forms, one consisting of the framework of policies, goals and financial mechanisms, therefore how; it can consist in the design of the actors' network, therefore who; it can define the management of tensions within the network or it can consist of network participation, where planners and politicians directly influence the decision making.

What we can see is that complexity science enters the decision making processes, developing what Innes and Boheer (2010) call 'collaborative rationality': "The complexity and rapid change in contemporary society have created an increasing awareness among policy leaders of the limits to hierarchical control by government agencies and to formal expertise in solving problems. This awareness leads to growing uncertainty about policy and a new focus on the need to manage uncertainty, rather than create programs and regulatory regimes that deny its existence. As society has become more culturally diverse, decision makers have to deal with an array of publics with different values, perspectives, cognitive styles and worldviews. Complexity is also reflected in growing interdependence among government players, as agencies find they cannot be successful, even on their own limited agendas if they continue to work unilaterally."

This opens also some reflection on the sustainability and resilience of decision making, no longer to be seen as end products but rather as an ongoing process.

How does this theory translate into practice?

4 THE METROPOLITAN GOVERNANCE BODIES IN THE REGION

The Vienna-Bratislava Region has been recognised as a functional entity by the European Union and studies from the OECD have been available for various years (Schremmer, 2003).

Now the two cities create a functional metropolitan region with 3.5 million inhabitants that, as both Austria and Slovakia are part of the European Union, is connected by labour market, housing and transport corridors. Although the cross-border collaborations are growing in number there still is no institution responsible for the coordination of the metropolitan region.

The challenge is that although the area works as a metropolitan region, the governance structures are not still too fragmented to coordinate actions easily.

The Region is characterised by different Länder on the Austrian side, each one having a different Urban Planning Law (Vienna, Lower Austria and Burgenland) and Bratislava following the Slovak Urban Planning Law.

Many super-national initiatives are active on the territory yet none of them have binding decisional power. Among the most relevant are:

- the Centrope Initiative[3] which brings together eight federal provinces, regions and counties that make up the Central European Region, with 6,5 million inhabitants.
- the PGO (Planungsgemeinschaft Ost)[4] is an organization for the administration of Burgenland, Lower Austria and Vienna to coordinate the preparation of regional planning issues, also in cross-border activities and regional networks.

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[3] For further information on the Centrope Initiative : www.centrope.com

- the Danube Strategy[5] interests 14 countries in the river basin area relating to topics from transport and environment to society and culture, without financial support.

Although these are all very important initiatives, they do not directly intervene in the decision making of the land uses destined for the metropolitan region.

Very relevant initiatives in the coordination of actions in the metropolitan region are the Stadt Umland Management (SUM), an association of Municipalities of the Vienna Metropolitan Area, and the Bratislava Umland Management (BAUM), recently developed on the blueprint of the SUM, which is financed by a European cross-border program (Creating the Future), including Bratislava and the Austrian municipalities close to the border.
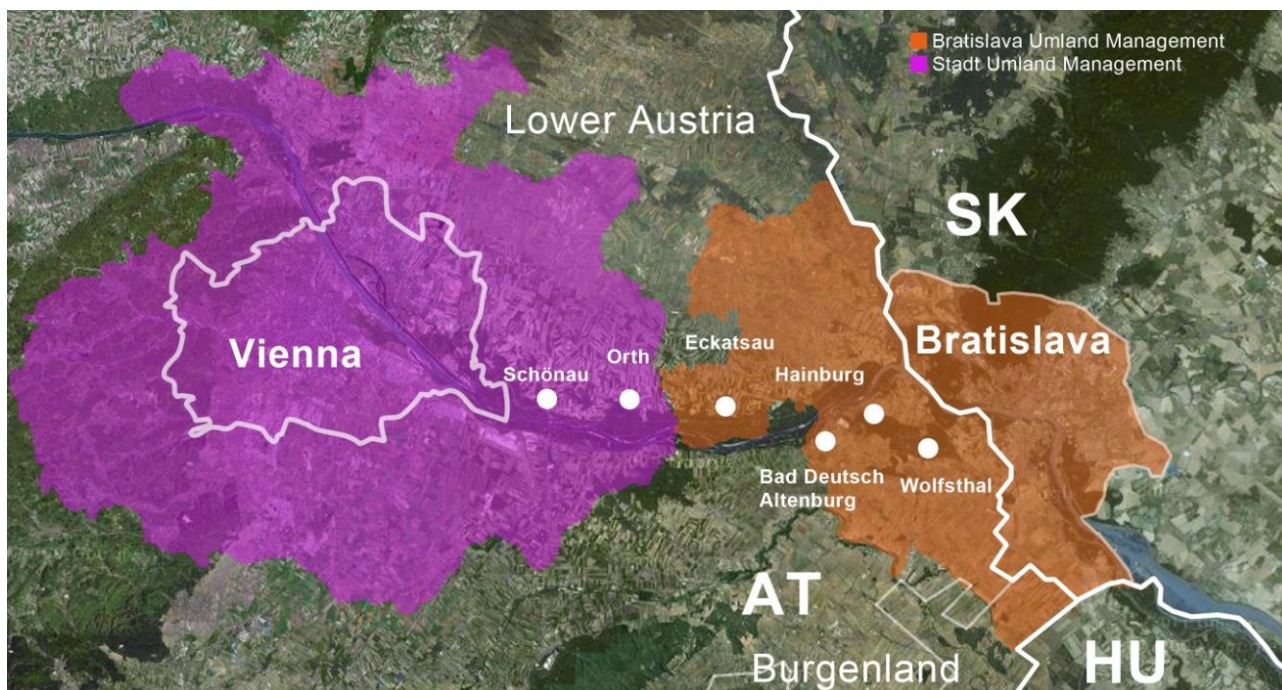
Image 1: The areas of influence of SUM and BAUM. Source: Image made by the author

Both SUM and BAUM are associations of the municipalities of the region that also include other relevant actors on their boards. They do not have budgets to enable the funding of projects in the Region nor do they have binding instruments that can enforce decisions, but rather they are responsible for the moderation and communication amongst institutions, mainly concerning projects such as transport infrastructures, water management and ecological corridors.

(a) SUM (Stadt Umland Management)[6]

Austria is a federation of States (Länder) of which Vienna is one of them and is surrounded by the Land of Lower Austria, each having a different Urban Planning Law. The city of Vienna, therefore, has the dual status of being a city and a State at the same time, but the functional area of the city goes beyond the administrative borders and covers parts of Lower Austria, especially in the southern part.

In Austria municipalities have to manage their planning activities, therefore each one of the approximately 100 municipalities surrounding the city of Vienna is responsible for their own plan.

Vienna and the municipalities of Lower Austria do not have a common inter-municipal planning body due to political reasons, economic prosperity and rivalry between the city and the suburban area. Regional planning and planning between the city of Vienna and the municipalities of Lower Austria is mainly based on single projects.

In 2006 an association was founded between the City and Land of Vienna and the Land of Lower Austria, whose jurisdiction would involve ensuring communication and coordination among the various institutions.

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[4] For further information on the PGO: www.pgo.wien.at

[5] For further information on the Danube Strategy : www.danube-region.eu

[6] For further information on the Stadt Umland Management: www.stadt-umland.at

One may assume that this would end up being a large bureaucratic machine, but this is not the case, as SUM is formed by two people, one in charge of the northern part and one of the southern one.

SUM has no decision power as such, as funding coming equally from Vienna and Lower Austria covers maintenance expenses, but influences the process because of its communication facilitator's role in priorities recognised by involved partners, mainly being transport and environmental issues.

There are no planning tools for the SUM as it is an association, a network that is based on the skills of those people involved.

As SUM is initiated by Länder it can support planning issues that are under their competence, and not on land use for example, which is under municipalities. Though related to this scale is a tool that has been recently introduced with great involvement also by SUM: the Landschaftskonto. This is a planning tool for environmental compensation, based on the German instrument of the Ökokonto, and uses a system where municipalities can collect points according to environmentally sustainable projects they carry out (creating a park for example) that can then be exchanged also with other municipalities to compensate projects with a higher environmental impact (such as a housing project).

The durability of this initiative currently seems to be stable but the fragility of this system stands in the dependency on political will and personal capacities of those people involved.

(b) BAUM (Bratislava Umland Management)[7]

The Bratislava Umland Management is an EU funded project that involves the city of Bratislava, the Regional Management of Lower Austria and the Regional Management of Burgenland, which over a period of two years (2011-2013) aims at developing a Multilateral Expert Platform that will prepare an Urban and Regional Planning Concept.

The project is the current result of a need for cooperation and coordination among municipalities across the border that has developed since the fall of the Iron Curtain and first took shape in the Jordes+ project[8] between 2002 and 2004, then the KoBra project from 2003 to 2007 and now the BAUM project.

What is interesting about the evolution of these projects is that the city of Bratislava became more and more involved in them up until today where it is the Project's Lead Partner.

In fact, the Jordes+ project included a very vast area which is more or less the one of the Centrope initiative, whilst the KoBra project, which stands for Cooperation Bratislava, was a project that included various Austrian municipalities along the border but strangely enough only involved the City of Bratislava in a very limited way (Schaffer, 2008).

The project KoBra was started as a form of institutional cooperation among Austrian municipalities from different Länder but did not manage to really communicate nor establish a cross-border collaboration as the current project BAUM is doing.

Although the BAUM project is still not completed it is already possible to see some strategies being implemented.

The Multilateral Expert Forum, composed by representatives of the regions from Austria and Slovakia, has already had a series of meetings that have up to now focused on the development of the Urban Planning Study and will be assessed in the closing phase of the project (BAUM, 2011).

This study includes comprehensive aims and targets agreed upon by both sides for issues concerning transport, water management, landscape protection and cultural heritage.

The value of BAUM lies in the fact that it is bringing round the same table institutions for the metropolitan region of Bratislava but its durability is only granted until the end of the EU financing unless the actors decide to build a more permanent structure at their own expense.

Both SUM and BAUM communicate with one another as they have representatives on one another's boards, but there is no official collaboration agreement among them nor is the coordination of the whole area one of their aims.

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[7] For further information on the Bratislava Umland Management: www.projekt-baum.eu
[8] For further information on the Jordes+ Project: http://www.pgo.wien.at/projekte/f_JORDES.htm

5 CONCLUSIONS

In the case of the Vienna-Bratislava metropolitan region we can see that the network governance is still at an initial phase, often facing problems due to budget and communication among stakeholders, but nonetheless it must be also noted that this symbolises a great advancement in order to dim the traces of the Iron Curtain.

This is in fact an interesting governance condition as in the past century the geo-political relationship between the two cities has changed radically, from the times of the Austro-Hungarian Empire, where the two cities were governed under the same legislation but playing very different geopolitical roles, to the independence of Czechoslovakia after WWI, from the rise and fall of the Iron Curtain; from 1993, following the Velvet Divorce, when Bratislava became the capital of the newly formed State of Slovakia to the entry in the European Union; from the entry in the Shenghen area until today, when they are a functional metropolitan region.

If 'collaborative rationality' gives much value to the interaction among individuals, being that the more these are linked by various networks, the more they will be able to combine various interests, in can be noted that both SUM and BAUM are based on a collaborative model, but they still do not cover the whole metropolitan region.

Will there be a joint project in the coming years between SUM and BAUM?

6 REFERENCES

BAUM, (2011): Städtebauliche Studie Entwicklung des Grenygebietes von Bratislava und den umliegenden österreichischen Gemeinde: http://www.projekt-baum.eu/de/vismo/dokumenty2.asp?id_org=700029&id=1010&p1=1045
Brzica, D. (2009), "Urban Dynamism within the Vienna-Bratislava Metropolitan Area: Improving Regional Competitiveness and the Constructed Regional Advantage Concept", Managing Global Transitions, Volume 7, issue 3, Published by University of Primorska, Faculty of Management Koper: http://www.fm-kp.si/zalozba/ISSN/1581-6311/7_241-258.pdf
Callon, M. (1986) 'Some Elements in a Sociology of Translation', in J. Law (ed.) Power, Action, Belief, pp. 196 ndash;229. London: Routledge
CEC (Commission of the European Communities) (2001) European Governance; White Paper, Brussels, 25-7-2001, COM(2001) 428 def., Luxembourg: Office for Official Publications of the European Communities.
EEA (2006), Urban sprawl – Europe's ignored environmental challenge:
http://www.eea.europa.eu/publications/eea_report_2006_10/eea_report_10_2006.pdf
European Spatial Development Perspective (1999), European Commission:
http://ec.europa.eu/regional_policy/sources/docoffic/official/reports/pdf/sum_en.pdf
Forum of Federations and Committee of Regions (2011) report on "The governance of Metropolitan Regions- European and Global Experiences", http://www.forumfed.org/post/Governance_of_Metropolitan_Regions.pdf
Klijn, E. & J. Edelenbos (2007) Metagovernance as network management, in: Sørensen, E. & J. Torfing (eds) Theories of Democratic Network Governance, New York: Palgrave Macmillan, pp. 199-214.
Piorr, A. et al. (2011), PLUREL synthesis report: Peri-urbanisation in Europe: "Towards European policies to sustain Urban Rural Future", Publisher: University of Copenhagen/Academic Books Life Sciences.
http://www.plurel.net/images/Peri_Urbanisation_in_Europe_printversion.pdf
Rhodes, R.A.W. (1997) Understanding governance. Policy networks, Governance, Reflexivity and Accountability, Buckingham/ Philadelphia: Open University Press.
STEP 05, Urban Development Plan Vienna 2005, www.wien.gv.at
Schremmer, C. et al. (2003), Vienna-Bratislava Region, Austrian Background Report for the OECD-Review 2003 and Assessment and Recommendations of the OECD, ISBN 3-902015-55-
Sørensen, E. (2006) Metagovernance: The changing role of politicians in processes of democratic governance, American Review of Public Administration, Vol. 36, No. 1, 98-114.
Territorial Agenda (2011), European Commission: http://www.eu2011.hu/files/bveu/documents/TA2020.pdf

Handlungsoptionen für Transformationsprozesse österreichischer Städte Richtung Smart City: Den demographischen Wandel beachten!

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1 KURZFASSUNG

Transformationsprozesse zu Smart Cities können nur mit dem Wissen um ihre spezifischen soziodemographischen Rahmenbedingungen, welche eine Leitlinie für die zu setzenden Maßnahmen darstellen können, einhergehen. Veränderungen in der demographischen Struktur und daraus resultierende Veränderungen der Nutzerinnen- und Nutzerzahlen und des Nutzungsverhaltens erfordern differenzierte Handlungsstrategien sowohl für das Re-Design von städtischen Strukturen als auch zur Implementierung von Smart-City-Maßnahmen. Gleichzeitig sind multiple Akteurinnen und Akteure und Stakeholder (z.B. Gemeinden, Planerinnen, Planer, Politikerinnen, Politiker, Verkehrsunternehmen, Ver- und Entsorgung) in diese Planungsprozesse und institutionelle Designs eingebunden, welche durch hohe Komplexität und Unsicherheit charakterisiert sind (vgl. de Roo et al, 2012). Ziel des Forschungsprojekts DemoSmart[1] war spezifisches Wissen für diese Akteurinnen und Akteure über den aktuellen Status und die Entwicklung von Stadttypen auf Basis ihrer aktuellen soziodemographischen Struktur und einer erwartbaren Entwicklung bereitzustellen. Für die unterschiedlichen Stadttypen wurden spezifische, adäquate Maßnahmen für Transformationsprozesse zu Smart Cities entwickelt.

2 AUSGANGSLAGE, ZIELE UND METHODE

2.1 Ausgangslage und Ziele

70 % der Europäerinnen und Europäer leben in Städten (vgl. Europäische Komission, 2011). Gleichzeitig verbrauchen auf globaler Ebene jene Städte 80 % der gesamten produzierten Energie und sind auch die größten Emittenten (vgl. OECD, 2010). Daher wird vor allem der Stadtplanung großes Potential für die Reduktion der negativen Auswirkungen des Klimawandels und Ressourcenknappheit im Kontext mit demographischem Wandel zugeschrieben. Innovative Lösungsansätze werden immer öfter mit dem Begriff Smart City in Verbindung gebracht, dessen Ausgangsidee auf der Annahme basierte, dass für die Effizienz von Städten nicht nur harte Infrastruktur, sondern auch die Verfügbarkeit und Qualität von Kommunikations- und sozialen Infrastrukturen eine Rolle spielt. (Vgl. Wiener Stadtwerke, 2011)

Gleichzeitig unterliegen Städte wesentlichen Veränderungen der Bevölkerungsstruktur, welche durch Wanderungsbewegungen bedingt sind und sich durch das Wachsen von Zentralräumen und das Stagnieren oder Schrumpfen von ländlichen Räumen äußern. Andererseits sind auch die Änderungen in der Altersstruktur der Bevölkerung wesentlich, die eine Vielzahl von Ursachen, wie beispielsweise den Rückgang der Geburten oder die zunehmende Lebenserwartung haben. Der soziodemographische Wandel und ein erwartbarer Anstieg des Durchschnittalters auf > 65 Jahren im Jahr 2030 (vgl. Proske, 2011; Statistik Austria, 2012) haben insbesondere Auswirkungen auf das Mobilitätsverhalten, die Entwicklung der Wohnformen, Energie, Ver- und Entsorgung und IKT. Aus diesen Rahmenbedingungen lassen sich folgende Forschungsfragen im Smart-City Kontext ableiten:

In welche Stadttypen lassen sich österreichische Städte anhand ihrer aktuellen und zukünftigen demografischen Entwicklung differenzieren?

Welche Maßnahmen sind für solche Stadttypen adäquat, um in Abhängigkeit von demografischer Entwicklung und Stadtgröße die Entwicklung in Richtung Smart City zu forcieren?

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[1] Das Forschungsprojekt „DEMOSMART – Sociodemographic change and the dynamics of Austrian Smart Cities" wurde durch den österreichischen Klima- und Energiefonds in der Programmlinie Smart Energy Demo – FIT4SET mit den Mitteln des Bundesministeriums für Verkehr, Innovation und Technologie beauftragt.

2.2 Methodischer Zugang

Das Forschungsprojekt behandelt die Komplexität des Themas im Rahmen eines interdisziplinären Multimethodenansatzes, Einerseits wurden 78 österreichische Städte mittels einer statistischen Korrelationsanalyse typisiert. Das Sample umfasst alle Städte mit mehr als 10.000 Einwohnerinnen und Einwohnern, wobei Wien, als Extremwert, in die Analyse nicht integriert wurde. Um eine zeitliche Dimension in die Arbeit zu integrieren als auch um Stagnations- und Schrumpfungsprozesse abbilden zu können wurde der zeitliche Rahmen bis zur Volkszählung im Jahr 1971 aufgespannt und alle Städte, die in dieser Periode einmal den Wert von 10.000 Einwohnerinnen und Einwohnern überschritten, in die Stichprobe integriert. Ergebnis der Korrelationsdanalyse sind fünf Stadttypen. Die Nachfrageseite unter Bezugnahme auf das voraussichtliche zukünftige Nutzerinnen- und Nutzerverhalten wurde mittels einer qualitativen Delphi-Befragung bearbeitet. Von Expertinnen und Experten wurden Maßnahmen vorgeschlagen und anschließend bewertet, die eine Entwicklung in Richtung Smart City für die jeweiligen Stadttypen begünstigen (76 Expertinnen- und Expertenbefragungen, zwei Durchläufe). Diese Analyse wurde durch ein Literaturstudium ergänzt und in Smart-City-Handlungsoptionen für spezifische Städte verdichtet.

3 DEMOSMART

3.1 Demographische Typologie österreichischer Städte

Aus der Korrelationsanalyse kristallisierten sich drei Faktoren heraus, auf Basis derer fünf demographische Stadttypen für Österreich ermittelt wurden. Einer dieser Faktoren ist die Bevölkerungsdynamik, für die der Indikator der Bevölkerungsentwicklung von 2001 bis 2011 verwendet wurde. Als zweite wichtige Größe gilt die Bevölkerungszahl („kritische Masse"), für die die Absolutbevölkerung 2011 als Indikator verwendet wurde. Die Bedeutung dieses Kriteriums ergibt sich insbesondere daraus, dass viele Smart-City-Technologien erst ab einer bestimmten Stadtgröße wirtschaftlich zum Einsatz kommen können. Die Altersstruktur ist die dritte wichtige Funktion, für die der Anteil der über 60 Jährigen als Indikator gewählt wurde. Dieses Kriterium ist vor allem für Fragestellungen wie Technikaffinität, Mobilität und soziale Infrastruktur von Bedeutung.

Tabelle 1: Übersicht über Indikatoren und Schwellenwerte für die Stadttypologie (Darstellung: ÖIR)

Stadttyp	Merkmale	Städte (exemplarisch)
Wachsende größere Stadt (16 %)	Geringer Anteil an Personen älter als 45 Jahre Überproportionales Wachstum der Gruppe von Personen jünger als 45 Jahre Hohe Mobilität (Umzüge) zwischen den Städten und hoher Anteil an Singlehaushalte Hoher Anteil an nicht in Österreich geborener Personen	Graz Salzburg Innsbruck Stadtregion Rheintal
Wachsende junge, kleine bis mittlere Stadt (44 %)	Junge Bevölkerung; geringer Anteil der Bevölkerungsgruppe älter als 60 Jahre Überproportional starkes Wachstum der Beölkerungsgruppe jünger als 45 Jahre	Bischofshofen Wörgl Marchtrenk

	Hoher Anteil nicht in Österreich geborener Personen	
	Vergleichsweiser geringer Frauenanteil bei gleichzeitig hohem Anteil an weiblicher Erwerbstätigkeit	
Wachsende ältere, kleine bis mittlere Stadt (9 %)	Hoher Anteil der Bevölkerungsgruppe älter als 60 Jahre und Personen die nicht mehr im Erwerbsprozess stehen (Pesionistinnen und Pesionisten)	Klosterneuburg
		Krems
	Unterdurchschnittlicher Anteil an Erwerbspersonen	Baden
	Überdurchschnittlich hoher Anteil an Frauen bei gleichzeitig geringem Anteil von Frauen im Erwerbsprozess	Bad Vöslau
	Hoher Anteil an Singlehaushalten	
Stagnierende kleine bis mittlere Stadt (16 %)	Sehr geringer Anteil der Bevölkerungsgruppe jünger als 45 Jahre	Steyr
		Kapfenberg
	Hoher Anteil an Personen im Pensionsalter	Spittal an der Drau
	Starker Rückgang junger Bevölkerung	
	Geringer Anteil an Personen geboren in EWR Staaten und relativ geringer Anteil an in Drittstaaten geobrenen Personen	Baunau am Inn
Schrumpfende kleine bis mittlere Stadt (15 %)	Signifikant geringer Anteil der Bevölkerungsgruppe jünger als 50 Jahre	Leoben
		Eisenerz
	Hoher Anteil an Personen im Pensionsalter	Mürzzuschlag
	Starker Rückgang der Bevölkerungsruppe junger Personen	Zwettl
	Kaum Zuzug	Bruck/Mur
	Hoher Anteil an Personen die in Österreich geboren wurden	Judenburg

Tabelle 2: Charakterisierung der Stadtstrukturtypen auf Basis der Regressionanalyse (Quelle: ÖIR)

3.2 Maßnahmen für Transformationsprozesse zu Smart Cities

Aufbauend auf den unterschiedlichen Stadttypen wurden auf Basis der Delphi-Befragung, internationaler Best-Practise-Beispiele und von Literatur Maßnahmen für die Entwicklung in Richtung Smart City formuliert. Diese Maßnahmensammlung gliedert sich in folgende Smart-City-Themenbereiche: Stadtentwicklung, Gebäude und Freiraum; Ver- und Entsorgung: Energie, Wasser, Abfall; Verkehr und Mobilität; Informations- und Kommunikationstechnologien. Die Maßnahmen wurden den Expertinnen und Experten zur Einschätzung und Bewertung vorgelegt. Dabei spielen folgende Bewertungsparameter bei der Argumentation eine Rolle.:

Die Umsetzung mancher Maßnahmen setzt eine kritische Masse hinsichtlich Nutzerinnen- und Nutzeranzahl und innovationsbereiter Personen voraus, dies wird durch die Einwohnerinnen- und Einwohnerzahl und -struktur beeinflusst. Hier wird der Begriff im Zusammenhang mit der Auslastung technischer Infrastruktur, beispielsweise des öffentlichen Verkehrs, verwendet. Falls eine kritische Masse potenzieller Nutzer- und Verbreiterinnen und Verbreiter unterschritten wird, ist eine Maßnahme möglicherweise nicht mehr wirtschaftlich rentabel oder umsetzbar. Eine kritische Masse an Nutzerinnen und Nutzern der öffentlichen Verkehrsangebote, welche nicht nur von der Einwohnerinnen- une Einwohnerzahl einer Stadt, sondern auch von der Alterszusammensetzung der Bevölkerung abhängt, ist somit eine wichtige Voraussetzung für die Wirtschaftlichkeit der Verkehrssysteme. Gerade in schrumpfenden Städten stellen bedarfsorientierte Verkehrsangebote (z. B Anrufsammeltaxi) daher eine wirtschaftliche Alternative zum Linienbetrieb in Zeiten schwacher Verkehrsnachfrage dar. Der zweite wichtige Bereich, in dem das Vorhandensein einer kritischen Masse von Bedeutung ist, ist die Verbreitung und Akzeptanz neuer Technologien und Innovationen. Nicht nur die Verbreitung neuer Technologien, sondern auch die Etablierung innovativer Mobilitäts-, Wohn oder Energiekonzepte bedürfen einer gewissen Akzeptanz und Nutzungsbereitschaft innerhalb der Gesellschaft. Eine gewisse Größe der Nutzerinnen- und Nutzergruppe und ein bestimmter

Bekanntheitsgrad, sind also wesentliche Voraussetzungen dafür, dass sich neue Technologien und Innovationen in den Bereich Mobilität, Wohnen, Energie und IKT am Markt durchsetzen können und wirtschaftlich sind (vgl. BMVIT, 2011). [2]

Neben der kritischen Masse, die von der Nutzerinnen- und Nutzeranzahl abhängt, spielt auch das Nutzerinnen- und Nutzerverhalten eine wichtige Rolle, welches maßgeblich durch die Altersstruktur bestimmt wird. Insbesondere die langfristige Investitionsbereitschaft aber auch die Nutzung moderner Technologien hängen vom Alter ab. So werden beispielsweise bestimmte IKT-Maßnahmen bei einem hohen Anteil betagter Bevölkerung weniger schnell greifen als bei einem hohen Anteil Jüngerer. Grundsätzlich gliedert sich das Nutzerinnen- und Nutzerverhalten in das kurzfristige Ver- und Gebrauchsverhalten und das langfristige Investitionsverhalten, welche das Kommunikations-, Einkaufs-, Konsum-, Entsorgungs-, sowie hier besonders das Mobilitäts- und Umweltverhalten umfassen.

In Ergänzung zu den beiden oben genannten Bewertungsparameter ist auch der Handlungsdruck einer Stadt, welcher von der Bevölkerungsdynamik bestimmt wird, zu berücksichtigen. In einer schrumpfenden Stadt ist beispielsweise ein größerer Handlungsdruck gegeben als in einer stagnierenden Stadt, auch schnell wachsende Städte weisen einen höheren Handlungsdruck auf. Generell ist der Handlungsdruck also in jenen Städten mit extremeren Werten im Bezug auf die Bevölkerungsdynamik größer, unabhängig davon, ob ein starkes Wachstum oder ein starker Rückgang zu verzeichnen ist.

Ergebnis der Analyse ist ein Demografie-Maßnahmen-Profil für jeden Stadttyp, das Handlungsempfehlungen als Grundlage zur Orientierung für eine Entwicklung in Richtung Smart City enthält.

Maßnahmenbündel	Maßnahmen	wachsende größere Stadt	wachsende junge kleine bis mittlere Stadt	Wachsende ältere kleine bis mittlere Stadt	Stagnierende kleine bis mittlere Stadt	schrumpfende kleine bis mittlere Stadt
I	Barrierefreiheit, Aufwertung und Gestaltung im Öffentlichen Raum (z.B. Straßenraumgetaltung mit Shared Space) und in Gebäuden	X	X	X	X	X
	Aufbau smarter Ver- und Entsorgungsnetze und Anpassung an geänderte Nachfrage	X	X	X	X	X
	Mischnutzungen im Quartier mit kurzen Wegen, soziale Infrastruktur und Versorgung der zukünftigen Nachfrage anpassen	X	X	X	X	X
	Erneuerbare Energien nutzen, Energetische Sanierung, Aufbau smarter Ver- und Entsorgungsnetze und Anpassung an die geänderte Nachfrage	X	X	X	X	.
	Neue Wohnformen (z. B. intergenerationelles Wohnen, Variabilität der Nutzung von Gebäuden, Alterungsfähigkeit von Gebäuden	X	X	X	X	X
II	Innovative Mobilitätslösungen: Sharing Systeme (z.B. Car sharing, Fahrradverleih), Mitfahrsysteme mit multimodalen Informations-, Buchungs- und Bezahlsystemen	X	X	.	.	.
	Systemintegration (z.B. Smart Grids)	X	X	.	.	.
	Web 2.0 für Beratung, Information und Partizipation zu kommunalen Themen (z. B. Wohnstandortwahl, Leerstandsbörse, Stadtinformation, E-Partizipation etc.),	X	X	.		
III	E-Government	X	X	X	.	.
	Multimodale Verknüpfungspunkte (z.B. Schnittstelle ÖV, Car Sharing)	X	X	X	.	.
	Nach- und Innenverdichtung von Siedlungen besonders an Haltepunkten des öffentlichen Verkehrs, flächensparender Neubau und ‚smartes Bauen'	X	X	X	.	.

[2] Gleichzeitig gilt es hier auch anzumerken, dass es vor allem im Bereich der Beteiligung und Partizipation von Nutzerinnen und Nutzer Smart-City-Maßnahmen gibt, die für die erfolgreiche Umsetzung eine kritische Masse hinsichtlich der Höchstzahl an Nutzerinnen und Nutzern haben z. B. Arbeitsgruppen auf Quartiers- und Stadtteilebene.

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	(z.B. Plusenergiehäuser), Bestandssanierung von Gebäuden.					
	Ausbau smarten öffentlichen Verkehrs (Mikro-ÖV, Stadtbussysteme)	X	X	.	X	X
IV	Gezielter Rückbau bei Leerständen, schlechter Bausubstanz etc.				X	X
	Ambient Assistanted Living (= selbstbestimmtes Leben durch Technik)	.	.	X	X	X
Legende: X: besonders für den jeweiligen Stadttyp geeignet						

Tabelle 3: Auswahl Smart-City Maßnahmen für Stadttypen (Quelle: Green City LAB)

Alle vorgeschlagenen Maßnahmen für Transformationsprozesse in Richtung Smart City wurden grundsätzlich von den Expertinnen und Experten als positiv bewertet, jedoch sind einige für die jeweiligen Stadttypen besser oder weniger gut geeignet sind (vgl. Tabelle 3).

Maßnahmenbündel I wurde für alle Stadttypen als nachvollziehbar und sinnvoll eingestuft.

Maßnahmenbündel II bezieht sich insbesondere auf die Typen ‚wachsende größere Städte und ‚wachsende junge kleine bis mittlere Städte'. Angepasst an die Stadttypen, die sich insbesondere durch einen höheren Anteil junger Menschen, höhere Mobilität und Singlehaushalte auszeichnen, spiegelt dieses Maßnahmenbündel eine höhere Technikaffinität aber auch mehr Potential für real-time Systeme wider, wie beispielsweise dynamische Ridesharing-Systeme. Die in diesen Nutzerinnen- und Nutzer-Gruppen weit verbreitete Verwendung von Smartphones begünstigt diese Entwicklungen.

Das Maßnahmenbündel III stellt den Übergang zwischen den expandierenden, prosperierenden und den stagnierenden bis tendenziell schrumpfenden Städten dar. Hier gilt es „klassische" Maßnahmen aus dem Bereich der Stadtplanung hinsichtlich Nach- und Innenverdichtung von Quartieren oder Stadtteilen oder aus dem Bereich der Verkehrsplanung (z.B. Öffentlicher Verkehr), zu setzen.

Für die Gruppen der stagnierenden und schrumpfenden Städte, die in der Regel von einer zunehmend älter werdenden Bevölkerung bewohnt werden, ist die Schaffung und Sicherung der lokalen sozialen Infrastruktur und die barrierefreie Gestaltung des Öffentlichen Raumes auch im Rahmen der Gesundheitsförderung und -vorsorge von besonderer Relevanz. Maßnahmenbündel IV zeigt typische Spielräume für diese Stadttypen und umfasst dabei den gezielten Rückbau bei Leerständen oder schlechter Bausubstanz sowie Ambient Assisted Living als spezifische Handlungsansätze.

4 FAZIT

Zusammenhänge zwischen der soziodemografischen Entwicklung von Städten und ihrem Weg in Richtung Smart City mit entsprechenden Handlungsoptionen konnten aufzeigt werden. Der Wandel der Bevölkerungsstruktur und die damit einhergehenden veränderten Alltags- und Nutzungspraktiken erfordern spefizifische Handlungsstrategien.

Die Ausarbeitung der fünf demographischen Stadttypen mit unterschiedlichen Demographieprofilen bildete die Basis für die Entwicklung der spezifischen Maßnahmen, die von Expertinnen und Experten auf ihre Eignung für die unterschiedlichen Stadttypen geprüft wurden. Die Maßnahmen decken alle Themenbereiche ab, welche für Smart Cities als wichtige Kriterien gelten.

Die Studie hat gezeigt, dass für Transformationsprozesse zu Smart Cities und die damit einhergehenden Planungs- und Entscheidungsprozesse folgende Themen von zentraler Bedeutung sind: Dynamik und Geschwindigkeit des Bevölkerungswandels, da dieser Handlungs- und Entscheidungsdruck sowohl bei Planenden als auch bei Entscheidungsträgerinnen und Entscheidungsträgern erzeugt. Bevölkerungszahl und -struktur sind entscheidend hinsichtlich der Erzielung einer kritischen Masse, die für die Auslastung von Infrastruktur und die Verbreitung neuer Technologien eine wichtige Voraussetzung ist. Smart-City-Maßnahmen haben auch hinsichtlich des langfristiges Investitionsverhalten und des kurzfristigen Ver- und Gebrauchsverhalten unterschiedlicher Nutzerinnen- und Nutzergruppen spezifische Erfordernisse, welche bei den Entscheidungsprozessen ebenfalls berücksichtigt werden wollen.

Klima- und Ressourcenschutz sowie Energieeffizienz sind Ziele auf unterschiedlichen räumlichen Ebenen, die Implementierung und Umsetzung erfolgt aber – in Österreich – zumeist auf kommunaler Ebene. Daher rückt bei der strategischen Forcierung der Smart City die Ebene der Stadt in den Vordergrund, auf der die einzelnen technischen Systeme Energie, Mobilität sowie Informations- und Kommunikationssysteme mit unterschiedlichen Maßnahmen zu einem Gesamtsystem vernetzt werden sollten. Zur Konkretisierung der Maßnahmen sollten jedoch auch die jeweiligen Quartiere innerhalb einer Stadt differenziert betrachtet

werden, da sich hier Synergien einfacher erzielen lassen und die Nutzerinnen und Nutzer leichter eingebunden werden können. Quartiere können anhand typischer Bauformen, Freiraum-, Sozial-, Verkehrsstrukturen etc. abgegrenzt werden. Dies bedeutet, dass die vorgeschlagenen Maßnahmen zwar als Entscheidungsbasis für die jeweilige Stadt im Gesamten dienen können, deren Umsetzung jedoch auf kleinräumiger Ebene nochmals genauer geprüft werden sollte. So könnten Maßnahmen, welches für die Stadt im Allgemeinen als besonders passend eingestuft wurde, für einen bestimmten Stadtteil ungeeignet sein.

5 QUELLENVERZEICHNIS

BMVIT (2011): Maßnahmen und Schritte für den Einsatz innovativer Planungswerkzeuge in der Raum- und Verkehrsplanung: Wissenschaftlicher Endbericht. (Hrsg.) Bundesministerium für Verkehr, Innovation und Technologie. Wien/Graz.
Europäische Kommission (Hrsg.) (2011): Eurstat regional yearbook 2011. Publicaitons office of the European Union. Luxemburg.
OECD (2010): Cities and Climate Change. OECD Publishing.
Roo, Gert de; Hillier, Jean; Wezemael, Joris van: Complexity and Planning (2012): Systems and Simulations -New Directions in Planning Theory. Ashgate Publishing Limited.
Wiener Stadtwerke (2011): Smart City: Begriff, Charakteristika und Beispiele. Materialien der Wiener Stadtwerke zur nachhaltigen Entwicklung. Wien

Heute die Jugend, morgen die ganze Welt – nachhaltige Fortbewegung langfristig fördern

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1 ABSTRACT

Mobilität spielt für die soziale Teilhabe von Menschen eine wesentliche Rolle und macht einen erheblichen Teil der Lebensqualität aus. Mobilität leistet aber auch einen Beitrag zur Inklusion der unterschiedlichen Bevölkerungsgruppen in die Gesellschaft. Jugendliche stellen die zukünftige Generation an Entscheidungsträgerinnen und Entscheidungsträgern dar – sie nehmen also einen gewichtigen Einfluss auf die zukünftige Lebensqualität in den Städten, die wesentlich davon abhängen wird, wie die Menschen mit ihren Mobilitätsbedürfnissen umgehen (Ruoss, 1999) und in welchem Maße es gelingt, die soziale Inklusion zu verwirklichen. Es gilt daher jene Voraussetzungen und Strukturen zu schaffen, die es den unterschiedlichen Bevölkerungsgruppen ermöglichen, in gleichem Maße am gesellschaftlichen Leben teilzuhaben. Im Rahmen des Forschungsprojektes „Jugendliche: Lebensqualität, Verkehr & Mobilität" (FWF Der Wissenschaftsfonds, P 23194-G17) wurde den vielfältigen Verflechtungen zwischen der Mobilität und der Lebensqualität von Jugendlichen (14-19 Jahre) in Österreich nachgegangen, um ein besseres Verständnis dieser komplexen Zusammenhänge zu erlangen. Es ist notwendig, mehr darüber in Erfahrung zu bringen, was für die Jugendlichen von heute Lebensqualität bedeutet und was ihnen für ihre Mobilität wichtig ist, um für die nachfolgenden Generationen qualitätsvolle Voraussetzungen für nachhaltige Mobilität zu schaffen. Zentrale Fragestellung war die Identifizierung von Bestimmungsfaktoren für eine nachhaltige Fortbewegung im öffentlichen Raum, die gleichzeitig auch hohe Lebensqualität bietet. Diese wurde durch eine umfassende Literaturstudie, Fokusgruppeninterviews mit Jugendlichen, einer österreichweiten Online-Befragung und Expertinnen- und Expertenworkshops zu beantworten versucht. Die Ergebnisse dieser Studie dienen als Entscheidungsgrundlage für Politikerinnen, Politiker, Stadt-, Raum- und Verkehrsplanerinnen, Raum- und Verkehrsplaner, damit diese Maßnahmen für nachhaltige Verkehrsmittelwahl junger Leute ergreifen können.

2 MOBILITÄT & LEBENSQUALITÄT

Mobilität und Lebensqualität werden unterschiedlich definiert, je nach Fachdisziplin werden andere Aspekte hervorgehoben. Inwieweit die betroffene Bevölkerung eingebunden ist, stellt einen wichtigen Indikator für die spätere Zufriedenheit und Nutzung (=Lebensqualität) dar.

2.1 Mobilität der Jugendlichen

Jugendliche weisen grundsätzlich ein nachhaltiges Mobilitätsverhalten auf, sie gehen häufig zu Fuß, nutzen den öV und das Rad. Mit Erwerb des Führerscheins, beim Eintritt ins Erwerbsleben oder im Zuge der Familiengründung ändert sich dieses Mobilitätsverhalten. Jugendliche sind eine sehr heterogene Gruppe; Alter, sozialer Hintergrund, oder die unterschiedlichen Lebenslagen beeinflussen ihre Einstellungen zur Mobilität. Jugendliche sind im Vergleich zur erwachsenen Bevölkerung hoch mobil. Die nachhaltige Fortbewegung der Jugendlichen sollte in vielfältiger Weise gestärkt werden, so dass sie auch als Erwachsene vorwiegend im Umweltverbund unterwegs sein werden. Da sich die Einstellungen zu Mobilität relativ schnell verfestigen, stellen Jugendliche eine entscheidende Zielgruppe für Bewusstseinbildung dar. Da die Phase des „Erwachsen-Werdens" eine sensible ist und alle Zeitbereiche, die eine Wende beinhalten auch Möglichkeiten für Informationsvermittlung und Beeinflussung darstellen, würde sich dies gut für die Thematik der nachhaltigen Mobilität eignen.

3 METHODOLOGIE

Im vorliegenden Projekt kamen zwei Methoden der Datenerhebung zur Anwendung – Fokusgruppen-Interviews (FGIs) und eine quantitative Online-Befragung.

3.1 Fokusgruppeninterviews (FGI)

Insgesamt wurden 4 FGIs mit Jugendlichen durchgeführt. Die Teilnehmerinnen und Teilnehmer (24 Personen) wurden anhand verschiedener Kriterien ausgewählt, wie etwa Alter, Geschlecht, Bildungsniveau, städtische vs. ländliche Herkunft. Mittels eines strukturierten Leitfadens zu den Themen Lebensqualität, Verkehrsmittelwahl und Zufriedenheit mit der eigenen Mobilität wurden qualitative Daten über Jugendliche in Wien und Niederösterreich erhoben.

3.2 Online-Befragung

Anschließend an die FGIs fand eine österreichweite repräsentativen Online-Befragung mit 14-19 jährigen Teilnehmerinnen und Teilnehmern statt. Insgesamt füllten n=800 Jugendliche den Fragebogen aus.

4 ERGEBNISSE

4.1 Ergebnisse der Fokusgruppeninterviews

Bekannte Lebensqualitätsdimensionen aus der Literatur, wie etwa Gesundheit usw. (Forward et al., 2004, CDV, 2004, Bein et al., 2004) konnten im Rahmen der Fokusgruppeninterviews um spezifische Dimensionen, die Jugendliche betreffen, erweitert werden. Die Aussagen der Jugendlichen in den FGIs wurden im Zuge der Auswertung zu verschiedenen Themenbereichen zusammengefasst, die wiedergeben wie Jugendliche den Zusammenhang zwischen Mobilität und Lebensqualität erleben:

- Respekt/Ernst genommen werden: Die Jugendlichen fühlen sich mit ihren Anliegen als Verkehrsteilnehmerinnen und Verkehrsteilnehmer häufig nicht ernst genommen bzw. von Erwachsenen nicht respektvoll behandelt.

- Selbstbestimmung/Unabhängigkeit: Dem Auto wird von den Jugendlichen große Bedeutung im Zusammenhang mit Unabhängigkeit, Eigenständigkeit und Erwachsenwerden beigemessen, wobei im Zuge rationaler Überlegungen der Besitz von Auto und Führerschein an Bedeutung (insbesondere in der Stadt) verliert.

- Sicherheit: Jugendliche haben ein hohes Sicherheitsbedürfnis. Verunsichernde Faktoren sind für Jugendliche im Verkehr u.a. sich auffällig verhaltende Personengruppen, Gruppen von (männlichen) Jugendlichen, Personen unter Alkoholeinfluss.

- Infrastruktur: Uneindeutige oder gefährliche Situationen im Verkehr hängen für die Jugendlichen oft mit der Verkehrsinfrastruktur zusammen. Vor allem die Radinfrastruktur wurde bemängelt. Jugendliche aus Niederösterreich kritisieren ferner das unzureichende Angebot an öffentlichen Verkehrsmitteln.

- Vorbildwirkung Erwachsene: Die Verkehrsmittelwahl bzw. die Einstellungen der Eltern oder der älteren Geschwister prägen die Jugendlichen, bspw. durch Bring- und Holdienste mit dem Auto (u.a. aus Sorge um die Sicherheit), durch Unterstützung beim Kauf eines eigenen Autos oder beim Erwerb des Führerscheins, durch Verbote mit dem Rad zu fahren oder nachts zu Fuß unterwegs zu sein.

- Mangelnder „Freiraum" im öffentlichen Raum: Die Jugendlichen geben an, dass „freie" Räume für sie fehlen, so wie es insgesamt an entsprechenden Freizeitangeboten mangele. Jugendliche in Wien haben dabei die Vorstellung, dass am Land mehr Freizeitangebote außer Haus bestehen. Jugendliche aus Niederösterreich wiederum empfanden das Angebot für Jugendliche, gerade was Indoor-Aktivitäten betrifft, in Wien weitaus attraktiver.

- Diskriminierung: Als sehr mobile Personen befinden sich Jugendliche oft im öffentlichen (Straßen-) Raum. Diskriminierung, die sie dabei von den Erwachsenen, aber auch von anderen Jugendlichen erfahren, beeinträchtigt ihre Lebensqualität. Sie haben das Gefühl, dass ihnen aufgrund ihres Alters oder ihrer Herkunft keine Chance gegeben wird.

4.2 Ergebnisse der Online Befragung

Ausgehend von den Themenbereichen aus den FGIs und Ergänzungen aus der Literatur wurden Hypothesen über die Zusammenhänge zwischen Lebensqualität und Mobilität entwickelt und anhand des Fragebogens geprüft. Ingesamt betrachtet weisen die Jugendlichen eine hohe allgemeine Lebenszufriedenheit auf (88,6 %

„sehr" oder „eher" zufrieden mit ihrem Leben). Entscheidend für ein gutes Leben für Jugendliche sind Freunde, Gesundheit, Familie und Ausbildung, sowie die Möglichkeit zur selbstständigen Entscheidung über die Freizeitaktivitäten. In Folge werden einige Ergebnisse der Hypothesenprüfung vorgestellt.

- Eingebundenheit in soziale Netzwerke: Jugendlichen ist Mobilität wichtig, damit sie ihre sozialen Kontakte pflegen können. Knapp über 86 % der Jugendlichen geben an, dass ihnen Mobilität vor allem wichtig ist, um Gleichgesinnte und Freundinnen und Freunde zu treffen.

- Soziales Verhalten: Jugendlichen ist es wichtig, dass sie im Straßenverkehr respektvoll behandelt werden. Die Aussage, dass Radfahrerinnen, Radfahrer, Fußgängerinnen, Fußgänger, Autofahrerinnen, Autofahrer etc. aufeinander Rücksicht nehmen sollten, erhielt von den Jugendlichen eine hohe Zustimmung (95,3 %).

- Sicherheit: Sich auf der Straße oder in den öffentlichen Verkehrsmitteln sicher fühlen zu können (vor „blöden Anmachen"), bewerten fast 90 % der Jugendlichen als wichtig. Als wesentlich erachten die Jugendlichen auch die Sicherheit vor Unfällen im Straßenverkehr – 94 % ist ihre Verkehrssicherheit wichtig.

- Infrastruktur: 88 % der befragten Jugendlichen ist es wichtig, ein gut ausgebautes Netz öffentlicher Verkehrsmittel nutzen zu können. 76 % erachten Gehwege als wichtig und 58 % finden ein ausreichendes Vorhandensein von Radwegen und Straßen als wesentlich für ihre Mobilität.

- Multimodalität: Jugendliches Mobilitätsverhalten ist meistens multimodales Mobilitätsverhalten. Aus den Daten wird ersichtlich, dass sich bestimmte Verkehrsmittel gut ergänzen: die Jugendlichen, die viel in ihrer Freizeit zu Fuß gehen, nutzen auch häufig das Fahrrad oder den öV. Das Auto ist nicht förderlich für die multimodale Fortbewegung. Jugendliche, die hauptsächlich mit dem Auto unterwegs sind, nutzen deutlich seltener andere Verkehrsmittel.
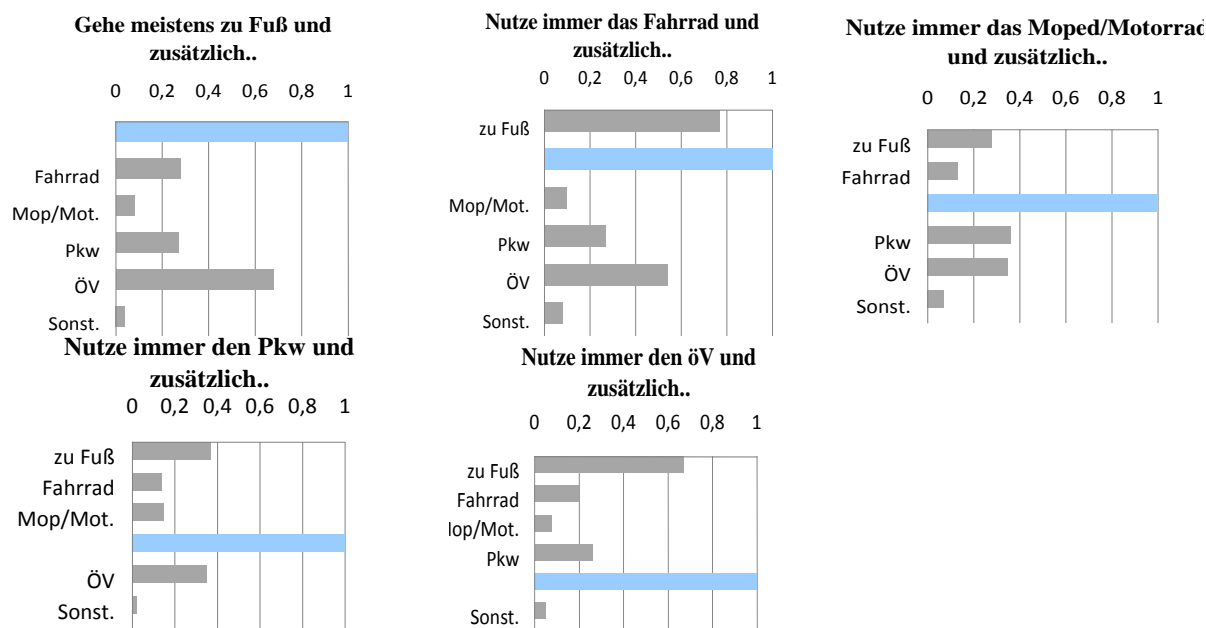
Fig.1: „Alle Verkehrsmittel, die von den Auskunft gebenden Personen in der Freizeit „immer" benützt werden (n=620), häufigst gewähltes VM =1, Werte zwischen 0 und 1: zeigen wie oft das betreffende zusätzliche Verkehrsmittel gewählt wurde.

- Unabhängigkeit: Knapp 80 % der Jugendlichen stimmen der Aussage zu, in ihrer Freizeit unabhängig von den Eltern unterwegs sein zu wollen. Erwartungsgemäß verfestigt sich diese Tendenz mit zunehmendem Alter. Bei Jugendlichen mit Migrationshintergrund ist der Wunsch nach Unabhängigkeit von den Eltern etwas weniger ausgeprägt.

- Umweltschutz/Nachhaltigkeit: Der Aussage, „damit die Umwelt geschützt wird, wäre es wichtig, dass man, so gut es geht, auf Fahrten mit dem Auto/Moped/Motorrad verzichtet und stattdessen öV oder Rad nutzt/zu Fuß geht" wurde von 67 % der Jugendlichen zugestimmt. Die Auswertung zeigte außerdem, dass den Jugendlichen der Zusammenhang zwischen intakter Umwelt und hoher Lebensqualität bewusst ist.

- Führerscheinbesitz: Für die Jugendlichen sind Führerscheinbesitz bzw. Führerscheinerwerb wichtig. Alle Befragten wollen als Erwachsene mit dem Auto unterwegs sein bzw. sind bereits Autofahrerinnen und Autofahrer. Die Autonutzung wurde aber durchaus kritisch reflektiert, z.B. dort wo Alternativangebote bestehen oder wo nur kurze Wege zurück gelegt werden.

- Lebenszufriedenheit und Verkehrsmittelwahl: Die meisten „sehr zufriedenen" Jugendlichen waren jene, die angaben, am häufigsten das Fahrrad als Verkehrsmittel zu benützen, gefolgt von jenen, die bereits selbst mit dem Auto fahren.
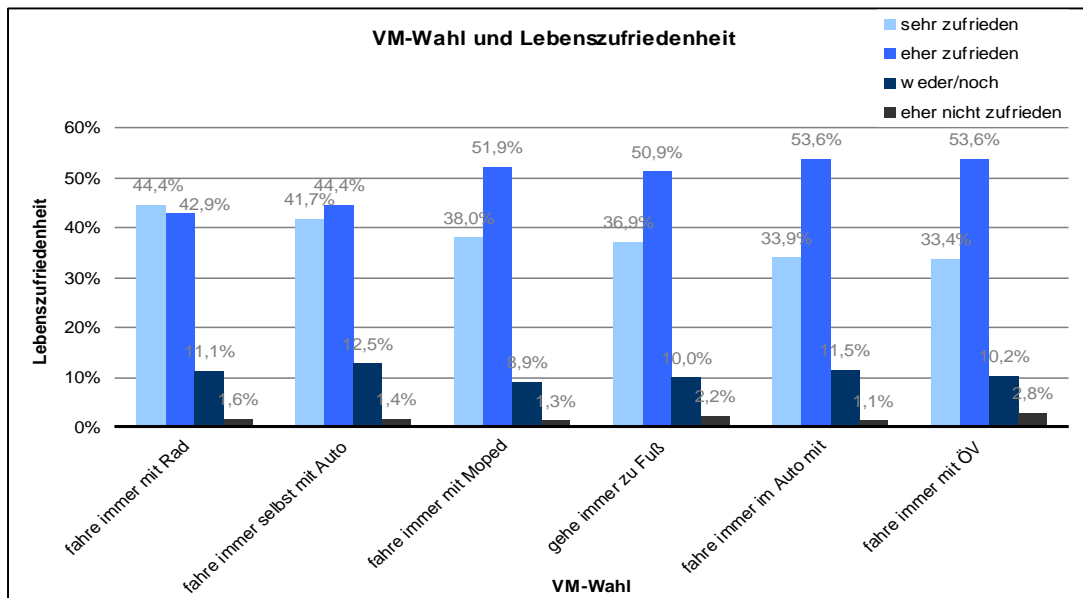
Fig. 2: „Wie zufrieden bist du mit deinem Leben?", nach Verkehrsmittelart, n=800

5 CONCLUSION

Jugendliche sind grundsätzlich bereit, sich nachhaltig fortzubewegen. Allerdings bringen sie auch deutlich zum Ausdruck, dass sich junge Menschen, die zu Fuß gehen, den öV nutzen und Rad fahren, als „Verkehrsteilnehmerinnen und Verkehrsteilnehmer zweiter Klasse" fühlen. Um sie darin zu bestärken, ihr „autofreies" Mobilitätsverhalten aufrecht zu erhalten, sollte diesem Umstand, der zweifellos die Lebensqualität beeinträchtigt, entgegen gewirkt werden. Unter anderem sollte es zu entscheidenden Verbesserungen seitens der Erwachsenen im Umgang mit ihnen als Verkehrsteilnehmerinnen und Verkehrsteilnehmer kommen. Dies betrifft, im weiteren Sinn, einerseits die Kommunikation mit Jugendlichen im Straßenraum und den öffentlichen Verkehrsmitteln, andererseits aber auch die Infrastruktur, die ihnen geboten wird.

Viele der Kritikpunkte, die Jugendliche äußern, sind hinlänglich bekannt. Sie werden aber nicht nur von ihnen, sondern auch von Erwachsenen, vor allem den Seniorinnen und Senioren, geäußert. Dazu zählen etwa die mangelhafte Infrastruktur für die Teilnehmerinnen und Teilnehmer im nicht-motorisierten Individualverkehr (nIV), Probleme mangelnder Sauberkeit oder die Beeinträchtigung des subjektiven Sicherheitsgefühls in den öffentlichen Verkehrsmitteln (vgl. z.B. Seisser & Wolf-Eberl, 2010, Ausserer et al., 2009, Risser, 2002).

Schwierigkeiten im Straßenverkehr, die besonders Jugendliche betreffen, sind neben dem bereits erwähnten Gefühl, nicht ernst genommen zu werden bzw. nicht als vollwertiges Mitglied der Gesellschaft zu gelten, die als kompliziert wahrgenommenen Fahrpläne oder zeitlich schlecht an die Bedürfnisse der Jugendlichen angepassten Angebote an öV.

Die Jugendlichen fühlen sich mitunter zur Verwendung bestimmter Verkehrsmittel gezwungen. Dieser Eindruck kann noch dadurch verstärkt werden, wenn die erwachsene Bevölkerung dieses Verkehrsmittel nicht oder kaum verwendet bzw. abschätzig beurteilt (zu Fuß gehen, Schülerbus etc). Haben sie im Rahmen dieser Verwendung Kommunikationssituationen zu bewältigen, die ihre schwächere Position verdeutlichen

(asymmetrische Kommunikation, wie unfreundlich behandelt werden durch Erwachsene, "Anmache" durch andere Fahrgäste etc.), so ist mit sinkender Akzeptanz zu rechnen.

In diesem Zusammenhang muss die Vorbildwirkung von Eltern und anderen Bezugspersonen erwähnt werden. Dies wurde von den Jugendlichen in den Interviews zwar nicht explizit thematisiert, muss jedoch aus sozialwissenschaftlicher Sicht ergänzt werden: Wenn Erwachsene bestimmte Fortbewegungsarten meiden, könnte das signalisieren, dass sie nur wenig attraktive Optionen darstellen. Das Mobilitätsverhalten der Erwachsenen prägt das Verhalten der jüngeren Generationen. Auch wenn sich gegenwärtig Tendenzen gezeigt haben (bislang vor allem im städtischen Raum), die in Richtung nachhaltiges Mobilitätsverhalten weisen, wie etwa ein steigender Fahrradanteil (vgl. Stadt Wien, 2012) oder zusätzliche Angebote wie Leihfahrräder oder Carsharing, so ermöglicht nur die Kombination sinnvoller und vor allem gleichgerichteter Maßnahmen ein dauerhaftes Umdenken. Im ländlichen Raum weisen etwa die Reduzierung des öV-Angebots in einigen Regionen und der zunehmende Zwang zu motorisiertem Individualverkehr (mIV) in die entgegengesetzte Richtung. Von den Jugendlichen zu erwarten, unter diesen Voraussetzungen nachhaltige Mobilitätsgewohnheiten zu entwickeln, ist nahezu illusorisch.

Auto- und Führerscheinerwerb werden von den Jugendlichen angestrebt, was vor dem Hintergrund mangelnder Kommunikation negativer Konsequenzen des Autoverkehrs nachvollziehbar erscheint. Gleichzeitig zeigen die Resultate dieser Erhebung, dass sich die Jugendlichen sehr wohl kritisch mit der Autoverwendung auseinander setzen. Das bedeutet, dass ein nicht zu unterschätzendes Potential hinsichtlich der Beibehaltung nachhaltigen Mobilitätsverhaltens vorhanden ist. Es gilt daher die entsprechenden Voraussetzungen zu schaffen. Das Vorhaben, die Jugendlichen im Umweltverbund zu halten, ist jedoch nur dann realisierbar, wenn die Rahmenbedingungen nicht weiterhin dem Autoverkehr dienlich sind, was vor allem in ländlichen Gebieten der Fall ist.

Es ist für die (jugendliche) Bevölkerung klar ersichtlich zu machen, dass sie als Fußgeherinnen, Fußgeher, Radfahrerinnen, Radfahrer, ÖV-Nutzerinnen und ÖV-Nutzer mindestens genauso gute Voraussetzungen, sei es was gesetzliche Regelungen, die Aufwendung von Finanzmittel oder eben die Infrastruktur betrifft, vorfinden bzw. in den nächsten Jahren vorfinden werden, wie es für den motorisierten Verkehr bereits Standard ist. Jugendliche ernst zu nehmen, beinhaltet auch ihre Mobilitätsbedürfnisse ernst zu nehmen. Gute Vorraussetzungen für nachhaltige Mobilität sicher zu stellen, bedeutet nicht nur einen zeitlich andauernden Gewinn für die Lebensqualität der Jugendlichen, sondern auch für die Gesellschaft als Ganzes.

6 REFERENCES

AUSSERER, K. et al.: Bef(w)usst unterwegs: Fußgängerstudie in Wien. Forschungsarbeiten aus dem Verkehrswesen, Band 191, BMVIT, Wien, 2009.

BEIN, N., PETRJANOSOVA, M., PLICHTOVA, J., RISSER, R., STAHL, A.: Toolbox. Public Report of Workpackage 6 of the EU-Project HOTEL: How to analyse Life Quality, an accompanying measure within the EU fifth Framework Programme Keyaction „Improving the Socio Economic Knowledge Base"; HPSE-2002-60057, Vienna, 2004.

CDV: State of the Art report, Deliverable D3 of the EU-project SIZE – Life quality of senior citizens in relation to mobility conditions , RTD programme "Quality of Life and Management of Living Resources, Brno, 2004.

FORWARD, S. et al.: State of the art ASI – Assess Implementations in the frame of Cities of Tomorrow, Proposal No: EVG3-CT2002-80013, 2004.

RISSER, R. et al.: Pilot Study Report, Deliverable 7 of the EU-Project HOTEL: How to analyse Life Quality, an accompanying measure within the EU fifth Framework Programme Keyaction, Bratislava, Cuneo, Lund & Vienna, 2004.

RISSER, R.: Gut zu Fuss. Fußgänger als Verkehrsteilnehmer 2. Klasse. Mandelbaum Verlag, Wien, 2002.

RUOSS, E.: Lebensqualität und Mobilität. Der bewegte Mensch – Vision oder Alptraum für die Wirtschaft. RIO Management Forum 99 vom 11./12. November 1999 im Verkehrshaus der Schweiz, Luzern, 1999.

SEISSER, O.,WOLF-EBERL, S.: Jugleist. Gruppenspezifische Leistbarkeit und Präferenz von Verkehrsmitteln; Ausschreibung ways2go. Research & Data Competence, Herry Consult, Wegener Center, Graz, 2010.

High-Resolution Global Monitoring of Urban Settlements

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1 ABSTRACT

Since the beginning of the 21st century, more than half of the global human population is living in urban environments and the dynamic trend of urbanization is expected to grow incredibly fast, with the number of urban dwellers currently increasing by about 180.000 people every day. In this framework, an effective monitoring of urban sprawl represents a key issue to analyse and understand the complexity, cross-linking and increasing dynamics of urban environments in order to ensure a sustainable development of urban and peri-urban areas. To this purpose, in the last decades satellite Earth observation (EO) has proved to be a promising tool in combination with widely automated methods of data processing and image analysis for providing up-to date geo-information on urban settlements at global scale; nevertheless, the geometric resolution of the current EO-based geo-information products is limited to 300-500 m, thus often resulting in poor accuracy to support decision makers and urban planners.

TanDEM-X (TerraSAR-X add-on for Digital Elevation Measurement) is a German radar satellite mission aiming at the provision of a global digital elevation model (DEM) at 12 m spatial resolution. Besides this primary goal, the global coverage with very high resolution (VHR) TerraSAR-X (TSX) and TanDEM-X (TDX) imagery collected in 2011 and 2012 can be used to characterize settlement patterns worldwide in a so far unique spatial detail. Accordingly, the German Remote Sensing Data Center (DFD) of the German Aerospace Center (DLR) has implemented a fully-automated processing system that detects and extracts built-up areas from the global TSX/TDX imagery acquired in the context of the TDM. The output of this approach is a global binary settlement mask that outlines urban and non-urban areas at the unprecedented spatial resolution of ~0.4 arc sec (i.e., ~12 m). The intended, world-wide data set is called Global Urban Footprint (GUF) and a public domain version of it will be made available at ~3 arcsec (i.e., ~50-75m) spatial resolution. With its global coverage and the enormous spatial detail, this initiative represents a promising contribution to global analyses of urban and peri-urban areas.

2 INTRODUCTION

Urbanization is one of the most pressing global challenges; indeed, according to the United Nations Development Program (UN 2011), almost two-thirds of the world's population will live in cities by the year 2030 (as an example, in China and India the number of new cities with more than one million inhabitants will come up to 30 and 26, respectively, just within the next 20 years). It is approximated that urban areas cover about 2 % to 3 % of the Earth's surface. However, despite this rather marginal significance in terms of spatial coverage, metropolitan areas represent the focal points of human activity. Therefore, the impacts of urbanization on the natural and human environment are much more far-reaching at all geographic and socioeconomic scales than the purely area-related perspective might imply. In this framework, regional to global analyses of urban growth patterns and the interrelation between urban areas and natural or anthropogenic processes have only just begun. Hence, there is much work remaining to provide spatially detailed, accurate and up-to-date geo-information on the patterns and processes within the urban and peri-urban environment. A key technology to provide the required data and information is satellite Earth Observation (EO), which in the last few years has proved being an effective tool for providing global geo-information on the location, spatial extent and distribution of urban areas. A comprehensive review of the available state-of-the-art EO-based and EO-supported global human settlements layers (GHSL) is given in (Gamba & Herold 2009, Potere & Schneider 2009). In particular, both papers highlights that the currently existing GHSL are mainly derived from medium resolution (MR) optical EO data, hence exhibiting a comparably coarse spatial resolution (i.e., at least a few hundred meters). Nowadays, the MODIS 500 (Schneider et al. 2009) and GlobCover (Bontemps et al. 2011) layers are considered to be the most accurate urban data sets provided on a global level; nevertheless, their limited spatial resolution (i.e., 463 m for MODIS 500 and 309 m for GlobCover) do not allow a precise characterization of urban settlements, especially in rural and peri-urban areas (which are characterized by small and scattered villages and towns).

Accordingly, some recent initiatives aimed at improving the current GHSL by developing efficient processing techniques for delineating settlement extents based on high resolution (HR) and VHR EO data. In this context, most promising approaches are based on: the analysis of a new global nighttime lights product derived from imagery of the Visible Infrared Imaging Radiometer Suite (VIIRS) (NASA 2012), the use of HR/VHR optical imagery (Pesaresi et al. 2011), and the employment of HR/VHR SAR data collected by the latest generation of radar satellite sensors (i.e., Envisat-ASAR, ALOS-PALSAR, Radarsat-1/2, TerraSAR-X, TanDEM-X, COSMO-Skymed).

The latter type of approaches looks particularly promising as, with respect to optical sensors, the weather-independent, day-and-night data acquisition capability and the low sensitivity towards atmospheric effects of SAR systems make them particularly suitable to provide temporally and radiometrically consistent global data coverages. In this framework, the authors yet explored and assessed the capabilities of the German TanDEM-X mission (TDM) (Krieger et al. 2007) to monitor built-up areas at very high resolution (Esch et al. 2012). With two global coverages of VHR SAR data acquired at 3m spatial resolution and collected within a period of about one year, the German TDM is predestined to be included to the new initiatives aiming at the provision of innovative GHSLs. Accordingly, the German Remote Sensing Data Center (DFD) of the German Aerospace Center (DLR) has developed and implemented the Urban Footprint Processor (UFP), i.e. a fully-automated, operational image processing and analysis procedure that detects and delineates built-up areas from the global TDM data. The outputs of the UFP are binary settlement masks – the Urban Footprint (UF) masks – indicating built-up and non-built-up areas at a spatial resolution of 0.4 arcsec (~12 m). The global coverage of UF data sets will then be used to generate a world-wide inventory of human settlements – the Global Urban Footprint (GUF) layer – that is also intended to be publicly provided at a spatial resolution of ~3.0 arcsec (i.e., ~50-75m).

3 URBAN FOOTPRINT PROCESSOR

The basic methodological components for detecting built-up areas from TSX/TDX data have been already introduced by the authors in (Esch et al. 2012). However, to effectively process the huge TDM mass data set of about 300 TB (one coverage comprises ~180,000 complex SAR images with each image having an average size of ~50,000 × 40,000 pixels), the abovementioned approach has systematically been enhanced and transformed into a fully-automatic processing chain with several additional modules and functionalities (Esch et al. 2013), namely the UFP. This processing chain takes single look slant range complex (SSC) Stripmap data of one TDM coverage (2011/2012) as input. The image analysis and classification module consists of three main components, namely feature extraction, classification stage, and mosaicking and post-editing. Each of them is described into details in the following.

3.1 Feature Extraction

The aim of the first module of the UFP is to extract the "speckle divergence" (Esch et al. 2010), an effective texture feature capable of highlighting areas characterized by heterogeneous and highly structured built-up. In particular, due to the strong scattering from double bounce effects in urban areas typical of SAR data, the attention is focused on the analysis of the local speckle and its development is estimated accounting for the local image heterogeneity (Esch et al. 2012) defined as:

$$H = \sigma_A / \mu_A \quad (1)$$

where, σ_A and μ_A represent the standard deviation and mean, respectively, of the original backscattering amplitude image A (stored inside a Single Look Slant Range Complex image product, SSC) computed in a local neighborhood. The image heterogeneity H, the fading texture F (which represents the heterogeneity caused by speckle) and the true image texture T are related as follows (Potere et al. 2009):

$$H^2 = T^2 F^2 + T^2 + F^2 \quad (2)$$

Accordingly, it is then possible to demonstrate (Esch et al. 2010) that (when considering radiometrically unenhanced SSC products as in our case) a reliable estimate $\hat{T}$ (i.e., the speckle divergence S) of the local true image texture is given by:

$$\hat{T} = S = \left(H - 0.5 \right) / 1.5 \quad (3)$$

To reduce the amount of data (due to technical restrictions) the multi-looking described in (Eineder et al. 2004) is finally performed for rescaling both A and S to a spatial resolution of ~0.4 arcsec (~12 m).

3.2 Classification

The second module of the UFP is dedicated to the production of a binary settlement layer (built-up, non-built-up) for the investigated scene once provided as input with the backscattering image A and the corresponding speckle divergence S and implements the technique described in (Marconcini et. al 2013). Generally, pixels associated with high values of S correspond to urbanized areas, while those exhibiting lower values correspond to non-built-up structures. Accordingly, for each investigated scene the objective is to determine a specific optimal threshold for S capable of effectively discriminating between built-up and non-built-up areas. Initially, all the pixels showing a backscattering amplitude lower than the prefixed threshold $Th^A = 100$ are marked as non-urban, since they always correspond to information classes not belonging to built-up areas (e.g., water bodies, surfaces with a smooth meso-scale roughness). A set of M candidate thresholds for S, $Th_1^S > \ldots > Th_M^S$, is then determined based on the specific image dynamics. For each of them, pixels are categorized into urban (U_m) or non-urban (L_m) candidates depending on whether the corresponding speckle divergence value is greater or lower than Th_m^S, respectively. Afterwards, we compute the Jensen-Shannon divergence $D_{JS}[U_m \| L_m]$ (Lin 1991) accounting for both A and S, which allows to estimate the "distance" between U_m and L_m (i.e., the probability distributions of U_m and L_m, respectively). The higher the divergence, the higher is the distance between the two distributions and vice-versa. $D_{JS}[U_m \| L_m]$ assumes high values for higher values of , while it decreases as the threshold gets lower. As soon as the two distributions U_m and L_m start to significantly overlap, then there always occurs a consistent fall in $D_{JS}[U_m \| L_m]$. When this happens, the corresponding threshold Th_{m*}^S is selected as optimal for the specific image under analysis and the subset U_{m*} is employed for training a one-class classifier based on support vector data description – SVDD (Tax and Duin, 2004). This approach allows increasing generalization and obtaining a more consistent and reliable final UF map G_{m*}.

3.3 Mosaicking and Post-editing

The last module of the UFP implements automated mosaicking and post-editing operations to further improve the quality of the generated UF products. The criterion adopted for selecting the optimal threshold for generally proved effective and robust. Nonetheless, it might happen that one or few UFs exhibit slight under- or over-estimation of urban areas with respect to corresponding neighboring UFs when mosaicking multiple images. To solve this problem we implemented a simple but effective technique, which accounts for the partial overlap occurring between neigbouring TDX/TDM scenes. In particular, by comparing the amount of samples categorized as urban falling in the intersections we can identify which UFs need to be improved and whether under- or over-estimation occurs and we then modify the threshold accordingly (i.e., we select the one resulting in the the lowest difference with respect to the neighboring UFs in terms of number of urban samples). It is worth noting that, sometimes highly mountainous areas could be wrongly categorized as built-up regions as they exhibit high values for both and as an effect of the particular topography. In order to solve this problem a dedicated mask has been implemented by taking into consideration the ASTER Global DEM (NASA 2013) and marking all those pixels showing a slope (i.e., the maximum rate of height change between each pixel and its closest eight neighbors) higher than 20 in the neighborhood of a local peak as non-urban. This approach allowed minimizing this type of error and to preserve urban settlements on the side of the mountains.

4   URBAN FOOTPRINT SETTLEMENT MASK

So far, the UFP has yet produced both A and S for a total of 140,000 scenes acquired in the context of the first TDM coverage (2011/2012) with each scene covering an area of ~50 × 30 km. Moreover, a number of globally distributed test runs for the final GUF generation have been performed investigating either single scenes or extensive mosaics consisting of several hundred images. An accuracy assessment of the corresponding results showed that the overall accuracies mostly lie in a range of 70 − 90 %. These results are in line with the outcomes of earlier studies investigating the methodological precursors of the UFP technique

Fig. 1 – Optical data (from Google Earth), TDM backscattering amplitude □, speckle divergence □, urban footprint and corresponding GlobCover 2009 urban class map for the cities of Accra (GH), Dar es Salaam (TZ), Baghdad (IQ), Amsterdam (NL).

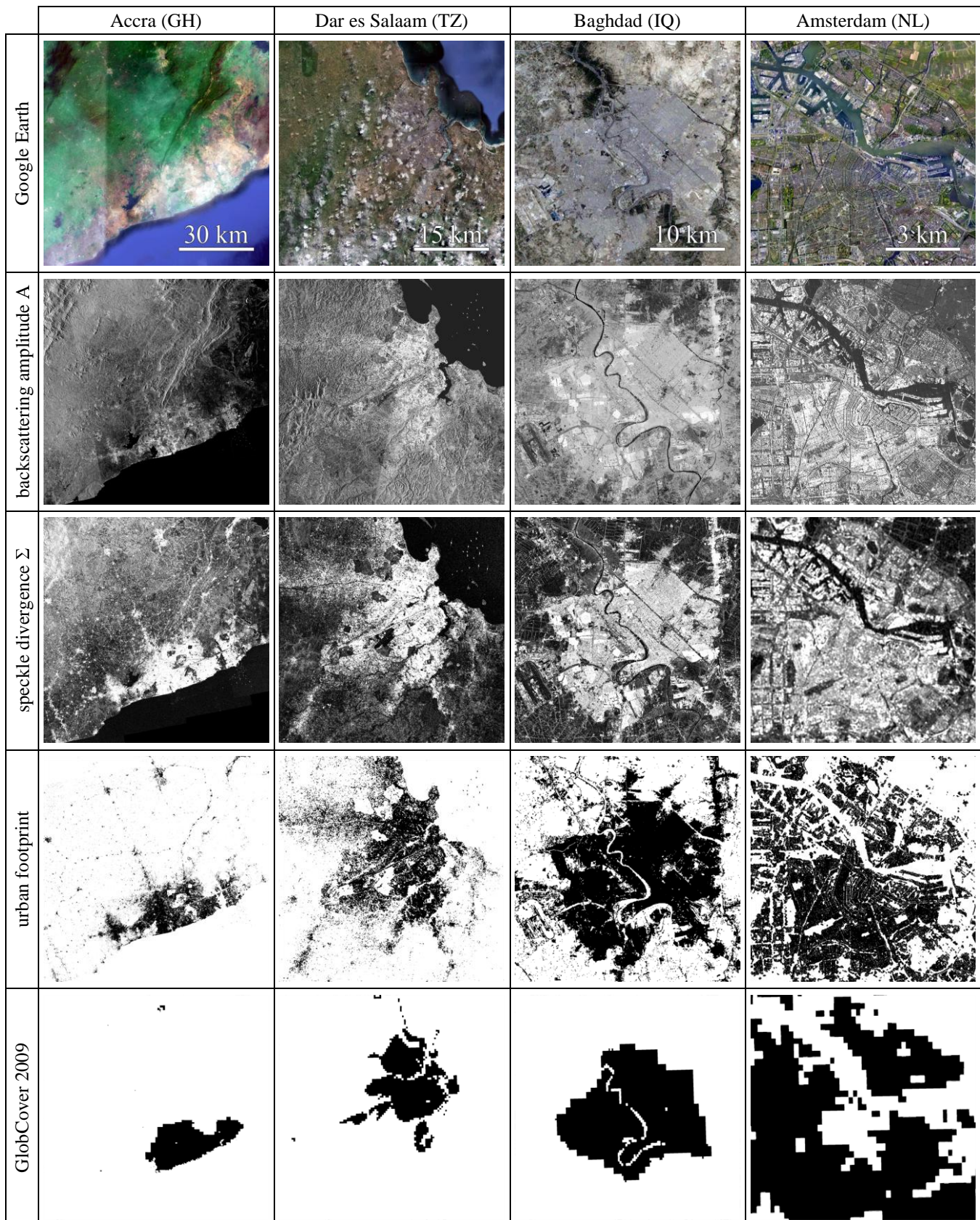(Esch et al. 2010, 2012). Figure 1 reports optical data from Google Earth, TDM backscattering amplitude □, speckle divergence □, urban footprint and corresponding GlobCover 2009 urban class map for four representative cases, namely the cities of Accra (Ghana), Dar es Salaam (Tanzania), Baghdad (Iraq), and Amsterdam (The Netherlands). The different scales of the given examples allow to assess the capabilities of

the GUF to see the large area settlement patterns in their spatial configurations with e.g. Accra or Dar es Salaam

as dominating urban centers and a hierarchical system of smaller urban centers or low density rural settlements. At the same time, structural details of cities are captured as the examples of Baghdad and Amsterdam. The capability of the algorithm to even ignore open spaces without any vertical structures such as buildings etc. or green belts within the urban centers becomes obvious. The examples stress that the settlement patterns can be extracted and characterized for diverse geographical regions and landscape types by means of TDM imagery and the UFP system.

5 CONCLUSION

In this paper we presented DLR's Global Urban Footprint (GUF) initiative along with its technical implementation, i.e. the fully-automatic processing and image analysis system of the Urban Footprint Processor (UFP). Using the already acquired TDM data of the first coverage (~140.000 images over ~180.000), we could yet test the performance of the processing chain and assessed the resulting built-up mask on the basis of several thousand globally distributed images. The results of these tests demonstrate the high potential of the GUF approach to provide a spatially detailed map of global settlement patterns for urbanized areas as well as for rural regions. With the described characteristics, the GUF (whose first completion is envisaged for 2014) will provide a unique data set that is to some extent complementary to the existing GHSLs derived from medium (MR) or high resolution (HR) optical imagery. Moreover, in addition to the full-resolution 12 m product also a public domain version downscaled at ~3 arcsec (i.e., ~50-75 m) will be generated.

Considering the challenges of the GUF production, we still investigate in the potential to improve the classification stage of the UFP. In particular, we intend to identify potentially existing, systematic weaknesses of the UFP that might not have been discovered so far and at the same time we gain more precise knowledge on the performance and optimal tuning of the algorithms for the classification and mosaicking stage. Regarding follow-on research and development, it is planned to adapt the UFP to all TSX/TDX imaging modes (ScanSAR, SpotLight) as well as to other SAR satellites such as Sentinel-1 or Radarsat-2. Moreover, the calculation and consideration of long-term coherences will be investigated. First studies have also shown the potential to characterize building structures and estimate building densities based on texture measures or the modeling of building volume on building block level using the VHR DEM data generated on the basis of TDM imagery.

6 REFERENCES

BONTEMPS, S., Defourny, P., Van Bogaert, E., Arino, O., Kalogirou, V., Ramos Perez, J. J.: GLOBCOVER 2009 Products description and validation report. Université catholique de Louvain (UCL) & European Space Agency (ESA). 2011.

EINEDER, M., Boerner, E., Breit, H., Holzner, J. Freitz, T., Palubinskas, G. & Balss, U.: TerraSAR-X – Payload Ground Segment – TMSP design. – TX-PGS-DD-300, Issue 1.0. URL: http://ophrtsxgss.intra.dlr.de/. 2004.

ESCH, T., Thiel, M., Schenk, A., Roth, A., Müller, A. & Dech, S: Delineation of Urban Footprints From TerraSAR-X Data by Analyzing Speckle Characteristics and Intensity Information. In: IEEE Transactions on Geoscience and Remote Sensing, Vol. 48, Issue 2, pp. 905-916. 2010.

ESCH, T., Taubenböck, H., Roth, A., Heldens, W., Felbier, A., Thiel, M., Schmidt, M., Müller, A., & Dech, S.: TanDEM-X mission – new perspectives for the inventory and monitoring of global settlement patterns. In: Journal of Applied Remote Sensing, Vol. 6, Issue 1, pp. 1-21. 2012.

ESCH, T., Marconcini, M., Felbier, A., Roth, A., Heldens, W., Huber, M., Schwinger, M., Müller, A.: Urban Footprint Processor – Fully automated processing chain generating settlement masks from global data of the TanDEM-X mission. In: Geos-cience and Remote Sensing Letters, Special Stream EORSA2012, submitted. 2013.

GAMBA, P. & Herold, M.: Global Mapping of Human Settlement – Experiences, Datasets, and Prospects. CRC Press. 2009.

KRIEGER, G., Moreira, A., Fiedler, H., Hajnsek, I., Werner, M., Younis, M. & Zink, M.: TanDEM-X: A Satellite Formation for High Resolution SAR Interferometry. In: IEEE Transactions on Geoscience and Remote Sensing, Vol. 45, Issue 11, pp. 3317-3341. 2007.

LIN, J.: Divergence measures based on the Shannon entropy. In: IEEE Transactions on Information Theory, Vol. 37, Issue 1, pp. 145-151. 1991.

MARCONCINI, M., Esch, T., Felbier, A., Taubenböck, H. (2013): A Novel Unsupervised Method for the Global Classification of Human Settlements with TanDEM-X Data. In: IEEE Geoscience and Remote Sensing Letters, submitted. 2013.

NASA – National Aeronautics and Space Administration: Night Lights 2012. URL: http://earthobservatory.nasa.gov/IOTD/view .php?id=79803. 2012

NASA – National Aeronautics and Space Administration: ASTER Global Digital Elevation Model Version 2. URL: http://asterweb .jpl.nasa.gov/gdem.asp. 2013.

PESARESI, M., Ehrlich, D., Caravaggi, I., Kauffmann, M., & Louvrier, C.: Towards Global Automatic Built-Up Area Recognition Using Optical VHR Imagery. In: IEEE Journal of Selected. Topics in Applied Earth Observations and Remote Sensing, Vol. 4, Issue 4, pp. 923-934. 2011.

POTERE, D. & A. Schneider: Comparison of global urban maps. In: Gamba, P. & Herold, M. (Eds.): Global Mapping of Human Settlements: In: Experiences, Data Sets, and Prospects. Taylor & Francis Group, pp. 269-308. 2009.

SCHNEIDER, A., Friedl, M. A. & Potere, D.: A new map of global urban extent from MODIS data. In: Environmental Research Letters, Vol. 4, Issue 4. 2009.

TAX, D. M. J., & Duin, R. P. W.: Support vector data description. In: Machine Learning, Vol. 54, Issue 1, pp.45-66. 2004.

UN – United Nations: World Urbanization Prospects - The 2009 revision. New York, 2011.

HLANDATA – Harmonisation of Land Use and Land Cover Data Across Europe: Project Results

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1 ABSTRACT

The EU project HLanData aims to demonstrate the feasible European level harmonization of the Land Use and Land Cover datasets taking into account both the data categorization and the data models, for any of their possible uses and users through the development of user-oriented value-added services. This contribution presents the results of the project. These are harmonised land use and land cover data according to INSPIRE in European regions, and the development and implementeation of several geoportals that give access to the data and provide different viewing and analysis functions. For the demonstration of the results a video was created.

2 PROJECT DESCRIPTION

Digital information on Land Use and Land Cover has been managed on national, regional and/or local level which results in a suite of datasets that are not always compatible to each other. Anyway, in a context where environmental threats such as climate change, biodiversity loss, and food security become more and more global, there is a need for integration of various sources of information at different scales. This is why planning has great hopes in the past year's development of Spatial Data Infrastructures (SDI). SDI gives access to geographic data that is stored and maintained by different data providers in different sources on international, national, regional and local level, harmonised according to common standards, and shared across administrative and thematic borders. The past decade has been influenced by a change of paradigm regarding accessibility of geodata. Traditionally geographic data and information management has been characterised by semantic and structural heterogeneity, multiple storage, and lack of coordination which results in incompatible datasets. Today there are numerous European, national, regional and local initiatives that support the development from "information islands" to "information systems". INSPIRE – the European Directive for a Spatial Data Infrastructure – provides a robust framework.

The EU project HLANDATA contributed to the harmonisation process focusing on land use and land cover data across Europe and addressing several application areas such as the management of waste, and land monitoring through the implementation of various value-added services in European regions. The HLANDATA geoportal provides one central access to decentralised data using web service technology so that users can visualise data from different sources together in one map with one common legend.

Geographers, planners, GIS analysts, public administration, decision makers, researchers, the public and other stakeholders require access to adequate and comprehensive data to achieve interdisciplinary and holistic approaches, transparency and participation in decision-making, efficient integrated data management, comparison of data, and monitoring of changes for a sustainable development. SDI can be a supportive element for spatial planning processes as it provides more harmonised data input than ever and helps to better understand and steer urban and regional dynamics.

HLANDATA is a European project supported by the ICT Policy Support Programme (ICT PSP) between March 2010 and February 2013. ICT PSP aims at stimulating innovation and competitiveness through the wider uptake and best use of information and communication technologies by citizens, governments and businesses (ICT PSPS website). Involved are nine partners, i.e. public authorities, private companies and research institutes from six different European Union countries as well as one international planning organization. The partners are the Government of Navarre as lead partner, Tracasa, National Geographic Institute (all Spain), UAB "Aerogeodezijos institutas" (AGI) (Lithuania), GISAT (Czech Republic), Latvian society "Technology Development Forum" – TDF, Slovak Environmental Agency (SEA), CEIT ALANOVA (Austria), and ISOCARP.

3 PROMOTIONAL VIDEO

The results of the project are presented the HLanData promotional video. It was uploaded to YouTube (http://www.youtube.com/watch?v=XoCgNdN8XMY&feature=youtu.be). Links have been made already

from the HLanData website (http://www.hlandata.eu/). The promotional video was unveiled at the HLanData Habitats final conference on 14th February 2013 in Madrid.

"In the last years geographical information systems have developed at a great speed, supported by new technologies, but different organisms have worked independently. A large number of databases have been created but without taking into account their interoperability. We talk about the same thing, but in different languages.

The HLanData project was born in this context with the main objective to demonstrate the feasible European level harmonization of the Land Use and Land Cover datasets taking into account both the data categorization and the data models, for any of their possible uses and users, through the development of user-oriented value-added services, and fully aligned with the INSPIRE directive.
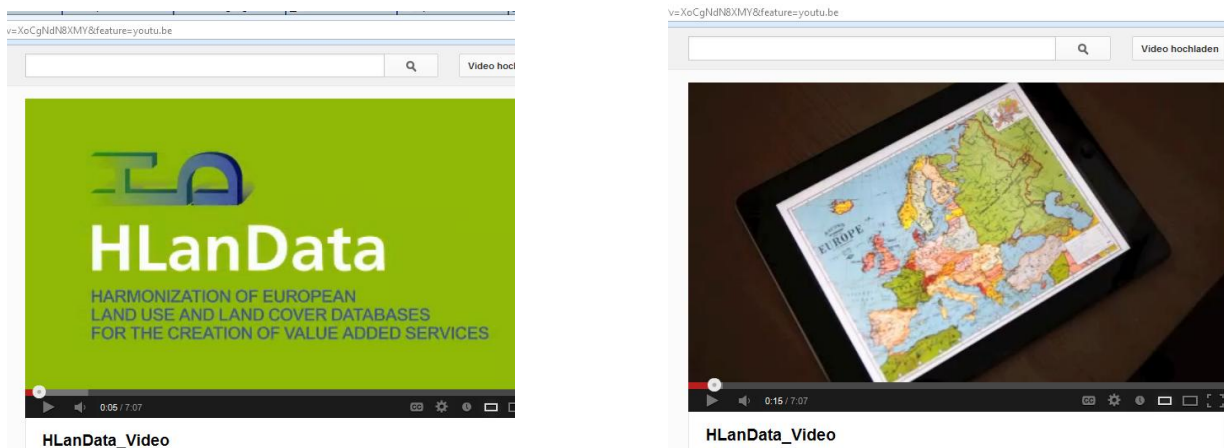
Fig. 1: Hlandata Promotion Video – Introduction (Source: URL 1)

The HLanData geoportal is the gateway to harmonized land use and land cover data stored and maintained in different sources across Europe. It provides a map viewer to overlay and compare spatial data, and a metadata catalogue that allows to search and to find available data. The HLanData geoportal follows the principle: one centralized access to decentralized data. Your benefit is that there is one common legend. Due to the harmonization of the data according to common standards on the HLanData geoportal you can easily view different land use or land cover data from Europe together in one map. Moreover, you can have a cross-border view. Harmonized data is a key input for integrated and holistic analysis for example in regard to environmental, mobility, economic, and social issues.
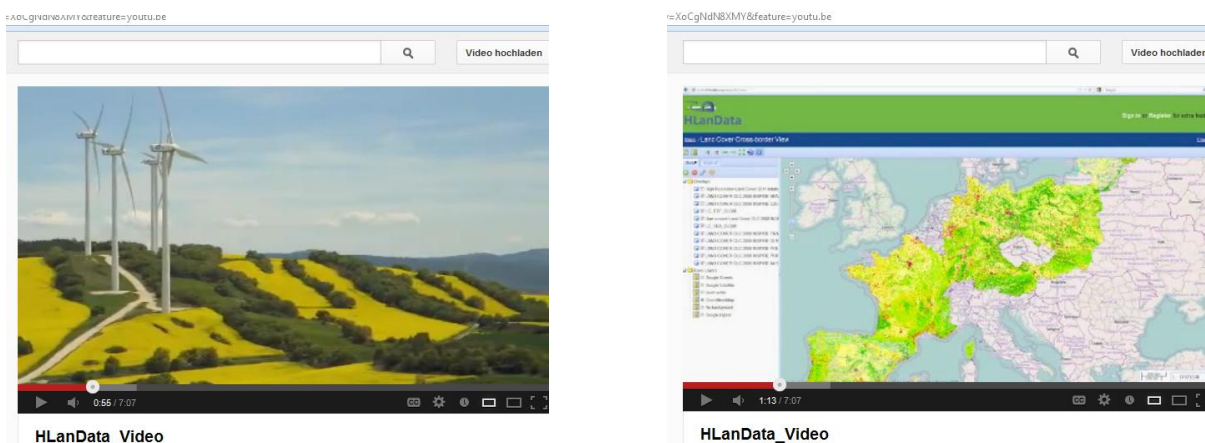
Fig. 2: HLanData Promotion Video – HlanData Geoportal (Source: URL 1)

Besides a geoportal, four pilots have been developed, offering guidance that will be of great help when searching for different type of information about the territory. The pilot developed in Spain and Latvia provides, amongst other things, information of what can be found in a point or an area and on where you can find a given type of land use or land cover. It also allows seeing the variations in each part of the territory as well as in which points it has varied similarly. The other pilots provide information on stock and flows land accounts, socio-economic data, development of spatial indicators, and detection of illegal waste dumps. In fact, the pilot implemented in Slovakia is an interactive specialized web-based map application focused on

waste management sector allowing selected operations as visualization, overlay and integration of different information from different sources. It integrates harmonized European datasets, national waste management data and national sources of spatial data intended for the additional functionalities and analyses as protected areas, geological maps, urban atlas and vector maps of Slovakia.

This work will be of great help to study and assess the territory. Thus, solutions are offered in different application fields taking into account the final users. The most important fields of action are territorial management and spatial planning on which dedicated pilots have been developed in the Czech Republic and in Lithuania, and the strategic environmental impact assessment for numerous emerging themes e. g. studies of the species, habitats and ecosystems and their potential to provide services including changes in their connectivity in relation to green infrastructure, calculations of CO_2 emissions, evolution of irrigated lands, preliminary calculations of soil erosion, study and assessment of the models of urban growth, waste management, but there can be many more.
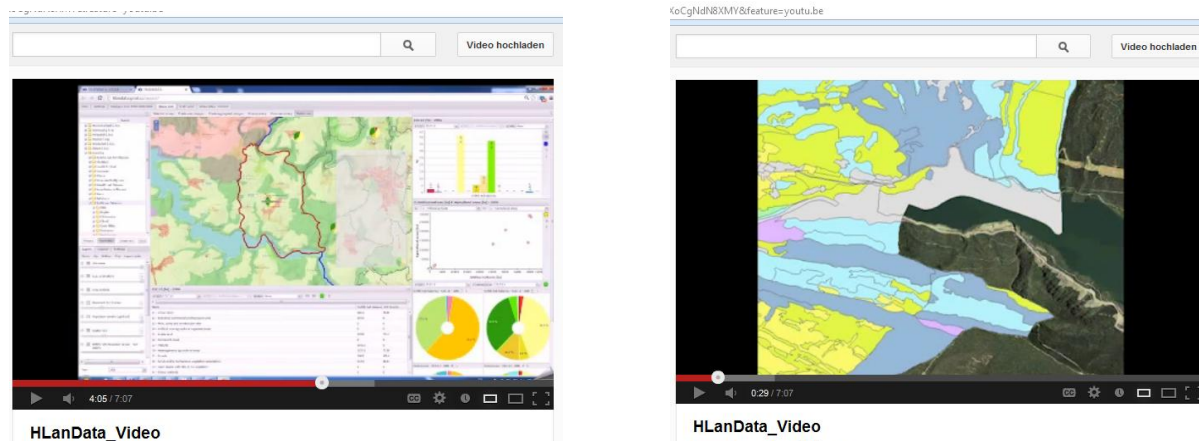
Fig. 3: HLanData Promotion Video – HlanData Pilots providing advances analysis functions (Source: URL 1)

All these applications will profit from sharing harmonised data and advanced, but easy to use tools for data exploration. The services that HLanData offers are addressed to any user of this type of information, particularly technicians of the public authorities; decision makers; private companies; researchers; NGOs; planners; GIS analysts; consultants; architects and engineers but also the general public. That is why we go for free and open technology via web, providing decision makers with information about land use and land cover.

We gathered the momentum of INSPIRE, which will oblige the member states to harmonize their geographic information data and we have closely cooperated with its thematic working groups of Land Use and Land Cover. We have also taken into account the directive related to the reuse of the public sector information. That is why the European Commission supports us and the European Environmental Agency and our tools are in line with Copernicus and GEO initiatives. Besides providing information to the users in the moment they require, this project also intends to increase participation and exchange of information.

HLanData has been possible thanks to the fruitful cooperation between nine partners from seven European countries, but our efforts would have been in vain without the active participation of the final users in testing the tools. Moreover, the different project phases have been supervised by a group of experts in an advisory board and by independent technical reviewers. HLanData has also involved other relevant experts in the several forums organized by the project. To all of them THANK YOU!"

4 REFERENCES

URL 1: Hlandata Promotion Video http://www.youtube.com/watch?v=XoCgNdN8XMY&feature=youtu.be
URL 2: Hlandata Website www.hlandata.eu
URL 3: Hlandata Geoportal portal.hlandata.eu
(accessed 5.3.2013)

Hydro Urban Units – a Meso Scale Approach for Integrated Planning

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1 ABSTRACT

Metropolitan Lima is one of the the world's largest megacities located in an arid climate. Water-related problems and opportunities vary greatly from place to place due to diverse natural and urban contexts. They require different solutions to integrate the urban water cycle and the (green) open space system. An integrated planning approach called "Lima Ecological Infrastructure Strategy" (LEIS) was developed within the LiWa-research project to address the specific challenges. Its aim is to provide guiding principles for a water sensitive urban and open space development, in order to contribute to the improvement and protection of the urban water cycle. A GIS-based planning tool assists in analizing the city and in localizing the various potentials and threats for Lima´s sustainable urban development. In order to reflect the diverse conditions in Metropolitan Lima, considering the natural and man-made forces, the city is analyzed with a meso scale approach through hydro-urban units.

The unit's geometry is based on sectors for water provison and further characteristics of the built and natural environment including open space and the availability of divergent water sources were assigned. Several aspects were considered and information such as topography, natural and man-made water sources, population density and growth rates, state of water infrastructure, structure of urban pattern and open space and environmental functions were aggregated or disaggregated and transfered to the approx. 450 hydro-urban units of similar size that are linked to the water supply. The meso scale units allow to show the city like a mosaic, with enough information to differentiate them according to the characteristics but not too detailed information that distract from the overall comparison.

This approach allows urban planning as well as water management institutions – which are both partners of the LiWa research project – to recognize the relationship between water sources and the urban structure and as a consequence, planning activities can be harmonized in a better way and development scenarios can be evaluated. For areas with specific hydro-urban characteristics, site-specific water sensitive design solutions for the integration of the urban water cycle and open space are developed in the next stage, which if applied in a larger scale create the ecological infrastructure of the city.

2 INTRODUCTION

The Peruvian capital Lima, situated on a desert coast along the Pacific Ocean, is considered one of the most vulnerable cities in the world due to the effects of climate change. With an average precipitation of 9 mm per year, it depends solely on its three rivers, Rio Rimac, Rio Lurin and Rio Chillon, which are fed from water transfers, rain and glaciers in the Andes that are melting rapidly because of climate change. Lima was initially founded in the Rimac River valley, but today the metropolitan area of Lima and Callao with its more than 9,45 million inhabitants extends over extensive desert areas, dry hills and surrounding valleys.

Although there is almost no rain, Lima´s climate is very humid due to the effects caused by the interface of the Humboldt cold current and the Equatorial hot current over the Pacific Ocean in the West and the high Andes mountains on the East. Average annual humidity along the coast is between 80 and 88 % and in the higher altitudes still has more than 70 % as an average, with almost 100 % from June through December (Atlas Ambiental 2011). As a result the whole metropolitan area is coated with fog, that hangs constantly over the city and turns some of the desert hills into temporary, herb-rich meadow biotops called loma.

The fast population growth, lack of implementation of urban or regional planning instruments, economic crisis and other factors have led to a vast expansion of informal settlements. These settlements lack many basic urban services such as water supply, waste disposal and wastewater infrastructure, which has caused environmental degradation. In the last 70 years the urban development has been characterized by informal occupation. The non-implementation of planning instruments due to prioritization of open markets has brought to the city urban speculation and urban sprawl that has guided urban development. Productive and agricultural land as well as some parks were replaced by new urbanizations. In addition to that, the agencies

in charge of water management and urban planning were neither sharing a joint vision nor coordinating their actions due to belonging to different management bodies. For these reasons urban planning is very weak and the last metropolitan urban development plan already expired in 2010 – however a first regional plan for the city has been developed and approved in 2012, preparing as the next step the development of the metropolitan urban development plan that should guide the city towards a new urban development model.

City structure, open space and the urban water cycle

Water management in Lima is led by a state owned enterprise called Servicio de Agua Potable y Alcantarillado de Lima (SEDAPAL), which is in charge of providing potable water and wastewater services. Many settlements in the peri-urban areas lack basic urban services such as water supply, waste disposal and wastewater infrastructure, which has caused environmental degradation. About one million people, mainly living in the hilly and peri-urban areas, are not connected to the public water supply networks. They receive drinking water, often of very bad quality, from private water vendors at high prices. SEDAPAL invests in large infrastructural projects to increase the water supply by bringing the water from the Atlantic water basin by tunnels through the Andes to the Pacific water basin.

Although there is a limited amount of water resources and many people lack access to safe water and sanitation, most parks and road greenery of Lima and Callao are irrigated with potable water. Due to a change in pricing potable water for irrigation, the pressure is continuously shifting towards utilization of treated wastewater for irrigation. Moscoso (2011) states in his study that only 15 % of the wastewater is treated and only 10 % of that which has been treated is reused for irrigation of green areas in Lima. The existing wastewater treatment system often cannot meet the quality demand of treated wastewater suitable for irrigation, leading to calls for modernization and investments into improvement of treatment systems to provide water of sufficient quality. Many municipalities and administrative bodies are building small wastewater treatment plants to cover their needs for water for irrigation without a coordinated plan with SEDAPAL. These facilities often fail in function due to lack of knowledge for maintenance and management capacity. Polluted rivers are concreted and channelized and irrigation channels are covered due to pollution without considering them an integral part of the open space system, as a potential source of water and a drainage system needed during rainy events in the upper parts of the watershed.

There have been attempts to utilize different sources of water for greening the city than just potable water. The discussion about reuse of wastewater has focused so far mainly on suitable technologies of the treatment facilities to provide sufficient amount of water for irrigation. However, the question of how to make use of the treated outflow of the existing, large-scale plants and where to allocate new, decentralized facilities is also high on the agenda. But little has been discussed about the actual design of the open space and its water demand. The current design practice fails to exploit the potentials of open space design to decrease the over-absorption of water resources, improve water quality of the degraded and polluted seasonal rivers, irrigation channels and groundwater. Lima's hydrological conditions and water infrastructure as well as the design of open space and green areas need radical rethinking to make urban and natural systems perform in concert with one another and keep up with the increasing water demand for a growing, more liveable and green city.

3 LIMA ECOLOGICAL INFRASTRUCTURE STRATEGY

A planning approach called "Lima Ecological Infrastructure Strategy" (LEIS) was developed within the BMBF[1] megacity project "Sustainable Water and Wastewater Management in Urban Growth Centres coping with Climate Change – Concepts for Metropolitan Lima (Perú)" (LiWa) to address the specific challenges.[2] The approach follows the question of how to integrate water management and open space planning.

The ecological infrastructure is based on the green infrastructure concept and it can be described as a multifunctional system of open spaces that, due to its multiple functions, serves as integral urban structure providing essential infrastructural services (Benedict & Mahon 2004; Ahern 2007; Mell 2010). A further methodological and conceptual background derives from water-sensitive urban design (Feyen et al. 2009; Hoyer et al. 2011). It is assumed that the coordinated designation of multifunctional open spaces, as proposed in the ecological infrastructure strategy, tackles the urban development challenges in a more

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[1] German Federal Ministry of Education and Research

[2] The web page of the project gives an overview of the whole project www.lima-water.de. For an overview of the challenges see also Schütze & Robletto (2010).

efficient way than conventional land use planning approaches. Therefore it can guide the urban development in a more sustainable way.

LEIS-Principles

The aim of formulating guiding principles for future open space design is to proactively contribute to the improvement and protection of the urban water cycle. The principles integrate multiple scales. On the metropolitan level, principles for a ecological infrastructure have been defined and harmonized with the Regional Concerted Development Plan 2012-2025. Those principles are translated into policies that will integrate the future urban planning and water management at macro, meso and micro scale.

They argue to

-        protect, develop and implement ecological infrastructure, considering availability and integral management of water resources;

-        protect and consolidate agricultural land and add value to improve ecosystem performance;

-        transform high risk areas as part of the ecological infrastructure;

-        promote water sensitive urban development that considers water catchment, saving, treatment and reuse of water in the city and develop water sensitive urban design according to water sources.

LEIS-Manual

On the site level, recommendations for prototypical water-sensitive solutions for different urban areas of Lima are developed. They are based on an a survey of several existing open spaces and new design projects to show how water sources and vegetation are dealt with in the open space design and management. Based on this survey, prototypical water-sensitive design solutions for different water sources in different spatial situations (=> hydro urban characteristics) are presented, which if applied in a larger scale create together the ecological infrastructure of the city.

LEIS-Tool

In order to localize for instance the areas with high irrigation demand and the various potentials for water saving, re-use of treated wastewater and multifunctional open space design, a GIS-based meso scale analyses of the metropolitan area is conducted. The objectives for the LEIS-Tool analyses are defined by both the LEIS manual and the LEIS principles alike – e.g. identification and quantification of all water sources – linking the overarching principles with programmes and prototypical projects on the ground.

With this approach integrated planning is not only applied in the sense that there is an integration of water management and urban planning, but also with regard to the integration of scales and most importantly through the interlink between the three components of the Lima Ecological Infrastructure Strategy.

4 MESO SCALE APPROACH – THE CITY AS A MOSAIC

4.1 Methodology

How to integrate water management and open space planning and why?

The lack of a unified view of the city that is shared by urban and open space planners and water management a like is one obstacle to integrated planning. The methodology developed in the research project and outlined in this paper leads to the creation of meso scale spatial units that define different typologies of urban spaces in relationship with the urban water cycle and provide guidance for the planning processes of both disciplines.

What information is available?

Due to the availability of satellite imagery with a resolution of up to 50 cm every level of detail that is needed for spatial planning can be captured. Furthermore extensive data about the socioeconomic situation is available (COOPI 2011), Google Earth communities contribute to specialised fields of interest and a new municipal administration updates important planning information.

Why is there a need for a less detailed meso scale approach and what means meso-scale in this context?

Despite the partially very detailed information, the problem of divergent spatial information depending on the field of interest, multiple scales, changing resolution and the incompletness of information remains. This

issue has been addressed by the planning institutions as challenges for integrated spatial analyses and there are recent examples that have developed solutions to overcome this problem – for large scale / country wide socioeconomic evaluation (Huyssteen et al 2009), and for geospatial analysis across scales, borders, sectors and disciplines (Naude et al., 2008).[3]

In the case of Lima, this common problematic is coupled with weak metropolitan planning institutions, historically fairly independent district municipalities and a strong sectoral organisation of spatial, social and infrastructure issues. Basic cadastral information of divergent sources are compeeting and a unified view on the city is lacking. The administrative districts of Lima and Callao are too diverse in terms of different urban conditions to be useful for any city wide comparison. On top of this, the provincial division between Lima and Callao force administrative borders onto the city that are hardly recognizable on the ground but have a strong influence for the availability and the harmonisation of information. At the same time, watershed outlines are in the case of Lima – a city without rain – not sufficient for spatial differentiation.

Meso scale as it is understood in this paper means the intermediate scale between the urban planner's block scale and the regional planners city scale.[4] For the people of Lima this intermediate scale is usually represented by the districts, even though they are by nature too heterogenous to be equally compared, with population ranging from 20.000 in the smallest district of La Punta to almost 1 million in the district of San Juan de Lurigancho.

The GIS-procedures of overlaying information, clustering, disaggregating and aggregating could be performed related to any homogenous spatial unit. The extensive SIRAD study (COOPI 2011) has shown the potential for a fine sclae block based analyses of risks and vulnerability. For raster based analyses the formerly known contrains with regard to fine scale resolution diminish. Processing power of standard computers would already allow for high resolution analyses (2 – 10 meters) of a raster based model and could facilitate suitability analyses with regard to the urban water cycle and open space planning. However the problem is not the level of detail of certain information but the divergence of information with regard to accuracy and timeliness and the lack of a unified perception.
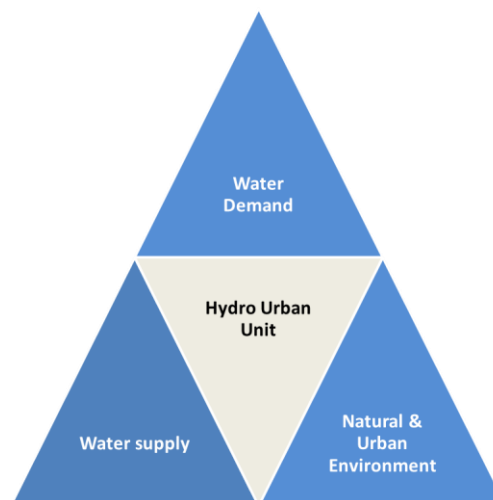
Figure 1: Combination of relevant characteristics in hydro urban unit.

Furthermore the key information in this case is the water, the consumption and the potential supply, and one of the key actors is the water company, which led to the decision to choose as a meso scale unit the water management sectors that are used by the water company SEDAPAL for managing the distribution of potable water. SEDAPAL is responsible for the water and wastewater services throughout the largest part of the metropolitan area, it is therefore in the situation of also holding partially more detailed and farther stretching spatial information than the actual planning institutions. There are 450 sectors with an average population of 20.000 and an average size of 95.500 m². They are covering the SEDAPAL service area which extends over

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[3] Avelar et al. (2009) have applied remote sensing analyses in order to pre assess the distribution of socio-economic classes in Lima on a meso scale level.

[4] Within the LiWa-Project, that actually covers all three Lima watersheds from the Ocean to the Andes in order to model climate change effects, macro, meso and micro scale are again used slightly different, with the whole metropolitan area of Lima and Callao being described as meso scale.

almost the whole built up area of Lima and Callao. A few sectors had to be added in order to cover the whole area of investigation with similar sized descrete spatial units.

Altogehter these units describe the city according to the water sources and the characteristics of the built and natural environments including open spaces. The hydro urban units consist of aggregated and disaggregated information, derived from topography, natural and man-made water sources, population statistics, the state of water infrastructure and structure of urban pattern and open space and environmental functions. They can be ordered into the spheres of "Water Demand", "Water Supply" and "Natural and urban environment" including population and society (fig.1). The combination of certain information results in specific hydro urban characteristics, the combination of all relevant aspects eventually leads to a set of distinct hydro urban typologies that are understood by urban planners and water management as a basis for their analyses, programms and projects.

Figure 2 shows an example for two sets of information that are assigned to the the mediating spatial unit, the HUU, through processes of aggregation and disaggregation. While in the one example the information about the level of connectedness of households to the sewage system is available in a fine scale (block), population growth trends as the other example are only estimated on the district level and therefore rather coarse. After processing the information can be combined in one spatial entity which is neither the block nor the district but the hydro urban unit.

Information A		Information B
"Households per block connected to sewage system"	Processing	"Population Growth trends for Lima districts"
	Aggregating household numbers to sectors/HUU Disaggregating growth trends to sectors/HUU	
	Hydro urban unit - Characteristic A - Characteristic B	
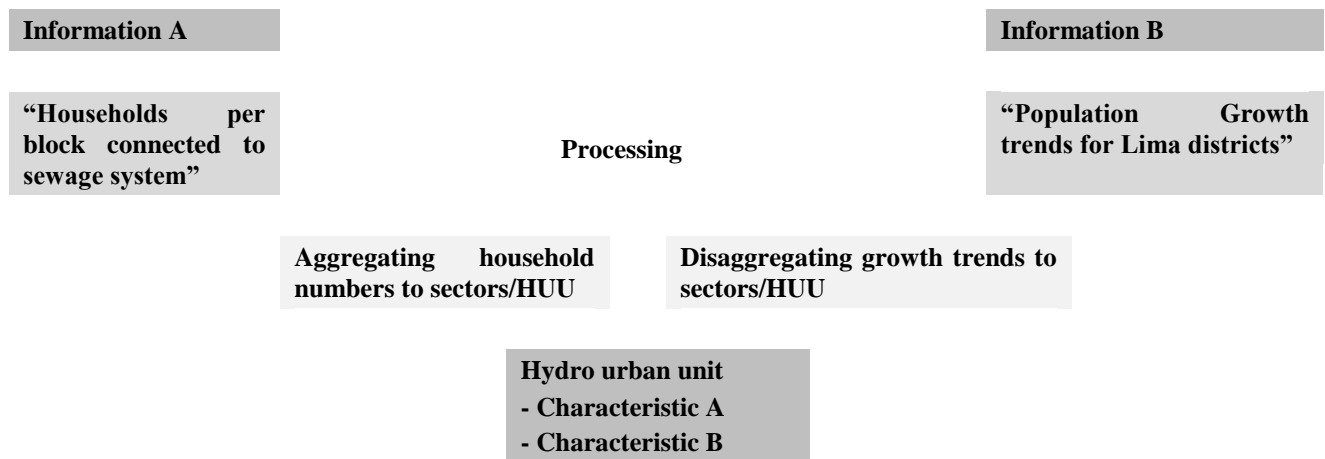
Figure 2: Processing information for hydro urban units.

4.2 Application

The usability of this approach will be shown with the following planning task that is derived from the principles of the Lima Ecological Infrastructure Strategy. One of the principles states: Protect, develop and implement ecological infrastructure considering availability and integral management of water resources. This results e.g. in a need to quantify the demand for the irrigation of green open spaces in Lima areas and the estimation of the potential supply for the irrigation of green areas.

Water demand

In a first step the water demand for irrigating green areas is quantified. Although there is detailed information about the irrigation of crops and the specific water demand for certain species, general numbers for the actual water consumption for green areas are not available. Within the LiWa-project divergent numbers for the demand of water were estimated. In a general survey Mosoco (2011) estimated 1,95 m³/m²/year. Based on an analyses of actual water supply information from SEDAPAL for 800 green areas, an average consumption of 1,49 m³/m²/year was identified by the author.[5] The district of Villa El Salvador in the sandy south of Lima estimates a demand between 2,5 and 2,7 m³/m²/year as an average for the district parks and 3,1 m³/m²/year for grass surfaces (Municipalidad de Villa el Salvador 2012).

Estimations for the demand based on real needs of intensive lawn vegetation result in only about 1 m³/m²/year which leads – depending on the type of irrigation – to 1,25 (pressurized irrigation) to 2

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[5] The sample consists of monthly consumption rates between May 2011 and May 2012 and the dataset includes the size of the actual serviced area. It is therefore assumed that it mirrors quite well the "normal" demand for irrigation including the standard management.

m³/m²/year (gravity irrigation). This leads to the assumption that besides the real need for the vegetation and the demand depending on the irrigation regime a third component that may be called "other losses" has to be considered. However for the estimation of the water demand the figure 1,5 m³/m²/year that is based on actual consumption data is taken, without speculating on the amount of "other losses".

Green open spaces

The main source of information for the green open spaces in Lima and Callao that are collected in the green catalogue[6] has been adopted from a dataset provided by SEDAPAL (12/2012). It quantifies the total green area that is serviced by SEDAPAL stretching over the whole area of Lima and Callao. The second source is the first draft of the green inventory which was put together by SERPAR and IMP and was supported by the LiWa project (9/2012). The green inventory was updated with Google Earth (visual comparison) and attributed according to coverage with vegetation, hard surface or bare soil. Other sources of informationen with less detail had to be taken for Callao and two Lima districts, because of availability reasons. Altogether a heterogeneous situation with regard to legal zoning status, ownership, real shape, vegetation coverage and categorization. Therefore the only comparable information was a rather crude differentiation in linear green areas, parks of all sizes and functions and the larger zonal and metropolitan parks (incl. Zoo) summing up to altogether 3.500 ha.[7]

Type	Area m²	Area ha
Linear green areas (mainly along streets)	8.216.672	822
Parks and other green areas	22.969.977	2.297
Zonal /Metropolitan Parks & Zoo	3.917.340	392
Total	**35.103.989**	**3.510**

Table 1: Green areas in Lima and Callao (ILPE 2013)

Considering a demand of 1,5 m³/m²/year and a total area of 35.100.000 m² a total water demand of 52.650.000 m³ or 1,67 m³/sec for the irrigation of green open spaces – without agricultural land – can be assumed. In comparison the total amount of potable water distributed through the water pipes was 18,22 m³/sec in 2011.

The future demand for irrigation is calculated depending on three factors:

a)   Enhancement of irrigation regime and adaptation of water sensitive design schemes for open spaces

The water management in parks is presently not very efficient. To estimate a potential for a reduction, the two irrigation systems that are presently most often used in Lima can be compared. The by far most often used gravity irrigation is only 50 % efficient the pressurized irrigation has an efficiency of 85 % .

Theoretically a complete compensation of gravity irrigation with pressurized irrigation would lead to a reduction of the water demand of roughly 40 %. However this situation can hardly be achieved and a realistic reduction of water consumption through a better irrigation regime and the adaptation of water sensitive design schemes for open spaces as proposed in the LEIS-Manual, lies rather with 10-15 % in a time span of 10 years. Therefore for any future water demand 1,35 m³/m²/year is taken for further calculations.

a)   Population growth

The last census for Lima by the Instituto Nacional de Estadística e Informática (INEI) was in 2007. There is no more recent census data available, but there are estimations by INEI about the future development of the whole country and its departments. INEI's estimated number for population growth until the year 2021 for the whole metropolitan region of Lima and Callao were broken down to growth rates for districts by IMP based primarily on district growth trends of the past (IMP 2011).

From 8.470.000 inhabitants in 2007 to 9.450.000 in 2012 to estimated 10.850.000 inhabitants in 2021 the city's population is expected to grow by more than a fourth within 15 years.

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[6] Within the project a collection of various information with regard to green areas is compiled in the green catalogue. It is not the green inventory that is presently being updated for the Municipality of Lima.

[7] Other studies, like the recently published survey by Ludena summarize about 2.550 ha for Lima alone (Ludena 2013) which is, considering the approx. 460 ha that are in Callao, 500 ha less than in this study.

But the growth is heterogeneously distributed over the city with a population that remains constant in consolidated districts to areas with an increase of 50 % up to 240 %. Within this project a further disaggregation from districts to sectors (hydro urban units) took place in order to show the process spatially distributed in a better resolution.[8]

b)   Ratio m² green area per inhabitant

The current ratio of m² of green public spaces per inhabitant in Metropolitan Lima and Callao ranges from 2,4 – 3,7 m²/inhabitant depending on the data source and the selection of the areas that account for "public green". Within the LiWa-project the higher numbers were chosen because they include all the linear green areas along streets with mostly decorative functions but nevertheless a considerable water demand.

In the public debate in Lima much higher ratios are considered, such as the 8 m² per inhabitant as proposed by the World Health Organisation is often used as the target indicator (Ludena 2013). In the Regional Concerted Plan for Lima an intermediate ratio of 5 m²/inhabitant is envisaged (IMP 2012, 361), this figure is therefore used in this study. Table 2 shows first the calculations for the whole city based on a status quo extrapolation with 4 m²/inh. also for the future population and than the calculations based on the intermediate goal of 5 m²/inh . In the lower part of the table the ratios are calculated for each hydro urban unit in order include the local conditions that vary greatly within the city.[9] This lead ultimately to higher numbers because in this case the green areas in HUU with more than the 4 or respectively 5 m²/inh. do not compensate for a deficit in another HUU.

4.3 Analyses

According to population growth until 2021, and a ratio of 5m² green area/ inhabitant, the quantification of the future demand for green areas results in 6.130 ha of green open spaces and 5,65 m²/inh. for the whole city and would have a water demand of approximately. 2,62 m³/sec (table 2). The map of the hydro urban units (fig. 3a) shows a very diverse image of the city with a great demand for an increase in the South of Lima and the North East but large areas which lie in the centre and the consolidated districts with only little demand.

According to Moscoso (2011), presently only a 10th of the treated waste water is used for irrigation of green areas and agricultural land, which amounts to roughly 0,3 m³/sec. It is widely acknowledged that there needs to be an increase in the use of treated waste water, but the question is how and where. An increase of the re-use of treated waste water could in theory compensate for instance the demand that results from the population growth. But is the water available where it is needed most?

Year/ irrigation regime	Water demand m³/m²/year	Population	Ratio green area m²/inh. whole city	Green area total	Water dem. m³/second
2012 – present	1,5	9.450.000	3,7 m²/inh.	35.100.000	1,67
2021 – no change		10.850.000	4,0 m²/inh.	43.400.000	2,06
2021 – water saving	1,35				1,86
2021 – no change	1,5		5,0 m²/inh.	54.250.000	2,58
2021 – water saving	1,35				2,32
			Ratio green area m²/inh. each HUU		
2021 – water saving	1,35		4,0 m²/inh.	54.800.000	2,34
2021 – water saving			5,0 m²/inh.	61.300.000	2,62

Table 2: Water demand changes according to irrigation regime and green ratio. Note the difference in total area, which is depending on the application of the ratio for the whole city or the more local hydro urban units.

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[8] Further adjustment of the distribution of the growth trends within a district is needed, in order to identifiy the most likely expansion area.

[9] Ludena also points out the existing contrast related to the unequal distribution of green-open space in the city. For instance some districts reach over 15 m²/inhabitant of green open space. However other districts located over desert or hilly areas reach an average of 0,2 to 2 m²/inhabitant of green public space, confirming the lack of coherence and unsustainability of the current urban development (Ludena 2013).

To answer that question the second step of the analyses identifies the HUU with a high percentage of households that are not connected to the sewage system (fig. 3b). Therefore these areas are potential areas for the connection to new, decentralized treatment plants that first of all clean the waste water but also provide irrigation water. With follow up analyses specific areas can be outlined and the respective design prototypes for "wastewater treatment parks" and other proposals and designs that are adequate for these areas and which are developed within the LEIS-Manual, can be implemented.
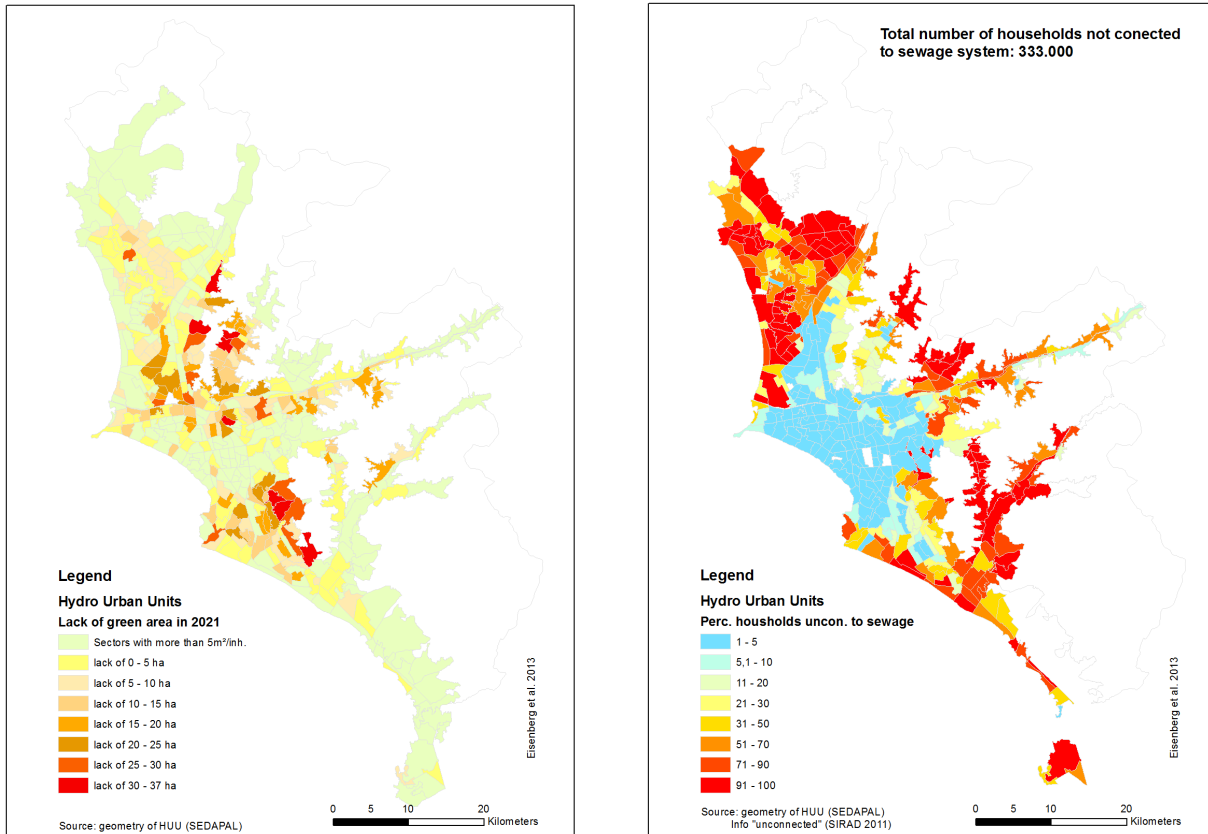
Fig. 3a: Lack of green areas in 2021 based on a ratio of 5m²/inh. in each sector/HUU. b) Percentage of households that are unconnected to the sewage system.

5 CONCLUSION

The Lima Ecological Infrastructure Strategy tries to bridge the sphere of general planning guidelines and principles for an integrated urban planning and water management to site-specific water sensitive design solutions. The question of what to aim for in order to integrate urban planning and water management is connected to the questions where to implement and how to do implement. This integrated approach is seen by the authors as an alternative route to tackle the fragmented planning that Lima's suffers from today.

The meso – scale analyses is adequate to localize specific demands for water consumption as well as the divergent potentials for water soruces. In a situation without updated population data, the disaggregation of general population growth trends is the only way to quantify future demand for green open spaces and localize it. The example presented in this paper shows only one of many possible solution to overcome the shortage of public green areas and and to identify potential water sources for irrigation at the same time. In this case the areas that are today unconnected to the sewage system are in the future potential catchment areas for waste water that can be treated and used for irrigation. More complex combinations of hydro urban characteristics will eventually be useful to identify distinct typologies that are understood by urban planners and water management alike and that may lead to a common vision of the metropolitan area of Lima and Callao.

6 REFERENCES

Ahern, J. (2007): Green infrastructure for cities: The spatial dimension.
In: Nowotny, V. Brown, P. (eds.) (2007): Cities of the Future Towards Integrated Sustainable Water and Landscape Management. IWA Publishing . London: 267-283

Avelar, Silvania; Zah, Rainer; Tavares-Corrêa, Carlos (2009): Linking socioeconomic classes and land cover data in Lima, Peru: Assessment through the application of remote sensing and GIS. In: International Journal of Applied Earth Observation and Geoinformation 11 (1), S. 27–37

Benedict, M. A., McMahon, E.T. 2004: Green Infrastructure. Linking landscapes and communities. Island Press, Washington, DC Coperazione Internazionale – COOPI; Institut de Recherche pour le Développement – IRD: (2011): Estudio SIRAD. Prparacion ante desastre sismico y/o tsunami y recuperacion temprana en Lima y Callao.

DIGESA; IGN; IMARPE; IMP; INC; INDECI; INGEMMET; INRENA; MEM; VIVIENDA; PETT; SAN; SEDAPAL; SENAMHI (2008): Atlas ambiental de Lima.

Feyen, Jan; Shannon, Kelly; Neville, Matthew (2009): Water and urban development paradigms. Towards an integration of engineering, design and management approaches ; proceedings of the International Urban Water Conference, Heverlee, Belgium, 15-19 September, 2008. Boca Raton, Fla.: CRC Press.

Hoyer, J., Dickhaut, W., Kronawitter, L., Weber, B. (2011): Water Sensitive Urban Design. Principles and Inspirations for Sustainable Stormwater Management in the City of the Future. Jovis Publishers, Berlin

Huyssteen, Elsona van; Biermann, Sharon; Naudé, Andries, Roux, Alize le (2009): Advances in Spatial Analysis to Support a more Nuanced Reading of the South African Space Economy. Urban Forum (2009) 20:195–214.

Institute of Landscape Planning and Ecology ILPE (2013): Report on Green Areas in Lima and Callao – coverage and water demand.

Instituto Metropolitano de Planificacion (2012): Plan Regional Lima (Propuesta) de Desarrollo Concentaado de Lima (2012-2025). IMP. Lima.

Instituto Metropolitano de Planificacion (2011): Analisis intercensal y proyecciones de la poblacion total del area metropolitana de Lima y Callao. Unpublished document.

Ludena, Wiley (2013): Lima y espacios publicos. Lima

Mell, Ian C. (2010): Green infrastructure: concepts, perceptions and its use in spatial planning. Newcastle University. School of Architecture, Planning and Landscape.

Moscoso, Julio (2011): Estudio de opciones de tratamiento y reuso de aguas residuales en Lima Metropolitana.

Municipalidad de Villa el Salvador (2012): Diagnostico Ambiental: Areas Verdes.
http://www.munives.gob.pe/AREAS %20VERDES.pdf

Naudé, Andrie., Huyssteen, Elsona van; Goss, Helga. (2008). Geospatial Analysis Platform and tools: Supporting planning and decision making across scales, borders, sectors and disciplines. Paper presented at the South African Planning Institute's Planning Africa Conference, 13–16 April 2008. Sandton

SEDAPAL (2012): Areas_Verde_Total.SHP. Dataset of Green Areas that are serviced by Sedapal from 5/2011-4/2012.

Schütze, Manfred; Robleto, Gloria: Challenges of water and wastewater management in the desert megacity of Lima/Peru – how can macromodelling help? In: Novatch 2010.

I-SCOPE: Smart Cities and Citizens

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1 ABSTRACT

The i-SCOPE project is based on interoperable 3D Urban Information Models (UIM) and delivers an open platform on top of which it develops, within different domains, three 'smart city' services. These will be piloted and validated, within a number of EU cities that will be actively engaged throughout the project lifecycle. The services will address:

(1) Improved inclusion and personal mobility of aging and diversely able citizens through an accurate city-level disable-friendly personal routing service that accounts for detailed urban layout, features and barriers.

(2) Optimization of energy consumption through a service for accurate assessment of solar energy potential at building level.

(3) Environmental monitoring through a real-time environmental noise mapping service, by leveraging citizen's involvement will who act as distributed sensors city-wide measuring noise levels through their mobile phones.

All smart services will be based on already available technologies which will be integrated, deployed and made publicly available from a "3D smart EU cities" portal.

The paper explores how the different pilots are being implemented in the various cities and what is the relationship between the public administration and the end users.

2 INTRODUCTION

"Smart City" is part of the current terminology that is strictly related to the way ourdays cities perform as for livability, efficiency and sustainability, reason why it has become to goal also at EU level, such as with the Digital Agenda (2013).

The fields of application are therefore very wide and address a development of 'smarter infrastructure' on the one side and a 'smarter usage' by citizens on the other (Caragliu et al. 2011).

Among the various scopes of smart cities are the introduction of advanced mobility management solutions, dealing with both transport infrastructures and information/monitoring systems, but also services are being developed to address environmental monitoring and energy efficiency issues. This is affecting not only the energy retail market, where utilities can benefit from smart grid technologies, but also the building construction sector, where the design of low-environmental impact buildings can significantly benefit from more efficient services optimising heating, air-conditioning or power consumption.

The European Commission, within the Digital Agenda, is paying significant attention to smart cities, as technologies associated to smart cities can bring to an improved knowledge-based economy, to better social inclusion and, in more general term, to a more livable environment.

The i-SCOPE project is therefore an example of how technological solutions are being tackled, including aspects dealing with social and environmental issues. Indeed in i-SCOPE each technological solution is not considered as an achievement "per se", but it engineered following an open-innovation, user-driven approach, with the ultimate goal of promoting a so-called "humane city".

In fact the approach within the i-SCOPE can be seen as a bottom-up research process based on open innovation systems, being promoted within three key research domains: 1) inclusive routing, to facilitate personal mobility of diversely-abled citizens; 2) solar impact analysis, to promote energy savvy planning policies; 3) crowdsourced environmental monitoring, to be able to use citizens and mobile IT technologies (i.e. smartphones) as distributed sensors of environmental information.

3 TECHNOLOGY

i-SCOPE integrates open source technologies and previously developed partner projects within a comprehensive toolkit promoting interoperability through the use of OGC and other open standards for data exchange and services. This allows for independent development and functionality deployment provided by different web-services. In i-SCOPE pre-existing technologies, wherever not available as services, will be wrapped by a service layer in order to ensure compliancy with the overall schema The following diagram provides an overview of the project architecture.

i-SCOPE will significantly rely on CityGML. This is the open standard for interoperable encoding of 3D Urban Information Models. Since i-SCOPE refers to Smart Cities CityGML and its extension according to the requirements of the project is the most prominent solution. The standard is being developed by the Open Source community under coordination of OGC. As previously mentioned, i-SCOPE requires extension of the core standard as well as the creation of two Application Domain Extension (ADEs) and the extension of a third one (on noise) of the current CityGML. This will extend modelling capabilities making CityGML compliant to the requirements of the three scenarios tackled by the project:

- Sun Potential Mapping
- Noise Mapping
- Differently-abled-friendly routing

The latest generation of 3D Urban Information Models (UIM), created from accurate urban-scale geospatial information, can be used as basis to create smart web services based on geomet-ric, semantic, morphological and structural information at urban scale level. CityGML (Open-GIS 2008) represents a very attractive solution that combines 3D information and semantic in-formation in a single data model.

The aim of i-SCOPE is to deliver an open platform, based on interoperable 3D CityGML UIMs, on top of which it possible to deploy various 'smart city' services. The main challenge of the work is to develop into the i-SCOPE framework an effective way to exploit the CityGML potentiality to provide Smart Cities services.

CityGML is a common information model for the representation of 3D urban objects. It is realised as an open data model and XML-based format for the storage and exchange of virtual 3D city models. As an OGC standard, CityGML plays a leading role in the modularisation of urban geospatial information.

Visualisation is a complex and important issue in 3D city model applications. Efficient visualisation of 3D city models in different levels of detail (LODs) is one of the pivotal technologies to support these applications and it is fundamental to visualise the urban environment in different scales, e.g. from overview scale like a region down to detailed scale like a building or even a room. Furthermore Internet has become a basic information infrastructure all over the world even for the deployment of new smart cities technologies. Therefore, it is necessary to develop methods to visualise 3D city models through the Internet (fig.1).
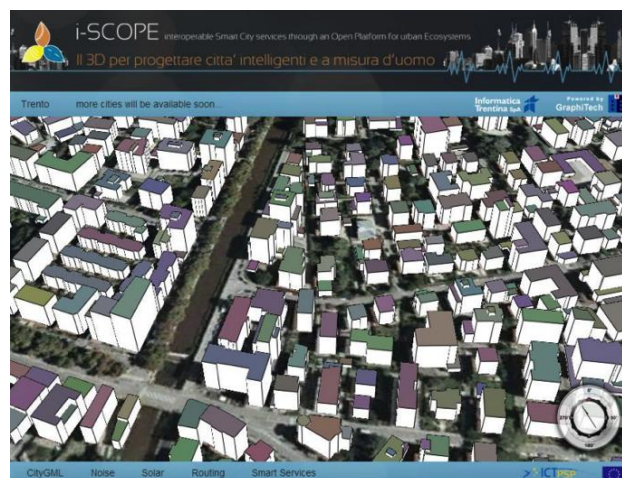
Image 1: LoD1 model of Trento visualized into i_SCOPE 3D environment

I-SCOPE project implements the possible services to stream the data to the client considering two different features: a) obtain optimum performance and very short response time avoiding the complex queries that can

be made with the WFS; b) transmit to the client the geometries plus the semantic information in a single stream. The way to obtain this kind of results is to stream data directly in the CityGML format. The method consists in a downloading service, which provides to the client the CityGML data fol-lowing a classic tile-based approach fig 2. Within the iSCOPE project the client has been developed on top of Nasa World Wind java SDK. Thanks to this approach many useful features can be implemented in parallel: different services like the WMS, WFS and the proposed approach can run concurrently allowing a great flexibility of the entire system.
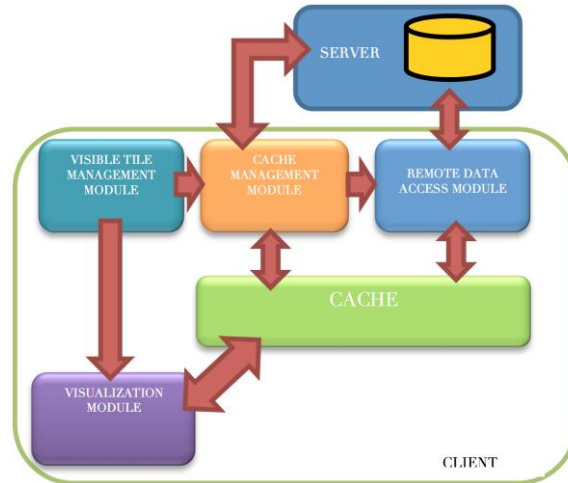
Image 2: System architecture of the proposed approach

i-SCOPE will also rely on integration of existing technologies. Specifically i-SCOPE will integrate a tool to generate 3D city models based on existing geodata data such as terrain models and floor plans to produce a realistic 3D city as CityGML. The technology will be customized and adapted to i-SCOPE's requirements in order to operate as a web service The service is asynchronous and realized with novaFACTORY software solution, the user once finished the generation can validate, both downloading and visualizing the final result, both through a summary report the quality of the model. After validation, CityGML data will be stored in 3DCityDB (2011), a free and Open Source 3D geo database to store, represent, and manage virtual 3D city models on top of the Oracle 10G R2 spatial (or 11G), developed by Institute for Geodesy and Geoinformation Science of the Berlin University of Technology.

4 THE PILOT SCENARIOS

The smart services proposed address the following three scenarios:

- Improved inclusion and personal mobility of aging people and diversely able citizens;
- Energy dispersion & solar energy potential assessment;
- Noise mapping & simulation.
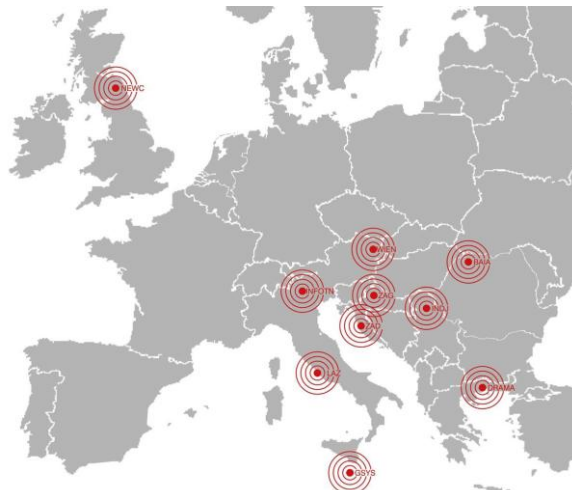
Image 3: Map of pilot cities within the i-SCOPE project

4.1 The solar energy potential assessment

Current solar assessment GIS (e.g. ESRI Solar Analysis) calculate solar potential based on raster data that need to be created separately from existing terrain and, if available, merging building information. Other online services are simply based on the position and through manual specification of the roof layout (orientation, slope etc.).

i-SCOPE solar assessment is based on accurate 3D georeferenced models of urban environment and therefore accounts for:

- Real layout of roofs and other structures (e.g. walls, slabs etc.).

- Correct positioning.

- Shadowing effects induced by adjoining buildings as well as vegetation, infrastructures (e.g. power line posts).

Unlike other solution all the aforementioned information is automatically calculated from a high precision UIM available in the interoperable standard CityGML. In turn as output the services delivers:

- Interoperable provision of solar maps through Web Coverage Service (WCS) or Web Map Service Time (WMS-T).

- Solar simulations can be calculated through a remote service, based on interoperable standard WPS.

This way any client (including commercial or open source GIS software) can perform simulations by invoking a smart service based on an interoperable protocol.

The solar energy potential assessment involves two services:

- Irradiation calculation: computes solar irradiation raster maps for given day, latitude, surface and atmospheric conditions

- Solar energy potential calculation: requires the irradiation calculation and delivers assessment settings for the buildings

Finally we propose an innovative scenario to support the update of data on heat dispersion from community of citizens and professionals. This information can be later accessed by city administration for planning or taxation purposes. City administrations can easily create maps to show how policies have contributed to improving energy efficiency in areas of the city.

4.2 Noise mapping scenario

The second scenario that i- SCOPE focuses on is that of mapping noise in urban areas, both through a novel participatory approach involving citizens and their mobile phones, as well as through the more standard approach of simulating the most important traffic-related sources of noise in a city.

Noise pollution is a substantial problem in societies of today: a recent report of the WHO calculates that in Western-Europe only every year 1 million healthy life years are lost due to traffic-related noise exposure (WHO, 2011). As a result there is high benefit in assessing noise in urban areas, as apparent from the Environmental Noise Directive (END) imposed by the European Union (European Parliament and Council, 2002). These dictate that urban areas above a certain size – applicable to all of the pilot partners involved in i-Scope – are to produce strategic noise maps, created through computer simulations based on general statistics, such as the average number of cars in the city. These maps are backed up only by limited amounts of sound measurements, because current measuring methods are expensive and thus not very scalable. The resulting maps give an average but not at all a complete view on the situation, entirely missing local variations due to street works, neighbourhood noise etc. The NoiseTube platform proposes a solution to these issues, by facilitating sound measuring at any place and time through a mobile app that exploits basic smartphone functionalities, namely microphone, wireless connectivity and localisation through GPS. Through these three components, NoiseTube transforms already ubiquitous smartphones into highly portable, accessible sound measurement devices, thus enabling all citizens to measure ambient sound levels whenever and wherever they please. The NoiseTube website collects all user measurements and visualises them on maps. Recent research (D'Hondt & al, 2012) showed that given calibrated phones and enough measurements for a particular area, we can construct noise maps of comparable quality to those produced by

governments today, thus providing a complementary view on the noise situation of urban areas. The i-Scope project is innovative in that it covers both mapping techniques within one framework, together with several pilot actions involving city administrations.

NoiseTube is a user-friendly, free and open source tool with which citizens can estimate the quality of their daily environment and how it is affected by their behavior, providing support for awareness-building as well as for undertaking citizen- as well as city-steered actions to solve local issues. It has been used by citizens all over the world, for individual use as well as for measuring campaigns by citizen action groups.[1] With i-Scope project came the first application of NoiseTube as a top-down noise mapping campaign method steered by city administrations, with pilot activities for Zagreb (HR), Baia Mare (RO) and Trento (IT).

A noise mapping campaign is different from individual use of the NoiseTube platform in that a campaign unites a group of people in an orchestrated measurement action, typically focussing on a specific concern. Concerns can be geographical (i.e. noise issues in a neighbourhood), temporal (how do peak hours in different cities compare?) or task-oriented (your boss at city hall asks you to evaluate how street works affect the commune, or a combination of the former. In a campaign it is important that measurements are gathered in a focused way so as to increase accuracy as well as representability of maps. Concretely, the campaign in Zagreb focused on a particularly busy city trajectory during peak hours (weekdays at 8 am). Five volunteers walked this 3,5 km trajectory daily for 5 days in June 2012, jointly amassing enough measurements so that a statistically relevant dataset was obtained. The map shown below was obtained by distributing measurements over a grid and computing averages for each 20mx20m cell. Volunteers used HTC Desire C (uncalibrated) phones, while the map's colour coding adhers to the colour codes used by Croatia. Pilot activities in Trento and Baia Mare have so far been focused on individual noise trajectories rather than on aggregated campaign maps.
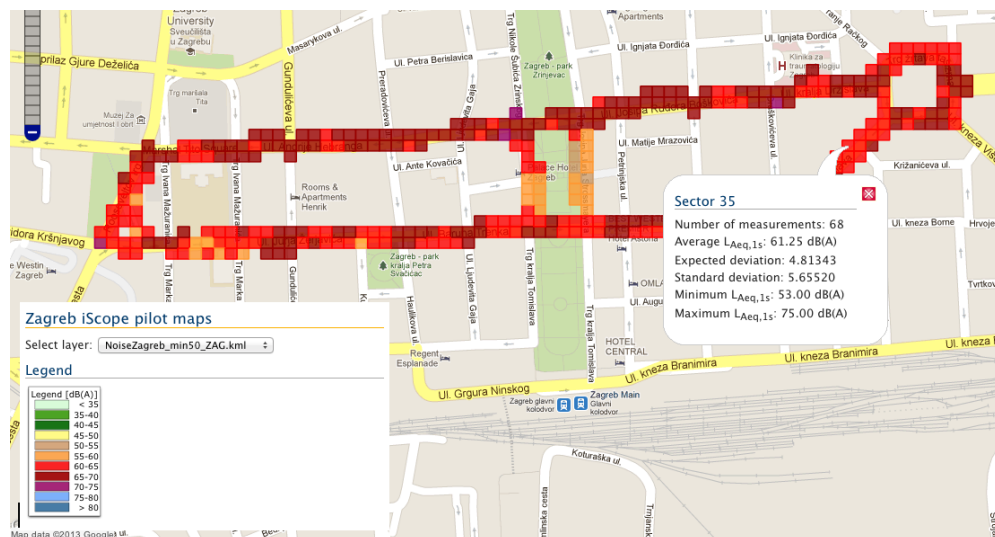
Image 4: Noise Map from the Zagreb Pilot

Our experience with city-based campaigns has been quite different from citizen-based ones. Most importantly city-based campaigns are much more centralised than grassroots ones. Indeed, the latter are more collaborative in terms of defining campaign specifications (area, time, material used). A second, related issue, is to do with communication with volunteers. Grassroots actions typically rely on a group of people already cohesive, both at the level of motivations as of concerns shared. This facilitates dissemination of NoiseTube essentials as well as communication of campaign requirements. Typically, one meeting involving a NoiseTube expert is enough to ensure a succesful campaign. In a city-based context it is often a city administrator who acts as the interface with volunteers in a hierarchical structure. Communication with the NoiseTube expert always occurred through this administrator, and never directly with the volunteers. This has led to issues with understanding campaign basics (in particular the importance of gathering enough measurements at the same tim), with motivating users to keep on measuring (by not giving them live feedback on what they had measured), and with organisation in itself. In our opinion, a well-maintained

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[1] See http://www.brussense.be/experiments for interactive, aggregated maps of our noise mapping campaigns so far.
Colour codes for noise maps under the END may be chosen freely by each member state.

(ideally face2face) communication chain, either directly between an expert and the whole group of volunteers, or between expert-administrator-volunteers, is essential in delivering a succesful campaign. Since, especially in an international context, it is not always to achieve this, we are currently working towards better support for campaign definition, management and analysis within the NoiseTube framework itself.

4.3 Accessible routing scenario

The i-SCOPE project will develop inclusive routing that will be targeted for visually impaired and wheelchair users. The results of route planning can be made available for blind people as spoken instructions. Unlike route planners, the innovativeness of the application lies in the fact that the blind are guided in and at the same time have the possibility to experience and understand city spaces, streets, places, parks, etc. as spatial constructs.

The aim is to provide a holistic description of the urban space which means that the user should be able to discover as many attributes of a street section as possible to get a better image of the city. The description includes information about streets, intersections, blocks, points of interest, possible causes of risk, etc. and their spatial relation to each other. The elements of the map need to be described in a semantic way that is adapted to the requirements of pedestrians, especially blind and visually impaired ones.

How does it work?

The City portal will have the option to choose the type of user requirements needed which will be:

- Wheel chair user
- Visually impaired:
    - Blind
    - Partially sighted
    - Colour blind

In this way the user will be able to identify from where to where they need to go and receive the best path for their needs.

Additional information will be provided to the user such as Points Of Inteterest (POIs) and dangers, that var according to the need. For example wheel chair users will receive information such as the quality of the pavement or the lack of ramps, whilst visually impaired users will know what shape a crossing has, if there is a zebra crossing or if there are interesting places nearby.

The service will have the option to be used on a personal computer at home, so to prepare the route in advance, or to be used in real time via the use of a Smart Phone (Android).

The added value of a mobile service is that in case of any unforeseen changes due to road works or changes in plans, the user will still be able to receive an ad hoc route. It must be said though that most users still will be preparing their route at home as this makes them often feel more secure.

The i-SCOPE accessible routing service will not be an alternative to other devices such as a guide dog or a cane, but it will be an additional aid that can provide great benefit.

4.4 The experience of the City of Vienna

In occasion of the Wiener Charta talks, a series of events held within the Local Agenda 21 activities of the city of Vienna where citizens define issues that the City Adminstration should tackle, a discussion on urban accessibility was held and the i-SCOPE project was discussed with the various user groups.

The half day workshop had representatives from the City of Vienna, Companies and research institutions involved in the development of accessible technologies and the user groups, respectively the visually impaired associations and the wheel chair users.

There was a presentation of the i-SCOPE project and then an interactive and lively debate where many issues were tackled, from broader comments such as the fact that accessibility is related to an overall societal attitude to more specific issues such as the affordability of accessible technologies.

What was interesting was that various stakeholders sitting round the table had the possibility to express needs and requirements yet at the same time provide comments and possible solutions to the other.

The event was considered very useful and it was agreed that other events like this will take place again, also out of the Wiener Charta context, also in view of the upcoming testing phase of the i-SCOPE prototype.

In this sense all the participants decided that the idea of starting up an ongoin platform to discuss about innovations within the city would be very useful, reason why the idea of becoming a Living Lab was received with great interest.

In fact the city of Vienna in the coming years will get more and more involved in the Living Lab network in order to bring together public administration, companies and citizens on a regular basis.

5   CONSIDERATIONS ON THE RELATIONSHIP BETWEEN CITIES AND CITIZENS

Citizens' involvement in the i-SCOPE project is an essential strategic element that allows demonstration of the use of the smart services that will be developed during the project implementation and thus to give assurance to the stakeholders of the investment's value . The citizens are one of the most important final users of the services that are going to be developed. Part of the project's sustainability is connected to the capability of local administrations (pilot partner cities/regions) to convey citizens' interest towards the platform/smart toolkit services and to involve them firstly as users but even as co-designer of/for smart solutions that are to be developed. Not only that the main results are directed to them, but also they are involved in the entire process of creating and achieving the necessary data for the project. Moreover, they are involved in the testing of the smart services that are to be created.

Also when thinking about citizens' involvement, it is important to consider that addressing citizens means not only addressing specific categories of stakeholders (e.g. cultural, environmental, economic grassroots organizations), but also to address citizenship in its various expressions (e.g. citizen as politicians, civil servants, city users, teachers and apprentices…). In fully experiencing citizenship rights, people (inhabitants) change roles different times. It is for these reasons that i-SCOPE is increasing citizens' awareness using direct (seminars, workshops, lectures…), semi-indirect (web communication, social networking…), and indirect (press releases, brochures, scientific articles…) means. Indeed, i-SCOPE partners are proceeding using all these communication possibilities.

Finally, it can be stated that the citizen's involvement takes place in 3 key phases:

(1) General information and publicity of the project to the citizens and relevant actors.

(2) General presentation of the stage of the project (evolution), initiated actions, finalized action, first results, and permanent dialog with the citizens and feedback selection from the citizens. Involvement of the citizens in the improving of the prototypes (using a careful predefined methodology). Periodic testing of the prototypes and products.

(3) General presentation of the implemented project (all actions implemented). Dissemination of the final results. Implementation of the prototypes. Future ideas for the improvement of the products

6   CONCLUSIONS

The many i-SCOPE outputs, from the more technological ones to the definition of indicators and frames for policies, will fall on different categories (from meta data modelling, definition of platform to the design of services and urban/territorial policies) that cannot bring to a synthesis if not faced in the context of a pluralistic and multi-faced governance based on the directive and directions given by the EU. The questions connected to inter-regional/cross border use of data, those connected to the indications for the design of trans-national services (the market is definitively global), the other linked with the indication to provide for the design of policies and strategies (the EU should provide a soft creation of coherence among all national and local policies in order to avoid unbalances in use of funds and in the definition of policy principles) are just few examples that demonstrate how the i-SCOPE purposes cannot be solved at local or at national level, but required to be set up, experimented and implemented at EU scale through the implementation of a partnership including, public administration (cities and regions) SMEs and research centres.

7 ACKNOWLEDGMENTS

8 REFERENCES

Caragliu A. , Del Bo C. et Nijkamp P. (2011): Smart Cities in Europe, Journal of Urban Technology, 18:2, 65-82
Digital Agenda (2013): http://ec.europa.eu/digital-agenda/

Indicator-Based Assessment of Land Use Planning in Wrocław Region with CommunityViz

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1 ABSTRACT

Wise decisions regarding land use transformation should consider potential impact of human activity and assessment to measure those changes. Indicator-based assessment should be established in a way which can be implemented in a given area on time. One of main issues which should be measured is environmental group. This paper presents the use of geoinformation system – CommunityViz for impact assesment of local polices and local development plans for communes around City of Wroclaw (Large Urban Zone). Simple but very useful impact model include demographical, environmental and vehicle-journey factors. Research has shown that CommunityViz can support environmental impact assessment very well.

Keywords: environmental changes, indicator-based assessment, GIS, CommunityViz

2 INDICATOR-BASED ASSESSMENT

The need of monitoring changes in the environment, as a complementary component of a comprehensive assessment of local development, has been discussed for many years. However local governments are not always able to forecast or monitor impacts of their policies effectively. The lack of consistent and comprehensive system of monitoring the investment processes and space transformation at the local level was found. It is a serious obstacle in the assessment of actual risks arising from land development. Moreover, one of the main conclusions defined in the scientific discussion on the phenomenon of urbanization, is urgent necessity to develop techniques which allow precise and clear as possible assess the scale of the phenomenon of urban sprawl. This is considered by the experts of the European Union as a "priority task of the Member States of the Union" (Kozlowski 2006).

In order to investigate the possibility of measuring indicators with the use of geoinformation systems, analysis focused on the current state of knowledge and reliable indicators were selected. As noted Czochanski (2010) indicators used in monitoring, should be simple (one-dimensional), relational and synthesizing (showing wider background of phenomena and relationships with other elements) and context (showing the relationships between different areas or variants of phenomena).

System used for assessment of the environmental effects is CommunityViz. It is an extension of ArcGIS Desktop. The two main components of CommunityViz are Scenario360 and Scenario3D. It's designed to assist process of decision-making by stakeholders in the planning process. It helps to evaluate the future traits that define the area and the factors that affect the local community. It can be used to carry out experiments with hypothetical scenarios, perform parametric evaluations, modify spatial calculation assumptions, present visual effects of the proposed action, make decisions based on comprehensive information and connect your work with three-dimensional visualization variants.

U.S. experience shows that CommunityViz with skilful use and cooperative society can be an effective tool to support decision-making (Walker and Daniels 2011). Case studies have shown that complexity of this software is really low. It can be successfully used for helping social participation even during work with laymen, people who are not specialists (http://placeways.com/communityviz/gallery/casestudies/pdf/). We used CommunityViz for assessing influence of spatial planning policy of City of Wroclaw and sourrounding communites. The essential thing was proper interpretation of principles for the formulation of indicators.

3 METHODOLOGY AND RESEARCH AREA

The research area includes Wroclaw and rural communes which are located around the city. Wrocław is the historical capital of Silesia and the largest city in western Poland. The city originated as a Bohemian stronghold at the intersection of trade routes, the Via Regia and the Amber Road. At various times it was a part of the Kingdom of Poland, Bohemia, the Austrian Empire, Prussia, and Germany. The city, as well as almost all of Lower Silesia became again part of Poland under the terms of the Potsdam Conference. In

August 1945 the city had a German population of 189,500, and a Polish population of 17,000. Almost all of the German inhabitants fled between 1945 and 1949 and were settled in Allied Occupation Zones in Germany. The Polish population increased by the postwar resettlement of Poles as well as forced deportations from Polish lands annexed by the Soviet Union in the east, especially from city of Lwów.

With over 650000 inhabitants Wroclaw is now the second city after Warsaw in terms of revenue (3.814 billion zł in 2012) and expenses (3.804 billion zł in 2012) budget in Poland. Income per capita is also second only to Warsaw. Wrocław manufactures buses, trams, railroad cars, home appliance, chemicals and electronics.
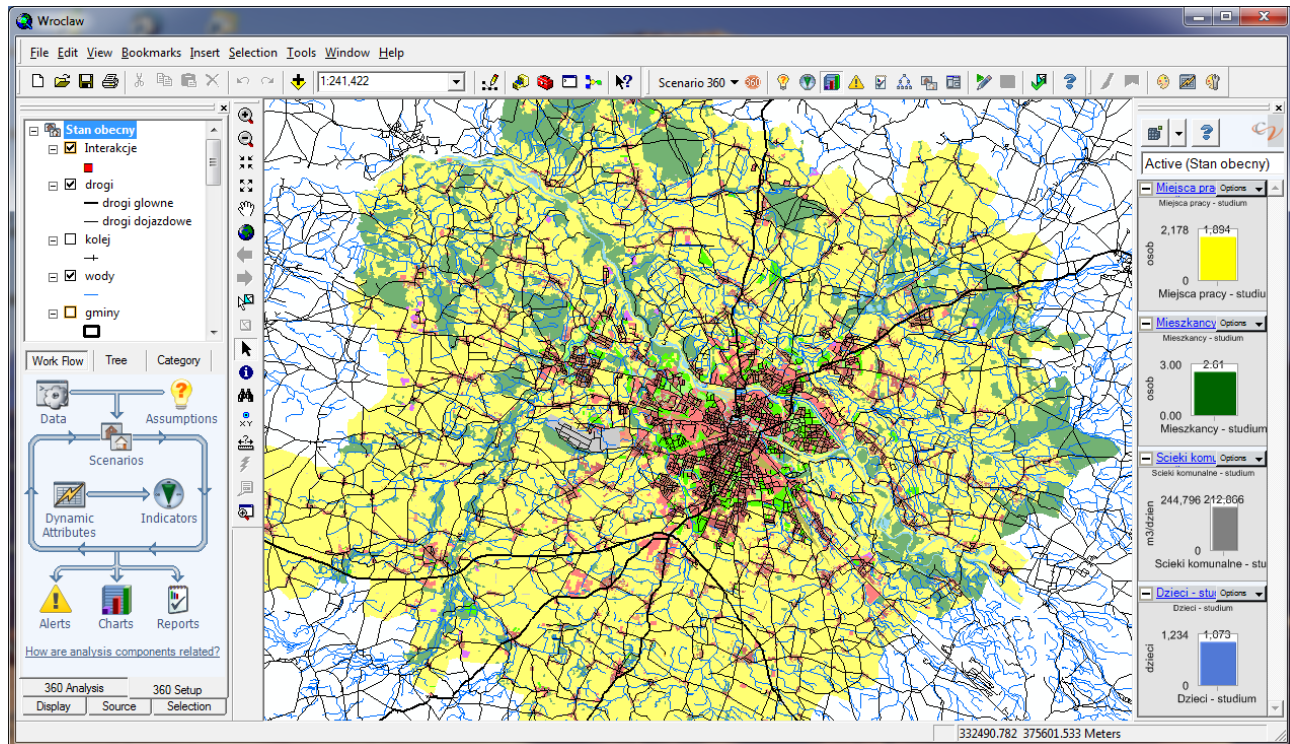
Fig. 1: Landuse of Wroclaw Region (2012)

Research was taken on local development plans for City of Wroclaw and communes located in the suburbia of Wroclaw: Miekinia, Oborniki Slaskie, Wisznia Mala, Czernica, Dlugoleka, Katy Wroclawskie, Kobierzyce, Siechnice, Zorawina and Kostomloty.

4 RESEARCH

Wanting to discuss desirable strategies for development of Wroclaw Region we started with evaluation of impact of current plans. Variety of spatial and non-spatial data including cadastral land-use, environment, changes in population, consumption of natural resources, energy and waste production was integrated. Additionally information about the approximate load of the road network by setting an indicative number of cars and daily trips as well as latest census results from National Statistical Office.

The core dataset prepared for the project was the unified landuse zoning plan for whole region. It was preapared on a base of 11 different landuse plans of communes and the city. Those plans are different in terms of abstraction level (from general to more concrete) as well meaning of definitions of landuse designation (the same designation have different meaning as well as different designation have similar meanings). The horizontaly integrated dataset includes 5748 planned landuse polygons. Polygons were interpreted to common landuse model developed with CommunityViz 4.1 and ArcInfo 9.3.1.

CommunityViz is not operating on integrated urban model like powerful predictive tools in kind of UrbanSim and TRANUS, that can run dynamic analysis of complex urban systems. CommunityViz is rather suitable for "what if", interactive sketch planning. Yet the models planners can develop with it's open modeling framework can be very sophisticated thanks to dynamic attributes, the unique capability of CommunityViz features. A dynamic attribute is based of formula that specifies how the attribute is calculated. It's value is automatically updated as any changes are made in the analysis. For example every

separate landuse plan unit is reevaluated :on the fly'' as it's area, mix of use or distance to nearest infrastructure changes for any scenario. We suggest that such, relatively simple in use planning tool may very relevant to community planning.
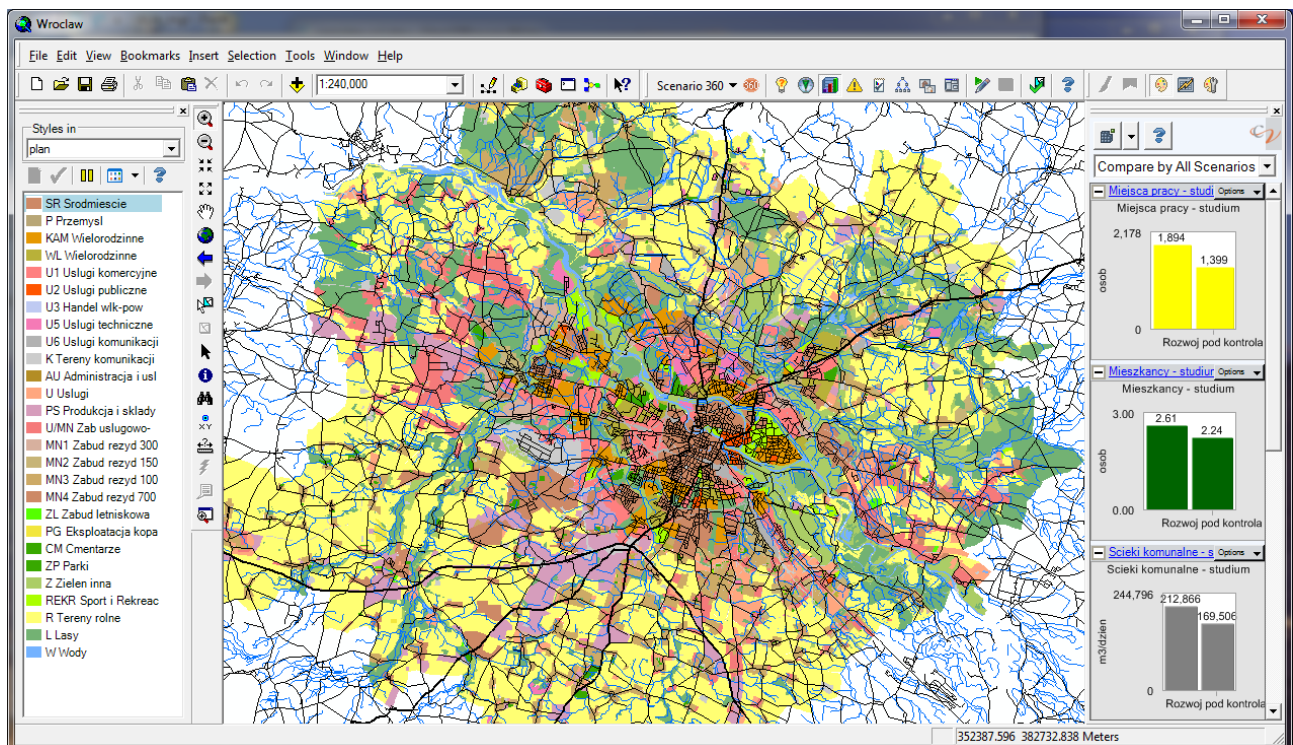
Fig. 2: Landuse models and planned landuse for Wroclaw Region (2012)

Indicator name	Description
Dzieci – studium	Children up to 19 years old
Emisja CO przez samochody	Total carbon monoxide emissions generated by vehicles associated with residential buildings in landuse plan layer.
Emisja CO2 przez samochody	Total carbon dioxide emissions generated by vehicles associated with residential buildings in landuse plan layer.
Emisja Hydrocarbon przez samochody	Total hydrocarbon emissions generated by vehicles associated with residential buildings in landuse plan layer.
Emisja NOx przez samochody	Total emissions of oxides of nitrogen generated by vehicles associated with residential buildings in landuse plan layer.
Gospodarstwa domowe – studium	Total number of dwelling units
Komercyjne zuzycie energii	Total annual energy used by commercial buildings in landuse plan layer for all applications, including electricity and heating.
Miejsca pracy – studium	Total number of commercial jobs
Mieszkancy – studium	Total number of inhabitants
Podatki PIT – studium	Tax (PIT income tax) revenues for local commune budget
Powierzchnie komercyjne – studium	Total commercial floor area
Scieki komunalne – studium	Waste water associated with residential buildings in landuse plan layer.
Wyjazdy samochodem	Total number of motorized trips taken each day, on average, by residential households (dwelling units).
Zuzycie energii przez GD	Total annual energy used by residential buildings for all applications, including electricity and heating.
Zuzycie wody – studium	Total water use associated with residential buildings in landuse plan layer.

Table 1: List of indicators defined to measure scenarios impact

Illustration presents application window with unified landuse plan and a list of 27 land-use models predefined for Wroclaw area. Each model (panel of the left) is given a name, symbolics and detailed characteristics (set of attributes, many of them dynamic) representing building density, mix of use, resources utilization rates etc. Using Scenario Sketch tools of CommunityViz, a land use can be applied to a feature by simply clicking on it on a map or by querying data. The planned landuse polygon takes on all the specified characteristics, and corresponding impacts are calculated automatically. Landuse models reference several regional changable, user-defined assumptions.

The set of indicators was defined within CommunityViz framework for Wroclaw region. Indicators measure accumulated impact of all plans, referencing datasets anywhere in the scenario. They provide an overall measurement opposed to landuse model attributes, which are an individual characteristic of polygons on a map. The list of indicators describing the demographic changes, build-out capacity under different zoning regulations, natural resources and energy consumption, waste production and increase the indicative amount of cars and the number of their daily trips is presented in tabular form below.

To demonstrate the technical feasibility of CmmunityViz alternative growth scenario was also defined. Concurrent to continuation reflecting development under the current growth plan, the second, more conservative scenario substantially concentrating development was proposed. It's increasing density of development in some areas by transferring growth from others reducing possible, undesirable effects of urban sprawl. Two variants are presented below side-by-side. A more sustainable scenario on the left and current growth on the right. The values of indicators are also shown.
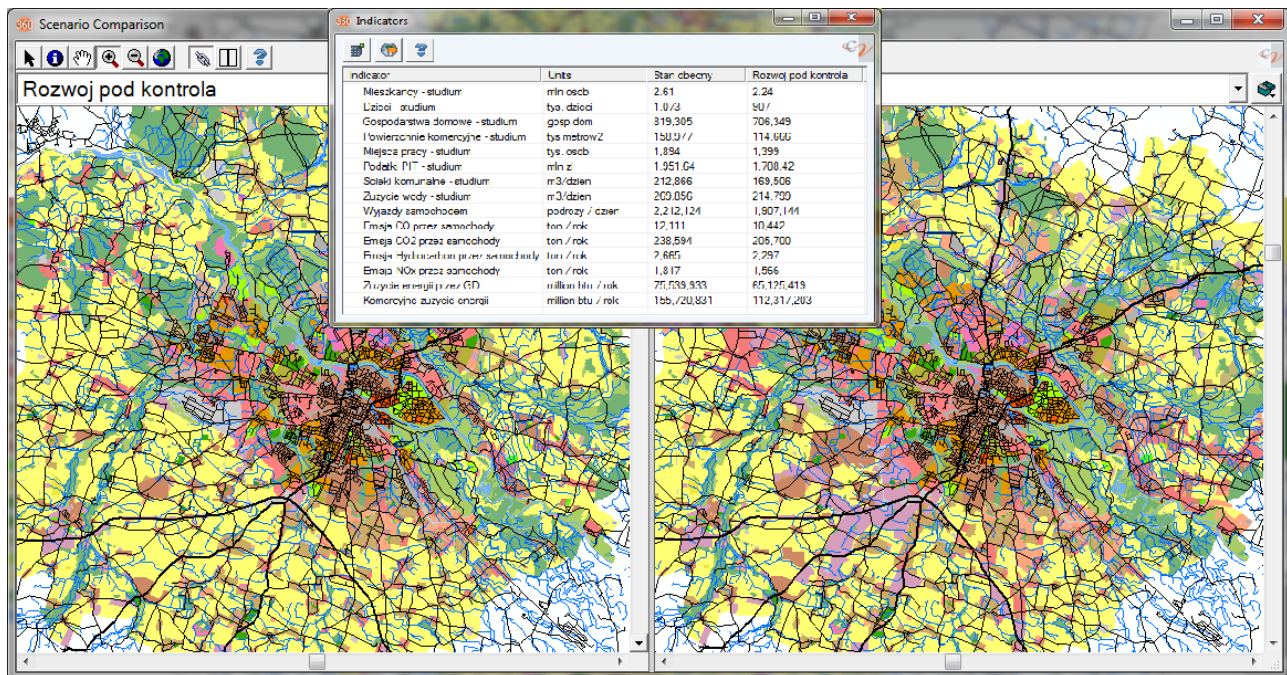
Fig. 3: Current growth plan (right) vs more conservative plan (left)

The analysis of current growth scenario provided the citizens and leaders of the Region with an understanding of the implications of their planning decisions. Big picture of land management policy conducted by independent communities not suprisingly makes negative impression. Incredible amount of land that was planed for development does not reflect any demographic trends. Plan that can make sense from the point of view of separated community is totally unrealistic for the region. It's hard to find any fit of infrastructure and landuse development. Landuse planning system does not seem to be linked with budget (planninng) capabilities of communes. It promotes rather than constraines urban sprawl.

We present here just preliminary results of the project. In comming months we are going to to determine the suitability of locations for accommodating future land use demands for residential, comercial and other land uses. Next stage is to define assumptions like population, employment and use it to project possible future land use of Wroclaw region.

5   CONCLUSION

Assessment the impact of local polices and local development plans can be carried out by using multiple techniques and tools. One of these instruments is GIS environment with CommunityViz. This system enables the assessment of the effects in parametric values, based on statistical assumptions. On the basis of the availability of local variables, the system can reliably and efficiently support the forecast, assessment and monitoring spatial transformations. CommunityViz is an understandable tool for participants, clearly outlining the results of the planned activities. The scenarios can illustrate alternative to current spatial polices and plans and their impact on the eco-capacity of the space before making a final decision on changes to the functional areas. The system allows to estimate the future potential media consumption, waste production, estimated load of the road network and many other features of the freely-defined demographic trends.

 A major advantage of the system is possibility to dynamically construct and analyze impacts of many scenarios with indicators based on any combination of available geoinformation and user-defined assumptions. Very important fact is that all calculations and resulting visualizations react „on the fly", nearly at the same time when assumptions are modified. That is why CommunityViz can be useful not only during time-consuming research but also in discussion with society.

Authors recommend CommunityViz as powerful educational tool for the decision-makers, planners and the citizens giving a better understanding of the complexities and impacts of land-use decisions. We recommended especially for those that want to use geoinformation creatively adding value on growing spatial data infrastructure.

6   REFERENCES

Czochanski, J. : The landscape in a monitoring system of spatial planning and development. Assumptions for the regional monitoring. „Problemy Ekologii Krajobrazu" T. XXVI. s. 59-74, Gdańsk, 2010
Fogel, P., Anusz, S., Decewicz, P., Fiszczuk-Wiktorowicz, J., Fogel, A., Gadomska, D., Kistowski, M., Kuznicki, W., Mendel, M., Pisarski, M., Pugacewicz, A., Rawska, H., Rybarczyk, W., Wlazlowski, T: Raport koncowy – Opracowanie kryteriów chlonnosci ekologicznej dla potrzeb planowania przestrzennego. Maszynopis, Warszawa, 2004
Gutry-Korycka, M.:Urban Sprawl Warsaw Agglomeration case study. Wydawnictwo Uniwersytetu Warszawskiego, Warszawa, 2005
Institute of Geography and Spatial Organization from Polish Academy of Sciences: Raport o stanie i uwarunkowaniach prac planistycznych w gminach na koniec 2007 r., Warszawa, 2005
Kozlowski, S. (red.): Zywiolowe rozprzestrzenianie sie miast. Narastajacy problem aglomeracji miejskich w Polsce, Studia nad zrównowazonym rozwojem, t. 2, Katedra Ochrony Srodowiska KUL, Komitet „Czlowiek i Srodowisko" przy Prezydium PAN, Bialystok-Lublin-Warszawa, 2006
Walker, D., Daniels, T. The planners guide to CommunityViz. The esstential tool for generation of planning. Chicago, 2011
http://placeways.com/communityviz/gallery/casestudies/pdf/ [2.10.2012]

JPI Urban Europe – Urban Megatrends Study

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1 ABSTRACT

For a research initiative, such as JPI Urban Europe (http://www.jpi-urbaneurope.eu), analysing the long term trends for urban development is crucial for the strategic focus of the programme. An Urban Megatrend study aims at providing the basis for the integrated, multidisciplinary urban research with a time horizon of 2050+ of JPI Urban Europe.

Global megatrends can be observed in cities in distinct ways depending on the characteristics of urban areas. Therefore, a multi-scale analysis of these trends has been conducted. The megatrend categories to be identified are: demographic evolution, climate change and environmental state, science and technology, economic dynamics, built environment and infrastructure and last but not least social-cultural issues. From these categories, a wide set of challenges for urban areas has been derived.

Beside a detailed data-based study, an intensive consultation and workprocess with experts and national representatives in workshops aimed and will aim at generating a differentiated picture of the urban development across Europe.

The Urban Megatrend Project will be completed in May 2013. Thus, final conclusions can be presented at the conference. This paper summarises our preliminary findings after two workshops and aims at giving an outlook on further research which is going to be conducted.

2 INTRODUCTION

2.1 What is the Joint Programming Initiative (JPI) Urban Europe?

The Joint Programming Initiatives (JPIs) are transnational research and innovation initiative introduced by the European Commission. The aim is to pool national resources in creating transnational R&D programmes with focus on grand challenges which cannot be solved on level of individual countries. With increasing urbanisation, cities are more and more put in the focus for a variety of reasons and by diverse disciplines. Therefore, JPI Urban Europe is striving to establish a large scale, long term, multidisciplinary and transnational research and development programme dedicated to urban development. JPI Urban Europe has been accepted as one of ten Joint Programming Initiatives.

2.2 Relevance of Urban Megatrends in JPI Urban Europe

Urban Areas across Europe are going to be faced with a number of challenges in the decades to come. As JPI Urban Europe is currently in its pilot phase, analysing urban megatrends is a central building stone for the strategic direction. The aim of this study has been to identify the trends, to analyse the interdependencies, to create a differentiated picture of the expected development path of cities across Europe and to identify the challenges resulting from the developments. Therefore, a multi-scale analysis, from global to local, has been undertaken.

Although the a majority of urban challenges result from global megatrends, the occurrence and effects on the local scale are very diverse depending on the geographical properties, the governance system with respect to urban planning and development, historical trends and economic performance. Thus, for a multinational long term initiative such as JPI Urban Europe it is essential to analyse the prospects and foreseeing possible trends and challenges on various scales to get a differentiated picture of the urban areas across Europe. The findings of this study are significantly influencing the Strategic Research Agenda of the JPI Urban Europe. Furthermore, in the short term, this study contributes to concrete call topics and to identify the immediate research needs. A comprehensive and differentiated study on urban megatrends and on the resulting challenges is a central building stone for the future strategic orientation of the Joint Programming Initiative.

3 METHODOLOGY

The methodology of the study is based on a multi-tire process. Desk research of available literature and exploration of existing foresight documents relevant assessing on urban megatrends provide the basis for further research. Therefore, scientific papers and national planning and development related documents with various thematic views, geographical scopes and time horizons were analysed. Cross linkages between and the integrative view upon the documents is ensuring a holistic analyses.

Representatives and experts from several countries participated in the in-depth research and analyses on national perspectives: Austria, Belgium, Denmark, Finland, France, Italy and the Netherlands. Thus, countries participating in the investigation are geographically distributed throughout Europe which aims at generating an all-inclusive view on the situation in 2050.

A quantitative analysis has been conducted for countries across Europe looking upon developments in demography, climate, social structure and economy. On basis of NUTS 3 regions, regionalised data on European urban regions regarding long-term trends of climate exposure, demographic and socio-economic development have been explored as a European wide data-driven backbone on the major trends.

4 MEGATRENDS AND CHALLENGES AT DIFFERENT SCALES

The study analyses urban megatrends at different scales: the global, the European and the national scale. Although global trends and geopolitical shifts are affecting countries across Europe, the occurrence, and thus the challenges stemming from the trends are diverse and depending on the circumstances in the countries and cities.

The data analysis illustrates a European wide image of trends and challenges influencing urban areas in the coming decades. Therefore, all urban regions with an urban population above 250,000 inhabitants within the functional urban areas have been taken into account. In total, 148 city regions were integrated into the analyses according to megatrends in demography, social structure and economy and climate. Data from EUROSTAT, as a baseline data, and projection data from IIASA (demography), the University Paris 1 (economy), the University of Edinburgh (land use) and from AIT (intraregional distribution in the urban regions) carried out within the PLUREL project (dealing with periurban land use relationships – www.plurel.net) and further ESPON projects (particularly ESPON climate as well as ESPON FOCI) have been applied for these analyses. The results clearly show that the megatrends manifest differently in space. In the study, two scenarios based on the PLUREL framework, which have been adapted from IPCC, were considered. Due to the limitation of this paper, only the highlights of the findings can be mentioned here.

4.1 Demography

Most urban areas are going to face a significant change in the demographic composition in the decades to come. Until 2025, while the majority of western European cities are expected to gain in population, especially the Central-Eastern parts of Europe are going to lose population which results in diverse challenges. While an aging society is going to influence urban areas across Europe, Central-Eastern and Eastern Europe are going to suffer even more by continuous out-migration driven by local economic decline. Therefore, this trend is amplified in the region.

In the contrary, urban areas with growing population are less prone from massive aging since the majority of people moving to urban areas are younger ones. Figure 1 shows the detailed expected population change in urban areas until 2025. The graphic is based on the scenario for moderate economic development. The demographic development of European cities is expected to influence the appearance and structure of urban areas significantly. Urban design, urban infrastructure and service provision have to be adapted to the needs of an aging society. Shrinking cities are going to be faced with a wide range of challenges. At the same time growing cities, especially in the European Pentagon (as suggested by ESPON), are challenged by demographic developments influencing the social composition in space as well as the built environment.
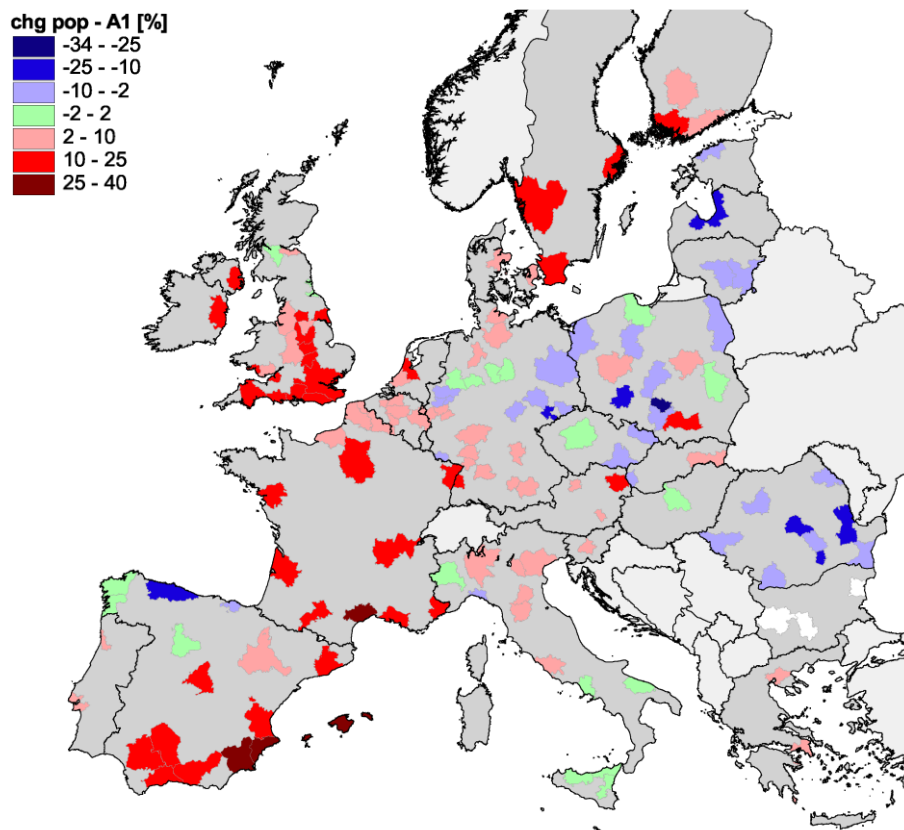
Figure 1: expected population change 2025. Data source: PLUREL project 2007-2010, scenarios A1. Population projections: IIASA, GDP projections: Univ. Paris, Nuts2 to NUTS3 disaggregation: AIT

4.2 Social-Cultural Issues

Due to the roll back of the welfare state and increased polarisation, social cohesion is expected remain under pressure. Thus, the willingness for solidarity and the further distribution of wealth are endangered. Especially, under the circumstances of an aging society with more retired and thus low income people, this issue is of high relevance. Within the urban regions, as well within entire Europe, the increasing economic polarisation results in higher spatial segregation at the local – as well as the supra-regional scale.

4.3 Economic Dynamics, and the Role of Science and Technology

Throughout Europe, a lack of qualified labour is expected. Due to the demographic dynamics, like the aging society, the workforce is decreasing. In 2050, due to global competition and the uprising BRIC and other Asian countries, the role European cities play in global competition is expected to be changed significantly. Service, high tech and innovative industries are expected to be of great importance for continuous growth in Europe.

Innovation, science and technology are seen as future opportunity for Europe. On the one hand it could significantly increase the sustainable development of cities, and thus contribute to the liveability of urban areas; on the other hand urban technologies bear great opportunities for economic growth. What is needed for a sufficient and successful implementation is the acceptance by the citizens. Furthermore, science and technology has to act and react to the social needs of the people. In the decades to come, the economic situation of and the quality of life in European cities are going to be highly dependent on developments in innovation, science and technology.

4.4 Natural Environment and Climate Change

Climate change is going to influence urban development in differentiated ways until 2050. Coastal urban areas will be affected by storm surges and have to adapt their infrastructure and built environments accordingly. Furthermore, extreme rainfall events with higher frequency and magnitude will be more likely causing river flooding affecting smaller cities by local events more frequently than larger ones by big events. Cities in the Mediterranean region and on the Balkans are going to face significant changes in the number heat days (Tmax >25°C) and tropical nights (Tmin >20°C) which can be severe if longer heat episodes will

occur. It is expected that the climate exposure in these regions is going to shift substantially and will affect more the older and ill population. Cities in Central-Eastern Europe observing a continental climate will suffer from more frequent and longer heat day episodes – the climate properties will change to those in near and far South-Eastern Europe Cities in Southern Europe are expected to suffer from temperatures currently observed along the African and Middle-East Mediterranean Coast. Urban Heat Island effects (lack of nocturnal cooling, lack of open space climate comfort, lack of cooling and ventilation in street canyons and apartments) will turn out to be growing issues. Cities in the Alpine areas will be less, Scandinavian and Baltic cities will be far less exposed by these trends.

5 FIRST CONCLUSIONS AND OUTLOOK

In the first part prospection exercise , the urban megatrends and stemming challenges have been identified by experts and committed by representatives of the participating countries. Based on data analyses, and the review of local studies a distinguished picture of the trends of urban space could developed for the European scale. The multi-scale analsyses depicts heterogeneous challenges for urban areas until 2050 across Europe regarding the megatrends in demography, social-cultural issues, economic dynamics, built environment and infrastructure, science and technology and natural environment and climate change.

The study is expected to be finalised in April/May 2013. The findings and storylines are going to be discussed with experts, stakeholders and city practicioners in order to draw robust conclusions how to proceed. By challenging the results with experts from various fields the scope of the study will be ensured and underlined. At the conference we will present the final storylines for urban development upon 2050 regarding the identified megatrends and challenges and draw conclusions for JPI Urban Europe.

This integrated and multidisciplinary study is providing essential input for the strategic research agenda of JPI Urban Europe is gaining in profile for a long term research and innovation initiative. Furthermore, in the short run, topics for research calls and for immediate actions are identified.

6 REFERENCES

APEC: The Future of APEC Megacities. Bangkok, 2011.
Boitier B., Da Costa P., Le Mouel P., Zagame P. (2008) Description of key macroeconomic variables, including regional GDP and employment for NUTS-2 regions. Univ. Paris 1. D.1.1.1 PLUREL – Project. www.plurel-org.eu
EUROPEAN COMMISSION: Cities of tomorrow. Brussels, 2011.
EUROPEAN COMMISSION: World and European Sustainable Cities. Brussels, 2010.
ESPON Climate 2011. scientific report, www.espon.eu
ESPON FOCI 2010 Future Orientations for Cities), scientific report, www.espon.eu
IPCC, 2007 (Pachauri, R.K. and Reisinger, A. (Eds.) Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change IPCC, Geneva, Switzerland. pp 104
Loibl W., Köstl M , K. Steinnocher (2010) Classification of the major European rural-urban regions at NUTS3-aggregate level. AIT, D 2.1.2, D 2.1.3 PLUREL – Project. www.plurel-org.eu
Skirbekk F., Prommer I., Samir KC, Terama E., Wilson C. (2007), Report on methods for demographic projections at multiple levels of aggregation. IIASA, D.1.2.1-PLUREL – Project. www.plurel-org.eu

LIMES – From Beacons to Facebook

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1 ABSTRACT

Communication is the basis for trans-border control of networks. With Project LIMES, the central element is the Limes, the ancient frontier region of the Roman Empire. The region is developing as a European cultural heritage site in 10 countries and parts of it have been recognized as a UNESCO world heritage site. The inhabitants of the European regions, the employees of the LIMES prototype project, representatives from the European Commission as well as actors and concerned people with their various interests and cultural backgrounds all have to be incorporated into communications networks. Facebook, Twitter, Google-Translator, Drop Box and blogs also present practical, simple and free (which is important for volunteers) possibilities.

2 LIMES ACTION

2.1 The Historical Region

The ancient Roman eastern frontier, about 3.500 kilometers long, passes through Europe. Even today, from Hadrian's Wall in the north to the Black Sea, its visible trail runs through forests, over hills and along rivers. Until about 1500 years ago, this is where beacons were burning all along the watchtowers. This frontier was also a rapid news chain between military stations (all north of the Alps, all are cities now). The beacons along the Limes were a very early precursor of the military ARPA net which was the predecessor of today's internet.

Today, the Limes passed through10 countries, 8 of them in the European Union. They all more or less use the cultural heritage of the Romans in today's tourism development.

2.2 The Interests of the European Commission

Commissioned by the European Commission for the project "Cultural Tourism in Rural Areas", analysts see a potential for an annual economic growth of 6 percent. Even two thousand years later, ancient Roman foundations, ruins of watchtowers or the depiction of historical situations in theaters and museum, guided tours on e-bikes or hiking paths can contribute to modern-day European economic growth. – When we talk about sustainability, we should take this 2000 year old economic history into focus.

In the first and second decade of the 21st century the mobile internet with access via smartphones and tablets plays an ever growing role in the life of the consumer. Local based information is an important driver for trade and tourism.

5 partners from three European countries were given 2 years to bring the Limes into the smartphone age. The most important goal is to initiate economic services via the smartphone and to encourage movement into the new economic age. Project LIMES is financed by the European Commission with approximately 500,000 Euro. Project LIMES is one of three large scale demonstrators. These three prototype programs are directly supervised and evaluated by the Commission.

About 1700 years ago, the Roman beacons burned for the last time. It wasn't until the 19th century that the historical significance of the Limes was rediscovered. In the 20th century a comprehensive touristic utilization of this cultural heritage began, initially with Hadrian's Wall in Great Britain. In the meantime, the Limes in Great Britain and Germany is recognized as a UNESCO world heritage site; the Netherlands are preparing a request for recognition of the "wet Limes" (the Rhine).The UNESCO seal and the care it requires are always a guarantee for increasing numbers of tourists. But despite all this, in many regions the Limes is often marketed as locally or regionally and not as an international world heritage site. The internationality of the Roman Limes troops and the monumentality of the construction do not find any comparable network in the millions of people along the 3.500 kilometer route.

From the very beginning, Project LIMES was able to rely upon a sound archeological network along the Limes. For tourism specialists, regional developers, tourism service providers or local politicians, many

Limes kilometers are merely a local historic location. Of course, we must also recognize the down-side of this Roman monument: seen purely from a local standpoint, the pre-industrial construction method of pile walls, watchtowers and castles frequently reduces the monument to "a few foundation rocks".

3 NETWORKS ALONG THE 3.500 KM MONUMENT

Setting aside all technological joys in the everyday life of a project member, the regular face-to-face meetings with Limes country representatives are the backbone of the project. Proposals and coordination on the business model can be developed much better if everybody works together.

3.1 Europäisches Advisory Board

LIMES-Action started at the beginning of 2012. Even in the European Commission application stage, partners were sought in all 10 Limes countries. All 10 Limes countries should be represented in a project-specific advisory board. But it wasn't until the second year of the project (2013) until this became a reality. The origins and the Limes-related interests of the advisory board members are heterogeneous: maintaining the monument is always the first priority of our archeological colleagues. Tourism and economy representatives do not questions this, but they have other priorities. The Advisory Board is a forum for scientific exchange as well as practical advice from the real economy. While, in Great Britain, millions of people visit Hadrian's Wall, parts of the Limes in Croatia are still located in the minefields of the 1991-1995 war. In Germany, Limes-related efforts are concentrated on building reconstructions, while in Lower Austria economic initiatives, like wine growing, are added to the reconstruction efforts.

The Advisory Board meets every 3 to 4 months.

3.2 Partners

The five partners of Project LIMES are now cooperating for the first time. The PER GmbH in Rheinland-Pfalz is a regional development agency of the state. The technological start-up business MARVIS hails from this region. It is the core of all technical tasks: developing and testing a smartphone app. In Lower Austria, CEIT (Central European Institute of Technology) is a partner whose specialty is public relations and dissemination. In Bulgaria, our partner is the German-Bulgarian enterprise INI-Novation. INI is an international business consulting company with a focus on innovation management and technology commercialization. The company has been providing tailored services to local governments, universities and R&D institutes. The Bulgarian city of Ruse is also a member of the partner team. The industrial city of Ruse develops cultural tourism on the historic foundation of the Roman fleet harbor. Every partner is responsible for individual work packages which are compiled separately or in cooperation with others.

The focal point for partnership cooperation is the weekly telephone conferences. Experienced partners were initially critical of the weekly coordination and regarded it as time-consuming. Nevertheless, the Friday morning conference has proven helpful. There are hardly any more time delays, the coordination is without problems, and even regular changes of personnel can be accommodated effortlessly. In the three partner countries, there is a total of about 12 people working on the LIMES project.

3.3 Stakeholders

In the three test countries Bulgaria, Austria and Germany, several steps the partners want to take need to be discussed with regional stakeholders. The tourism structure in Rheinland-Pfalz is compartmentalized and must often be addressed at the local decision-making level. In contrast, there is the simple city model in Ruse which is responsible for tourism development. Small working groups meet regularly in the text regions to coordinate ideas on economic initiatives and Smartphone app service offers. One of the essential questions continues to be which project-relevant data can be used and networked for the LIMES project. The partners communicate on a regular basis, often in weekly e-mail newsletter (in the local language plus English), with the stakeholders.

A total of about 1,500 actors are involved in the LIMES Project in the three countries.

4 SOCIAL NETWORKS, NEW MEDIA AND DIGITAL TOOLS

There are dramatic changes in the opportunities for international projects by social network systems (SNS), micro-blogs and blogs.

At the moment, the LIMES Project operates 6 blogs, micro-blogs and websites in three languages (German, Bulgarian, English): information is passed in a timely and cost-effective manner to a large number of people. Smartphone messages or photos on Project LIMES provide a positive impression of a very abstract project. The first photo of the app prototype was published via digital media.

Fig. 1: The common LIMES Blog

With the LIMES App as the project's core element, a lot of rural area actors are initially left out. Awakening an interest or understanding for a European network and a mobile phone service for tourists regarding the entire Limes in the over-40 population is slow. Even by eliminating postal deliveries almost completely we found that the communicative backbone in the non-commercial area tends to be e-mail versus Facebook or Twitter.

In addition to the LIMES App, the activities in the Rheinland-Pfalz Limes region are focused on regional services in the 2013 tourist season.

Fig. 2: The Facebook page of Creative Tourism Limes

Creative Tourism Limes offers digital (and thus inexpensive) services with around 30 programs presented by 90 providers. In partnership with professionals, market newcomers are given the opportunity to enter the market without financial risk. A central editorial staff and common market-related, standardized modules (web building blocks, Facebook page) provide assistance.

Fig. 3: The common Creative Tourism Limes Homepage.

For its internal work Project LIMES does not employ a joint server but uses private, free-of-charge cloud services for document administration.

5 CONCLUSION

For internal administration as well as telephone and mail services, the helpful services provided by Facebook, Twitter and blogs are the most important tools for the European prototype project LIMES. When it comes to "office-to-office" communications, however, social network systems do not play any role. With external contacts and for information and communication purposes within the project environment, social network systems (SNS) are becoming increasingly important today. At the moment, the role played by social networks when designing and offering regional tourist services remains to be seen. An answer will be found in the 2013 season.

6 REFERENCES

www.limes-mobile.eu
www.facebook.com/limesblog
www.kreativreisen-limes.de
www.facebook.com/kreativreisenlimes

LIMES – Older than the Way of St. James

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1 ABSTRACT

Like the ancient Limes, the Way of St. James connects various countries and regions in Europe. For many years, the Way of St. James has been a success in the tourism market. However, the Limes – which is considerably older than the Way of St. James and certainly has the same potential – is much less developed and known as far as tourism is concerned. Only some regions in Europe make use of the Limes as a location factor to promote economic development and to keep up with social challenges. They demonstrate multiple opportunities how the Limes can be valued creatively and how these values (i.e. guided tours, events, exhibits, authentic replicas, illuminations, interactive museums, creativity offers) can be communicated. All regions can profit from these experiences.

The LIMES project strives to interconnect the regions along the Limes and promote sustainable tourism in the regions by innovative services and technologies. Creativity will play a central role in the strategic approach to this project.

2 PRELIMINARY REMARKS

This presentation deals with tourism development of the Roman Limes in Europe. It is based on the assumption that, with the Limes, similar tourism development is possible as was experienced with the Way of St. James in the last decades. My views are based on the experiences and results which have, so far, been achieved by the Limes project which is sponsored by the European Commission. Aspects on sustainability, competitiveness and territorial cohesion will also be discussed.

3 THE WAY OF ST. JAMES – AN EXAMPLE FOR THE DEVELOPMENT OF A CULTURAL ROUTE

The Way of St. James is one of the most well-known long-distance hiking paths in Europe. For more than 1000 years, pilgrims have walked this path to the tomb of the Apostle St. James in the Spanish City of Santiago de Compostela. Mostly, the Way of St. James is considered to be the main route through Northern Spain, the so-called "Camino Frances". This route goes from Saint Jean Pied de Port through the Pyrenees, then traverses the north of Spain near Pamplona, Burgos, Leon and Astorga all the way to Santiago. However, it is not only this main route which is referred to as the Way of St. James; also all pilgrims' paths whose destination is the tomb of the Apostle James in Santiago de Compostela are also referred to by that name. There are Ways of St. James in Germany, Poland, the Czech Republic, Hungary, Italy, Austria, Switzerland, France, Spain and Portugal. Together, they form a Europe-wide network of main and side routes which connect throughout Europe (ref. figure 1).

It is not just the European dimension which makes the Way of St. James so interesting in the touristic development of the Limes; it is also the successful activities carried out in the past decades in the revitalization of the Way of St. James. The following facts are cited as examples:

- In 1962 the main route, Camino Frances, was officially declared as a historic-artistic ensemble.

- In 1984 the European Council pronounced the Way of St. Frances as a European Cultural Route and declared its protection as a major goal of European cultural policy.

- In 1993 the Camino Frances in Spain and, in 1998, the four main Ways of St. James in France were incorporated into the list of UNESCO world heritage sites.

- In 2005 the transnational cooperation project "European Ways of St. James" was begun. The reactivation of the Way of St. James network was thus expanded to other countries. An internet homepage (www.jakobsweg.net) was established as a central platform in order to facilitate the exchange of communication and information.

These and other activities have resulted in a considerable increase in the number of pilgrims. In the last 10 years, more than 2 million pilgrims (possibly many more) from all continents hiked the Way of St. James

and made use of the multiple services and products along the way, thereby contributing to the economic development of cities and regions.
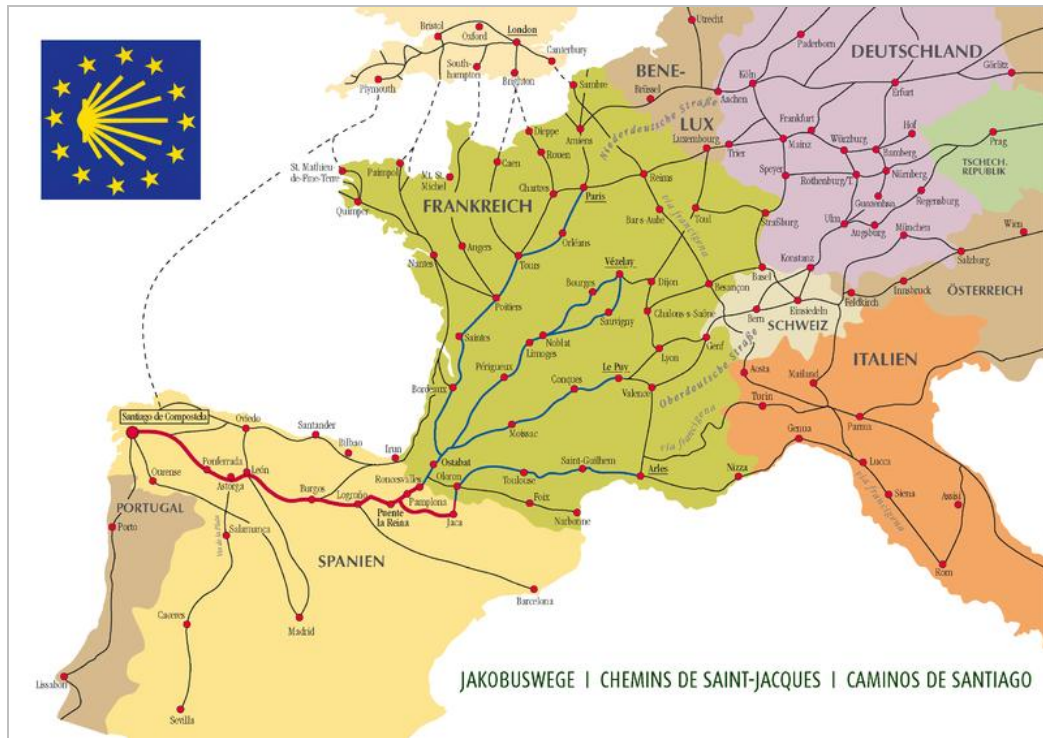
Fig. 1: Ways of St. James in Europe (Source Wikipedia)

4 THE LIMES IN EUROPE

4.1 The Limes Route

Unlike the net-like formation of the Way of St. James, the Limes has a linear shape. At the time of the largest expansion of the Roman Empire under Emperor Trajan (99 till 117 A.D.) the Limes ran from the Atlantic coast in the north of England through Central Europe to the Black Sea, from there to the Red Sea and through Northern Africa to the Atlantic coast. In Europe alone, the Limes was more than 3,500 kilometers long. It was secured in its entirety by a chain of watchtowers as well as small and large castles. Rivers like the Rhine and the Danube as well as mountains formed natural borders. In places where there were no such natural barriers, the Romans secured the borders of their empire with palisades and walls. The Roman border facilities served as a military "early warning system" and were supposed to ensure control of the daily traffic of people and goods with neighboring tribes. The economy was booming along the Limes. The land was cultivated. Roads and cities were built.

Today, the Limes passes through 10 European countries (Great Britain, the Netherlands, Germany, Austria, Slovakia, Hungary, Croatia, Serbia, Romania, Bulgaria) – see figure 2.

4.2 Requirements for the Touristic Development of the Limes

Compared to the Way of St. James, tourism development of the Roman Limes is in its infancy. There are, however, some countries which have initiated regional selective attempts at development. But there are also countries where there are no attempts whatsoever to utilize the Limes for tourism development. In the past years, cooperation at European level was essentially limited to the specialized area of archeology and tourism was not considered.

Why is it that the Roman Limes, which is 1000 years older, could experience the same successful touristic development as the Way of St. James?

Let me first describe the natural and cultural potentials.

In many places, original structures of the Limes (walls and trenches, ruins of watchtowers or castles) still exist and can be experienced as such (Schafranski 2010, www.vici.org, Vujovic 2008). Measures have been

taken to utilize some sections for tourism. The spectrum of measures taken is so large, that only a few examples are cited here:

- Reconstruction of Limes-related facilities, e.g. castles (The minor castle in Pohl, Saalburg), watchtowers, hot springs and building.
- Performance of Limes-related events (Roman markets, game and sports competitions, illuminations, theater performances, etc.)
- Expansion of gastronomic services along the Limes by including Roman food and drink.
- Improvement of information services, e.g. by building museums and information centers, training tour guides/Limes Cicerones, erecting information boards.
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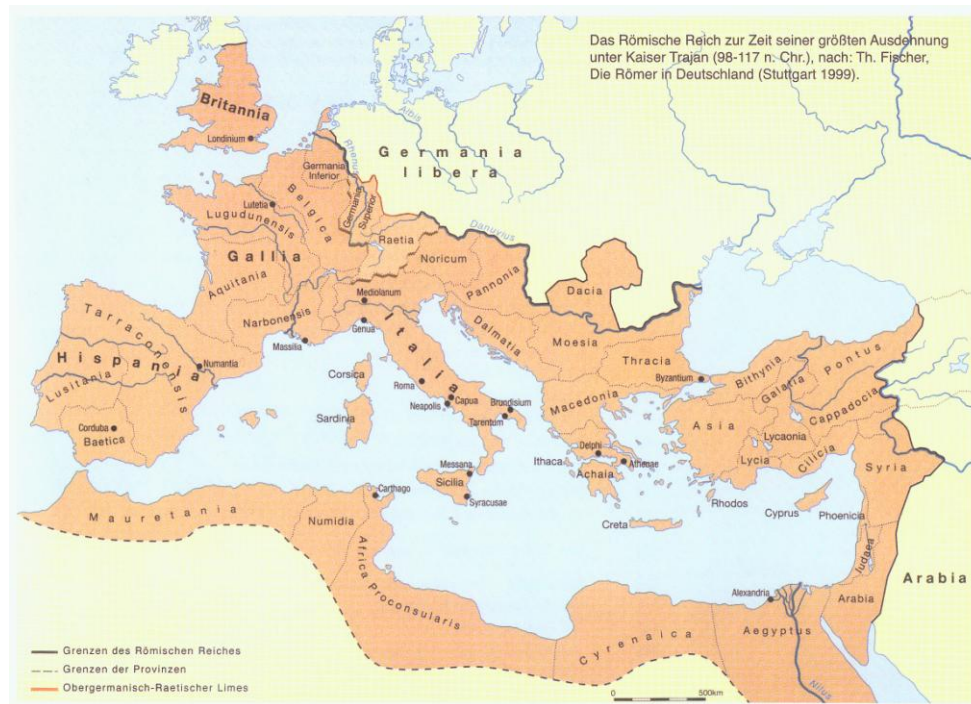
- Fig. 2: The route of the Roman Limes at the time of its greatest expansion around 117 A.D. (Source: LVermGeo Rheinland-Pfalz. GDKE)

Development of hiking and bicycling paths along the Limes.

The Limes sections or locations which experienced tourism development (e.g. Hadrian's Wall in Great Britain, Xanten, the Limes Castles in Pohl and Saalburg in Germany, Carnuntum in Austria) demonstrate that tourism development along the Limes can be promoted significantly by these measures. The deciding factors for success are creativity, cooperation and the focus on a target audience.

Along the Limes in Europe there are many more natural and cultural sights which have not been cohesively compiled and evaluated. It is especially notable that along the Limes there are 20 UNESCO world heritage sites which make the Limes a special cultural route.

Further aspects for initializing opportunities for tourism development are as follows:

- The increasing importance of culture tourism even in rural areas (Drda-Kuehn 2010).
- The inclusion or intended inclusion of the Limes in the UNESCO world heritage site list (so far, the following sections of the Limes in Europe have been included in the world heritage list: Hadrian's Wall and the Antonine Walls in Great Britain, the Upper Germanic-Rhaetian Limes in Germany).
- The successful beginnings of touristic marketing of the Limes in several sections of the Limes.
- Eastern and Western Europe are growing together.

For the successful utilization of these development opportunities it is vital that the regions along the Limes cooperate more comprehensively in the future.

5 PROMOTING SUSTAINABLE TOURISM ALONG THE LIMES WITH THE EUROPEAN "LIMES" PROJECT

It is a central goal of LIMES (abbreviation for: Large Scale Innovative and Mobile European Services for Culture Tourism in Rural Areas) to promote culture tourism in the rural regions along the Roman Limes. The major points are as follows

- Economic development of the test regions in Bulgaria, Austria and Germany with innovative services and mobile technologies as a pilot project.
- Promote cooperation at various levels.
- Develop a prototype LIMES App for the 3 partner countries, thus creating the technical basis for the expansion of the information system to all 10 countries along the Limes.

The project includes our partners from Bulgaria, Austria and Germany. The other 7 European countries, which are located along the Limes, are represented in an Advisory Board.

Promoting sustainable tourism is an ambitious goal of the LIMES project. Sustainable development certainly is the key for the competitiveness of tourist destinations. This means that economic, social, cultural and ecological goals must be coordinated. It is emphasized as EU policy by the Commission's 2010 communication "Agenda for sustainable and competitive European tourism". It proposes various principles to achieve the goal of competitive and sustainable tourism (e.g. development with a suitable rhythm, i.e. by considering the specific character of the destination – including all interest groups – utilization and Europe-wide dissemination of available knowledge).

Not all these principles can be considered and implemented in the promotion of sustainable tourism along the Limes in this European LIMES project, which is limited to two years. The focal point of LIMES is the impetus for a joint and coordinated touristic utilization of the Limes by the countries along the Limes. This is expressed in the activities which have, so far, been initiated and which are described as follows.

5.1 Awareness Development

Awareness of the opportunities to promote tourism development by smart phone and tablet mobile services hardly exists, even in tourist organizations and enterprises. That is why it became necessary to develop awareness. In addition, it was our goal to make people aware that a Europe-wide touristic development of the Limes presents opportunities which do not occur in regional development and which should be utilized accordingly.

At the same time, the goal of these activities was to energize development forces at regional level, to mobilize potential and to promote cooperation.

Various events were hosted in the test regions along the Limes. In our own LIMES newsletters, newsletters and journals of other organizations as well as media releases information was provided about the LIMES Project and the development opportunities it provided.

In summary, it can be said that, based on our activities, the interest to use new technologies for the promotion of tourism, to cooperate on a European level and to learn from each other has obviously grown significantly.

5.2 Cooperation on Various Levels

Measures to promote cooperation were used for the entire European level, the regional level as well as for the cooperation between regional actors, organizations and enterprises.

In order to improve cooperation at European level, the LIMES Project partners participated in and contributed to a series of international events in Europe. The cooperation between the partners from Bulgaria, Austria and Germany is close. The Advisory Board, which contains representatives from the other 7 countries along the Limes, is regularly informed about the progress and results of the project. The European cooperation has made LIMES known internationally and has provided many impulses for tourism development in the regions.

At the regional level, measures were taken to improve cooperation between regional community administrations, tourism organizations, economic development agencies, chambers of commerce and

industry, as well as other organizations with a view towards tourism development of the Limes region. In Rheinland-Pfalz these activities were geared toward concrete projects, e.g. developing a market strategy for the Limes region, improving the sign-posting of the Limes hiking path and implementing an organization for the development of the Limes region. The willingness for cooperation in this rural area is very high. It is the basis for improving competitiveness and cohesion in the Limes region.

A high value was put on the cooperation between regional actors, organizations and enterprises. In Rheinland-Pfalz, information events and workshops were held in cooperation with the chamber of industry and commerce. In addition, the actors were directly approached via a so-called Limes tour. This resulted in co-operations within established projects.

5.3 Development of Innovative Services

It is well-known that the life cycle of offers and the change in tourism expectations, which are a factor of societal changes, make it necessary for the competing destinations to continually develop innovative services. This is a challenge for all regions along the Limes. Competition between the regions along the Limes can be favorable for development.

In Rheinland-Pfalz we were successful in developing innovative services in cooperation with businesses, tourist organizations and citizens. In 2013, 90 private hosts will offer 26 new tourist services with 70 events within the "Kreativreisen Limes" program. This will result in revenue of approximately 50,000 Euro for the service providers. The events are aggressively marketed, to include Facebook and internet home pages.

In addition, E-bike tours along the Limes are offered for the first time in the 2013 season. We were able to get 4 service providers to offer a total of 12 interesting E-bike tours.

5.4 Developing a LIMES App

The LIMES App, which is intended as a prototype within the framework of the LIMES project, is very important for tourism development and competitiveness of the regions along the Limes. For the first time, the entire Limes in Europe is the focus of tourist development. In addition to information about the Limes, the App will contain important information on tourist services along the Limes, to include the innovative services which were developed jointly by the regions. Initially, the App will only apply to the test regions, but all regions and countries along the Limes will be included in the future.

6 CONCLUSION

Europe is one of the most attractive tourist destinations in the world. Accordingly, tourism is an important economic factor in Europe. It contributes significantly to economic growth and job creation.

Like the Way of St. James, the Limes can become an outstanding European destination. The conditions for the development of sustainable and competitive cultural tourism along the Limes exist. We must now use and combine the potentials. Tourism trends have to be acted upon in a creative and anticipatory manner.

In all European countries along the Limes there is a willingness for tourism development of the Limes and to utilize new technologies in the process. The development of the LIMES App within the framework of the European LIMES Project makes an important contribution to develop and market the European Limes as a whole. The formation of a Limes Alliance is sought for the development of the Limes as a European cultural route.

7 REFERENCES

DRDA-KÜHN, Karin: Mini-study in the field of services innovation in tourism niche markets. Bad Mergentheim, 2010.
SCHAFRANSKI, Franz: UNESCO-Welterbe "Grenzen des Römischen Reiches, Obergermanisch-Raetischer Limes". In: Blätter zum Land, 2/2010, Herausgeber: Landeszentrale für politische Bildung Rheinland-Pfalz. Mainz 2010.
VUJOVIC, Vojislaw und Marlies: Der Limes: Von der Nordsee bis zum Schwarzen Meer. Klagenfurt. 2008
EUROPÄISCHE KOMMISSION: Europa – wichtigstes Reiseziel der Welt: ein neuer politischer Rahmen für den europäischen Tourismus. Mitteilung der Kommission an das Europäische Parlament, den Rat, den europäischen Wirtschafts- und Sozialausschuss und den Ausschuss der Regionen. Brüssel 2010.
www.europa.eu/legislation_summaries/enterprise/industry/l10132_de.htm
www.vici.org
www.jakobswege.net
www.de.wikipedia.org/wiki/Jakobsweg

LIMES – Turning on the Light Switch

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1 ABSTRACT

LIMES [1] is an EU project which examines whether new, innovative, mobile services can strengthen the economy in areas outside the big cities. Test areas are rural regions along the Roman Limes in Europe. There are multiple challenges in the project: low infrastructure (regarding technology, mobility, supply, etc.), constrained thinking of the population, low employment, outdated industry, etc.

The rural regions, however, have an enormous unused potential which should be developed. By creating a "bottom-up" cooperation, a "we-feeling" will exceed borders. The pitfalls of low network coverage are avoided by a large open Wi-Fi initiative. Studies have shown that the rigid sector mentality must be eliminated in order to create new, cross-sector approaches which will strengthen the region from within. With all this, innovative mobile services play an enormous role – to lead rural regions into the present and to turn on a common light switch.

2 INTRODUCTION

The challenges citizens and planners face in rural areas are widely known. Demographic change and a declining infrastructure have left their footprints. This not only applies to closing post offices, banks, supermarkets, etc., but it is also a mobility factor. A possible sector, which defies the decline of the regions outside the big city lights, is tourism. But how can it survive when public transportation is decreased and hikers have no place to eat or spend the night? How can rural regions be economically supported under these conditions? This question is the purpose of the European LIMES project. Its goal is the promotion of economic development in the regions along the Roman Limes in Europe by culture tourism and the application of innovative mobile services.

Limes is the name of the ancient Roman frontier that represented the border of the Roman Empire at its greatest extent until the beginning of the 3rd century AD. The influence of the Roman Empire, which was one of the greatest states the world has even seen, survived for over 2000 years. Successive generations have built on that heritage and modified it, thus helping to create our modern world. Parts of the Limes became a UNESCO world heritage site: Hadrian's Wall, the Antonine Wall and the Germanic Limes were added to the world heritage list (JILEK; KUTTNER; SCHWARCZ, 2011, p. 8ff; ALTHOFF et al.). The potential of the cultural heritage has not been exploited as far as cultural history is concerned.

3 THE OPPORTUNITIES OF CULTURE TOURISM AND MOBILE SERVICES

Tourism has always been an important economic factor for rural areas. According to OECD, culture tourism is that sector of tourism which is predicted to experience a dynamic development in the next years. Culture is an important factor for the attractiveness of most destinations, for international as well as for domestic tourists. More and more people put culture into the focus of their vacation planning. Destinations, cities as well as regions, increasingly use the opportunity to point out cultural offers in order to establish a better market position (ref. OECD 2009).

A big potential for tourism is provided by new, innovative mobile services (ref. European Union, 2012, p: 11ff). They are designed to make travelling easier. With their mobile phones, travelers have all the information they need at all times at all locations world-wide. This is the reason the European Commission created the European Mobile and Mobility Industries Alliance (EMMIA). EMMIA's goal is to bring together representatives from politics and industry to ensure joint sustainable solution approaches in the development of mobile services (ref. EMMIA, 2013). To test these solution approaches in real life, there are three Large Scale Demonstrators. The three demonstrators develop and test transferrable concepts for the provision of

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[1] Stands for Large Scale Innovative and Mobile European Services for Culture Tourism in Rural Areas

mobile services for tourists. This is done in close cooperation with tourism agencies, public administrations and businesses in rural areas with valuable but under-used cultural heritage sites (MAYO 2012, p. 18).

4   THE LIMES TEST REGION IN RHEINLAND-PFALZ

In addition to Austria (Lower Austria) and Bulgaria (the region around the city of Ruse), another test region is the rural region along the Roman Limes in Rheinland-Pfalz (Germany) . A different partner is responsible for each region so that diverse objectives can be realized in the individual region.

The State Project Development Agency (PER) is responsible for the region in Rheinland-Pfalz. Geographically, the Limes region is located in a triangle between Cologne/Bonn, Koblenz and Frankfurt/Main (ref. figure 1).
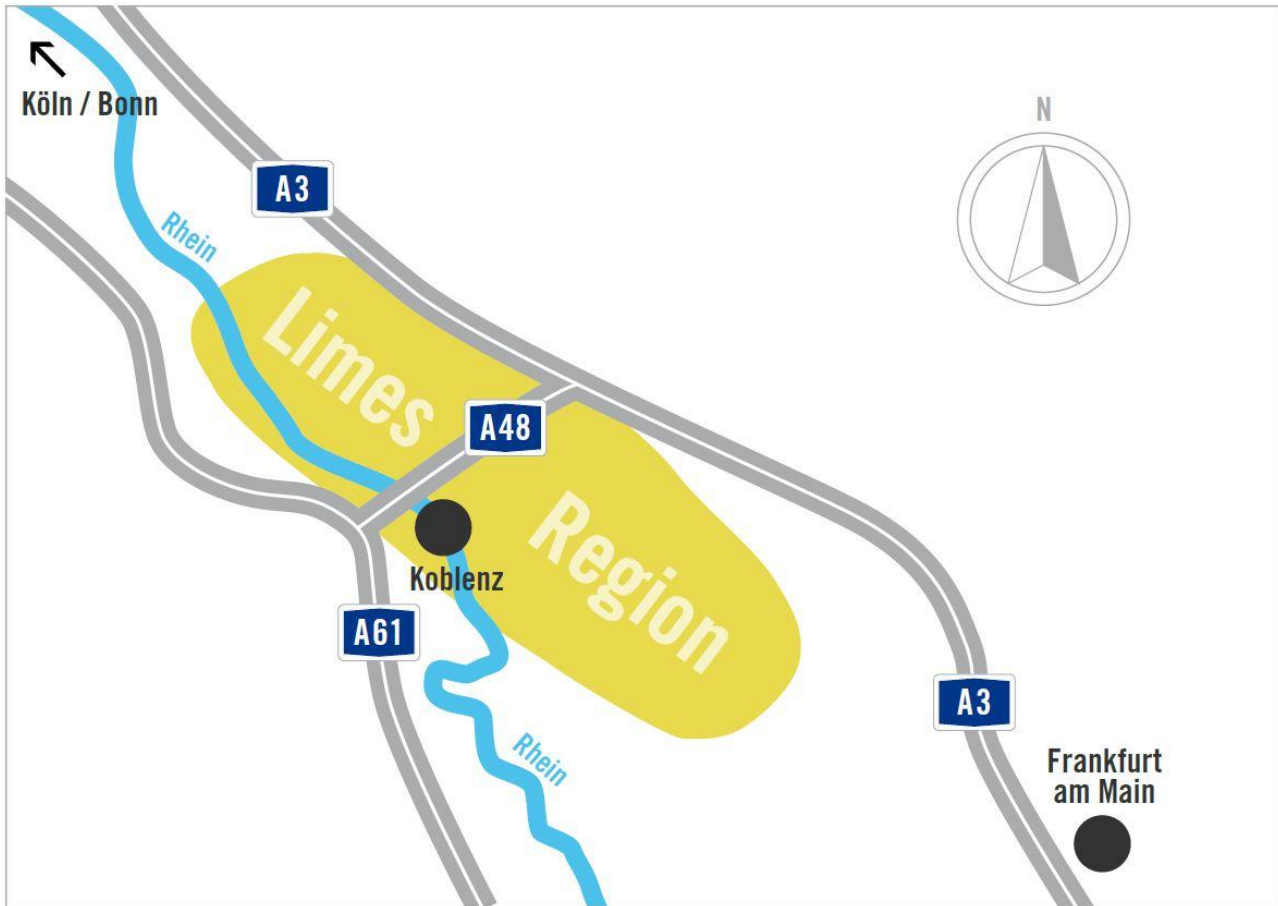
Fig.. 1: The Limes Region in Rheinland-Pfalz is located in a triangle between Cologne/Bonn, Koblenz and Frankfurt/Main.

The area of 750 square kilometers has 250,000 people in 4 counties, 12 associated communities and non-associated cities as well as 42 villages and suburbs (ref. figure 2). During the past years, various visualization and maintenance measures were implemented (SCHAFRANSKI; THOMAS, 2010, p. 158 ff). One of the obstacles for an expansion of the tourist infrastructure is the narrow-focused thinking of many actors in the region. The idea that visitors are not interested in political borders and that they want to experience the region as a whole has not yet been realized. There currently is no central organization which deals with the touristic development of the Limes region as a whole.
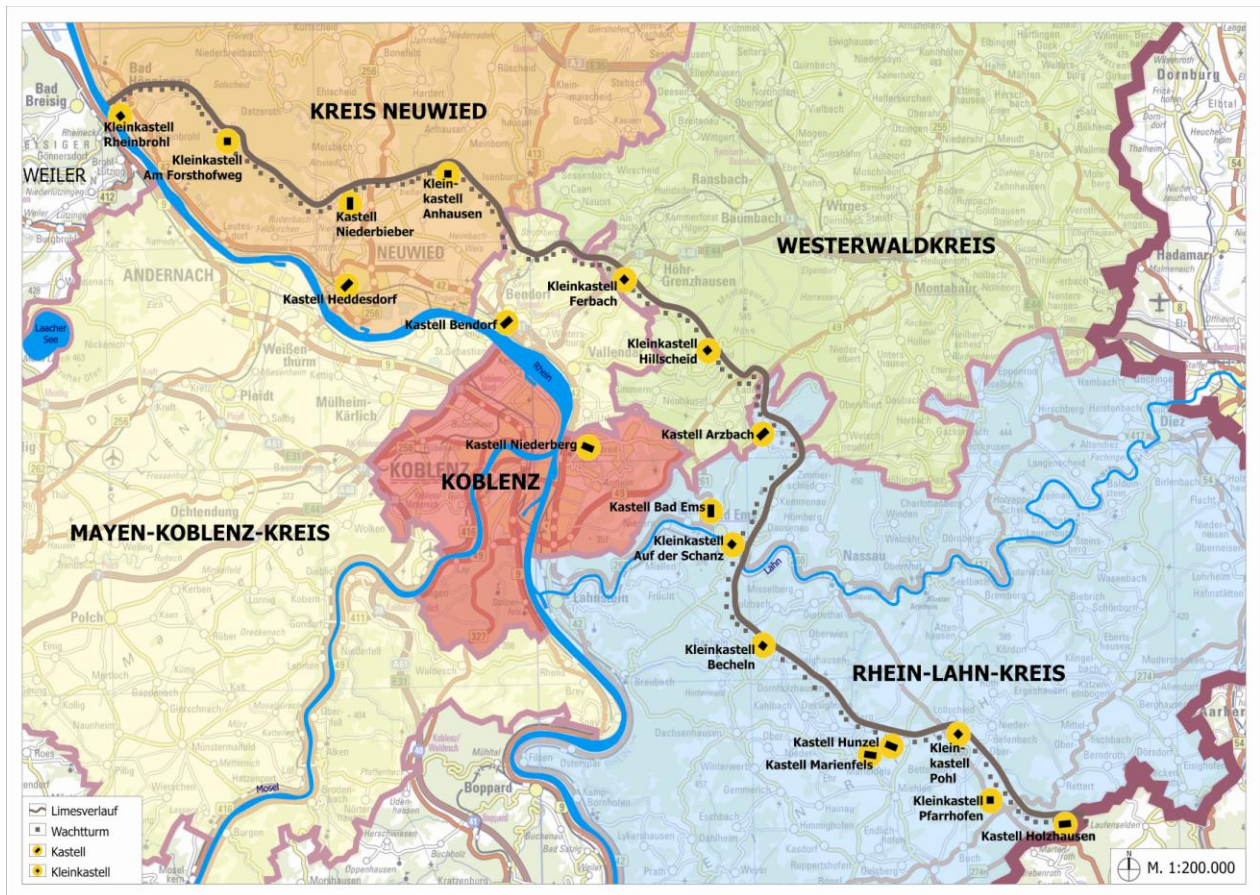
Fig. 2: The Limes passes through rural areas and has a few spots which are interesting for tourists.

5 THREE INITIATIVES TO INITIATE INNOVATIVE SERVICES

The pronounced narrow-focused thinking is only one challenge faced by project LIMES in accomplishing its goal to promote culture tourism in Rheinland-Pfalz.

As a first step of the project, the situation was analyzed with a view toward tourism and technology. This resulted in two interesting facts: Firstly, there are relatively few touristic offers in the region. In order to market the region successfully, however, a minimum of tourism-related infrastructure is recommended. Secondly, it was found that the 3G network coverage in Bulgaria and Austria is very good, but in the German test region it was very limited and spotty. If mobile services are to function, all visitors must have internet access – at least at certain locations.

Developing potentials in rural areas requires an intensive exchange with stakeholders from the region. Solution proposals must be developed together with the stakeholders, otherwise they cannot be realized practically later (ref. HOEFER, 2010, p. 328). Promotion attempts often fail because, after the on-site promotion is terminated, no-one from a local level stands behind the project. In order to achieve a "bottom up" cooperation, several on-site workshops and events with various subjects were organized. Actors from the local political scene, tourism, business as well as volunteers from the region were invited. The feedback from these events was used to develop various concepts to make the region along the Limes attractive for tourists.

5.1 Creative Tourism Limes as a Cross-Sector Approach

One approach which created new tourism services in the region is Creative Tourism Limes. This initiative came about in cooperation with Creativ Tourism Austria. It is supported by regional economic developing agencies, community associations, local tourism organizations and the Koblenz Chamber of Industry and Commerce. It is, therefore, a good example for trans-community and international cooperation.

Creative Tourism Limes promotes the idea that creative courses (like distilling one's own single-malt whisky or a professional painting course) are offered as a package combined with a culinary experience program and overnight stays in a hotel (ref. figure 3). Tourists are offered an experience which is perfectly attuned, and tourist specialists profit from the synergy effect.

Fig. 3: Creative Tourism Limes – Something for Everyone

More than 70 enterprises or private persons are involved in Creative Tourism Limes; with almost 30 offers and more than 70 events in the year 2013 they generate an additional economic value of at least 50.000 Euro. The investment costs are relatively low, with approximately 20.000 Euro for personnel, costs for a joint home page, a marketing cooperation with the Big Brother Creative Tourism Austria, plus print and design costs for flyers and PDF brochures. With the marketing cooperation program, Creative Tourism Limes was introduced to the general public at the International Tourism Fair in Berlin.

As a cross-sector approach, the creative economy together with tourism specialists put the program on the joint home page www.kreativreisen-limes.de and on Facebook www.facebook.com/kreativreiseamlimes. The partners are challenged to actively participate in the promotion and communication via Facebook. This will strengthen their understanding of mobile services and the opportunities of this potential which was, up to know, unused.

So far, results demonstrate that a big budget or sponsoring opportunities are not always needed in every case for the stimulation of the economy in rural regions. It requires courage, time and a view beyond state borders. It's worth talking to neighbors, to learn from others and to become active one's self.

In the 2013 season, Creative Tourism Limes will be tested under real-life conditions to investigate how tourism in the rural regions can be better developed. Whether the Limes regional concept works and what the future will bring will be determined at a joint meeting in October. One thing is sure right now: other Limes countries like The Netherlands have great interest in expanding the concept to their Limes regions.

5.2 E-Bike Tours along the Limes

Another approach which created new program for tourists in the region was the E-Bike Initiative along the Limes. E-bikes have become very trendy in the past few years. Supported by environmentally-friendly electric motors, e-bikes can be used to master steep hills and long distances. Joint bicycling tours no longer depend on how old or physically fit people are; e-bikes provide active recreation even for "silver agers". In view of the demographic change e-bikes will stay trendy even in the future.

The newly created e-bike tours take people to the special sites along the Roman Limes, the Roemerwelt museum, or the authentically reconstructed Limes castle in Pohl as well as to other unique cultural and scenic sites of the region. Examples are the castles and fortresses in the Middle Rhine Valley, a UNESCO cultural heritage site. Four providers have joined forces and are offering 12 interesting tours, most of which are guided.

As with Creative Tourism Limes, investment is comparatively low. A flyer was printed for 2.750 Euro; it provides information on tours, services, dates and booking methods. The service is also advertised on the Creative Tourism Limes homepage, thus creating a synergy effect between Creative Tourism and e-bike

tours. The partners who arrange e-bike tours along the Limes are challenged to actively participate in the marketing and communication via Facebook and their own home page. The end of the 2013 vacation season will show whether this program was successful.

5.3 Network Coverage via Free Wi-Fi

The "Free Wi-Fi and Loading Facilities for Visitors and Customers" program was created to face the challenges of low network coverage in the Rheinland-Pfalz Limes region. With the support of the Koblenz Chamber of Industry and Commerce, all businesses in the region were asked to make their Wi-Fi and electrical outlets available for customers and visitors to the region. This means that visitors can use mobile services despite the limited network coverage and international visitors avoid the high data roaming charges. As smart phone batteries are usually charged only for a limited time, offering visitors the opportunity to charge their smartphones in a restaurant, makes good sense. In this way, hikers can use mobile services like hiking apps without having to worry about discharged batteries.

So far, more than 100 regional businesses are participating and are covering the gaps in network coverage (ref. figure 4). Visitors may recognize the participating businesses by a sticker which was distributed to these enterprises (ref. figure 5).
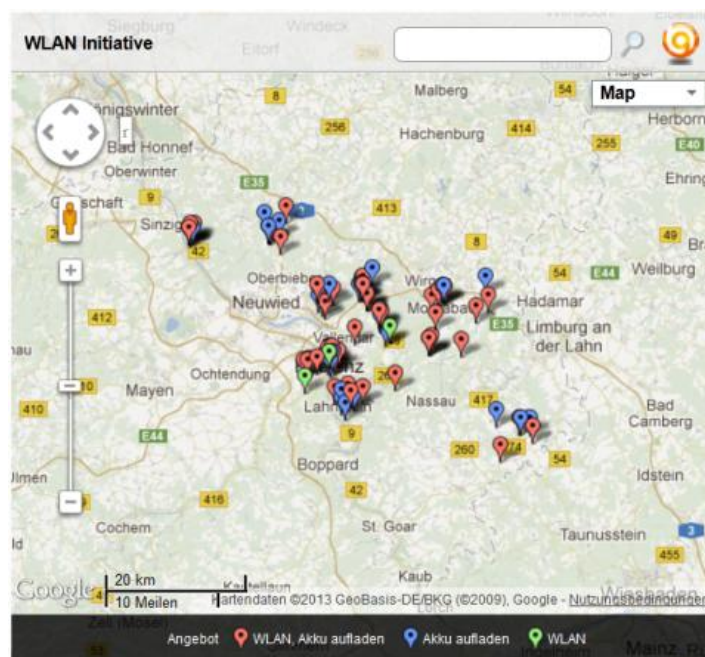
Fig. 4: The Wi-Fi program closes Network Coverage Gaps

Fig. 5: Stickers of the Wi-Fi Initiative that Fills Gaps in Network Coverage

6 CONCLUSION

As demonstrated by our results, the rural area has multiple economic potentials. The biggest challenge, however, is to acknowledge and utilize them. To do this, new paths must often be explored, as demonstrated

by the Creative Tourism Limes example. The creative economy is a significant economic factor in Germany and, by combining it with existing sectors or industries, can be used to promote the areas (ref. HERING, 2010, p. 31 ff). The Wi-Fi initiative along the Limes demonstrates how a regional disadvantage can be turned into a business advantage. Visitors, who charge their smartphones or tablets or surf on the internet, will automatically stay longer in a business and consume more of its products.

It is obvious that a low financial budget can also be regarded as an opportunity, i.e. to use one's own dedication and the assistance of unconventional ideas to achieve one's economic goals. A very important factor is to make use of the synergy effects. Goals can be achieved by acting in concert and to promote each other. It is easier to inspire visitors for other program in the region if these visitors were satisfied by their initial visit to the Limes. And thus one profits from the other.

The negative trend in the development of rural areas can only be combatted by a joint, borderless presence of the region. To put it graphically: only if we stick together can we explore new paths and turn on the lights in the rural area.

7 REFERENCES

ALTHOFF, S.; KRATZ, N.; LANDWEHR, G.: LIMES – Large Scale Innovative and Mobile European Services for Culture Tourism in Rural Areas; In: Schrenk M., V. Popovich V., Zeile P., Elisei P., Eds.: "REAL CORP 2012 – RE-MIXING THE CITY towards sustainability and resilience? – International Conference, Schwechat, Austria, May 14-16 2012, Proceedings". Schwechat/Austria: CORP – Competence Center for Urban and Regional Planning. 2012. Page 441-446.

European Mobile and Mobility Industries Alliance: About EMMIA (Internet: http://www.mobilise-europe.mobi/about-emmia/, 22.03.2012).

European Union: The Smart Guide to Service Innovation. Brussels, 2012.

HERING, H.: Zur wirtschaftlichen Dimension von Kultur und Kreativität In:Land der Möglichkeiten. Kunst-, Kultur- und Kreativwirtschaft in Rheinland-Pfalz. Reihe: Dokumentationen der ZIRP, issue 6, pp.327-331. Bad Kreuznach, 2010.

HÖFER, H.: Kulturtouristische Standortentwicklung als Wirtschaftsförderung im Ländlichen Raum. In:Land der Möglichkeiten. Kunst-, Kultur- und Kreativwirtschaft in Rheinland-Pfalz. Reihe: Dokumentationen der ZIRP, issue 6, pp.327-331. Bad Kreuznach, 2010.

JILEK, S., KUTTNER, E., SCHWARCZ, A.: The Danube Limes in Austria, in: Breeze D., Jilek, S., Thiel, A. (Eds.): Frontiers of the Roman Empire., Central Europe Project "Danube Limes – UNESCO World Heritage, 2011.

MAYO, Allen et al.: REPORT – Meeting the Challenge of Europe 2020. The transformative power of service innovation. Copenhagen, 2011.

OECD: The impact of culture on tourism. OECD, Paris, 2009.

SCHAFRANSKI, F.; THOMAS, I.: Die Erschließung des Weltkulturerbes am Beispiel des Limes. In: Land der Möglichkeiten. Kunst-, Kultur- und Kreativwirtschaft in Rheinland-Pfalz. Reihe: Dokumentationen der ZIRP, issue 6, pp.327-331. Bad Kreuznach, 2010.

Linking Demographic and Spatial Data for a Successful Stakeholder Process in Climate Change Protection Projects – The Case Study of Leoben/AT

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1 ABSTRACT

In 2011 Green City Lab e. V. and an interdisciplinary project team conducted the project „Green Network Leoben" funded by the Climate and Energy Fond Austria in the Smart Energy Demo – fit4set research program. The aim of the project was to address climate change and preserve and improve the quality of life in Leoben through a stakeholder process. This process was based on initial surveys on the CO2-status of the town, on mobility and on open and built space typologies as well as on a demographic analysis. This paper mainly focuses on the nexus between demographic change, urban structure and climate change.

Leoben, the second largest city in the federal state of Styria, is characterised by heavy industry, as well as by the Montanuniversität and research and technology companies. Leoben has about 25.000 inhabitants. One of the current challenges the city council is facing, is a demographic shift – a population decline of 4 % in the last decade. One of the key questions in this project was how everyday life in 2025/2050 can be environmentally friendly, energy-efficient and with the highest quality of life for every age group living in Leoben.

This paper outlines in particularly the challenges arising from a demographic shift in the context of climate change adaptation and demands on open spaces and housing. The authors present results from an analyis of demographic data on polling station level and an urban and open space typology on the spatial scale of parcels. The demographic and spatial data were overlapped to gain social-space specific results. The results provide a more specific insight in possibilities and capacities of each age group and building and open space type in terms of setting climate protection measures and the quality of the housing environment. The gained data can consequently inform a stakeholder process in a more accurate and efficient way by linking social with environmental data.

2 THE URBAN AND THE DEMOGRAPHIC STRUCTURE AS 'KEY PLAYERS' IN CLIMATE PROTECTION ACTIVITIES

The urban structure and the open spaces of a town are the physical setting for measures adressing energy efficiency and climate protection. The role of buildings and the open spaces framing them, e.g. gardens, parks and streets, is often underestimated. The organisation and design of open spaces influences the quality of life of urban citiziens significantly.

Besides the urban structure, the demographic situation in a town, a block or a building play an important role in the success of climate protection activities since it informs planners and the community administration about the prospensity to invest in climate protection, acceptabilty of new policies and designs and about the sensitivity to climate change. In particular the latter depends on the age group and on the urban structure (e.g. heat island effect). (EPSON & IRPUD 2011)

The authors of this study investigate the thesis that climate protection measures can only be implemented successfully – that means with a high citizens' acceptance and improvent of the quality of life – if data on the urban structure are overlapped with data on the socio-demographic situation of a town. Interlinking the urban structure with the demographic data provides stakeholders involved in climate protection projects with valuable knowledge about the needs and demands of different age groups in different housing types.

2.1 Methodical approach

Within the project several surveys were conducted and interlinked: an analyis of demographic data on polling station level, an urban and open space typology on the spatial scale of parcels including a townwide mapping of the urban and open space types, an assessment of the potential of buildings for installation of photovoltaic panels (short PV-potential). A CO2-status-analysis carried out by the project partner Voigt &

Wipp Engineering GmbH and Energieagentur Obersteiermark provided essential information on CO_2 emission sources. A mobility survey and CO2-emmission estimation conducted by the project partner verkehrplus GmbH gave a detailed picture of the mobility data and behaviour of the inhabitants of Leoben.x[1]

Through overlapping the data in a map, correlations between the urban structure and the demographic situation get visible and together with the map of PV-potential and the CO2-status-analysis the results provide a specific insight in possibilities and capacities of each age group and building and open space type in terms of setting climate protection measures and the quality of the housing environment. Furthermore, the results can consequently inform a stakeholder process in a more accurate and efficient way by linking social with environmental data.

3 THE CASE OF LEOBEN/AUT

Leoben is the second biggest town of the Austrian federal state of Styria with a population of approx. 25.000 inhabitants. Leoben is situated in the the Mur-Mürz-valley, a lateral valley, in a region characterized by heavy industry and timber industry. The Montanuniversität Leoben and technlogy companies are also an important economic motor for the area. Since the 1970ties the region has to face a profound change in the demographic and economic development which manfests itself not only in a shrinking and aging population but also in new demands on the urban structure, open spaces and land use.

In 2011, the project „Green Network Leoben" included a feasibilty study to identify, initiate and implement falgship projects for Leoben to transform the town into a Smart City. A city can be defined as smart, when investments in human and social capital, traditional and modern communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance. (CARAGULIU et al 2009). A project conducted by the Centre of Regional Science at the Vienna University of Technology identified six main 'axes' (dimensions) by which cities can be characterised as „smart": a smart economy, smart mobility, a smart environment, smart people, smart living and smart governance. (Centre of Regional Science, Vienna UT, 2011)

The following case study of Leoben focussing on the (built) environment and on the people of Leoben was part of the „Green Network Leoben" project and aims at exploring the social captial and its spatial link of the town. It also aims at identifying potentials – in regards to the tranformation of the town into a smart city – which are very much interwoven with the hitherto unused and overlooked knowledge, experience, capabilities and possibilities of the people living in the town. Results of the analyis of spatial and demographic data were discussed in several meetings with a group of stakeholders in Leoben.

3.1 The urban structure of Leoben

The map „Urban Structures" (Fig.1) illustrates the different types of housing and open spaces in the districts of the town. In the old town, the town centre, pre-industriel and Gründerzeit (second half of the 19th century) buildings with mixed use dominate the townscape. The town centre is sourrounded by residential areas with single, detached and terraced houses, residential blocks as well as the occacional solitary high-rise buidling. Remnents of old peasant buildings and villages are also still recognaziable in the town's urban fabric.

The building types correlate with the open space structure: residential areas with houses (detached, terraced or duplex) their inhabitants and some of the pre-industriel and Gründerzeit buildings provide their residents with privat gardens or yards. However, residential blocks and in particular solitary high-rise buildings do not have private open spaces. The residents of these building types have to share the green spaces with all block's or building's residents.

The availabilty of and access to private open space decide on the opportunities and possibilities to set climate protection measures in a household: private gardens provide space for e.g. gardening and food production, leisure activities close to the house, for installing photovoltaic pannels, etc. All these activities carried out in private open spaces adjacent to the house can contribute to the reduction of CO2-Emission since they reduce transport distances or encourage the implementation of alternative energy source. In buildings with shared green spaces, these activities are harder to organize because any change in the use of the shared green spaces

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needs to be discussed with and agreed by all residents of the block and the building management and owner. However, vegetation of open spaces – no matter if private, public or semi-public – contributes to CO2-storage. Though the amount of CO2 stored depends on the type of vegetation: deciduous trees store more than conifers, trees in general more than hedges, lawn or herbaceous planting. (DAVIES et al. 2011)

On a bigger scale, public open spaces and green spaces accessible by the public also play an important role in a town's vulnerability and adaptability to climate change. A townwide survey on Leoben's land use shows that 78 % of the municipality area are covered with forest. The forest are an excellent CO2-storage, a local recreation area, source of fresh and cool air and supports a sustainable timber economy. 14 % of the area are built areas which are located along the rivers. Urban sprawl which could threaten the forest and could cause more traffic and cost for the maintenance of the infrastructure is currently only a marginal issue in the municipality of Leoben.

In addition, public open spaces in the town and along the rivers, bicycle routes and trails along the rivers as well as natural riparian areas provide high quality open spaces close to the town centre and help avoid heat islands in the densely built areas. They can also help promote walking and cycling (eg pedelecs) as an alternative to using a car.
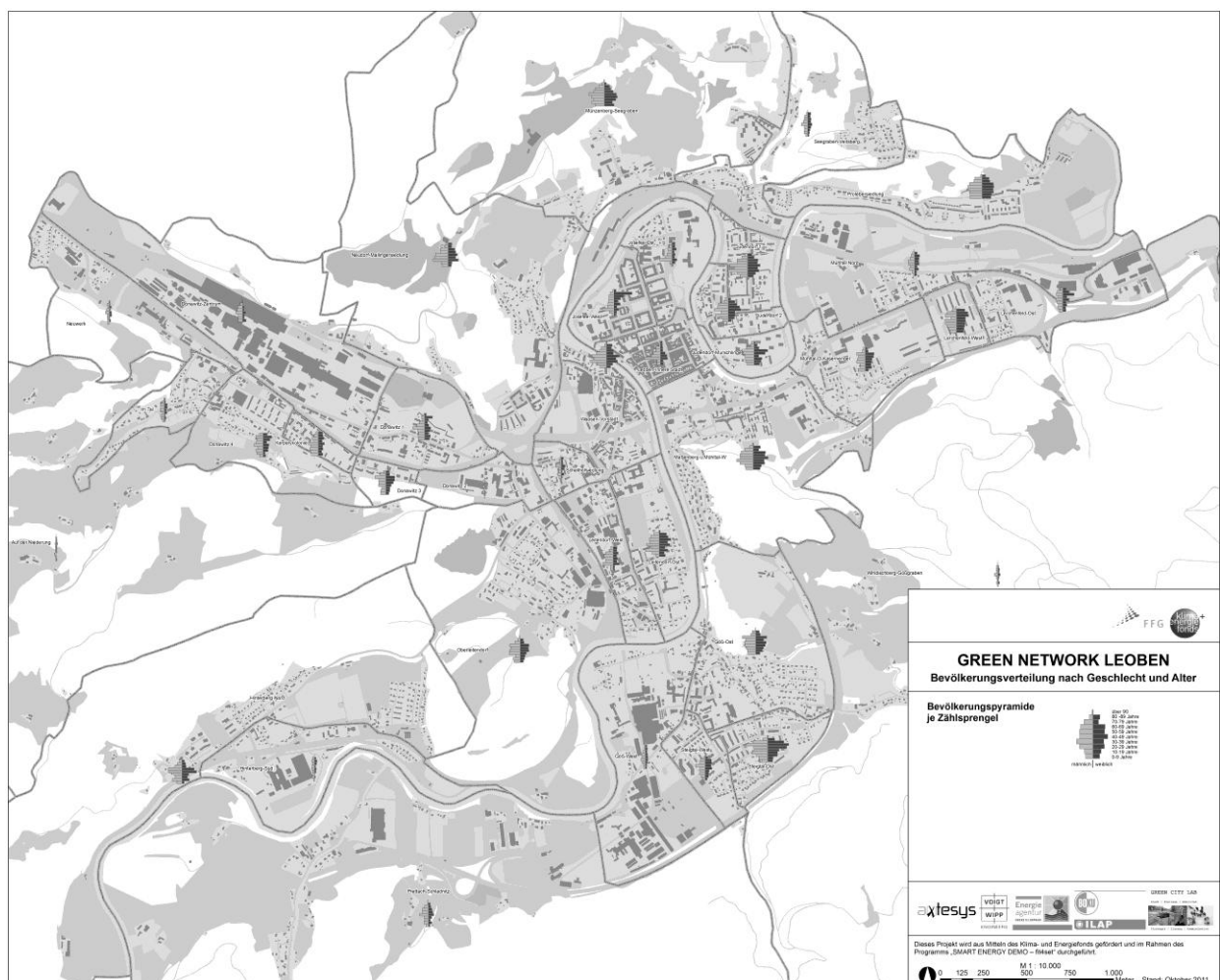
Fig. 1: The urban structure, buidling and open space types in Leoben

Typical for Leoben are big industrial areas of different dates of origin and different trades (heavy industry, technology, research, crafts). They hold great potential for measures in terms of environmental protection and renewable energy. Furthermore, they provide 4500 work places in the sector of material goods (JAUSCHNEG et al. 2012). From the perspective of the employees and workers there are additional challenges in terms of climate change which need to be focussed on more than used to be the case. The working environment can be improved climate friendly in more than one sense. For example, open/green spaces for employees and workers for healthy and regenerative breaks can also contribute to reduce soil

sealing and create new habitats, climate friendly cooling of offices and workshops can be realized through using PV-panels to procude the necessary energy.

3.2 The socio-demographic characteristics and prognosis of Leoben – Getting older and less

The current population prognosis predicts a continuing decline of the population down to approximately 24.000 inhabitants in 2030. (Regionale Bevölkerungsprognose Steiermark 2009/2010 – Bundesland, Bezirke und Gemeinden Bevölkerungsprognosen) The population pyramid age structure indicates an ageing population. The total decline of the population through the last decade was 4 % (Quelle: Statistik Austria). The general demographic data for Leoben gives an overview of the main demographic trends in the municipality but cannot describe the situation on a smaller spatial scale like in the districts and blocks of specific neighbourhoods in the town. To gain this specific insight, the project team analyzed the demographic data on polling station level (data of 1.1.2008, Statistik Austria) by age and gender. (Fig. 2)

In general, the age cohort of the 40 – 49 year-olds is the biggest age group in the municipality of Leoben. A closer look on the polling station level reveals a more differentiated picture of the age pattern.[2] For example, in Hinterberg-Nord, a residential, suburban area of Leoben, not only the the age cohort of the 40 – 49 year-olds but also the the age cohort of the 50 – 59 year-olds is over-represented. In Steigtal-Ost and Göß-Ost the age group of 60+ is relatively big.
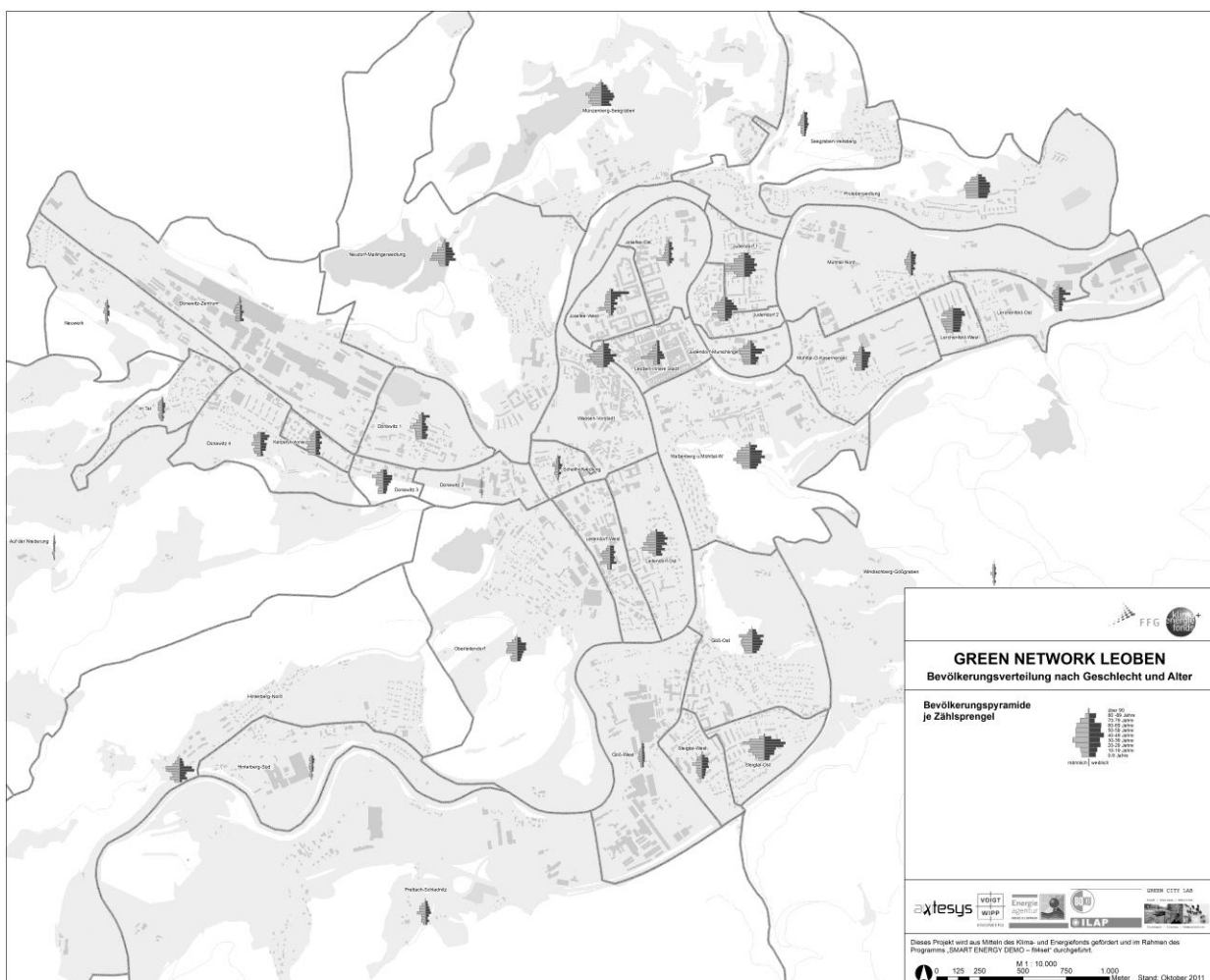
Fig. 2: Demographic data on polling station level by age and gender (data of 1.1.2008, Statistik Austria)

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[2] Some noticeable deviations from the general trend: In the town center (Innere Stadt, Josefsee West and East) the age cohort of 20 -29 year-old males is dominant. That phenomenon is linked to the Montanuniversität which is located in the town center. The above average size of the age cohort of the 80 – 89 year-olds in Donawitz 1 can be explained by the the retirement home which is located in this area.

By overlapping demographic data with the urban structure of the town, „younger" and „older" urban districts can be identified. Depending on the „demographic age" of an urban district, the needs, demands and desires of their inhabitants concerning the built environment and the open spaces diversify. (DAMYANOVIC 2007) Also, the inhabitants' capability and potential in participating in climate protection activities as well as the vulnerability to climate change vary.

4 CONCLUSIONS: THE BUILDING TYPE AND AGE MIRROR THE DEMOGRAPHIC CHANGE

Overlapping the demographic and urban structure map revealed that in the areas built in the 1970/80ties and in the areas at the fringes of the town, where detached houses are the pre-dominant building type, the age group of 40+ is the biggest population group. Especially in the residential areas with detached houses built in the 1950ties to the 1970ties, the average age of the inhabitants is even higher and a significant increase of the age group of 50+ and 60+ can be observed. Furthermore, the maps revealed an increase in the percentage of old people in the solitary high-rise buildings of the 1960ties and 1970ties. This phenomenon corresponds with the increase of population due the economic boom of this era.

4.1 Potentials, obstacles, motivation for setting climate protection messures depending on the age group and building type

Detached and terraced houses offer the possibility to set various climate protection measures since they provide private open spaces like gardens etc. They offer a high quality of live. In addition, they are often in private ownership. An improvement of e.g. the insulation or investment in alternative energy sources can be made on the basis of the individual decision of the house owners. But, the residential areas with detached and terraced houses in Leoben show an aging population whose willingness to invest in e.g. energy saving measures is diminishing in comparison with a younger age group. The amortization of photovoltaic pannels takes at least 14 years but can also take up to 50 years depending on the efficiency and the individual demand. (KAUFMANN et. al 2011) The age group of 60+ is therefore hesitant to invest in this kind of climate change protection measures unless other subsidies shorten the amortization. On the other hand, the houses built between 1950ties and 1970ties have bad thermal characteristics. Taylor-made incentives for the age group of 60+ to encourage investments in thermal renovation and installation of alternative energy sources would contribute to climate protection.

Compared to terraced or detached houses, the quality of open spaces and the built enviroment of residential blocks and solitary high-rise buildings is lacking in some points. The absence of private open spaces with direct access to and from the house reduces the quality of life and the options concerning setting climate protection measures on the buildings and in the green spaces. All activities and decisions involving the building and/or the open spaces must be discussed and agreed by the building owners, buidling asscociation and management and the owners. These aspects could hamper climate protection measures. On the other hand, these buildings often have huge roof tops with excellent PV-potential and space for example roof top gardens, which would reduce the grade of soil sealing and provide additional green space. Activities set in the green space, e.g. community gardens, planting of trees and facade greening would not only contribute to climate protection and the prevention of heat islands, they would also improve the quality of living conditions especially for the elderly. In contrast to detached and terraced houses in private owner ships, not only financial resources for the technical realization of climate portection measures are required, but also a budget to enable a partizipation process involving all stakeholders concerned with the building (including the inhabitants). This ensures a sustainble implementation of climate protection measures and high acceptance of these activities as well as equal access for all inhabitants of a residential block.

Linking the demographic data on polling station level and data on the urban structure not only revealed a more differentiated picture of the town's and ist inhabitants' situation and options but also highlighted the need for a more differentiated approach in stakeholder processes concerned with climate protection. Furthermore, it points out the need for a more differentiated budgeting which not only takes the technical implementation of e.g. energy saving activities into account but also the social aspects of climate protection measures like stakeholder processes.

5 REFERENCES

AMT DER STEIERMÄRKISCHEN LANDESREGIERUNG, Fachabteilung 1C Landesstatistik: Regionale Bevölkerungsprognose Steiermark 2009/2010 – Bundesland, Bezirke und Gemeinden Bevölkerungsprognosen, Endbericht Leoben, Heft 13, 2010

BEV, Bundesamt für Eich- und Vermessungswesen: Digitale Katastermappe 2011, Bevölkerungsdaten auf Zählsprengelebene von Stichtag 1.1.2008

CARAGLIU, A. & DEL BO, C. & NIJKAMP, P.: Smart Cities in Europe. Serie Research Memoranda 0048. VU University Amsterdam, Faculty of Economics, Business Administration and Econometrics. http://ideas.repec.org/p/dgr/vuarem/2009-48.html (zuletzt abgerufen am 03.04.2013). 2009.

CENTRE OF REGIONAL SCIENCE, Vienna UT: Smart Cities. Ranking of European medium-sized cities. Final report. http://www.smart-cities.eu/download/smart_cities_final_report.pdf, (zuletzt abgerufen am 03.04.2013), 2007

DAMYANOVIC, D.: Landschaftsplanung als Qualitätssicherung zur Umsetzung der Strategie des Gender Mainstreamings. Wien, 2007.

DAVIES, Z.G. & EDMONDSON, J.L. & HEINEMEYERS, A. & LEAKE, J. & GASTON, K.G.: Mapping an urban ecosystem service: quantifying above-ground carbon storage at a city-wide scale. The Journal of Applied Ecology (online). 2011. British Ecology Society. pp.1 – 10. 2011.

EPSON & IRPUD ESPON Climate. Climate Change and Territorial Effects on Regions and Local Economies. Applied Research 2013/1/4. Draft Final Report. Version 25/2/2011. Summary Report. ESPON & IRPUD, TU Dortmund, 2011.

JAUSCHNEG, M., FUCHS, B., BERGER, M. et al.: Green Network Leoben, Publizierbarer Endbericht Smart Energy Demo – FIT for SET 1. Ausschreibung – Smart City Leoben, Projekt in der Programmlinie Smart Energy Demo – FIT for SET, (noch unveröff. Bericht) 2012

KAUFMANN, J. & KOLLER, B. & PRESSL, H.: Rechnen sich private Photovoltaikanlagen. http://www.akstmk.at/bilder/d162/Photovoltaik_2011.pdf (zuletzt abgerufen am 20.9.2012), 2011.

STATISTIK AUSTRIA: Arbeitsstättenzählung 2001

Living Environment Information Services – Enhancing the Collaboration between Authorities and the Citizens

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1 ABSTRACT

The environmental planning is shifting towards a more open and collaborative direction. Nowadays it is widely recognized that citizens ought to have not only the right but also genuine possibilities to influence the planning and the decision making concerning their living environment (e.g. Puustinen 2004; Healey 1997, Fischer 2000). In Finland, the renewed Land Use and Building Act came into force in 2000, announcing that in a planning process it is obligatory to offer opportunities for the citizens to take part in. However, despite the change in law and attitudes, there have been difficulties in integrating the citizens' knowledge and views into the planning processes (Bäcklund 2007, Leino 2006, Puustinen 2006). Hence, the knowledge should be incorporated into the planning more efficiently, so that the citizens' views can have a genuine impact on the decisions made. (Bäcklund 2007, Staffans 2004).

Electronic services, such as public participation GIS applications, are suggested to help bridge the gap between authorities and the citizens. It is said that gathering citizens' knowledge attached to its geographical whereabouts enhances the integration of the knowledge into decision-making practices (Kahila & Kyttä 2009). Fagerholm (2012) also stresses the importance of locating knowledge when gathering citizens' opinions. By developing new tools for planning, the Living Environment Information Services, participation will be made easier for the citizens and the authorities to utilize. But how will these three internet applications enhance openness and collaboration between authorities and citizens?

Firstly, with the help of Alert service Tarkkailija (Observer), citizens will be integrated more efficiently into the decision making at the very early stage of the planning process. As the Finnish name of the service suggests, it serves as an observer, alerting the citizens on the planning concerning their environment. Secondly, with Enquiry Service Harava (Rake), citizens will be able to express their opinions and views on a map so that the planning can be directed to the geographical whereabouts. The name of the service stems from the metaphor that information can be gathered widely and efficiently as if raking leaves. What is more, this experiental knowledge gathered with Harava can be taken to Liiteri, the Information service, where it can be analyzed and examined freely. The name of Liiteri (Shed) represents its role as an information storage or a shed, where a wide range of data can be collected and stored. By opening the data used in the planning process, the decisions made will be better justified. These three services are part of SADe, the Action Programme on eServices and eDemocracy which aims at making public administration more efficient and customer friendly.

2 LIVING ENVIRONMENT ESERVICES AS A PART OF THE SADE PROGRAMME

The national development project Action Programme on eServices and eDemocracy (SADe) is currently underway in Finland. SADe programme runs until the end of 2015 and it is among the Government's key projects. SADe is coordinated by the Ministry of Finance in Finland, and Living Environment Information Services are a part of the programme. The objective of the programme is to create eService packages that enhance the cost-efficiency and quality of the public sector and are used by citizens, companies and the authorities alike. The services in the SADe programme are created to provide citizens, companies and organisations with smooth and efficient eServices (The Ministry of Finance 2013). The premise is also to make services more readily available, regardless of time or place. These new services will enable the creation of new means of participation and interaction, of which the services presented in this article are only one example.

According to Steinmann, Krek & Blaschke (2004) there are only few truly interactive GIS-based applications for web based public participation. They say that web based Public Participatory Geographical Information Systems (PPGIS) applications have developed at the same pace as the theoretical analysis concerning the theme. Also Hawthorne (2004) points out that participation in web based systems is difficult to maintain over an extended period of time. Academics, who in many instances develop and uphold these systems are often

overworked and they lack funding and time. Now ten years have passed and we see clearly that the situation has changed. Development around PPGIS applications and services has been progressive and in Finland the Environmental Administration is taking the consciousness into national level.

Harava, Tarkkailija and Liiteri are a part of the Ministry of the Environment's eServices for Housing and Building package. It provides electronic services related to housing and the built environment. They can be used when applying for various permits and subsidies, and for information and analysis purposes. The goal with electronic services is to improve citizens' participation opportunities and to improve the information flow between citizens, the authorities and companies. Another goal is to make it easier to collect and utilize the information required for land use planning.

Both national and international examples of the services selected for the SADe programme were sought during the initial investigation phase in 2010. There are various kinds of map-based query services in Finland, while the UK is home to such services as Mappiness. There are local planning observation services similar to Tarkkailija in Australia, under the name Planning Alerts, and in the UK, under the name TwitterPlan, among other places. Services resembling the Liiteri information service include Helsinki Region Infoshare in Finland and Mapumental in the UK.

The Harava, Tarkkailija and Liiteri services are produced in co-operation with IT providers. Bidding contests have been held to determine the parties implementing the Harava and Tarkkailija services. Dimenteq Oy and its partners will implement Harava, while Solita Oy with its subcontractors are responsible for implementing Tarkkailija. The bidding contest for Liiteri will be held in the autumn of 2013. The implementation projects were preceded by a preliminary investigation in 2010 and requirement specifications in 2011.

2.1 Alert service Tarkkailija

Most of us are likely to have encountered a situation in which we have had to search numerous sources and services for information regarding issues related to planning and building in our immediate environment, a recreational environment located in a neighbouring municipality, or the municipality in which our summer house is located. We may not have been able to resolve this issue online, having to call a municipal official. Next summer, the Tarkkailija service will be adopted in Finland. This service is developed to assist for example in situations mentioned above, providing access to online information content regarding the built environment that the user finds interesting. The service will be available throughout Finland, free of charge for all citizens.

Tarkkailija keeps citizens, companies and authorities informed on the changes happening in their environment. The service understands the meaning of information content by comparing it to an extensive concept model. It also determines the location based on the information content. Users may determine the topics, areas and projects they wish to monitor, or, alternatively, locate their area in the service and search for events related to their local surroundings.

Information content related to the built environment serves as the basis for Tarkkailija. Tarkkailija has been set to process the information content on more than 400 websites. The service "scrapes" websites for content related to the relevant subject matter on a regular basis. Screen scraping means that the service reads the content on pages, comparing it to an extensive concept model, an ontology. In the first phase, websites subjected to screen scraping and analysis will include the websites of all Finnish municipalities and other public-administration operators and public-sector projects related to the built environment. The search may also be extended to cover such things as news websites, online magazines and social media services.

Therefore, the contents of Tarkkailija exist before the service is available. This information will simply be further processed through analyses and GIS. Attempts will be made to determine locations for website content significant to the service, using coordinates, addresses and other local names. This will enable the provision of information on the basis of location and regional limits.

The service will provide end users with an alert service that will keep them abreast of news in the areas that interest them. Users must select which topics they are interested in and which areas they wish to monitor. When the alert service detects new information in the user-determined area that may interest the user, the service will send prompts to the user by email, for instance. Tarkkailija enables its users to gain a comprehensive understanding of their surrounding area, along with its services and changes. Tarkkailija is

primarily aimed at citizens, but other actors such as companies may also use it to monitor changes impacting company operations, while the authorities may use it as a communications channel.

2.2 Enquiry service Harava

It is widely known that public participation has an important role in community planning process especially at the local level. According to Graig, Harris, Weiner (2002) and Milovanovic (2003) participation is commonly considered to be positive and the new applications and technologies are welcome.

Enquiry service Harava represents one form of a PPGIS application: a map-based feedback system for collecting citizens' experiences. With Harava, organizations are able to conduct structured surveys to gain a wider perspective in decision-making. In addition to data captures, Harava can be used for nature inventories. It also functions as a question & answer platform, allowing inhabitants to ask questions from the authorities. Through the SADe programme Harava is planned to be a valuable application particularly for authorities and municipalities. The service will be easy to adopt in different kinds of organizations, for example associations and companies.

Harava enquiries' basic idea is to draw points, lines and areas on a map and specify for example why the object is a meaningful place for the respondent. A single line or a marked area informs the cityplanner very quickly where the place is and what the existing structures of the area are. Moreover, when there are more marked places, routesand interesting points, the gathered objects can be called spatial data. Every single object has coordinates and attributes and together the objects can be analysed further with the GIS software. Harava is not an analysis tool, but it enables data collection explicitly to the right formula. The information collected with Harava can easily be processed into thematic maps or other visual representations. As "a picture is worth a thousand words", the citizens' views, opinions or observations can be displayed so that the findings of the enquiries are easy to grasp for everyone. Visualisation of the GIS data is a different field of science, but one can assume that it generates more discussion than plain tables and figures. Bamberg and Lehtonen (2011) argue that visualisation of information is the key factor in creating interaction between the planners and the public.

In the Harava case, the user's point of view is two-sided. The first group of users of Harava, or other PPGIS applications, is the general public. It is often a very heterogeneous group of users who have a diverse range of world views, cultural backgrounds and knowledge. These aspects require that the systems are accessible and easy to use. For normal users Harava appears in the form of enquiries and a question & answer platform, and the user interface for the respondent is quite simple.

On the other hand, the administration aspect of the PPGIS applications is used by professionals from the different municipal sectors and organisations. All of them are not GIS experts and the level of computer knowledge is variable. Administration interface enables the construction of enquiries, maintaining online forum or nature inventories. The most important purpose is to create enquiries and it includes dozens of functionalities. To name a few: selection of backround maps, determining the scale, maintaining the user access inside the organization, writing the questions and determining the response options. What is more, the service contains former enquiries, which the admin can use as they are or develop further. The user interface also enables downloading data from the database while the enquiry is still on, so that the results can be evaluated in the middle of the process and not only after the enquiry has been turned off. Harava gives statistics easily on the number of respondents relative to time. Harava application has been tested and evaluated also from the administration perspective so that enquiries are easy to construct and maintaining the system is adoptable.

Pilot organizations have a very important role in building the contents of Harava. The group of pilots consists of 35 different organizations: municipalities, regional councils, companies, universities etc. Each organization creates an enquiry for an existing project, simultaneously creating question series available for further use. The focus of the existing enquiries is on land use planning, but there are also different themes like findings of invasive species, noise abatement, resident survey and many more. The service aims to transform citizens' location-based knowledge, opinions and ideas into an environmental planning tool for the authorities. When working together with a large scale of organizations, the goal is achievable.

2.3 Information service Liiteri

The information service Liiteri is an information and analysis service, where one can not only search for information on the built environment, but also analyze and make visualisations of it. In Finland, the GIS-based information on the built environment has been dispersed in various different registers. As the information is gathered to the Liiteri service, the information can be found and utilized more easily. Liiteri consists of a map section and a statistical section, which are dynamically interactive. Therefore, a lot is expected of the new service: usability, combining different kinds of information and new information contents.

The information content consists of data concerning urban structure, population, buildings and housing, jobs and commuting, mobility and transport, services, recreation, natural resources, cultural environment and land use, for example. The information is mainly produced by Finland's environmental administration, Statistics Finland and Population Register Centre.

Liiteri is mainly targeted at authorities in municipalities for implementing their regulatory assignments. Until now, a major part of the information has mainly been easily available only for the authorities. However, with the help of Liiteri, also inhabitants will be able to obtain information on their living environment. The interesting contents for the citizens are related to the quality and planning of their surroundings. The service provides users with ready-made thematic maps and statistics on for example accessibility of services, which also helps the inexperienced user to make use of the data. Furthermore, the service serves for both companies and research and study purposes. Using the service is free for everyone concerning the data owned by the Finnish environmental administration and ready calculated statistics.

One new and important theme for the information content of Liiteri is the perceived quality of the environment. Therefore the citizens have a significant role as producers of the data as well. As Harava offers a way of gathering uniform data all over the country, Liiteri brings the information all together providing an analysis platform. Hence, with similar enqueries made in municipal level the observation can be expanded to nationwide scale. The development of Liiteri has commenced and the service will be completed by the end of 2014.

3 CONCLUSIONS

The main purpose of developing Living Environment Information services is to bring planners' desktop closer to the citizens and on the other hand the services give numerous possibilities for planners to gather information, ask opinions and get perspectives from the inhabitants. The aim is also to construct applications that are quickly adobtable in any demographic range. The idea is that these services will support one another (see figure 1).
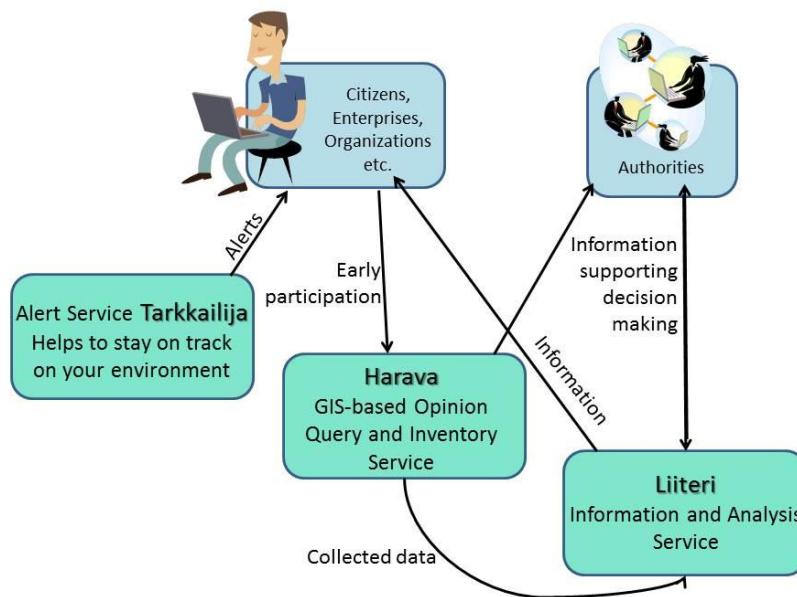
Figure. 1: Synergy from the interaction between eServices

As Harava launches an enquiry, the inhabitants of the area are notified via Tarkkailija service. By examining the citizens' views at an early stage of the planning process the risk of conflicts will be reduced (Leino 2006; Laine & Peltonen 2003). After the enquiry is completed, the results will be transferred to Liiteri, the information service, where the information can be analysed by anyone.

More transparent governance and deliberative democracy are the main objectives. We believe that these objectives will be accomplished with the enhanced information flow due to the Living Environment Information Services. It is also interesting to see what kinds of innovations and new ideas emerge due to easier access to large amounts of information. Developing the services is a significant step concerning not only Finnish Government's open data policy but also enhancing openness and equality in Finnish planning. The thought of more thoroughly justified decisions, better planning, smoother planning processes and satisfied citizens inspires everyone working in the developing of the service package to thrive for creating functional services.

However, a change is needed concerning attitudes and ways of incorporating the citizens' knowledge into planning. The real challenge is to improve the way the knowledge produced by citizens is taken into consideration by the public administration. Therefore, there is a growing need to study the impacts of these services in planning and decision making more profoundly. By learning the defects, the services can be developed further to match the needs. Special attention should be given to the question on how the knowledge produced by citizens can be integrated into the decision making more efficiently.

The Living Environment Information Services Harava and Tarkkailija will be launched in 2013 and the expectations are high!

4   REFERENCES

Bamberg, J. & Lehtonen, P,: Facilitating Knowledge Sharing in e-Governance: Online Spatial Displays as Translating Devices. In Manoharan, Aroon & Marc Holzer (toim.) E-Governance and Civic Engagement: Factors and Determinants of E-democracy. IGI Global Publishing 2011.

Bäcklund, P.: Tietämisen politiikka: kokemuksellinen tieto kunnan hallinnassa. Helsingin kaupungin tietokeskus. Helsinki 2007.

Craig, W.J., Harris, T.M. & Weiner, D. (Eds.): Community Participation and Geographic Information Systems, Taylor & Francis. London, 2002.

Fagerholm, N.: Community inhabitants' values and benefits in dynamic tropical forest landscapes – Participation and spatial analysis in landscape knowledge integration.Doctoral Thesis, University of Turku. Turku 2012.

Fischer, F.: Citizens, Experts, and the Environment. The politics of local knowledge. Duke University Press, Durham and London, 2000.

Healey, P.: Collaborative planning, Shaping Places in Fragmented Societies. Department of Town and Country Planning, University of Newcastle upon Tyne, 1997.

Hawthorne, T.: A summary of Web Based Public Participation GIS, unpublished paper, pp. 1-12. 2004.

Kahila, M. & Kyttä, M.: SoftGIS method as a bridge builder in collaborative urban planning. In Geertman, S. & Stillwell, J. (2009) eds. Planning Support Systems: Best Practices and New Methods. Springer. pp. 389 – 411. 2009.

Leino, H.: Kansalaisosallistuminen ja kaupunkisuunnittelun dynamiikka. Tutkimus Tampereen Vuoreksesta. Citizen participation and the dynamics of town planning. A case study of Vuores territorial plan, Tampere. Doctoral Thesis, University of Tampere, Tampere 2006.

Laine, M. & Peltonen, L.: Ympäristökysymys ja aseveliakseli – Ympäristön politisoituminen Tampereella vuosina 1959-1995 (Environmental Issues and the "Brothers-in-Arms Axis" Politicisation of the Environment in Tampere from 1959 to 1995). Doctoral Thesis. Tampere University Press. Tampere 2003.

Milovanovic, D.: Interactive planning – use of the ICT as a support for public participation in planning urban development: Serbia and Montenegro cases, 39th ISoCaRP Congress 2003. http://www.kas.de/upload/dokumente/mega cities/Interactiveplannin.pdf

Puustinen, S.: Yhdyskuntasuunnittelu ammattina. Suomalaiset kaavoittajat ja 2000-luvun haasteet. Suomen ympäristö 715. Ympäristöministeriö. Helsinki 2004.

Puustinen, S.: Suomalainen kaavoittajaprofessio ja suunnittelun kommunikatiivinen käänne. Vuorovaikutukseen liittyvät ongelmat ja mahdollisuudet suurten kaupunkien kaavoittajien näkökulmasta. Väitöskirjatyö. Teknillinen korkeakoulu, Yhdyskuntasuunnittelun tutkimus- ja koulutuskeskuksen julkaisu A34. Espoo 2006.

Staffans, A.: Vaikuttavat asukkaat: Vuorovaikutus ja paikallinen tieto kaupunkisuunnittelun haasteina. Yhdyskuntasuunnittelun tutkimus- ja koulutuskeskuksen julkaisuja. Espoo 2004.

Steinmann, R., Krek, A. & Blaschke, T.: Analysis of online publc participatory GIS applications with resect to the differences between the US and Europe. Paper published in the proceedings of Urban Data Management Symposium´04, Chioggia. Italy 2004. http://geography.sdsu.edu/People/Pages/jankowski/public_html/web780/Steinmann_et_all_2004.pdf

The Ministry of Finance, Action Programme on eServices and eDemocracy http://www.vm.fi/vm/en/05_projects/03_sade/index.jsp, Helsinki 2013.

Meeting the Needs of Different User Groups in Mobility as Key to Ensure Social Inclusion

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1 ABSTRACT

An accessible public space and self-determined mobility are important preconditions for most activities in daily life and social inclusion. The design of outdoor environment, e.g. streets and facilities, as well as the supply of different transport modes have major impact on the opportunities of people for participation in everyday life. There is a variety of user groups with special requirements concerning the public space and transport modes, such as persons with reduced mobility or sensorial impairments. But beside the attributes of these well known groups, also other characteristics exist that can cause mobility impairments, like missing knowledge of the national language, poverty, learning disability etc. All these user groups indicate a different picture concerning their mobility pattern in comparison to average values.Therefore their needs in public space and mobility offers vary substantially. Sustainable community planning has to take into account those facts in the present as well as in the future and therefore requires an inclusive design that allows people of all ages, backgrounds and abilities the use of open spaces and transport means. In Austria a survey with 450 persons was conducted to analyse and compare mobility pattern of different groups of persons, which have different potentially mobility impairing characteristics. Besides the mobility pattern, the survey focussed on the experiences in the outdoor environment, the subjective perceived degree of impairment, problems and ideas of solutions. The paper presents the results of the study showing that the mobility pattern of the persons in focus vary significantly from average values in Austria. Based on the study results fields of action could be identified which authorities should consider when developing sustainable short- and long-term strategies for inclusive design of public spaces and supply of transport modes.

2 OBJECTIVES

In Austria a survey with 450 persons was conducted to analyse the mobility pattern of different groups of persons, which have different potentially mobility impairing characteristics. Aim of the survey was to show differences in mobility pattern of certain groups, identify obstacles and coping strategies of persons in focus and to analyse the subjective perception of the individual mobility options. This paper will present the methodology of the survey as well as its resuslts. It will deal with measureable facts on mobility, which will be compared with average values from Austria. Furthermore, it gives examples of individually reported barriers as well as assessments of the accessibility of transport modes and outdoor environment. Based on the survey results of the survey fields of action were identified, in which local authorities should plan, develop and implement measures in order to enhance the accessibility and therewith the social inclusion for different groups of persons. The results of the project emphasise the linkage between inclusive design and sustainable community planning and provide recommendations for spatial and transport planners and communities.

3 MOBILITY SURVEY

3.1 Methodology of the survey

One possibility to analyse mobility behaviour and detect mobility barriers and needs of persons with possible mobility impairing characteristics is to calculate mobility indicators for the persons in focus and to compare them with average values of the country. For Austria nationwide data is available for the year 1995 (Herry, Sammer 1996). To collect data of mobility behaviour of persons with possible mobility imapiring characteristics, a mobility survey was conducted in the framework of the study. In 450 personal interviews persons with at least one of the following characteristics were surveyed:

- Physical or sensory impairment,

- Difficulties in reading and/or writing and in understanding the national language,

- Risk of poverty,

- Single parents and families with 3 or more children,

- Aged over 74 years,

Most participants of this survey can be allocated to the groups of hard-to-reach persons (Brackertz, 2007); on the one hand, they are difficult to identify because their characteristics are not mentioned in official records; on the other hand, the willingness to participate actively in a survey is comparatively low (Riandey & Quaglia, 2008). In literature one can find a number of publications addressing the specific problems of sampling and conducting surveys with hard-to-reach persons (Banister & Bowling, 2004; Chlond & Ottmann, 2007; Schwanen, 2010). For the survey potential interview participants were contacted via their social environment, at work, family, neighbours, associations or specific organisations (Cowham et al., 2008). Within the interviews the persons reported about trips they made on two reference days using trip diaries. For each trip origin and destination, means of transport used, reported length and trip duration, trip purpose, accompanying person(s), aids used to overcome mobility barriers as well as problems encountered on the trip and their solution were reported. Furthermore, they were interviewed on availability and use of means of transport, frequently encountered problems affecting everyday mobility, subjective perception of their mobility impairment and socio-demographic issues. The participants were also asked about barriers with which they are confronted in their mobility. There were no categories provided for answering this question in order not to influence the direction of the responses. After all interviews were conducted the answers were summarised in categories.

3.2 Comparison of mobility pattern

It was assumed that by comparing mobility indicators one can deduce differences in the mobility behaviour between the persons in focus and the Austrian population. In spite of some methodological limitations the descriptive analysis of the mobility data shows typical and well interpretable differences between most of the groups investigated and the average of the Austrian population.

In the year 1995 on average about 3.7 trips per person were accomplished on a working day in Austria. The trip rate per day of the persons surveyed is lower for almost all groups (see fig. 1). The trip rate is significantly lower for persons with learning disabilities, wheelchair users, deaf and elderly persons (between 2.4 and 2.7 trips per day). For the elderly it can be assumed that the trip rate is lower because they are not employed anymore and the missing daily trips to work and back home are reasons for the differences. For the other groups mentioned this can't be the explanation, because participants were interviewed in workshops and training facilities, which they frequent each day. If a high or low trip rate has to be assessed positively or negatively depends on the number of trips and the activities connected are desired or enforced. Nevertheless, in different sources it is assumed that lower trip rates are related to social exclusion and disadvantages (e.g. BMVBS 2012, Stanley et al. 2011).
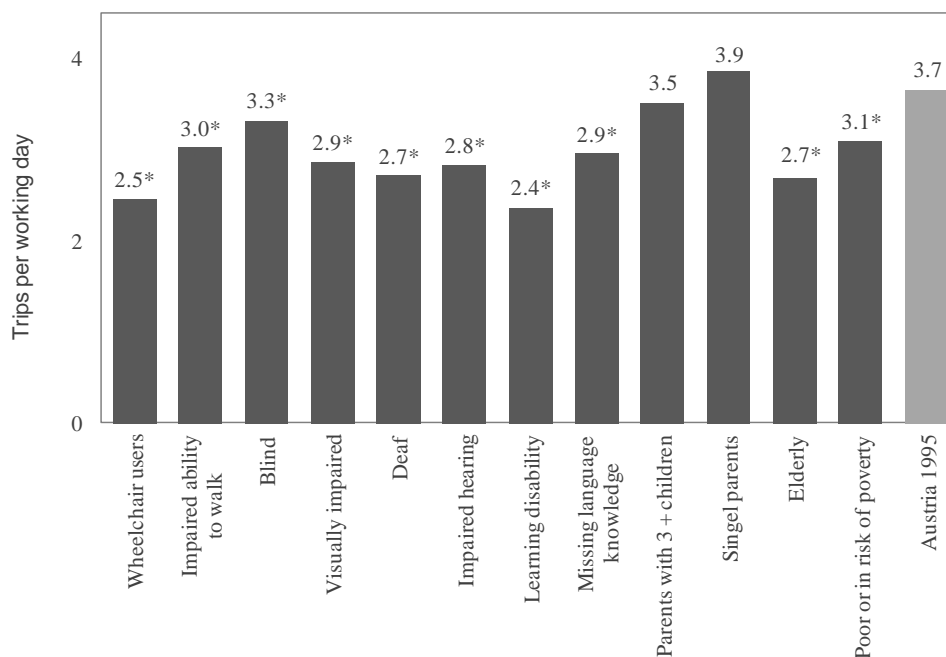
Fig. 1: Trip rate of mobile persons per working day (*= significantly different from Austrian population)

Singel parents have a higher trip rate per day compared to the average in Austria. This disparity is not significant but can be explained clearly. Also in other studies implemented in Germany this phenomenon was observed (e.g. Stiewe & Krause 2012). The higher trip rates can be interpreted as forced mobility, because daily trips like bringing and picking up children have to be accomplished by one person only.

Shorter average trip lengths indicate that persons have a smaller range of action to accomplish their daily activities (fig. 2). Especially trip lengths of wheelchair users (5.5 km/trip), persons with an impaired ability to walk (6.4 km/trip), visually impaired persons and persons with immigrant backgrounds (both 7.7 km/trip) are below the average value of the Austrian population with 9.5 km/trip. Combining these numbers with the lower trip rates it is obvious that the range of action is smaller. A conscious choice of the residential location of the persons in focus with all important infrastructures around can be one reason for this phenomenon, but Schoenfelder & Axhausen (2003) interpret these numbers as an indicator for a possible social exclusion. Negative deviations are interpreted as not-realised trips (Duvarci & Mizokami 2009).

The comparison of average trip lengths and trip durations delivers insight into the average velocity, with which the trips are accomplished. The average trip lengths of many groups are below the average value of Austria and also trip durations vary significantly from 23 minutes, which is the mean in the country. Although trips are shorter the persons interviewed need more time for accomplishing them, which shows that the average velocity of the persons is much lower. The combination of all three mobility indicators points out that the effort to accomplish trips and to fulfil activities seems to be much higher than for the average population.
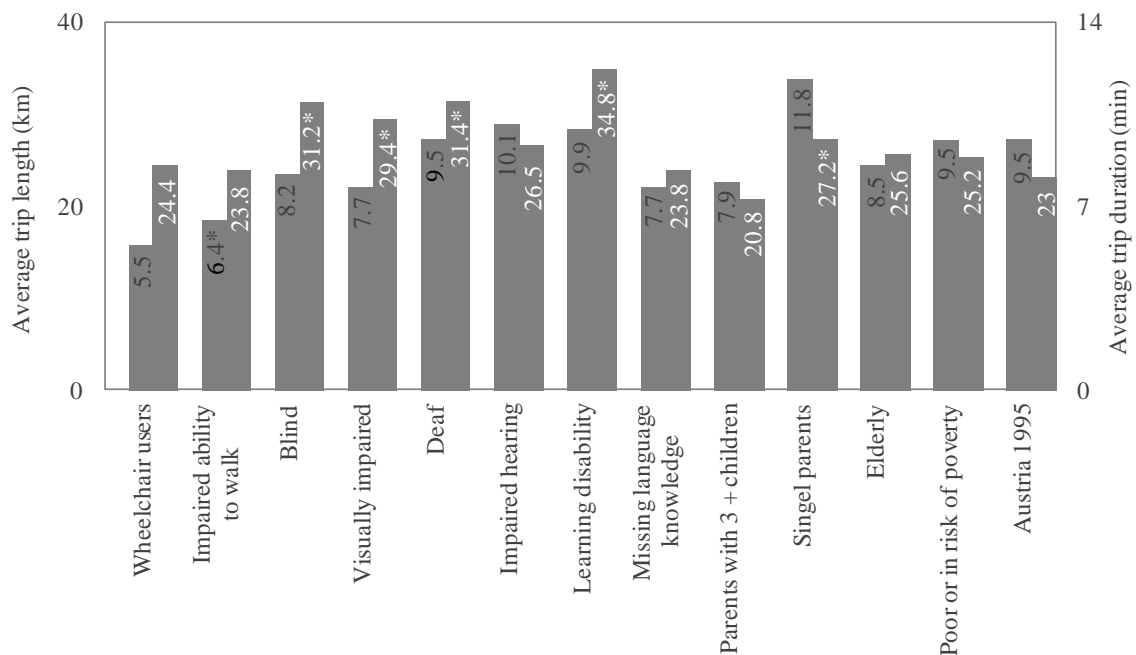
Fig. 2: Average trip length in km and average trip duration in minutes on working days (*= significantly different from Austrian population)

Partly the lower velocities can be explained by the availability and choice of transport means. The modal split varies significantly for almost all groups investigated compared to the average in Austria. Most of the groups use public transport significantly more often. Especially deaf persons and persons with learning disabilities have to be mentioned here: more than 50 % of their trips are accomplished by public transport. Also for the other groups – excepted wheelchair users, families with 3 or more children and single parents – the part of the trips made with public transport means is higher than for the average population. Families with 3 or more children and single parents use the car as much as often as the Austrian population in average. Because of the high number of trips per day, their restricted time budget and required transport capacities they seems to be bound to the car use. All other groups – excepted hearing impaired persons – use the car for for not more than 20 % of their trips, which is significantly lower than the value of the average population with 40 %.

The comparison of these mobility indicators as well as other figures from the study show that the mobility behaviour from the persons interviewed differ significantly from the Austrian average. Taking into account only these quantitative values it can be assumed for the groups investigated are less mobile and therewith they are at risk of being excluded from the society (Dodson et al. 2010). If the differences in the mobility indicators really cause restrictions in the activities and social inclusion for the persons in focus of the study can't be proven with these indicators. Persons can use different organisational strategies, support offers and devices in order to accomplish their activities without or with less restrictions.

4 BARRIERES IN THE PUBLIC SPACE

4.1 What people hinders to be mobile

The follwing groups of barriers mentioned in the interviews are related to the public space and have to be taken into account by urban and transport planners.

Barriers in the build environment form main obstacles for persons with potentially mobility impairing characteristics. Especially high kerbstones, stairs, steep ramps and missing or broken lifts in public space and buildings were mentioned by elderly, persons using wheelchairs or having mobility impairments as well as parents with children. Also uneven pavemantes were mentioned by wheelchair users, elderly and visually impaired persons. Further on, it is peceived as a barrier if space for pedestrians is limited and if crushes begin to develop. A problem which was mentioned basically by persons with visually impairments is the incorrect installation of traffic signs or other fixed equipment (e.g. letter boxes), which constitute high risks of injuries.

Missing boundaries between areas of different usage can be barriers for the persons in focus. Persons with visually imparments and elderly, whose ability to see is decreased, information reception became slower and reaction is delayed (Rytz, 2006), have problems in such environments due to an increasing feeling of insecruity and a higher risks for collisions. In contrast, for mobility impaired persons and people, who are mobile with prams or baggages, the absence of kerbstones and boundaries between different areas is an advantage. Planners have to find a compromise to meet the needs of both groups. Especially with regard to the upcoming discussions on shared space this problem has to be resolved.

Street crossings are perceived as obstacle by persons with visually impairments, elderly and persons with children. Barriers are constituted by highly frequented streets without traffic signals, traffic lights without accustic signals and short green phases. Crossings and the corresponding flattened kerbstones should be marked to show visually impaired persons where to change to the other side of the street.

Not only in the built environment barriers are hidden, also mobile or unexpected obstacles in public space limit the mobility of different groups. For example, building sites comprising shutoffs, signboards and building material hamper persons with mobility reducing characteristics. As barriers also decorations and advertisments in front of shops or other objects on the sidewalk (waste containers, carriage of postmen, etc.) were mentioned, which in some cases even obstruct the guiding system for visually impaired persons.

Almost all groups in focus of the study perceive long distances to different locations as reason for their mobility impairments. Particularly if the persons have to carry goods problems occure. Poor persons are effected by this problem remarkably because they often live in areas that are not connected sufficiently to city infrastructures. Due to a lack of mobility options they are not able to reach service facilities and therewith they are in risk of social exclusion.

A problem, which is not related to urban or regional planning directly, but which has to be taken into account by decision makers in overall strategies, is the feeling of the interviewees that other traffic participants are not aware of the problems of different person groups. This often has negative consequences on the mobitliy options of the persons analysed in the study. For example, car drivers who ignore crosswalks, heedless pedestrians or cyclists as well as bus drivers who disregard the special needs of public transport users were mentioned by the interview participants.

4.2 Fields of action

On the base of the barriers and problems mentioned by the interviewees some main fields of action could be identified, which should be considered by urban, regional and transport planners in their decision making processes.

Planning processes

People with mobility impairing characteristics accomplish their trips more often by foot or public transport. This means that the distances covered are shorter and the ranges of action are limited. Therefore, the idea of "short distances" should be promoted more intensively and the configuration of the residential environments has to be adapted to the needs of potentially impaired persons – especially in rural and suburban areas. In all planning processes the convenient and barrier free accessibility of public space and buildings has to be taken into account. The best way to consider all issues that concern persons with potentially mobility impairing characteristics is to include the groups affected in decision making from the beginning on. Participation processes should be integrated as a firm component of each planning process.

Information provision

One main field of action for improving mobility options of the persons in focus of the study is the information provision. Here, information on public transport (e.g. barrier free vehicles, interruptions) and unexpected obstacles in public space (e.g. building sites) should be offered. New information and communication technologies and channels have to be developed to inform impaired persons. These technologies have a high potential to help persons with impairments, but one should never forget that there are always persons who can't use technological devices. These are not only elderly but also persons who cannot afford to buy new technologies or persons who are not able to use it. Therefore also "traditional" services, like call centres or on-site support personnel should always be available.

Awareness raising

Awareness raising has also high potentials to improve the situation of persons with mobility impairing characteristics. Training courses and campaigns should be offered to educate and inform service personnel (e.g. of public transport services) on the one side and the broader public on the other side. It has to be elucidated how problems can be avoided and how everyone can help persons with reduced mobility.

The differences between mobility indicators of the persons investigated and the average population show a significant disparity in the behaviour and therewith in the chances to participate in everyday life. Problems and needs of most of the groups which were mentioned in the survey are well known and many measures to overcome obstacles are developed. But still the implementation of measures is not satisfying and has to be further supported and promoted. It also has to be considered that there exist further groups of persons having considerable mobility problems which are not in focus of planners and authorities until now.

5 REFERENCES

Herry, M.; Sammer, G.; Schuster, M.; Röschel, G.; Russ, M.: Allgemeine Mobilitätserhebung der Österreichischen Haushalte, Endbericht. Vienna, 1996.

Banister, D., Bowling, A.: Quality of life for the elderly: the transport dimension. In: Transport Policy 11 (2), p.105–115. 2004.

Brackertz, N. Who is hard to reach and why? ISR Working Paper. 2007. http://www.sisr.net/publications/0701brackertz.pdf, Accessed April 4, 2011.

Bundesministerium für Verkehr, Bau und Stadtentwicklung (BMVBS) (Eds.): Mobilität, Erreichbarkeit und soziale Exklusion. Fähigkeiten und Ressourcen einer ländlichen Bevölkerung für eine angemessene Versorgung und Teilhabe am öffentlichen Leben (Mobility, Accessibility and social Exclusion. Ability and resources of the inhabitants of rural regions for adequate supply and participation in social life). BMVMS-Online-Publikation 27/2012. 2012.

Chlond, B.; Ottmann, P.: The Mobility Behaviour of Single Parents and their Activities outside the Home. In: German Journal of Urban Studies, Vol. 46, No. 2, 2007. http://www.difu.de/node/5943. Accessed Feb. 17, 2011.

Cowham, M.; Webb, J.; Dye, J.; Crowther, B.: Prioritising Street Improvements for Respondents with Disabilities: Qualitative and Quantitative Research. Presented at the 8th International Conference on Survey Methods in Transport, France, May 25-31, 2008.

Duvarci, Y.; Mizokami, S.: A suppressed demand analysis method of the transportation disadvantaged in policy making. In: Transportation Planning and Technology 32 (2), p. 187-214. 2009.

Riandey, B.; Quaglia, M.: Surveying Hard to Reach Groups. Presented at the 8th International Conference on Survey Methods in Transport, Annecy, France, 25-31 May 2008.

Rytz, M.: Senioren und Verkehrssicherheit (Senior citizens and road safety). Verkehrsclub Schweiz (Eds.). 2006

Schönfelder, S.; Axhausen, K. W.: Activity Spaces: Measures of Social Exclusion? In: Transport Policy 10 (4), pp. 273-286. 2003.

Schwanen, T.: The mobility of older people – an introduction. In: Journal of Transport Geography 18; p.591–595, 2010.

Stanley, J. K.; Hensher, D. A.; Stanley, J. R., Vella-Brodrick, D.: Mobility, social exclusion and well-being: Exploring the links. In: Transportation Research Part A 45(8), p.789-801. 2011.

Stiewe, M.; Krause, J. (2012): Geschlechterverhältnisse und Mobilität–Welchen Beitrag leisten Mobilitätserhebungen? (Gender relation and mobility – Which contribution mobility surveys can make?) In: Schrenk, M.; Popovich, V. V.; Zeile, P.; Elisei, P. (Eds.): Proceedings REAL CORP 2012. Schwechat, Austria 14-16.05.2012. http://www.corp.at. Accessed Sept. 05, 2012.

Meter-ON: Smart Metering for Europe's Smart(er) Households

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1 ABSTRACT

Smart meters are one of the pillars of the smart grids and since few years are attracting much attention. They will help in the transition towards "active networks evolution" to massively integrate renewable energy sources into the grid and they will enable the full exploitation of technologies like electro-mobility and active demand programs with great benefits in terms of the overall sustainability of the energy system, positively impacting both the society and the environment. The massive introduction of intelligent metering systems will assist the active participation of consumers in the energy market, promoting transparency and competition and favouring the emergence of a well-functioning and non-discriminatory retail market in the whole Union. The paper presents initial results regarding consumers' involvement of the European project Meter-ON, a coordination and support action which aims to steer the implementation of smart metering solutions throughout Europe by effectively collecting the most successful experiences in the field and highlighting the conditions that enabled their development.

Meter-ON Consortium is led by the European Distribution System Operators for Smart-Grids, including 32 leading DSOs and associations throughout the European Union. The Consortium comprises university-linked foundations (EnergyLab), technological institutions (RSE and CEIT Alanova) and communication experts (ZABALA).

2 INTRODUCTION

In most cases smart metering involves the installation of an intelligent meter at residential customers and the regular reading, processing and feedback of consumption data to the customers. Smart metering is often referred to as automated meter reading (AMR), or in the case of real-time, two-way communications, as advanced metering infrastructure (AMI) (Van Gerwen et all, 2006).

The evolution of power grids into smart active networks is key in enabling the transition towards more sustainable and environmental friendly energy systems, and smart metering is a core tool to develop smart grids in the future. In this field, Distribution System Operators (DSOs) from all over the world are designing, developing and implementing different smart metering systems, and testing them in pilot projects before proceeding with large scale roll-outs. Different transmission technologies and protocols are used. Although the first objective of smart metering infrastructures is the "metering and billing", it emerged they are also key to enable other advanced services related to smart grid features and to make consumers more active players in the energy market (Bavarian et all, 2012).

The intelligent meters will enable the massive penetration of distributed energy resources by supporting the bi-directional flow of communication and energy needed to effectively integrate electricity produced from green energy sources. Smart meters will also allow the introduction of electro-mobility and the deployment of related charging infrastructures. According to the feedbacks, Meter-ON has observed from its first collection of data that even if supportive smart metering regulation is not already in place throughout Europe, DSOs are exploring smart metering deployment possibilities and, leveraging on this infrastructure, they are developing other advanced services that can support the development of smart grids at large.

The successfull deployment of smart metering infrastructures relyes on different interlinked aspects: technical, economic, regulatory and consumer involvement issues. This paper aims to take a deeper look on the consumers' side, as they represent the end-user but also (in many cases) the less experienced actors when it comes to smart metering.

3 METHODOLOGY AND OBJECTIVES OF THE METER-ON PROJECT

The Meter-ON project is a coordination and support action financed by the Seventh European Framework Program (FP7) which aims to steer the implementation of smart metering solutions in Europe by effectively

collecting the most successful experiences in the field and highlighting the conditions that enabled their development. On the basis of the lessons learned, the goal of Meter-ON is to provide to any stakeholder an open information platform with clear recommendations on how to tackle the technical barriers and the regulatory obstacles endangering the uptake of smart metering solutions in Europe. Meter-ON will address completed, on-going and planned smart-metering projects and is consisting of a three-step approach performing the following activities (as shown in Figure 1):

(1) collection of information related to smart metering projects;

(2) analysis of each project according to the identified set of information domains (see below);

(3) drawing conclusions and recommendations on the way forward based on the lessons learned from the most successful smart metering experiences.
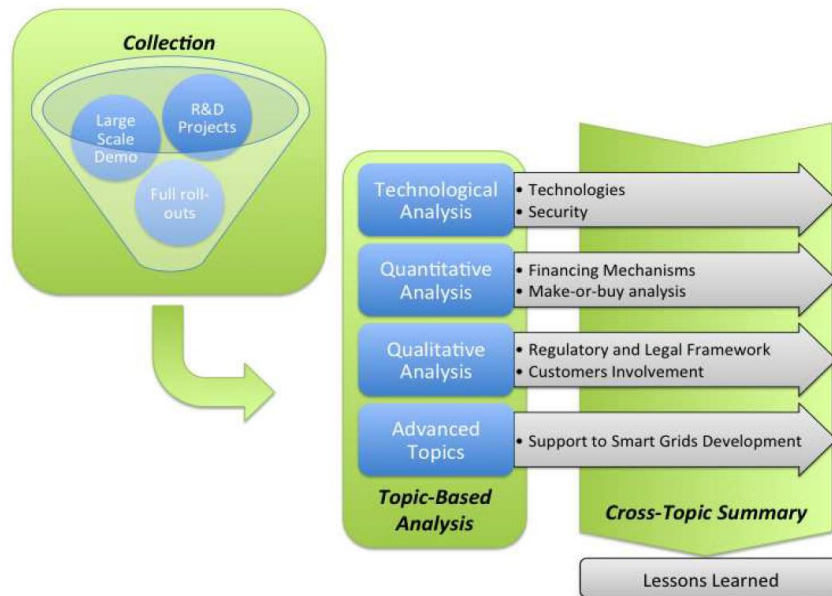
Figure 1 Meter-ON Approach

During the Topic-Based Analysis, each project goes through the following analysis:

- Technological analysis of the grid characteristics of the company running the smart metering project, of the overarching smart metering architecture, of the smart meter devices installed, of the cyber security and privacy policies applied by each smart metering solution presented.

- Quantitative analysis, comprising cost and benefit originating from the project and information on the supply chain development process related to each project.

- Qualitative analysis on the regulatory and legal framework in place in each country where the project is running and on user acceptance and customer involvement assessment, to evaluate consumers perceptions and attitudes towards smart meters.

- Advanced topics, comprising information on the impact of electricity smart meters on distribution network operations, information on smart metering solutions as supportive of electric vehicle infrastructure, demand response programs and the existence/plans of smart metering solution for other energy carriers (heat, gas and water), when applicable identifying also multi-utility approaches.

4 QUESTIONNAIRES AND FEEDBACK

Aside from the available literature, the consortium has developed a questionnaire having four main information domains, as decribed above. This has been distributed to the utilities involved in the project in order to receive direct input but also to make sure that sharing experiences ensure a win-win situation for all parties involved. In the first collection phase of the project, 15 project information questionnaires have been gathered. Projects collected take place in 10 European countries (Figure 2) and according to the information available in total it is foreseen that by 2020 about 100 million meters will be installed. The project information sample comprises 1 project in the R&D phase, 5 projects in the pilot phase, 1 project in the

demonstration phase and 8 projects in the roll-out phase (on-going or completed), in the countries outlined below:

Figure 2 Meter-ON coverage

5 CONSUMER FOCUS

The involvement of the customer is noted to be a complex point linked to the regulation in place in each Member State, where customers are expected to be engaged in these changes, but as some evidence show the information needs to be shared in a more accessible and understandable manner for them to do not see smart meters as a danger and to experience real benefits from their usage.

Three matters are recurrent in the acceptance and involvement of customers' vis-à-vis smart metering solutions: security and privacy related issues, cost related issues and energy efficiency. Even if the latter is used as a tool to convince the user of the importance of the smart meter, there is evidence showing that energy savings are reached not only by installing the device, but by having a combination of advice, precise billing and smart meter (Klopfert & Wallenborn, 2011).

The concerns related to data collected from smart meters range from how is this information handled to what might happen in case of unauthorized accesses. Along with this issue, trivially, consumers might fear they are charged the costs related to the infrastructure without receiving back the corresponding benefits.

As a general rule it is observed that effective information campaign promoting consumer awareness and knowledge should be performed by the company running the smart metering project, not only to mitigate their resistance to the technology but to promote at an early stage the interaction with the meter, to support those advanced smart metering uses, such as demand response programs, where the involvement of the customer is crucial.

Information collected by Meter-ON shows that in some cases companies running the smart metering projects adopted a clear strategy targeting the engagement of the end-users, but in other cases it is clear how the focus was more on the technological side and how the customer was not involved at the early stage of implementation. The initiatives to engage the consumers in the smart metering implementation range from basic informative letters on the matter with updates throughout the process, to round-table meetings with the stakeholders and to large-scale surveys and Customer Service platforms to attract customers in providing their opinions and to enhance their interaction with the smart meter. In the next phases Meter-ON will try to identify the most successful strategies to involve consumers in the smart metering field.

6 CONCLUSION

This paper highlighted that the customer should be put at the core of smart metering developments, as he/she is the first actor concerned by the deployment of this technology. It is observed that effective information campaign promoting consumer awareness and knowledge should be performed by the responsible company, to promote at an early stage the interaction with the meter and thus supporting those advanced smart metering uses, such as demand response programs, which are expected to bring energy savings.

Meter-ON project has gathered already information from 15 projects that are going to involve about 100 million customers in the next few years. Considering the high number of households affected by the deployment in various cases, the consumer needs to be a priority at all levels. Creating a transparent environment around smart metering will facilitate understanding about the topic among consumers and consensus at the higher decision levels.

7 ACKNOWLEDGEMENTS

8 REFERENCES

Van Gerwen et all, 2006 – Rob Van Gerwen, Saskia Jaarsma and Rob Wilhite; Smart metering – Briefing Paper, KEMA (The Netherlands), 2006.
Bavarian et all 2012 – Sara Bavarian, Lutz Lampe, Siew Cheong, Sol Lancashire, Adeleye Kunle; Leveraging the smart metering infrastructure in distribution automation, Department of Electrical and Computer Engineering, University of British Columbia, Vancouver, Canada – SmartGridComm Third International Conference, 2012
Klopfert & Wallenborn, 2011 – Frederic Klopfert, Gregoire Wallenbom; Empowering Consumers through Smart Matering. BEUC, Belgium, 2011.
For more information please visit www.meter-on.eu or contact the authors of the paper.

Motorways in Agglomerations – Changing Concepts for Changing Needs

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1 ABSTRACT

Limited financial resources, environmental regulations, new mobility trends and outdated planning concepts call for a rethinking – not only in politics, society and spatial planning, but also in infrastructure development.

The past thrieve for constantly expanding capacities of motorways through new routes or enlarging existing infrastructure is becoming outdated. Intelligent expansion and new technologies displace "conventional"

(= increase-driven) strategies. Austrian motorway provider ASFINAG is already extending his future policies to new topics of strategic network planning: effects of motorways on space- and regional development, opportunities for intermodal crosslinking, enhance of information services, etc.

Also the demands of customers have changed. Linked traffic information in real time like Traffic Message Channel (TMC) is already an integral part of traffic-information and will in future be increasingly offered in a package with various mobility services. The discrete one-dimensional traffic information is already past. Future services will provide a cross-modal integrative mobility information, which means, that customers get reliable support in multimodal routing and mobility any time he needs.

Further, ASFINAG defines itself not only as a provider for road-infrastructure and high-quality technical services, but also committes itself to a builing culture in the sense of environment responsibility. The ambitious objective in the long term is to improve the appearance of motorways and expressways in terms of architectural quality and their integration in landscape. In cases of construction of new routes, ASFINAG early began to pay considerable attention to design aspects. Now, these activities will be extended to the existing network. From noise barriers up to motorway maintenance buildings, all design-related constructions will be architecturally revised, so that the appearance of our entire network – from bridge to rest areas – will be refurbished for our customers and residents nearby motorways.

2 MOTORWAYS IN COMPETITION OF SITES

2.1 Motorways affect Spatial Development

Spatial development in Austria is strongly influenced by highcapacity-infrastructure and has generated certain principles: industrial parks settle mainly in the catchment area of existing motorway junctions. It is considered as a precondition by local authorities and investors to build new junctions for the purpose to establish commercial real estates. It is even politically demanded. Common task in spatial und infrstructure-planning is it therefore, to develop an integrative view, ie. to anticipate possible effects of infrastructure on regions and communities followed by deriving regional and balanced transport policy objectives. Positive and negative effects are to be faced in terms of balancing interests!

2.2 EU Research project "TIILUP"

In 2012 a noteworthy EU research project named "TIILUP" (Transport Infrastructure Integrated Land Use Planning) was started. As a member of the coregroup team, ASFINAG assists to develop innovative instruments and methods, which can integrate land-use-planning more efficient into the process of multimodal infrastructure planning. Existing cases in the Netherlands, Germany and Austria have shown how such an integrated approach can lead to significant increases in cost efficiency in terms of investment costs, improved planning and investment processes and social/economic benefits as well as better reliability of the transport system and liveability for citizens in the regions involved. The TIILUP approach will analyse these and other relevant best practices to determine the key elements of the various approaches and consolidate them in a suite of generic approaches: the TIILUP toolbox.

The outcome will be a practical toolbox which enables organisations (such as local, regional and road authorities) to plan infrastructure more efficiently and meet policy objectives. The solutions in the toolbox

will be proven in practice and be accompanied with common standards, guidelines and specifications. This product will be disseminated through a sound knowledge transfer process.

2.3 Paying for benefits initiated by motorway connections

Fulfilling her duties, ASFINAG is increasingly confronted with projects and measures in the interests of other (third) parties. Especially interchanges often prove as a "magnet" for extensive business relocations. Usually the provision of infrastructure generated by ASFINAG implicates a significant rise of values in land use creation, but there are no adequate benefits (eg. road toll income) in return. As a customer-financed motorway operator it is therefore legitimate interest, to share costs with other parties according to the calculated moneticed benefits. In these cases of cost sharing, the funding is usually aliquot to the achieved benefits.

Since a few years this approach was established as common practice in ASFINAG. Further appropiate cost-sharing models are applied successfully for: the provision of noise barriers, protection of torrents and avalanches, Park & Drive facilities etc.

3 MOTORWAY OF THE FUTURE: INTELLIGENT AND CROSS-LINKED

3.1 Intelligent solutions replace expansion measures

The strategic focus getting motorways more efficient, is – by implication – focused on urban areas. Changed transport policy perspectives, changing mobility needs and rigorous cost reduction targets have distinct consequences: capacity constraints on the primary road network will in future be faced not only through expansion projects, but will be compensated by intelligent inventory-orientated solutions.

ASFINAG is developing sustainable solutions as follows:

- Emergency Lane Release: on critical routes a temporary realease of emergency lanes shall compensate high traffic volumes during morning and evening peaks. The objective is it, to keep traffic fluent and avoid accidents and traffic jams. To make this concept work, appropriate dynamic overhead displays and a video control system have to be installed. After implementation of all traffic safety-related requirements, the emergency lane can be released temporarily.

- Ramp metering: ramp meters could be installed to restrict the total flow entering the motorway, temporarily storing it on the ramps – a process called "access rate reduction." In this way, the traffic flow does not exceed the motorway's capacity.

3.2 Cross-modal network

ASFINAG has developed a strategy- and action plan for linking road networks with other modes of transport – concerning both – passenger and freight traffic. Appropriate locations connecting motorway with other carriers are examined regulary in order to find and develop multimodal nodes. First measures on motorways as signposting of Park & Ride (P&R) facilities were already implemented on ASFINAG network.

To optimise collaboration and information generally, regular meetings with delegates of other infrastructure operators are taking place. Besides P&R supply ASFINAG also thinks ahead how existing Park&Drive (P&D) facilities and service stations or rest areas can be developed as intermodal nodes for bus line operators in future. New "features" can be implemented in those locations, such as "Ride&Drive" (a combination of public transport and carpooling), as well as e-mobility devices in Park&Drive locations.

Concerning P&R facilities, information management in Austrian motoway-network will be continously expanded. The information provided includes the current connection status, the availability and utilization of public-transport, which can provide incentives for customers to change modes efficiently.

ASFINAG telematic network shall play a key role in intermodal information management. The development and implementation of "Cooperative Systems", based on an exchange of information and communication between vehicles and road infrastructure, is progressing rapidly. As part of the recent ITS World Congress 2012 in Vienna, achievements in cooperative services were demonstrated live in a "Showcase" in and around the city Vienna. Through a wireless communications network, a cooperative vehicle system can enable cars, buses, trucks to communicate not only with each other, but also to intermodal nodes. Major goal is to

integrate different modes of transport and to provide efficient interchanges between private and public transport.

Fig. 1: "Car-to-Infrastructure" – communication

Increasing cross-linking of vehicles through the area-wide availability of mobile, wide band, communication solutions offers numerous opportunities for communication with infrastructure networks. Thus, traffic information will be an indispensable part of future mobility.

3.3 Incident management, traffic control, Level of Service

Another strategic approach to improve quality of transport in urban areas are „soft" skills like intelligent network monitoring and data analysis. These traffic control measures also help to increase capacity of motorways without constantly enlarging capacities by additional lanes. Associated with comprehensive congestion causal-research activities, alternative solutions (for example release of emergency lanes) can displace expensive expansion measures. Intelligent traffic-monitoring can result in quite ordinary optimization measures which increase road safety substantially and thus a better route availability. Since today ASFINAG has already installed numerous of intelligent analysis- and control systems. The objective of all activities is it, to offer customers a safe and efficient traffic-network and make use of the existing data-infrastructure as much as possible. Since a few years, traffic problems on Austrian motorway-networks are actively managed and motorists are informed immediately about hazards or obstacles. To be able to communicate with drivers, road-side facilities, known as Traffic Control Systems – supported through different traffic information services – are already provided.

Basis for all Real-time informations are 2150 sensors along the Austrian motorway network, as well as Real-time data from partner organizations (eg executive or radio Ö3). Skillful coupling these different data sources significantly improves the quality of single informations.

Figure 2: webbased ASFINAG Traffic Control and Level Of Service Information

Further, as truck parking facilities are increasingly demanded, ASFINAG, for example, has installed a truck parking information systems for metropolitan areas of Vienna and Linz.

Another successful information-service are, for instance, ITS-supported recommendations of alternative routes in case of line blocking and congestions situations.

4 INFORMATION / COMMUNICATION: MORE IMPORTANT THAN EVER

4.1 Telematic services

Successfull Transport systems in urban areas are today a matter of information. Future traffic information services of transport operators will be a highly specialized, quality-assured, data-management that provides reliable, timely, high-available and multi-modal informations for the linked up customers. The usefulness of mobility information is elementary for the customers and has to be offered easy and simple to understand. Especially traffic information has to be integrated to those platforms which are utilized by customers for their daily information. Not to forget additional „key-innovations" like e-Mobilty, e-Safety, as the latest progressions in urban mobility.

Standalone-Informationtechnologies of today will continuously be replaced by integrated centralized services. Multimedia service for traffic information is provided on uniform, standardized platforms and available for customers by mobile devices and digital broadcast services.

Figure 3: Traffic information services ASFINAG
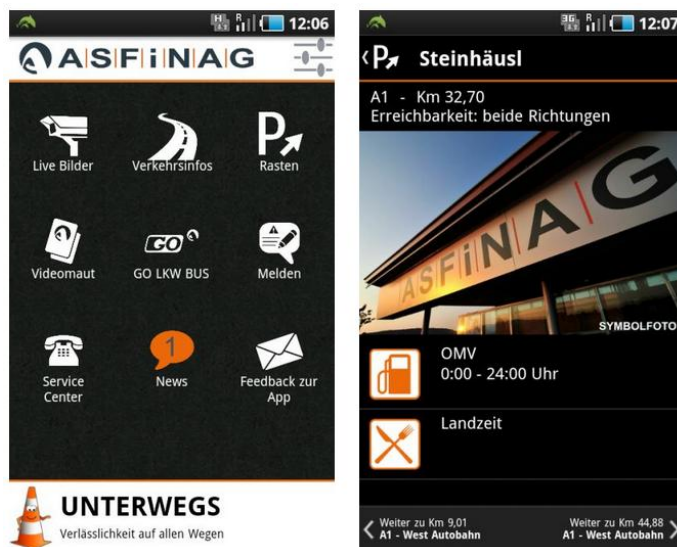
Figure 4: Mobile Internet ASFINAG

From ASFINAG point of view sustainable mobility can only be achieved by measures along all three intervention-axes: vehicle – man – infrastructure. In multimodal transport networks of the future, users choose from the most comfortable and best suitable transport-facility for the particular route, travel purpose and the current traffic situation (eg unavailable route because of roadworks). Successful application of multimodality in daily life requires integrated route planning, reliable knowledge of the current traffic situation and well directed alternative options. For those pursoses powerful communication and information solutions are necessary. A variety of different traffic information services are currently available to road users in Austria. One oft he most efficient services will be the „Traffic Information Austria (VAO)", a

plattform developed under guidance of ASFINAG. The mission was to create a collaborative information service covering all Austrian traffic means and all traffic-states (for cyclists, pedestrians, public transport, motor vehicles, Park&Ride) in realtime and in consistently high quality. Highlighting alternatives and options enable customers to switch to more environmental-oriented means of transport and ensure more attractiveness and greater awareness. According to the results of the research project „ITSworks", the potential for shifting traffic from the car to more environmentally friendly modes ranges up to six percentage points.

Particular requirements in data quality and comprehensive information have to be implemented:

- the offering has to become coherent and not only cover small sections of the mobility range, as is currently often the case

- the quality of all services should be equally high; they should thus have access to a collaborative database in order to prevent inconsistent recommendations

- the digital maps currently employed should also be standardised to reduce inconsistencies in routing and localisation to a minimum

- a common coordinated strategy would ensure traffic control more flexible, ecological and efficient in terms of mobility

5 MOTORWAYS AND BUILDING CULTURE

The perfect motorway meets several aspects: it must be planned safe and functional – and simultaneously must fit in the landscape as much as possible. Motorway routes, noise barriers, bridges, tunnels, rest areas, toll cabins and other buildings leave – because of their size and feature – distinctive marks in landscape and are therefore not only a technical but also an architectural challenge for Highway authorities.

As part of the ASFINAG – design initiative, launched in 2010, was the founding of a „design advisory board" of internal and external experts in the fields of architecture, landscape architecture and planning as well as representatives of the Austrian Chamber of Architects. As a strategic approach, the company has focused not on ordinary design proposals or catalogs but on sustained strategic and organizational regulations, in order to allow plenty of room for creative minds to realize innovative (design) ideas in the project execution.

Austria's 2175 km long road network consists of over 1,250 kilometers of noise barriers and 4745 bridges, both with renewal cycles starting from 15 to 20 years up to 70 years. Purpose of the design initiative ASFINAG is to guarantee, that our construction projects are not reduced on safety and functionality, but should also fit aesthetically into the landscape.

In cases of construction of new routes, ASFINAG early began to pay considerable attention to design aspects by undertaking architecture competitions. Very positive customer feedback confirmed the chosen path. Now, these activities are already extended to the existing network, which is a far more complex exercise. Just in the year 2012 eleven different design contests for renewal measures in the existing network were settled.

An important aspect of the design initiative was, already from the beginning, the subject of economics. To ensure efficient and cost effective solutions, one of the most decisive requirement is to implement design aspects early and coordinated in the planning process. This must be guaranteed by all involved disciplines.

Objectives of the ASFINAG design initiative:

- Continuity and long-term effectiveness

- Standardization instead of sprawl

- Innovation as an element of design

- Basic principle of economics

- Defined and achievable quality criteria

- Employee training on "Architecture"

- Top-quality renovations – particularly bridges and noise barriers

Fig 5:. Construction of Motorways has to deal with building culture

6 CONCLUSION

Already for several years ASFINAG faces increasing traffic challenges in urban areas, which only can be solved in an overall context. Common target of all measures is it, to run the road-network to the lowest possible costs and related to highest efficiency and innovation. Thus under precondition of largest possible customer satisfaction on high level of quality. To ensure furthermore, that customers travel safely and unhinderd on ASFINAG network, it requires increasing intelligent and innovative solutions – with a reinforced focus on optimizing the existing infrastructure as well as deepen intermodal strategies and information services.

7 REFERENCES

ASFINAG: Annual Report 2011, Vienna, 2012.
ASFINAG: F&E Schriftenreihe ASFINAG No 6, Vienna, 2012

Opportunities for Sustainable Development of Suburban Rural Areas on Example of Karabiha Rural Settlement

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1 ABSTRACT

Thinking about planing cities we also should not forget about improving living condition in rural areas and their potentials for sustainable development.

Karabiha rural settlement located to the south of Yaroslavl – major town of Yaroslavl region, it is extended rural area, that occupy about 217 square kilometers and contain 63 villages with overall population about 13.350 residents. Some processes, that going on here today can be also recognized in rural territories, that surround another cities and towns in Russia like increasing of building detached one-family houses and dachas, appearance of huge retail and logistic centers, but there are some features, that can help to distinguish Karabiha from another rural areas. Although Karabiha's residents dependent from center of region in labor, culture, education, health care and another needs, territory has potentials not to be only a kind of remote "bedroom community" of Yaroslavl. During the last few years in Karabiha were opened several new factories of food and construction equipment industry, ski and recreation centers, and even dolphinarium. Karabiha often associated with famous Russian poet Nikolai Nekrasov, who wrote here poems "Russian women" and "Who lives well in Russia?", today his estate transformed into a museum.

Recent years Karabiha survived dramatical growth of building, that was provoked by allocation of land, mainly for individual housing. Increasing of building detached one-family houses explained not only by appearance of "newcomers" from Yaroslavl and another regions, but about a half of new homes were constructed by Karabiha's inhabitants. While Yaroslavl and Yaroslavl region demonstrate population decline, Karabiha shows grow of residents, that was ensured, on the one hand, by natality, on the other hand, by migration inflow. Population can increase more as a result of realization low-rise housing projects, that launched by government of Yaroslavl region and private sector. But in this case very important not only to rise quantity of residential real estate, but also expand quality of life in new and established residential areas, improving accessibility of education, health care, culture and sport facilities.

This paper focused on determination, problems and potentials for sustainable development and smart grow of Karabiha, taking into account of local administration's responsibility.

2 INTRODUCTION

Rural areas are often mentioned as home for almost a half of overall world population and their development is vitally important. Although in Russia according to statistic data 74,03 % of residents concentrated in cities, many of the rural areas now face significant challenges and survive dramatic changes. Influence of urban sprawl on the countryside especially visibly in vicinities of cities, where it is seen as widening of urbanized space.

Yaroslavl region is a part of Central Federal okrug, and situated to the north from Moscow region. It has passed through urban sprawl process, despite of negative demographical trend, in the recent 10-15 years. Increasing number of housing as well as industries and logistics on the territories that surround major cities of the region, like Yaroslavl, Rybinsk and Pereslavl-Zalessky dramatically accelerates. Negative impact of this process can be recognized in consuming of agriculture land, spreading the recourses and environmental degradation. But at the same time appearance of investment and newcomers can be considered as a potentials for improving living conditions for rural inhabitants and development of territories in a sustainable way. Rural areas influenced by planning policy implemented by different levels of public authority and, at the same time, in the last 10-15 years with the emergence of private land ownership affect of private sector has also increased significantly.

For rural areas Russian legislation provides a two-tier system of municipal management, including division into municipal districts and settlements . Sharing of responsibility between districts and settlements can be flexible, and depends from ranges that is called " issues of local importance " that contain maintenance of common infrastructure, roads, repair of municipal housing, provision of education, healthcare, cultural and public services, protection of nature and cultural heritage sites and landscaping.

If realization of planning policy is concern, local councils responsible for development planning documentation, that according to legislation named " Territorial planning scheme of municipal district" or "General plan of settlement", that show dislocation of social objects, streets, infrastructure and border of the villages, with components of strategic vision of development for 20-25 years. Another document, "Land use and development plan", that establishes variety of permitted uses of land according to zoning and regulation for each zone. In this case importance of planning policy, pursued by local councils became crucial.

Another thing, that affects on development of rural areas is allocation and privatization of land. New private land owners often tend to sale or develop their allotments for housing, or logistic and industry, that have cause increasing of urbanized space.

3   KARABIHA RURAL SETTLEMENT

Karabiha rural settlement located to the south of Yaroslavl – major town of Yaroslavl region, it is extended rural area, that occupy about 217 square kilometers and contain 62 villages and township with overall population about 13.350 residents. Territory of settlement populated unevenly, majority of population concentrated in villages Karabiha, Dubki, Kormilitsino, Ananyino, Shchedrino, Nagorny, and township Krasnye Tkachi, that have good connection to the center of region by public transport. Another villages inhabited by much less number of permanent residents, but at the same time, in summer population doubles because seasonal migrations out of Yaroslavl for vacation or holydays.

Since Soviet times Karabikha have had a huge number of dachas and horticultural associations, which territories consist of 600 square meters pieces of land with small huts, but today it is more common to build big houses with all amenities, although this second dwelling, not used for permanent living, mainly for rest.

Karabikha, Krasnye Tkachi and Kormilitsino compactly located along the road Yaroslavl – Shopsha, closely related to each other economically, socially and culturally, and form a kind of rural agglomeration.

Village Karabiha is administrative center of the settlement that often associated with famous Russian poet Nikolai Nekrasov, who wrote poems "Russian women" and "Who lives well in Russia?" at the time being here. Today his estate with poet's house and English park transformed into a museum and attract tourist, especially for celebration of poetry Day . There is also a school founded by poet 's brother Feodor Nekrasov, administration and hospital.

Krasnye Tkachi – township was formed around the textile factory, founded by Sakin's family in the end of XIX century. Despite significant advances in the Soviet era, the company experienced a difficult restructuring, reduction of production and number of employees. Currently, the factory employs only about 70 people, but at the same time its territory located on the banks of the river, and includes several historic buildings can be converted into a museum or creative spase. In structure of township we can trace the stages of its development: the factory buildings and owner's house, dormitories and barracks preserved somewhere in the central part of the township, then, there are five-storey blocs of flat along the road built in the 70-80 years of the 20th century, surrounded by detached one-family houses, some of them were built recently. After the referendum in 2009 Krasnye Tkachi became a part of Karabiha rural settlement.

The settlement Dubki was founded for families, resettled from neighbor villages for construction of the oil plant and families living in Karabiha estate after its transformation into a museum. Houses were built at the same time with poultry farm and greenhouse complex. Over the past few years the greenhouse complex was renovated and expanded, opened hatchery and meat processing plant.

Shchedrino, Ananyino, Kormilitsino and Nagorni – central manor of agriculture enterprises, were built under the influence of idea of "agriculture towns", that was popular in 60-80 years of the 20th century. Agriculture towns – settlements, that surround large enterprises or farms, built mostly of blocs of flat with full range of services, like culture, retail, education and health care. All these villages were equipped by facilities, but it's condition highly depended on situation with local industry.

Shchedrino and Nagorni , that located just in 5 minutes by bus from the core of Yaroslavl, tend to became a kind of remote "sleeping quarters", after realization of low-rise residential micro-region in Shchedrino, it's population is going to triple.

Currently actions of regional government have a huge impact on development of Karabiha. On the territory, that adjacent to Yaroslavl in the northern part of the settlement was founded industrial park, wgere were

opened production of construction machinery, pharmaceutical plant and a number of other industries. In 2010, most part territory of industrial park was included in the boundaries of Yaroslavl. But its creation has played a major role in the development of adjacent areas, related to logistics, trade and service for vehicles.

Nowadays regional government launched the program of constructing affordable housing and one of pilot project of low-rise micro-region with social infrastructure was started on the territories annexed to the Krasnye Tkachi. At the time of this paper was written about 200 hectares have been allocated for the integrated development for the construction of low-rise affordable housing, it is assumed that these areas will be provided to contractors on preferential terms.

4 TRENDS AND PROSPECTS

While Yaroslavl and Yaroslavl region demonstrate population decline Karabiha shows grow of residents, that was ensured, on the one hand, by natality, on the other hand, by migration inflow. Growth of building, that was provoked by allocation of land, mainly for individual housing, increasing of building detached one-family houses explained not only by appearance of "newcomers" from Yaroslavl and another regions, but about a half of new homes were constructed by Karabiha's inhabitants. The birth rate is accompanied by increased demand for both in nursery schools, sport facilities and public spaces attractive for young people. The last year, administration of the settlement started program of creation athletic fields in Krasnye Tkachi, Dubki, Ananyino and Shchedrino.

Despite the availability of jobs in the settlement, according to various estimates, up to 50 percent of the working population prefer to work in Yaroslavl, residents of Karabiha settlements also depend on the city in culture, education, health care and another needs. At the same time, area contain many tourist attractions like Nekrasov's estate, picturesque landscapes and churches, historical factory buildings, dolphinarium, ski and recreation centers that may considered as s good base for development local tourism and creation of new jobs.

Karabiha demonstrates positive trends, not only in population, but also on indicators such as fiscal capacity, resettlement of dilapidated housing, construction new real estate and industrial buildings, development of infrastructure, retail, culture and recreation facilities, and it may seems that everything "goes well" by itself without planning or clear strategy. However Karabiha rural settlement have a good position for further development and smart grow, but this way needs to be planned in collaboration with residents and neighbor municipalities.

5 FUTURE VISION

for Karabiha it is possible to choose between a number of potential strategies including the industrial or tourist-oriented development. Both directions could be successful, but for provide better quality of life for inhabitants it is essential to take measures to improve the ecological situation, especially in Nagorny, Dubki and Shchedrino, that located near the southern industrial hub. Their need to accelerate the implementation of sanitary protection zone.

In case of increasing in birth rate creating of space for childhood may be a good challenge for Karabiha to attract young families who wish to raise children closer to nature and protect them from the harmful effects of the city. Under the circumstances it means invest more in social services, education and sport infrastructure.

Karabiha rural Implementation of planning policy and the allocation of land in accordance with the developed in 2009 planning documentation, that sets rules for interaction between municipality and developers.

6 CONCLUSION

Whether experience of Karabikha can be useful to other rural areas, taking into account all the possible differences? For the region with overall negative population trend, like Yaroslavl region more detailed study of the experience of its parts, that demonstrate increasing of natality could help to improve demographical trend.

7 REFERENCES

Municipal statistic data of Karabiha rural settlenent
General plan of Karabiha rural settlenent

Orijentir – Interactive City Guide for All

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1 ABSTRACT

"Orijentir" is conceived as an accessible city map that pretends to provide solutions for better accessibility for people with visual, cognitive, mobility and hearing limitations in Belgrade, capital of Serbia and Novi Sad, the second biggest city, through an accessible application for mobile devices with Android, iOS and Windows OS. The application will be used as an assistive technology to guide from a point of origin to a destination by using of metropolitan transport and/or pedestrian routing. By providing optimal and accessible routing and orientation by GIS and GPS it will try to improve freedom of movement of persons with disabilities as one of the key human rights and to help their independent living.

The project presents the extension on just developed application called Accessibility Map designed by Vidan Danković that provides information about the accessibility of facilities. The application is intended for all those who have a need for this information, persons with disabilities, pregnant women, parents with young children, the elderly, etc.

Orijentir will be a coalition project of Centre for Society Orientation (COD) as a project leader, Accessibility Audit Association of Serbia, Ecumenical Humanitarian Organization (EHO) and different participants from public sector such as government and administration of Serbia, Belgrade and Novi Sad and University of Belgrade as well as different private companies and European funds and US development funds for disability issues.

The project development started in January 2013 and our team of 3 NGO's from Belgrade and Novi Sad is at the moment on the first stage, working on important cadastral data collection. Estimated project duration is two years.

2 INTRADUCTION

There is an increasing awareness of social responsibility in every community to make an inclusive society, society accessible for. This accessibility applies to both the outside environment and to the interior environments. In many countries this awareness is reinforced by anti-discrimination legislation advisory and regulatory guidelines. The collaboration of all important stakeholders in the process of making decisions during the definition of laws and standards, design of urban plans, construction works is crucial for understanding of necessities of every individual and providing environment without barriers. However, in many cases such as Serbia crucial stakeholder are not included in these processes which lead to creation of inaccessible environments.

Accessibility is a general term used to describe the degree to which a product, device, service, or environment is available to as many people as possible. Accessibility can be viewed as the "ability to access" and possible benefit of some system or entity. Accessibility is often used to focus on people with disabilities and their right of access to entities, often through use of assistive technology.

The term "accessibility" is also used in the Convention on the Rights of Persons with Disabilities as well as the term "universal design". Accessibility is strongly related to universal design when the approach involves "direct access". This is about making things accessible to all people (whether they have a disability or not).

Disability according to ADA standards is a generic term that includes all the components about the person: impairments, activity limitations and participation restrictions. It expresses aspects of negative interaction between the individual with health problems and physical and social environment.

The disability rights movement advocates equal access to social, political, and economic life which includes not only physical access but access to the same tools, services, organizations and facilities.

While it is often used to describe facilities or amenities to assist people with disabilities, as in "wheelchair accessible", the term can extend to Braille signage, wheelchair ramps, elevators, audio signals at pedestrian crossings, walkway contours, website design, reading accessibility, and so on.

Consider redefinition of laws and standards as long and complicate process which includes changes on all levels, therefore through this project it would be tried to provide solutions for better accessibility for people with visual, cognitive, mobility and hearing limitations in Belgrade, capital of Serbia and Novi Sad, the second biggest city by using ICT (Information and Communication Technology), or more specific: GPS (Global Positioning System) and GIS (Geographic Information System).

3 OBJECTIVES

"Orijetir" is conceived as an accessible city map that pretends to provide solutions for better accessibility for people with disabilities in Belgrade and Novi Sad through an accessible application for mobile devices with Android, iOS and Windows OS. The application will be used as an assistive technology to guide from a point of origin to a destination by using of metropolitan transport and/or pedestrian routing. By providing optimal and accessible routing and orientation by GIS and GPS it will try to improve freedom of movement of persons with disabilities as one of the key human rights and to help their independent living.

It is easy to see how in the urban or natural environment the same message is presented on many different ways. The analogy of presenting the same message on different ways in the same urban environment is essential for providing equal opportunities to all and Centre for Society Orientation (COD) as a project leader dealing with this issue from the human rights perceptive. This application will provide specific guiding to persons with visual, cognitive, mobility and hearing limitations trough voice, text and imaging inputs on different languages.

The project presents the extension on just developed application called Accessibility Map designed by Vidan Danković (Accessibility Audit Association of Serbia) through the program Social Change Hackathon presented on the 48 hours competition for the development of 15 social responsible applications for mobile devices. Accessibility Map provides information about the accessibility of facilities. The application is intended for all those who have a need for this information, persons with disabilities, pregnant women, parents with young children, the elderly, etc. Objects are mapped for users with a few simple questions followed by illustration. There is the option of adding additional images and descriptions, and all objects are passing through the administrator verification. Furthermore, data provided by users can be useful tool for city administrators about inaccessible places in town. The project is supported by SEE ICT organizations from Belgrade, with the support of the Institute for Sustainable Communities (ISC) and USAID.

There is an increasing awareness of social responsibility in every community to make a society accessible for all. In many countries this awareness is reinforced by anti-discrimination legislation advisory and regulatory guidelines. However, in many cases such as Serbia, people with disabilities are classified as persons that need protection or care, outside of mainstream society in the medical model of disability.

This project pretends to make one step forward by providing solutions for better accessibility of people with disabilities in Serbia by using ICT. We strongly believe that this project as one of the first step in accessibility improvement in Serbia will raise awareness about the needs of people with disabilities and initiate changes on all levels.

4 PROJECT SETTING

"Orijentir" project will be developed in the following phases:

- Cadastral data collection as a preparatory stage for the creation of digital map for Belgrade and Novi Sad [1]

- Cadastral data processing as a preparatory stage for the development of applications

- Focus groups sessions- gathering information about the needs of future application users

- Software development [2]

- Software testing

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[1] Since Serbia is not covered with sufficient data on Google Maps and OSM servers the first stage of the project will be data collection for the creation of interactive map. It will include cadastral information about buildings and streets as well as information about public transport and pedestrian crossings. The information will be collected from our cadastre and public companies in charge for maintaining public transportation and pedestrian crossings.
[2] The application will be first developed for Android since it is the most widely used in Serbia.

- Volunteers training on accessibility standards for special data collection [3]
- Special data collection by usage of Accessibility Map [4]
- Training for future users
- Software operation
- Maintaining application stability and update
- Visual identity

Since the project development started in January 2013 our team of 3 NGO's from Belgrade and Novi Sad is at the moment on the first stage. Estimated project duration is two years.

5 PARTICIPANTS

This project will be a coalition project of COD as a project leader, Accessibility Audit Association of Serbia, Ecumenical Humanitarian Organization (EHO) and different participants from public sector such as government and administration of Serbia, Belgrade and Novi Sad and University of Belgrade as well as different private companies and European and US development funds funds for disability issues.

COD is Serbian NGO working since 2008 on providing support to local coalitions of disabled people organizations. Through the development of Local Action Plans in field of disability they focus on the inclusion of disability issues in the process of creating a local policy. Out of consultancy process, coaching and mentoring of local DPO coalitions COD works on outlining specific measures that need to be taken to ensure the full participation of people with disabilities in all fields. For the moment COD is working with 9 local coalitions of disabled people organizations, representing 60 DPO's from 13 municipalities, from all 6 regions in Serbia. Projects are supported by Handicap International, European Commission, USAID y Swedish International Development Cooperation Agency.

Accessibility Audit Association in Serbia (URP) is a non-profit organization, established in 2009 to gather recognized individuals and organizations advocating for the development and implementation of accessibility standards in order to create an environment that benefits for all people. They are committed for implementation of the concept "Design for All" (DfA), which is the professional support for designers and architects with the aim that public space, buildings, services, products and services are planned in a way so that they can use them all the people, regardless of their physical, sensory, intellectual, social characteristics or age.

EHO is a humanitarian, non-factional, non-governmental and non-profit association of citizens from Novi Sad, Serbia. They are actively involved in the building of a cohesive civil society in Serbia by working in the following areas: poverty reduction, development of inter-church cooperation and promotion of human rights. Their work and activities are entirely project-based and resources for project are provided through calls for proposals from national and international donors who support social development and support, inter-church cooperation and health-educative program.

6 INNOVATION

From the late 1980s when GPS was introduced there have been huge number of projects trying to provide better accessibility for visual impaired trough smart city concept which implies usage of ICT. These projects are usually specialised only for visual impaired and provide maps for West countries and are not multi-lingual. Also, it is important to mention that because of the high costs these applications are not accessible to users form developing countries. In order to provide lower development costs new applications are usually based on free sources such as Google Maps or Open Street Map. That is a good platform, but unfortunately without sufficient information for our country, so in the first step we are working on development of maps for Serbia.

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[3] Educative short move that provides volunteers with basic information about accessibility standards will be made.
[4] Students of architecture from University of Belgrade and Novi Sad will be included in data collection trough university seminar as well as 20 volunteers with disability who are cooperating with one of the partner organization. The source for the mapping will be existing Accessible Map application. It will be amended with information about bus stops location and pedestrian crossings which accessibility should be evaluated.

Consider a local context and knowledge more adequate in resolving problems of disabled in Serbia, because global applications didn't bring adequate solution, this project will pretend to provide solutions for better accessibility for people with disabilities in general in two biggest cities in Serbia. The application will be developed on three relevant OS's and supported by latest technologies available on mobile devices such as GPS, compass and accelerometer, as well as 3G or Wi-Fi connection to provide maps and a guidance system. The application will be developed to achieve full accessibility following principles of universal design. It will be multi-modal and multi-language project.

7 OUTCOMES

The direct result of this project reflects in improvement of mobility and accessibility of persons with disability in order to raise their quality of life and independent living and that is his major benefit. For now, trough the Accessible Map project we have recorded over 5000 accessible and inaccessible public buildings in Serbia. However through the data collection phase it will give a further step in creating a greater data base relating to the accessibility: accessible facilities, pedestrian crossings with lowered curbs, sound semaphore, etc.

Through the process of mapping, in order to improve this database, volunteer training will be done. By this training our volunteers will learn about the principles of accessibility, which will increase public awareness of the needs of people with disabilities in our society. It is important to mention that since the first phase of the project will include basic cadastral database collection required for the formation of an interactive map of Belgrade and Novi Sad this project is not only useful for people with disabilities in Serbia but for the benefit of all citizens as well as tourists who come to visit Serbia.

It is important to emphasize that in this project people with disabilities are actively included. Regardless of the existing principles of universal design and accessibility, we believe that every context is different and that through active work with interest group we all begin to get a clearer picture of their actual needs in our society.

8 CONCLUSION

Implementation of the project will ensure free movement of persons with disabilities by giving them opportunity to participate in ordinary life activities. Through the citizen participation on mapping accessible and inaccessible spots in our cities we will try to motivate people to start their own small actions to help their neighbours with disability. Indication of inaccessible environments in Serbia will force authorities to initiate some changes as well.

Since the application will be based on pedestrian and public transport routing it will be able to indicate most common routs for people with disabilities in Belgrade and Novi Sad and provide companies responsible for implementation of accessible standards on street and in public transport with information which routs and spots are their priorities in future accessibility improvement.

The application will bring more people with disabilities to public and change generally accepted attitude about medical model of disability in our society and that after the successful development the application could be extensible to other Serbian cities and cities dealing with the same problems in this region.

It is not possible to eliminate all barriers at once, but the right information is halfway. If you pointed the finger on barriers people will know what kind of different problems exist and it will raise awareness of this important issue.

9 REFERENCES

ADA STANDARDS: http://www.ada.gov/pubs/adastatute08.htm#12102, accesed on 10/01/2013
ARGUS : D1.2 State of the art of the relevant technologies and standards (CO), 2012.
CONVENTION ON THE RIGHTS OF PERSONS WITH DISABILITIES: http://www.un.org/disabilities/convention/ conventionfull.shtml, accessed on 07/01/2013
COTTON BRIAN, Moving Citizens in the Smarter City—Using a Framework Approach to Plan Intelligent Transportation Systems Strategies and Implement Solutions, A Frost & Sullivan White Paper.
DISABILITY MONITOR INITIATIVE FOR SOUTH EAST EUROPE: Slobodno kretanje osoba sa invaliditetom u Jugoistočnoj Evropi: Nepristupačno pravo? [Free movement of persons with disabilities in Southeastern Europe: An inaccessible right?], Belgrade, 2006.

Prato: Organizzazione e Tecnologie per un nuovo Modello di Sviluppo urbano consapevole

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1 INTRODUZIONE

La città di Prato ha circa 188.000 abitanti, capoluogo di una Provincia di 7 comuni all'interno dell'area metropolitana di Firenze, Prato e Pistoia. Ha subito una fortissima immigrazione cinese (60.000 abitanti), ed è una città dove sono diventati complicati i rapporti tra le varie etnie. Inoltre, con la crisi del settore manifatturiero tessile, la città attraversa un periodo di grande ristrutturazione industriale.

Dispone di una rete urbana di 600 km di strade, 45 km di piste ciclabili di cui 3 varcano i confini comunali, verso Campi Bisenzio, Montemurlo e Vaiano, e un rete bus urbana di 240 km. Ha sviluppato progetti innovativi sulla mobilità puntando a realizzare un sistema di drenaggio del traffico esterno sfruttando l'asse est ovest dato dall'autostrada declassata Firenze Pistoia e dalla tangenziale Ovest. Ha, inoltre, creduto sul trasporto pubblico realizzando tre linee di forza della rete bus (Linee ad Alta Mobilità) e progettato a livello esecutivo la prima linea tramviaria urbana che prevede estensioni in area metropolitana e l'interoperabilità con la rete ferroviaria.

La città affronta notevoli problemi di traffico e di inquinamento per cui la mobilità deve essere coinvolta in qualsiasi processo di sviluppo urbanistico.

Ha, quindi, deciso all'interno del progetto GIOCO di dotarsi di nuovi strumenti di pianificazione e di gestione del territorio che permettano di gestire in modo integrato la mobilità e di poter intervenire per tempo nelle decisioni che possono impattare sul territorio e, più in generale, sul traffico urbano.

1.1 Obiettivi del progetto

- Evitare ingorghi e blocchi di traffico (mancato coordinamento degli interventi)
- Migliorare la qualità delle strade (controllo dei cantieri)
- Ridurre il numero di buche e aumentare la sicurezza stradale
- Ridurre la burocrazia
- Evitare lo scambio di carta tra i settori
- Eliminare le asfaltature inutili (tagli su strade appena asfaltate)
- Tenere costantemente informati i servizi di emergenza sulla viabilità alternativa.

1.2 Sistemi informativi

Il Comune è sempre stato all'avanguardia per tutto ciò che è connesso ai sistemi informativi. Già da tempo si è dotato di un sistema informativo territoriale che raccoglie una gran mole di dati, informazioni legate al territorio che sono di valido aiuto per le decisioni da prendere quotidianamente.

Inoltre, si è dotato da tempo di un sistema di gestione delle ordinanze che permette di tenere sotto costante controllo lo stato della viabilità e soprattutto tutte le modifiche attuate temporaneamente o con ordinanze permanenti.

1.3 Nuovi metodi organizzativi e nuove tecnologie applicate: il progetto Prato City Works

All'interno del progetto finanziato dalla Regione Toscana assieme al Comune di Firenze e alle Province di Firenze, Prato e Pistoia, è stato deciso di realizzare una cabina di regia che permette di governare le trasformazioni del territorio, riducendo l'impatto generato dai lavori stradali sulla vita quotidiana dei cittadini.

Con questo nuovo modello è possibile finalmente gestire la quotidianità e programmare in modo appropriato anche gli interventi a lungo termine.

Inoltre, mettendo in dialogo più uffici dell'amministrazione si possono prendere decisioni più responsabili e si evitano gli errori commessi in passato.

1.4 Prato e Firenze: l'area metropolitana

Questa esperienza pone in rilievo il tema della gestione trasversale dei territori contigui: in una logica di area metropolitana, è necessario avere una piattaforma comune per capire cosa succede anche a 50 km di distanza, mettere in dialogo una grande realtà. I vari enti possono finalmente adottare delle regole comuni, agevolare gli attori esterni, rendendo il territorio più appetibile e interessante per i nuovi investimenti.

Si sta, infatti, attivando un processo di standardizzazione delle procedure amministrative: precedentemente i Comuni della Regione Toscana non avevano uno scambio di informazioni e si era adottata una modulistica differente per ognuno degli stessi. L'obiettivo, invece, di Regione Toscana è di riuscire a standardizzare le procedure, agevolando di conseguenza anche tutti gli operatori del territorio.

1.5 Il procedimento amministrativo integrato: coordinamento, alterazioni e ordinanze in un processo omogeneo e congiunto

Il Comune rilascia circa 3000 ordinanze all'anno e 2000 alterazioni: dal 2012 ha a disposizione una banca dati geografica per le attività di progettazione e per tutta la gestione quotidiana degli interventi. In Prato City Works sono contenuti i diversi interventi per poter comprendere meglio le dinamiche di sviluppo del territorio e le necessità degli operatori economici. Al processo complessivo partecipa anche la SO.RI, agenzia di gestione della riscossione che funge anche da sportello unico per professionisti e privati che devono presentare una richiesta di occupazione nel territorio del Comune di Prato.

1.6 Caso d'uso

Caso d'uso attuale

Il sistema Prato City Works è attualmente utilizzato dal settore strade e dal settore mobilità. Vengono inclusi i lavori del Comune e quelli delle società che gestiscono i sotto servizi.

Di seguito possiamo riassumere come vengono attualmente gestiti questi procedimenti:

- Le società convenzionate (ad es. Telecom Italia e Publiacqua) inviano le richieste di alterazione con il sistema on line. Devono allegare in formato PDF Planimetrie, Sezioni, Relazioni tecniche e indicare con precisione gli spazi occupati per il calcolo COSAP
- Attendono dal coordinamento l'approvazione per spazi e periodi proposti
- Il settore strade verifica la congruità dei progetti presentati, i tempi e le superfici. Richiede all'ambiente eventuali prescrizioni
- Se l'istruttoria va a buon fine, è possibile richiedere l'ordinanza di traffico
- La società consegna a sportello le istanze ufficiali e ritira la concessione. L'ordinanza viene scaricata direttamente dal sito del Comune.

1.7 Qualiutenti lo utilizzano

Prato City Works viene utilizzato da tutte le società dei sottoservizi (Publiacqua, Telecom Italia, Estragas, cc.) per le richieste di concessione di alterazione suolo pubblico ed in particolare per la comunicazione entro 24 ore dall'evento di tutti gli interventi di urgenza (fughe/guasti, ecc.) e per gli interventi che rientrano nella concessione unica (inferiori a 20 metri quadri).

1.8 Quanti utenti lo utilizzano

Ci lavorano 2 persone a tempo pieno, oltre agli istruttori degli altri settori coinvolti quotidianamente o su richiesta specifica, circa altri 50 utenti comunali.

1.9 Quali informazioni gestiamo

Il sistema include tutte le informazioni legate all'occupazione del territorio (scavi, ponteggi, occupazioni in genere), oltre alla gestione dei provvedimenti di mobilità. È l'archivio storico di tutto ciò che è accade sul territorio per permetterci di controllare se un lavoro viene eseguito a regola d'arte.

La gran parte dei problemi incontrati sulle strade non sono causati dal deterioramento naturale ma dai "tagli" eseguiti per la gestione delle infrastrutture. Nel caso i ripristini non vengano eseguiti correttamente, questi porteranno all'accelerazione del deterioramento del piano orizzontale.

É, quindi, necessario migliorare la qualità dei ripristini stradali per ridurre le buche, gli avvallamenti, le fessure, perché solo così è possibile usare meglio le risorse dedicate alle manutenzioni stradali e ridurre il numero dei contenziosi ricevuti dai cittadini.

L'obiettivo del progetto è migliorare la sicurezza delle persone e delle cose e utilizzare meglio le ridotte finanze comunali facendo aumentare la vita naturale delle strade.

1.10 Lo stato di attuazione del progetto

Dopo oltre un anno di esercizio, abbiamo finalmente una banca dati significativa che ci mostra come le società stanno operando sulla città di Prato. Solo grazie a Prato City Works siamo riusciti a controllare le società e abbiamo intenzione di estenderne l'uso per riuscire ad avere un controllo completo sulla manutenzione e sulle occupazioni delle strade stesse. Stiamo, infatti, studiando delle nuove metodologie operative che costringano i gestori di sottoservizi ad aggregare gli interventi tra loro. Questa esigenza è maturata, in particolar modo, con il progetto che coinvolge l'estensione della rete in fibra ottica. É obiettivo dell'amministrazione richiedere agli operatori telefonici di utilizzare un'unica servitù nella quale collocare tutte le dorsali delle compagnie telefoniche interessate a cablare Prato in fibra ottica.

Abbiamo, di fatto, impostato un controllo del territorio, fino a ora mai applicato in Italia, che ci permetterà nel tempo di avere strade migliori, che dureranno più a lungo.
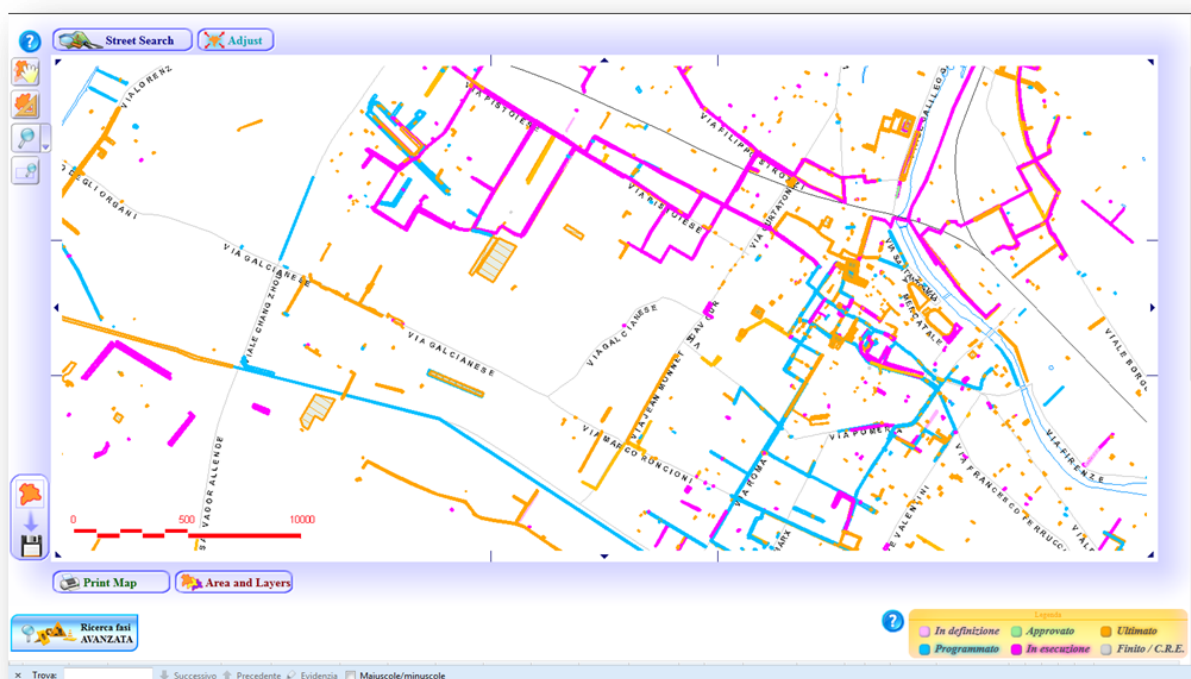
Figura 1: come è attualmente in trasformazione il tettorio

1.11 Ricadute sull'organizzazione dell'ente

Il progetto ha portato a dover cambiare il modo di ragionare di tutto il personale dell'ente. Avendo a disposizione una quantità enorme di informazioni e mettendole a disposizione di tutti, utenti del comune e delle aziende esterne, è oggi necessario fare delle scelte che hanno un impatto trasversale su tutto l'ente. Non si può più ragionare in modo ultra settoriale e verticale, ma è necessario comprendere che qualsiasi decisione ha un impatto sugli altri settori e anche sulle aree territoriali confinanti.

In futuro sarà, infatti, sempre più necessario prevedere di integrare i sistemi dei vari comuni dell'area metropolitana tra loro, per riuscire a prendere decisioni che riducano il disagio sulla cittadinanza anche quando il punto decisionale non è all'interno dell'ente stesso.

2 ESTENSIONE E NUOVI SVILUPPI DEL PROGETTO

Avendo già avuto dei ritorni positivi dall'utilizzo del sistema, è obiettivo del settore estenderne le funzionalità. In particolare, verranno realizzate delle nuove funzionalità che coinvolgono il miglioramento della pianificazione territoriale.

Inoltre, è prevista la possibilità di completare lo sportello unico per il suolo pubblico, permettendo agli utenti di presentare le pratiche on line firmate digitalmente. Questo processo prevede la necessità di integrare, quindi, anche il sistema di Protocollo Informatico del Comune, oltre ai processi legati ai pagamenti: marche da bollo, diritti di sopralluogo e canone di occupazione del suolo pubblico.

Inoltre, a breve, verrà data la possibilità agli utenti di presentare anche le richieste di ordinanza in una forma più avanzata, cioè con un'interfaccia che guiderà l'utente nella richiesta e nella compilazione, rendendo gli utenti più consapevoli e responsabili nella gestione delle modifiche che coinvolgono il traffico e la viabilità.

3 CONCLUSIONE

Questo nuovo modello gestionale dimostra che è possibile utilizzare la conoscenza e la consapevolezza unita alla tecnologia per fare un salto di qualità e aiutare gli amministratori a fare delle scelte innovative e coraggiose.

Proseguendo nell'applicazione del progetto e continuando a raccogliere informazioni di giorno in giorno sarà anche possibile eseguire una pianificazione di sviluppo del territorio che abbia a disposizione tutte le trasformazioni già eseguite e di ottimizzare le attuali poche risors economiche del Comune.

Regional Effects of Urban Planning – an Informal GIS Tool to Support Sustainable Strategic Planning

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1 ABSTRACT

Nowadays the demand for a more sustainable urban development rises. At the same time demographic, climatic and structural economic changes are new overall conditions that require new concepts in spatial planning. The article describes a new tool for Geographic Information Systems that supports strategic planning with objective values about the local, municipal and regional effects of planned urban development projects. The tool models different economic, ecological and social effects of residential areas and areas for industry, commerce and retail. For example costs for infrastructures, financial benefits, ecological, climatic and traffic effects as well as accessability to important infrastructures are considered. For a new residential area in Germany the article presents the results of the modules "municipal revenues" and "land use change and ecological value" and reports on first reactions of partners working in planning practice.

2 INTRODUCTION

The european population and economic development cause land use change for new areas for housing, industry and commerce or retail. Although the population in Europe is growing in total, there is a coexistence of growth and shrinkage in several countries on all spatial levels. In shrinking areas the infrastructure costs per inhabitant rise and schools and other infrastructures are threatened to be closed. This enhances the competition for inhabitants and firms between regions and municipalities with the aim to maintain these infrastructures. In Germany the situation is intensified because the financial equipment of municipalities mainly depends on the amount of inhabitants and located firms. This system is an incentive for an extensive settlement development as a basis for new inhabitants and firms.

But at the same time, the demand for a sustainable development rises. Not only fiscal effects, but also ecological and social consequences of settlement development should be taken into cosideration in planning and negotiation processes. The knowledge about fiscal, ecological and social effects is often very limited. This especially applies in an early stage of planning, when important decisions about the locations and main characteristics of the projects are made. As a consequence, discussions about new projects in spatial planning are often more dominated by general statements than by science-based analyses. Furthermore, spatial planning and decision-making processes are characterised by isolated considerations and fragmented responsibilities. Sustainable urban development needs tools, instruments and methods to consider effects of planned projects.

3 STATE OF THE ART – EXISTING TOOLS IN GERMANY

In the german discussion about the effects of new residential areas – especially for single family houses – the aspects of infrastructure costs and fiscal impacts are very important. Especially municipal revenues are an essential factor for the competition between municipalities for new inhabitants. But decision-making processes are often dominated by general statements: It is a common opinion that new residential areas will have positive fiscal effects for a municipality.

The fiscal impacts of urban sprawl is discussed since several years – especially in the USA, but also in Germany since the 1970s (Danielzyk et al. 2010). In the last few years a lot of tools have been developed in Germay with the aim of giving objective and science-based information about the costs and benefits of new residential areas (an overview gives Dittrich-Wesbuer/Osterhage 2010 or the website of "Allianz für die Fläche"[1]). In spite of their similar aims they are based on different concepts, referring to the technical realization, the level of details and the precision of results. The existing tools are web- or MS Excel-based or have been developed as independend software. Furthermore, municipalities can purchase reports for a cost-benefit-calculation. Further differences result from the technical realization and vice versa. Some tools focus on the calculation of costs for investment and maintenance as well as operating costs. Technical

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[1] http://www.allianz-fuer-die-flaeche.de/Kosten-Nutzen-Modelle-273.html

infrastructures like streets or (waste) water infrastructures are considered in all mentioned tools. Some of them also include social infrastructures (for example kindergarten, schools), public transport and fiscal revenues. But the level of detail and the precision of results are connected to the expenditure to compile and enter the necessary data. Web-based tools can often be used to create results in a few minutes if all required information is available. They are more suitable to give an impression of general relationships and make decision-makers and spatial planners aware of the consequences of their decisions. More complex tools produce very detailed analyses that can be used in different stages of spatial planning or the political discussion. There are different tools that can be used in all imaginable spatial applications.

These new tools are already in use and support local spatial planning processes with objective and science-based information about costs and fiscal impacts resulting from new residential areas. The experience is that not all new residential areas have positive fiscal impacts for municipalities, even though general statements are not possible. Impacts depend on the individual local situation. Infrastructure costs decrease with an increasing density, but they also depend on the specific location. This has an influence on the effort of building additional and the utilization of existing technical and social infrastructure.

Against often expressed fears, these tools did not lead to dominating economic aspects in spatial planning. Instead infrastructure costs and fiscal impacts can be one aspect in the consideration of interests. Additionally, there is a rising awareness for the long-term follow up costs of infrastructures as an important aspect for sustainable settlement development.

But in addition to these tools, a more expansive view on impacts of urban development projects is necessary. This concerns different aspects: Sustainability requires the consideration of economic, ecological and social aspects. The tools are limited to housing areas, but settlement development also includes new areas for retail or industry and commerce. In addition to that, the impacts of analysed projects are mostly not restricted on single municipalities, but the projects can cause effects on the regional structure and the development of interdependent municipalities. There is a need for additional decision-support-systems (DSS), that expand the view by more information about the impacts of urban development projects in all dimensions of sustainability.

4 A NEW APPROACH: REGIO PROJEKT CHECK

4.1 Overview

Based on these experiences the project team – consisting of institutions that have developed some of the mentioned cost-calculators – has worked on a follow-on project called RegioProjektCheck. The new instrument expands the existing decision-support-systems in three different aspects. Firstly, it illustrates the effects for both the affected neighbouring municipalities and the region. Secondly, in addition to housing, models for companies and retail become involved. Thirdly, it models additional topics of impacts (Fig. 1).

Fiscal impacts remain an important topic. Production and follow-up costs for the public sector as well as changed municipal revenues resulting from taxes and other payments are modelled. The effects are replenished by a regional model for multiplier effects, containing effects on jobs or consumption. Besides the fiscal topics the tool also covers ecological and social effects to expand the existing instruments. The ecological topic contains models for soil sealing, landscape fragmentation, energy consumption and emissions. The social effects deal with accessibility of infrastructures and therefore give evidence for inhabitants with limited mobility (for example children, handicapped, persons without a car). Every effect is visualized in a different way because the effects might occur in monetary dimensions, points, distances, minutes or CO_2-emissions.

Therefore the tool can be used in a wider context, for instance in strategic regional planning processes. Because of this complexity it aims at experts who interpret the results and use them to advise municipalities and regions concerning multidimensional effects of projects. These experts can be external personal working as consultants or internal employees working in the public administration of the affected region itself. Single values as well as joint evaluations are available depending on the topic of effects. The aim of the tool is to visualize effects of decisions and to objectify discussions by offering a joint basis for decisions. It has to be underlined that the new tool should not replace existing formal processes but expand and support them in an early consideration.

Technically it is realized via a set of toolboxes in a Geographic Information System (GIS). According to the local context and problems, the tool offers different toolboxes which can be used optionally in a modular system. The users are able to modify single parameters to test variations of projects and different basic conditions, so the regional discussion becomes enriched.
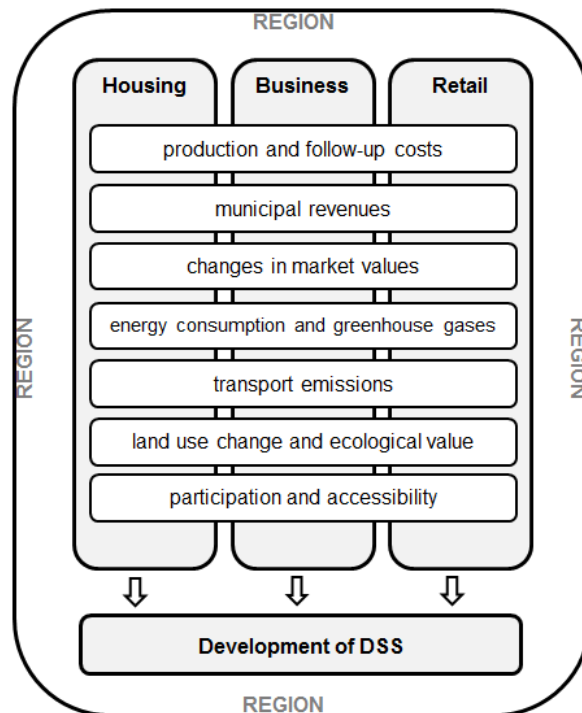
Fig. 1: Overview RegioProjektCheck

4.2 Test calculations

To illustrate possible results of the tool, we use it for the case study of a housing area and juxtapose the fiscal effects on the one hand with the effects on land use change and ecological value on the other hand. These topics of effects are very different with regard to their methodologies and evaluations. Our case study is a new housing area in the municipality of Kürten (19,500 inhabitants; district: Rheinisch-Bergischer Kreis) consisting of 70 single-family houses on 2.9 ha.

4.2.1   Municipal Revenues

The municipal revenues contain tax revenues and effects on the municipal revenue sharing system as direct effects. The regional value added, job effects and effects on regional consumer spending are modelled as indirect effects in an economic point of view (Kronenberg 2010). The model does not deal with the whole municipal budget but it visualizes the project-depending absolute change in revenues in order to simplify a comparison between projects and municipalities. While the direct effects are modelled for every affected municipality, the indirect effects are modelled for a wider region.

Fig. 2 shows that the municipality of Kürten gains additional yearly revenues concerning property tax, income tax and equalization payments but also has to pay additional county rates. The neighbouring municipality of Bergisch Gladbach looses income tax and equalization payments but has to pay less county rates. This effect is caused by the inhabitants moving from Bergisch Gladbach to Kürten. The new housing area also has effects on the district Rheinisch-Bergischer Kreis. It receives additional county rates caused by additional inhabitants in the district. These shifts in inhabitants are calculated in a complex population model which operates in the background and offers the project-related effects on migration in different municipalities.
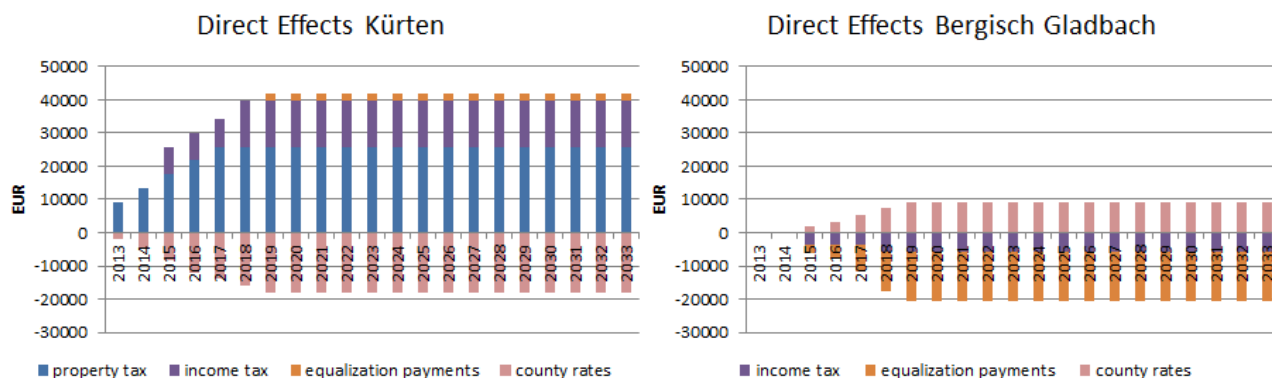
Fig. 2: direct effects on two neighbouring municipalities

In addition to these direct effects, the housing area evokes temporary indirect effects. The construction of the housing area stimulates additional demand in the construction industry. The regional value added amounts to yearly 1.1 million EUR, at maximum 5,300 EUR additional income tax and 29,000 EUR less social subsidies for the region during the construction phase. This brings along 6,000 EUR additional consumer spending in the region devided into different product groups.

An evaluation of the direct effects is possible, when we compare them with the production and follow-up costs. Our experiences show that the additional revenues can become considerably reduced, sometimes the yearly costs even exceed the yearly revenues. Both direct and indirect effects can be evaluated if they are compared to other similar projects on the regional level.

4.2.2   Land use change and ecological value

The topic of land use change and ecological value models and evaluates the ecological effects resulting by the shift of the built environment. The effects of human use (energy consumption, greenhouse gases and transport emissions) are covered in other topics of effects. This topic falls into three parts: the effects on the project area, the effects on the regional area and a regional evaluation of the rarity of the ecological conditions as well as the quantity and quality of land use change.

Local effects on the project area itself are evaluated by the model of an ecological area performance (Arlt/Lehmann 2005). It evaluates the contribution of different types of land use referring to the maximum ecological potential, for example concerning percolation or thermal storing. Regional effects are at first evaluated by the model of undissected lowtraffic areas (UBA 2003: 283) which regards the dissection of the biotopes in a regional context. As a second step, it is examined if the location affects regional cold air flows. The regional evaluation of rarity compares the existence of nature reserves on the one hand as an indicator for regional rarity and evaluates on the other hand. In addition, the quality of land use change is evaluated by the location to existing settlements (demand for integrated locations) and the density, that is to say the efficiency of land use. More integrated projects minimize the requirement for additional infrastructures and have positive links to other ecological effects. Table 1 shows the results for the case study. The different effects are evaluated either in a scale (1 = very poor to 5 = very good) or via a qualitative description.

	Evaluation	Explanation
1. Local Effects	1	
2. Regional Effects		
Undissected Lowtraffic Areas	2	
Regional Cold Air Flow	No effects expected	
3. Regional evaluation		
Existence of nature reserves	!	Conservation area "Mittlere Suelz" Fertile soil to be protected
Integration	1	
Density	5	

Table 1: Evaluation of land use change and egological value

4.3 Evaluation of the results

The test calculations indicate the great variety of effects additional projects might have on the municipal and the regional level. Considering the municipal revenues we can say that the quantity of new inhabitants and their previous place of residence form very influential issues. These keyfactors mainly influence the revenues with regard to the income tax or the fiscal equalization system.

For land use change and ecological value the exact location and the former use of the area are more important. Soil sealing before and after realizing the project are crucial for the local level, the location in relation to biotopes and cold air flows might concern neighbouring municipalities and existing nature reserves might be affected. Considering the degree of integration and the density results are very different. While in the presented project the density is higher than the mean of the district, other results in this module are worse because of the chosen location.

Because of the variety it is not easy to summarize the results in terms of single values over all types of effects. The experiences with the partners working in planning practice have shown that this complex point of view is very helpful for the experts. But additionally, for political discussions an easier way of showing the results would be useful, for example as "traffic-light-systems". But an automatically generated overall evaluation neither is possible nor makes it sense. A possible result for local effects might be that one municipality makes a profit regarding one topic while neighbouring municipalities lose compared to the status without the project. Concerning another topic the result might even switch into opposite. Furthermore, for the regional level results are of a different nature. On the one hand a region can be understood as a summation of single municipalities, on the other hand some joint effects cannot be located exactly within the region (like CO_2 emissions). In this case, the region as a whole is considered.

5 CONCLUSIONS

With an isolated way of looking at the situation the revenues of single municipalities increase with a higher immigration rate. New housing areas seem to be the solution for every municipality. But especially in times of demographic changes the amount of population is limited in a regional context. Additional revenues in one municipality cause less revenues in others. Because of strong interconnections concerning migration and commuting within regions as well as regional social and ecological effects of settlement development we need regional cooperation – and DSS with a spatially and thematically expanded point of view.

The models are predominantly developed and partly already programed as GIS-toolboxes. First urban projects have been calculated, but further tests are necessary to verify the models. RegioProjektCheck illustrates the effects for different topics on different spatial levels. The consideration of the different effects should be integrated in planning and political processes. By using that kind of instrument, knowledge about the decisions´consequences can be increased and cooperation concerning regional development can be encouraged. First experiences show great interest from different administrative institutions of spatial planning, that comprise municipalities, regions and a federal state. They all need a DSS with a spatially and thematically expanded view to push on sustainable urban settlement development.

6 REFERENCES

Arlt, Günter ;Lehmann, Iris: Ökologische Flächenleistungen – methodische Grundlagen; Analyse und Bewertung teilstädtischer Gebiete in Dresden. Dresden, 2005

Danielzyk, Rainer; Dittrich-Wesbuer, Andrea; Osterhage, Frank: Die finanzielle Seite der Raumentwicklung: Auf dem Weg zu efizienten Siedlungsstrukturen? Eine Einführung in den Sammelband. In: Danielzyk, Rainer; Dittrich-Wesbuer, Andrea; Osterhage, Frank: Die finanzielle Seite der Raumentwicklung. Auf dem Weg zu effizienten Siedlungsstrukturen? Pp. 225-247. Essen, 2010

Dittrich-Wesbuer, Andrea; Osterhage, Frank: Kostenbewusste Siedlungsentwicklung als Zukunftsaufgabe. Neue Werkzeuge für die Planungspraxis. In: Danielzyk, Rainer; Dittrich-Wesbuer, Andrea; Osterhage, Frank: Die finanzielle Seite der Raumentwicklung. Auf dem Weg zu effizienten Siedlungsstrukturen? Pp. 225-247. Essen, 2010

Kronenberg, Tobias: Erstellung einer Input-Output-Tabelle für Mecklenburg-Vorpommern. In: AStA Wirtschafts- und Sozialstatistisches Archiv volume 4, issue 3 pp. 223-248, Trier, 2010

Umweltbundesamt (UBA): Reduzierung der Flächeninanspruchnahme durch Siedlung und Verkehr – Materialienband -. Text 90. Berlin, 2003

Rete Ecologica Locale, aree verdi al limite tra città e campagna

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1 ABSTRACT

Nell'ambito dei Piani di Recupero (PdR) di nuclei abusivi nel Comune di Anzio (Provincia di Roma, Italia), è stato sviluppato uno Studio di Rete Ecologica Locale (REL), con l'obiettivo di definire gli obiettivi di conservazione della biodiversità a scala di paesaggio locale e di inserire nei documenti di piano indirizzi e misure volte alla tutela degli ecosistemi agro-forestali.

L'area in esame si trova ai margini di agglomerati urbani consolidati, in una condizione definibile rur-urbana (rurale-urbana), laddove 13 frammenti principali (i nuclei abusivi) sono immersi in un mosaico paesaggistico rurale, a sua volta ulteriormente frammentato da edifici sparsi.

Pertanto l'azione principale dello Studio è l'individuazione REL, nell'ambito interessato dai PdR e nelle aree limitrofe, attraverso una analisi finalizzata a capitalizzare ed integrare le conoscenze naturalistiche disponibili, in un ottica conservazionistica e di sviluppo sostenibile. I risultati del disegno di rete ecologica a scala locale sono stati utilizzati a supporto dei PdR.

Lo Studio è stato articolato in diverse fasi ed attività: 1) Raccolta e catalogazione di tutti i dati e le informazioni inerenti la biodiversità e, secondariamente, le componenti ed i fattori ambientali ad essa correlati (copertura e consumo di suolo, aspetti abiotici, aspetti urbanistico-territoriali, aspetti infrastrutturali, etc); inserimento di tutte le informazioni raccolte ed i dati originali in un geodatabase, rendendo quindi disponibile l'informazione geografica nell'ambito di un Sistema Informativo Territoriale Ambientale; 2) applicazione di 2 sistemi di classificazione del paesaggio (induttivo e deduttivo), e confronto dei risultati; 3) individuazione un set di indicatori di qualità e stato di conservazione; 4) analisi, attraverso gli indicatori, del contesto ambientale (con particolare riferimento alla biodiversità), al fine di valutare la qualità ambientale e lo stato di conservazione; 5) individuazione, attraverso l'applicazione di modelli e l'approccio esperto, degli elementi della REL (aree core, stepping stones, etc); redazione di indicazioni per la zonizzazione e le Norme Tecniche di Attuazione dei PdR.

I risultati sono stati rappresentati in una relazione tecnica ed in cartografie tematiche.

Reuse of Abandoned Churches in the Netherlands

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1   ABSTRACT

Churches for sale, quite unthinkable only fifty years ago, but nowadays a harsh reality. Plenty of choice, as you can see on websites like www.redres.nl or www.reliplan.nl, the leading real estate agencies that specialize in selling churches. Important medieval city churches, landmarks in the countryside or postwar buildings in the suburbs, if you want one, you can buy it in the Netherlands. Every type of building is available, but mostly with a lot of different restrictive conditions attached. Finding new forms of use therefore is a difficult and time-consuming affair.

From 'Domus Dei' to real estate. How did it get this far en how do we deal with the problem of abandoned churches and the reuse of this type of building in the Netherlands? In this paper I will try to answer these questions. I want to outline the different policies, tell about the Dutch approach and show some interesting solutions. But before I do, let me first give a global impression of the situation and some facts and figures.

2   SOCIETY IS CHANGING

In the last twenty-five years Dutch society has changed dramatically. The population has grown from 15 to 17 million inhabitants, prosperity has increased, more people live on their own and more people leave the countryside because of unemployment and a lack of facilities. Traditional religious values are vanishing and the ongoing secularization is causing financial problems for the Protestant congregations and Catholic parishes. A shrinking group of (mostly elderly) people has to take care of the maintenance and conservation of about 6,500 churches, including the most important – and most expensive- 2,700 church buildings, listed as national, historical monuments.

In 2004 there was a merger of the three main Dutch Protestant Churches. This Protestant Church in the Netherlands is the country's leading denomination in the North and West, other than in the South, which is predominantly Catholic. The Catholic Church is also reorganizing, resulting in fewer parishes. For instance, in the archdiocese of Utrecht the number of parishes fell from 316 to 49. These processes have led to a large number of closures – usually of non-listed, often younger buildings as these have no grants for maintenance and are easier to sell.

3   CHURCH AND STATE

In the Netherlands there has been a strict and clear separation between Church and State since 1795. The government does not interfere in ecclesiastical matters and the Church takes care of its own personnel and buildings. Churches are owned by the local parishes or congregations. They have to take care of their property and only if a church is listed as a national monument there are State grants available for restoration and maintenance (for 6 years, up to 50 % of 3 % of the reconstruction costs). Demolishing listed churches is not allowed, so selling for reuse is often the only option once these churches have been abandoned.

4   ECCLESIASTICAL POLICY

Selling churches is a problem for Catholics, more than for Protestants. This difference results from their divergent views on the religious value of the building. For Protestants the building itself is mainly functional, the place to meet, the place for reflection and necessary for preaching God's Word. It is not a consecrated, sacred place and therefore does not have the religious importance that it has for Catholics.

Another important factor is the difference in the way the Protestants and Catholics are organized. Protestant congregations have a governing body for areas of common interest, the General Synod. The Synod, for instance, takes care of the education of the clergy or draws up church ordinances and regulations. But the local congregations are independent, have their own governing authority and can make their own decisions. So if a church cannot be used for worship anymore, the local congregation decides what will happen to the building, mostly in addition to the general, ecclesiastical rules. The Roman Catholic Church has another, more centralistic organizational structure. Even though the local parish owns the building, according to the

ecclesiastical rules the bishop eventually decides if a parish is viable and he decides on whether the building should be sold, reused, or demolished.
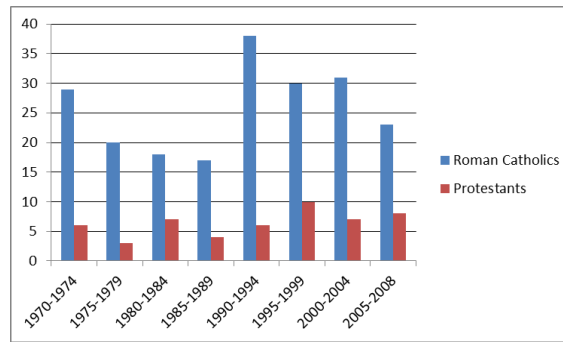
Fig. 1: Demolished churches in the Netherlands 1970-2008. (Source: N. Roeterdink e.a. Haarlem, 2008)

Their organizations, processes and responsibilities may differ, but what both denominations have in common is that they fear 'unworthy' new functions and 'improper' use after a church has been sold. Because of this the Dutch bishops and the General Synod declared their policy and visions on abandoned churches and formulated various conditions for churches on sale. In short: new community functions like health centers, libraries, schools, and day care centers for children are fine, but only if they respect the religious and historic values of the buildings. Preferably no commercial or profane functions. Likewise, non-Christian religions are not preferred by Protestants, and with regard to Catholic churches not even allowed. This last point of view is based on a few negative experiences in the past.
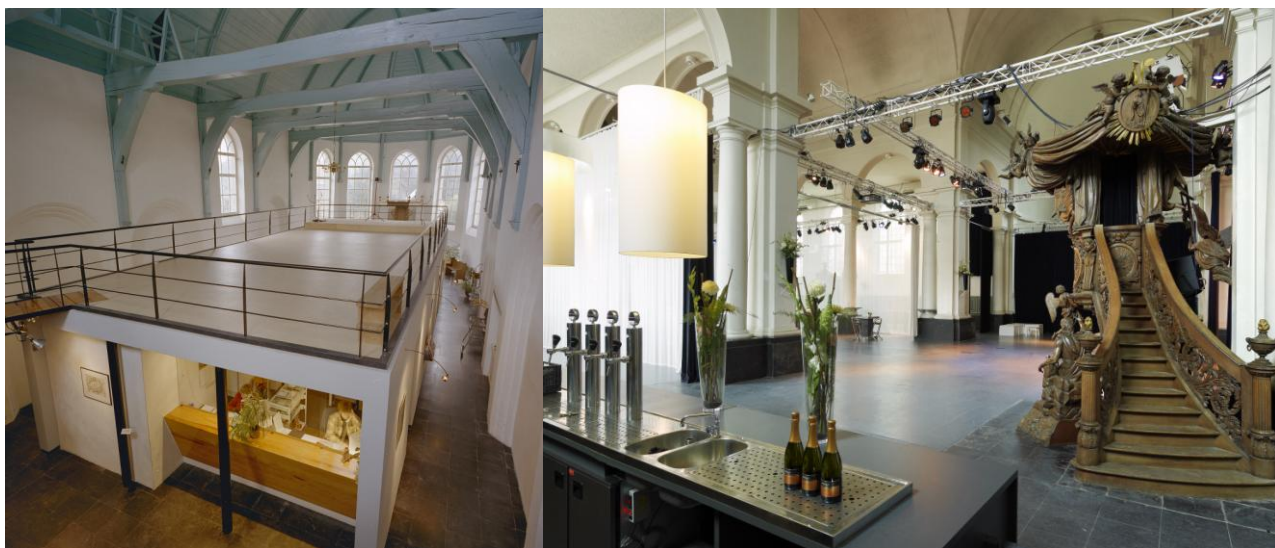
Fig. 2: Community functions, 'worthy' and 'unworthy'. Left, Brielle St. Jacobschurch, wonderful converted into a General Practitioners Practice. Right, church of St. John Baptist in Roosendaal, since 2007 partycentre and in cultural use.

5 2008, YEAR OF RELIGIOUS HERITAGE

These documents were written in 2008, the national Year of Religious Heritage. This public initiative had two main goals. First to make the authorities and the general public aware of the important social role and cultural, historical and religious values of churches. And second, to make them aware of the large quantity of (upcoming) abandoned churches – including their interiors and religious objects – and the need to do something on this societal problem. A lot of local and national events took place. The website www.reliwiki.nl, with information about all the churches in the Netherlands, was launched and the organizing committee published Geloof in de toekomst (Faith in the future), a strategic document with facts and figures, important issues, analyses and recommendations that was presented to the government. [1]

The Year of Religious Heritage had its positive effects. Many books and guidelines were published about processes, policy, regulations or best practices, etc. New funds and possibilities for grants appeared and new solutions and instruments were developed by the national government, provinces, local authorities or by

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[1] http://www.religieuserfgoed.nl/doc/GelooftoekomstWEB.PDF

private initiative. The national government for instance raised their heritage budgets and invested in the restoration and maintenance of churches. As a result today up to 90 % of the listed churches is in a good state of maintenance.

5.1 Effects

5.1.1 Governmental

In our 'A Future For' series of guidelines, the Dutch Cultural Heritage Agency has published two church brochures. One is about how to deal with changing historic churches in religious use, the other is about new use in abandoned churches. The latter brochure contains all kinds of information about governmental and ecclesiastical policies, laws and regulations, heritage aspects, communication, the process of converting churches and the range of functions and design principles. [2]

A revolving fund was installed to stimulate shared use/multifunctional use in listed churches. The National Restoration Fund, the principal bank of the Cultural Heritage Agency, offers low-interest loans, up to € 50,000, especially for adjustments and facilities in churches to make them useful for more than just religious purposes. [3] The municipality of Utrecht has also possibilities for non-listed buildings. They encourage additional use and reuse and give grants for measures that contribute to a better exploitation. [4]

Commissioned by the Dutch Ministry of Education, Culture and Science, the Guidelines on Ways of Dealing with Religious Objects were developed in a joint project by the Churches, heritage institutions and the National Museum for Christian Art and Culture – Museum Catharijneconvent. This instrument helps to deal with the surplus of religious objects when churches have to be closed. [5]
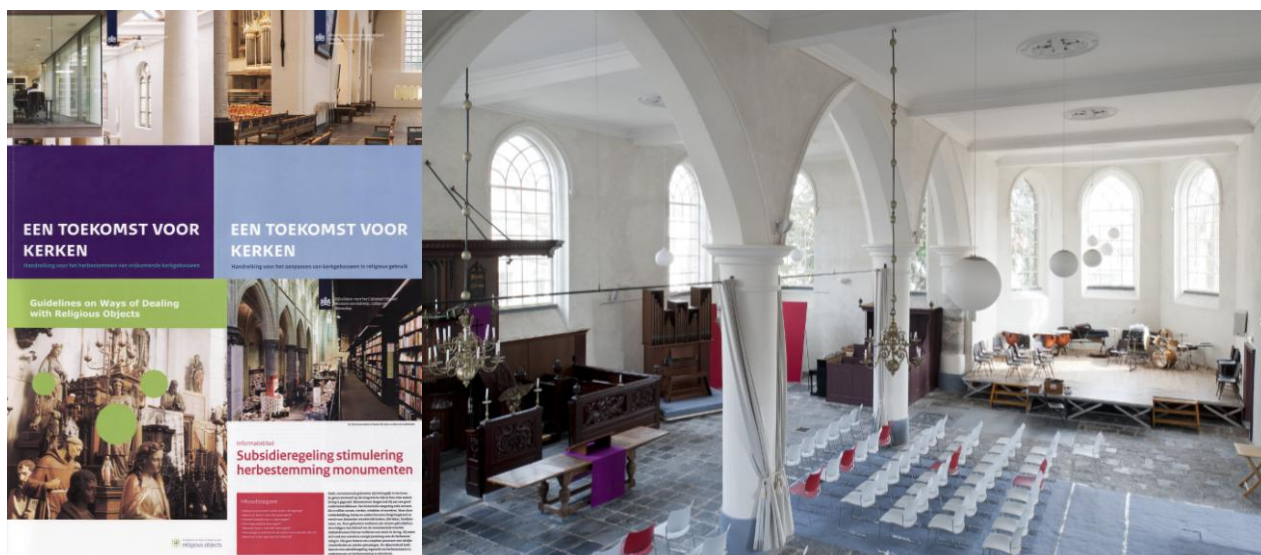
Fig. 3: Left governmental brochures. Right, the church of Groede. Multifunctional use made possible by the low-interest loan of The National Restoration Fund.

5.1.2 Provincial and local authorities

Not only the national government, but also provincial and local authorities have taken their responsibility after 2008. Provinces like Noord-Brabant, Limburg, Zeeland, Gelderland and Friesland started extensive church inventories and used the results for their heritage policy. For example the predominantly Protestant province of Friesland in the North. This rural province has 647,000 inhabitants and about 770 churches, mostly in towns and small villages. A lot of them are threatened or already abandoned. A number of 240 churches are still converted and 45 of these are owned by a private trust that acquires historic churches, exploits and maintains them. To understand the extent of the existing and upcoming church problems the provincial government started an inventory. They gathered all kinds of information, from heritage value,

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[2] http://www.cultureelerfgoed.nl/organisatie/publicaties-van-rijksdienst/toekomst-voor
[3] http://www.restauratiefonds.nl/restaureren/kerken/Kerkennevenfunctielening/Paginas/default.aspx
[4] http://www.utrecht.nl/images/DSO/monumenten/Monumenten/Monumentenbeleid/Folder_Kerkenregeling_18dec08.pdf
[5] http://www.hrre.nl/assets/Uploads/Guidelines-on-Ways-of-Dealing-with-Religious-Objects-1.1.pdf

maintenance costs, the financial situation up to the amount of church members. Some of the conclusions were shocking. For instance 25 % of the churches are owned by congregations who have less than 100 members. At least 85 congregations expect serious financial problems within 5 years and 219 within 10 years. Maintaining their church on the long run is not possible. Because of these outcomes the province has installed a 'Deltateam'. This team consists of four regional specialists; a heritage consultant, an architect, a financial advisor and a social community expert, who consult the small communities and help them to find solutions and new functions for churches under threat.

Interesting and successful initiatives are also found on a local level. In an increasing number of cities the civil and ecclesiastical authorities collaborate in so-called church visions. The church vision answers questions like: which parishes must be merged, which churches remain in religious use, which churches can be converted and which churches can be demolished. The document contains an inventory of all the churches, analyses (religious values, heritage values, spatial, functional, etc.) of the buildings, and an overview of needs and opportunities of the district or neighborhood. As soon as a church is threatened or abandoned, the vision helps to make more well-considered decisions on conservation, reuse or demolition. Church visions can be recorded in zoning regulations. Recently the city and deanery of Heerlen for example researched all their religious heritage. Data was collected about use, parish prognosis, monumental value and reuse opportunities (square meters, parking places, etc.). A number of 44 churches have been described and valued. In the next step Heerlen City Council and the Church authorities draw up their church and heritage policy together.

Similar projects are run in Bergen op Zoom, Amsterdam, Helmond and The Hague. In the last two cities the City Council decided to buy abandoned churches. In The Hague the Protestant Juliana church from 1926, situated in an economically disadvantaged neighborhood, was bought by stadsherstel. Converting the church into a social community center in 2006 had a positive effect on the immediate area. The same could be seen in Helmond where a Catholic postwar church, in 2003 converted into a theatre, is part of an upgrading process of the neighborhood. A vibrant health center in the same city, initiated by the municipality and developers, is found in the Leonardus church.

5.1.3 Private initiative

Some private initiatives are also important, successful or promising. Since 1981 we have the Vereniging van Beheerders van Monumentale Kerkgebouwen. This national association for owners and managers of historic church buildings is committed to the proper management and use of monumental church buildings. They facilitate professionalism and educate their members in the upkeep and exploitation of the churches used for congresses, concerts, exhibitions or other manifestations. Very successful is the Stichting Oude Groninger Kerken, a trust already 40 years old that acquires old churches in the province of Groningen and takes care of them. They own, protect and exploit 70 churches in the province of Groningen.

Fig. 3: The abandoned church of Oosterwijtwerd still has his its important interior thanks to Stichting Oude Groninger kerken.

They have a team of professional employees who educate volunteers, involve the local population, arrange activities or performances and are very keen on fundraising and getting legacies. Trusts of this kind, but a lot smaller, can also be found in five further provinces. Recently a new trust that operates on a national scale was founded. This 'Church and Cloisters' trust buys, converts and exploits churches and cloisters and has its roots in BOEI, a private non-profit organization for redeveloping industrial heritage. Their know-how in real estate, finance, exploitation and heritage helps them to find new functions and creative solutions. Like Stichting Oude Groninger Kerken they are very active in fundraising and one of their sponsors is the National Bank Lottery.

6 RELIGIOUS HERITAGE AND REDEVELOPMENT, NEW STEPS

Despite all these initiatives and trusts the problems keep growing. Due to the financial crisis, not only churches are abandoned, also other heritage such as town halls are at risk as well. This increases the competition for churches and makes it more difficult to find new functions. The national government has considered the huge task of redevelopment both in its Policy Document on Architecture and in its new policy on heritage management. Redevelopment has become one of the main pillars of policy. Because of this in 2010 the National Redevelopment Programme started and also a new subsidy system for stimulating the redevelopment of monuments was introduced. This system consist of two parts. First the 'wind- and watertight scheme', devised to prevent demolition or prolonged vacancy and to promote the sustainable use of valuable objects. And second, the possibility of granting redevelopment plan feasibility studies, for property owners to help them explore the options for redevelopment.

More governmental action in favor of Dutch religious heritage started last year. The director of the Cultural Heritage Agency, Cees van't Veen, noticed that central direction and coordination in addressing the problems failed, but is strongly needed. This point and the next step in the process were discussed in several meetings with national key players and stakeholders. Essential is commitment of all partners and the development of a national agenda for religious heritage. Specific themes like financing, heritage selection, regulations, policies, etc. must be part of that agenda.

7 CONCLUSION

In conclusion, the reuse of churches is not a new phenomenon, but more than ever it has become an urgent and very complex issue in which religious opinions, cultural awareness, emotional attachments, rational and economic arguments all play a part. Because of the large quantity of abandoned churches, the lack of money and the lack of worthy new functions, it will be difficult to convert them all. I think we have to choose, but in a well-considered and communicated way, based on mutual respect and trust.

8 REFERENCES

Besseling H. e.a. (red): Meer dan hout en steen. Handboek voor sluiting en herbestemming van kerkgebouwen. Zoetermeer, 2011.
Boelens, O. en T. Meijers (red.): Het kerkgebouw als religieus erfgoed. Bergambacht, 2009.
Groot, A. en B. Linskens (red): Handreiking religieus erfgoed voor burgerlijke en kerkelijke gemeenten. Leiden, 2008.
Nelissen, N.: Geloof in de toekomst, Strategisch Plan voor het Religieus Erfgoed. Berne-Heeswijk, 2008.
Pollmann, T.: Herbestemming van kerken. Een ontnuchterend relaas. Den Haag, 1995.
Roeterdink, N. e.a.: Onderzoek herbestemming kerken en kerklocaties; een inventarisatie vanaf 1970, Haarlem 2008.
Websites:www.rkkerk.nl;www.pkn.nl;www.toekomstkerkgebouwen.nl;www.herbestemming.nu;www.kennisbankherbestemming.nu

Risk Management and Spatial Planning – Understanding Rapid Urbanization in Climate Change

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1 ABSTRACT

In the emerging mega-urban regions of Southeast Asia, both planned and unplanned urbanisation into flood prone areas appears to be an unavoidable consequence of socio-economic development. These risks occur, often not due to a lack of risk awareness or weak planning instruments, but seem to be an accepted consequence of maintaining current economic success and social progress. Flood risk protection and implementation of costly mitigation measures are often shifted to a future development cycle, where implementation is not seen to constrain the economic goals. Asian cities located in deltaic settings such as Ho Chi Minh City (HCMC) in Vietnam, exhibit higher exposure levels to flood risk primary as a result of their location, their low elevation and if located in tropical regions, the significant annual variations in climatic and weather extremes they incur, so that a compelling need for dedicated site specific risk assessment and urban planning arises. Disasters like the recent flood in Bangkok in 2011 have shown that this development strategy cannot be justified any longer, especially in the times of a changing climate. Associated economic losses and social implications are simply too high.

Our results are an outcome of a 5 year research project in HCMC funded by the German Federal Ministry for Education and Research, focused on developing adaptation options to climate risks that could then be subsequently implemented into the existing land-use planning framework. Based on the development of core indicators describing future urban structural changes in relation to the changing patterns of risk exposures, spatially explicit planning recommendations were compiled in close cooperation with the responsible city authorities. Our contribution focuses on how to overcome the current limitations in implementing scientifically-founded and evidence-based adaptation planning to flood risks by communicating the importance in realising the present and plausible opportunities to influence future urban land-use.

2 STRATEGIC LAND-USE PLANNING UNDER A CHANGING CLIMATE

To support the potentials of urban land-use planning for adaptation in HCMC, the focus has to be on and towards the evaluation of land conditions and urban development potentials in a more spatially explicit manner than prevously undertaken. In the development of planning recommendations to assist master plan adjustments for both land-use and urban development, recommendations need to be both grounded in realistic land-use and urban development scenarios.

By Year	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total Locations	64	63	64	67	125	126	96	58	31
Locations in the Center	62	62	61	61	107	86	69	31	14
Locations in the Periphery	2	1	3	6	18	40	27	27	17
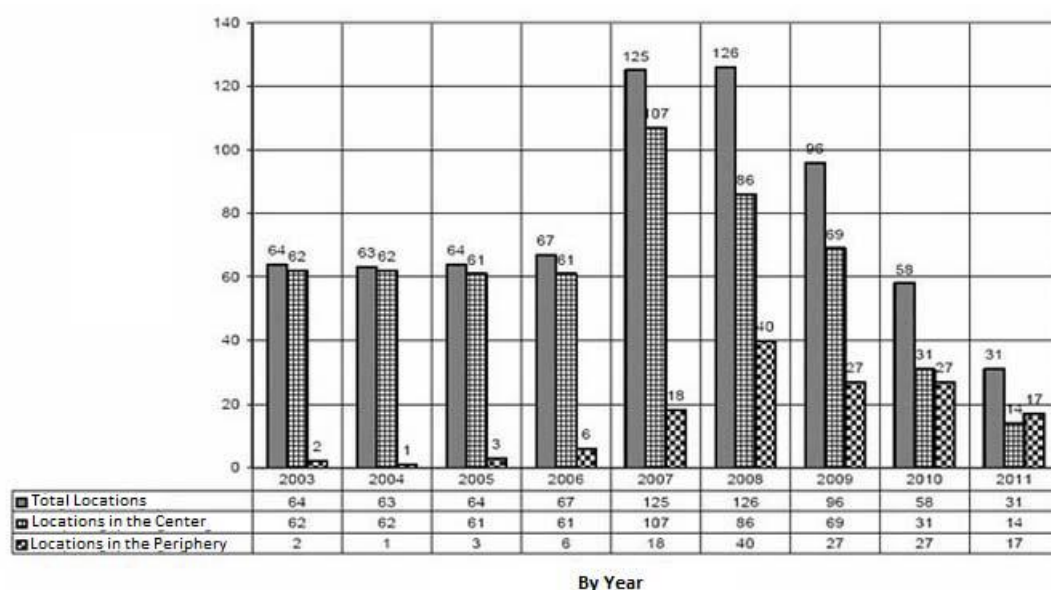
Fig. 1: Number of flooding locations in the central and periphery districts of HCMC 2003-2011 (Source: Ho Chi Minh City Steering Centre for Flood Control, 2011)

These need to in turn consider both the underlying land conditions and site suitability for development and additionally are required to integrate the pressing climate-related issues into HCMC's existing urban planning framework. Following the recent heavy investments seen in storm-water drainage upgrading and expansion, the number of flood-prone areas within HCMC – while remaining fairly constant between 2007 and 2009 at around 100 localities per year – was seen to decrease significantly in the inner-city districts (Ho Chi Minh City Steering Centre for Flood Control 2011). In contrast, districts located in the periphery, which were subjected to the most rapid recent urbanisation, and are located in general in low-lying areas display the largest number of flood events over the same time frame. (Figure 1). This substantiates the need for urban planning and urban management to be more carefully assessed to ensure that both site and off-site flooding considerations have significantly been addressed in planning. Resultantly, there is a pressing need for a risk assessment methodology to integrate the physical aspect of exposure of new urban developments with the environmental impact-related information of built-up areas.

The main factors affecting urban development activities are natural factors, like naturally flood-prone area, topography and soil conditions (Figure 2), and artificial factors, like urban services (water supply, drainage, roads), accessibility to urban centres and land prices. The current urban development situation in HCMC is characterised by a high population density in the existing urban core area, mostly by low-rise housing structures. This has led to an extreme inherent urban compactness (Figure 2), which ensures due to location a good accessibility and short commuting times for the residents. At the same time, however, low-density sprawling into the peri-urban fringe – partly caused by illegal development is visible, resulting in an ineffective infrastructure provision. The current development trends – a continued concentration and densification within city centre and along the major transportation corridors – is highly impractical, yet is mainly driven by small private development projects on the level of the single building or street block. This trend is worrying from an environmental standpoint, as without planning interventions of some degree, such small scale yet high-density developments fail to provide adequately for open space provision and environmental services. The assessment of HCMC's urban development strategy highlights a lack of effective planning and plan enforcement mechanisms for guiding urban growth orientated to the basic underlying natural conditions, against a backdrop of strong market mechanisms that have recently dictated the current development activities.

3 DEVELOPMENT OF RECOMMENDATIONS FOR ADAPTATION PLANNING

The rapid urban growth and expansion of cities into natural areas is not solely the problem of HCMC, but is a global phenomenon presenting an important challenge to both sustainability and adaptation planning. Effective planning policies are required to stem the tide of increasing land-consumptive development into the high-risk flood-prone areas of HCMC. Here, without delay urban containment policies should be considered as a promising adaptation approach to address the current and unfolding spatial risk-patterns of HCMC. Figure 2 highlights clearly that the current urban form and structure of HCMC is strongly influenced by and to some extent constrained by its underlying natural conditions.
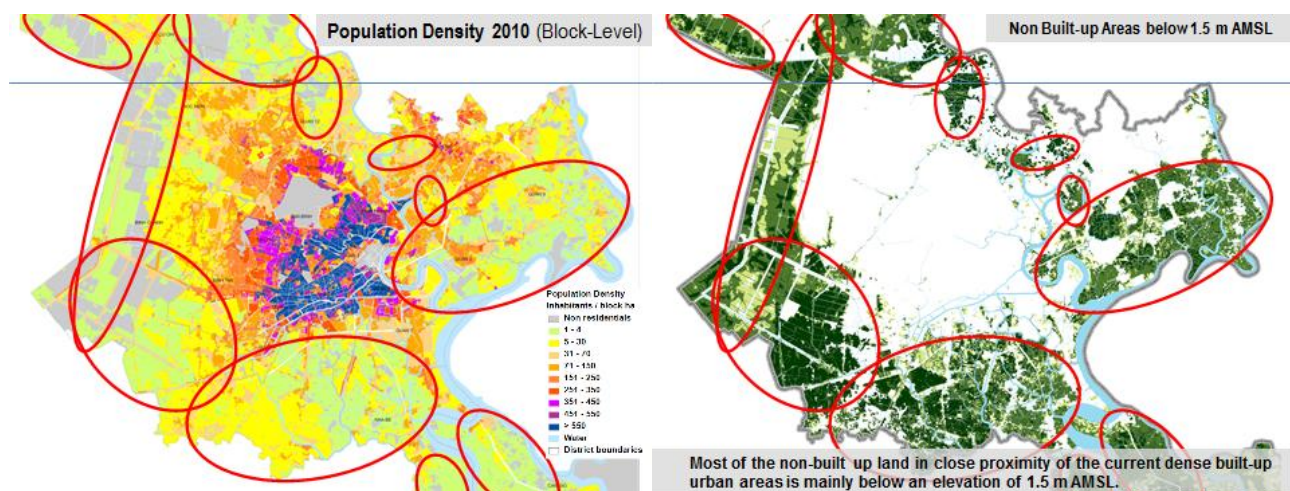
Fig. 2: Non built-up areas at flood-risk (right map) surrounding the densely populated city-core (left map) – (Storch&Downes 2012)

The few remaining open spaces surrounding the extremely dense core –mainly agricultural land–have an elevation below the current high-tide level of 1.5 m AMSL.These spaces currently act as a natural blue and green belt–akin to flood risk zoning by nature–and strongly influence the ongoing inner-city re-densification. Hence only a genuine understanding the interrelationship between urban densification and adaptation processes to current flood risk can aid the guidance the spatial adaptation processes of HCMC in the uncertain times of rapid urban growth and climate change.

During the many meetings in HCMC, final discussions over the location of the main focus areas and the areas of interests with unique impact patterns and development pressures (Figure 3) were held with the Department of Natural Resources and Environment (DONRE) and their land-use planning consultants from the Sub-National Institute of Agricultural Planning and Projection, to aid and facilitate DONRE's consultation activities with the 24 districts of HCMC.
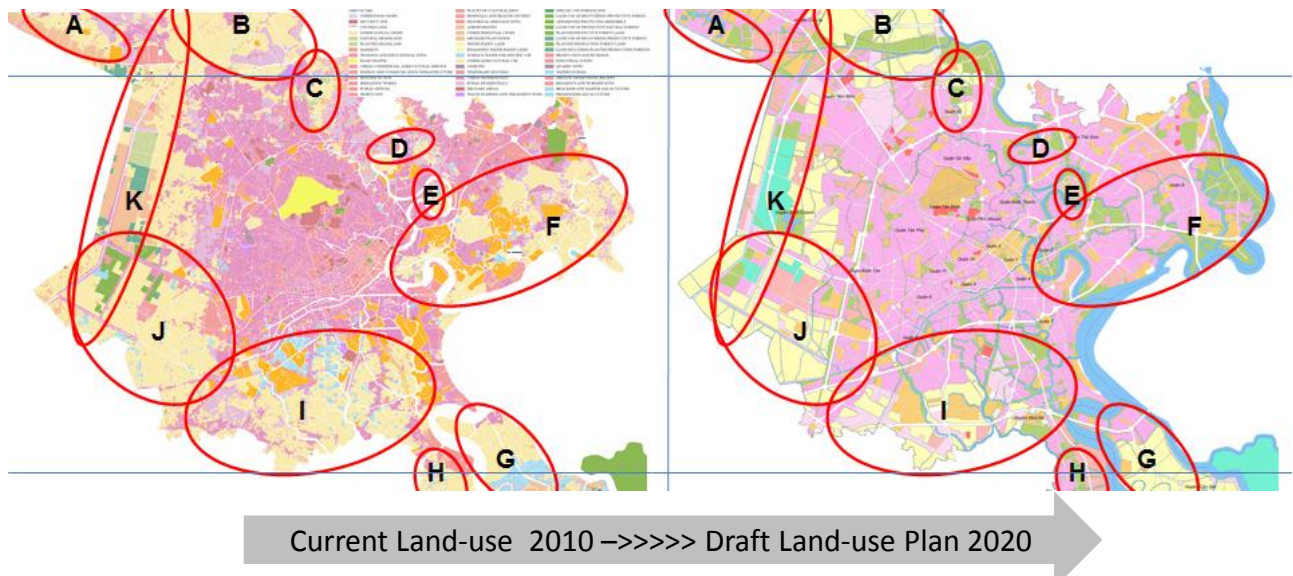
Fig. 3: The defined Focus Areas for Land-use Planning Recommendations (red circles areas A-K) marked on the current-use map derrived from our urban strcuture type approach and a draft verison of the land use plan 2020 (Storch&Downes 2012)

Our developed planning recommendations for climate change adaptation focus on supporting the designation of natural flood-prone greenbelts (Figure 2), the most restrictive form of urban containment policy. Utilising the existing flood-prone areas as greenbelts for current and future flood protection measures would additionally provide significant urban environmental benefits including recreational value, protection of open space, agricultural land, natural resources, all in additional to the highly important supporting ecosystem services for storm- and floodwater management and their important function as fresh and cold air production zones to mitigate the urban heat island effect (Figure 4).
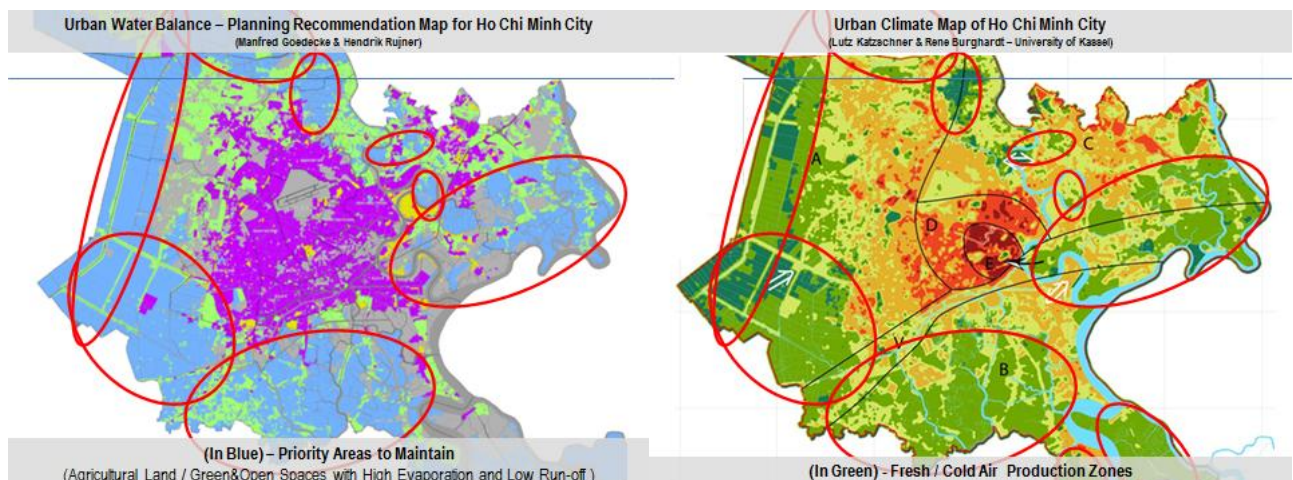
Fig. 4: Urban water balance planning recommendation map (left) and urban climate map of HCMC (right) – (Storch&Downes 2012)

To be ultimately climate resilient, urban development planning need to reconcile and use the already the already existing ecological services at their disposal in adaptation planning. Supported by environmental planning methods and tools land-use planning can protect these environmental services in a systematic manner (Figure 5).

The basic incorporation of Strategic Environmental Assessment (SEA) methods for core climate-related environmental impacts in the thematic areas urban climate, urban floodin and storm water retention highlights the valuable ecological services of open spaces and agricultural land for climate-related risk mitigation. The consideration of multiple types of climate-related hazards can reduce the likelihood that adaptation planning and risk reduction efforts targeting one type of climate-related hazard will increase exposure and vulnerability to other climate impacts, in the present and future (Figure 5).
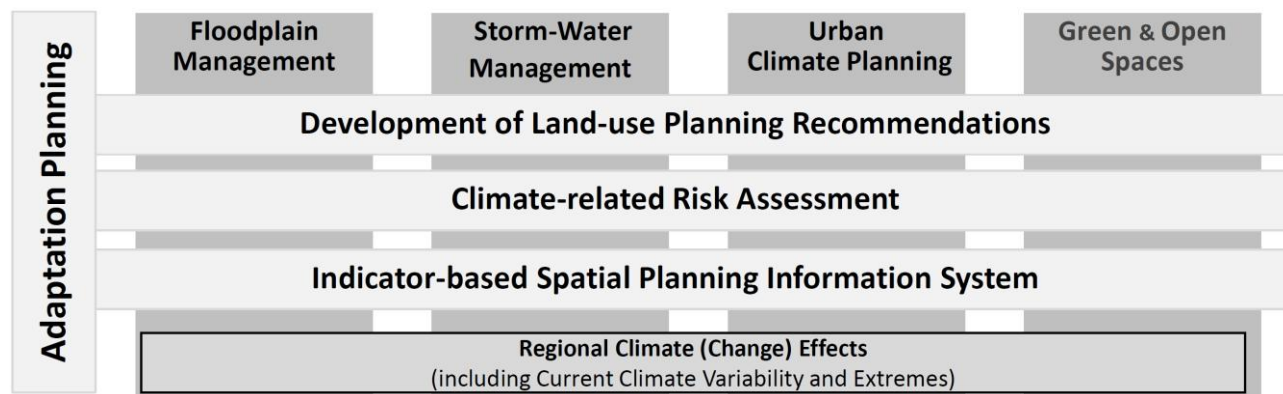
Fig. 5: The environmental planning tools and methods used for the integrated assessment of blue and green infrastructure for an adapted land-use planning in Ho Chi Minh City

For high-dense urban patterns, a larger share of blue and green infrastructure is in general beneficial for adaptation, as it provides space for urban agriculture, natural spaces for retention and detention of storm- and flood water management, and areas to generate and transit cool and fresh air, lowering and offsetting the energy demands for cooling in cities such as HCMC with tropical climates.

The developed planning recommendation maps can be used to assist the application of zoning guidelines for climate-adapted land-use planning (Storch et al. 2012, Storch&Downes 2012). In HCMC the need for adaptation will largely be associated with managing climate extremes – like urban flooding or urban heat waves (Figures 2 and 3). The spatial zoning of adaptation needs in land-use planning must therefore be associated with future urban growth and socio-economic development (Figure 4). By spatial-explicitly examining the rates of socio-economic change at the local level, the demand for adaptation can be assessed. These changes – represented by urban land-use changes – if compared with projected changes in climate extremes can highlight that the rates of socioeconomic change are likely to be greater than those for climate over the next decades (Storch&Downes 2011).

4 SUPPORTING ADMINISTRATIVE INTEGRATION AND IMPLEMENTATION

For high-dense Asian megacities, the inherent complexity of risks and vulnerabilities requires high resolution spatial information, in order to identify hazard patterns, vulnerabilities and risks at a scale that can provide guidance for urban land-use and development planning. Planning for risk and uncertainty for future urban growth will not just be a challenge for high flood prone areas; it will be a broader challenge impacting on the very nature and location of future urban development, particularly in planning for climate change (Labaeye et al. 2012). Here land-use planning that takes into account disaster risks is the single most important adaptation measure for minimising future losses (Storch&Downes 2011). The spatial planning framework and subsequent urban planning decisions, as currently applied, do not attach ample or sufficient importance to the physical exposure, the rate of urban growth and the risk of disaster losses. Generally, urban governments are responsible and have a moral obligation for regulating either construction or development in such a way that minimises risks. Urbanisation does not necessarily have to lead to an increasing hazard portfolio and can, if managed properly, contribute towards risk reduction. However, there are a number of key characteristics of the urbanisation process that do directly contribute to the formation of risk. Solely spatial and physical exposure alone does not explain nor directly lead to increased urban risk. If urban

growth in risk-prone locations is directed by adapted land-use zoning and at the same time guided by adequate building standards, ensuring risk patterns can be effectively managed and mitigated.

Land-use planning is seen as having a key role to play in developing efficient and tailored strategies to climate-proof HCMC (Storch&Downes 2011). As such, our research has not been carried out in isolation but from the outset was foremost intended to assist DONRE with administrative policy making (Figure 6) in making informed decisions underpinned by the latest assessment techniques (Figure 5). The results of our cooperation show the apparent gravity of the grave challenges faced by DONRE with respect to climate proofing past and future urban development.
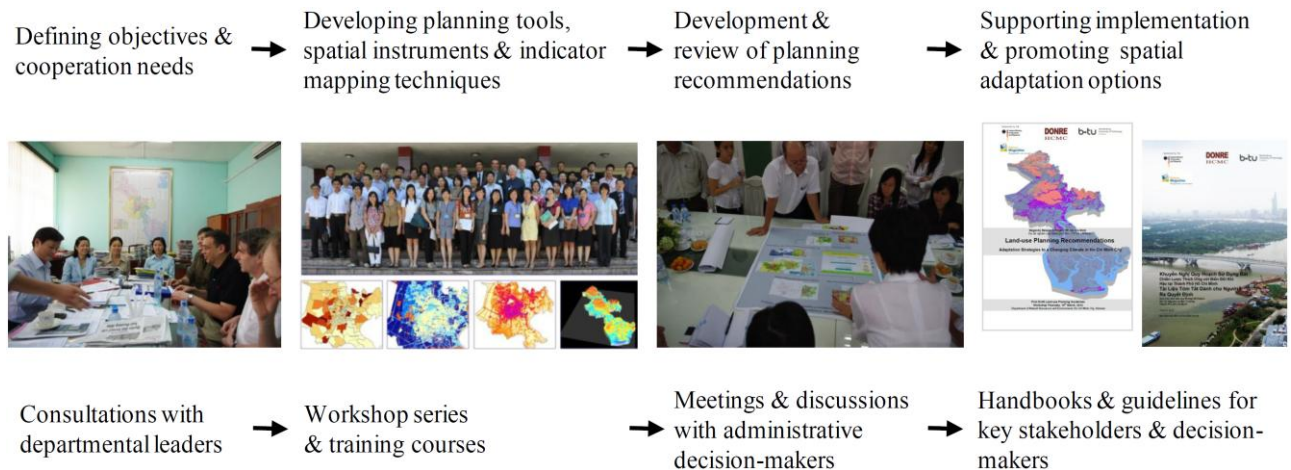
Fig. 6: The cooperation and joint research activities with DONRE in the development and implementation of planning recommendations for adapting HCMC's land-use plan to climate change (2008 to 2013).

Ultimately, DONRE has the task to determine the overall land-use, spatial zoning and environmental quality of HCMC. As such, DONRE possesses executive powers over one of the most important instruments for the adaptation of HCMC to climate change, the steering and management of land-use. To their credit, DONRE has become very conscious of its responsibility in relation to climate change responses and the management of associated impacts. Externally, these matters have gained increasing acceptance and importance within the wider administrative structure of HCMC; while, internally they have reinforced the essential need to adapt their own planning. However integrating climate change considerations into land-use planning in HCMC is inherently a complex decision-making problem, which requires the careful assessment of the current decision situation, related to place and space.

Fig. 7: Meeting and discussion in October 2012 with DONRE and Sub-National Institute of Agricultural Planning and Projection over the unique characteristics and development challenges of each focus area.

Upon the request of the Planning Division of DONRE and with their close cooperation, a workshop entitled "Adaptation Strategies to a Changing Climate in HCMC – Development of Land-use Planning Recommendations" was organised to outline and more importantly discuss, the integration of the research results form the various work packages into consistent, transferable and usable planning recommendations for the revision of the Land-use Plan.

The need to disseminate the project results to the local districts of HCMC was highly stressed prior to the workshop by the Planning Division of DONRE, as a much needed and essential further step. As such, all key stakeholders from district-level were officially invited by Ms. Nguyen Thi Cam Van (DONRE) to the workshop. The workshop promoted the integration of our research results into the existing planning framework respectively to the needs of DONRE´s land-use planning.

At the workshop, the compiled Handbook "Land-use Planning Recommendations – Adaptation Strategies to a Changing Climate in Ho Chi Minh City" (Storch et al. 2012) was showcased and distributed to the administrative stakeholders of the 24 districts of HCMC. With the support of Vietnamese-German University students of the Urban Development Planning master programme, it was possible to translate the whole handbook into Vietnamese. The handbook summarises over 40 pages, the main findings and recommendations for the adaptation of the new Land-use plan (Figure 8). The Planning Guidelines are divided into five chapters, three chapters summarise the strategic environmental assessment of urban surface runoff, exposure to tidal flooding and future sea-level rise and the urban climate situation, while two chapters explain the applied methods for urban structure type mapping, urban growth monitoring and plan conformance assessment.

Fig. 8: Development of Handbooks: Land-use Planning Recommendations (Storch et al. 2012, Storch&Downes 2012)

The discussions with the administrative stakeholders on district-level highlighted the accepted and crucial need to integrate climate-related issues into planning and decision making processes. The workshop was chaired by Dr. Nguyen Van Phuoc, Vice-Director of DONRE and Head of Environmental Management and Director of the strategic program "Ho Chi Minh City Moving towards the Sea with Climate Change Adaptation". Valuable clues and insights were gained into the feasibility of science-based planning recommendations and the exact needs of our Vietnamese partners for future thought-out, sustainable and efficient planning strategies. Emphasis was placed on how to better integrate our gained project results into the land use planning framework in a transparent, usable and comprehensive manner for DONREs land-use planning tasks until end of 2012 and future capacity building needs.

The second handbook (Figure 8) was produced according the demands of DONRE and addresses the cooperation with DONRE in ensuring and facilitating the integration of our research results into the formal and official procedural steps for the development of the Land-use Plan 2020 (LUP 2020), upon request from the Planning Department of DONRE and the Land-use Plan consultants from Sub-National Institute of Agricultural Planning and Projection. Additionally a short summary of 15 central maps explain and support our science –based planning recommendations visually. Again, the whole handbook was translated into Vietnamese language and cross-checked by DONRE and its consultants, reproduced 400 times and distributed to administrative stakeholders and planning institutions by DONRE (Storch&Downes 2012).

5 CONCLUSION – VISIBLE IMPACT OF PROJECT RESULTS

The main visible impact of our intensive cooperation with DONRE to integrate our planning recommendations into the Land-use Plan 2020s administrative procedure, is seen in the integration of our assessment results and core planning recommendations maps for all selected 11 focus areas into DONREs official report for submission of the Land-use Plan 2020 to the Peoples Committee of HCMC entitled "Draft

report of land-use planning toward 2020, land use plan for the 5 years (2011-2015) for Ho Chi Minh City" (DONRE-HCMC 2012).
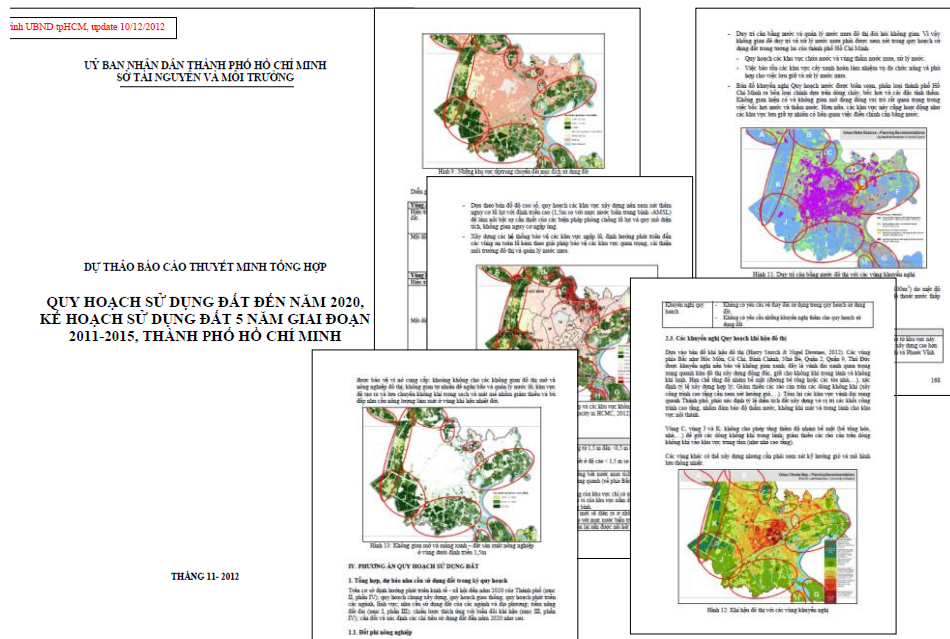
Fig. 9: Impact of the Megacity-Project on Adapted Land-use Planning Integration of the jointly developed Planning Recommendations into the Official Report by DONRE for Submission to the Peoples Committee in December 2012 (DONRE-HCMC 2012)

The joint development and refinement of the planning recommendations for the climate-risk adapted Land-use Plan 2020 has resulted within DONREs Planning Division and the Consultant Institution providing a strong impression of co-ownership. In total our results are integrated within a 20 pages chapter of their official LUP2020 report (Figure 9). The content of our assessment results have been left unchanged, they have been only been shortened and re-edited to the formal administrative requirements.

6 ACKNOWLEDGMENT

7 REFERENCES

DONRE-HCMC (Department of Natural Resources and Environment – Ho Chi Minh City) (2012) Draft report of land-use planning toward 2020, land use plan for the 5 years (2011-2015) for Ho Chi Minh City. Official report for submission of the Land-use Plan 2020 to the Peoples Committee of HCMC. In Vietnamese. (unpublished).
HO CHI MINH CITY STEERING CENTRE FOR FLOOD CONTROL (2011) Flooding locations in the central and periphery districts of HCMC 2003-2011. (Internal report).
LABAEYE, A., BRUGMANN, J., NGUYEN VAN PHUOC, BAO THANH, LY KHANH TAM THAO, NGUYEN ANH TUAN, STORCH, H. and SCHINKEL, S. (2012) Reality Check: Ho Chi Minh City, Vietnam. In: Otto-Zimmermann, K. (Ed.) Resilient Cities 2. Local Sustainability 2, 367-376, Berlin: Springer, DOI: 10.1007/978-94-007-4223-9_38.
STORCH, H., DOWNES, N.K. (2011) A scenario-based approach to assess Ho Chi Minh City's urban development strategies against the impact of climate change. J. Cities, 28 (6) Special Issue: Low Carbon Cities), 517–526. DOI:10.1016/j.cities.2011.07.002.
STORCH, H. and DOWNES, N. (Eds.) (2012) Land-use Planning Recommendations. Adaptation Strategies for a changing climate in Ho Chi Minh City. Summary for Decision-Makers. Upon request of the Planning Division, Department of Natural Resources and Environment Ho Chi Minh City, December 2012. DONRE-HCMC&BTU-Cottbus.
STORCH, H., DOWNES, N., GOEDECKE, M., KATZSCHNER, L., WELSCH, J. and RUJNER, H. (2012) Land-use Planning Recommendations. Adaptation Strategies for a changing climate in Ho Chi Minh City. March 2012. BTU-Cottbus.

Smart Cities and Urban Governance. The urbanAPI Project: Bologna Case Study

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1   ABSTRACT

The urbanAPI project has been funded by the European Commission in the context of European initiatives to improve policy as a more transparent and understandable process: it is a three-year, €4 million, multi-partner collaborative project developing ICT tools to support urban governance and spatial planning in four cities across Europe.

Underpinning the project is the understanding that the delivery of more sustainable cities requires the application of enhanced intelligence in urban management, to produce an effective basis for assessment of urban complexity and decision-making.

Fraunhofer IGD (Project Coordinator), AIT (Austrian Institute of Technology) assisted by GeoVille are responsible of ICT tool design and implementation, UWE and AEW (Rome) with the contribution of ICLEI, are responsible for engagement with stakeholders in order to define their needs, organisation of workshops and assessment of the tools application in the partner cities. Vienna, Bologna, Vitoria-Gasteiz, and Ruse are the partner cities supporting the applications with practical experience, governance needs and data.

The urbanAPI tools provide advanced ICT based intelligence in different urban planning contexts:

- First, directly addressing the issue of stakeholder engagement in the planning process by the development of enhanced virtual reality visualisation of neighbourhood development proposals.

- Second, at the city-wide scale, developing mobile (GSM) based applications that permit the analysis and visual representation of socio-economic activity across the city.

- Third, the development of simulation tool applications in the city-region responding to the simultaneous demands of both expanding city populations for certain European cities, and declining and frequently ageing populations elsewhere.

Lessons derived from the urbanAPI experience will permit the development of generic ICT tools that can be used in the majority of the cities of Europe.

In this context, the enhanced ICT tools proposed by urbanAPI offer the potential to provide urban planners with the tools and intelligence needed to actively manage the urban environment. These tools will provide planners with precisely the information they need to fully expose the socio-economic and environmental impacts associated with alternative options for territorial development and thereby create conditions in which the political mandate and the basis for more effective management is secured.

In this paper will be analysed the project expected impact on urban governance and the results achieved with the 3D application in the city of Bologna during the first phase of the project implementation.

2   ICT-INTELLIGENCE FOR URBAN PLANNING CONTEXTS

Effective governance of the cities and city regions of Europe today is fundamentally undermined by urban complexity, whereby the high degree of interconnectedness and multiple interactions between socio-economic and environmental factors in a territorial context create major barriers to the effective implementation of sustainable urban development. The proactive governance of cities and the delivery of more sustainable compact cities require the application of enhanced intelligence in urban management, to produce an effective basis for assessment of urban complexity, and decision-making support.

The governance of cities is a collective effort requiring joint initiative between planning and management agencies from EU to local level, clear coordination between a variety of agencies at the local level, as well as critical inputs from all stakeholder groups including citizens.

In this context the urbanAPI applications -3D virtual reality visualisation, mobile phone based mobility dynamics, city region growth simulation – will be brought as common toolsets to the four cities serving as

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test cases (Vienna, Bologna, Vitoria-Gasteiz, and Ruse) addressing different spatial scales in the multi-level governance setting of urban environments.

The proposed urbanAPI toolset and the applications will make use of the vast data resources – geospatial and statistical datasets – related to urban planning, by integrating smart ICT technologies to promote sustainable planning policies by engagement with the public through ideas and visions that address alternative urban planning perspectives and new city development proposals.

Local initiatives will be encouraged to participate within the planning process, to contribute to the appropriate solutions and understand and finally endorse the expected impacts on environment and citizens.

Each application developed in one city context will be paired with another similar application in another and different city and national context, where different socio-economic, environmental and territorial characteristics, as well is governance structures and practices will be evident. Lessons will be derived from the comparative assessment of the applications developed in these differing contexts that will form the basis for the future development of generic ICT tools that can be utilised in the majority of the 500 cities of Europe with populations over 100,000, as well as other smaller cities and towns throughout Europe.

•	• 3D VR	• Public Motion Explorer	• Urban Growth Simulation
• Vienna	• √	• √	•
• Bologna	• √	• √	•
• Vitoria-Gasteiz	• √	• √	•
• Ruse	•	• (√)	• √

Fig. 1: City wise urbanAPI applications at the three urban contexts: neighbourhood (3D), city (PME) and urban region (UGS)

The urbanAPI project will support both sides in the urban policy and governance system: the policymaking and practitioner side as well as the stakeholders and the public.

The generic ICT applications will be built from a set of common libraries for data integration, policy modelling, simulation and visualisation, to be easily adapted to changing requirements by integration of the relevant data sets, to inform the practitioners and gather feedback from the public. Public participants in urban governance processes usually are not always ready to observe simulations for hours, to orient themselves in relation to complex cartographic products or use special equipment to experience results. Making these applications available to the public requires on the one hand simplification in the simulation concept, and on the other hand enhancement of visualisation techniques.

3 THE USER PERSPECTIVE

Most European citizens embrace the "collaborative Internet" and expect to be able to interact with city governments using ICTs. ICTs are seen as enablers of more and better participation (e-Participation), and democracy (e-Democracy) and more inclusive societies (inclusive e-Governance and e-Inclusion), extending beyond enhanced service delivery, to facilitate and enhance interactions between actors, thus requiring change in regulatory and governance processes. However, especially at the city level there is as yet only limited evidence of the direct effects of ICT-enabled innovations on city governance systems.

The urbanAPI project provides ICT enabled innovations for city governance and adapted governance models to support new stakeholder engagement and citizen participation, in order to enhance sustainable urban policy development and delivery. The conceptual frame for the project is based upon the understanding that urban managers throughout Europe face common challenges in responding to the desire for a more participatory democracy, in order to define the basis for securing urban economic vitality, social inclusion and environmental sustainability.

The urbanAPI project ICT tools will be developed with the application cities of Vienna, Ruse, Vitoria-Gasteiz, and Bologna. Local initiatives in the four urban regions working in this project will be encouraged to participate within the planning process, to contribute to the final solutions and understand and finally accept the expected impacts on environment and habitants.

In order to gain relevance beyond the four cities implementing the ICT tools proposed by urbanAPI, to gather additional input from urban experts and to reach out to the many cities throughout Europe that could

potentially benefit from the project's results, various activities at different stages in the project foresee the involvement of one or more relevant stakeholder organisations:

- Stakeholder Board: This advisory group convened a number of (approx. 10) networks, associations and other organisations dealing with urban policies, urban planning and/or urban sustainability.

- Requirement Workshops, organised in each application city: In order to tailor the application of the ICT tools proposed by urbanAPI as much as possible to the needs and possibilities of the four cities participating in the project.

- Evaluation Workshops: In the evaluation phase, expert input will be organised through another series of workshops, setting the criteria for analysing the outcomes and reflecting on the experiences made during the application of the ICT tools.

4 3D VR APPLICATION

The 3D urbanAPI system is built on the basis of the City Server 3D, developed by Fraunhofer IGD, which has already been proven in use by various municipalities. A web-portal is set up for the integration of several reusable visual interaction components that will be accessible over the internet.

The applications in the three cities (Bologna, Vitoria Gasteiz and Vienna) will allow, through an interactive process, the implementation of a new 3D scenario creator.

These technical developments will permit the transfer of Virtual Reality from academic research to real world applications by developing a generic tool:

- to display live content, such as other users□ interactions, sensor data and simulation results;

- to render 3D content adapted to the requirements of the policy making support application;

- to add content and to modify 2D and 3D objects depicting alternative urban planning decisions, e.g. on the basis of parameters (such as eaves height) defined in the zoning plan;

- to create custom projections, e.g. in vertical and horizontal cross-sections across time, space and theme on the fly;

- to process large amounts of rich 3D models, but also little and coarse 3D information from standard CAD and GIS data bases and selected elevation views (photos, renderings) as texture information;

- to allow easy and widespread applications, by providing a simple and intuitive graphical user interface (GUI) to introduce alternative planning scenarios;

- to focus on data integration and harmonisation and to the delivery of seamless applications.

Figure 1: Preview of the 3D scenario creator (source: Fraunhofer)

Using the 3D VR (virtual reality) visualisations, the general effects and the visual impact of urban development plans can be realistically shown. The 3D scenarios support the negotiation process for urban development projects. Interactive control of planning interventions and presentation of the new visual effects, released through changes in zoning, help citizens to experience these changes.

In order to guarantee the best user experience possible high quality 3D geodata are used as well as rich interaction elements, especially to provide feedback on planning in various forms. This means that special emphasis is put on user-friendly client interfaces and an easy-to-understand simulation. Users will have the possibility to choose between the 3D web client and a mobile application.

5   BOLOGNA NEIGHBOURHOOD SCALE: 3D APPLICATION

Bologna is pursuing ICT solutions for both urban planning as well as environmental objectives. The aim is to communicate more effectively with citizens by visualising future development and potential impacts and enhance public engagement for a quick feedback on planning initiatives.

The development of the 3D scenario creator is conceived to enhance public and stakeholder engagement in the rehabilitation and mobility plan for the city centre ("Di nuovo in centro").

A pilot area of the city centre has been chosen for the application: this area is also involved in a project called „Ambiente Vitale", which aims to increase awareness and public participation in relation to green and public spaces provision, as well as sustainable lifestyles.

The 3D application will help planners to better visualize urban transformations in the district, improve interdepartmental collaboration and coordination in decision-making, and take account of citizens' opinions and suggestions, in line with the community participation processes already started with the many citizen committees and cultural associations.

Citizens will be able to interact with the Municipality through the 3D scenario creator, and chose their focus on including, for example, the rehabilitation and mobility plan, bike and car sharing points, public transportation and cycle track routes. They can also provide inputs concerning the management of pedestrians' route ways, the rubbish collection system and the use of public spaces.

The tool will help public and private planners to take easily in consideration citizens' suggestions and feeds, in order to better take care of interests and needs of the community, and come to an agreement with environmental sustainability issues.

- The application is started: the process of needs definition and requirements gathering has been completed, work on cartographic data is finished, it was time consuming work, because available data derived from different sources and have been collected for different purposes;
- after the selection and the final check, Geoville harmonized the data.

At present the visualisation of the district's routes has been realised and we are working on communication to public and private stakeholders: a specific urbanAPI 3D application link to add to the Bologna Municipality web page, is under development.

Fig.2- Bologna city centre

6 CONCLUSION

The urbanAPI 3D virtual reality visualisation toolset will allow the fast development and deployment of participative policy support applications for decision support, conflict management, analysis and visualisation, being developed and evaluated in collaboration with the cities partners.

The Bologna application will be assessed in comparison with the experiences going on in differing city contexts (Vitoria and Vienna) and will form the basis for future generic and reusable ICT tools. Setting this goal will ensure the sustainability of the approach, as the created solutions will be applicable beyond the application cases used for evaluation in this project.

7 REFERENCES

Comune di Bologna, AmbienteVitale Project: http://www.comune.bologna.it/ambiente/servizi/6:6197/14256/
Comune di Bologna, Mobility Plan: http://www.comune.bologna.it/dinuovoincentro
Comune di Bologna, PSC (Municipality Structural Plan): www.comune.bologna.it/urbanisticaedilizia
urbanAPI Deliverables: D1.3.1 – Annual Report 2012, D2.1 – User Requirement Definition, D4.1.4 – Dissemination and Exploitation Plan

Stadtentwicklungsfonds – ein innovatives europäisches Finanzierungsinstrument zur Entwicklung integrierter Immobilien

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1 ABSTRACT

Integrierte Stadt- und Immobilienentwicklungen weisen zwar hohe externe Effekte für die urbanen Stadtakteure auf. Gleichzeitig ist ihre Rentabilität oftmals unterhalb der Vorgaben privatwirtschaftlicher Immobilieninvestoren, weswegen es in vielen europäischen Mitgliedsstaaten bei derartig komplexen Projekten außerhalb von Wachstumsregionen zu einem Marktversagen. Genau hieran setzt seit 2007 die Europäische Kommission mit ihrer JESSICA-Initiative an, in deren Mittelpunkt das innovative revelovierende Finanzierungsinstrument, der Stadtentwicklungsfonds, steht. Die Idee, rechtlichen Rahmenbedingungen und Anwendungsgebiete zur Förderung integrierter Immobilienentwicklungen in Europa werden im Rahmen dieses Beitrages vorgestellt.

2 STADTENTWICKLUNGSFONDS

2.1 Rechtlicher Hintergrund

In der aktuellen EFRE-Förderperiode (2007-2013) wurde im Rahmen der sog. JESSICA (= Joint European Support for Sustainable Investment in City Areas)-Initiative den europäischen Mitgliedsstaaten die Möglichkeit eingeräumt einen Teil der Strukturfonds-Ressourcen im Rahmen ihrer Operationalen Programme zur Unterstützung von Finanzinstrumenten in der nachhaltigen Stadtentwicklung zu nutzen. Im Mittelpunkt der Initiative stehen dabei die Stadtentwicklungsfonds (sog. Urban development Funds, UDF), welche sich nachfolgend beschrieben werden.

2.2 Idealtypische Fondsstruktur

Immobilienentwicklungsprojekte, die Teil einer integrierten Stadtplanung sind, sollen im Rahmen von Stadtentwicklungsfonds über gün¬stige Fondfinanzierungen (Eigenkapitalbeteiligungen, Investitionskredite und/oder Garan¬tien) unter¬stützt werden:
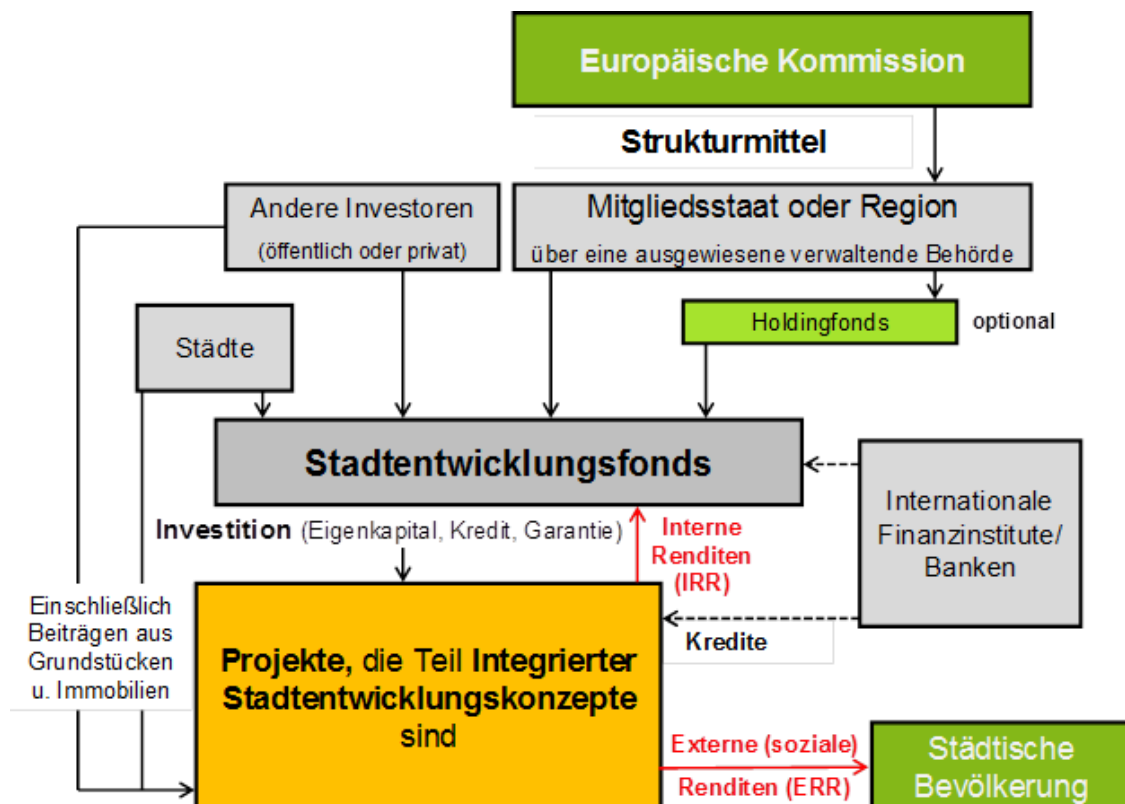
Fig. 1: Struktur eines Stadtentwicklungsfonds.

Die Stadtentwicklungsfonds selbst werden hierbei durch Mittel aus dem Euro¬¬päischen Strukturfonds für regionale Entwicklung (EFRE), die durch die mittel¬ver¬wal¬ten¬de Be¬hörde ggf. unter Einschaltung eines nationalen oder regionalen Holdingsfonds einge¬speist wird, sowie möglicher kommunaler und/oder privater Finanzmittel refinanziert. Die Rück¬flüsse aus den Projektfinanzie¬run¬gen sollen in der Folge wiederum in nachhaltige Stadt¬entwick¬lungsprojekte eingesetzt werden und so einen Finanzie¬rungskreislauf erzeugen. In diesem Sinne bilden Stadt¬entwicklungsfonds ein neues Förderinstrumentarium, welches ange¬sichts öffentlicher Kassen, die immer stärker in ihrem finanziellen Handlungsspielraum einge¬schränkt werden, die nötigen nach¬haltigen Förderwirkungen im Bereich der Stadtentwicklung sichern kann.

2.3 Umsetzung in der aktuellen EU-Förderperiode 2007-2013

Die JESSICA-Initiative ist in dieser Förderperiode ein experimentaler, innovativer Ansatz, weshalb die EU Kommission (DG Regio) und die Europäische Investitionsbank (EIB) diese Pilotphase durch technische Hilfen unterstützen, um einen Informationsaustausch der erforderlichen Akteure auf allen räumlichen Ebenen zu bewirken.

In Deutschland erfolgte die Diskussion und Einführung von Stadtentwicklungsfonds im Rahmen zweier Forschungsprojekte (u.a. eines ExWost-Forschungsprojektes für fünf Modellvorhaben), welche vom Lehr-stuhl Immobilienentwicklung federführend für das Bundesministerium für Verkehr, Bau und Stadtentwicklung in Zusammenarbeit mit dem Bundesinstitut für Bau-, Stadt- und Raumforschung betreut wurden. Parallel dazu wurden durch den Lehrstuhl Immobilienentwicklung für die EU Kommission und die EIB fünf mögliche Geschäftsmodelle („Prototypen") für Stadtentwicklungsfonds in Europa entwickelt, welche zwischenzeitlich in 51 Fonds (mit einem Gesamtdotierung von 1,8 Mrd. Euro, Stand Januar 2012) auch bereits umgesetzt wurden:

Land	Holdingfonds	EK in Euro	Stadtentwicklungsfonds	EK in Euro	Prototyp
Bulgaria	HF Bulgaria	33,0	Regional Urban Development Fund AD	18,9	Stadterneuerung
Czech Republic	HF Moravia-Silesi	19,7			Stadterneuerung
Estonia	KredEx	57,0	Swedbank AB	33,0	Energieeffizienz
			SEB Bank	16,0	Energieeffizienz
Germany			SEF Brandenburg	20,0	Stadterneuerung
			SEF Hessen	10,0	Stadterneuerung
			SEF Thüringen	20,0	Stadterneuerung
			Wohnungsbaufonds Thüringen	120,0	Stadterneuerung
Greece	HF Greece	258,0	Pancretan Cooperative Bank andTT Hellenic Po	14,7	Stadterneuerung
			National Bank of Greece S.A.	83,3	Stadterneuerung
Italy	HF Campania	100,0			
	HF Sardinia	70,0			
	HF Sicily	148,1	Fondo di Rigenerazione Urbana Sicilia SRL	90,3	Smart City
Lithuania	HF Lithuania	227,0	Siauliu Bankas AB	6,0	Energieeffizienz
			Swedbank AB	6,0	Energieeffizienz
			Siauliu Bankas AB	15,0	Energieeffizienz
			SEB Bank	6,0	Energieeffizienz
Poland	HF Mazovia	35,9			
	HF Pomerania	53,0	Bank Gospodarstwa Krajowego	34,5	Stadterneuerung
			Bank Ochrony Srodowiska S.A.	14,8	Stadterneuerung
	HF Silesia	56,0	Bank Ochrony Srodowiska S.A.	54,4	Stadterneuerung
	HF Westpomeran	33,4	Bank Ochrony Srodowiska S.A.	14,2	Stadterneuerung
			Bank Zachodni WBK SA	17,4	Stadterneuerung
	HF Wielkopolska	70,2	Bank Gospodarstwa Krajowego	65,9	Stadterneuerung
Portugal	HF Portugal	130,0	Banco BPI S.A.	61,4	Stadterneuerung
			Caixa Geral de Depositos S.A.	49,0	Energieeffizienz
			Turismo de Portugal IP	14,6	Smart City
Spain	HF Andalucía	85,7	Banco Bilbao Vizcaya Argentaria SA	40,3	Stadterneuerung
			AC JESSICA Andalucía, S.A.	40,0	Stadterneuerung
	HF FIDAE Spain	127,7			
United Kingdom	HF London	119,7	Foresight Environmental Fund LP	41,9	Umwelttechnologie
			Amber Green LEEF LP	12,0	Energieeffizienz
			Amber Green LEEF 2 LLP	47,9	Energieeffizienz
			EMUDF	18,0	Stadterneuerung
			JESSICA Wales UDF	65,9	Stadterneuerung
	HF Northwest Eng	120,9	North West Evergreen LP	35,9	Stadterneuerung
	HF Scotland	59,9	Amber Green SPRUCE LP	9,6	Stadterneuerung
			Amber Green SPRUCE 2 LLP	47,9	Energieeffizienz
11	**19**	**1.805,1**	**32**	**1144,5**	

Fig. 2: Umsetzung der Stadtentwicklungsfonds in der aktuellen EU-Förderperiode 2007-2013

3 CONCLUSION

In der kommenden EFRE-Förderperiode (ab 2014) sollen Stadtentwicklungsfonds zu einem Standardin¬strument in der Förderung nachhaltiger Stadt- und Regionalentwicklungen von den Mitgliedsstaaten genutzt werden. Die Erkenntnisse aus den aktuellen Pilotfonds in Europa aber auch die neuen rechtlichen Rah¬menbedingungen für die kommende Förderperiode stehen im Mittelpunkt eines aktuellen europäischen Forschungsprogramms des Lehrstuhls Immobilienentwicklung der TU Dortmund, welches unter WWW.IMMO.TU-DORTMUND.DE/EIBURS eingesehen werden kann. Sie zeigen recht deutlich, dass Stadtentwicklungsfonds keine Konkurrenz zu nationalen rein zuschussorientierten Förderprogrammen zur nachhaltigen Stadtentwicklung, wie sie in Deutschland die Städtebauförderung zum Inhalt hat, sind, sondern ein komplementäres Finanzierungsinstrument mit abweichenden Voraussetzungen und Anwendungsgebie¬ten.

4 REFERENCES

Nadler/FIRU (2011): Stadtentwicklungsfonds in Deutschland, Hrsg. BMVBS, BBSR, BBR, Berlin, Bonn 2011.

Nadler (2010): Evaluation study Urban Development Fund North Rhine-Westphalia, Brussels, Luxembourg 2010 (on behalf of the EIB and DG Regio).

Nadler (2010): Evaluation study Urban Development Fund Saarland, Brussels, Luxembourg 2010: Financial structure of the UDF Hamburg, pp. 51-66, (on behalf of the EIB and DG Regio).

Nadler (2010): Evaluation study Urban Development Fund Berlin, Brussels, Luxembourg 2010: Financial structure of the UDF Berlin, pp. 52-66, (on behalf of the EIB and DG Regio).

Kreuz/Nadler (2010): JESSICA – UDF Typologies and Governance Structures in the context of JESSICA implementation, Brussels, Luxembourg, 2010 (on behalf of the EIB and DG Regio).

Nadler/FIRU/Kreuz (2009): Stadtentwicklungsfonds in Europa – Ideen zur Umsetzung der JESSICA-Initiative, Hrsg. BMVBS, BBSR, BBR, Berlin, Bonn 2009.

Nadler (2009): Evaluation study Urban Development Fund Hamburg, Brussels, Luxembourg 2009 (on behalf of the EIB and DG Regio).

Nadler/FIRU/Kreuz (2008): Urban Development Funds in Europe – Ideas for imple-menting the JESSICA Initia¬tive – Report for the Marseille meeting of EU Urban Poli-cy Ministers – 25.11.2008.

Stadtklimakomfortzonen – von übergeordneten Planungen zu lokalen Interventionen

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1 ABSTRACT

Global Climate Change has a major impact on cities and their inhabitants. The ordinary Central European city with an average of 2°C temperature increase will therefore face significant impacts on the usability of open spaces and needs the attention of urban planners, the civil society and decision makers. The number of heat days in the region of Stuttgart for instance is predicted to double until the end of the century. With the urban climate comfort zone approach – that is proposed and investigated within the EU-funded TURAS-project (www.turas-cities.org) – an integrated set of measures is introduced that aim to maintain and to improve the usability of open spaces with regard to the increase of bioclimatic stress. This will be reached by urban planning guidelines that focus on green infrastructure and local interventions. One of these local measures is a green wall that serves as a cooling and shading facility as well as a potential noise barrier and water storage. It will be built and tested in order to feed back the results into an integrated transition strategy that serves as a role model for the TURAS partner cities.

2 EINLEITUNG

Im Fokus der Berichterstattung zu den Auswirkungen des globalen Klimawandels stehen häufig die drastischen Folgen, wie zum Beispiel der Meeresspiegelanstieg, der die Metropolen an den Küsten bedroht, oder die Zunahme von Extremwetterereignissen mit vermehrten Hochwassern und Überschwemmungen auf der einen und Hitzewellen und Dürren auf der anderen Seite. Aber bereits für die „normale" Stadt mit durchschnittlichen Temperaturanstiegen von 2° C werden die Folgen signifikant sein und stellen eine Herausforderung für die Stadt- und Landschaftsplanung und die beteiligten Akteure dar. Im Rahmen des von der EU geförderten Projektes „TURAS – Transitioning towards Urban Resilience and Sustainability" (www.turas-cities.org) stellen sich nun 28 Institutionen aus 16 Städten und Regionen dieser und weiterer Aufgaben „auf dem Weg zu mehr Nachhaltigkeit und Resilienz in Städten". In den kommenden vier Jahren entwickeln und testen sie Maßnahmen, die am Ende in einer auf andere europäische Städte übertragbaren „integrierten Übergangsstrategie" zusammengeführt werden sollen.

Die TURAS-Projektpartner in der Region Stuttgart – Verband Region Stuttgart, Helix-Pflanzensystem, Universität Stuttgart – sind an unterschiedlichen Arbeitspaketen beteiligt. Eins davon beschäftigt sich mit dem Konzept der Stadtklimakomfortzonen, um den Auswirkungen des Klimawandels auf das lokale Stadtklima mit einem abgestimmten Maßnahmenpaket zu begegnen.

3 DER ANSATZ: STÄDTISCHE KLIMAKOMFORTZONEN

Das Problem ist einfach umrissen: Für die Region Stuttgart wird eine Verdoppelung der Anzahl der heißen Tage (> 30° C) bis zum Ende des Jahrhunderts prognostiziert. Die im Rahmen des Klimaatlas der Region Stuttgart erstellten Bioklimaanalysen (vgl. Abb. 1) identifizieren die räumliche Verteilung der belasteten Gebiete und setzen sie mit Bevölkerungszahlen in Beziehung. Über 50 % der Verbandsfläche und 45 % der Bevölkerung werden bei einer Verdoppelung der Hitzetage bis zum Ende diesen Jahrhunderts von Hitzestress an mehr als 30 Tagen im Jahr betroffen sein (VRS 2008, 130 ff), was ganz erhebliche Auswirkungen auf die Nutzbarkeit des öffentlichen Raums zur Folge haben wird.

Das Konzept für städtische Klimakomfortzonen setzt an diesem Punkt an. Die Stadtklimakomfortzonen sind Bereiche des öffentlichen Raums, die trotz eines hohen bioklimatischen Belastungspotenzials aufgrund ihrer Ausstattung bzw. stadträumlichen Einbindung einen erträglichen, wenn nicht sogar angenehmen, Aufenthalt im öffentlichen Raum auch an Hitzetagen ermöglichen.

Die Errichtung der städtischen Komfortzonen zielt darauf ab, die Aufenthaltsqualität des öffentlichen Raums in Bezug auf die Umgebungstemperatur zu erhalten und zu erhöhen. Dies geschieht durch den Ausbau der Grünen Infrastruktur, durch konkrete Empfehlungen zur Erhöhung des Durchgrünungsanteils und weitere etablierte Maßnahmen der Stadt- und Landschaftsplanung (BMVBS 2011, Landeshauptstadt Stuttgart 2010, VRS 2008), aber auch durch lokal begrenzte Interventionen.

Aufbauend auf den Daten und Analysen des Klimaatlasses der Region Stuttgart werden prioritäre Gebiete definiert, in denen Anpassungsmaßnahmen vorrangig in Angriff genommen werden sollten. In Kombination mit Analysen zum Nutzungspotenzial der Grünflächen (Eisenberg 2009), zur „Fußläufigkeit" (walkability) und zur Nutzungsfrequenz des öffentlichen Raums lassen sich Bereiche identifizieren, in denen mit lokalen, begrenzten Interventionen ein möglichst großer Effekt hinsichtlich der Aufenthaltsqualität und Nutzbarkeit erzielt werden kann.
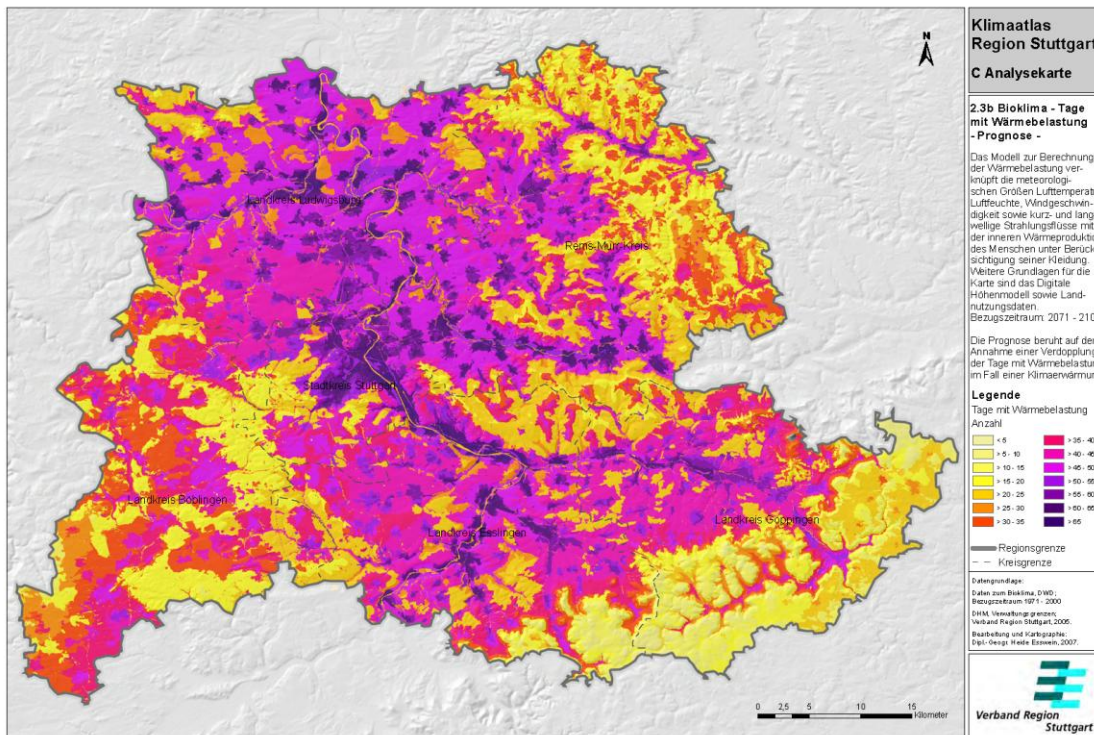
Abbildung 1: Bioklima – Tage mit Wärmebelastung (Quelle: VRS 2008, 134)

Der Verband Region Stuttgart, die Firma Helix-Pflanzensystheme aus Kornwestheim, das Institut für Landschaftsplanung und Ökologie der Universität Stuttgart sowie die Stadt Ludwigsburg als assoziierter Partner arbeiten zusammen, um exemplarisch eine städtische Klimakomfortzone auszuweisen, zu testen und zu evaluieren. Die „Stadtklimakomfortzonen" werden als ein abgestimmtes Paket von Anpassungs-maßnahmen an den Klimawandel entwickelt, dessen Übertragbarkeit auf andere TURAS-Partnerstädte ebenfalls Gegenstand der Untersuchungen ist.

4 LOKALE INTERVENTIONEN

Eine lokale Maßnahme der Klimakomfortzonen wird näher auf ihre Wirksamkeit und Alltagstauglichkeit hin untersucht: die Grüne Wand, die sowohl stadtklimatische, lufthygienische, wie auch ästhetische, stadträumliche und Lärmschutzfunktionen aufweisen wird.

Der Standort für die Grüne Wand ist so gewählt, dass diese punktuelle Maßnahme als Bindeglied zwischen bestehenden Grünverbindungen fungiert und daher nicht nur im unmittelbaren Umfeld ihre Wirkung entfaltet, sondern auch die Ergänzung einer bestehenden klimatischen Komfortzone ermöglicht.

Die Wirkung der Wand auf das Mikroklima und bezogen auf die Funktion als Bindeglied in der städtischen Komfortzone wird im Rahmen des Projektes untersucht. Die Erfahrungen mit der Grünen Wand werden anschließend in die übergeordnete integrierte Übergangsstrategie des TURAS-Projektes, wie auch in die Empfehlungen zur Anpassung an den Klimawandel für die Region Stuttgart einfließen.

5   DIE GRÜNE WAND

Die Grüne Wand wird an einem Standort erbaut, der die oben skizzierten Anforderungen erfüllt. Es ist vorgesehen in der Summe bis zu 30 m lange und ca. 2-3 m hohe, flächig mit Vegetation bewachsene Wandelemente zu erstellen, die von einer baubotanischen Baumkrone auf dem Wandkopf überragt wird.

Bei einer Wandhöhe von 3 m und einer Länge von 30 m würde eine vertikale Nettogrünfläche von etwa 200 m² entstehen. Um möglichst schnell ein mikroklimawirksames Kronendach zu erhalten, wird in die Wand eine baubotanische Konstruktion eingefügt, die das Grünvolumen innerhalb kurzer Zeit signifikant erhöht. Mithilfe der baubotanischen Methode der Pflanzenaddition (Ludwig 2012, 219 ff) werden Pflanzenstrukturen erschaffen, die sich nach einer kurzen Anwuchsphase, in der sie auf eine Versorgung aus der Grünen Wand angewiesen sind, autark aus dem Boden versorgen (Ludwig 2012, 257). Die folgende Abbildung veranschaulicht diese baubotanische Konstruktion (vgl. Abb. 2).
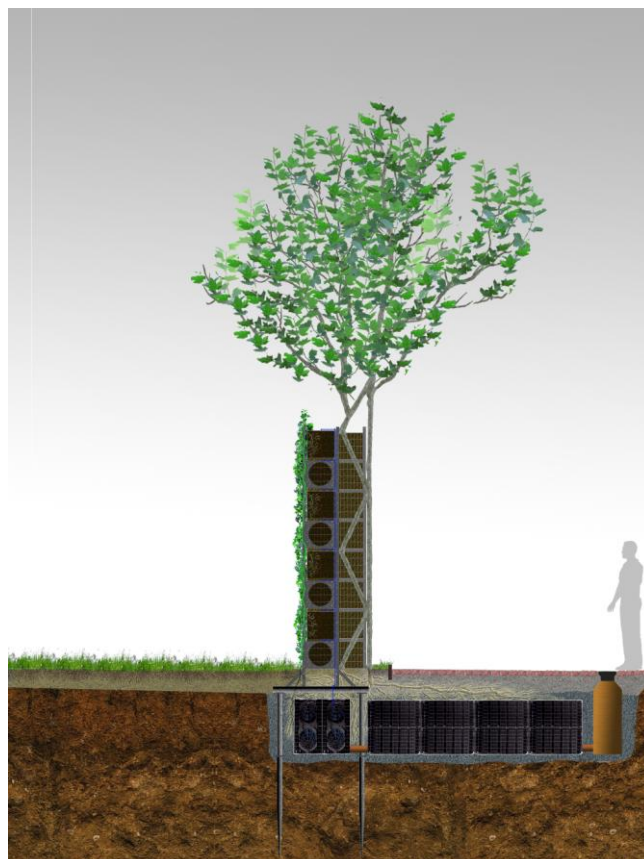
Abbildung 2: Grüne Wand mit baubotanischer Konstruktion (Quelle: F. Ludwig, unveröffentlicht)

6   ENTWURFSPROZESS UND BEGLEITENDE MESSUNGEN

Die Ausgestaltung der Grünen Wand und ihres Umfeld erfolgt in der ersten Jahreshälfte 2013 in enger Abstimmung zwischen der Kommune, der Universität Stuttgart und den Konstrukteuren der Wand. Dabei werden Effekte der Wand auf das Kleinklima mithilfe von Analyse- und Simulationssoftware untersucht und Entwurfsvarianten verglichen. Soweit es an dem innerstädtischen Standort möglich ist, wird auch ein integriertes Regenwassermanagement, das die Bewässerung der Wand sicherstellen soll, einbezogen. Um die Akzeptanz sowohl für die Maßnahme an sich, wie auch die dahinterstehende Konzeption der städtischen Klimakomfortzonen zu steigern, werden lokale Akteure frühzeitig eingebunden .

Vor und nach Fertigstellung der Grünen Wand sind umfangreiche Messungen zu bioklimatischen Parametern an der Wand und in ihrem Umfeld vorgesehen . An der Wand selber werden umfangreiche Untersuchungen zur optimalen Pflanzenauswahl und den Auswirkungen auf die Biodiversität durchgeführt. Ergänzt werden die technischen Messreihen durch ein Nutzermonitoring, das Frequenzzählungen, Beobachtungen und Befragungen beinhaltet.

7 ERWARTETE ERGEBNISSE UND AUSBLICK

Das Konzept der Klimakomfortzonen verbindet etablierte Anpassungsstrategien mit Analysen zum Nutzungspotenzial des öffentlichen Raums. Durch die Konzentration der Maßnahmen zur Verbesserung der Aufenthaltsqualität entstehen Zonen, die auch bei höherem bioklimatischem Belastungspotenzial die Nutzbarkeit des öffentlichen Raums gewährleisten sollen. Dies ist auch im Hinblick auf die demographische Entwicklung von Bedeutung, wird doch eine alternde Gesellschaft umso stärker auf funktionierende öffentliche Räume im Wohnumfeld und den städtischen Zentren angewiesen sein.

Die Einzelmaßnahme „Grüne Wand" entfaltet sicherlich nur sehr begrenzt eine stadtklimatische ausgleichende Wirkung. Der Wert der Grünen Wand liegt vielmehr darin, vor Ort konkret eine Lücke in der Abfolge von Grünflächen zu schließen. Somit kann eine Klimakomfortzone geschaffen und an einem innerstädtischen Standort das Thema „Klimawandel und Anpassungsstrategien" platziert werden.

Durch die wissenschaftliche Begleitung wird sichergestellt, dass verlässliche Aussagen zu Stärken und Schwächen der Maßnahme gemacht werden können und darauf aufbauend die Übertragbarkeit auf andere Standorte in der Region Stuttgart, aber auch in den TURAS-Partnerstädten, beurteilt werden kann.

8 LITERATUR:

Bundesministerium für Verkehr, Bau und Stadtentwicklung BMVBS 2011: Klimawandelgerechte Stadtentwicklung. Ursachen und Folgen des Klimawandels durch urbane Konzepte begegnen. Schriftenreihe Forschungen Heft 149. Berlin.

CIRCLE-2 (Hg.) 2013: Adaptation Inspiration Book. 22 implemented cases of local climate change adaptation to inspire European citizens.

Eisenberg, B. 2009: Parkstrukturmerkmale – ein Beitrag zur Quantifizierung des Nutzungspotenzials öffentlicher Grün- und Erholungsanlagen. Stuttgart.

Landeshauptstadt Stuttgart (Hg.) 2010: Der Klimawandel – Herausforderungen für die Stadtklimatologie. Schriftenreihe des Amtes für Umweltschutz – Heft 3/2010. Stuttgart.

Ludwig, F. 2012 : Botanische Grundlagen der Baubotanik und deren Anwendung im Entwurf. Stuttgart.

Verband Region Stuttgart VRS (Hg.) 2008: Klimaatlas Region Stuttgart. Stuttgart.

SUNSHINE – Smart UrbaN ServIces for Higher eNergy Efficiency

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1 ABSTRACT

SUNSHINE – "Smart UrbaN ServIces for Higher eNergy Efficiency" delivers innovative digital services, interoperable with existing geographic web-service infrastructures, supporting improved energy efficiency at the urban and building level. Specifically, SUNSHINE delivers a smart service platform accessible from both a web-based client and from an App for smartphones and tablets. In parallel to technical integration a key standardisation activity will also result in the definition of the extension of existing data model (CityGML) through the definition of a specific Application Domain Extension (ADE) on building energy behaviour, something very important for the pilots within SUNSHINE and its large-scale uptake beyond current locations.

SUNSHINE is a European funded project in the competiveness and innovation framework program for the duration of three years with 16 partners from ten countries and it started in February 2013.

2 INTRODUCTION

Energy consumption in urban areas is increasingly recognized as an important source of global greenhouse gas emissions. Cities account for approximately two-thirds of global primary energy consumption and 71 % of energy-related greenhouse gas emissions (IEA 2010). Energy demand patterns vary widely from city to city and across countries. Today, energy use in residential, commercial and public buildings accounts for 40 % of total global final energy consumption (UNEP 2007). There is a huge energy saving potential in this sector and significant scope for adopting more efficient technologies and services in buildings (IEA 2010).

Energy certification of buildings is a key policy instrument for reducing the energy consumption and improving the energy performance of new and existing buildings. It should provide information that may increase demand for more efficient buildings, thereby helping to improve the energy efficiency of the building stock in the country (ARKESTEIJN, K., VAN DIJK, D. 2010).

SUNSHINE – "Smart UrbaN ServIces for Higher eNergy Efficiency" is a step towards this policy and is a tool to improve the energy efficiency of buildings and urban areas. This paper presents the young European funded project SUNSHINE, which will develop a smart service platform for planners and public administration to extract analytical indicators necessary for the definition of energy saving policies for the existing public buildings asset and to define energy pre-certification mechanisms. Further, building managers can use SUNSHINE to optimize energy use of large-scale optimization of public illumination network. SUNSHINE uses three scenarios which lead into a smart service platform that will be accessible from web-based client and from an App for smartphones and tablets. An important aspect of the SUNSHINE project is the use of a scalable approach, based on CityGML standard format, which makes a simultaneous representation of the energy balance at architectural and urban scale possible. CityGML is an open data model and XML-based format for the storage and exchange of virtual 3D city models particularly suited to applications.

The SUNSHINE technology will be the result of the customization and integration of existing software components developed by other EC-funded projects focusing on smart-city technologies, including BRISEIDE, i-SCOPE and i-Tour (DE AMICIS, R., CONTI, G., PRANDI, F 2010).

In the SUNSHINE project eight work packages are planned (figure 1) which are basically structured in preparatory work, technical development and the deployment of the pilots. Awareness, networking and dissemination will accompany the project over the entire duration. These activities include the involvement of stakeholders, information linkage with Smart City Portfolio working group and other related EU funded projects. A further aim of this work package is the organisation and coordination of user meetings, seminars, workshops at international, national and local level to be hosted by the various partners of the consortium.
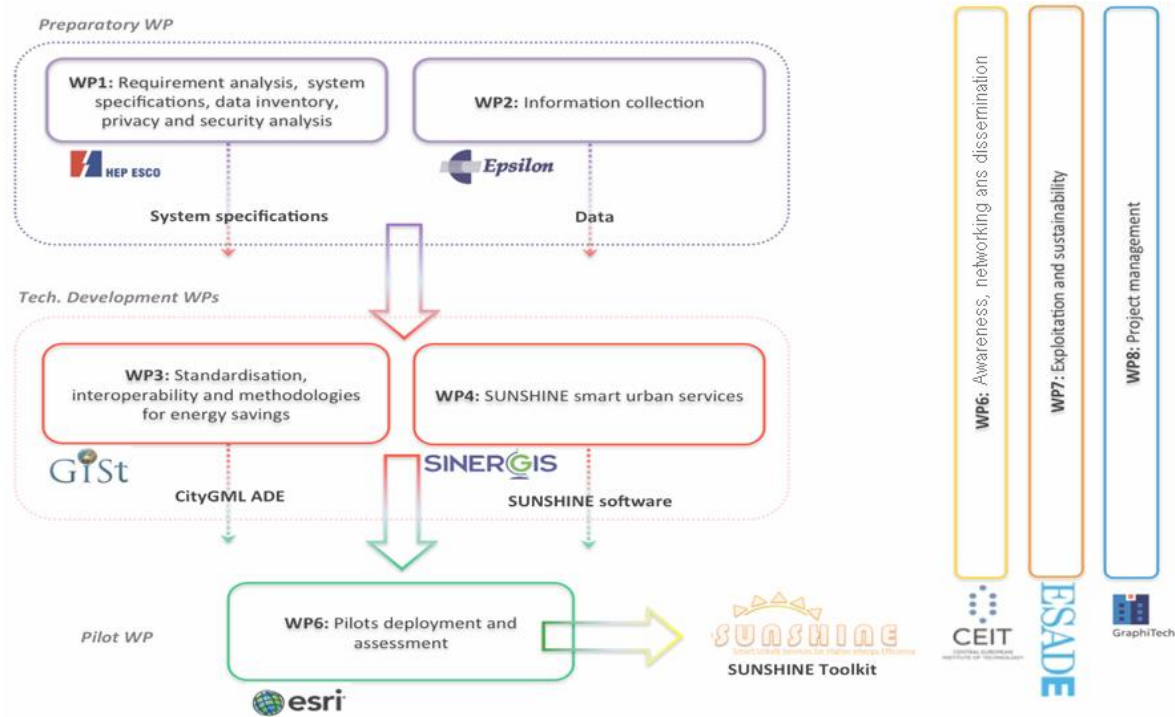
Fig.1: Overview of the work packages (source: GraphiTech)

3 SUNSHINE SCENARIOS – PILOTE USER CASES

Within the SUNSHINE project three different scenarios are planned which will be a desktop-based user-friendly 3D geobrowser supporting OGC standards. In particular, the SUNSHINE platform will allow the three following scenarios.

3.1 Scenario 1: Assessment of energy performances and electronic energy pre-certification

The automatic large-scale assessment of building energy behavior based on data available from public services (e.g. cadastre, planning data etc.) which are involved in the project via letter of commitment. The information on energy performances will be used to automatically create urban-scale "ecomaps" to be used for planning activities and large-scale energy pre-certification purposes.

User case: A building manager from the local public housing agency of Ferrara, Italy, starts a web-client to assess energy behavior of a set of 150 public buildings located city-wide (note that a single public building asset may be a multi-unit dwelling such as an apartment block).

The web-client connects to a SUNSHINE smart service that in turn connects to existing web services run by several departments of the municipality (e.g. cadastre, urban planning department etc.). The latter expose relevant data (including type of building, use category, geometry, size and shape, age and climatic zone, etc.) that has been compiled to ensure compliancy to a single interoperable profile of standards from OGC.

The SUNSHINE smart service uses this information to generate the 3D model of the relevant portion the city encoded as CityGML standard format, including estimation on performances for each building according to the SUNSHINE CityGML ADE (Application Domain Extension) on building energy efficiency. The information calculated by the system can also be double checked against actual consumption values available from the local energy provider.

As result the system returns both a 2D and 3D "ecomaps" (the latter being the full CityGML model), whereby each public building is classified according to their theoretical energy performance.

3.2 Scenario 2: Heating and cooling forecast and alerts

The previous assessment will be then used, together with localized weather forecasts available through interoperable web-services, to ensure optimization of energy consumption of heating and cooling systems through automatic alerts that will be sent to the SUNSHINE App.

User case: January 2013, Schwechat in Lower Austria, located next to Vienna. High-energy consumption was reported in the previous few weeks due to cold weather. Weather forecasts then predicted a sharp and significant increase in daily temperatures from minus ten degrees to around plus eight degrees. The building manager of the Multiversum, a multi-purpose event hall in Schwechat, had previously installed the SUNSHINE App on his smartphone. The App was configured with information on the type of heating system and position of the Multiversum. The building manager had set an alert that would inform him of extreme and unseasonable changes in weather conditions. He receives detailed information on the dynamic rate scheme for the following day which increases significantly costs for energy consumptions. This gives him the possibility to react immediately and to adjust the heating.

The SUNSHINE system receives the weather forecasts predicting the sharp increase in temperature. The system retrieves the list of buildings according to their energy performances and it starts sending notifications, according to the estimated thermal inertia of each single building, warning to turn off the heating system, due to improving weather condition, at a given time of the day to ensure an optimally comfortable transition to higher external temperatures.

The same scenario could be applied both in hot summer days (when air conditioning is at its peak) and during cold winter days to reduce concentration of PM10 due to excessive heating of buildings.

3.3 Scenario 3: Optimization of power consumption of public lighting systems

Lastly SUNSHINE will ensure interoperable control of public illumination systems based on Automatic Meter Reading (AMR) facilities remotely accessible, via interoperable standards, from a web-based client as well as from an App for smartphones or tablets.

User case: An operator of the Municipality of Bassano del Grappa (Italy) wants to optimize illumination (indoor and outdoor) levels of public buildings (e.g. City Council) and building of public interest (e.g. stadium). He starts a 3D web client that shows the map of the city and the public illumination network. The web client operates as a dashboard from which he can control, through an interoperable standard, real time status of public illumination system. This allows him to check, from a single point of access, the functioning of the various parameters of the entire lighting system through an interactive mapping environment, identifying for instance damages, power losses or simply inefficient use (for instance lights being turned on when unnecessary).

The operator can control lighting conditions to avoid unnecessary illumination of common areas whenever not required. He selects one of the lines that surround the local stadium and sets the illumination level down by 50 % in the evening when all activities inside the stadium are finished. Similar optimization is performed for other public buildings. The dimmering (as well as other control) can be performed at control panel level (for the entire line) or at single illumination unit.

4 PILOTS WITHIN SUNSHINE

The three described scenarios will be piloted in the context of nine sites across five countries which includes e.g. for Italy 20 public buildings in Ferrara; 60 technical buildings across the Trentino Province; 4 public illumination lines in the centre of Bassano del Grappa (Italy), 5 public illumination lines in the city of Rovereto (Italy) 3 building complexes in the area of Val di Non (Italy) and their outdoor public illumination systems.

Fig 2: The multipurpose hall "Multiversum" in Schwechat (Source: Multiversum)

For Austria it will be a multipurpose hall "Multiversum" in Schwechat, Austria whose managing director has committed to SUNSHINE. It is a complex opened in 2011 used for sport and cultural events, but also for exhibitions, fairs, congresses, conventions and business events. Within this pilot all three scenarios will be tested. Other pilots are located in Croatia, Greece and Malta.

SUNSHINE will be piloted for a duration of 12 months and it will target at energy and emission savings ranging, within the various pilots, from 10 % to 30 %, with higher savings being foreseen for pilots relying on older buildings, or equipped with older heating, cooling or lighting technologies. Energy savings will be compared to a one-year baseline data acquired, during the first stages of the project prior to the deployment of the pilots.

5 CONCLUSION AND FUTURE WORK

This paper has given details of the initial project plan for the following three years. SUNSHINE is a European project aiming to improve the energy efficiency of public buildings. Local administrations are playing an important role within the project and are constantly involved in the process.

The first step within the project will be to precisely define the use cases to be addressed by the various pilots and collect requirements for the deployment of the SUNSHINE system, including e.g. user, training, service requirements and a definition of the software architecture of the whole SUNSHINE system. Further steps for the SUNSHINE implementation are the identification, collection and harmonization of all available information to support the SUNSHINE pilots.

6 REFERENCES

ARKESTEIJN, K., VAN DIJK, D. (2010), Energy Performance Certification for New and Existing Buildings, EC Cense P156, EC, available at: www.iee-cense.eu

DE AMICIS, R., CONTI, G., PRANDI, F (2010). An Integrated Framework For Spatio-Temporal Data Management: The Project BRISEIDE – BRIdging SErvices Information and Data for Europe. In WebMGS 2010 – 1st International Workshop on Pervasive Web Mapping, Geoprocessing and Services. Como, Italy

IEA (2010), Energy Performance Certification of Buildings-A policy tool to improve energy efficiency, Paris, France, available at: www.iea.org

UNEP (2007), Buildings and climate change – Status, Challenges and Opportunities, Kenia, available at: www.unep.org

The 7+1 Graz Process – a Method for Promoting the Development of a Smart City

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1 ABSTRACT

In order to stress the development of a low- carbon economy, the situation in the European Cities concerning the transformation of the entire energy system is challenging. Therefor a powerful tool with broad participation process has to be set up, to define the "ideal city" development. The definition of a vision, building up of a set of indicators, drawing of a roadmap, specification of the main actors and the inclusion of the main trends and bariers for urban planning are to tackled. Main indicators are prepared for a city-development up to the year 2050 for social, economic and ecological sustainability. The representation through the indicator matrix will be visualized with a spider map representing the pillars of sustainability for the 7+1 main indicators of the weighted environmental parameters. Outcome will be the representation of the current situation and the targeting of the most urgent measures to improve the the quality of life in urban agglomerations.

2 I LIVE GRAZ, THE PROJECT

2.1 Background

The transition to sustainable energy systems should start in cities. There is no way around: the facts are striking: cities cover about 1 % of the world's surface, but they consume 75 % of the energy and cause 80 % of the emissions of global warming gases. And the cities keep growing. Nowadays about 50 % of the world's population lives in cities, and 60 % are expected by 2025. These cities at present are powered by fossil energies: coal, oil and gas. While the cities contribute to climate change, also the results will be seen here mostly. Within cities an increasing number of hot days and nights can be expected, air quality is decreasing. Moreover, many cities face great problems with growing traffic, blackouts and poor suburbs.

But this is also a chance: measures taken here unfold the greatest effect! Urban systems are the leverage point for solving global energy problems. There is no blueprint for such a "Smart" city, but some rules which are general and they can be transferred into different cultures and climates.

The European Union (EU) is tackling the challenge through a policy whose target is nothing less than the transformation of the entire energy system, with far-reaching implications on how we source and produce our energy, how we transport and trade it, and how we use it. In short, it is necessary to make low-carbon technologies affordable and competitive – a market choice. This is the core idea behind the European Strategic Energy Technology Plan [1] which includes a Smart City Initiative.

The Smart Cities Initiative aims at improving energy efficiency and stepping up the deployment of renewable energy within large cities, going even further than the levels foreseen in the EU energy and climate change policy. This initiative supports cities and regions that take pioneering measures to progress towards a radical reduction of greenhouse gas emissions through the sustainable use and the production of energy and as a result it involves the cities on the forefront of the development of the low-carbon economy.

2.2 Methodology for a participatory process

The Smart City project in Graz has been started in 2011 with a grant from the National Austrian Research Foundation FFG. The project has been managed by the City of Graz through its buildings authority. The main research partner was the Graz University of Technology, which was responsible for mediating the decision processes. The methodological background was a systematic innovation process similar to that proposed by Mann [2]. The project wasnot started with the present situation but by defining the desired outcome: an ideal city for living, working, learning, culture and leisure (comp. fig. 1).

As shown in fig. 2 in order to be able to find the "ideal city" independent of present interests (internal drivers) and (mega-) trends (external drivers), seven expert groups were established. The eighth group, experts integrated the thematic results into the visions and indicators for "urban planning) thus this structure is called the "7+1 Graz Process".
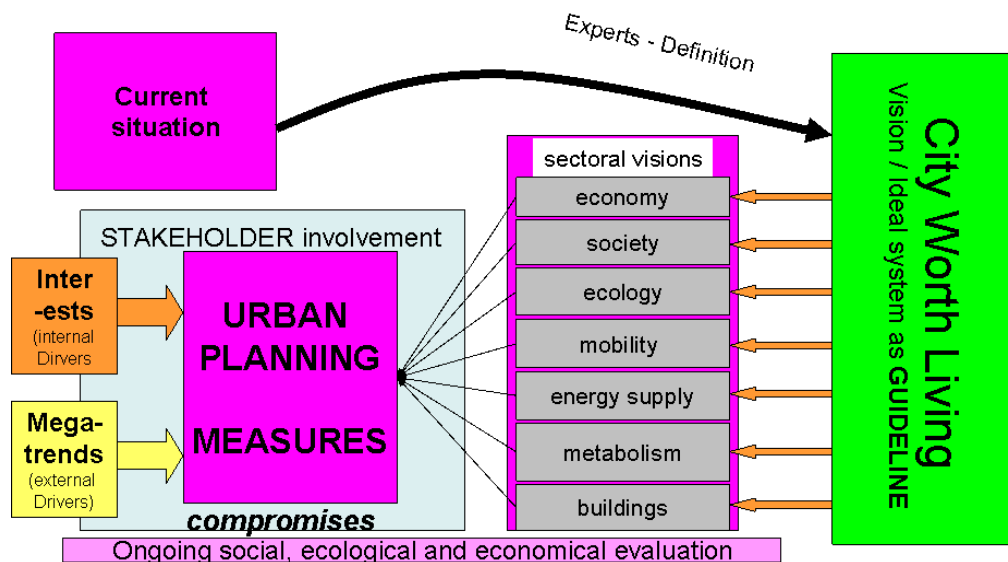
Figure 2. From sectorial visions to urban planning measures

Each of the groups was led by a representative of a (semi-)public institution (city, utility company,…). Researchers of eleven institutes from the Graz University of Technology and representatives from various departments of the City of Graz, business, NGOs and the general public joined the process.

The process management defined the tasks for each of the working groups:

- Definition of the vision of the sector
- Build a set of indicators
    - "Hard" indicators that can be quantified by numbers
    - "Soft" indicators, text only
- Draw a roadmap
- Specify the main actors and assign duties to them
- Assessment of the supporting (mega-)trends and most likely barriers

Based on the results of the seven working groups, the experts defined their visions and measures for urban planning.

2.3 Sectorial visions and indicators

Each of the 7+1 expert groups defined its visions and indicators according to the following fields of action:

Economy: Graz is one of the leading medium-sized cities in Europe; it is dynamic and worth living, furthermore it is an international benchmark for research and innovation sites for green and sustainable technologies (Green Tech Valley) for energy, mobility, resource efficiency, health and design.A Main feature of a smart urban economic development consists in the efficient use of budgetary resources, the maintenance and the selective expansion of existing technical and social infrastructure. Main focus is laid on improving the efficiency and the secured financing of infrastructure management. An effective Smart City Development pursues innovative financing schemes, as well as resource-efficient business models, considering life-cycle costs.Thus the guidelines can be developed for the effective use of resources and public resources through coordinated investment decisions of technical and social infrastructures and also for the promotion of research, innovation and development projects in the field of urban development. Targeted results will be quality agreements with investors for targeted implementation of sustainable urban development, the promotion ofthe establishment of "green economy" companieswith state subsidies, establishment of urban "Revolving" and citizens Funds.The use of financialmeans is linked to the effective action towards the achievement of objectives for individual measures. A second evaluation criteria consists in the integral consideration of the life cycle costs. This approach would lead to sustainable investment decisions and long-term budget savings.Compact and dense development of urban settlement patterns along existing public infrastructure networks leads to the increase of efficiency in the management of technical and

social infrastructure such as: public transport, water, energy, supply and disposal networks, telecommunication networks, road networks, Kindergartens, schools, social housing, retirement homes, swimming pools, sports facilities, etc.Prerequisite for the sustainable management of public facilities provide multifunctional usable building – and infrastructure.Urban development funds are used to support the achievement of Smart City development, concerning investments and projects of individuals and businesses, which have demonstrated long lasting positive effects, conform to an integrated city development approach.

City authorities should initiate and support the establishment of revolving city-development funds and Citizens Funds to strengthen the implementation of climate change projects. This includes the establishment of a municipal information platform where the respective participating opportunities are available. Main indicators in this thematic field are a high quality of life, a sustainable growth, international accessibility and the oportunity for the settlement ofheadquarters for large companies.

Society: Graz should be an attractive place for living in every stage of life. The society is open-minded, child-oriented and democratic. The citizens engage themselves in the development of their living environment. Resource protection and sustainability are accepted guidelines that manifest themselves in daily life. The best possible supply with social infrastructure (schools, kindergartens, nursing homes, ---) is coupled witha corresponding minimum building densities and minimum densities of people. (i.e.: compact development structures).Structures comfortably linked to public infrastructure should be pursued in order to enable a resource-saving, energy-efficient and low-carbon urban development, the promotion of compact and dense housing. Main focus is laid on densification of the existing building stock,additional allotments,the use of vacant lots as well as on targeted and meaningful preparation and development of brownfield sites before any dedication of new land.

The prerequisite for a functioning internal development (densification of existing buildings) is the expansion of public space. This is the most important link between the structural spatial urban structures for the district at a public city level to create attractive public spaces (greens, traffic areas, open space) which has been taken as habitat and identity-support to enter the crucial issue of a vibrant livable compact city.

In particular a growing viable city should respect land saving / space-efficient urban development on which depends a number of effects from the consumption of building areas.A smart city development is accompanied by an early involvement of affected groups (residents, local stakeholders such as businesses, organizations and institutions). The acceptance of the Smart City implementation can be significantly raised and projects become adapted to the requirements and needs of the individual living environment through a transparent information and a targeted participation. A diversified combination of methods should be used in order to reach most of the inhabitants. As outcome guidelines will be drawn up: best is the earliest possible involvement of all affected stakeholders, the targeted public participation and information, an accompanying district management in urban development projects and the promotion of the awareness for sustainable living.

For the purposes of an integrated urban development of the area district management a bridge has to be built for instance between residents, the political-administrative system, the business sector and other local actors (associations and institutions, etc.). High importance has to be dedicatedto the networking and the integration of existing resources within the district, whichis one of the main characteristics of Smart City developments. The district management is coordinated by the City authorities and by all sponsoring associations implemented in the district development, in order to activate the population and to promote joint district identity initiations with all involved initiatives and organizations to carry outdevelopment projects. There are important incentives to increase awareness such as:education priorities in kindergartens and schools, general information activities, events, contests and awards, consultations and coaching measures. Through this policy mix the awareness for a sustainable lifestyle is increasedin order to anchor the following topics in the population: energy-and resource-efficient behavior, application of renewable energy technologies, the awareness for the true costs of infrastructure enhancement and development as a basis for purchasing decisions, gentle mobility behavior, communitarian use of products (eg: carsharing), promotion of regional markets, prevailing sale of fair trade products, etc.

Main indicators for the social thematic field are the amount of neighborhood conflicts, whichare independently solved within the residential community via peer mediation and neighborhood management. Another indicator for the development of construction projects can be actively involved and informed (that

also applies to private projects), which is seen as an asset and involved and concerned persons. Working schedules should be need-based, tailored to the life stageand childcare is adapted to custom models. All people should use communication technologies in everyday life regardless of age, gender or social status. Ideally every technical innovation should be affordable and seen as a positive contribution to a sustainable lifestyle, which is considered as chic and hasa high social prestige. High awareness for resource optimization is a basic life concept for the society concerning leisure activities, both in daily life and on the job.

Ecology: Graz has been developed towards a zero-waste and low-emission city which is CO2-neutral. The quality of the soil and the brooks has improved significantly. Noise pollution is no more a problem and biodiversity has been increased. A dense net of green corridors that can freely be accessed overdraws Graz. The urban public space minimizes the need for motorized mobility. The city development is based on the "duality principle" for an adequate balance between density and open space planning standards, with an aim to rebuildconstantly the quarter in its existing boundaries. The City development has many opportunities thanks to large private open spaces – either individually or collectively private. In these urban areas, green area stabilizing measures and extensions are operated and practiced according to ecological horticulture.The area of the city as part of the region is an absolutely limited resource. The expansion of urban area which goes hand in hand with the expansion of necessary traffic areas which is depending on the use of the outdoor landscape and a increasingland consumption. From an ecological point of view, the urban development was primarily done oriented towards inner development premises. The amount of animals and plant species indicates thebiodiversityin the urban area.

Mobility: Graz has been developed towards a city in which there are multiple choices of mobility technologies. The mobility concept combines resource efficiency with possibilities for social contacts. Local supply of the most relevant goods, services and recreational facilities guarantees short distances that can be covered by foot or bicycle. A substantial fraction of the areas used by cars at present is regained for people. A significant part of land as currently occupied by individual traffic and has to be recovered for residencial functions dedicated to the citizens. The program allows implementing a fundamental change in the modal split in urban and regional areas.Mixed uses (retail, office, housing, food, social infrastructure, ...) are economically functional and stable if the minimal building densities (1.8 – 2.0) with enough housing demand a minimum densitycan be ensured. That leads to a settlement through moderate densification, the part of the required road area of which up to 25 % could be reduced. Part of this spatial savings can be used to supply public green. Main indicators therefor arethe unquantifiable part of the local mobilitysuch as a compact city development, extensive cycling and public transport friendly connections, the recovery of roads as natural habitat, the improvement of the public transport offer, information and communications technology to simplify and speed up public transports, optimized freight logistics for traffic reduction and reduced transport service design.

Energy: In the year 2050 Graz and its environment are in an energetic equilibrium. The energy needed (including mobility, production and services) is produced by 100 % in the region with sustainable technologies. People act correspondingly knowing the value of energy. The utility companies provide the infrastructure for distribution and storage of energy and as a resultthe use of compact development structures leads to significant energy savings for buildings.

The expansion of emission-neutral heat supply networks requires compact development structures to be economically displayed. Main indicators for renewable energy are the ones that the power must be converted by force from the current fossil primary energy sources to renewable energy sources.

Fossil fuels will only be used for special applications.Energy should be decentralized, whereby the decentralization refers to the transfer fee / addition of large power plants with small, consumer-distributed generation units. Major criteria for the indicators are the costs, the availabilityand the security of the energy supply. The energy and power generation technologies, which ultimately define the new security of supply, are cost effective and sufficiently available.Energy costs for renewable energy should not be higher than the current pricing level.

Concerning to the energy awareness the residents should be aware of the value and should behaveaccording to the different qualities of various forms of energy at different times.

Concerning to the energy efficiency the energy is converted from high efficiency technologies and applications in use. Energy is not wasted – the consumption will be stabilized at the lowest possible level

without loosing life-quality.The entire process chain of production, distribution and conversion (use) of energywas taken into account by energy efficiency.The storage for the compensation of (renewable) energy when the demand has adequate available storage capacity is an important issue.

Metabolism: Graz is a waste free city and it uses water efficient technologies. Wastewater is treated and does no harm to the environment. Goods are repaired, reused and recycled. Waste prevention is the first principle and has taken root in all areas of daily life. An appropriate local services and infrastructure are accessible by walking distance for everyday goods supportinthe concept ofthe "compact city". All businesses provide their products in a circuit and conform to the life cycle and the cradle-to-cradle approach. Justice is implemented in all areas of the supply and the disposal is following the principle of 'polluter pays'.

Indicators for the metabolism arethe quotas for reusing goods and materials and also using of the wastewater as a source of energy and materials.

Buildings: Every building is considered over its life cycle and should contribute to the urban quality of life in terms of ecology, economy and social life. Buildings should be multifunctional as far as possible.They should provide possibilities for working, living, leisure and mobility. In 2050 all the buildings are characterized by high quality architecture (design, detail and quality of execution, multiple functionality, insertion into the environment), by taking into account the established architectural quality criteria. This includes processes such as user participation, needs assessment, planning, allocation and the implementation of culture.Indicators for building sustainability are the resource efficient planning which is an integral part in the planningof new construction projects, building skills and awareness of the client, users, planners and contractors.For the energy neutrality the best issue will be the use of all new buildings (except special buildings) as part of the approval process to demonstrate the high quality approach for these development solutions.As far as these visions are rather general, indicators should be developed in order to make the progress measurable for the vision. A general measure had to be found in order to make the indicators comparable. Even for the individual aspects of quality of life, it was difficult to find indicators. This can be discussed at the example of "noise pollution". Noise can be measured by decibel. The decibel is commonly used in acoustics to quantify sound levels relative to a 0 dB reference which has been defined as a sound pressure level of .0002 microbar, or 20 micropascals. The reference level is set at the typical threshold of perception of an average human and there are common comparisons used to illustrate different levels of sound pressure. In each city, there are quiet and noisy areas and it would be possible to define noise levels that should not be exceeded. Such a measure would not be comparable with any other indicator, like air quality, biodiversity or economic activity.Through the definition of present value (2010) and the target value, which has been prescribed in the vision process for 2050, a scale can be defined on the time axis. Noise like today's (2010) average gives 10 points, and noise for the target situation in the year 2050 gives 50 points (areas with more noise pollution than today's average get 0 points).

	Status 2010	Vision 2050	my quarter/ my project	corresponds to value of year 20.. (found by liner interpolation from 10 to 50)
Energy resources	Austria supplies 27 % energy from renewable resources	100 % renewable energy	80 %	39
Energy efficiency	average consumption 6000 W / cap	average consumption 1500 W / cap	2000 W	45
Mobility	1.5 cars per family	0.3 cars per family	1	26
Number of indicators			3	
			result for my quarter 36,7	

Table 1: Examples of how different indicators can be brought on one scale – the time scale towards the ideal state in 2050.

Urban development should not be merely limited to the balancing of interests. Therefore urban development and urban policy are developing prospects and potentials to show that winners of the game are not the story concerned, but the citizens.

The values for 2010 are originating from the acquisition of the real data, while the values for 2050 are the result of the vision-defining process. The corresponding value that provides the "status-year"has been obtained by linear interpolation between the value of 2010 and the value of 2050.

Finally,according to the theory of sustainability the indicators, have been grouped into three categories:

- Set of indicators for social sustainability

- Set of indicators for economic sustainability

- Set of indicators for ecological sustainability

The examples of indicators that can be used are given inTable 2. Values for status 2012 and 2050, as well as the project numbersare left free.For each of the Smart City Project these should be filled in the vision process.

Social	Economic	Environmental /resources
Social integration	Local supply	Air quality
Education, schools	Jobs	Noise pollution
Recreation	Costs of living	Water resources
Cultural activities	Commercial transport	Waste water treatment
Health	Information and communication technologies	Waste management
Safety	Gross national product (generated in the quarter / per person)	Biodiversity
Individual mobility	Value of infrastructure	Locality of food resources
Living, houses		

Table 2: Proposed indicators for Smart Cities

To review the progress and to document the successes and the lessons learned, the activities are actively monitored with the help of theSmart City indicator set. The appropriate use of the indicators are compared and evaluated at the neighborhood level for constant monitoring should be checked and reached, compared to the realized Smart City lighthouse projects and subsequently all observation levels (region, city, district, Qzartier, project).

The aim of the evaluation system is the effective management of the Smart City process in the city development and in particular the Smart City Urban Development in the three target areas (Graz center, Mur West and the Graz fair district). Essential part of the monitoring and evaluation system is an annual report with Smart City Graz consisting of a data summary and withan ongoing constant review progress and recommendations for further activities. The main variables are represented by easily readable graphs, with which the tracking of a constant monitoring of the Smart City development is ongoing.

Figure 3 shows the possible representation of the individual parameters in a spider web diagram for the environmental pillar of sustainability for two competing projects (the numbers reflect the progress from now (2011) to the vision state in 2050).

	my project	competing project
air quality	5	11
noise pollution	35	11
water supply	50	50
waste water	35	11
waste management	35	45
biodiversity	12	35
locality of food	40	11
green corridors	25	0
open water	0	11
traffic free zones	25	11
average	26,2	19,6
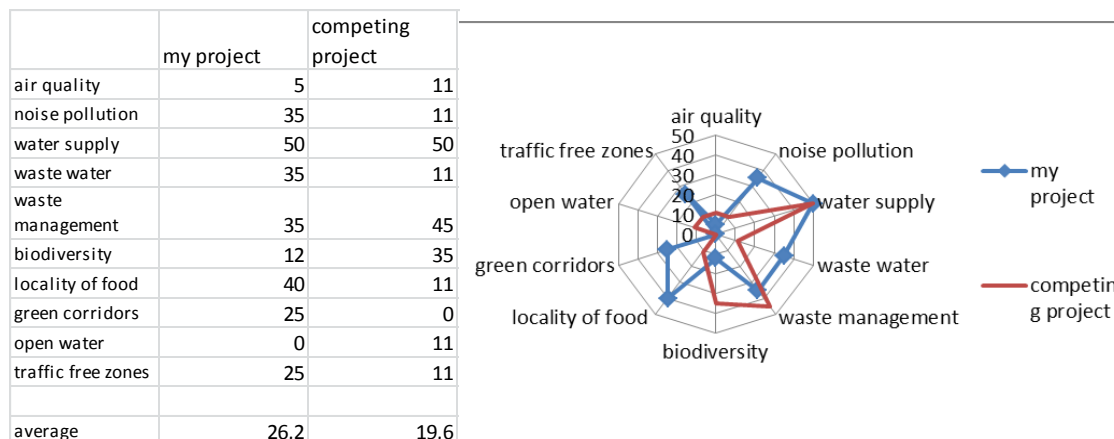
Fig. 3: Spider web diagram for the environmental parameters

Fig. 4 shows the presentation of the three pillars in one diagram. Several projects can be displayed in one graph, so that an easy comparison of various concepts or areas is possible. It can clearly be seen how far the progress towards the vision state of 2050 has been reached by the project.
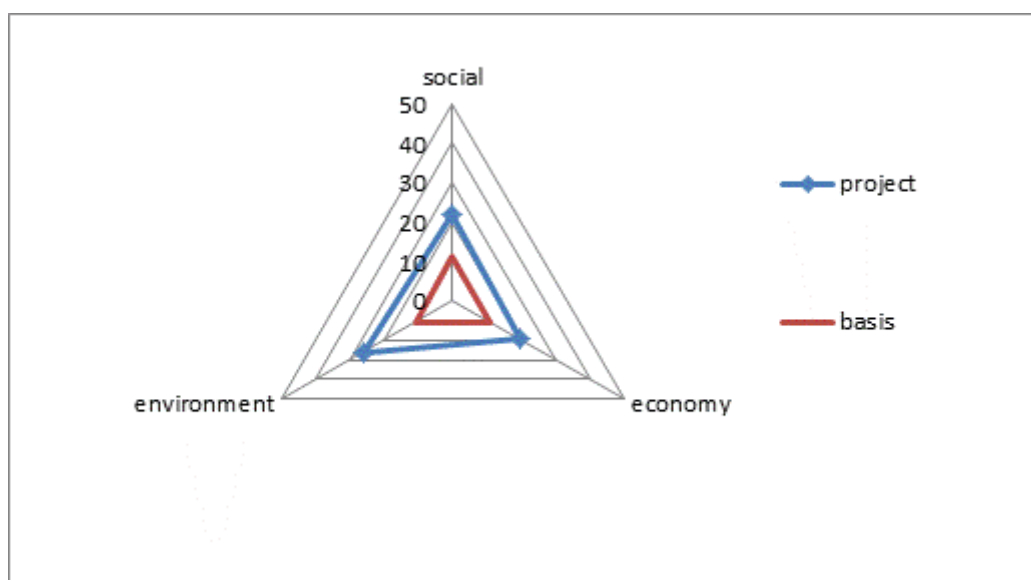
Fig.4: Spider web diagram for the three pillars of sustainability in the Smart City Quarter

As a next step, weightings can be defined for each indicator. As we choose weights between 1 and 10 – a result of a participatory discussion as well – people can define their individual preferences.

	Status 2010	Vision 2050	My quarter / my project	corresponds to value of year 20..	weights
Energy resources	Austria supplies 27% energy from renewable resources	100% renewable energy	80%	39	5
Energy efficiency	average consumption 6000 W / cap	average consumption 1500 W / cap	2000 W	45	2
Mobility	1.5 cars per family	0.3 cars per family	1	26	8
Number of indicators			3		
			result for my quarter	36,7	32,9

Table 3: Examples of indicators with weightings

The resulting value for the project is now lower, since mobility (with a low result) has been weighted stronger than the energy ones.

3   CONCLUSION

It is planned to make the matrix accessible for citizen's trough a web-based systems. We expect that people contribute to new indicators and to new visionary statuses. They are also invited to put weights on the indicators, so that their priorities for an urban development can be seen.

Another objective is to measure the quality of different quarters in the city. People should give their values for the present situation in their living area. From that can be seen, where the most urgent measure to improve the quality of life should be located.

The developed strategies form the basis for the control to reach a "smart and sustainable urban development" in Graz and to speed up the dissemination of the knowledge of good practice and assure the transferability of the results.

Major issue should be the continuous evaluation and further development of the indicators and strategies which will contribute to the transferability to other districts and may also be pursued on citywide level, to integrate smart urban technologies for demonstration purposes and thus to ensure the development of the entire surroundings of the district towards a smart sustainable development.

The Smart City developmentwhich will be developed in Graz consequently will lead to closed-knit networks of cities and common strategies for a variety of topics in the follow-up of the Smart City concept,. International experience exchange through workshops and conferences should be made with the project partner cities.

To achieve the best results, cooperation and partnership cooperation of city and provincial agencies are essential. The province of Styria, and its departments play an important role for the development of good-practice examplesto contribute to the establishment of a Smart City Region. Combined workforce between city, state and federal governments is necessary for the achievemnet of a successful smart urban and regional development is fundamental for the realization of a successful smart urban and sustainably intergral development. Needed for the future is the formulation of a close cooperation and dialogue to set up common goals and to monitor the joint activities.

4   REFERENCES

[1] European Union, The Set -Plan European Strategic Energy Technology Plan,European Commission, Brussels, 2007
[2] Mann D., Hands on Systematic Innovation. Creax Press, Ieper, Belgium, 2002

The Role of Community in Urban Regeneration: Mixed Use Areas Approach in USA

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1 ABSTRACT

The paper intends to investigate how the community involvement in decision planning process could led to successful urban regeneration initiatives.

Starting from the American experience of "smart growth" and going toward the increase of the demand of mixitè in urban settlements, we argue that the involvement of the community could define a mixed approach in decision planning process to support urban regeneration toward more sustainable "supply". Analyzing what meaning the mixed use has acquired, still ambiguous particularly in the US context, where it still represents "the exception, not the rule" (Grant, 2002:79), the core of the paper is to investigate if the community role within the decision making process is a basic and essential factor to assure the quality enhancement of urban regeneration activities.

More in particular, the paper intends to understand the following issues:

- physical interaction vs balance in space and through time of urban transformations
- planning process community-led vs the key factors for successful urban regeneration initiatives
- planning choices vs. functional integration
- the attitudes of local communities officials vs mixed use

Based on some insights coming from the CLUDs project under 7FP Irses 2010, the paper aim at highlighting two USA case studies, Fort Point District in South Boston area (MA), and Jacobs Market Street Village located in Southeastern San Diego (CA). Both of them emblematic case studies on community involvement.

2 INTRODUCTION

The paper drawing from case studies analysis conducted in USA under the CLUDs project – Marie Curie IRSES, intends to demonstrate the connection occurring between successful urban regeneration initiatives and community involvement toward a mixed use of the spatial environment. Particularly, the aim is to investigate if the community role within the decision making process is a basic factor to assure quality enhancement of urban regeneration activities. Urban regeneration has been a concept much discussed in the last years. In particular come authors define urban regeneration as "comprehensive and integrated vision and action which leads to the resolution of urban problems and which seeks to bring about a lasting improvement in the economic, physical, social and environmental of an area that has been subject to change" (Roberts & Sykes, 2000:17). Moreover, according to Turok (2004:111) "urban regeneration process means to change the nature of a place by involving residents and other stakeholders, embracing multiple objectives and activities, with partnership working among different stakeholders".

So that participation and places are linked issues considered part of the process that assumes urban transformations: talking about "community involvement", "civic engagement" or "participatory urban process", here means to investigate how community-led developments drive toward a suitable urban environment. The paper will go through the analysis of community involvement approaches, starting from a general overview of participatory approaches within the policy making process, investigating what community added value is in raising quality standards of urban transformations. Then the community participation in urban regeneration initiatives will be declined through two case sudies analyzed in USA, highlighting the trend toward a mixed use of space under the general umbrella of Smart Growth principles.

3 COMMUNITY INVOLVEMENT OVERVIEW

It is widely recognized the increasing importance of community involvement within planning processes. Participatory urban planning, charette meetings, workshops, laboratories de quartier: more or less cities have

been moving toward this direction since few decades. Then, "current trend toward multi-level governance has created important opportunities for increased community involvement and enhancing local democratic processes" (Bailey, 2010:6) through a wide range of methods used to make people involved within the planning and policy making processes. The reason is that local involvement should be guaranty of efficacy and sustainable initiatives, a chance of being able to create a built environment that satisfy community demands. Nevertheless, the "broad context of community involvement is highly contested" (Bailey, 2010: 13) according to different contexts and belonging to different scales. Arguing that the building of urban identities claim for well-structured civic contents (Talen, 2008 quoted by Vall Casas- Koschinsky- Mendoza, 2011:172), the importance of local community awareness about urban transformation objectives is expected to play a central role. "The results of local visioning/planning efforts are determined by both the preferences of residents and community needs" (Walzer–Hamm, 2010: 154). Moreover, Healey claims for a process of "inclusionary argumentation" in which "participants come together, build understanding and trust among themselves, and develop ownership of the strategy" (Healey, 1997:249).

In USA cities the term "livability" is frequent used: according to Bohl (2002) it "operates at the level of the everyday physical environment and focuses on place making". Particularly, "within the livability arena are both the two-dimensional conceptual aspects emphasized by sustainable development (economy, ecology, and equity) and the three-dimensional aspects of public space, movement systems, and building design. (…) the livability vision expands the sustainability mix to include land use design aspects, ranging down to the micro scale of the block, street, and building, as well as up to the macro scale of the city, metropolis, and region". (Godschalk, 2004:6). Smart Growth and New Urbanism could be considered the general umbrella to which the livability concept refers, since they advocate for participatory planning design and community involvement. To cope with sprawl indeed "the issue is not density, but design, the quality of place, its scale, mix and connections" (Calthorpe – Fulton, 2001:274), all topics that imply sense of place and people awareness of their neighborhood. In North American car-oriented urban contexts, the Smart Growth approach is particularly focused on bridging the gap between urban density and collective transportation. As a matter of facts, retrofitting inner urban brownfield spaces and declined neighbourhoods contributes to preserve urban density, both in economic and financial sense, as concentration of functions and productive activities, and in social sense as sense of community (Calthorpe, 2001). So that, urban areas lacking in mix use functions are often privileged places for retrofitting actions, assuming that "unsustainable urban form could turn into a sustainable place" (Talen, 2011). That is why community participation means reinforcing the possibility of success in regeneration initiatives since "patterns of everyday life not only are mediated in landscapes but are given new meaning as a result of the spontaneous interactions that occur between different people in these places" (Bachin, 2002: 236). Indeed "one of the recurring themes surrounding sustainable cities is the role of public participation and the broader civil society in helping to shape and implement these programs" (K.P Ortney, 2005:1)
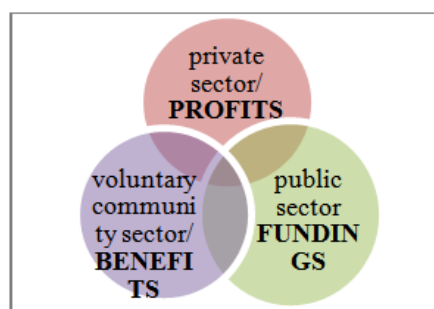
Fig. 1: the specific reasons for participation process in urban regeneration initiatives.

4   URBAN REGENERATION AND COMMUNITY ROLE IN US CITIES

A general trend of "retrofitting suburbia" is strongly pushing forward urban regeneration initiatives that involve people in order to cope with the lack of "sense of place" coming from the sprawl direction of the last decades. The so called "return to center" (Herzog, 2006) implies new way of considering urban space, integrated in functions and meaning to reach that kind of balance that allow to live a sustainable urban landscape. The mixed-use in often the answer, however it's not just about densification, rather it claims for a compromise of weights that a urban environment should take into account.

Case Studies Based On Cluds' Model	Jacobs Market Street Village SAN DIEGO (CALIFORNIA)	Fort Point District BOSTON (MASSACHUSSETS)	Discussions
Brief Description of the case studies	The Jacobs market street village is envisioned as a vibrant community, residential, commercial, and cultural district. The case study is planned and operated by community stakeholders: the goal is to provide residents a direct economic stake in neighborhood change.	Fort Point district historically is a light-industry related area along the Fort Point Channel in South Boston, today it's a mixed use area. It is characterized by a strategic position within the city geography: along the Fort Point Channel, within the Boston Innovation District, a big Economic Development Area attracting enterprises and economies from all the Massachusetts.	The case studies, though located in two different contexts, are linked from Smart Growth Rationale, and balanced by a strong PublicPrivatePartnership with the goal to obtain a more equitable benefits distribution for the whole community.
The mixed use approach in urban regeneration projects	J'sMSV is a mixed use area. It was founded around a transit center, Market Street And Euclid Ave, belonging to the category of Transit Village. The core of the mixed use area is the transit station, redesigned as a public space, which has the important function of being a meeting place for the community, a place for special events. Briefly, JsMSV is a modern version of Greek agora (Bernick-Cervero, 1997:5), and the transit station is also considered the connection with the region.	The planning process is the core of this kind of public-private partnership: public management of private money to rich community advantages. In Fort Point, the urban regeneration is considered in its broad sense, since it involves economic aspects, such as job creations and tax revenues, increasing of property values and advantages location for companies, and also a new urban context vision, with an open spaces system of more than 11 acres pursuing a better quality of life for people who live and work there (affordable housing, sustainable policies).	The main output from case study comparison, is that a strong partnership between public and the private community – led, could generate mixed use of space. Urban contexts assuming a new meaning with the role of catalyst for business and social services, fostering higher quality standards of life.
The role of the communities in urban regeneration initiatives	The community has played a key role in the processes of urban regeneration, indeed the case study could be considered as "pilot case study" for community participation. JsMSVshows the ability of individuals to cooperate with the planning forces for a strategic Joint Action. The participative intention has been crucial for the area, once considered as "food desert": a strong social network, financial resources, adequate planning actions, safe neighborhoods perception, with schools and services, improved development of local resources. Local community in particular represents the real driver of change, under a strong dynamic network that crates a virtual bridge of exchange with other communities. In order to support "community leaders", workshop and *charette* meetings made people working together on common goals, involving residents under common visions, solving problems, and developping action plans. A shared decision-making process to create new opportunities, following a consensus based approach, made residents critical mass in drawing, implementing, and evaluating works, preserving the community identity.	In Fort Point district the participation process has been strongly pursued since the BRA main goal, with planning implementation, was to reach public benefits through private investments. The participatory planning process is particularly important from the beginning to the end of the master plan drawing: *charette* and meetings have been regularly done in order to share the urban regeneration attempt of Fort Point District with the local community and all the main stakeholders. The core strategy is the direct involvement of people, companies and landowners of Fort Point District: each of them participated in different ways to realize this initiative. People, cultural and artist associations, through their sensitiveness and their strong sense of belonging; companies through their know-how and financial capability; landowners through their sense of place; public authorities giving the legal framework to which refer, by preserving the existent but encouraging a medium- long term vision of what it could be.	The comparison shows: in urban regeneration projects the involvment of the community has been crucial for the final outcome; two peculiar approaches, in both technical and sociological terms. The technical approach, related with the charrette meeting tool, means to support "community leaders" to work together on common goals, with the challenge to create new opportunities and functions for the master plan implementation; the sociological one consists in to bringing new economic opportunities, improving quality of lifestyle by creating livable neighborhoods, walkable and friendly, with improved health, education and community safety environment.

Table 1: Case studies insights.

In US we can see as this trend is increasingly involving private actors within the planning process, shifting toward a decentralized planning system in which local actors and stakeholders play a crucial role. Frequently, private organizations and planning consultants are hired from public – private coalitions to shape the vision of the future development of cities, or redevelopment, while addressing choices toward a consensus- based approach (McCann, 2001). So that the product is a sort of collaborative planning process

through meetings in which community representatives and local actors have a proactive role in shaping urban development, often institutional places of political struggle to affirm a kind of urban growth instrumental to political choices. As suggested by McCann (2001) the increase in privatization due to the reduced economic resources is improving a sort of lack of accountability of planning services with a wider popular critique of bureaucracy "in favor of a rhetoric in bottom up policy making" so that "urban policy is increasingly left in the hands of corporate-supported organizations" (MacCann, 2001:209) while no profits keep growing. Their role is increasingly gaining the ground in guiding people toward a right lifestyle, since a livable neighborhood is becoming a health related issue. Pedestrian and friendly environments are desirable actions to be pursued in urban regeneration initiatives in most of US cities affected by sprawl phenomenon: community acknowledgement here is a key factor to gain higher standards of urban environment, since the consensus allows to implement those actions easily. In some cases community involvement does not refer to a specific project or master plan, rather it is a mean to sensitize people toward a particular health issue: they are made aware of risks and possibility to be considered with respect to sustainability in urban regeneration initiatives or about gaps to be filled in order to reach higher standards of quality of life.

Then, in suburban landscapes these actions assume the role of physical identity restoration by taking into account the importance of the sense of community (Calthorpe 1993, Calthorpe and Fulton 2001). The outcome is twofold: on one hand social and health related organizations give strength to the social component of the planning process, addressing people to consider the city as a place they have to care of; on the other hand the community participation, oriented from private actors, sometimes seems to be politically influenced toward a decision. Otherwise, studies about community participation show how the more a community is represented by people with high level of culture, with a personal perspective about their neighborhood, the less this kind of guide is determinant for the final outcomes. With respect to the issue they want to face, government acts directly by providing grants or incentives for specific health programs in which no profit organizations are mediators between public and private actors (stakeholders) to teach communities which kind of built environment they should pretend to live in. Particularly, these programs are strongly linked with the spatial outcome they look for, mostly oriented toward mixed-use neighborhoods, to cope with urban sprawl for example, less car oriented rather pedestrian and bicycle enhancers. Consequently, although physical solutions do not allow to solve social and economic problems of communities (Leccese&McCormick, 2000) a supportive urban framework could address the right way to cope with those issues. Moreover, Bachin (2002:237) suggests that "the physical spaces of neighborhood may both encourage and impede the formation of community connectedness and also how the process by which neighbors relate to the physical space around them has implications for their ability to transcend economic, racial, ethnic, class, or religious boundaries". Generally the aim is to create more informed and engaged communities increasing the physical places where people can participate in and lead change following a inclusionary but also proactive approach.

5   CONCLUSION

David Harvey (1989:12) said that cities need to "keep ahead of the game [by] engendering leap-frogging innovations in life-styles, cultural forms, products, and service mixes… if they are to survive." This was a radical change, since it is about lifestyle, not life referred just to environment or air pollutions.

Assuming that spatial transformations inexorably affect social behaviors and cultural values, drawing from evidences of urban low density area characterized by isolation and lack of sense of place, it could be stated that physical interaction among different functions, enhancing a mix of uses and a compact urban environment, improve the achievement of balance in urban contexts previously characterized by strongly separation of functions. Community involvement is about inclusiveness, as far as procedures, transparency, as far as government transactions, accountability of planners to the citizens they work for: to cope with socio-economic inequality, sharing information, giving accessibility to knowledge. Then, the participation process is a way to strengthen a sense of "belonging to" that has to be preserved and enhanced because "The sense of community is formed and sustained over shared resources" (Perdikogianni , 2007:3).
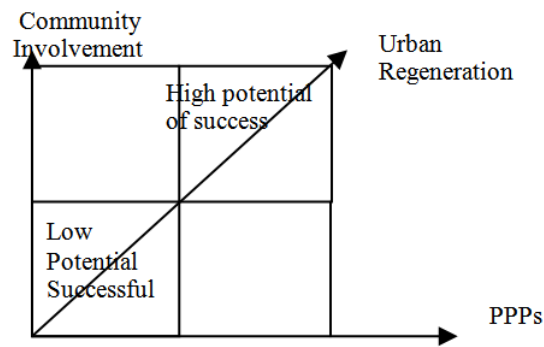
Fig. 2: Community involvement and Public-Private Partnerships relations in implementing successful urban regeneration initiatives.

Drawing from case study evidences we might suggest a strong connection between community planning and urban regeneration initiatives, both fostered by public-private partnerships, in many context the first box of the second one. PPPs act as facilitators for making process decision in urban planning process in general and in urban regeneration initiatives in particular. Within already developed areas, characterized by a blighted built environment, urban regeneration implies community involvement, stakeholders participation, to successful overcome their status of decay; as far as new development areas, community involvement within the policy making process could improve the efficacy of planning implementation, following a consensus based approach. Local experiences of this kind show an empirical relationship between people attachment to place and local economic growth. So that it can be stated that in those particular cases social involvement affects spatial dimension and economic development: urban functions once separated gain a mixing use meaning that allows having healthier urban environments and local economic development. Moreover, the more community are linked each others, under a common network, the more they generate a virtuous circle of positive values and knowledge sharing.

6 REFERENCES

BACHIN, Robin: City Building as Community Building: Re-visioning Planning History. Journal of Planning History , Vol.1, Issue 3, pp. 235-239. 2002.

BAILEY, Nick: Understanding community empowerment in urban regeneration and planning in England: putting policy and practice in context. Planning, Practice & Research , Vol. 25, Issue 3, pp. 317-332. 2010.

BOHL, Charles C., SCHWANKE, Dean : Place making: developing town centers, main streets, and urban villages. Urban Land Institute. Washington DC, 2002.

CALTHORPE, Peter, FULTON, William: The regional city. Island Press, pp.279-285. 2001.

CALTHORPE Peter.: The Next American Metropolis. Ecology, Community, and the American Dream. Princeton Architectural Press. New York, 1993.

FIORINA, Morris P: Extreme voices: A dark side of civic engagement. Civic engagement in American democracy, Vol.395, pp. 405-413. 1999.

GODSCHALK, David R.: Land use planning challenges: coping with conflicts in vision of sustainable development and livable communities. Journal of the American Planning Association, Vol. 70, Issue 1, pp 5-13. Winter, 2004.

GRANT, Jill: Mixed use in theory and practice: Canadian experience with implementing a planning principle. Journal of the American Planning Association, Vol. 68, Issue 1, pp. 71-84. 2002.

HARVEY, David. From managerialism to entrepreneurialism: the transformation in urban governance in late capitalism. Geografiska Annaler. Series B. Human Geography, Vol. 71 b, Issue 1, pp.3-17. 1989.

HEALEY, Patsy: Collaborative Planning: Shaping Places in Fragmented Societies. University of British Columbia Press. London,1997.

HERZOG, Lawrence A: Return to the Center: Culture, Public Space, and City-Building in a Global Era. University of Texas Press. 2006.

LECCESE, Michael, MCCORMICK, Kathleen: Charter of the new urbanism. McGraw-Hill Professional. 2000.

MCCANN, Eugene J: Collaborative Visioning or Urban Planning as Therapy? The Politics of Public-Private Policy Making. The Professional Geographer, Vol. 53, Issue 2, pp. 207-218. 2004.

PERDIKOGIANNI, Irini: From space to place: the role of space and experience in the construction of place. The Barlett School of Graduate Studies, UCL. Istanbul, 2007

PORTNEY, Kent: Civic Engagement and sustainable cities in the U.S. Public Administration Review, Vol. 65, Issue 5, pp. 579-591. September/October, 2005.

SYKES, Hugh, ROBERTS Peter: Urban regeneration: a handbook. Sage Publications Limited. 1999.

TALEN, E.: Sprawl retrofit: sustainable urban form in unsustainable places. Environment and Planning B: Planning and Design Vol. 38, Issue 6, pp 952-978. 2011

TUROK, Ivan: Cities, regions and competitiveness. Regional Studies Vol. 3, Issue 9, pp.1069-1083. 2004

VALL-CASAS, Pere, KOSCHINSKY Julia, MENDOZA Carmen: Retrofitting suburbia through pre-urban patterns: Introducing a European perspective. Urban Design International, Vol 16, Issue 3 pp.171-187. 2011.

WALZER , Norman, Gisele F. HAMM: Community visioning programs: processes and outcomes. Community Development, Vol. 41, Issue 2, pp. 152-155. April-June, 2010.

Underground Space – Lost Space Ready to be Reclaimed

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1 ABSTRACT

'Lost spaces' can become interesting experimental areas within the urban fabric of cities. An example of this are former inner city docks that provide numerous opportunities for new uses and activities. Can lost spaces add to a city's diversity and also be part of social initiatives that lead to new social structures?

Apart from this question, the authors will be looking at a vast area of lost space, namely the space which exists underneath cities and is often overlooked. In the event that it is acknowledged as a part of the urban fabric, it is often seen as an urban service level, the space where we place the utilities. Those functions which we rather not have on the surface are readily placed below the surface. The authors will provide an overview of cases that demonstrate this, but will also propose a radically new approach which questions the wisdom of this choice.

This new approach is to see underground space not as lost space but as a valuable societal asset which can be integrated into the urban fabric and used in various ways. The value for society is that it provides new and additional spaces that actually compliment or further enhance livability on the surface. This can play a key role in common day urbanism based on density and mixed-use.

We will reveal that just like lost spaces in cities, underground spaces are unappreciated and often misjudged in terms of their potential. But just as with lost spaces, there are citizen initiatives which unlock the potential of underground spaces. The Lowline project in New York is a prime example of this (figure 1). The concept involves reusing a former, now disused underground tramway depot and unlocking its potential as a new public space in form of an underground park.

Figure 1: artist impression of the Lowline NYC (US), courtesy of RAAD Studio

The main difference between underground space and surface development is that below the surface there are no open spaces by definition. In a sense all spaces between underground developments are lost by definition. It means that any development should take this into account and contribute to creating connections and thereby public spaces. This requires not only planning but also management of underground space. The authors argue that just understanding the potential of underground space is not enough. The actual development will require a spatial dialogue between many stakeholders, including planners, engineers, developers and public decision makers. The extensive use of underground space beneath the City of Helsinki was achieved in this way: the creative reuse of former civil defense shelters, connecting them and planning future uses based on sound geological expertise.

Although unlocking the potential of underground lost spaces may seem daunting, the potential rewards for society are enormous. Many cities are struggling to cope with the ever increasing demands on space. Underground space can provide an interesting answer and should really be a standard component of modern urban planning.

2   LOST SPACES: THE CASE OF INNER CITY DOCKS

Inner city docks can become industrial wastelands when they lose their original function. They often influence the urban landscape surrounding them negatively as many examples worldwide illustrate. Revitalizing these areas can be a major challenge. In the city of Rotterdam a former inner city dock was reused in an innovative way. After closing off the dock from the river and pumping out the water, the space which was lost under water was reclaimed. A waste water treatment plant was then built in that reclaimed space. After completion the plant was covered and a city park scape created (figure 2a and 2b). This allowed for further urban development in an area which would have lost all its attractiveness had the plant been built on the surface (Cornaro & Admiraal).

Figure 2a and 2b: Dokhaven redevelopment Rotterdam (NL) before and after completion

In the same city, part of a former rail road yard was redeveloped into an urban farm. The farm produces not only for its own restaurant and shop but also supplies local restaurants and bakers. The urban farm itself attracts customers and serves as an information center on urban farming and on how citizens can become part of an initiative which focusses on creating awareness amongst citizens to seize the initiative and accept responsibility for greening their city (Pötz & Bleuzé). In this way, what at first was a simple initiative to reuse a, for all intent and purposes lost space, suddenly becomes a campaign for new social initiatives and creation of new social structures over time. Part of the success was using crowd funding to acquire the capital needed for the project and to create special advantages for those that contributed like special menus and seating in the restaurant.

The authors emphasize both these examples to underline the potential of what can happen if the concept of underground space is seen as an opportunity to reclaim lost spaces and to create opportunities for civic ecology practices (Krasny and Tidball). It requires us first to accept the concept of underground space, but also to look past that concept in terms of just using it as an urban basement or service level.

3   OUT OF SIGHT – OUT OF MIND

The concept of underground space is not new. It has been around for a long time and looked at from an abstract level as part of mankind's choice in terms of shelter: the cave or the tent. The cave is seen as synonymous for underground space: mankind creating modern day caves and in that way reclaiming lost spaces. Historical examples are the 'Yaodongs' in China, which were already being used before the start of the Common Era and are still in use today (figure 3). They provide shelter against the harsh environment on the surface. The Yaodong is of interest from a conceptual point because it demonstrates the concept of opening up underground space to the surface.

Although these historic examples are well known, it wasn't until the 19th century that engineers started thinking about building tunnels as part of the evolving railway networks. This made it possible to also start thinking about underground railway lines, thus the metro was born. But along with the idea of using underground space for these large conduits carrying trains and passengers, the underground space also proved an effective way of hiding what we didn't want to see on the surface. The Paris Sewers created by Hausmann are a good example of this. In many cities, by the beginning of the 20th Century, chaos was reigning in the underground space through uncoordinated use of it for utilities. By using underground space as an urban service layer, the concept of opening up underground space was lost as well. It was as if underground space was disconnected from the surface and became lost space. It was out of sight and out of mind.

The question which this raises is whether the concept of underground space is so limited that it can only be seen as the ultimate urban service level?

Figure 3: example of a Yaodong, China

4 A NEW APPROACH: OPENING UP UNDERGROUND SPACE

We have shown that the use of underground space evolved through the work of pioneers, exploring this vast lost space beneath cities. Their approach was to develop in a way that was for the larger part disconnected from surface activities. In a publication by the Government Planning Agency of the Netherlands in 2000, underground space was litterally portrayed as the final frontier (RPD, 2001). This comparison was not far from the truth in that in many cases underground space is used on a first come, first served basis. The first to stake his claim can use underground space irrespective of the question whether this is advantageous to society or not. Although the use is seemingly disconnected, at certain points, connections are made   in the case of underground metro lines, the staircases provide access to underground platforms or stations. But imagine if once again we could open up the underground space in such a way that it would be integrated into the urban fabric without citizens consciously thinking about whether they are above or underground. That is precisely what the next two examples propose.

4.1 New York City, Lower Eastside, the Lowline

Krasny and Tidball write about civic ecology practices as: "(…) self-organized stewardship initiatives, often taking place in cities". The Lowline project is an example of such an initiative. It is about pioneers who discover a lost space below the Lower Eastside of New York City. This lost space consists of a structure which extends three blocks and was used until 1948 as a station and balloon loop for streetcars. It has ceilings which are 6 meters high. The core idea of the Lowline is to become the inverse of the High Line initiative. The High Line is a former elevated railway line running through New York City and has been successfully transformed to an elevated linear park stretching over thirty city blocks. It provides the city with much needed public space but also has attracted flora and fauna amongst which endangered species as the Monarch butterfly. The Lowline is proposed to become an underground park by opening up parts of the structure to the surface allowing daylight to enter (see also figure 1). The founders see it as an invaluable public green space, providing the city with what it lacks: open public spaces where people can meet and relax. From a conceptual point of view this is a perfect example not only of reclaiming lost space, but also of how to integrate underground spaces into the urban fabric and how to use these spaces to strengthen social structures through creating places that people can share and where people can meet.

4.2 Osmose, the Paris metro station of the future

In a study commissioned by the Paris Transport Authority RATP, one of the proposals called for a new concept for an underground metro station. By literally opening up the underground to the surface on a grand scale, slopes are created which can perform various uses. These range from just relaxing and enjoying the surroundings to watching movies on a big screen. A density is created focused on a transport hub, but in such a way that quality is achieved and multi-functions are created. In this proposal what in reality often is a

mono-functional hidden and lost space, was dramatically transformed and integrated into the urban fabric and reclaimed for the city to use and enjoy (figure 4a and 4b).
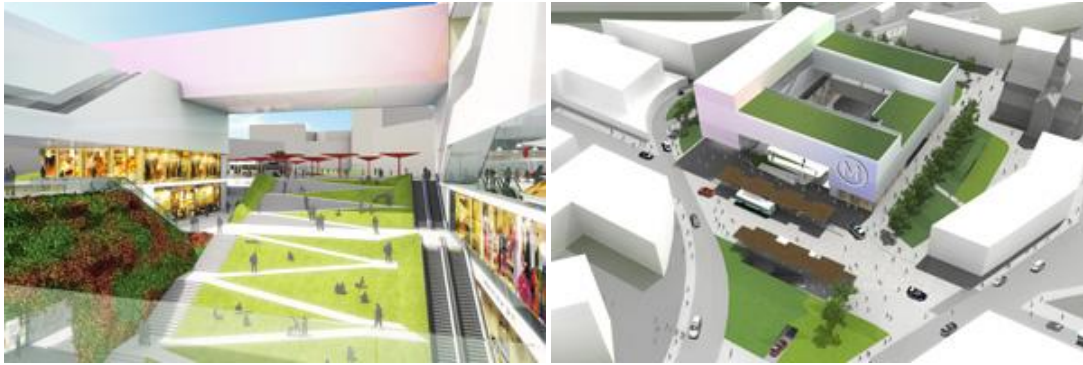
Figure 4a and 4b: Open Air Metro Project Paris (F), courtesy of Foreign Office Architects

5 APPRECIATING, PLANNING AND MANAGING

Appreciating the possibilities of underground space is just one step. The earlier mentioned concept of shelter illustrates this: tents can be placed, caves have to be created. The use of the underground space asks for an understanding of the geology and other factors which determine the possibilities from an engineering point of view. Underground space use also asks for an understanding of its possibilities. The first come first served strategy could prove to be disastrous in the long term. Not planning it will prove to be non-sustainable. Using underground space from an energy perspective (geothermal applications) can in itself lead to an exploitation that inhibits further use from a space perspective. The authors would like to stress that only through a spatial dialogue on the use of underground space between all parties involved, will it be possible to decide its best long term use.

This is further illustrated by the zoning plan shown in figure 5. As the city planners conserve areas for storage of hot and cold water as part of hot-cold extraction schemes, other uses of underground space are ruled out. This could hold true for a larger part of underground space or just one layer, depending on the consistency of the water carrying layers.
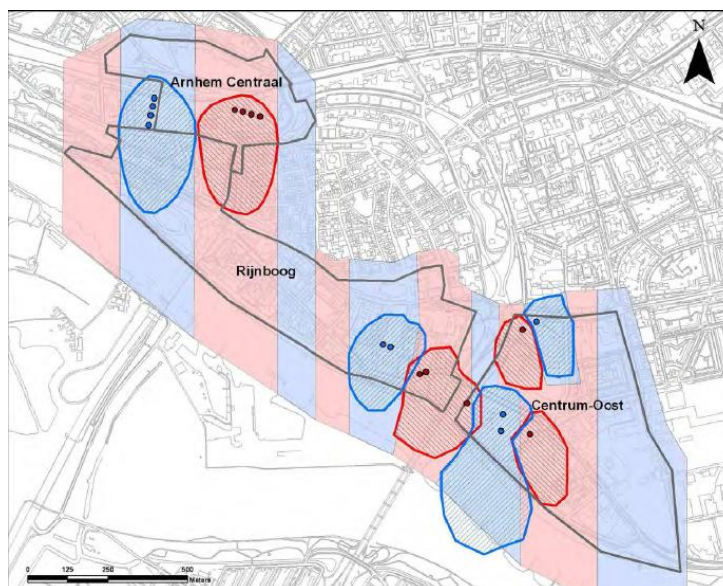
Figure 5: underground zoning plan showing hot and cold zones for water storage schemes, City of Arnhem (NL)

The City of Helsinki is one of the few cities in the world that actually has an Underground Space Master Plan. The plan itself was driven by both the geology and existing structures. Large underground nuclear shelters were identified for reuse as car parks but also as a swimming pool (figure 6). The geology identified other areas for future spatial use, making it possible to connect facilities underground. Building underground metro lines provided excavated material which was reused by the city to backfill old docks and redevelop these into new waterfront properties. Helsinki clearly illustrates that to plan underground space one needs to know underground space in terms of its geology and understand the opportunities this gives.

Figure 6: Itäkeskus Swimming Pool, Helsinki (FI)

Planning the use of underground space from a wider perspective is paramount to the sustainable development of underground space. But in itself it's not enough. Underground space also needs to be actively managed because of the various resources that it contains, space being just one of those. Although most of underground space might be seen as lost space, it contains an enormous potential for cities if planned and managed in the right way. Not doing so will ultimately result in chaos and prevent future development and use.

6 CONCLUSION

The authors have shown that in terms of lost space, underground space can be taken to be a prime example of space lost to society. But just as lost spaces on the surface can be transformed, the same can be achieved below the surface with often surprising results. Integrating underground space into the urban fabric is a challenge which, when met, will provide spatial quality to a city. This cannot be achieved by just looking at underground space as a segregated urban service level. Planning and managing underground space is key to its sustainable development and ultimately providing the city with those spaces it desperately needs, but cannot provide at the surface.

7 REFERENCES

Cornaro Antonia & Admiraal, Han (2012). Changing World – Major Challenges: the Need for Underground Space Planning. Proceedings 48th ISOCARP congress, Perm 2012.
Krasny, Marianne E. & Tidball, Keith G. (2012). Civic ecology: a pathway for Earth Stewardship in cities. Published online by the Ecological Society of America. Doi: 10.1890/110230.
Pötz, Hiltrud & Bleuzé, Pierre (2012). Urban green-blue grids for sustainable and dynamic cities. Coop for Life, Delft, ISBN 978-90-818804-0-4.
RPD (2001). Ruimtelijke Verkenningen 2000. Het belang van een goede ondergrond. Rijksplanologische Dienst. (In Dutch).

Urban Agriculture: How to Create a Natural Connection between the Urban and Rural Environment in Almere Oosterwold (NL)

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1 ABSTRACT

Growing concerns about food prices, food security and the sustainability of the contemporary agri-food system reluctantly places food worldwide on the agendas of the authorities. It is emphasised that a re-integration of food(-production) in the urban system could mutually contribute to the sustainability of cities and agriculture. In highly urbanised countries like The Netherlands food production is a nearly exclusive rural issue, leading to a sharp boundary between the rural and urban environment. Is it possible to re-integrate agriculture, food production, in the urban system and if so what wil be the added value and how can it sustain in an urban environment?

We introduce the Dutch city of Almere, a fast growing city with 190,000 inhabitants 30 km Northeast of Amsterdam. Part of the cities' expansion plans is the transformation of approximately 4,000 ha polder area into a rural-urban fringe with a fixed amount of urban agriculture (50 %), housing (30 %), infrastructure and ditches and public green (20 %). This transformation should occur over the next 20 years through so called organic urban growth in which future inhabitants are evoked to create their own house, estate, neighbourhood, urban farm or enterprise. The development strategy titled "Almere Oosterwold: Estate for Initiatives" is a revolution in Dutch urban planning as it steps away from the current governmental dictate and top down planning. Almere Oosterwold is also a revolution in Dutch urban planning because of the pivotal position of food production -urban agriculture- in the plan. The idea is that world market oriented agriculture in the polder will alternate over the next 20 years to urban oriented agriculture.

We were challenged by the municipality of Almere to support them with elaborating strategies for the development of urban agriculture in Almere Oosterwold. We started with distinguishing the potential features of future urban agriculture in this area. Then these potential features were compared to current urban agricultural initiatives and enterprises in the Netherlands, leading to 12 types of urban agriculture. Subsequently, these 12 types of urban agriculture were detailed in requirements for development, like minimum size, needed infrastructure and legislation. Then we explored the opportunities and threats of developing these types in a rural-urban setting like Almere Oosterwold. Finally, the challenge was rendered to the municipality in a recommendation in which, zoning, pioneering and connecting were highlighted as the key elements of the development of urban agriculture in this area.

In the zoning strategy it crucial to prevent the change of land from urban agricultural use towards other uses, because urban agriculture is still an economically weaker function than housing, recreation or industry. Developing a trust in which the urban agricultural land is accommodated could be a strategy to prevent agricultural land to future urban sprawl. Because of the pivotal role of the urban agriculture on one hand and the lack of familiarity with it on the other hand, it is advised to provide pioneers with free space to experiment and improve. To coordinate and facilitate this free space the municipality should appoint an area manager. The access to the process of experimenting and improving provides the area manager (and the municipality) with new instruments (and rules) which support to conduct the development of this area. The pioneer space also can inspire newcomers. The transition of the environment subsequently will follow the path of both zoning and pioneering. Essential is that Almere Oosterwold from its foundation inextricably is connected to the city, physically as well as mentally, through infrastructure, and produce stream, and in the communication. This not only will be a responsibility of the municipality but of all stakeholders in the area.

2 INTRODUCTION

2.1 Urbanisation and agriculture; from distinct poles towards a re-union

In a highly urbanised country like The Netherlands there is a tendency towards a sharp delineation between the urban and rural environments. To some extent this sharp delineation has been the result of a strict (post

WWII) zoning policy (Koomen et al., 2008). The goal of this policy is to keep the landscape open and undeveloped, to limit travel distance and to support amenities (Van Remmen and van der Burg, 2008). This policy is fuelled by the fact that The Netherlands have to handle a relatively heavy urbanisation pressure; on the 3,4 million ha land, nearly 17 million people dwell, work, recreate and commute. The strict zoning policy has led to scarce space to develop which resulted in large price differences between land designated for housing, recreation or infrastructure and land designated for nature conservation or agricultural purposes (Cotteleer et al., 2007). As a consequence, when areas are labelled for (future) urban sprawl, the weaker economic functions like agriculture are pushed aside in favour of the stronger economic functions like housing and industry (Visser et al., 2009). This makes agricultural land, especially in the urban fringe, hard to safeguard from urbanisation, even as its values are appreciated (Koomen et al., 2008). Nevertheless, the Dutch policy of strict zoning and clustered urbanisation is regarded as successful because it leaves a decreasing, but still substantial, area for agriculture. In 2012 still 68 % of the land is in agricultural use (15 % for cities and infrastructure allotting 17 % for nature and recreation), leaving the floor for the Dutch Agro-food complex to act as second player at the global market (PBL, 2012; Berkhout et al., 2011).

The strict Dutch zoning policy has its drawback. A complete segregation of agriculture and urban development emerges, quite often even enshrined in physical planning theory and practice (Van der Schans and Wiskerke, 2012: 247). This segregation amplifies the already growing mental and physical distance between the city and its agriculture hinterland (Visser et al., 2009: 186). Where urban-rural linkages growing extinct, cities become increasingly dependent on the (global) Agro-food complex (Sonnino, 2009). A typical meal travels 3,000 km from farm to fork in the Western countries (Pearce, 2006). In the Netherlands food consumption accounts for one third of the national Greenhouse Gas emissions, partly due to these food miles (Vringer et al., 2010). Growing concerns about peak oil, food prices, food security and the sustainability of the contemporary global Agro-food complex discards a shade on the segregation between the urban and rural environment (Morgan and Sonnino, 2010; Ilieva, 2013).

We discussed that strict Dutch zoning policies have been safeguarding farm land from urbanisation. However, this policy combined with the development of a global Agri-food complex also has been leading to segregation between the urban and rural world. Recent urban interest in regional food policies could put farming in the peri-urban area in another daylight (Zasada, 2011). Peri-urban farming already differentiated or diversified to some extent their economic activities in the Netherlands over the past years to meet the urban interest (Van der Schans, 2010). However, peri-urban farms still have to compete with strong economic factors like housing, leisure and business & industry development. The question is whether a peri-urban (planning) policy could stimulate the development of these differentiated or diversified farms in the peri-urban zone and at the same time could protect farming against (future) urban sprawl. Based on two cases in Provence and Tuscany Perrin (2012) concludes that farmland protection in peri-urban areas is more effective when top-down policies are connected with bottom-up initiatives. In his literature review Zasada (2011:646) concludes that the peri-urban area needs to be recognised as an individual policy arena to overcome the rural-urban divide and strengthen urban-rural relationships. This stresses that a policy focused at the peri-urban area is needed to develop peri-urban farm activities.

In this paper we introduce the case of Almere Oosterwold (NL) where the transition of world market oriented farming towards diversified or multifunctional (peri-) urban farming is intended by the municipality of Almere (190.000 inhabitants). This transition should take place over the next 20 years in an area of approximately 4.000 ha east of the city boundaries. Starting point is an open polder landscape where 50 arable and dairy farms have been producing for the world market and where diversified farming activities are lacking. How to build a new diversified peri-urban landscape when bottom-up initiatives in peri-urban agriculture are nearly absent? What should a peri-urban policy arena in Almere Oosterwold look like? We argue that only a change in zoning policy is not enough to transform the features of this area. Because of the pivotal role of (peri-) urban agriculture in this area and the lack of familiarity with it, the city should develop a policy plan with three central issues: land ownership, pioneering with multifunctional urban and peri-urban agriculture, and physically and mentally connecting the area with the city.

Before starting with the case of Almere Oosterwold we will discuss urban agriculture, because of its key role in this case.

2.2 (Peri-)Urban Agriculture: definition

The concept of '(peri-)urban agriculture' knows many definitions, with differences regarding the activities it entails, what is being produced, the place where the activities occur, who is involved, and whether the activities are public or not (Mougeot, 2000; Veen et al., 2012). What most scholars agree about, however, is that urban agriculture is different from and complementary to the current rural agriculture: the lead feature of [urban agriculture] which distinguishes it from rural agriculture is its integration into the urban economic and ecological system (Mougeot 2000:9). It is not its (peri-)urban location which distinguishes urban agriculture from rural agriculture. Van Veenhuizen and Danso (2007:6) deduce, referring to Mougeot (2000), that the most important distinguishing feature of urban agriculture is that it is an integral part of the urban economic, social and ecological system. It depends on typical urban resources, competing for land and water with other urban functions, influenced by urban policies and plans, and contributes to urban social and economic development (Van Veenhuizen and Danso, 2007). Hence, urban agriculture uses resources, products and services found in and around the city and supplies resources, products and services for local consumption in return (de Zeeuw et al., 2011).

In this paper we define urban agriculture as Mougeot (2000:10) does:

UA [Urban agriculture] is an industry located within (intra-urban) or on the fringe (peri-urban) of a town, a city or a metropolis, which grows or raises, processes and distributes a diversity of food and non-food products, (re-)using largely human and material resources, products and services found in and around that urban area, and in turn supplying human and material resources, products and services largely to that urban area.

2.3 (Peri-)Urban Agriculture in planning

'Politicians and planners are faced with many competing claims for the use of scarce land in and around cities in industrialized countries' (Deelstra et al., 2001: 1). As argued before, this specifically holds for the Netherlands, where population density is high. When land is scarce, it pays off to combine several functions. That way various demands can be satisfied at once (Deelstra et al., 2001). Therefore it is important for (Peri-) urban planners to find complementary uses of land, creating win-win situations (Campbell, 1996). (Peri-) Urban agriculture could offer these complementary uses because it combines functions. It not only provides urban society with fresh food at short distance, but in the Netherlands it combines this with societal functions like education, recreation or care (Van der Schans, 2010). More importantly, growing food inside or in the vicinity of the city is itself associated with benefits for society. Hence, food production is multifunctional in nature: it links to public health, environment and social justice (Morgan, 2009). Agriculture is therefore an effective tool to make productive use of urban open spaces (Mougeot, 2000). Moreover, there is a reasonable demand among urban public for multiple functions and value from farming (Zasada, 2011: 646).

(Peri-) Urban agriculture, however, is largely ignored in urban and regional planning (Taylor Lovell, 2010). This holds for the Netherlands too (Van der Schans, 2010). One of the reasons is that urban agriculture does not have an institutional home. The obvious home of urban agriculture should be the Ministry of agriculture but this ministry may lack the political mandate for urban agriculture. In the Netherlands spatial and urban planning is part of the ministry responsible for housing and spatial planning. The focus of this ministry is urban development city development, whereas agriculture, conservation and landscape development is the responsibility of the Ministry of agriculture. However, the focus of the national spatial planning is changing. Spatial planning is partly handed towards local authorities, providing them more freedom to facilitate local spatial developments (Koomen et al., 2008). This act leaves the floor, to a certain extent, to cities to develop their own spatial and urban planning, which may open the door to (peri-) urban agriculture.

This is the moment to introduce the Dutch city of Almere, a city where local authorities embraced this freedom in developing its own spatial development plan: Almere 2.0 (Almere, 2009). A plan in which it involved (peri-) urban agriculture as part of a new area: Almere Oosterwold.

In the chapter 3 we briefly introduce Almere and then make a step towards Almere Oosterwold.

3 CASE OF ALMERE OOSTERWOLD

Almere is the youngest city of the Netherlands and is located in the province of Flevoland, 30 km east of Amsterdam (figure 1). Planned in the early 1970s on land reclaimed from the sea at the Western edge of the

latest IJselmeerpolder, the layout and design of this suburban city is completely different from other Dutch cities (Roorda et al,. 2011). The original poly-nuclear design of Almere, inspired by the English garden cities of Ebenezer Howard, is unique in the Netherlands (Remmers, 2011). Almere consists of a city centre surrounded by several satellite towns, with large forests, parks, canals and ponds between them (Jansma and Visser, 2011). The original development plans for Almere started from a clear design hierarchy that put landscape above the urban districts, meaning that the green landscape shaped the framework for the lay out of the city districts (Roorda et al., 2011: 66). The large green spaces between its urban nodes were meant to facilitate the connection of agriculture and nature with urban life (Zalm and Oosterhoff, 2010). Almere has grown from zero inhabitants in 1975 to 190.000 inhabitants in 2010 (Remmers, 2011). In its eagerness to grow residential expansion took over the agenda leaving less space for the development of the landscape and open-space (Ilieva, 2013). However, Almere is still this poly-nuclear city with much more green and blue within its borders than average Dutch cities. 80 % of the total surface of Almere is water, woodlands, parks or nature reserve (Almere, 2006). Although part of its origional lay out, urban agriculture was never developed properly, aside from one commercial city farm in the city's fringe (Dekking et al., 2007; Remmers, 2011).

Because of the growing need for new housing in the Amsterdam and Utrecht areas and the absence of locations on the 'old' land, Almere is expected to expand to 350,000 inhabitants by 2030 (Almere, 2009) This expansion, organised by the Almere 2.0 program in which the city cooperates with national and local partners, is part of a national task to reconstruct the Dutch North Metropolis area (Amsterdam-Almere-Utrecht). In anticipation to this Almere 2.0 program, the city introduced the seven Almere Principles: cultivate diversity, connect place and context, combine city and nature, anticipate change, continue innovation, design healthy systems and empower people to make the city (Almere, 2008). The Almere Principles are a result of a close collaboration between Almere and William Mc Donough (the Cradle to Cradle approach). They are intiated by an ambitious aldermen responsible for the Almere 2.0 plan (Jansma and Visser, 2011). These Principles (Figure 2) were developed to direct the city to a sustainable development, as well as support the retrieval of the city's identity, i.e. developing a peoples' city (Remmers, 2011). Almere coined urban farming as one of the vehicles to achieve these ambitions (Remmers, 2011). Moreover, it is the city's desire to produce 10 % of its food locally by the year 2030 (Almere, 2009; Jansma et al., 2012).
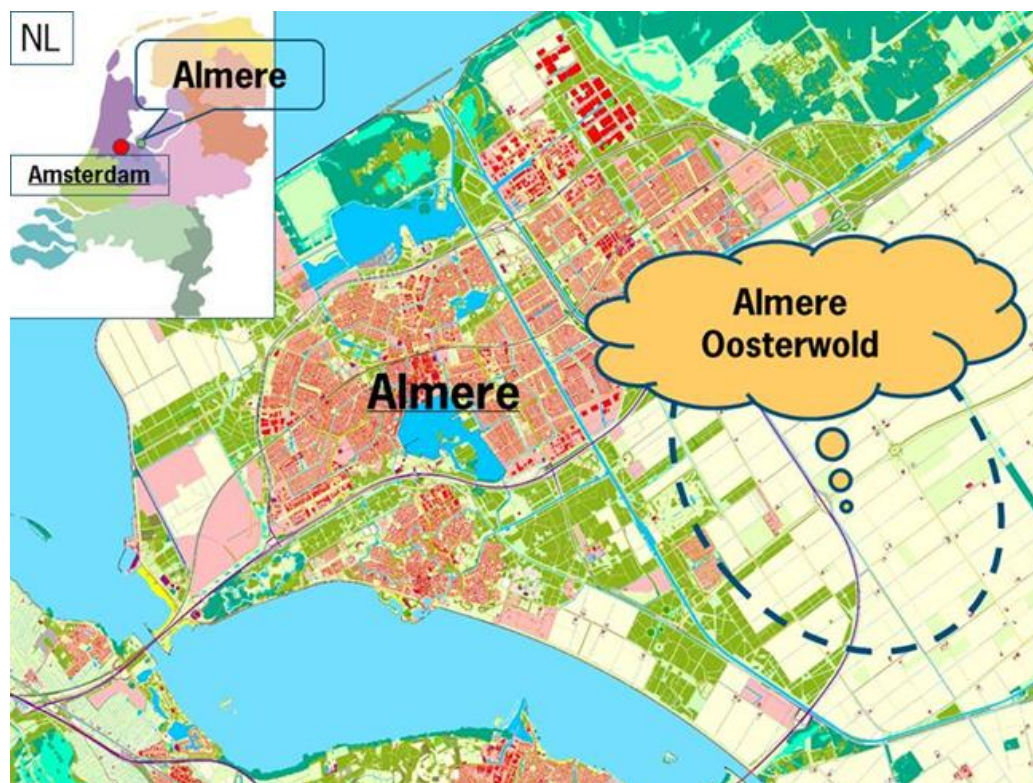

Figure 1. Almere is a new town in the Dutch province of Flevoland with 190,000 inhabitants (2010). As part of its expansion plans, 15,000 new houses on approximately 4,000 ha are planned east of the city: Almere Oosterwold.

Part of the Almere 2.0 program is the transformation of approximately 4,000 ha polder area into a rural-urban fringe with a fixed minimum amount of urban agriculture (50 %) producing for the regional market (Almere, 2012). The remainder is available for housing (30 %) and infrastructure, ditches and public green (20 %). The city's ambition is to develop this conventional agricultural polder area through entrepreneurship and citizens' initiatives towards 'Continous Productive Urban Landscapes' (referring to the CPULs: Bohn and Viljoen, 2005), producing food, energy, resources and water within and for the city (Van Oost and De Nood, 2010). This transformation should ensue over the following 20 years through a so-called 'organic' (i.e. step by step approach or gradual) urban growth. A fundament under this organic development is that there is no fixed development plan. The autorities provide future residents with only a set of rules, the so-called area s' pasport (Almere, 2012). This leaves the floor to future residents to create their own house, estate, neighbourhood, enterprise or urban farm. Moreover, the future residents are challenged to create the area s' genuine identity, the Do It Youtself Urbanism -DIYU- planning paradigm (Almere, 2012; Ilieva, 2013). This development strategy, titled "Almere Oosterwold: Estate for Initiatives", is a revolution in Dutch urban planning as it steps away from the national dictate and top down planning (Almere, 2012). Almere Oosterwold is also a revolution in Dutch urban planning because of the pivotal position of food production – urban agriculture – in the plan (Almere, 2011; Jansma and Visser, 2011).

> **The Almere Principles**
> **For an ecologically, socially and economically sustainable future of Almere 2030:**
> **1. Cultivate Diversity**
> To enrich the city we acknowledge diversity as a defining characteristic of robust ecological, social and economic systems. By appraising and stimulating diversity in all areas, we can ensure Almere will continue to grow and thrive as a city rich in variety.
> **2. Connect Place and context**
> To connect the city we will strengthen and enhance her identity. Based on its own strength and on mutual benefit, the city will maintain active relationships with its surrounding communities at large.
> **3. Combine city and nature**
> To give meaning to the city we will consciously aim to bring about unique and lasting combinations of the urban and natural fabric, and raise awareness of human interconnectedness with nature.
> **4. Anticipate change**
> To honour the evolution of the city we will incorporate generous flexibility and adaptability in our plans and programs, in order to facilitate unpredictable opportunities for future generations.
> **5. Continue innovation**
> To advance the city we will encourage improved processes, technologies and infrastructures, and we will support experimentation and the exchange of knowledge.
> **6. Design healthy systems**
> To sustain the city we will utilize 'cradle to cradle' solutions, recognizing the interdependent, at all scales, of ecological, social and economic health.
> **7. Empower people to make the city**
> Acknowledging citizens to be the driving force in creating, keeping and sustaining the city, we facilitate opportunities
> The words of the Almere Principles will come alive and become meaningful through human action, by incorporating them on each level into every design for the city as whole.

Figure 2. The Almere Principles (source: Remmers, 2011)

The aim of Almere is that over the next 20 years Almere Oosterwold organically transforms to a rural-urban area with at least 50 % regional oriented (peri-)urban agriculture. To establish this huge ambition, Almere founded the subsidiary Almere Oosterwold in which the major regional representatives participate in 2010. The main task of this subsidiary is to develop a strategic development plan (which includes a basic set of rules for developing in the area, i.e. the area's pasport) which supports the start of the organic transformation of Almere Oosterwold. The ambition is to start in 2013 with the first steps of the transformation of the area. However, the current features of this Almere Oosterwold area do not attract people to develop their house, estate or farm there. The area consists of a large-scale polder layout developed in the late 1960s-early 1970s (Figure 3, top left). The majority of the approximately 50 present-day farms in this area are large-scale (>50 ha) modern arable or dairy farms producing for the global market. Because of the the pivotal role of (peri-)urban farming in the future area and the non-inviting features of the area, the subsidairy of Almere Oosterwold decided to start with leaving the floor to the development of urban agriculture.

Figure 3. The intended step by step transformation of current Almere Oosterwold (top left) to the rual –urban area (bottom right) over the next 20 years (source: Almere, 2012).

In 2011 we were challenged to by the susidiary Almere Oosterwold to support them with elaborating strategies for the organic development of urban agriculture in Almere Oosterwold. In the following part we will explain the subsequent steps in the development strategy we adviced to the subsidairy of Almere Oosterwold.

4   DEVELOPMENT OF PERI-URBAN AGRICULTURE IN ALMERE OOSTERWOLD

The starting point of our journey towards peri-urban agriculture in Almere Oosterwold was to distinguish the characteristics of the future agriculture in this area. That isn't easy because, there are few examples in practice of food production properly planned in and around cites as a systematic approach to build greener and more sustainable metropoles (Van der Schans and Wiskerke, 2012: 250). Using the ideas behind the Almere Principles, urban agriculture only can work if it is an integral part of the city's social, economic and environmental system. This directed us to the potential benefits of urban agriculture using the work of Van Veenhuizen and Danso (2007) and de Zeeuw et al. (2011). These authors recognise three dimensions of urban agriculture; 1) a food-secure and inclusive city; 2) an environmentally healthy city; and, 3) a productive city. Just as Van der Schans and Wiskerke (2012: 251) adapted this model (to manifestations and policy aspects of urban agricuture), we also took this model as our starting point. As the three themes recognised in the work of Van Veenhuizen and Danso (2007) and de Zeeuw et al. (2011) have similarity with the three dimensions of sustainability – people, planet and profit – we combined them. This led to three major aspects of urban agriculture; 'our city', 'healthy city' and 'economic city'.

We then combined these three major aspects with current urban policy issues. The idea behind this is that as urban agriculture is an integral part of the urban system, it can contribute to finding solutions to such issues. This would make clear how a city can benefit from urban agriculture, and for what types of issues urban agriculture can be deployed. Starting point for these policy issues was an exploration by Veen and Mul (2010) who studied policy issues of four major cities in the Netherlands (Rotterdam, Groningen, Tilburg and Almere) during the regional elections of 2010. The authors listed and aggregated the main policy issues in these four cities, looking specifically at those issues that could benefit from urban agriculture. Issues that were similar were combined, or joined under the same heading. This process led to six major policy issues to which urban agriculture can potentially contribute; society, learning and working, recreation and leisure, living environment, food and health, and sustainability (Veen and Mul, 2010).

The next step was to combine the three major aspects (our city, healthy city and economic city) with these six major policy issues. Within these six major policy issues, we made six couples of two themes using the list of main poliy issues during the regional elections of 2010. Three of these couples – Added value, sustainability, and participation – fall within one of the three major aspects of the urban agriculture city. The other three couples – learning and working, liveability, and health – fall within two adjacent aspects, that

way connecting our city, healthy city and economic city. By making these connections, we recognise that urban agriculture can contribute to various issues and that such issues cannot be perfectly separated. Graphically represented, this resulted in Figure 4.
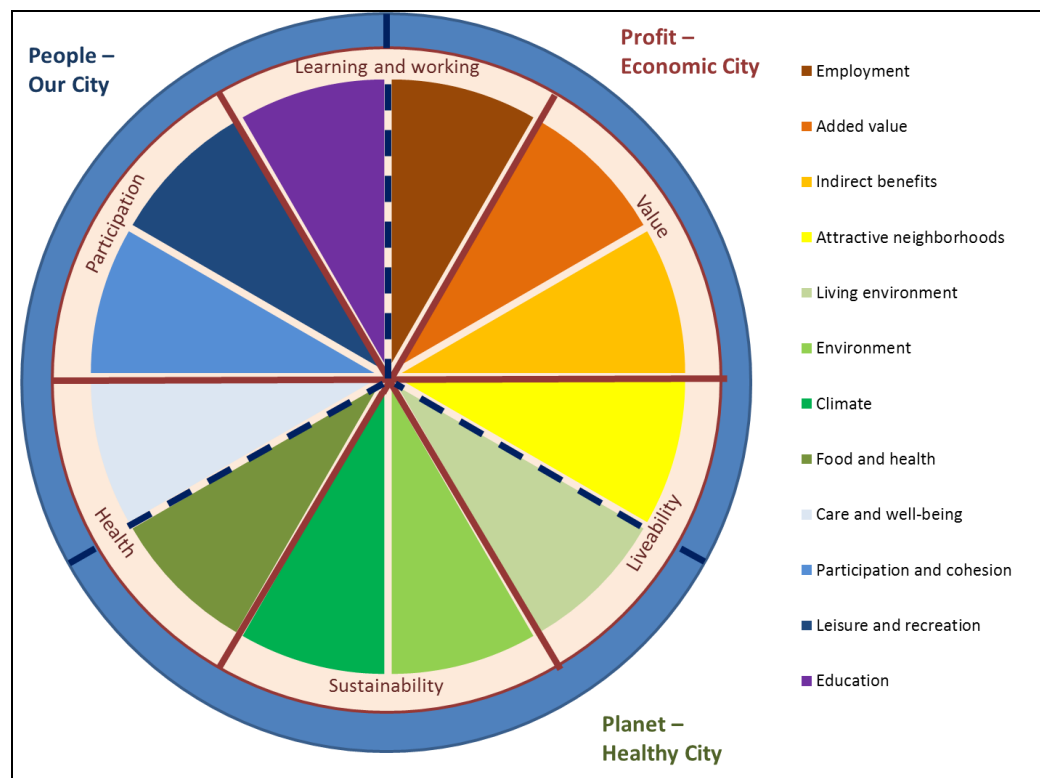

Figure 4. The twelve policy themes of urban agriculture based on a survey in four Dutch cities during local elections of 2010.

Subsequently, we coupled each of the twelve themes from Figure 4 with a current initiative, concept or enterprise in the Netherlands. As urban agriculture is multifunctional, a specific initiative would fit several themes, but for each theme we chose an example that would be most explanatory or illustrating. Hence, this is not to say that an example would not fit within another theme. Table 1 shows the twelve themes and the twelve respective examples. In the table we also mention the estimated required size and location for this type of initiative, requirements for succesful development and chances and obstacles for development. This way, the twelve examples can be seen as twelve 'prototypes' of urban agriculture.

At least six of these prototypes have te potential to be a part of future Almere Oosterwold. These prototypes require a minimum size of land starting with 5 ha. The smaller urban agriculture initiatives problably will start in the vicinity of the city, where the more production oriented ones will flourish at a some distance of the city. The land available for urban agriculture should be preserved for a long period (> 10 years). So the zoning policy for this area should provide these minimum sets of land throughout the area and prevent these to future urban sprawl. Developing a trust in which the peri-urban agricultural land is accommodated could be a strategy to prevent agricultural land to future urban sprawl. This land conserving trust could also provide newcomers from outside the area with land to establish their urban agriculture initiative. This new input is possibly needed. A survey carried out in 2011 with 15 current entrepreneurs from the Almere Oosterwold area shows that only a quarter to half of them are potentially interested in a conversion to an urban-oriented agriculture. The different prototypes do face potential obstacles like accessibility, distance to the city, infrastructure and logistics and distribution of the produce (Table 1). A set of rules and instruments could help to overcome these obstacles. The question is which roles urban agriculture on one hande and the susidiary Almere Oosterwold (or municipality) should play in the organic development of the area. Moreover, the question is also who has the lead in solving the obstacles because there will be no fixed plan. In an area unfamiliar with urban agriculture, moreover unfamiliar with organic development, it is hard to indentify who should have the lead. Hence, to develop a dynamic set of rules (and instruments) it is advised to provide the pioneers in urban agriculture with free space to experiment. In order to coordinate and facilitate this free space the municipality should appoint an area manager. The access to the process of experimenting and improving provides the area manager (and the municipality) new instruments

(and rules) to conduct the development of this area. The pioneer space also can inspire newcomers or the current farmers in the area. In the path of both zoning and pioneering the transition of the environment will follow. It this transition proces new residents are challanged to settle in the area. Essential is that from the foundation of Almere Oosterwold the area inextricably is connected to the city, physically as well as mentally, through infrastructure, and produce stream, and in the communication. This not only will be a responsibility of the municipality but of all stakeholders in the area. The (peri-) urban agriculture in the area has a pivotal role because it seduces residents of Almere into the area and also delivers their produces to the city. Urban agriculture in Almere Oosterwold is in a way the first step towards a reconnection of the urban and rural environment.

5   CONCLUSION

In this paper we introduce the case of Almere Oosterwold (NL), an area of approximately 4.000 ha east of the city boundaries. This area should organically alter from a open polder area with world market oriented agriculture towards an (peri-) urban area with diversified or multifunctional (peri-) urban farming and housing. This transition should take place over the next 20 years in. Starting point is a polder landscape where 50 arable and dairy farms have been producing for the world market and where diversified farming activities are lacking. We asked ourselves how to develop a new diversified peri-urban landscape with a central role for (peri-) urban agriculture when bottom-up initiatives in peri-urban agriculture are nearly lacking? Using the ideas behind the Almere Principles, we argued that urban agriculture only can work if it is an integral part of the city's social, economic and environmental system. This directed us to the potential benefits of urban agriculture translated in three major aspects of urban agriculture; 'our city', 'healthy city' and 'economic city'. Based on current policy issues we discerned twelve themes within these three major aspects of urban agriculture. These twelve themes were visualized through connecting each with a current urban agriculture initiative or concept. These are the prototypes of (peri-) urban agriculture which could potentionally be developed in this area. We argued that only a change in zoning policy is not enough to develop these type of (peri-) urban farming. Because of the pivotal role of (peri-) urban agriculture in this area and the lack of familiarity with it, the city should develop a policy plan with three central topics: land ownership, pioneering with multifunctional urban and peri-urban agriculture, and physically and mentally connecting the area with the city. These three topics are the first steps to guide Almere towards a process of reconnecting the urban and rural environment.

6   REFERENCES

Almere, 2006. Sociale Atlas van Almere: monitor van wonen werken en vrije tijd. Almere, Dienst Onderzoek en Statistiek. 153 pp. (in Dutch)

Almere, 2008. The Almere principles; for an ecologically, socially and economically sustainable future of Almere 2030. Thoth Publishers, Bussum, the Netherlands. 79 pp.

Almere, 2009. Concept Structuurvisie Almere 2.0 (Draft Strategic Vision Almere 2.0). Almere kan groeien van 190,000 naar 350,000 inwoners? Wat betekent de schaalsprong voor de stad en de regio? Stuurgroep Almere 2030, Almere, Jun 2009. 309 pp. (In Dutch. Summary in English).

Almere, 2011. Landgoed Almere. Thema nummer, februari 2011, Almere. 42 pp. (in Dutch)

Almere, 2012. Almere Oosterwold; Land-goed voor initiatieven (Development Strategy of Almere Oosterwold), March 2012. Rijks-regioprogramma, Amsterdam-Almere-Markermeer (RRAAM), Almere 2.0, IAK gebied Almere Oosterwold, Gemeente Almere. 280 pp. (In Dutch)

Berkhout, P., T. Bakker, W.H.M. Baltussen, P.W. Blokland, N. Bondt, C.J.A.M. de Bont, J.F.M. Helming, O. Hietbrink, P. van Horne, S.R.M. Janssens, A. van der Knijff, M.G.A. van Leeuwen, V.G.M. Linderhof, A.B. Smit, G. Solano and A. Tabeau, 2011. In perspectief; Over de toekomst van de Nederlandse agrosector. LEI, Rapport 2011-051, Den Haag, The Netherlands. 166 pp. (In Dutch)

Bohn, K. and A. Viljoen, 2005. More space with less space (p 11-16). In: CPULS, continuous productive urban landscapes: Designing Urban Agriculture for Sustainable Cities, André Viljoen (ed.). Architectural Press, Oxford UK. 280 pp.

Campbell, S., 1996. 'Green Cities, Growing Cities, Just Cities? Urban Planning and the Contradictions of sustainable Development'. Journal of the American Planning Association Summer 1996. 30 pp.

Cotteleer, G., J. Luijt, J.W. Kuhlman and C. Gardebroek, 2007. Oorzaken van verschillen in grondprijzen. Een hedonische prijsanalyse van de agrarische grondmarkt. Wageningen, Wettelijke Onderzoekstaken Natuur & Milieu, WOt-rapport 41. 84 pp. (in Dutch)

Dekking, A., J.E. Jansma and A.J. Visser, 2007. Urban Agriculture Guide; Urban Agriculture in the Netherlands under the Magnifying glass. Wageningen University and Research, Applied Plant Research, Lelystad, the Netherlands. 20 pp.

Deelstra, T., D. Boyd and M. van den Biggelaar, 2001. 'Multifunctional land use: an opportunity for promoting urban agriculture in Europe'. The International Institute for the Urban Environment, Delft. 7 pp.

De Zeeuw, H. R. Van Veenhuizen and M. Dubbeling, 2011. The role of urban agriculture in building resilient cities in developing countries. Journal of Agricultural Science, 2011: 1-11.

Hodgson, K., M. Caton Campbell and M. Bailkey, 2011. Urban Agriculture: Growing Healthy, Sustainable Places, Chicago, Ill: American Planning Association. 148 pp.

Ilieva, R.T., 2013. Growing Food-sensitive cities for tomorrow; How to integrate sustainable food systems and spatial planning for a brighter urban future in the 21st century? Doctoral Dissertation, Politecnico di Milano, Dipartimento di Achritettura e Studi Urbani, Milan, Italy. 432 pp.

Jansma, J.E. and A.J. Visser, 2011. Agromere: Integrating urban agriculture in the development of the city of Almere. Urban Agriculture Magazine 25 (2011): 28-31.

J.E. Jansma, E.J. Veen, A.G.J. Dekking, M.P. Vijn, W. Sukkel, M. Schoutsen, A.J. Visser, M. van Boxtel en H. Wieringa, 2011. Staalkaarten stadslandbouw+; ontwikkelstrategieën om te komen tot stadslandbouw in Almere Oosterwold. Wageningen UR, PPO agv Lelystad. 63 pp. (In Dutch)

Jansma, J.E., W. Sukkel, E.S.C. Stilma, A.C.J Van Oost and A.J. Visser, 2012.The impact of local food production on food miles, fossil energy use and greenhouse gas (GHG) emission: the case of the Dutch city of Almere (p 307-321). In: Sustainable food planning; evolving theory and practice; A. Viljoen and J.S.C Wiskerke (eds), Wageningen Academic Publishers, Wageningen, 598 pp.

Koomen, E., J. Dekkers and T. Van Dijk, Open-space preservation in the Netherlands: Planning, practice and prospects. Land Use Policy 25 (2008) 361–377

Morgan, K., 2009. Feeding the city: The Challenge of Urban Food Planning. International Planning Studies: 14:4 (2009): 341-348.

Morgan, K., and R. Sonnino, 2010. The urban foodscape; world cities and the new food equation. Cambridge Journal of Regions, Economy and Society, 3 (2010): 209-224.

Mougeot, L.J.A., 2000. 'Urban agriculture: definition, presence, potentials and risks'. In: Bakker, N., M. Dubbeling, S. Gündel, U. Sabel-Koschella and H. de Zeeuw (eds) (2000). 'Growing cities, growing food: urban agriculture on the policy agenda. A reader on urban agriculture'.

Moustier, P. and G. Danso, 2006. Local Economic Development and Marketing of Urban Produced Food, in: Veenhuizen, R. van (ed) Cities Farming for the Future. Urban Agriculture for Green and Productive Cities. The Philippines: RUAF Foundation, IDRC and IIRR.

PBL, 2012. Nederland verbeeld; een andere blik op vraagstukken rond de leefomgeving. 05 Voedsel. Planbureau voor de Leefomgeving. www.pbl.nl/nederlandverbeeld (accessed, January 2013) (In Dutch)

Pearce, F., 2006. Ecopolis now. New scientist, 17 June 2006: 36-42.

Perrin, C., 2012. Regulation of Farmland Conversion on the Urban Fringe: From Land-Use Planning to Food Strategies. Insight into Two Case Studies in Provence and Tuscany, International Planning Studies, DOI:10.1080/13563475.2013.750943.

Remmers, G.G.A., 2011. City resilience; building cultural repertoire for urban farming in Almere. Urban Agriculture Magazine 25 (2011): 47-50.

Roorda, Chr., M. Buiter, J. Rotmans, M. Bentvelzen, N. Tillie, and R. Keeton, 2011. Urban Development: the State of the Sustainable Art, an international benchmark of sustainable urban development. Dutch Research Institute for Transitions (DRIFT), Erasmus University Rotterdam, May 201. 117 pp.

Steel, C., 2008. The hungry city; how food shapes our lives. Chatto & Windus, Londen. 383 pp.

Taylor Lovell, S., 2010. Multifunctional Urban Agriculture for Sustainable Land Use Planning in the United States. Sustainability 2010, 2, 2499-2522.

Thornton, A., E. Nel, and G. Hampwaye, 2010. Cultivating Kaunda's plan for self-sufficiency: Is urban agriculture finally beginning to receive support in Zambia?, Development Southern Africa, 27 (4): 613-625.

Van der Schans, J.W., 2009. Urban agriculture in the Netherlands. Urban Agriculture Magazine, No. 24 (2010): 40-42.

Van der Schans, J.W. and J.S.C.Wiskerke, 2012. Urban agriculture in developed economies (p 245-258). In: Sustainable food planning; evolving theory and practice; A. Viljoen and J.S.C Wiskerke (eds), Wageningen Academic Publishers, Wageningen, 598 pages.

Van Oost, A.C., and I. de Nood, 2010. Almere Oosterwold: toonbeeld van duurzame gebiedsontwikkeling. Groen, vakblad voor ruimte in stad en landschap, 11 (2010): 41-45. (In Dutch)

Van Remmen, Y. & A.J. Van Der Burg, 2008. Past and future of Dutch urbanization policies: growing towards a system in which spatial development and infrastructure contribute to sustainable urbanization. Urban Growth without Sprawl, 44th ISOCARP International Congress Dalian- China, 19-23 September 2008.

Van Veenhuizen, R. en G.K. Danso, 2007. 'Profitability and sustainability of urban and peri-urban agriculture', Agricultural management, marketing and finance occasional paper 19, Rome: Food and Agriculture Organization of the United Nation (FAO). 95 pp.

Veen, E.J en M. Mul (2010). Stadslandbouw: Inspiratie door variatie. Stedennetwerk Stadslandbouw, Rapport nummer 394, Lelystad: Praktijkonderzoek Plant en Omgeving, WageningenUR. 45 pp. (In Dutch)

Veen, E.J., P.H.M. Derkzen and J.S.C. Wiskerke, 2012a. Motivations, Refexivity and Food Provisioning in Alternative Food Networks: Case Studies in Two Medium-sized Towns in The Netherlands. International Journal of Sociology of Agriculture and Food, vol.19, nr.3: 365 – 382.

Veen, E.J., B., Breman and J.E. Jansma, 2012b. Stadslandbouw. Een verkenning van groen en boer zijn in en om de stad. Wageningen UR, Lelystad. 42 pp. (In Dutch)

Visser, A.J., J.E. Jansma, H. Schoorlemmer, and M.J. Slingerland, 2009. How to deal with competing claims in peri-urban design and development: The DEED framework in the Agromere project, p 239-252. In: Transitions towards sustainable agriculture and food chains in periurban areas: Poppe K. J., Termeer, C. and Slingerland M.A. (eds), Wageningen Academic Publishers, 2009. 392 pp.

Vringer, K., R. Benders, H. Wilting, C. Brink, E. Drisse, D. Nijdam, and N. Hoogervorst, 2010. A hybrid multi-region method (HMR) for assessing the environmental impact of private consumption. Ecological Economics 69:2510-2516.

Zalm, Chr. and W. Oosterhoff, 2010. Het Almere Landschap: drager van polderstad Almere. Groen, vakblad voor ruimte in stad en landschap, 11 (2010): 8-13. (In Dutch)

Zasada, I., 2011. Multifunctional peri-urban agriculture—A review of societal demands and the provision of goods and services by farming. Land Use Policy 28 (2011) 639– 648.

A

Policy theme	Example	Optimal/required size	Optimal location	Requirements	Chances	Obstacles
Employment (Economic City)	Ridammerhoeve, an organic goat farm open to the public. 250.000 visitors a year. Offers app. 10 full time jobs. Cheese making, playground, education and conference centre, pet farm (http://www.geitenboerderij.nl/).	5 - 25 hectares	Peri-urban	Flexibility in rules and regulations, e.g. regarding zoning and licenses	Commercially viable	Difficult balance between agriculture and activities
					Many employees necessary	Municipal flexibility needed for room to develop, zoning and permits
				Finding a balance between agricultural work and activities for visitors	Employment in different areas	Specific infra structure needed: accessibility, parking, bike routes
					Farm rents land from municipality	Land is scarce and expensive; long term land lease
				Easy accessible to the public	New business	
Added value	Stadsboerderij Almere, organic urban farm. Beef cattle, arable and vegetable farming. Meadows and fields spread over the city. Care, farmers market, new artisan business and education (http://www.stadsboerderijalmere.nl/).	50 > hectares	Peri-urban	Security of access to land over longer period	Commercially viable, close market	Land is scarce and expensive
					Different activities means involving many people in food production	Difficult to get long-term land lease
				Access to market, small distance to market	Through education sustainable connections with citizens	Building a sustainable distribution system within the city: economically and environmentally
					Connections with citizens gives right of existence	
Indirect benefits	Doarpstún Snakkerburen, community garden. Various vegetables grown, sold in garden shop. Run by volunteers. Cultural activities organised, meeting place for neighbourhood, education (http://www.dedoarpstun.nl/).	< 1 hectares	Urban	Access to volunteers	When indirect benefits known, it is more clear what urban agriculture can bring	Indirect benefits like better health or beautiful neighborhood often unclear
					This particular example does not get subsidies and manages, even pays rent	Sometimes hard to find volunteers for running the garden
				Access to finances	A meeting place for different people	Finances for similar projects are hard to find
Attractive neighborhoods	Community garden Parmenidesstraat, Amsterdam. Community garden surrounded by housing block. Started by housing corporation, twelve residents have private plot. Design made together (http://www.buitenruimtevoorcontact.nl/projecten/moestuin-in-wijsgerenbuurt-amsterdam).	< 1 hectares	Urban	Access to open space for a longer period of time	Involves people in their neighborhood and strengthens feelings of ownership and increases social contacts	Longterm agreements with municipality
					Multifunctional use of land available due to the financial crisis	
				Ambitious people in neighborhood	A way to prevent people from moving out of the neighborhood	People in (mixed) neighborhoods may not be used to work together, takes time and maybe set of rules
					A more attractive neighborhood makes higher rents possible	

B

Policy theme	Example	Optimal/required size	Optimal location	Requirements	Chances	Obstacles
Living environment (Healthy city)	Creatief Beheer, organisation that sees maintenance of green areas as vital for neighbourhood improvement. Works with all neighbourhood stakeholders and improves the quality of the neighbourhood with the residents. Human interaction is central (http://www.creatiefbeheer.nl).	< 1 hectares (area)	Urban	Access to open spots for a longer period of time	Multifunctional use of (derelict) urban spots, opposing degradation	People in (mixed) neighborhoods may not be used to work together, takes time and maybe set of rules
				Freedom to change the neighborhood landscape	A way to prevent people from moving out of the neighborhood	
					Brings people together, increases social contacts	Municipal flexibility needed for room re-furnish neighborhood
Environment	Agromere, a virtual city district on 250 ha. Closing the nutrient cycle is one of the targets of this concept (www.agromere.wur.nl). which integrates living space on 70 ha (for 5,000 inhabitants) with 180 ha urban agriculture.	> 50 hectares	Peri-urban	Closing nutrient cycles requires flexibility in rules and regulations	Closing cycles by (re) using organic waste cycles	It is not permitted to re-use human urine and faeces
					Closing cycles is possible on different scales	Besides using household waste, other ways to close cycles are still far, although small systems are working
					Composting household waste improves soils	
				Closing nutrient cycles requires more technical possibilities	Possible to re-use phosphate and nitrogen	Large-scale waste processing is bound by strict rules
					Agricultural and urban waste can be used to produce bio-energy	Continuity in deliverance of energy can be problematic
					Urban agriculture as incubator for innovations	
Climate	Oregional, short food chain by farmers. Cooperation sells products from the twenty members directly to buyers in the region, like restaurants and hospitals. (http://www.oregional.nl).	Not applicable	Peri-urban	Good cooperation between farmers	Potentionally lower foodmiles	As consumers make most food miles and large-scale food systems are very efficient, it is unclear to what extent food miles are really reduced
					Less links needed in the food chain, higher price for farmers produce	Small-scale local food processing may be less efficient in energy use
				Efficient logistics	Fresher products	
					Added value remains in the local area	
Food and health	Bioakker, organic harvest-it-yourself garden. Maintained by entrepreneur. Members pay initial amount, subtract the value of what they harvest. Members are invited to help with the gardening work. Prices are low to make it widely available (http://www.bioakker.nl).	1 - 5 hectares	Urban	Producing space of good quality, large enough and accessible, long term lease	Awareness of local and seasonal food increases	Space to produce - good quality, accessible, large enough - is scarce in the city
					Multifunctional use of the land available due to the financial crisis	Temporality of land may put entrepreneurs off
					Direct relation with producer of food	Policy and regulation not yet suitable for large-scale
				Flexibility in policies and regulations with regards to commercial food production in the city	Fresh food is available and close by	In this example: garden not close to supermarket which is an obstacle for visiting
					Short supply chain	

C

Policy theme	Example	Optimal/required size	Optimal location	Requirements	Chances	Obstacles
Care and well-being (Our city)	Moestuin Maarschalkerweerd, organic urban care farm. Daily activities and reintegration trajectory for people with distance to employment. Work in garden, lunch cafe and shop. Playground and educational projects (http://www.moestuinutrecht.nl).	5 - 25 hectares	Peri-urban	(Government) funding to pay for care	Various benefits for people when working in green environment; stress release, daily rhythm, working with others	Pressure on income from care due to cuts in funding
				Available space close to public, long-term lease		Land is scarce and expensive; long term land lease
					Care farm in the urban fringe less far than in rural area, less travelling	Specific infra structure needed: accessibility, parking, bike routes
Participation and cohesion	Moestuinjes IJburg, small individual garden containers on unused land in Amsterdam. Allotment complex founded, residents hire three containers. The municipality takes care to furnish the site (http://debrugkrant.nl/volkstuintjes-op-braak-liggende-kavel-haveneiland).	Containers of 1m²	Urban	Effort to include different groups in the project	Project is mobile and can be moved	Some people or groups may be left out
				Flexibility in policies and regulations in order to use public space	People work together to beautify their area	When the project moves, this may lead to disappointment
Leisure and recreation	t Geertje, organic recreational farm. Mostly goats but also milking cows, pigs, chickens and horses. Cheese making, sold in farm shop and farm restaurant. Hiring boats, canoes and bikes. Overnight accomodation, company outings, childrens parties, bachelor parties. 100.000 visitors yearly (http://www.hetgeertje.nl).	25-50 hectares	Peri-urban	Consistency in rules and regulations; recreational farms need to comply with both agricultural and recreational regulations	The target group is close, increases social contacts	Too many visitors can lead to nuisance for local residents
					Diversified activities offers extra income to farmer	Land is scarce and expensive; long term land lease
				Rules to minimise nuisance (noise, smell, traffic)	(Peri-Urban) farms fit with what people are looking for; leisure, green space, animals	Regulation can be an obstacle, as farms need to comply with agricultural and recreational regulation, which may be contradictory
Education	Burdje op 'e Skoalle, agriculture lessons in schools. Primary school students get one full day and two half days workshops on food and agriculture from secondary vocational students, for whom this is part of their curriculum (http://vimeo.com/45890484).	Not applicable	Both are suitable	Flexibility in school programmes so that there is space for these types of classes	Offers opportunities to teach children how food grows	Schools have to comply with strict programmes in which it is hard to find space
					Education is possible in diverse urban agriculture initiatives	Schools do not always have the financial means or staff to join
					Especially working with the harvested food is a tool to involve parents and local residents	It may be harder to reach adolescents through urban agriculture
				Classes should be free and staffed as most primary schools may not have financial means or staff	Agriculture can be used for various subjects, from maths to biology and drawing	
					Especially useful for children for whom cognitive learning is harder	

Table 1. Three major aspects of urban agriculture; A: 'economic city', B 'healthy city' and C 'our city' divided in twelve policy themes. Each of the twelve themes is coupled with a current initiative, concept or enterprise of (peri-) urban agriculture in the Netherlands. The table also mentions subsequently the estimated required size and location for this type of initiative, requirements for succesful development and chances and obstacles for the development. This table was adjusted from Veen et al. (2012) and Jansma et al. (2011).

Urban Dimension of Territorial Cohesion: Perspective Facing the Crisis

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1 ABSTRACT[1]

The Territorial Agenda highlighted in 2007 the increasing influence of European policies on the territory.

On one hand these policies, adopting an integrated and strategic territorial approach, should take into account as soon as possible the development potentials at local, regional and national level as well as the stakeholders directions. On the other hand the strategies devoted to specific development of cities and regions have to enter more explicitly both in national and European framework. It was considered essential that regional, local and national issues were articulated with Community policies, with particular reference to rural development policies, environmental and transport policies but also to cohesion. In this context, the Leipzig Charter on Sustainable European City was fully inserted in the Territorial Agenda since the Chart promoted an integrated policy for urban development as a task of the European dimension. Integrated urban development policy and territorial cohesion policy were seen then as two complementary contributions to the realization of sustainable development. The entry into force of the new Treaty of Lisbon (2009), provided a more solid basis for action on territorial domain: Cohesion policy aims to articulate more and more according to a multidimensional view that aspires to be economic, social and, above all, territorial.

Meanwhile, the global economic and financial crisis occurs. A crisis affecting Europe, too, and that in part undermines the macroeconomic convergence achieved by cohesion policy.

Economic, social and territorial cohesion remains at the center of the most recent policy document prepared by the Commission: Europe 2020, which should be the reference for the next ten years as at the time was for the Lisbon-Gothenburg Strategy. The vision for Europe is that of a smart, sustainable and inclusive 'growth'.

The Territorial Agenda renewed in 2011, which not surprisingly is called TA 2020, taking as fundamental the objectives assumed in the Leipzig Charter (and in the other documents on urban development as the Declarations of Marseille and Toledo), however, considers the cities as engines for smart, sustainable and inclusive 'development' and promotes them as attractive places to live, to visit and where to invest. But the TA sees also as the deprived urban areas, the existence of which is often hidden from official statistics, can be a special place of exclusion. The urban regeneration policies are seen as a potential support for local development where it is necessary to adopt an integrated and multi-level approach.

The development process of European policy is profoundly affected by the ongoing processes of change at the global scale. On one side are recognized structural characteristics of the economic crisis and, on the other, there is a clear need for choices no longer be postponed in relation to 'energy model' development both in terms of security of supply and the fight against climate change.

The dialogue between macroeconomic policies and territorial development policies seems increasingly involve a local development model that refers to different disciplines and different social practices.

The starting point is the idea that the development of different regions follow different paths and that the residual factors not explained by classic or Neo-Keynesian economic theory are of endogenous nature and often intangible. Regarding the contribution of local development to cohesion policy, the Barca report on a place-based policy emphasizes that local development is likely to increase the efficiency of Community funding through increased concentration of structural funds at the local level and by virtue better management of local projects, selected on the basis of eligibility criteria and subject to monitoring and evaluation.

The current phase is crucial for the determination of the guidelines for the next programming period post-2013. The proposal for a New Regulation 2014-2020 precisely in relation to the 'new objective' territorial cohesion refers to the need to address the role of cities, functional geographical areas and sub-regional territories which have specific geographic or demographic problems. To this end, in order to better enhance the potential at the local level, the local development initiatives should be strengthened and facilitated,

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[1] I contenuti del presente contributo sono frutto di un lavoro comune. Tuttavia l'elaborazione dei paragrafi 1,2,3 è attribuibile ad Angela D'Orazio, mentre quella dei paragrafi 4 5 e 6 a Maria Prezioso

making sure they are participatory, establishing common standards and providing close coordination for all the funds of the Community Support Framework.

Territorial cohesion implies here explicitly sustainable urban development to which the ERDF allocates at least 5 % of the resources devoted to integrated actions in this field for each Member State (with investments from different channels). In addition, the Commission will launch calls for innovative actions in urban areas and make ESF human capital investments in cities easier.The framework laid down in the new Partnership Agreement implies a structured participatory process and the definition of strategies and priorities at the national and regional level for the construction of local development strategies at the urban scale. To do this requires elements of 'knowledge of the land' and the construction of a knowledge base for the development and monitoring of the actions that require a new focus on the ability of local authorities in driving initiatives.

Starting from these considerations, the contribution aims to investigate the past and current areas of action of the European policy and to explore which dimensions of territorial cohesion are typical of urban scale and what kind of policies should be taken.

2 IL QUADRO DI RIFERIMENTO

Nel 2007 la Territorial Agenda dell'Unione Europea sottolineava l'influenza crescente delle politiche comunitarie sul territorio. Le politiche comunitarie dovevano prendere in considerazione il potenziale di sviluppo locale, regionale e nazionale insieme alle indicazioni degli stakeholders adottando un approccio territoriale strategico e integrato. Inoltre le strategie di sviluppo specifico per le città e le regioni avrebbero dovuto iscriversi più esplicitamente sia nei quadri nazionali che in quello europeo. Si riteneva fondamentale che le questioni regionali, nazionali e locali trovassero un'articolazione diretta con le politiche comunitarie, in particolare con le politiche di sviluppo rurale, quelle ambientali e dei trasporti ma anche con le politiche di coesione.

In questo quadro la Carta di Lipsia sulla città europea sostenibile (2007 e 2010) si iscriveva pienamente nell'Agenda Territoriale in quanto in essa si promuoveva una politica integrata di sviluppo urbano come un compito di dimensione europea.

La politica integrata di sviluppo urbano e la politica di coesione territoriale venivano viste quindi come due contributi complementari alla realizzazione dello sviluppo sostenibile.

L'entrata in vigore del nuovo Trattato di Lisbona (2009), ha fornito una base più solida all'azione in campo territoriale: la politica di coesione da quel momento mira ad articolarsi sempre di più secondo una visione multidimensionale che aspira ad essere economica sociale e, soprattutto, territoriale.

Nel mezzo interviene la crisi finanziaria e poi quella economica globale che investe anche l'Europa e che in parte vanifica i risultati macroeconomici di convergenza ottenuti dalla politica di coesione.

Oggi la coesione economica, sociale e territoriale rimane al centro del più recente documento strategico elaborato dalla Commissione, Europa 2020 (2010), che dovrebbe costituire il riferimento per i prossimi dieci anni come a suo tempo fu per la Strategia di Lisbona-Gothemburg. La visione per l'Europa è quella di una 'crescita' smart, sustainable and inclusive.

La Territorial Agenda rinnovata nel 2011, che non a caso prende il nome di TA 2020, assumendo come fondamentali gli obbiettivi della Carta di Lipsia (così come degli altri documenti di principio sullo sviluppo urbano come le Dichiarazioni di Marsiglia e di Toledo), considera tuttavia le città motori di sviluppo smart, sustainable and inclusive e le promuove come luoghi attrattivi, per viverci, visitarle ed investire su di esse. Ma vede anche come le aree urbane degradate, la cui esistenza è nascosta spesso dalle statistiche ufficiali, possano essere un luogo privilegiato dell'esclusione.

I termini in gioco sono allora dimensione urbana, politica di coesione, sviluppo sostenibile: la questione della scala pertinente delle politiche di sviluppo viene chiamata in causa dall'emergere del concetto di coesione territoriale.

3 IL RUOLO DELLA DIMENSIONE URBANA NELLE POLITICHE DI SVILUPPO

Un riferimento diretto alle città nelle politiche europee si sviluppa soprattutto a partire dagli anni '90 con il Libro verde del 1990 sull'ambiente urbano (COM(1990) 218) nel quale si analizzavano le problematiche di uno specifico 'ambiente urbano' proponendo un approccio globale e una serie di azioni a livello europeo da

inquadrarsi in una migliore cooperazione e integrazione tra le politiche. Negli stessi anni il rapporto "Città europee sostenibili" (con l'Agenda 21 locale) pone le basi per un quadro di azione a livello locale imperniato su quattro principi di base per la sostenibilità nelle aree urbane: gestione urbana, integrazione delle politiche, approccio ecosistemico e cooperazione e partnership. La comunicazione "La problematica urbana: orientamenti per un dibattito europeo" (COM(1997)197) analizzava le problematiche economiche, sociali ed ambientali delle città europee, mettendo in luce la necessità di contemplare una prospettiva urbana nelle politiche comunitarie.

Nel 1998 il "Quadro d'azione per uno sviluppo urbano sostenibile nell'Unione europea" (COM(1998)605) per la prima volta, ha adottato un'impostazione esplicitamente orientata allo sviluppo sostenibile, definendo quattro obiettivi principali di indirizzo politico: migliorare la prosperità economica e l'occupazione nelle città; promuovere la parità, l'integrazione sociale e il rinnovamento nelle aree urbane; tutelare e migliorare l'ambiente urbano (verso la sostenibilità locale e globale); contribuire a un'efficiente gestione urbana e al rafforzamento dei poteri locali. In particolare ha fissato una serie di obiettivi politici precisi per migliorare l'ambiente urbano che sono ancora validi e che vengono inclusi sempre nei documenti successivi (dalla strategia tematica sull'ambiente urbano, alla Carta di Lipsia, alle serie delle strategie europee sullo sviluppo sostenibile 2001, 2006, 2009). Nel corso degli anni 2000 l'importanza delle questioni urbane è stata riconosciuta sotto le successive presidenze dell'Unione (per es. Consigli informali di Rotterdam 2004 e Bristol 2005).

Nel rapporto su 'La dimensione urbana nel contesto dell'allargamento' (2004/2258(INI)) del Parlamento Europeo, lo sviluppo urbano sostenibile, in virtù del ruolo giocato dalle città per il perseguimento degli obiettivi di Lisbona e Gothenburg, viene integrato nell'ambito della politica di coesione e l'esistenza di una politica urbana implica l'esplicito riconoscimento della dimensione urbana e la sua integrazione (orizzontale con le altre politiche) nelle competenze della Commissione Sviluppo Regionale.

Nello stesso documento si domanda di introdurre insieme al dialogo sociale e civile un 'dialogo territoriale' che permetta alle diverse autorità (regionali e locali) e alle loro associazioni di partecipare alle negoziazioni e alle decisioni che riguardano politiche e azioni in ambito urbano nel quadro della politica di coesione.

L'Inter-service Group on Urban Development (2005), sotto il coordinamento della DG Regio, avrà lo scopo di: promuovere un approccio integrato allo sviluppo sostenibile urbano nella programmazione e nell'implementazione di Fondi strutturali; identificare nell'ambito delle diverse politiche europee le iniziative volte a sostenere lo sviluppo sostenibile delle aree urbane garantendo la cooperazione tra i diversi servizi della Commissione; assicurare il partenariato tra Commissione, Parlamento Europeo, Comitato delle Regioni, le associazioni di città e di aree urbane.

Le politiche di rigenerazione urbana sono viste allora come un potenziale supporto allo sviluppo locale[2] e l'approccio da adottare è quello integrato e multilivello.

La letteratura grigia considera giustificate le azioni di sviluppo locale in quanto: consentono una reazione di compensazione, correttiva o resiliente per superare gli impatti negativi di delocalizzazione dei posti di lavoro, chiusura delle imprese, crescente disoccupazione ed esclusione sociale; consentono un riequilibrio rispetto a cambiamenti istituzionali come i processi di decentramento e inducono il coinvolgimento dei governi locali nello sviluppo economico e dell'occupazione; costituiscono un trampolino per strategie di sviluppo che siano adattate localmente alle circostanze, al contesto e ad una visione condivisa di futuro.

Il modello che ne risulta è in linea con il paradigma della nuova politica regionale veicolato dall'OECD (1992, 2004, 2008) e con il contenuto del Rapporto Barca (2009) sulla coesione territoriale. Per quest'ultimo in un'ottica placed-based, lo sviluppo locale è suscettibile di aumentare l'efficienza del finanziamento comunitario grazie a una maggiore concentrazione dei fondi strutturali a livello locale e in virtù di una

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[2] Il dialogo tra politiche economiche e politiche di sviluppo territoriale sembra sempre più passare oggi per un modello di sviluppo locale che si nutre di diverse riferimenti disciplinari e differenti pratiche sociali. Alla base vi è la concezione che lo sviluppo di differenti territori segua diverse strade e che i fattori residuali non spiegati dalla teoria economica classica o da quella neo keynesiana siano di natura endogena e spesso immateriale. Gli elementi comuni a queste scuole di pensiero risiedono nelle affermazioni: le opportunità di crescita esistono in tutti i differenti territori e il potenziale sottoutilizzato può essere sfruttato; tali opportunità e potenziali possono essere trasformati in progetti di sviluppo integrato; attori locali dinamici e impegnati, cooperando all'interno di un partenariato, possono fornire assistenza e incoraggiamento da parte di livelli di governo sovralocali e da altre istituzioni come le università.

migliore gestione dei progetti locali, selezionati sulla base di criteri di eligibilità e sottoposti a monitoraggio e valutazione.

4   L'EMERGERE DEL CONCETTO DI COESIONE TERRITORIALE

La coesione è sempre localizzata e strettamente legata, in Europa, al comportamento del sistema socio-economico territoriale. Questo legame era già stato individuato a partire da J. Brunhes e C Vallaux (1921), G. Jaia (1938), J. Schumpeter (1954), W. Sombart (1967), P. George (1967) rispetto a contenuti e categorie divenuti poi un insieme di variabili nel campo della geoeconomia (Lo Monaco, 1983)

Innestando su questo approccio ulteriori parametri – derivanti dall'attenzione che l'Unione Europea dedica alla nozione di "sistema economico" in quanto espressione di valori coesivi nazionali e regionali (struttura e organizzazione politica, storia, identità) – la coesione può essere stimata in rapporto alla dimensione territoriale che essa assume in sede regionale.

Nuovi metodi di stima (Prezioso, 2006) consentono oggi di valutare ex ante la coesione stimando rapporti di interdipendenza tra variabili economiche tradizionali e non, senza concentrare l'attenzione sui soli indicatori di ricchezza regionali (come il PIL). Secondo questo nuovo approccio, la coesione è stimata come effetto quali-quantitativo della scelta politica dello Stato o delle regioni; essa influenza l'efficienza e la massa (popolazione, risorse naturali, ecc.) di un territorio, senza tuttavia esserne influenzata (Prezioso, 2008).

L'economia e la geografia del secolo scorso hanno definito i principali caratteri della coesione: come sistema (base per l'interpretazione della sua dimensione territoriale) che contribuisce a gestire, disciplinare e integrare le attività individuali e collettive, nella direzione di un regime economico; un sistema nel quale le unità geografiche dovrebbero identificare le unità politiche ed economico-territoriali, così come la capacità di diffondere principi insediativi territoriali socio-economici, che abbiano attraverso i programmi operativi il potenziale di influire sul complesso degli indicatori (reddito, prodotto interno lordo, salute..).

Agli indicatori che nel tempo ne sono derivati, si è aggiunto (2007), lo spazio geografico e geo-economico, cioè quella dimensione territoriale entro cui si realizzano le esperienze quotidiane della coesione. Meno astratto dello 'spazio' economico, il territorio può essere studiato in modo multidimensionale, ed essere direttamente percettibile dai cittadini e dalle cittadinanze.

Il rapporto tra territorio e sistema politico-amministrativo coeso, cioè la "regione", ha coinvolto sino ad oggi solo indicatori di densità, efficienza e gestione delle infrastrutture, stima del capitale fisso sociale (Camagni et al. 2010) dimostrando che la coesione è influenzata, in Europa, dalle determinanti geografiche, secondo il livello di scala e di approfondimento tecnico della cultura di appartenenza e la produttività delle attività svolte dai singoli o dalle istituzioni, stimolata ed assicurata dalla presenza di valori comuni di orientamento socio-culturale.

In ogni contesto territoriale, la coesione economica diventa "geograficamente" rilevante solo quando viene assunta come "criterio ordinatore" del paesaggio e in esso si organizza transformando in "razionalità tecnica" i rapporti posizionali e funzionali tra elementi biotici e abiotici che lo compongono.

La coesione è stata considerata dal 2000 un nuovo strumento di intervento per la diffusione nazionale della solidarietà economica, monetaria, sociale. Beneficiare dei fondi di coesione ha significato dunque dichiararsi territorio non coeso, spingendo i territori a mostrare le proprie disparità regionali (Grecia, Irlanda, Spagna e Portogallo) con la volontà di ridurle agendo/progettando attraverso i settori operativi dell'ambiente e delle infrastrutture di trasporto. Nelle esprienze di planning che ne sono conseguite, il risultato non è sempre stato positivo.

Dal 2005-2006, la coesione è stata ri-definita nei contenuti e nelle modalità attuative in vista del nuovo ciclo di sviluppo 2007-2013, acquisendo un significato positivo ed attivo di forza attrattiva capace di resistere agli impatti, alla rottura ed alla separazione di un'economia o di una società. Analizzare un territorio ed il suo grado di coesione interna ed esterna significa rilevare e valutare le risorse di cui esso è dotato, i legami di interdipendenza che tra di esse si creano. Ai fini della misura della coesione, gli indicatori a disposizione (database EUROSTAT, ESPON, OCSE, JRC, etc.) permettono di rilevare risorse naturali, finanziarie, umane e culturali, in termini quali-quantitativi, distributivi, temporali, evidenziando le modalità endogene con cui tali indicatori – territorializzati – interagiscono tra di loro. Le tradizionali regioni amministrative UE (le

NUTS) hanno poco a che fare con la coesione; per valutare la quale si deve però necessariamente collocare un dato all'interno di una unità statistica e territoriale di riferimento (georeferenziazione).

L'inserimento di indicatori territoriali di coesione, preceduto da una serie di indagini e da 4 Rapporti (2001-2006) ha posto in luce tre ambiti: integrazione, coerenza e sostenibilità (temi focali anche del "VII Framework Comunitario 2007-2013"). Sintetizzare i principali indicatori utilizzati a livello europeo e nazionale per misurare la coesione non è dunque semplice. Ne esistono di vario tipo e molti si incrociano con quanto elaborato nel 2000-2006 per l'attuazione della Strategia di Lisbona. Una buona misura del livello di coesione deve prevedere: a) la territorialità: il campo dell' intervento sociale presenta innanzitutto una valenza geografica a livello dell'origine della misura. Infatti il livello di territorialità gioca un ruolo molto importante. Alcune misure sono iniziate e condotte autonomamente a livello locale spesso sulla base di bisogni specifici e puntuali. Altre misure, pur in una logica di pianificazione nazionale sono modulate in base alle specificità locali; b) la dimensione intersettoriale che concerne in particolare i settori di intervento: economico, sociale in senso stretto, sociosanitario, educativo/formativo e del mercato del lavoro. La dimensione locale favorisce spesso l'incrocio virtuoso delle diverse politiche messe in campo.

Il "sistema Europa" ha trovato nella coesione un elemento regolamentato di spinta all'azione collettiva (multilevel governance), per contrastare gli effetti della mancanza di competitività per il 2007-2013. Il nuovo approccio alla coesione ha richiesto una lunga fase di riconversione e di sviluppo delle politiche europee e nazionali tra il 2005 ed il 2007, che hanno anche recepito indicazioni sul potenziale di inclusione sociale, sullo sviluppo bilanciato, sulla qualità della vita.

Il rinnovo delle istituzioni, garantito dall'entrata in vigore del nuovo Trattato di Lisbona (2009), ha fornito una base più solida all'azione in campo territoriale: oggi la politica di coesione mira ad articolarsi sempre di più secondo una visione multidimensionale che aspira ad essere economica sociale e, soprattutto, territoriale.

Ma la politica di coesione è anche il campo nel quale si confrontano visioni politiche contrastanti in merito all'idea di Europa che si vorrebbe costruire, ai modelli di sviluppo economico ai quali fare riferimento, alle azioni da implementare per perseguire gli obiettivi (D'Orazio, 2011).

5 LA DIMENSIONE URBANA DELLA COESIONE TERRITORIALE

Sul piano della dimensione europea, la coesione è stata stimata quasi esclusivamente alla scala dei comportamenti urbani. Questa misurazione ha spesso utilizzato indicatori di segno diverso, a volte temporalmente sfasati, creando un forte divario tra esperienze empiriche alla scala locale e politiche territoriali regionali. Più il fenomeno è studiato e scomposto, più ci si allontana dal rapporto sussidiario che anche la coesione deve rispettare in campo amministrativo (multilevel governance).

Tuttavia è proprio alla scala urbana che la coesione si manifesta sotto forma di policentrismo (Prezioso, 2011), attraverso cui assume forma territoriale insediativa e organizzativa; per questo è difficile poter contare su una tipologia univoca di coesione territoriale, perché le dimensioni regionali e sub-regionali ne cambiano la connotazione nel tempo.

Lo "sparpagliarsi" della coesione sul territorio e la frammentazione delle funzioni urbane ha la sua scala di lettura nei sistemi regionali e sub-regionali policentrici. Essa procede o recede parallelamente all'andamento di altri fenomeni: mercato del lavoro (il livello di coesione è funzione delle dinamiche lavoro salariato/lavoro autonomo oltre che andamento occupazione/disoccupazione); disagio sociale, visibile nei quartieri delle grandi agglomerazioni polarizzanti e nei crescenti processi di segregazione spaziale ed esclusione sociale; esplosione e diversificazione dei bacini di mobilità/accessibilità casa-lavoro che divaricano i modelli spazio-temporali (bacini di prossimità convivono con quelli metropolitani del Daily Urban System e con quelli globali); "regolamentazione urbana e territoriale", con il sovrapporsi di territori e ambiti di competenza.

La coesione prende forma da una regione geografica integrata e dà forma a una regione geografica integrata, a un'area, cioè, occupata comunque da insediamenti, imprese, servizi, spazi naturali, rurali, urbani, montani. Molti hanno pensato di individuare la coesione regionale utilizzando tipologie di interazione funzionale (metropoli, megalopoli, sprawl come Londra, Parigi, Tokio, Milano, Ruhr-Renania, Boston-Washington), per fissare e standardizzare regole di reciprocità economica e gestionale tra aree economicamente interdipendenti (cross-border zones). In realtà, la coesione urbana dipende dalla sua esistenza a scala sub-regionale (NUTS 3), segnata in molte regioni europee, in alcuni contesti, dalla trasformazione in sistemi locali di originari localismi.

Fonti differenti richiamano sempre più l'attenzione su questa capacità, dovuta a: l'intensificarsi della concorrenza a livello internazionale; l'aumento dei processi di delocalizzazione produttiva; la propensione ad una veloce innovazione di processo, di prodotto e organizzazione generata dall'adozione di nuove tecnologie (ICT). Da questo punto di vista, la dimensione territoriale della coesione è rappresentata sempre da un'azione di interesse collettivo locale.

Nel quadro della politica di coesione, il ruolo delle città si è affermato sostanzialmente a partire dagli anni 2000. Il coinvolgimento della scala urbana, dai progetti pilota urbani dell'inizio degli anni 90, si è strutturato durante due generazioni di programmi dell'iniziativa comunitaria URBAN (fino al 2006) per poi costituire uno degli elementi portanti di molti programmi operativi del periodo 2007-2013. I fattori di successo del 'modello URBAN' sono stati individuati in coordinamento intersettoriale delle azioni, partenariati orizzontali, responsabilità locale rafforzata, concentrazione dei finanziamenti su aree geografiche bersaglio. La principale novità della politica di coesione del periodo 2007-2013 è stata quindi identificata nell'integrazione del modello URBAN (del tipo di interventi e di approcci previsti da quel tipo di iniziativa) nel sistema dei fondi strutturali: esso permette di coinvolgere tutte le città nell'ambito di diversi assi tematici. La finalità è quella di integrare al meglio le diverse politiche settoriali agenti sulla città e di migliorarne la governance. Attualmente nei programmi operativi del ERDF la dimensione urbana è esplicitamente considerata, in relazione alla possibilità per Stati membri e regioni di concepire, come in URBAN, programmi integrati urbani.

La definizione di coesione territoriale in relazione alle usuali dimensioni della sostenibilità – cioè economia, società e ambiente – può essere declinata in tre macro-componenti e cioè l'efficienza territoriale, la qualità territoriale e l'identità territoriale (Camagni et .al. 2010). L'efficienza territoriale si riferisce all'uso efficiente delle risorse rispetto a energia, suolo e risorse naturali; competitività e attrattività, accessibilità interna ed esterna di ciascun territorio. La qualità territoriale si riferisce alla qualità dell'ambiente di vita e di lavoro; standard di vita comparabili attraverso i territori; accesso ai servizi di interesse generale e alla conoscenza. La identità territoriale si riferisce alla valorizzazione del capitale sociale; lo sviluppo di un visione condivisa del futuro; salvaguardia delle specificità e rafforzamento delle vocazioni produttive e dei vantaggi competitivi di ciascun territorio. Nell'enunciazione delle priorità di intervento relativi agli Obiettivi Convergenza e Competitività possiamo agilmente identificare le questioni legate all'ambiente urbano e alla gestione dei servizi di interesse generale insiti nella concezione di coesione territoriale.

Un'analisi preliminare applicata al primo periodo della presente programmazione (DG Regio, 2008) su programmi operativi ERDF evidenzia alcuni risultati interessanti. In particolare:

1) le azioni previste per le città sono molto variegate ma considerano aree bersaglio sia in termini di riqualificazione di aree svantaggiate oppure di potenziamento competitivo di poli di innovazione; in questo senso si tratta di azioni conformi agli obbiettivi di coesione legati a crescita ed occupazione;

2) la possibilità di includere azioni urbane e di coinvolgere direttamente le città ha avuto molto successo dal momento che un buon numero di regioni e di Stati membri le ha inserite nei programmi operativi;

3) invece di comporre strategie integrate di sviluppo urbano le tipologie di intervento sono settoriali;

4) nonostante le ampie possibilità offerte dal regolamento 2007-2013 per il miglioramento della governance nelle operazioni di sviluppo urbano raramente esse sono state considerate nei documenti di programmazione: in particolare manca sia un coinvolgimento locale efficace nella concezione e implementazione dei programmi sia la partecipazione attiva dei cittadini;

5) la maggior parte delle città coinvolte riveste un ruolo molto limitato nel processo decisionale e nella gestione dei flussi finanziari sul territorio.

6   CONCLUSIONI

L'attuale crisi economica e finanziaria investe tutti i settori dell'economia. Le misure prese a partire dal 2008 mirano a recuperare livelli di reddito e di occupazione puntando su una crescita intelligente, sostenibile ed inclusiva, secondo Europe 2020. La sostenibilità (complessiva) del modello rappresenta un fattore chiave: è infatti cruciale che gli interventi di sostegno all'economia e di mitigazione degli impatti sociali della crisi siano compatibili con gli obbiettivi di sostenibilità di lungo termine. La scelta strategica sembra essere quella di cogliere la crisi come opportunità per sviluppare un modello di società che sia a bassa emissione di

carbonio, efficiente nell'uso delle risorse, basato sulla conoscenza e sull'inclusione sociale. Nel breve periodo questo si deve tradurre nell'adottare misure 'green' (supporti, incentivi..) che rivitalizzino l'economia e creino occupazione. Nel medio e lungo periodo ciò dovrebbe aiutare la creazione di nuove tecnologie e ridurre l'impatto delle azioni antropiche sul cambiamento climatico, l'impoverimento delle risorse naturali e il degrado degli ecosistemi.

In questo momento la fase è cruciale per la determinazione degli orientamenti relativi al prossimo periodo di programmazione post 2013. Le indicazioni contenute nella proposta di nuovo regolamento 2014-2020 proprio in relazione al 'nuovo obiettivo' della coesione territoriale fanno riferimento alla necessità di affrontare il ruolo delle città, delle aree geografiche funzionali e dei territori subregionali che hanno specifici problemi geografici o demografici.

Per molti, la città, e non il territorio, emerge come veicolo di coesione a due velocità: degli esclusi e dei vincenti. Questo si rileva in tutte le città fordiste, dove però il fenomeno della segregazione è "associato" con una forte solidarietà di classe e possibilità di socializzazione dovuta alla ridotta ampiezza dei bacini di mobilità. Nella città "esplosa", al contrario, la segregazione è "dissociata", con isole di povertà ed esclusione localizzate casualmente all'interno del tessuto urbano, quasi a formare un arcipelago.

Per ricomporre questa coesione destrutturata serviva, secondo i modelli di fine '900, un tessuto connettivo organizzato su 3 elementi: l'accessibilità interna (tempo medio di mobilità inferiore ad un'ora, diversificazione e specializzazione delle attività, offerta di beni completa, complementarietà complesse organizzate a rete); la presenza di nodi di interconnessione di reti differenziate che permettano l'accesso ai nodi esterni del sistema globale; l'autorganizzazione, che dà luogo ad un paesaggio fortemente interconnesso dove i bacini di mobilità si allargano e si sincronizzano (come suggerisce il caso olandese).

In questo modo sembrava possibile personalizzare modelli coesivi policentrici in termini di residenza-lavoro lasciando che l'individuo si costruisse una città "à la carte" in sostituzione della integrazione fordista e della dsintegrazione post-fordista. Questo nuovo modello, definito di metropolizzazione-regionalizzazione, sancisce un'idea di coesione in accordo con la riforma degli Enti locali in alcuni paesi europei (Francia, Italia, Spagna), enfatizzando il ruolo del territorio e costringendo ad interrogarsi su quale modello di integrazione realizzare attraverso il piano, a quali costi collettivi, quali le scelte irreversibili, quali sistemi di governance e government più adatti alla complessità, quali le criticità delle scale da trattare: micro-territoriale per ottenere una coesione compatta e co-operativa; macro perché sia coerente.

La coesione comincia ad essere rappresentata e misurata da un tipo di regione nella quale la vita economica e sociale è direttamente influenzata dai caratteri di sufficiente integrazione e interdipendenza intra e transfrontaliera. Importanti in questo ottica le riflessioni contenute nello Schema di Sviluppo dello Spazio Europeo (CEC, 1999), dove, per diverse ragioni, si sono fissati i principi guida di natura etico-culturale che dovevano regolare l'azione dei soggetti (pubblici e privati) che concorrono alla definizione del modello di sviluppo coeso. Quindi un interesse comune europeo per il mantenimento di uno sviluppo territoriale equilibrato e sostenibile – fondato sul rispetto delle aree sensibili e ad elevato pregio naturalistico, su un'organizzazione degli insediamenti umani attenta al consumo di suolo e ad un equilibrato rapporto con il territorio – e l'acquisizione alla cultura policy-making europea di due concetti:

- la città e l'armatura urbana complessiva sono solo strumenti della competizione fra sistemi territoriali in epoca di globalizzazione, è al contrario la coesione l'elemento portante della capacità competitiva;

- le reti di città possono rappresentare un modello di organizzazione territoriale coeso a livello intermedio, ma non necessariamente policentrico, che consente ad un sistema di città di medie dimensioni di raggiungere elevati livelli di competitività attraverso rapporti di sinergia e di complementarietà, economie di rete e di specializzazione solo se il sistema è già potenzialmente in essere un sistema.

La risposta che molti hanno dato, sia nel caso delle reti regionali di città, sia nel caso delle metropoli maggiori, è la connessione alle grandi reti di trasporto e comunicazione trans-europee come scelta policentrica equipotenziale coesa. Tutto il contrario della condizione posta dall'UE per il raggiungimento di uno sviluppo equilibrato e di obiettivi complessivi di equità territoriale: intervento in aree di esclusione e di povertà; competitività migliorando l'efficienza e l'accessibilità esterna a disposizione di investitori esterni alla città; la sostenibilità agendo sulla rete energetica e l'uso di risorse scarse come suolo e spazi aperti.

Questa divergenza si deve probabilmente alla spiccata 'propensione culturale' mostrata dal Comitato di Sviluppo Spaziale Europeo a privilegiare (anche finanziariamente) la trattazione di temi urbani rispetto alla coesione (rigenerazione con interventi integrati di quartieri in crisi; partecipazione dei cittadini alle scelte di pianificazione e di progettazione urbana; gestione strategica della riqualificazione del centro-città; scambio di esperienze di best practice nelle politiche urbane) come se si dovesse fare di tutto per ribadire che la metropoli esiste veramente, o si deve costruirla laddove non c'è mai stata.

La risposta è invece includere la Territorial Agenda 2020 nelle azioni di pianificazione, in particolare alla scala urbana per superare meta-modelli space-blind o metafore di indirizzo generaliste sulla coesione.

7 RIFERIMENTI BIBLIOGRAFICI

BARCA L. :'An Agenda for a Reformed Cohesion Policy': A Place-based Approach to Meeting European Union Challenges and Expectations (Independent report prepared at the request of Danuta Hübner, Commissioner for Regional Policy), 2009
BRUNHES, J., Vallaux, C. : La Géographie de l'Histoire, Edizioni Alcan. Paris, 1921
CAMAGNI et al.: TIPTAP. Territorial Impact Package for Transport and Agricultural Policies Applied Research Project 2013/1/6 Final Report – Part A and B, ESPON Programme 2013, available on www.espon.eu. 2010
CEC- European Commission: ESDP – European Spatial Development Perspective: Towards a Balanced and Sustainable Development of the Territory of the European Union. Luxembourg. 1999.
CEC – European Commission: Investing in Europe's Future: Fifth Report on Economic, Social and Territorial Cohesion – The Future of Cohesion Policy. 2010.
COMMISSION EUROPEENNE – Direction Général Politique Régionale : Renforcer la dimension urbaine: analyse des programmes co-financés par le Fonds européen de développement régional pour la période 2007-2013, Document de travail de la Direction générale Politique régionale, Bruxelles, 25 novembre 2008.
http://ec.europa.eu/regional_policy/sources/docoffic/2007/working/urban_dimension_fr.pdf, 2008
COMMISSION OF EUROPEAN COMMUNITIES: Green Paper on Urban Environment, Communication of Commission to the Council and Parliament, COM(1990) 218), 1990.
COMMISSIONE DELLE COMUNITÀ EUROPEE: Comunicazione della Commissione al Consiglio, al Parlamento Europeo, al Comitato Economico e Sociale e al Comitato delle Regioni – Quadro d'azione per uno sviluppo urbano sostenibile nell'Unione Europea COM(1998) 605 finale, 1998.
COMMISSIONE DELLE COMUNITÀ EUROPEE: Comunicazione della Commissione al Consiglio, al Parlamento Europeo, al Comitato delle Regioni e al Comitato Economico e Sociale Europeo COM (2008) 616 final Libro verde sulla coesione territoriale. Fare della diversità territoriale un punto di forza {SEC(2008) 2550} Bruxelles, 2008
COMMISSIONE DELLE COMUNITÀ EUROPEE: Comunicazione della Commissione EUROPA 2020 Una strategia per una crescita intelligente, sostenibile e inclusiva3.3.2010 COM(2010) 2020, Bruxelles, 2010
D'ORAZIO A.: "Quale dimensione territoriale nelle politiche comunitarie? Strategia Europe 2020 e obbiettivi di coesione" in XXXII CONFERENZA ITALIANA DI SCIENZE REGIONALI, AISRe 15-17 settembre, Torino, 2011
EUROPEAN COMMISSION: Towards an urban agenda in the European Union, COM(1997) 197, 1997
EUROPEAN COMMISSION: A white paper on European Governance., COM(2001), 428/2, CCRE-CEMR. Bruxelles, 2001.
EUROPEAN PARLIAMENT: Report on the urban dimension in the context of enlargement (2004/2258(INI)) Committee on Regional Development Rapporteur: Jean Marie Beaupuy, 2004.
GEORGE P.: Manuale di geografia economica, Edizioni Liane. Milano, 1967.
INFORMAL MINISTERIAL MEETING ON URBAN DEVELOPMENT AND TERRITORIAL COHESION: Territorial Agenda of the European Union. Towards a More Competitive and Sustainable Europe of Diverse Regions. Leipzig on 24/25 May, 2007
INFORMAL MINISTERIAL MEETING OF MINISTERS RESPONSIBLE FOR SPATIAL PLANNING AND TERRITORIAL DEVELOPMENT: Territorial Agenda of the European Union 2020. Towards an Inclusive, Smart and Sustainable Europe of Diverse Regions, Gödöllő, Hungary on 19th May, 2011.
INTER-SERVICE GROUP ON URBAN DEVELOPMENT: The urban dimension in European Union policies, Bruxelles, , available on http://ec.europa.eu/regional_policy/index_en.htm, 2010
JAJA, G.: Lezioni di Geografia, GUF . Genova, 1938.
LO MONACO, M.: I sistemi economici, in Lo Monaco M. (a cura di), Appunti di Geografia economica, Kappa, pp. 7-43. Roma, 1982.
OECD: "National support programmes to LEIs: content and evaluation", LEI Notebook, April issue N.16 , 1992
OECD: "Evaluating Local Economic and Employment Development: How to assess what works among programmes and policies" 2004
OECD: "Making Local Strategies Work: Building the Evidence base" 2008
PREZIOSO M.: STeM Approach – towards a common and cohesive European policy, in Boscaino P. (ed. by), Present and future of ESDP. Proceedings of International Conference, , Alinea, pp. 79-92. Città di Castello, 2005
PREZIOSO M.: STeM Approach for a sustainable territorial development of the Lisbon strategy, in Ersa, 46th European Congress – ESPON Special Session, Volos, agost-sept. (CD). 2006
PREZIOSO M.: "Cohesion policy: methodology and indicators towards common approach". ROMANIAN JOURNAL OF REGIONAL SCIENCE, vol. 2, p. 1-32, ISSN: 1843-8520, 2008
PREZIOSO M.: Territorial cohesion facing the crisis: how do indicators address newly the issue?. In: La cohésion économique, sociale et territoriale en Europe. CERI-DATAR Paris, 2011.
SCHUMPETER J.: Storia dell'Analisi Economica, Oxford University Press, New York, 1954.
SOMBART W.: Il Capitalismo moderno, Utet, Torino, 1967.

Urban Nexus – Structured Dialogue, Problem-Solving, and Strategic Partnerships

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1 ABSTRACT

Urban Nexus is a 3 year €1m, multi-partner Coordination Action (2011-2014), funded by the European Commission (FP7), that aims to enable and further strategic urban research which can address the challenges facing European cities today. These challenges include the current economic crisis, sprawling urban development and pressures on the natural environment, as well as the longer-term implications related to climate change and resource scarcity e.g., peak oil and water.

Urban Nexus supports the development of a structured dialogue with all relevant stakeholders, including civic leaders, policy-makers, businesspeople, researchers and educators to enable rich communication, knowledge transfer and partnership-building around these challenges.

This form of direct engagement will help to build upon and strengthen the relationship between various stakeholders and policy-makers through engagement, collaborative prioritisation, and knowledge transfer, to secure long term strategic partnership. Framed by these principles, the Coordination Action pursues the following objectives:

- Increase awareness, knowledge exchange, cooperation and collaboration through structured dialogue;

- Promote innovative problem-solving approaches to the complex and interrelated policy issues concerning sustainable urban development and;

- Further the long-term strategic framework for scientific cooperation through the enabling and building of strategic partnerships.

This in turn should lead to integrated perspectives for sustainable and resilient urban communities.

2 URBAN NEXUS – STRUCTURED DIALOGUE

Urban Nexus is developing structured dialogue with stakeholders in relation to the key dimensions of sustainable urban management including energy, water scarcity, transport, tourism, technology and innovation, governance, social equity and cohesion, and sustainable consumption. These are prioritised according to stakeholder consultations, conducted via the project Stakeholder Advisory Board.

The scope of the Coordination Action does not permit all issues to be addressed equally, nor indeed is this desirable. The political priorities for the territorial management of cities and city region's provide the basis for understanding and structuring of the interconnected complexity of urban life and thereby the effective management of the city towards sustainable development. Cities in Europe today respond to a variety of sometimes conflicting (political) demands. In responding to the political imperative of climate change mitigation and adaptation cities must also ensure that cities fulfil their role as motors of economic development whilst securing appropriate conditions for a socially cohesive and healthy population, and quality of life. The Urban Nexus conceptual framework provides the basis for ordering and prioritisation of the various challenges faced, highlighting the strategically critical elements, and also providing principles to define the interconnectedness of all elements. This framework is derived directly from the legacy of the URBAN-NET project (ERA-NET).

The URBAN-NET framework promoted the vision of the sustainable city by focusing on future research needs and activities that stimulate the planning, financing, performance, dissemination and utilisation of research amongst all stakeholders at all levels including local, regional, national, transnational and European. This framework includes:

- adapting to climate change;

- health and quality of life;

- sustainable land-use;

- integrated urban management;
- integrated information and monitoring.

2.1 Adapting to Climate Change

Anthropogenic climate change and its consequences are major challenges for European cities. European cities are traditionally built in strategic geographical locations along major rivers or next to the sea, consequently a substantial number of European cities are likely to experience the direct impacts of climate change including flooding as well as extreme temperatures. Climate change has severe implications for urban populations including heat stress, cardiorespiratory complications, parasitic and infectious disease, flooding, and drought. There is therefore a strong need for the establishment of resilient cities, urban areas able to absorb changes, reorganize and integrate economic, socio-cultural and ecological developments. Strategies are needed to improve the collective responsiveness and preparedness of individuals, institutions and services to the inevitable consequences of climate change. Education, health care, public health initiatives, infrastructure and economic development will become increasingly important in maintaining acceptable levels of quality of life.

There has been a lot of research attention focused on the mitigation of climate change. Mitigation aims to reduce emissions of greenhouse gases and curb further anthropogenic climate change by reducing energy consumption, improving energy efficiency, the substitution of fossil fuel use and changes in land-use practice. However, adaptation is a necessary imperative for responding to climate change. Urban areas and cities are particularly vulnerable due to the complexity and interdependency of activities and relationships between actors. Urban-specific characteristics serve to amplify climate change impacts, e.g. the urban heat island effect, increased flood risk due to greater impermeable surface area and, in the majority of cases, the proximity of urban areas to coasts, rivers or watersheds. Adaptation is often overlooked in favour of mitigation, witness the international efforts of the Kyoto Protocol to address emission reductions at a global scale. However, the scale and sophistication of day-to-day relationships and interactions in urban areas across Europe and other continents belies the fragility and susceptibility of urban society, economy and infrastructure to seemingly remote or even minor perturbations arising from climate change. Changing climate trends and an increasing frequency of extreme events, such as forest fires, drought, heat waves, excessive precipitation and storms, are pushing urban societies ever closer to unpredictable and potentially chaotic futures.

2.2 Health and Quality of Life

There has been increasing recognition that the planning, design and management of urban areas has significant implications on the health and quality of life of urban populations. Reliance on cars, high levels of pollution and poorly designed and planned neighbourhoods has exacerbated problems with health and health related behaviours. Research has focused on a number of areas including for example, sustainable transport, the design of cities and suburbs, and the promotion of physical activity and the exposure of urban populations to contaminants in water, air and soil. Despite a raft of evidence and guidance, the recommendations for how to achieve healthy lifestyles remain disconnected and ineffective. What is needed is the development of an integrated understanding and problem-solving orientation for issues concerning quality of life and sustainability in the urban realm through bringing challenges and risks to health into the foreground. In addition, this could include a synthesis of evidence of risks and challenges to people's health arising from spatial planning as manifest in urban form and urban design in an accessible form. However, health and quality of life remains a complex issue which cannot be solved by one agency alone. Therefore, consultation is required with a range of stakeholder communities including planners, those in the health care sector, education institutions and so on, to develop a common understanding of the integration and synergy between the wider determinants of health, economic resilience and urban ecosystem services.

2.3 Sustainable Land-Use

Land-use and land management practices have a major impact on natural resources including water, soil, nutrients, air, plants and animals, landscape and landform. One of the most important tasks of a sustainable land-use policy should be to minimise environmental impacts and in particular the consumption of natural resources. It is still unclear how this goal could be reached and what measures would be appropriate. The

polycentric city region model has been suggested as a basic orientation model and vision of urban sustainability in which autonomous cities create a continuum of densely developed and mixed-use areas and landscapes; integrating energy, food production, open space and spatial concentration of buildings. The model of a polycentric city region appears to combine the advantages of a compact city such as density, mix of functions, public transport with the individual qualities of suburban areas e.g. green spaces, child-friendly environments and home ownership. This model seems more valid for some parts of Europe than for others, for example not immediately for the lower density parts of Europe. However, research is needed to understand the driving forces, interactions and dependencies and to find innovative solutions as part of a participatory decision-making process between citizens, local government and other actors. The achievement of sustainable land-use and settlement structures seem to be mainly a question of decision-making and implementation. Thus, research should also contribute to implementation through scientific analyses, advice and evaluation. Research for and about implementation has a role other than implementation alone. It is about observing or preparing and analysing decisions and their implementation which in turn will also be about lessons learned and best practices.

2.4 Integrated Urban Management

The interconnectedness of the social, economic and environmental dimensions of urban life and the associated drivers of change at the urban level, also create complex conditions for urban management, and fundamental barriers to the effective implementation of sustainable urban development. In response to this interconnectedness and complexity, the principles for integrated urban management have become the pre-eminent framework for the development of appropriate policy responses to these urban challenges.

One basis for policy failure in relation to the land-use – transport – environment nexus can be attributed to difficulties of securing an integrated policy response between the responsible agencies. Two fundamental poles of this integrated policy response concern first, the horizontal policy integration necessary between the sectoral agencies responsibilities for land-use management, and transport and environmental planning, at the local and regional levels of governance. Failure to secure an integrated policy response is attributed to variety of factors including notably organizational and procedural barriers to achieve central coordination, as well as problems of communication between organisations.

The second dimension of policy integration concerns vertical coordination between agencies responsible for policy delivery at local, regional, national and EU levels. The factors identified above operate in the horizontal perspective and are equally applicable, but in land-use management in the European context in particular, a special focus is required on how to reconcile subsidiarity with necessary coordination of actions.

2.5 Integrated Information and Monitoring

Effective monitoring of the pressures, state and impacts at the urban level, as well as the effectiveness of policy responses in controlling urban development, is clearly essential. One of the prime barriers to integrated urban management is identified in the opportunity to address and overcome these deficiencies in policy responses necessary to secure sustainable urban development.

2.6 Structuring Principles and Structured Dialogue

The concepts reviewed above provide a prime basis for analysing the various interconnected issues that define the complexity of the city and the challenges of city management. These concepts deliver structuring principles, and a basis for prioritisation of the thematic focus for knowledge transfer and the delivery of structured dialogue to the urban stakeholder communities. The thematic focus for knowledge transfer and structured dialogue in Urban Nexus is also developed according to stakeholder assessment of the priorities for the delivery of sustainable urban development, difficulties of measurement via indicators, and in the creation of assessments of urban impacts that effectively relate to policy needs. The complexity of urban interactions is clearly a major challenge in this regard, but the generation of integrated information and effective monitoring of policy implementation is also undermined by information management systems that are primarily designed to meet the needs of a particular agency and which do not communicate with other agency information systems. The fragmentation of the information and intelligence essential to support integrated policy solutions and policy implementation seriously impedes the effective response of cities and regions of Europe to these challenges.

3   STRUCTURED DIALOGUE AND SUSTAINABLE URBAN COMMUNITIES

On the basis of the structured dialogue developed in the urban Nexus Dialogue Cafes focused on the themes of Urban Climate Resilience (Glasgow, May 2012) and Health and Quality of life (Barcelona, October 2012), the following challenges related to resilient communities have been identified by the stakeholder communities:

3.1 Integrated Approach beyond Individual Policies

An integrated approach is needed to support policies. Of course this is not new, but we need to go beyond the level of individual prolicies. Structured partnerships between policy-makers, the private sector, researchers and civil society are necessary to address cost issues and to mobilise wide societal support for sustainable urban development, especially as these are under pressure in these times of economic crisis. An integrated set of indicators is also needed in order to ensure better measuring of potential hazards for cities (climate, land use, air pollution etc.). Harmonization of different data bases between different city sectors, between city and governmental administration and between cities on trans-border and transnational level is also a target. Upgrading city management with an objective permanent monitoring of urban change, territorial management and efficient use of different financial mechanisms, including European funds, should also be considered. Integrated sets of indicators, correlated to local and regional priorities, traditions and territorial and environmental capacity, will allow for better cross-boundary cooperation and territorial development within Europe.

3.2 Green Infrastructure

Promoting green infrastructure is an effective way to increase health and quality of life in cities. It also has capabilities to address climate issues: it helps to decrease urban heat island effects and could act as a buffer for water retention. Green infrastructure has the power to mobilise support for sustainable development because of its appeal at the local level. Green infrastructure could be the leverage for securing more attention to resilience and adaptation, rather than the current focus on mitigation.

3.3 Built Environment

Health and quality of life in cities is not only about implementing technological improvements in order to ensure less noise and better air quality. Good urban design will lead to better traffic flows and should lead to more lively urban areas at the same time. This, together with green infrastructure, improves the quality of life in cities. Upcoming activities on the theme of urban land use will surely add more knowledge to this. Advanced investigation into tendencies for urban sprawl or shrinking cities together with risk assessment on natural and anthropogenic disasters or catastrophes provide further potential for better strategy and action planning on sustainable urban management.

3.4 Bottom-up Initiatives

Often bottom-up initiatives in neighbourhoods result in the development of more sustainable characteristics of the area while fostering social cohesion among citizens. Interestingly, many promising initiatives happen in areas confronted with demographic decline. It is a cost-effective way to improve the general quality of life in cities. Moreover, large-scale political action on sustainability can only be enforced if there is wide support for it among the population. Bottom-up initiatives can create such support, in tandem with the wider partnerships between business, research, civil society and policy-makers mentioned above, and regional networks are a potential solution.

4   CONCLUSION

The urban Nexus long-term strategic partnership aims to respond to a dynamic of self-organising governance in forging a new conceptual basis for long-term strategic partnership, and in facilitating partnership formation in the framework of Dialogue Cafe interactions. The conceptual framework for the long-term strategic partnership is identified with the public, private and 'third' sectors. Partnership between these sectoral interests combine the innovation of the private sector, the collective values of the public sector, and the human desires of the third sector. These partnerships and linkages can be classified into three basic combinations – public-private, private-community and public-community – where each sector has certain strengths, weaknesses, opportunities and threats:

- Public-private linkages include various partnerships and consortiums, ethical procurement, supply chain initiatives, and much of mainstream economic development activity.

- Private-community sector linkages include local business or regeneration partnerships, social investment funds, 'mutual' or cooperative finance firms, corporate trusts and companies, consumer clubs and networks, cooperatives, community development trusts and other forms of social enterprise.

- Community-public sector linkages include voluntary sector compacts, neighbourhood partnerships, customer charters, intermediate labour markets, social trading, and other forms of community enterprise.

5 REFERENCES

Urban Nexus Consortium, Urban Climate Resilience: Synthesis Report and Follow-up Report, Glasgow, 2012.
Urban Nexus Consortium, Health and Quality of Life: Synthesis Report, Barcelona, 2012.

Urban Risk Assessment using Intelligent Geoinformation System

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1 ABSTRACT

Urban safety became one of the important components of a city government work in the whole world. It is connected with growth of megalopolises and agglomerations, globalization of terrorist and criminal structures, increase of number of natural and technological disasters. Therefore information system is necessary for management of urban areas that will allow to reduce resources spent on organization of situation monitoring in the cities and to increase overall performance of city services.

In the paper questions of development and implementation of urban safety information system on the basis of intelligent geoinformation technologies are considered.

2 INTRODUCTION

Hundreds of various catastrophes happen every day in the world. It is natural disasters (earthquakes, floods, tornado, snowfalls and others), technological disasters (fires, oil spill, dike burst, electric power system accidents), and transport accidents (shipwrecks, car accidents, air crash, railway accidents). Modern cities are complex, suballocated areas. Selection of megacities, agglomeration, coastal, dryaland, islands and high-altitude cities as places of residence make people particularly vulnerable in terms of their safety. As a consequence, urban population is less protected and urban areas are more vulnerable in case of catastrophe. All that leads to death of many people, heavy economic and environmental damage. In the past few decades the number and immensity of natural disasters increased approximately in 5 times, and their danger – in 9 times. Also it is important to note that in underdeveloped countries losses on natural disasters is significantly higher, than in economically developed regions (McGranahan G. et al., 2007).

Urban safety problem is one of the key problems considered in the most part of publications. The greatest contribution to the development of the concept of cities security is made by C. Moser (Moser C. et al., 2008) and G. McGranahan (McGranahan G. et al., 2007). Also the problem of risk assessment from natural and technological disasters is often discussed at CORP conferences. For example, the damage caused to large cities by floods is estimated in (Aubrecht, et al., 2009; Liao, et al., 2011).

Therefore development of effective system for risk of urban areas safety forecasting and assessment now is needed. Such system will allow:

- in some cases to prevent catastrophes;
- to provide recommendations to implement timely behavior in case of disasters;
- to estimate accident consequences.

In the paper one of the risk assessment methods for suballocated areas and variants of risk map creation using GIS-technologies is discussed.

3 RISKS' ASSESSMENT METHOD

The risk is understood as possibility of an event occurrence with negative implications. Risk assessment assumes calculation of a set of quantity characteristics, i.e. definition of possible implications of risks realization for different groups of population and infrastructure. Risk assessment includes following main aspects: estimation of damage from influence of one or several hazards, probability of disasters and others.

The risks assessment related to consequences of natural and technogenic disasters in a given region can be described as a set of features. So, the number of natural and technogenic disasters for the region has distribution density of this event time.

Risks assessment of natural and technological disasters consequence for a given region is proposed to be made using the method that includes the following steps:

(1) Dividing the entire set of possible natural and technological disasters variants into groups according to their parameters. Building groups is based on available statistics for these groups as well as on initial states

of infrastructure objects and population density for the given region. Groups are used in order to define matching probabilities of the events' occurrence.

(2) Defining based on statistics distribution density of event time (natural and technological disaster) taking into account disaster intensity (for example, earthquake magnitude, square of inundation area et al.). Event probability depending on time can be defined by the corresponding distribution density.

(3) Assessing risks for each variant of the natural and technological disaster with regards to infrastructure objects and population of the given region.

(4) Calculating the mean value of possible natural and technological disaster risks for these objects in a given time range taking into account uncertainty of event time.

Let us dwell upon the features of each step. Definition of density functions of i dangers occurrence time $f_i(t)$ can be carried out in advance and in future they are only improved. For recognition of natural and technological disasters current conditions on the basis of registered data analysis known methods (Ayvazyan S.A. et al., 1989) can be used.

For calculation of initial parameters of natural or technological disasters in some cases the known models and methods can also be applied (Stallings R.A., 2003). Each variant of initial condations leads to receiving $B_i(t)$ - parameters of i-th dangers in the given region using this models and methods. These parameters include the number of human losses, the number of earthquake induced failures, the square of ecological pollution et al.

Risk assessment of each natural or technological disaster at time instant T provides accounting its properties (for example, disaster intensity, damage by disaster et al.), as well as accounting the characteristics of the inflicted facilities. In the interests of such assessment taking into account natural or technological disaster event time uncertainty $\overline{B}_i(T)$ – mean values for parameters of i-th dangers at time instant T are calculated as:

$$\overline{B}_i(T) = \int_0^T B_i(T-t) f_i(t) dt \qquad (1)$$

It is suggested to calculate conditional risks $W_{ij}(\overline{B}_i(T))$ - of i-th dangers at time instant T for specific j-th objects depending exactly on the parameters $\overline{B}_i(T)$. These especial conditional risks can be, for instance, determined by experts. They can be also received as a result of the processes' modeling based on advanced geoinformation technologies and special analytical problems' solutions. Among these problems are the assessment of area flood level, the environmental threats occurrence and other.

The resulting predicted risk from natural or technological disasters at time instant T taking into account previous conditions and probabilities P_i of i-th dangers occurrence are calculated using the following equation:

$$W_\Sigma(T) = \sum_{i=1}^n \sum_{j=1}^m W_{ij}(\overline{B}_i(T)) P_i \qquad (2)$$

where m – the number of analysed objects or regions.

Risk $W_\Sigma(T)$ according to (2) is a current risk. Risks' prediction for specified time intervals is possible using integral estimates derivation.

Unlike the known methods the proposed approach allows to predict the risks from natural or technological disasters in the current situation under a significant uncertainty of risk emerging time. The new method can be successfully implemented in modern geoinformation systems. However, the method application is associated with a number of features.

4 SOME FEATURES OF THE METHOD APPLICATION FOR GEOGRAPHIC INFORMATION SYSTEMS

Application of GIS-technologies for the solution of risks assessment problems of natural or technogenic disasters assumes application of effective methods of gathered geophysical data visualization, results of their modeling and forecasting.

Use of the risk assessment method allows operatively to reflect in geoinformation systems risk dynamics and to estimate damage values depending on type of a natural or technogenic disaster or their set. The spatial analisys performed by GIS tools allows:

- to represent the results of risk prediction as a series of thematic maps. On these risk maps taking into account spatial accessory to specific region zones that are defined by specific values $W_\Sigma(T)$ both separated objects and groups of objects can be displayed. Creation of the thematic maps assumes development of qualitative scale for $W_\Sigma(T)$ values that reveals the relation between risk level and level of destruction. On the basis of the developed dynamic maps the decisions aimed to decrease risks and to plan actions for coasts protection against disasters can be made.

- to classify regions by hazards level for each of disasters variants for specific infrastructure objects and for specific life environment.

- to carry out adoption of the rational and operational decisions directed on timely realization of actions complex, directed on reduction of risk, preservation of life and human health, decrease of damage from catastrophics.

Using intelligent GIS allows to imorove decision support on alarm, to predict possible consequences and to carry out offers on protection actions.

5 CASE STUDY

5.1 Study area

Let us consider a problem of a risk and safety assessment for Italy urban areas. The country is administratively divided into 20 regions (Table 1). The largest cities and towns of Italy are Rome, Milan, Naples, Turin, Palermo. It is known that the territory of Italy is the subject of such natural disasters, as earthquakes, floods, volcanic explosion and a tornado.

The strongest earthquakes which occurred in Italy are: Sicily earthquakes 1693 (more than 60 000 of people deaths), the Great Neapolitan Earthquake (11 000 deaths), 1908 Messina and Reggio earthquake (100 000 deaths), 1915 Avezzano earthquake (killed more than 30 000 people), the 1980 Irpinia earthquake (2570 deaths). The last happened in April, 2009 L'Aquila earthquake.

Region	Capital	Area (km2)	Population
Abruzzo	L'Aquila	10763	1342177
Aosta Valley	Aosta	3263	128129
Apulia	Bari	19358	4090577
Basilicata	Potenza	9995	58768
Calabria	Catanzaro	1508	2011537
Campania	Naples	1359	5833131
Emilia-Romagn	Bologna	22446	4429766
Friuli-Venezia Giulia	Trieste	7858	1235761
Lazio	Rome	17236	5724365
Liguria	Genoa	5422	1616993
Lombardy	Milan	23844	9909348
Marche	Ancona	9366	1564866
Molise	Campobasso	4438	319834
Piedmont	Turin	25402	4456532
Sardinia	Cagliari	2409	1675286
Sicily	Palermo	25711	5050486
Tuscany	Florence	22993	3749074
Trentino-Alto Adige	Trento	13607	1036639
Umbria	Perugia	8456	906675
Veneto	Venice	18399	4936197

Table 1: Administrative divisions.

5.2 Earthquake risk assessment for Italy region

On the basis of earthquakes data (Earthquakes, 2013) which have occurred in Italy since 1693 we will allocate nine categories of possible consequences from an earthquake (Table 2): I – instrumental to moderate; II – rather strong; III – strong; IV – very strong; V – destructive; VI – ruinous; VII – disastrous; VIII – very disastrous; IX – catastrophic.

Scale	Category	Magnitude	Estimate Number Each Year	Description
instrumental to moderate	I	<=4.3	900 000	No damage.
rather strong	II	4.4-4.8	30 000	Damage is negligeable. Small, unstable objects are displaced or upset; some dishes and glassware are broken.
strong	III	4.9-5.4	20 000	Damage is slight. Windows, dishes, glassware are broken. Weak plaster and masonry are cracked.
very strong	IV	5.5-6.1	500	Damage is moderate in well-built structures; considerable in poorly-built structures. Furniture and weak chimneys is broken. Masonry is damaged. Bricks, tiles, plaster and stones fall down.
destructive	V	6.2-6.5	100	Structural damage is considerable, particularly in poorly-built structures. Chimneys, monuments, towers, elevated tanks may fail. Frame houses are moved. Trees are damaged. Cracks appear in wet ground and steep slopes.
ruinous	VI	6.6-6.9	50	Structural damage is severe, some structural elements may collapse. General damage to foundations is caused. Reservoirs are seriously damaged. Underground pipes are broken. Conspicuous cracks are observed in ground; liquefaction.
disastrous	VII	7.0-7.3	10	Most masonry and frame structures foundations are destroyed. Some well-built wooden structures and bridges are destroyed. Serious damage is caused to dams, dikes. Sand and mud is shifting on beaches and flat land.
very disastrous	VIII	7.4-8.1	10	Few, if any (masonry) structures remain standing. Bridges are destroyed. Rails are bent greatly.
catastrophic	IX	>8.1	5-10	Damage total. Lines of sight and levels are distorted. Objects are thrown into the air.

Table 2: Categoty and number of possible earthquakes.

Fig. 1 displays histogram which demonstrate probabilities of earthquake events in each of Italy regions. Probabilities are defined on the basis of the statistical data received from http://earthquake.usgs.gov/earthquakes/map with use of statistical analysis methods. Generally, as it is seen from bar graph, Italy regions are subjects to earthquakes in a varying degree. It is possible to allocate two most dangerous regions: Sicily and Emilia-Romang. The calculations are also made for these regions.
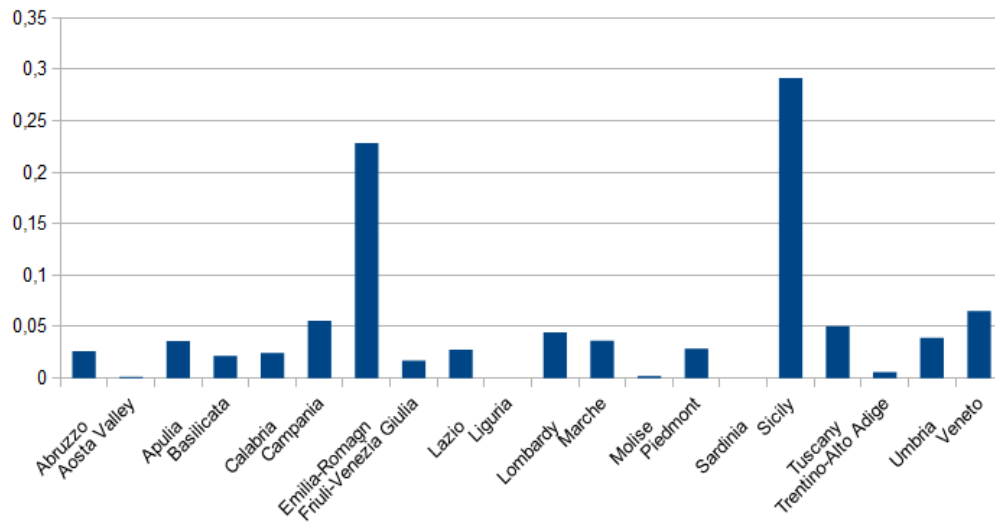
Fig 1: Probabilities of earthquake events in the Italy regions.

These calculation results are used for risk level assessment in relation to concrete components of environment or infrastructure connected with human life. The risk assessment from impact of a possible earthquake was estimated taking into account danger and damage to people health, danger and negative influence on environment for two regions: Sicily and Emilia-Romang.

Overall risks summary is made taking into account weight coefficients which have been set by an expert for each of allocated territories. In Fig. 2 the predicted risk from natural disaster at time instant , probabilities of -th dangers occurrence and earthquake magnitude for two most dangerous Italy regions: Sicily and Emilia-Romang is given.
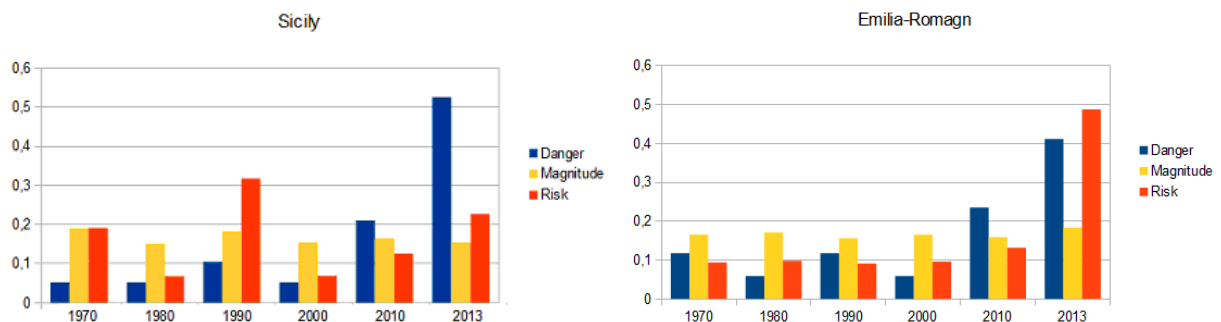

Fig 2: Results of risk assessment for Sicily and Emilia-Romang regions.

The obtained results indicate first of all that some territories become eventually more and more steady against certain types of disasters while others on the conversely, they only start meeting certain difficulties. As can be seen from Fig. 2, in recent years the earthquakes magnitude on Sicily decreases, and in Emilia-Romagn increases.

While the earthquakes magnitude on Sicily decreases, disaster hazards are preserved to be high. All this is first of all due to that over the past ten years Italians have become more prepared for possible earthquakes and eruptions of volcanoes. The researches concerning the reasons of these phenomena are continuously conducted, early warning systems are improved, and danger of underground fluctuations when constructing roads, houses and office buildings is considered.

Let's create a qualitative scale for the resulting predicted risk, using nine point grading scale of earthquakes (Table 2). This scale connects risk levels with nature of destroying influences, danger and damage to health of people. The qualitative scale for risk values is given in Fig. 3.
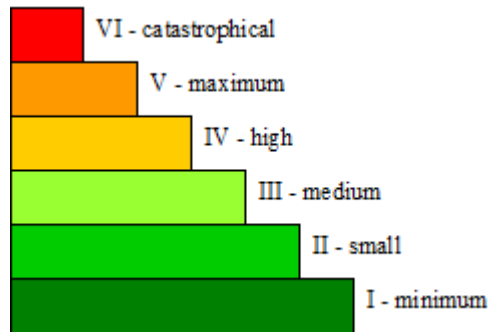
Fig 3: Qualitative scale for $W_\Sigma(T)$ values

Risk level	Risk value
VI – catastrophical	0.186-0.833
V – maximum	0.127-0.186
IV – high	0.103-0.127
III – medium	0.07-0.103
II – small	0.005-0.07
I – minimum	0-0.005

Table 3: Results of risk assessment

Negative influence degree (risk level) is estimated with a qualitative scale for the resulting predicted risks taking into account their weight coefficients. Weight coefficients are defined by experts such as city managers or other experts.

The results of risk assessment for Italy region is given in Table 4. Fig.4. illustrates a risk map. On the basis of the received risk maps further actions for region protection from the subsequent disasters are planned.

Fig 4: Risk map for Italy region.

6 CONCLUSION

The paper proposes a new approach to a risks assessment from natural or technogenic disasters taking into account specific features of regions. In future work it is supposed for risk assessment to consider not only such factors as damage to health of the person, danger and negative influence on environment, the built-up territories hazards but also social and economic risks. Also possibility of animation and 3D maps development can be discussed.

7 REFERENCES

AUBRECHT, C., KOSTL, M., KNOFLACHER, M., STEINNOCHER, K. The importance of active public communication – Settlement systems and land use patterns seen from a disaster perspective. In: Proceedings of 14th International Conference on Urban Planning, Regional Development and Information Society, pp. 895-900. Catalonia, Spain, 22-25 April, 2009.

LIAO, C.-H., CHANG H.-S. Explore Urban Flood Vulnerability based on Spatial Pattern in Taiwan Ecological City Viewpoint. In: Proceedings of 14th International Conference on Urban Planning, Regional Development and Information Society, pp. 309-314. Essen, Germany, 18-22 May, 2011.

World Bank. Building Safer Cities: The Future of Disaster Risk. Washington, DC: World bank, 2003.

McGRANAHAN, G., BALK, D., ANDERSON, B. The Rising Tide: Assessing the Risk of Climate Change and Human Settlements in Low Elevation Coastal Zones. J Environment and Urbanization, 19(1): 17-37, 2007.

MOSER, C., SATTERHWAITE, D., et al. Pro-Poor Climate Change Adaptation in the Urban Centers of Low- and Middle-Income Countries. In: Background paper for the "Social Dimensions of Climate Change" workshop, Washington, DC, 5-6 March, 2008.

AYVAZYAN, S.A., BUKHSTABER, V.M., ENYUKOV, I.S., MESHALKIN, D.D. Practical statistics. Classification and decrease in dimension. Moscow, Financy and statistics, 1989. (in Russian)

STALLINGS, R.A. Methods of disaster research. Xlibris Corporation, 2003.

EARTHQUAKERS, http://earthquake.usgs.gov/earthquakes/?source=sitenav, accept on 01.02.2013

Urban Space Patterns and Homelessness in Bucharest, Romania

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1 ABSTRACT

Urban poverty continues to represent a concern in cities' territorial planning as it alters the quality of life and it disrupts the development process in some cities. Homelessness reflects the extreme manifestation of urban poverty resulted from housing and social exclusion, even in developed European Union countries. The post-socialist transformation processes and the current economic crisis increased poverty and inequalities in Romania. Homelessness intensified and became visible after 1990, especially in Bucharest – metropolitan city that attracts both investors for development actions and poor population seeking for solutions to get out of poverty. The study investigates the urban space of Bucharest to differentiate the characteristics that influence the homeless living on the streets to locate in certain places in the city. The empirical analysis included a three-level urban space categorisation. The functional types of space were correlated to the homelessness presence according to three space characteristics: property type, physical structure and state of use. The resulted space typology was used to assess the Bucharest territory and to analyse the homelessness hot spots. The main findings argue that the characteristics that define the urban space correlate with the homelessness locations so that homeless people localisation in Bucharest depends on the urban space capacity to meet the homelessness housing and living needs. The analysis' conclusions evidence the homeless location patterns and they help urban planners and policy makers to understand the correlates between the homelessness behaviour and territory so that to include urban space modelling and to use the information to improve policies and actions to alleviate extreme poverty in Bucharest.

2 INTRODUCTION

Urban poverty represents a result of globalization and economic restructuring (Knox, McCarthy, 2012) that conducted to social polarization. Homelessness stands out as extreme poverty in the urban environments and it reflects the effects of long term unemployment, under-qualification, occupation in the informal economy and inadequate housing and living conditions (Fitzpatrick et al., 2011). The homeless suffer from severe housing deprivation and social exclusion (Eurostat, 2010) and they lack any form of proper accommodation so that they are forced to sleep in unofficial places – derelict buildings, in informal places – outdoors, or in specially destined places – night and emergency shelters (Brousse, 2004).

Current research on homelessness includes mainly studies about the people living on the streets (May, 2009) – they explain the relation between different spaces (based on functionality) and homelessness and they investigate the conflict raised by the homeless presence in the public space (Cloke et al., 2010; Paasche, 2012; Radicchi, 2012; Schmidt, 2012; Tompsett, Toro, 2010; Young, 2012). While the international literature finds some correlations that explain the homeless location preferences (Lee, Price-Spratlen, 2004; Cloke et al., 2010; Rukmana, 2011; Radicchi, 2012), studies focused on homelessness in Romania (Dan, Dan, 2005; O'Neill, 2010) lack such a geographical approach to evidence the interdependencies and connections between homelessness and territory.

Based on the Bucharest territory assessment, we aimed to identify the urban space patterns that influence the homeless to locate in certain places in the city. The typology of spaces occupied by the homeless reveals the multilevel relation between population, extreme poverty and territory in the Bucharest urban environment.

3 METHODOLOGY

3.1 Study area

The restructuring processes during the transition period (Ceccato, Lukyte, 2011; Göler, Lehmeier, 2012) and

the current financial crisis resulted in increased poverty and homelessness in Romania. Bucharest represents the homeless concentration area in Romania as a side effect of being the main investment area and the most populated urban area. Quantitative studies (Dan, Dan, 2005) estimated 11000 – 14000 homeless people in Romania, with around 5000 homeless persons in Bucharest. The profile of the homeless in Bucharest consists of adult men, between 31 and 60 years old, with secondary education (Paraschiv, 2012), but the

share of women and families living on the streets is increasing. Familial conflicts and former child care residents represent the main causes of homelessness in Bucharest and the main accommodation choices include the underground canals, the improvised shelters and the interior of blocks of flats (Cărăboi, 2011).

3.2 Urban space typology and homelessness

Based on direct field observation, the Bucharest territory was investigated to detect the main areas where the homeless concentrate (Fig. 1). Then, the urban space in these areas was assessed to construct a typology of the space characteristics that act in the homeless location options.
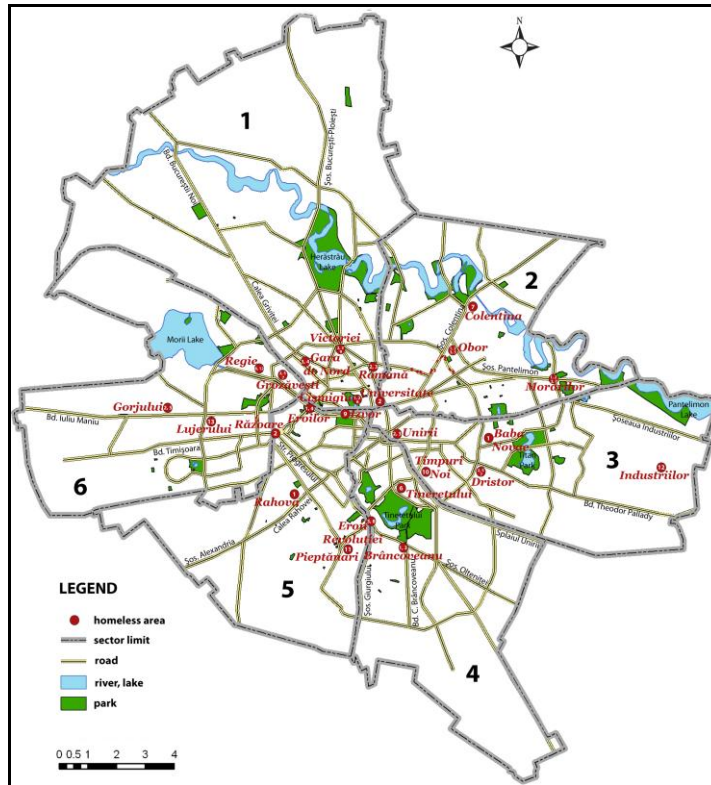

Fig. 1: The homeless concentration areas in Bucharest

The Bucharest urban space assesssment was based on the urban space characteristics resulted from three criteria considered (Fig. 2). The property type of a certain space states for two main and two secondary urban space types: (1) public spaces – semi-public spaces; and (2) private spaces – semi-private spaces. According to their physical structure, urban areas may be open or closed spaces, and their state of use depicts used or derelict spaces. The interrelation between all these characteristics helped to evaluate the homeless areas and to identify the urban space patterns that intervene in the homeless territorial distribution within the city of Bucharest.
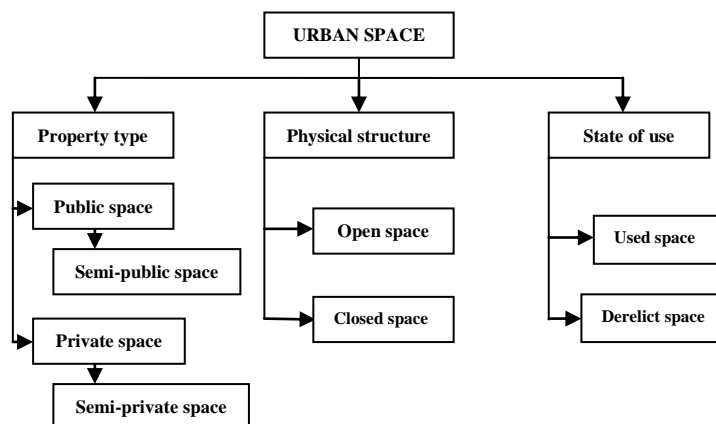

Fig. 2: Characteristics employed in the urban space assessment. Source: adapted after Paraschiv (2013)

4 RESULTS

Homelessness concentrates mainly in the central and the pericentral areas of Bucharest. The analysis of the Bucharest homelessness areas in relation to their space characteristics evidences the typology of functional spaces (Table 1) the homeless use to satisfy their housing and living needs. The public, open and used (in use) spaces include three different functional categories: (1) green spaces – parks frequented by the whole city's population or by the district's population; or neighbourhood gardens and squares; (2) intersections – in the city centre or near commercial areas; pedestrian space – sidewalks in the city centre or around residential spaces; and (3) transport infrastructure space – railway or public transport (metro, bus, tram) stations. The public, open, but derelict spaces where the homeless locate include undeveloped or neglected green spaces – ussually small sized and near institutions (a hospital) or high traffic areas (a railway station). Semi-public places, open and used, refer to commercial spaces like markets, hypermarkets, shopping malls and shops that the general population accesses freely, but the homeless may face restrictions due to their physical appearance. But the homeless locate near these commercial spaces to get money or food. The sewerage infrastructure space represents a public property, but without being destined for public use, so that it constitutes a semi-public, closed and used space the homeless largely choose for sheltering. The sewerage canals gather the group homelessness, formed generally by the homeless people with substance dependencies (drug, alcohol). The homeless utilise the residential space in every state it may be found – in use or abandoned. The only used residential spaces the homeless may employ for sheltering are the blocks of flats, where they find shared spaces – the hallway, the stairs, the basement, the attic – available to use if the inhabitants agree. Otherway, the homeless may live in derelict individual houses or apartment buildings.

Urban space patterns		Homelessness areas
Public/Open/Used space	*Green spaces*	Obor, Morarilor, Baba Novac, Rahova, Cişmigiu, Eroilor, Brâncoveanu
	Intersections, Pedestrian space	Gorjului, Răzoare, Grozăveşti, Romană, Universitate, Obor, Morarilor, Dristor, Cişmigiu, Victoriei, Unirii
	Transport infrastructure space	Gara de Nord, Romană, Obor, Morarilor, Eroii Revoluţiei, Victoriei, Unirii, Brâncoveanu
Public/Open/Derelict space	*Green spaces*	Gara de Nord, Eroilor
Semi-public/Open/Used space	*Commercial spaces*	Gorjului, Grozăveşti, Obor, Dristor
	Religious space	Tineretului
Semi-public/Closed/Used space	*Sewerage infrastructure space*	Grozăveşti, Morarilor, Dristor, Colentina, Gara de Nord
Private/Closed/Used space	*Residential space*	Regie, Eroii Revoluţiei, Cişmigiu
Private/Closed/Derelict space	*Residential space*	Izvor, Victoriei
Semi-private/Open/Used space	*Garbage bin*	Timpuri Noi
	Waste deposits space	Pieptănari
Semi-private/Open/Derelict space	*Vacant space*	Regie, Industriilor
	Brownfield space	Lujerului

Table 1: Homelessness localisation spaces in Bucharest. Source: adapted after Paraschiv (2013)

The semi-private spaces refer to publicly owned spaces destined to private use or without a public functionality – the outdoor garbage bins inside residential areas (used by the inhabitants) and the waste deposits spaces (controlled – used by the sanitation companies; uncontrolled – companies and population deposit waste on vacant spaces). The vacant and the industrial brownfield spaces represent privately owned spaces, inside the city or at the periphery, that are underdeveloped or not yet exploited by the owners, so that the homeless may appropriate and build informal housing – improvised shelters and barracks.

Among the 25 areas in Bucharest identified with homeless presence, 18 areas (72 %) enter the category of public, open and used spaces, so that the homeless locate mostly in parks (7 areas – 28 %), in intersections, on the pedestrian space (11 areas – 44 %), and near the transport infrastructure space (7 areas – 28 %).

Obor and Morarilor, Gara de Nord, Grozăveşti and Cişmigiu represent the areas in Bucharest that gather four and respectively three different urban space patterns used by the homeless to shelter or to find food and money opportunities.

5 DISCUSSION

The distribution pattern of homelessness in Bucharest shows territorial diffusion, but the 25 concentration areas represent spaces with more than 5 homeless people (Paraschiv, 2012). The homeless locate in these places as a response to what these spaces offer to their housing and living needs. The public, open and used spaces give free access to the homeless, without impediments from the general population. They constitute also high traffic areas that may provide better ways to obtain money – through begging or informal work (cleaning car windshields, directing the cars in the parking lots, helping the locals, selling small objects) and food – by begging or by finding leftovers. The green spaces represent the best choice to improvise shelter, but the homeless use also the pedestrian and the transport infrastructure spaces for sleeping.

The commercial areas represent also spaces with high cars and population traffic and they present attraction to the homeless for the same reasons as the public spaces. Religious spaces – churches and cemeteries – represent quick and certain sources of money and food, as the population that frequent these places is used to help the people in need. The sewerage canals are oftenly occupied by the young homeless people and they are associated with the first generation of homeless young people and children (the "street children") that appeared after the 1990s (while the transition period started), due to their escapes from the state child care institutions. The homeless that live in the underground canals form groups and homeless communities in which the individuals rarely conduct behaviours that could lead to reintegration in the society (sobriety, working) – they depict the chronic state of homelessness and homelessness as a way of life, involving huge efforts (financial, time, human resource) to make changements to a normal, more responsible, living and housing condition. Residential spaces, wheter in use or derelict (Fig. 3), and their homelessness utilisation constitute the main reason of conflict between the general population and the homeless people. The homeless depend on the other inhabitants' acceptance and support when they need to shelter in used multifamilial residences.

Fig. 3: Urban localisation patterns of homelessness in Bucharest (2012). (a. derelict green space; b. derelict residential space; c. brownfield space; d. pedestrian space)

The largest share of derelict houses are located in the central part of Bucharest, they represent former nationalised houses (in the socialist period, they were taken from their owners and transformed in public housing) and they are currently in an ambiguous (de jure or de facto) state: (1) these houses are whether in a juridical process to return to their former owners or (2) they are already in the possession of their former owners but not yet in use – they abandon for a while the houses, they allow the homeless to appropriate the space and they wait for the building to be destroyed, case in which the solution is to sell or to develop the space with new, modern and more profitable constructions. The homeless people usually locate in the residential areas or they shelter near the space destined to residential waste deposits in the neighbourhoods where they used to live or to frequent before their state of homelessness. The vacant land and the industrial brownfield sites give the highest degree of freedom to the homeless to appropriate the space, to use the largest land surfaces and to exploit it to satisfy most of their housing and living needs.

The main findings of the research show that the urban space patterns interact with the homeless population and it support their subsistence in different ways, according to the urban space characteristics that define their accessibility and functionality.

6 CONCLUSION

Urban poverty and homelessness reflect deficiencies in conducting a sustainable relation between population and territory and they represent current challenges in the territorial systems development. The geographical approach contributes to evidence the complex interconnection between homelessness and urban space, to explain the exchanges involved and the results that act in the functioning of the entire urban environment. The urban space patterns influence the homeless decisions to locate in certain places and they explain the homelessness territorial distribution. The urban planners and the policy makers may use the main findings of the study to construct more integrative strategies to end homelessness in Bucharest.

7 ACKNOWLEDGEMENTS

8 REFERENCES

BROUSSE C.: The production of data on homelessness and housing deprivation in the European Union: survey and proposals. Office for Official Publications of the European Communities, Luxembourg, 2004.

CĂRĂBOI A. D.: Prevenirea infecției cu HIV/SIDA în rândul grupurilor vulnerabile: persoane care locuiesc pe stradă şi rromi. Raport de cercetare. Eurolobby, Bucharest, 2011.

CECCATO V., Lukyte N.: Safety and sustainability in a city in transition: the case of Vilnius, Lithuania. In: Cities, Vol. 28, pp. 83-94, 2011.

CLOKE P., May J., Johnsen S.: Swept Up Lives? Re-envisioning the Homeless City. Wiley-Blackwell, UK, 2010.

DAN A.-N., Dan M.: Persoanele fără adăpost din România – o estimare a numărului acestora. In: Calitatea Vieții, Vol. XVI, Issue 1-2, pp. 1-22, Bucharest, 2005.

EUROSTAT: Combating poverty and social exclusion. A statistical portrait of the European Union 2010. Publications Office of the European Union, Luxembourg, 2010.

FITZPATRICK S., Pawson H., Bramley G., Wilcox S.: The homelessness monitor. Tracking the impacts of policy and economic change in England 2011-2013. Crisis, London, 2011.

GÖLER D., Lehmeier H.: From post-socialist transition to globalisation and europeanisation? Metropolitan developments in Belgrade, Bucharest and Sofia. In: Collection of Papers – Faculty of Geography at University of Belgrade, Issue 60, pp. 33-48. Belgrade, 2012.

KNOX P. L., Mccarthy L. M.: Urbanization: an introduction to Urban Geography, third edition. Prentice Hall, 2012.

Lee B. A., Price-Spratlen T. (2004), The Geography of Homelessness in American Communities: Concentration or Dispersion?, City & Community, 3(1): 3-27.

MAY J.: Homelessness. Vol. 5, pp. 185-190. In: Kitchin R., Thrift N. (eds.), International Encyclopedia Of Human Geography, Elsevier, Oxford, 2009.

O'NEILL B.: Down and then out in Bucharest: urban poverty, governance, and the politics of place in the postsocialist city. In: Environment and Planning D: Society and Space, Vol. 28, Issue 2, pp. 254-269, 2010.

PAASCHE S.: Is Anti-Begging Legislation 'Good Practice' in Tackling Homelessness?. In: Homeless in Europe, pp. 7-10, FEANTSA, Brussels, 2012.

PARASCHIV M.: Urban (in) security and assessment of extreme poverty: residents' perception referring to homelessness in Bucharest. In: Procedia Environmental Sciences, Vol. 14, pp. 226-336, 2012.

PARASCHIV M., Urban characteristics and homelessness in Bucharest. In: Urbanism. Arhitectură. Construcții, Vol. 4, Issue 2, pp. 27-34, Bucharest, 2013.

RADICCHI A.: The geographies of homelessness: the case of italian railway stations. In: Homeless in Europe, The Geographies of Homelessness: Homeless Experiences and Homeless Policy in Different Spaces issue, pp. 11-13, 2012.

RUKMANA D.: Comparing the residential origins of homeless families and homeless individuals in Miami-Dade County, Florida. In: Area, Vol. 43, Issue 1, pp. 96-109, 2011.

SCHMIDT J.: The Danish Government's Policies on HomelessMigrants' Rights to Public Space and Public Facilities and Services for Homeless People: An Example of the Criminalisation of Homelessness in Copenhagen. In: Homeless in Europe, pp. 4-6, FEANTSA, Brussels, 2012.

TOMPSETT C. J., Toro P. A.: Predicting overt and covert antisocial behaviors: parents, peers, and homelessness. In: Journal of Community Psychology, Vol. 38, Issue 4, pp. 469-485, 2010.

YOUNG S.: The Geographies of Homelessness: Homeless Experiences and Homeless Policy in Different Spaces. In: Homeless in Europe, pp. 2, FEANTSA, Brussels, 2012.

VIATOR – A Mobile Travel Companion for Disabled Persons

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1   ABSTRACT

VIATOR (lat. "the traveller") is a mobile platform for smartphones that guides disabled (i.e., blind or physiaclly impaired) persons on their journeys using means of public transportation. It appropriately provides up-to-date information concerning connections, delays and alternative transportation options across different transportation companies. It considers physical obstacles and hints for each particular target group (e.g., stairs vs. elevators for wheelchair users), triggers re-planning if required, and provides an open interface for leaving self-created location-bound hints for each desired target group (e.g., blind people guide blind people) such that the mobile phone appears as an active companion throughout the journey. This paper presents the technical architecture for VIATOR, which is based on an open, extensible framework for mobile location-based services (named Digital Graffiti) and illustrates the results of a first prototype implementation.

2   INTRODUCTION

Disabled persons are facing a manifold of disadvantages when using public transportation. On the one hand, stairs and raised vehicle entrances are considered insuperable obstacles for wheelchair users. On the other hand, missing tactile lines or path descriptions prevent blind or visually impaired people from maneuvering on their own at public transportation nodes. Existing information- and navigation systems for public transportation only instruct their users in terms of transportation means, departure times and departure platforms. Instructions considering the way to and from public vehicles for handicapped persons especially at larger transportation nodes are lacking or outdated due to ponderous and inflexible content management mechanisms at the backend of such systems. Moreover, most of the systems are proprietary and unable to link to competing transportation companies in order to provide a closed information chain for a journey.

In the course of the research project ways2go within the framework of the strategic initiative IV2Splus funded by the Austrian government (FFG) a prototype for a mobile travel companion for disabled persons informing them not only about means of transportation but also guiding them through stations regarding their needs has been developed. It consolidates diverse travel information systems and provides navigation instructions from arbitrary sources, even from the users themselves (self-organizing content management).

The technical basis for implementing this research issue is a mobile location-based and context-sensitive information-, communication-, and collaboration system (Digital Graffiti) (NARZT 2013) developed by the University of Linz, in association with Siemens Corporate Technology in Munich, and the Ars Electronica Futurelab also in Linz, which enables its users to arbitrarily place and consume information in both public and private locations using state-of-the-art mobile tracking-enabled cell phones and the current location of a user as a contextual input for appropriate delivery of information. Travel information (including up-to-date actual data of delays, cancellations or detours, etc.) is provided, classified and made generic for shared networking by the project partners ÖBB (Austrian Federal Railways Company), OÖVG (Upper Austrian Transport Association) and Linz AG (Local Traffic Line Service Provider in Linz). In cooperation with the Department Integriert Studieren at the University of Linz and CEIT Alanova (Central European Institute of Technology in Vienna) new paradigms for barrier-free interaction have been created not only guiding users but also offering them an instrument to provide self-created content for other users. Blind people shall be able to annotate their way for other blind people regarding their special needs.

3   STATE-OF-THE-ART

Unaided free movement for people with disabilities using public transportation is the focus of research in a project called NAVCOM (BISCHOF 2012). Blind persons are required to find the right vehicle or to signal their wish to enter or leave a vehicle. The authors propose a WLAN-based system communicating between public transportation vehicles and smartphones, an extension to navigation systems for pedestrians, the

functionality of which ends at the entrance door of the vehicles. In general, this project group investigates the potentials of technical support for navigating handicapped people in public spaces. Within the project ways4all (funded by the Austrian government), they explore indoor navigation for visually impaired persons using RFID, in order to compose navigation instructions not based on absolute coordinates (KIERS 2011).

MofA – Mobility for All (MOFA 2010) is a project that goes a step beyond when planning public transportation nodes. The project provides tools for creating accessible squares, entrance areas and accessible public transport buildings. It employs weak-point analysis in order to manifest rating systems for travel information services, evaluating form and up-to-dateness of the provided information (e.g., real-time capabilities, elevators, width of doors, stairs and level differences, etc.). The project focuses on mobility in public space and compares existing approaches and comes up with new description-, observation- and classification methods for accessibility-checks including recommendations to solve the discovered problems.

A similar approach is examined as the key issue in the project MoViH (MOVIH 2011) trying to identify both mobility and hindering factors for persons with visual or hearing impairments. The outcome of the findings is a catalogue of effective and efficient measures to be depicted in recommendations and standards supporting public transport companies in planning environments considering special needs of blind or acoustically disabled persons. BIS – Barriere Informations System (BIS 2012) especially focuses on the requirements of wheelchair users. The project aims at developing a barrier-free interactive routing system in close coordination with the target group, technology experts and administrative and political stakeholders throughout the research process in order to calculate and visualize the most suitable ways to go for wheelchair users.

In terms of closed information chains across different transportation companies, hardly any reasonable solution exists for commercial usage, yet. Public transportation service providers offer proprietary information systems enabling their users to consume provider-specific travel information on their mobile phones when entering their desired start and target coordinates into a provider-related mobile app (e.g., Scotty – a route planning service of ÖBB (SCOTTY 2011). The integration and consolidation of various proprietary information systems is a particular challenge.

Target-oriented automatic delivery of information to the traveler (e.g., for indicating a transfer or delay) is the next field of investigation. Most systems do not inform their users about changes in the time schedule, once the trip has been calculated. Travel information has to be requested from scratch at every transition point or is difficult to handle due to a complex system of rules across transportation providers. Until today, to the authors' knowledge, there is no automatic mobile travel information system that continuously guides the passenger during his journey and context-sensitively keeps him up-to-date considering transfers or delays.

However, reference to actuality and automatic delivery of personalized travel information (and consequently the difficulty of a closed information chain) are already recognized as key issues in a series of current research projects: WISETRIP – Wide scale network of e-systems for multimodal journey planning and delivery of trip intelligent personalized data (FOSTIERI 2007) is an approach within the course of an EU project to connect different travel information systems and transmit personalized data in real-time. Similarly, i-Travel – service platform for the connected traveler (KOMPFNER 2007) is trying to develop a virtual travel assistant providing current travel information for passengers during their journey. OASIS – Open architecture for accessible services integration and standardization (BONFIGLIO 2007) even goes a step beyond and develops a generic platform for integrating different information services.

As a summary, we already recognize a series of isolated research subjects dealing with navigation aspects for disabled persons or closed information chains. The VIATOR project aims at integrating all these issues with a different and innovative approach based on utilization of a smart location-based information system, which is capable of triggering specific actions due to regional closeness of its users to selected locations.

4 ARCHITECTURE

The technological basis for VIATOR is a location- and context-based platform named Digital Graffiti (NARZT 2013), which connects any position in three-dimensional space to arbitrary information ele-ments (e.g., text, images, sound, videos, links, or even executable code). This data tuple (geo-position and information element) is provided with a visibility space and a set of recipients and is transferred when any of the recipients crosses the visibility space. For related developments see e.g., (AIT-CHEIK-BIHI 2011). In

particular, the technology platform enables depositing information in the form of Digital Graffiti on mobile devices at any location in public and private space and consuming such. As a special feature, the platform offers automatic control of electronic actions (e.g., opening a gate, starting or stopping a machine, triggering a measurement or transaction) without any additional manual action, when a given device is in the vicinity of a Digital Graffito containing executable code (see NARZT 2009, NARZT 2011), presuming adequate access privileges that relate to a person, a device, a software system, etc. or that results indirectly through the settings of a certain interest profile.

Applying this platform as the technological basis for a mobile public transportation guide means utilizing the location-based action control mechanism for up-to-date calculations regarding transpor-tation schedules. In particular, the transportation companies have to provide standardized interfaces for requesting their schedules, enabling their users to site-specifically and automatically perceive appropriate departure information when they arrive at a station or stop (similar to the big screens showing the departing trains). The user is consequently able to pick the desired destination by a single click and thus to anonymously specify a route.

Concerning travel routes across transportation companies, the system does not invent routing algorithms and scheduling procedures from scratch. Instead, it utilizes existing services and triggers them on demand in the same way as the time schedule example given above. So, the system continuously (and also location-sensitively) re-initiates calculations regarding the selected route by the location-based action control mechanism. This means, that a user automatically triggers the route planning service of the appropriate vendor at spatial proximity to his next stop and is informed about his schedule and connecting means of transport, giving the passenger a continuous information chain during his journey.

Barrier-free and target group-related routing is based on the same mechanism: Whenever a user enters a station or stop he automatically triggers navigation calculations due to his user profile (i.e., specifying the type of disability), selected route and schedule. These calculations are externally sourced out to special route computing services with centralized data collections to be updated either via CMS operators or by the users of the system themselves, who are able to edit these instructions due to their experiences on-site via the inherited mechanism of the basic system for editing Digital Graffiti information elements.
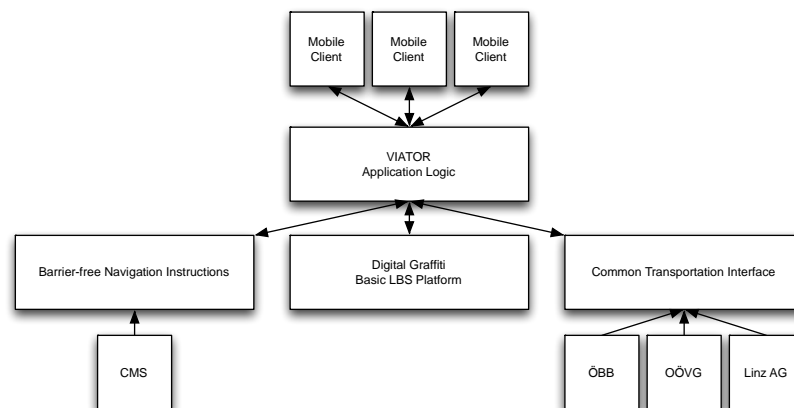

Fig. 1: VIATOR system architecture (simplified excerpt)

Thus, the general mechanism for barrier-free navigation across transportation companies providing up-to-date travel information and offering an active notification- and feedback instrument for direct interaction and self-organization of the information content is based on location-based action control, a function available from the basic platform Digital Graffiti. Thus, the VIATOR system does not contain complicated new algorithms for managing complex collaboration of different information providers. Instead, it utilizes a simple mechanism applied for all tasks, which makes the entire system easy to understand, maintain and extend.

Fig. 1 gives an impression on the collaboration of involved components, neglecting details due to space limitations: The application logic is encapsulated within the main VIATOR server component, communicating to its basic platform Digital Graffiti, which remains completely unchanged in its elementary behavior and is executed as a separate process. The mobile clients connect to the main VIATOR server component, which delegates all Digital Graffiti-related functions to its underlying platform, enabling the

clients to create and consume location-based information elements. The system is extended by two separate processes consolidating travel information from different transportation providers on the one hand (right side) and providing barrier-free navigation instructions on the other (left side). The latter can either be managed through CMS or via the VIATOR application logic indirectly by the clients.

5 PROTOTYPE

The system architecture as shown in Fig. 1 has been prototypically implemented by the University of Linz using JBoss AS7 Java Enterprise Application for the server components and Android for the clients. The project partners ÖBB (Austrian Federal Railways Company), OÖVG (Upper Austrian Transport Association) and Linz AG (Local Traffic Line Service Provider in Linz) have provided their data through the Common Transportation Interface (see Fig. 1) and CEIT Alanova has provided route calculations for disabled persons to be retrieved from their server component.

For the users, the system depicts as follows (the user interface is kept rather simple in order to comply with requirements concerning blind users, for whom only the texts in appropriate order are essential, see Fig. 2):
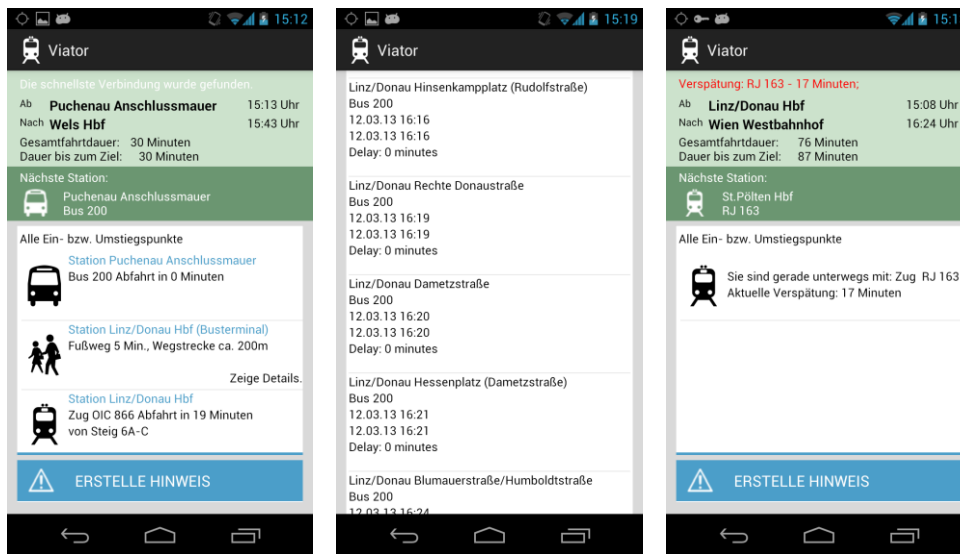

Fig. 2: VIATOR user interface. (a) display route, (b) display details on route, (c) automatic announcement of a delay

The system starts with a screen requesting the desired destination (not depicted here). The user can either enter (and auto-complete) a destination or select from a list (considering the transportation options due to the user's current location). A summary of the input, the next station and all subsequent maneuvers are listed (Fig. 2b). For each list item, the user is able to take a detailed look and experience the consecutive stops and times during his journey (Fig. 2c).
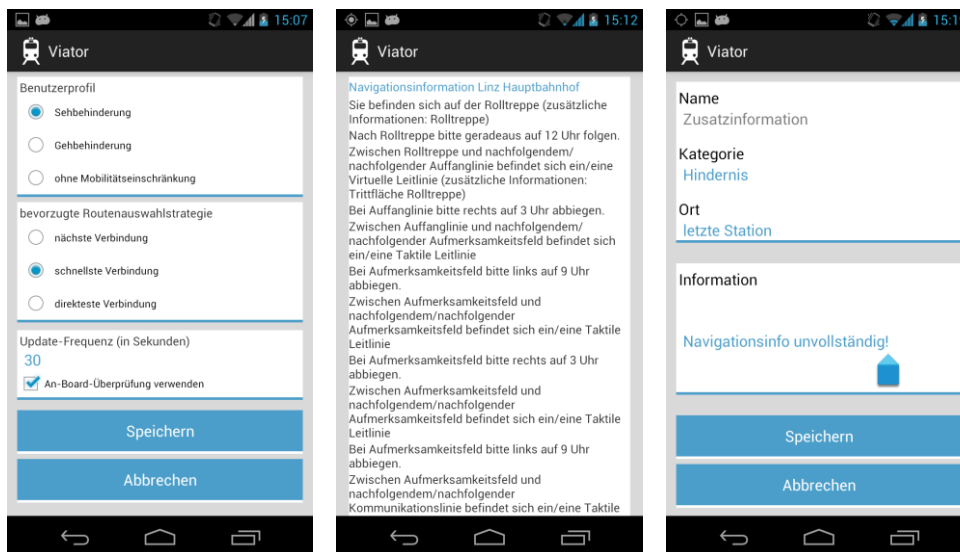

Fig. 3: Barrier-free usage: (a) select impairment, (b) maneuver instructions for blind persons, (c) self-created content

So far, the VIATOR looks similar to existing travel information systems. The first difference is noticeable, though, when unforeseen events occur and the route changes (i.e., either means of transportation or the schedule). In these cases, VIATOR actively reacts, informs the traveler about the change and immediately calculates and displays the traveller's new options without manual intervention. Fig. 2c gives an example of a delay immediately announced via sound to the user.

In terms of barrier-free usage, VIATOR offers to select the type of impairment as part of the user profile. The prototype implementation contains two options for blind and disabled persons (see Fig. 3a). Fig. 3b shows a (pretended unstructured) flow of text representing navigation instructions for blind people. A visual format is unnecessary, though, because this text is meant to be read by screen readers and is only considered for the target group of blind persons. Fig. 3c finally gives an impression of an editing tool enabling its users to create or update those navigation instructions (self-organization).
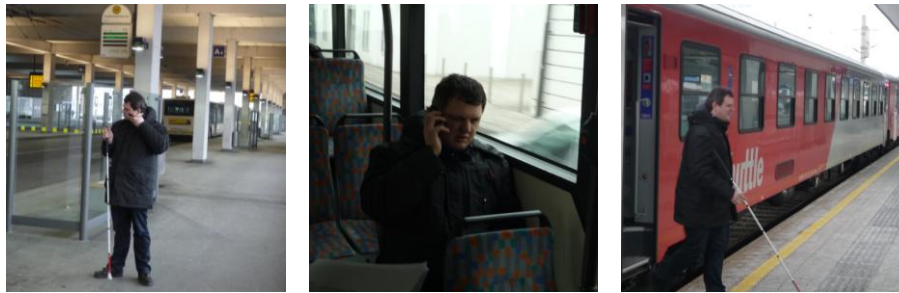

Fig. 4: First experiments: (a) blind person instructed by VIATOR, (b) announcement during journey, (c) finding tactile lines

At this time of writing, the project consortium has conducted first experiments using VIATOR by either blind persons or wheelchair users. Fig. 4 shows impressions caught during those tests, where a blind person is acoustically instructed by VIATOR regarding his next means of transport (Fig. 4a), actively informed about his next steps during the journey (Fig. 4b), and prepared to find the tactile lines when leaving the transportation vehicle (Fig. 4c).

6 CONCLUSION

VIATOR is an approach of integrating both provider-related transportation information and barrier-free navigation instructions based on a location-sensitive platform. It does not apply complicated rules for providing up-to-date information and announcements, but uses the mechanism of location-based action control from its underlying core Digital Graffiti for initiating calculations regarding a user's destination, his current whereabouts and disabilities. A first prototype implementation has proven applicability in the course of several tests (improvements due to experienced weak points are still to be incorporated) conducted by the target group of disabled persons.

7 REFERENCES

AIT-CHEIK-BIHI W., Bakhouya M., Nait-Sidi-Moh A., Gaber J., Wack M.: A Platform for Interactive Lo-cation-Based Services, Procedia Computer Science, Volume 5, 2011, pp. 697-704.

BIS – Barriere Informations System, Gefördertes Projekt aus der 4. Programmlinienausschreibung ways2go, 2012.

BISCHOF W., Krajnc E., Dornhofer M., Ulm M.: NAVCOM – WLAN Communication between Public Transport Vehicles and Smart Phones to Support Visually Impaired and Blind People, 13th International Conference, ICCHP 2012, Linz, Austria, July 11-13, 2012, Proceedings, Part II, pp 91-98, 2012.

BONFIGLIO S.: Open architecture for accessible services integration and standardisation (OASIS). FIMI S.R.L. Italy, Funded under 7th FWP, ICT-2007.7.1, 2007

FOSTIERI M.: Wide scale network of e-systems for multimodal journey planning and deli-very of trip intelligent personalised data (WISETRIP). Hellenic Telecommunications & Telematics Applications Company, Science & Technology Park of Crete, Funded under 7th FWP, TPT-2007-0.0-04, 2007.

KIERS M., Bischof W., Krajnc E., Dornhofer M.: ways4all – Indoor Navigation without absolute Coordinates for the Visually Im-paired and Blind People, FHK Conference 2011, Vienna.

KOMPFNER P.: i-Travel – service platform for the connected traveller (ITRAVEL). European Road Transport Telematics Imple-mentation Coordination Organisation S.C.R.L, Belgium, Funded under 7th FWP, TPT-2007-0.0-04, 2007

MOFA: Mobilität für Alle – Mobilität im öffentlichen Raum. Wiener Linien GmbH & Co KG Studie, Gefördertes Projekt aus der 1. Programmlinienausschreibung ways2go, 2010.

MOVIH: Mobilität seh- und hörschwacher Menschen im öffentlichen Personenverkehr (ÖV). Hilfsgemeinschaft der Blinden und Sehschwachen Österreichs, Gefördertes Projekt aus der 2. Programmlinienausschreibung ways2go, 2011.

NARZT W., Schmitzberger H.: Location-triggered code execution — dismissing displays and keypads for mobile interaction. UAHCI '09: Proceedings of the 5th International Conference on Universal Access in Human-Computer Interaction. Part II. Berlin, Heidelberg: Springer-Verlag, pp. 374–383, 2009.
NARZT W., Wasserburger W.: Digital Graffiti – A Comprehensive Location-Based Travel Information System, 16th International Conference on Urban Planning, Regional Development and Information Society (REAL CORP 2011), Editors: M. Schrenk, V. Popovich, P. Zeile, Essen, North Rhine-Westphalia, Germany, ISBN: 978-3-9503110-0-6, 2011.
NARZT W., Pomberger G.: Digital Graffiti – a Smart Information and Collaboration System, International Conference on Electronic Engineering and Computer Science, EECS 2013, Elsevier IERI Procedia (ISSN: 2212-6678), Beijing, China, 2013.
SCOTTY: Der österreichweite Routenplaner für alle Öffis. ÖBB, http://fahrplan.oebb.at/bin/query.exe/dn (verified March 2013).

Was kosten Radverkehr, Fußverkehr, öffentlicher Personennahverkehr und Kfz-Verkehr eine Kommune? – Entwicklung und Anwendung einer Methode für den Vergleich verschiedener Verkehrsmittel anhand von kommunalen Haushalten

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1 ABSTRACT

Während die Kosten des Kfz-Verkehrs meist keiner Rechtfertigung bedürfen, stehen die Kosten für Radverkehr und öffentlichen Personennahverkehr (ÖPNV) regelmäßig in der öffentlichen Diskussion. Einer der Gründe ist, dass die Kosten der einzelnen Verkehrsmittel (Investitions-, Unterhaltungs- und Betriebskosten) und ihr Verhältnis zueinander nicht bekannt sind: Verkehrsrelevante Kosten sind in deutschen Kommunen auf verschiedene Teilhaushalte und Haushaltsstellen verteilt und damit für die verschiedenen Verkehrsmittel nicht transparent. Außerdem existieren wesentliche Unterschiede in der haushälterischen Berücksichtigung, die bestimmte Verkehrsmittel systematisch benachteiligen.

Es soll daher eine Methode entwickelt werden, mit der aus kommunalen Haushalten die Aufwendungen und Erträge für Investition und Betrieb differenziert nach Verkehrsmitteln (Radverkehr, Fußverkehr, Kfz-Verkehr, ÖPNV) in einer Stadt angegeben und einander gegenübergestellt werden können. Diese Methode soll anhand der Haushaltspläne der Städte Bremen und Kassel erarbeitet und exemplarisch dargestellt werden.

Im ersten Schritt wird untersucht, welche Relevanz verschiedene Haushaltspositionen jeweils für einzelne Abschnitte des Verkehrsnetzes haben. Beispielsweise ist der Winterdienst für Erschließungsstraßen von geringerer finanzieller Relevanz als für Hauptverkehrsstraßen oder Fußgängerzonen. Bei der Straßenbeleuchtung und der Straßenreinigung sind etwa Hauptgeschäftsstraßen anders zu behandeln als Straßen in Gewerbegebieten. Im folgenden Schritt werden den Verkehrsmitteln – Fuß-, Rad-, Kfz-Verkehr und ÖPNV – jeweils die Netzabschnitte zugeordnet, die sie nutzen können.

Eine wesentliche Herausforderung in dem Vorhaben ist die Entwicklung sachgerechter Aufteilungsverfahren, da der Verkehrsraum in den meisten Fällen von mehreren Verkehrsmitteln genutzt wird. Mit Hilfe von digitalen Netzdaten lassen sich Teilnetze für verschiedene Verkehrsmittel bilden und Aufteilungsschlüssel für Aufwendungen und Erträge differenziert nach (gewichteter) Netzlänge und verschiedenen Typen von Straßenquerschnitten erarbeiten. Für die verschiedenen Netzelemente sind Aufteilungsschlüssel für z. B. Betriebs-, Unterhaltungs- und Abschreibungsaufwendungen zu ermitteln. Die Eingangsgrößen und die getroffenen Annahmen wurden in einem Expertenworkshop diskutiert und weiterentwickelt, darüber hinaus fanden Experteninterviews mit Vertretern der Stadtkämmerei, der Fachabteilungen und der städtischen Betriebe (Stadtreinigung, Energieversorgung, Verkehrsbetriebe) aus den Beispielkommunen statt.

Die zu entwickelnde Methode soll in erster Linie als Entscheidungshilfe dienen und dazu beitragen, dass in Städten Haushaltsmittel effektiver eingesetzt werden können. Das Forschungsprojekt wird im Rahmen des "Nationalen Radverkehrsplans" vom deutschen Bundesministerium für Verkehr, Bau und Stadtentwicklung gefördert und vom Fachgebiet Verkehrsplanung und Verkehrssysteme der Universität Kassel bearbeitet.

Im Vortrag sollen die vorhandenen Systeme zur verkehrsmittelbezogenen Kostenermittlung vorgestellt, ein Überblick über die verkehrsrelevanten Aufwendungen und Erträge aus der Analyse der kommunalen Haushalte der Beispielstädte gegeben und die zentralen Ansätze der zu entwickelnden Aufteilungsmethode erörtert werden.

2 PROBLEMSTELLUNG/MOTIVATION

2.1 Motivation und Ziel

Radverkehr und Fußverkehr spielen eine Schlüsselrolle für die umwelt- und stadtverträgliche Mobilität. Die entscheidende Rolle spielen dabei die weltweit wachsenden Städte: In den Städten werden die politischen

Entscheidungen getroffen, welche Bedingungen für welche Mobilitätsformen geschaffen werden. Auf der kommunalen Ebene fallen auch die wesentlichen Entscheidungen, wie und für welche Verkehrsmittel die finanziellen Mittel eingesetzt werden. Darüber hinaus liegen in Städten die wesentlichen Potentiale für die Verlagerung von Verkehr auf umweltfreundliche Verkehrsmittel, da gerade im Nahbereich nicht-motorisierte Verkehrsmittel ihre Stärken ausspielen können. Gleichzeitig ist in Städten das öffentliche Verkehrsangebot in der Regel gut ausgebaut, sodass Potentiale für multimodales Verkehrsverhalten vorhanden sind.

Aus verschiedenen Gründen sind dabei bestimmte Verkehrsmittel gegenüber dem Kfz-Verkehr benachteiligt: Zunächst herrscht keine Transparenz über die Höhe der Aufwendungen und Erträge für die verschiedenen Verkehrsmittel. Ein zweiter Punkt ist, dass sich die Finanzierung je nach Verkehrsmittel wesentlich unterscheiden: Während etwa für kommunale Verkehrsunternehmen ohne Weiteres ein jährliches Defizit als Aufwendungen der Stadt (bzw. ihrer Bürger) angegeben werden kann, sind Kosten für Straßenbau- und Unterhaltung auf verschiedene Teilhaushalte und Haushaltsstellen verteilt und damit weder insgesamt noch verkehrsmittelspezifisch bekannt. Eine wichtige Rolle spielen in Deutschland auch Fördermittel, die eine Stadt von Land oder vom Bund erhält. In der öffentlichen Diskussion kann dies dazu führen, dass geförderte Infrastrukturprojekte aufgrund eines relativ kleinen Eigenanteils der Kommune als kostengünstiger wahrgenommen werden als Projekte, die vollständig von der Kommune finanziert werden müssen. Häufig sind Infrastrukturprojekte, die der Verbesserung des nicht-motorisierten Verkehrs dienen, allein aufgrund der relativ geringen Kosten nicht förderfähig. Damit wirken sich die Unterschiede in der Finanzierung nachteilig aus und führen zu Fehlanreizen und Fehlentscheidungen. Transparenz und Kostenwahrheit kann daher die Akzeptanz fördern und umweltfreundliche Nahmobilität stärken.

Umwelt- und Klimaschutzziele sowie das Ziel einer Entlastung von negativen Folgen des Verkehrs können in Städten aber meist nur im Bestand erreicht werden. Der in Deutschland vorhandene Trend zur Reurbanisierung führt in der Mehrheit der größeren Städte zu einem Bevölkerungszuwachs. Dies bedeutet aber auch, dass im gleichen Straßenraum zusätzlichen Nutzungsansprüchen begegnet werden muss und dass die Nutzungskonkurrenz zwischen verschiedenen Verkehrsmitteln herrscht.

Eine Chance, mehr Transparenz zu erreichen, liegt in der Einführung der Doppik (Doppelte Buchführung in Konten), wodurch erstmals für den Stadtkonzern, bestehend aus der Kernverwaltung und den privatrechtlich geführten städtischen Unternehmen ein einheitliches Rechnungswesen vorhanden ist. Durch die Einführung der Doppik ist es möglich, die Entwicklung des Vermögens einer Stadt zu betrachten. Die Doppik wird in zwölf von 16 deutschen Bundesländern bis 2016 eingeführt, in vier Bundesländern gibt es eine Wahlmöglichkeit zwischen einer erweiterten Kameralistik und der Doppik [BERTELSMANN STIFTUNG/KOMMUNALE GEMEINSCHAFTSSTELLE FÜR VERWALTUNGSMANAGEMENT].

Ziel ist es daher, eine Methode zu entwickeln, mit der Aufwendungen und Erträge in kommunalen Haushalten für Investition und Betrieb differenziert nach Verkehrsmitteln (Radverkehr, Fußverkehr, Kfz-Verkehr, öffentlicher Nahverkehr) in einer Stadt angegeben werden können. Der Aufwand für Datenbeschaffung und Durchführung soll dabei angemessen und handhabbar sein. Die Methode soll anhand der Haushaltspläne der Städte Bremen und Kassel erarbeitet werden, allerdings soll sie im Ansatz auch auf andere Städte übertragbar sein. Die Ergebnisse sollen exemplarisch anhand der Beispielstädte dargestellt werden.

2.2 Stand der Forschung

2.2.1 Studien der Organisation ICLEI zu Subventionen des Autoverkehrs

Das Europasekretariat der Organisation ICLEI – Local Governments for Sustainability hat mit finanzieller Förderung des deutschen Umweltbundesamtes 2001 die Haushalte der Städte Bremen, Dresden und Stuttgart untersucht. Ziel war es, die offensichtlichen und die versteckten Einnahmen und Kosten des motorisierten Individualverkehrs (MIV) zu ermitteln. Im Mittelpunkt stand die Abschätzung von Anteilen mit MIV-Relevanz an den einzelnen Haushaltsabschnitten auf Basis von Haushaltsanalysen und Experteneinschätzungen.[ICLEI-EUROPASEKRETARIAT 2001] Im Jahr 2006 veröffentlichte ICLEI Ergebnisse für neun weitere deutsche und drei ausländische Städte.[ICLEI-EUROPASEKRETARIAT 2005] Diese Vorgehensweise griff das Verkehrswissenschaftliche Institut Stuttgart auf und verglich im Auftrag der Stadt Stuttgart die kommunalen Kosten der Stadt Stuttgart für verschiedene Verkehrsmittel in den Jahren 2002 bis 2006. Diese Studie wurde allerdings nicht veröffentlicht.[FAIRKEHR]

2.2.2   Least Cost Transportation Planning (LCTP)

Im Jahr 2002 wurde das Konzept der „Least Cost Transportation Planning (LCTP)" vorgestellt, das im Auftrag des Umweltbundesamtes entwickelt wurde. Mit Hilfe dieses Konzeptes können Verkehrsprojekte hinsichtlich ihrer Kosten (private und öffentliche Kosten) und Umwelteffekte beurteilt werden. Das Verfahren basiert auf einer „virtuellen Firma" mit den verschiedenen Verkehrsträgern MIV, Lkw-Verkehr, ÖPNV, Fußgängerverkehr und Fahrradverkehr als Abteilungen. Ausgabenträger der „Firma" sind die Nutzer und die öffentliche Hand, unterteilt nach Gebietskörperschaften und kommunalen Verkehrsunternehmen. Es werden auch Mittelflüsse innerhalb des öffentlichen Sektors berücksichtigt (z. B. Zuschüsse). Betrachtungsgegenstand sind die Ausgaben und Einnahmen aus den kameralistisch geführten Haushalten; Kapitalkosten werden als Gemeinkosten betrachtet, die nicht dem Rad- und Fußverkehr, sondern nur den anderen Verkehrsmitteln angelastet werden. Gleiches gilt für externe Kosten. Auswirkungen auf die Umwelt werden in originären Messgrößen erfasst. Für die Aufteilung wird ein „Straßennutzungsindikator" verwendet. Dieser wurde für die Städte Freiburg und Schwerin ausgearbeitet und gibt die Beanspruchung der Verkehrsfläche und die Abnutzung von Infrastruktur an. Die Verteilung der Gesamtausgaben erfolgt pro Personen-, Platz- oder Fahrzeugkilometer. Daher sind auch Jahresfahrleistungen der einzelnen Verkehrsmittel als Eingangsgrößen für die Anwendung der LCTP erforderlich. Die LCTP wurde in vier Modellkommunen (Görlitz, Göttingen, Hannover und Heidelberg) testweise angewendet und evaluiert.[UMWELTBUNDESAMT]

2.2.3   Weitere Studien

Für die Berechnung von Mautsätzen wurden verschiedene Verfahren für Wegekostenrechnungen entwickelt. Diese beziehen sich allerdings auf Fernstraßen und unterschiedliche Fahrzeugklassen und sind daher nicht ohne weiteres auf die vorliegende Fragestellung übertragbar.

Das Deutsche Institut für Urbanistik (Difu) und die Planersocietät Dortmund haben in einem Forschungsprojekt im Auftrag des Bundesministeriums für Verkehr, Bau und Stadtentwicklung einen „Verkehrsfolgekostenschätzer" entwickelt, mit dem für Neubaumaßnahmen neben den Herstellungs- auch die Folgekosten von Verkehrsinfrastruktur für öffentliche Haushalte angegeben werden können. Zur Kostenermittlung werden Elemente der Infrastruktur geplant, so z. B. für die innere Verkehrserschließung die Verkehrsflächen, Straßenlängen, Leuchtpunkte und Straßenbegleitgrün.[BUNDESMINISTERIUM FÜR VERKEHR, BAU UND STADTENTWICKLUNG, 2011a] Aufgrund der Zielsetzung des Vorhabens ist allerdings kein Vergleich verschiedener Individualverkehrsmittel mit dem Verkehrsfolgekostenschätzer möglich, sondern lediglich von IV und ÖPNV.[BUNDESMINISTERIUM FÜR VERKEHR, BAU UND STADTENTWICKLUNG, 2011]

3   METHODISCHES VORGEHEN

3.1 Gegenstand der Betrachtung/Methodische Vorüberlegungen

Gegenstand der Untersuchung sind die verkehrsrelevanten Aufwendungen und Erträge der Städte. Dabei reicht es nicht aus, den kommunalen Haushaltsplan zu betrachten, da verkehrsrelevante Aufwendungen und Erträge nicht vollständig im Haushalt dargestellt sind. Ein Beispiel hierfür ist der in Deutschland übliche Defizitausgleich des kommunalen Verkehrsunternehmens aus Gewinnen aus Wasser- und Stromversorgung innerhalb des Stadtwerkekonzerns. Daher müssen außer den Haushaltsplänen der Städte auch die Bilanzen der städtischen Unternehmen betrachtet werden. Somit kann man von einem „Stadtkonzern" sprechen, in dem ein einheitliches doppisches Rechnungswesen angewendet wird. Betrachtet wird die gesamte kommunale Leistungserbringung für Bau, Betrieb und Unterhaltung der Verkehrsinfrastruktur bzw. Verkehrssysteme. Dazu gehören auch Aufwendungen für Verwaltung. Für die Leistungserbringung können verschiedene Organisationseinheiten dieses „Stadtkonzerns" zuständig sein. Daher müssen die Rechnungsunterlagen der Stadt, ihrer kommunalen Unternehmen und der Eigenbetriebe betrachtet und später im Aufteilungsverfahren berücksichtigt werden. Tabelle 1 zeigt die Rechnungsunterlagen und die jeweiligen Organisationseinheiten des „Stadtkonzerns".

Organisationseinheit	Rechnungsunterlage
Kernverwaltung	Haushaltsplan
kommunale Unternehmen	Geschäftsbericht
Eigenbetriebe	Wirtschaftsplan

Tabelle 1: Organisationseinheiten und Rechnungsunterlagen im "Stadtkonzern"

Die Betrachtung als „Stadtkonzern" lehnt sich an die Vorgehensweise der LCTP an, in der alle Verkehrsdienstleistungen von einer fiktiven „Firma" erbracht werden. Allerdings gibt es wesentliche Unterschiede: In der hier zu entwickelnden Methode werden als Eingangsgröße doppische Haushalte betrachtet und nicht mehr kameralistische geführte. Kapitalkosten werden daher den Verkehrsmitteln anders zugeordnet. Zudem werden hier u. a. Nutzerkosten nicht betrachtet.

Prinzipiell können folgende Kostenarten unterschieden werden:

- Investitionskosten (z.B. für Neubaumaßnahmen der Verkehrswegeinfrastruktur, für Anschaffung von Fahrzeugen des ÖPNV),
- laufende Kosten (z.B. Betrieb und Unterhaltung der Verkehrswegeinfrastruktur und der Fahrzeuge des ÖPNV, Personalkosten),
- Kapitalkosten (Abschreibungen, Zinsen).

3.2 Grundzüge des doppischen Haushaltes

Vor der Einführung der Doppik führten die Kommunen ihre Haushalte nach der Kameralistik. Die Kameralistik ist eine Geldverbrauchsrechnung, in der kalkulatorische Kosten (z. B. Werteverzehr des Vermögens) außer Acht bleiben. Demgegenüber hatten die privatrechtlichen städtischen Unternehmen ein doppisches Rechnungswesen. Die Doppik führt also zu einer Vereinheitlichung des Rechnungswesens innerhalb des „Stadtkonzerns". Die Einführung der Doppik bedeutete auch, dass erstmals der Wert des Vermögens einer Stadt bilanziert werden musste.

Bestandteile des kommunalen Haushaltes sind der Ergebnisplan, der Finanzplan und die Teilpläne. Der kommunale Haushalt nach dem Prinzip der Doppik setzt sich zusammen aus der Bilanz, dem Ergebnishaushalt und dem Finanzhaushalt. Die Bilanz bildet die Struktur des Vermögens ab. Im Ergebnishaushalt stehen alle Aufwendungen und Erträge; er bildet Kosten und Leistungen ab und folgt damit betriebswirtschaftlichen Prinzipien. Der Ergebnishaushalt beeinflusst die Abschreibungen und das Jahresergebnis in der Bilanz. Der Finanzhaushalt erfasst alle Zahlungsströme – alle Einzahlungen und Auszahlungen; er folgt kameralistischen Prinzipien und wirkt sich auf die liquiden Mittel in der Bilanz aus. Der Ergebnishaushalt und der Finanzhaushalt werden jeweils in Teilpläne untergliedert.[SCHWARTING 2006] Die kommunalen Aktivitäten werden als Produkte aufgeführt. Die Produkte gliedern sich in Produktgruppen über mehrere Stufen bis zu den einzelnen Produkten. Eine Schwierigkeit des Produktplans ist, dass die Gliederung im Vergleich zum früheren Haushaltsrecht weniger verbindlich vorgeschrieben ist. So können die Kommunen Teilhaushalte entweder nach Produktbereichen und Produktgruppen (produktorientiert) oder nach Organisationsbereichen (organisationsorientiert) gliedern.[SCHWARTING 2006].

Die Strömungsgrößen in Ergebnis- und Finanzplan sind in Tabelle 2 dargestellt.

Ergebnisplan	Finanzplan
Erträge Steuern Zuweisungen und Zuschüsse für laufende Zwecke öffentlich-rechtliche Leistungsentgelte aktivierte Eigenleistungen Auflösung von Sonderposten	Laufende Einzahlungen Steuern Zuweisungen und Zuschüsse für laufende Zwecke öffentlich-rechtliche Leistungsentgelte
Aufwendungen Personalaufwendungen Aufwendungen für Sach- und Dienstleistungen Abschreibungen	Laufenden Auszahlungen Personalauszahlungen Auszahlungen für Sach- und Dienstleistungen
	Einzahlungen aus Investitionstätigkeiten
	Auszahlungen aus Investitionstätigkeiten
	Einzahlungen aus Finanzierungstätigkeiten
	Auszahlungen aus Finanzierungstätigkeiten

Tabelle 2: Strömungsgrößen im kommunalen Haushaltsplan nach der Doppik. Quelle: Schwarting, Gunnar: Den kommunalen Haushaltsplan – kameral und doppisch – richtig lesen und verstehen, 3. Auflage, Mainz 2005

3.3 Grundsätzliche Vorgehensweise der Aufteilungsmethode

In diesem Abschnitt wird die Aufteilungsmethode in Grundzügen vorgestellt, die es ermöglicht, die in den kommunalen Haushalten verbuchten Verkehrskosten anteilig den einzelnen Verkehrssystemen (Kfz-Verkehr, Fußgängerverkehr, Radverkehr) zuzuordnen.

Betrachtet wird der Ergebnishaushalt: In ihm sind Aufwendungen und Erträge dargestellt. Die Betrachtung des Finanzplans ist für die vorliegende Fragestellung nicht sachgerecht, da er lediglich Geldflüsse darstellt. Ein wesentlicher Nachteil ist, dass im Finanzplan Abschreibungen nicht aufgeführt sind, weil ihnen kein Mittelfluss gegenübersteht. Zweitens sind aus Geldflüssen im Finanzplan oft keine Rückschlüsse auf den tatsächlichen Werteverbrauch, ausgedrückt als Abschreibungen, möglich. Beispielsweise werden Investitionsmaßnahmen oft erst nach Jahren vollständig abgerechnet.

Demgegenüber können für die Abschreibungen im Ergebnisplan und das Vermögen Aufteilungsschlüssel entwickelt werden, mit denen die Beträge aufgeteilt werden können, die nicht direkt einem Verkehrsmittel zurechenbar sind. Die folgenden Aufwendungen und Erträge sollen differenziert für folgende Verkehrssysteme dargestellt werden:

- Fußverkehr: insbesondere Aufwendungen für die Infrastruktur

- Radverkehr: insbesondere Aufwendungen für die Infrastruktur

- Kfz-Verkehr: Neben Aufwendungen für die Infrastruktur kommen vor allem Aufwendungen für Verkehrsüberwachung, Straßenverkehrsbehörde und Kfz-Zulassungsbehörde zum Tragen. Im ruhenden Verkehr spielen vor allem auch Erträge aus der Parkraumbewirtschaftung und Gebühren oder Pacht für Parkhäuser oder Tiefgaragen eine Rolle.

- ÖPNV: Zum ÖPNV zählt der Verkehr mit öffentlich zugänglichen Verkehrsmitteln, für den die betreffende Kommune Aufgabenträger ist und damit die Finanzverantwortung trägt. Dies umfasst in der Regel den straßengebundenen öffentlichen Personennahverkehr, d. h. Linienbus-, Straßenbahn- und U-Bahnverkehr. Regionalverkehr, für den Dritte (z. B. das Land oder ein Zweckverband) Aufgabenträger sind, sowie der Fernverkehr auf der Schiene zählen nicht dazu. Für Bau und Betrieb der Straßenbahn- bzw. U-Bahninfrastruktur sowie für die Erbringung der Betriebsleistung sind in der Regel kommunale Verkehrsunternehmen zuständig. Allerdings verursacht der Linienbusverkehr auch Aufwendungen für die Straßeninfrastruktur, die bei der Aufteilung der Straßeninfrastrukturkosten berücksichtigt werden müssen.

Betrachtet werden also jene Aufwendungen und Erträge, für die die Stadt oder ihre Unternehmen die finanzielle Verantwortung haben. Besondere Verkehrsinfrastrukturen wie Häfen oder Flughäfen werden nicht berücksichtigt. Es entstehen zwar durch diese Verkehrsinfrastrukturen Aufwendungen und Erträge in kommunalen Haushalten (entweder bei der Kommune selbst oder einer kommunalen Betreibergesellschaft),

die zweifellos verkehrsrelevant sind, allerdings zählen Häfen und Flughäfen weder zur allgemeinen Infrastrukturausstattung der Städte noch dienen sie der alltäglichen Mobilität.

Tabelle 3 zeigt die zuständigen Organisationseinheiten und deren Aufgaben am Beispiel der Stadt Kassel.

	Kfz-Verkehr, Radverkehr, Fußverkehr	ÖPNV
Kernverwaltung	Straßeninfrastruktur Straßenverkehrsbehörde Zulassungsbehörde Führerscheinbehörde Ordnungsbehörde	Aufgabenträger
Verkehrsunternehmen		Straßenbahninfrastruktur Erbringung der Betriebsleistung

Tabelle 3: Verkehrsrelevante Zuständigkeiten und jeweilige Organisationseinheit am Beispiel der Stadt Kassel

3.4 Entwicklung der Methode zur sachgerechten Aufteilung der Aufwendungen und Erträge

Im Folgenden wird vorgestellt, wie aus kommunalen Haushaltsplänen eine Aufteilung der relevanten Haushaltspositionen nach Verkehrsmitteln vorgenommen werden kann. Die gleiche Vorgehensweise ist bei städtischen Unternehmen ebenso anzuwenden, wenn dort verkehrsrelevante Positionen vorhanden sind. Es wird hier davon ausgegangen, dass sich das städtische Verkehrsunternehmen auf den ÖPNV beschränkt. Das Prinzip der Zuordnung von Aufwendungen und Erträgen zeigt Abbildung 1. Die Vorgehensweise besteht aus vier Arbeitsschritten.
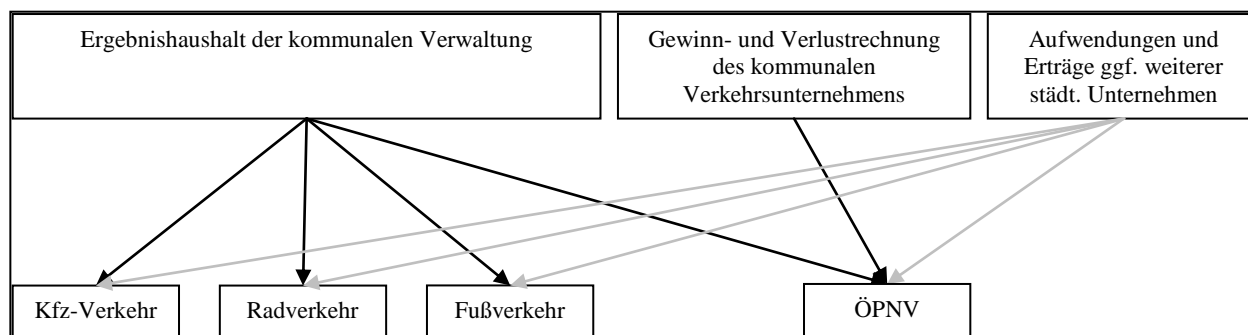

Abbildung 1: Zuordnung der Aufwendungen und Erträge aus den Rechnungsunterlagen zu den einzelnen Verkehrsmitteln (Prinzipskizze)

3.4.1   Schritt 1: Analyse der Teilhaushalte und Festlegung der Aufteilungsschlüssel

Im ersten Arbeitsschritt werden die verkehrsrelevanten Ertrags- und Aufwandspositionen der Haushaltspläne identifiziert. Für jede verkehrsrelevante Haushaltsposition wird anschließend ein verursachungsgerechter Aufteilungsschlüssel definiert. Die Aufteilungsschlüssel geben an, wie viel Prozent einer Ertrags- bzw. Aufwandsposition den einzelnen Verkehrsmitteln zugeordnet werden können. Der Hintergrund ist, dass bestimmte Positionen nur für bestimmte Verkehrsmittel oder bestimmte Gruppen von Verkehrsmitteln unterschiedlich relevant sind.

Beispiel: Die Straßenbeleuchtung ist für Fußgänger anders zu dimensionieren als für den Straßenverkehr. Oder: Ein hoher Schwerverkehrsanteil erfordert eine aufwändigere Dimensionierung des Straßenoberbaus.

3.4.2   Schritt 2: Entwurf des Straßenraums und Planung der Bauelemente

Im zweiten Schritt wird die Verkehrswegeinfrastruktur in einer Stadt durch eine fiktive Entwurfs- und Bauplanung nachgebildet. Dies ist notwendig, weil zwar in Geoinformationssystemen Verkehrsnetze vorhanden sind, aber nur wenige Daten enthalten sind, die eine Differenzierung nach Verkehrsmitteln ermöglichen. Beispiele sind die Breiten von Straßenräumen der Netzabschnitte, unterschieden nach Fahrbahn, Gehwegen und Anlagen des Radverkehrs, oder die Führungsform des Radverkehrs (gemeinsamer Fuß- und Radweg, Schutzstreifen, Radfahrsteifen, Fahrradweg). Die fiktive Planung umfasst die Definition von spezifischen Straßentypen, den Entwurf von Straßenraumquerschnitten und die Planung von Bauelementen. Zentral ist die Aufteilung des Straßennetzes in „Fahrbahn" und „Seitenraum", beiden Teilräumen werden jeweils die Verkehrsmittel zugeordnet, die sie nutzen können. Zusätzlich wird auch

Infrastruktur geplant, die für Linienbusverkehr erforderlich ist, um dessen Aufwendungen und Erträge später dem ÖPNV zurechnen zu können, sofern diese nicht bereits beim kommunalen Verkehrsunternehmen verbucht sind. Diese so geplante Straßeninfrastruktur liefert die wesentlichen Eingangsgrößen für die Kostenermittlung im dritten Schritt.

3.4.3   Schritt 3: Ermittlung der Wiederbeschaffungswerte und der Abschreibungskostensätze

Im dritten Arbeitsschritt werden Wiederbeschaffungs- und Abschreibungskostensätze für die Bauelemente der Teilräume ermittelt. Anhand dieser lassen sich im nächsten Arbeitsschritt Aufteilungsschlüssel entwickeln, die es ermöglichen, die Abschreibungskosten in den Haushalten sachgerecht den Verkehrssystemen zu zuordnen

Die Berechnung der Wiederherstellungskostensätze wird anhand der in Schritt 2 festgelegten Planungsdaten der Bauelemente sowie mit Hilfe von Einheitspreisen der einzelnen Bauelemente durchgeführt. Die Kosten werden für Teilraumlängen von 100 m errechnet, sodass Wiederherstellungskostensätze in der Einheit Euro pro 100 m [€/100m] vorliegen.

Zur Ermittlung der Abschreibungskostensätze wird die Methode der linearen Abschreibung angewendet. Hierbei wird von einem jährlich konstanten Werteverzehr über die Nutzungsdauer ausgegangen. Die Nutzungsdauern der Bauelemente werden anhand von Richtlinien der Forschungsgesellschaft für Straßen- und Verkehrswesen sowie weiteren Abschreibungstabellen angesetzt. Das Verfahren der linearen Abschreibung wurde gewählt, da der Zustand und das Alter der Elemente im Bestand nicht bekannt ist. Daher werden auch Wiederbeschaffungswerte zu Neupreisen angesetzt, statt eine finanzielle Bewertung des Bestandes zu einem bestimmten Zeitpunkt vorzunehmen.

3.4.4   Schritt 4: Erarbeitung der Aufteilungsschlüssel

Im vierten Arbeitsschritt werden anhand der Planungsdaten des Arbeitsschritts 2 sowie der Kostensätze des Arbeitsschritts 3 sachgerechte Aufteilungsschlüssel für die Ertrags- und Aufwandspositionen des Arbeitsschritts 1 bestimmt.

Dies verdeutlichen folgende Beispiele:

- Aufteilungsschlüssel für die Aufwandsposition Abschreibungen: Anhand der straßentypspezifischen Abschreibungskostensätze der Verkehrssysteme und der Netzlängen der Straßentypen (aus den digitalen Verkehrswegenetzdaten) lassen sich die verkehrssystemspezifischen Abschreibungskosten sowie die gesamten Abschreibungskosten der fiktiven Straßeninfrastruktur errechnen. Der Quotient aus verkehrssystemspezifischen Abschreibungskosten und gesamten Abschreibungskosten der im Verfahren geplanten Straßeninfrastruktur ergibt schließlich die prozentualen Anteile der einzelnen Verkehrssysteme.

- Aufteilungsschlüssel für die Aufwandsposition Straßenentwässerung: Die Kosten der Aufwandsposition Straßenentwässerung lassen sich über verkehrssystemspezifische Flächenanteile sachgerecht aufteilen. Anhand verkehrssystemspezifischer Querschnittbreiten der Straßentypen und der Netzlängen der Straßentypen (aus den digitalen Verkehrswegenetzdaten) lassen sich die verkehrssystemspezifischen Flächen und die Gesamtfläche der fiktiven Straßeninfrastruktur errechnen. Der Quotient aus verkehrssystemspezifischer Fläche und Gesamtfläche ergibt schließlich den prozentualen, verkehrssystemspezifischen Flächenanteil.

Für die Erarbeitung der einzelnen Aufteilungsschlüssel werden zunächst für die einzelnen Teilräume (Fahrbahn und Seitenraum) die Querschnittsbreiten und die Bauelemente mit den zugehörigen Kostensätzen sachgerecht den Verkehrssystemen zugeordnet. Verlaufen in einem Teilraum lediglich Verkehrswege eines Verkehrssystems, so ist die Zuordnung eindeutig.

Beispiel: Wird die Fahrbahn ausschließlich vom Kfz-Verkehr genutzt, werden diesem die Querschnittsbreite der Fahrbahn, die Bauelemente der Fahrbahn und die gesamten Wiederherstellungs- sowie Abschreibungskosten der Fahrbahn zugeordnet.

Werden die Teilräume hingegen von mehreren Verkehrssystemen genutzt, müssen die Querschnittsbreiten, die Bauelemente und die Kostensätze sachgerecht aufgeteilt werden. Hierfür werden u.a. Planungsvorgaben aus Richtlinien benutzt.

Beispiel: Nach den Richtlinien für die Anlage von Stadtstraßen dürfen Fußgänger- und Radverkehr nur dann gemeinsam geführt werden, wenn der Anteil der Radfahrer nicht mehr als ein Drittel der Gesamtbelastung beträgt. Somit werden im Aufteilungsverfahren die Querschnittsbreiten, die Bauelemente und die Kostensätze zu einem Drittel den Radfahrern und zu zwei Dritteln den Fußgängern zugeordnet.

Die einzelnen Aufteilungsschlüssel werden schließlich mit den Netzlängen der jeweiligen Straßentypen multipliziert, um damit die Anteile für die Aufteilung der verkehrsrelevanten Aufwendungen und Erträge vornehmen zu können.

Bei der Interpretation der Ergebnisse ist zu beachten, dass im Gegensatz zu den anderen Verkehrsmitteln die Flächen des Fußgängerverkehrs auch verkehrsfremden Funktionen dienen, insbesondere dem Aufenthalt, in Geschäftsstraßen oft auch als Ausstellungs- und Auslageflächen. Teilweise ist der Flächenanspruch für die nicht-verkehrlichen Funktionen sogar höher als für die Verkehrsfunktionen. Fußgängerzonen dienen darüber hinaus auch dem Liefer- und Ladeverkehr.

3.4.5   Aufwendungen und Erträge des ÖPNV im kommunalen Haushalt

In kommunalen Haushalten sind auch Aufwendungen enthalten, die durch den Linienbusverkehr entstehen. Beispielsweise kann der Linienbusverkehr aufgrund hoher Achslasten zusätzliche Abschreibungs- und Unterhaltungskosten im Straßennetz verursachen. Dies fällt insbesondere auf Straßen mit einem geringen Anteil des übrigen Schwerverkehrs ins Gewicht. Diese Mehrkosten werden nicht von den kommunalen Verkehrsunternehmen, sondern vom Straßenbaulastträger getragen und sind damit in den kommunalen Haushaltsplänen verbucht. Diese Mehrkosten werden mit Hilfe von Berechnungsverfahren für die Dimensionierung des Oberbaus nach RStO (Richtlinien für die Standardisierung des Oberbaus von Verkehrsflächen), unter Zugrundelegung von Achslastdaten sowie Verkehrsstärken des Linienbusverkehrs abgeschätzt. Gleiches gilt für auf der Fahrbahn geführte Straßenbahngleise.
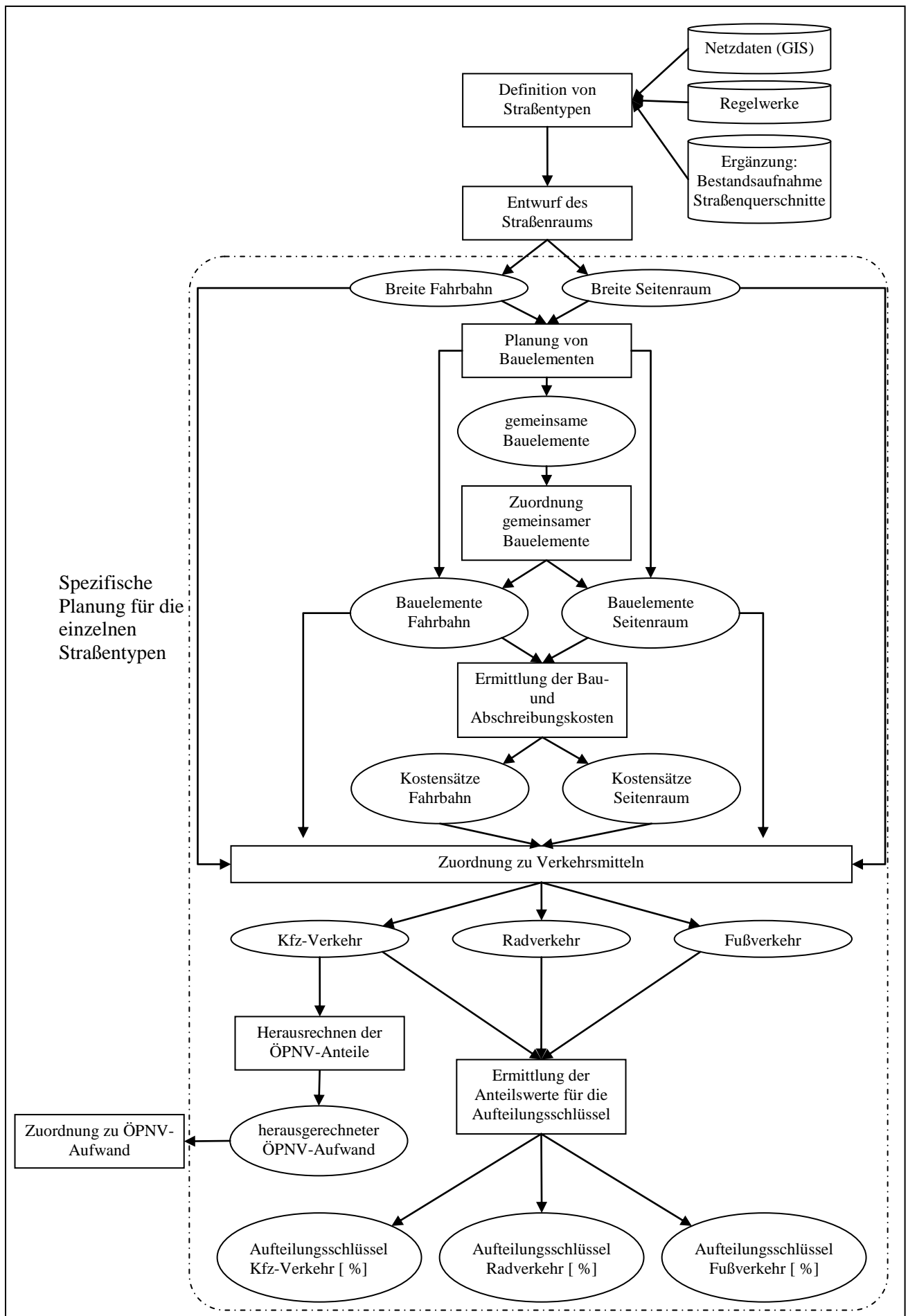
Abbildung 2: Prinzipskizze des Aufteilungsverfahrens

4 AUSBLICK

Als erstes Arbeitspaket wurde die Analyse der Haushaltspläne abgeschlossen. Dabei wurde der Aufbau der Haushaltspläne der Beispielstädte Kassel und Bremen untersucht. Derzeit wird darauf aufbauend die Aufteilungsmethode entwickelt. Die ersten methodischen Ansätze wurden in einem Workshop mit 15 Experten diskutiert, sodass deren Anregungen und Erfahrungen aus ähnlichen Fragestellungen in die weitere Bearbeitung des Forschungsprojekts einfließen können.

Ein zentraler Bestandteil der Aufteilungsmethode ist die Entwicklung von Aufteilungsschlüsseln, die im Wesentlichen auf standardisierten Straßenraumquerschnitten basieren. Mit Hilfe von Geoinformationssystemen sollen Teilnetze für die verschiedenen Verkehrsmittel gebildet werden, um diese Aufteilungsschlüssel auszuarbeiten. Da Daten zu Breiten des Straßenraums und Angaben zu Anlagen des Rad- und Fußgängerverkehrs im Besonderen in Geoinformationssystemen nicht vorhanden sind, ist vorgesehen, die erforderlichen Eingangsgrößen aus Richtlinien abzuleiten (z. B. Fahrbahn- und Gehwegbreiten). Da insbesondere im Altbestand nicht davon auszugehen ist, dass Regelbreiten aus den Regelwerken zum Straßenentwurf vorhanden sind und zudem in den meisten Fällen Bandbreiten vorgegeben sind, wird das Forschungsvorhaben durch eine Bestandsaufnahme von ausgewählten Straßenraumquerschnitten (u. a. durch Luftbildauswertung, Pläne und Messungen vor Ort) ergänzt. Damit können verlässlichere Werte als Eingangsgrößen für das Aufteilungsverfahren verwendet werden, die Ergebnisse sind besser auf andere Städte übertragbar und die generelle Anschlussfähigkeit für die weitere Forschung wird erhöht.

Mit ihrer umfassenden Betrachtungsweise stellt diese erweiterte Methode einen sachgerechten Ansatz für die Aufwandsseite dar und verbessert die Anschlussmöglichkeiten für die weitere Forschung auf dem Gebiet der Nachhaltigkeit und des umweltverträglichen und kosteneffizienten Verkehrs in Städten.

5 QUELLEN

BAUER, Björn: Entwicklung einer Methode zur wirtschaftlichen Bewertung verschiedener Verkehrsträger. Masterarbeit am Fachgebiet Verkehrsplanung und Verkehrssysteme, Universität Kassel. Kassel, 2012.

BERTELSMANN STFTUNG, KOMMUNALE GEMEINSCHAFTSSTELLE FÜR VERWALTUNGSMANAGEMENT (Hrsg.): Manifest zum öffentlichen Haushalts- und Rechnungswesen in Deutschland. Mehr Transparenz, Effektivität und Effizienz in Politik und Verwaltungen durch ein einheitliches doppisches Haushalts- und Rechnungswesen. Internet: http://www.bertelsmann-stiftung.de/cps/rde/xbcr/SID-21719402-F930C518/bst/xcms_bst_dms_29126_29127_2.pdf (abgerufen am 20.03.2013). Berlin, 2009.

BUNDESMINISTERIUM FÜR VERKEHR, BAU UND STADTENTWICKLUNG (2011, Hrsg.): Abschätzung und Bewertung der Verkehrs- und Kostenfolgen von Bebauungs- und Flächennutzungsplänen insbesondere für die kommunale Siedlungsplanung unter besonderer Berücksichtigung des ÖPNV. BMVBS-Online-Publikation 03/2011. Berlin, 2011.

BUNDESMINISTERIUM FÜR VERKEHR, BAU UND STADTENTWICKLUNG (2011a, Hrsg.): Verkehrs- und Kostenfolgen der Siedlungsplanung. Nutzerhandbuch für den Verkehrsfolgekostenschätzer Version 1.0. BMVBS-Online-Publikation 02/2011. Berlin, 2011.

FAIRKEHR: Versteckte Millionen, in: fairkehr, VCD-Magazin für Umwelt, Verkehr, Freizeit und Reisen, Ausgabe 1/2005. Internet: http://www.fairkehr-magazin.de/fileadmin/user_upload/fairkehr/archiv/2005/fair_0105/titel/versteckte_millionen.htm (abgerufen am 20.12.2012). Bonn, 2005.

ICLEI-EUROPASEKRETARIAT (Hrsg.): Wieviel zahlt unsere Kommune für den Autoverkehr? Arbeitsblätter zur Aufdeckung versteckter Subventionen für den motorisierten Individualverkehr. Internet: http://www.increase-public-transport.net/fileadmin/user_upload/Procurement/SIPTRAM/Hidden_Subsidies/Faltblatt.pdf (abgerufen am 05.12.2012). Freiburg, 2001.

ICLEI-EUROPASEKRETARIAT (Hrsg.): Versteckte Kosten des städtischen Autoverkehrs. Öffentliche Gelder für den privaten Verkehr, Aktualisierte deutsche Fassung aus dem englischen Original. Internet: http://www.increase-public-transport.net/fileadmin/user_upload/Procurement/SIPTRAM/Hidden_Subsidies/German_leaflet_final.pdf (abgerufen am 05.12.2012). Freiburg, 2005.

SCHWARTING, Gunnar: Den kommunalen Haushaltsplan – kameral und doppisch – richtig lesen und verstehen. Leitfaden für Rat und Verwaltung, 3. überarbeitete Auflage. Berlin, 2006.

UMWELTBUNDESAMT (Hrsg.): Bracher, Tilman; Backes, Thomas; Uricher, Angelika: Möglichkeiten der Umweltentlastung und Kostenreduzierung im Verkehr durch Verkehrsplanung – mit Leitfaden für die LCTP-Anwendung in Kommunen, Umweltforschungsplan des Bundesministeriums für Umwelt, Naturschutz und Reaktorsicherheit, Forschungsbericht 299 96 108, ISSN 0722-186X. Berlin, 2002.

Discomfort of the Present, Relief of the Future

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1 INTRODUCTION

Nowadays, urban development is experiencing new phases: a territorial widening from the district to the city, from the city to the agglomeration, from the agglomeration to the metropolitan area.

The existence of the metropolitan area is still under question and the answer varies depending on the scale and the governance and economic trends and actors in the different territories.

INTA's Community of competence Metropolisation[1] departing from new understandings on the urbanization processes works together with its members, including urban development actors who are confronted with metropolitan practical experiences, leading a reflection on the following lines:

(1) Limits of the metropolisation

(2) From making the city to being the city

(3) Metropolitan identity and representations

We refer here to recent activities INTA run in the context of urbanisation processes underway. The international seminar "A city for all made by all! The future of social contract in the scattered city" held in France and the International programme In-between metropolitan strategies.

2 THE RIGHT TO THE CITY IN THE SCATTERED CITY

"Making metropolis, it means probably also to allow those who live far away or nearby to keep in touch, to receive information, to keep a voice on the territory which belongs to them. Leaving, coming back, welcoming, staying connected, are images that shape metropolitan identities."[2]

The shifting of the concept of inhabitant to the one of "territoriant" was defined by Nicolas Tixier, professor at the National School of Architecture of Grenoble at the Congress INTA35 where INTA first approached the topic of the intermediate metropolises, their development strategies and alliances drawing new territorial settings. Intermediate cities are facing new governance issues and developing new models of cooperation with their local partners (who are those partners?), the challenge being to have more regional relevance while maintaining significant local connections at the municipal level.

"We do not live in cities anymore, but in territories. […] Each of us has its own territorial map, on which it draws its own routes. One has his tricks, tactics, strategies to make use of the territory.

Which kind of tools do we have today to explain these practices and routes sudden or intended, sometimes passive but often inventive? A Catalan researcher, Francesc Muñoz, coined for it a neologism, the world "territoriant" to complete the word inhabitant and meaning by this that the space where we declare we live, is not obviously the only meaningful space for us.

Shifting from the idea of inhabitant to that of territoriant, leads in different places to redefine spaces in which his involvement is legitimate - political involvement as much as physical.

But this also refers more widely to the idea that it is possible to be attached to a territory and its future even if we do not live in it (physically).[3]

In this new territorial context then Which are the responsibilities of the metropolis towards its neighbouring territories and areas of influence? And what are the relationships between urban and suburban, urban and rural?

The multiple interactions of actors, geographical scales and functions draw the components of a living, productive and cultural space that goes beyond the administrative limits - the metropolitan area.

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[1] http://www.inta-aivn.org/en/communities-of-competence/metropolisation

[2] Nicolas Tixier, professor at the National School of Architecture of Lyon, addressing World Urban Development Congress INTA35 in Grenoble during Opening Session "Representation and metropolitan identity"

[3] Contribution of Nicolas Tixier at INTA35 in the opening speech titled "Representation and metropolitan identity"

However, this concentration of economic, political and social activities, creating wealth, and economic and cultural influence is also the root of a worsening of social segregation, exclusion and relegation. They are growing to the point of challenging the "social contract" by the juxtaposition of "societies" who oppose or who often prefer to ignore each other.

What emerges today with increasing force are issues that concern the relationship between urban and rural areas. The same issues that call into question the "social contract" are stressed but refer to the relation metropolis/periphery.

These issues are raised in a particular way in the suburban area that, according to the definition given by Eric Charmes:[4] "... has an essential feature: it is a space of urban dynamics, since its growth is clearly related to the proximity of a metropolis. But at the same time it keeps its own identity, something quite close to the order of the rural."

Those territories between rural and urban dimension are struggling to find their place in the process of metropolisation. It shows a gradual withdrawal of public services and favorable conditions for the development of social relations and activities. We are witnessing there a decline in the "Republican conquest of territory"; territorial solidarity being undermined by the concentration of development and services in the most efficient territories as the metropolitan heart, to the detriment of its periphery.

So we see in these suburban areas different forms of breaks, bursts: a gradual creation of the "scattered city": a political and landscape fragmentation and the social and economic disintegration.

3 WE LIVE TERRITORIES

"Where do you live? How to do you live and to which territory you fell you belong?" This is what INTA asked camera in focus and a map of the daily commuting of the interviewed supporting to discover the habits from the inhabitants of five among European and Latin America cities. This video entitled " The scattered city" opened the 2 days international seminar A city for all made by all ! The future of social contract in the scattered city" we run in France last December in collaboration with the City of Vaulx-en-Velin, ENSAL (National School of architecture of Lyon), ENTPE (National School of Public Works of the State) and the UNESCO Chair Urban policies and citizenship. Open the video a Dutch woman coming from a "big village" ...of 45,000 people!, who moved in the "satellite" of the Randstad where property prices are lower, allowing her to "buy a real home. Although the train is overloaded she takes it every day for work or for shopping. She sees herself as a "suburban". On the other hand, the couple living in the hills around Givors, small town between Lyon and Saint-Etienne (France), did not "feel as living in the suburbs" but still "on the outskirts of Lyon." The husband is used to take his car daily to access the urban services located in the center of Givors ... 10 minutes away. Third witness, the resident of a community located 6 km from the town of Brignoles in Var (south of France), always takes her car to go to the nearby town of Toulon and she feels she "belongs to the Var hinterland." Scale change with the testimonies of people from Latin American. Colombia, Bogotá, the man interviewed is pleased to live "isolated" in the countryside, even if he is confronted with intense traffic jam to reach the city centre for his daily courses. Another one lives in one of the 500 000 houses built without permission on the flanks of mountains overhanging Lima, Peru. In a chain, it takes him daily 2h taxi, walk and a bus trip to reach his work.

Journey that might be improved with the creation of a cable line that also might provide many other socio-economic changes.

How do we give a representation to this reality? How to build solidarity within the scattered city ? With these many small towns beyond the suburbs, we should come up with new governance models".[5]

The parallel raising of both metropolitan and local scales (globalisation and decentralisation) facing each other, competing and sometimes mixing, recompose territories and powers.

Moving and overlapping borders are putting into question planification tools, plans, programmes and projects and governance systems.

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[4] Eric Charmes, RIVES lab Director, ENTPE
[5] Eric Charmes, RIVES lab Director, ENTPE

4 IS THE METROPOLITAN LEVEL THE ANSWER?

Mobility, according to our members experience is one key element of the debate on periurbanity and able to make solidarity among territories effective and thus one key factor on which the metropolitan level can be built.

In the Netherlands, the Randstad, the metropolitan area is made by hundred of small towns, four main cities, counting some 7 million inhabitants. " Everything takes place at a small scale, says Paul Gerretsen, director of Deltametropolis Associaton, which focuses on the metropolitan development of the Randstad. Mobility and multimodal commutings structure the territory. "Many people have chosen to live in small towns and take the train every day to go to work. "They made a compromise that is built around the mobility system."

But the integration of mobility it is enough to build political solidarity across the metropolis?[6]

The answer is difficult for the Netherlands where the level of the Randstad is not politically represented. Although there is no official metropolitan governance for Randstad Holland, it does continuously work as a metropolitan system in reality. The mobility flow between the four cities is increasing more rapidly than the mobility between the cities and their own region.

In Medellin, the urban integrated programme for the metropolitan region AMVA (Area Metropolitana Aburrà Valley) including all modes of urban transportation also plays a fundamental role in "building a territorial equity."[7] It is in this framework that was created a line of "metro cable." Passing through the "illegal/not planned" neighborhoods, it enables them to develop socially and economically. In fact along its way has emerged a library, colleges and pedestrian paths.

In Bordeaux Urban District major projects and infrastructures representing public and private investment have been undertaken (Bordeaux's decade 2010-2020) strengthening the exceptional features of exchange, innovation and quality of life of Bordeaux among which the tramline system that has unified territories, in physical terms, giving space to multiple occasions of movement within the metropolitan area.

Whether you're in Medellin, in the Randstad or Bordeaux, mobility and transport infrastructure are essential to solidarity between territories, " especially because those peri urban territories go far beyond the municipal limits". Territories whose representation is still missing.[8]

The examples we got from our members show how difficult and complex are processes of construction of metropolitan governance and its capacity to adapt to global and local changes. Metropolitan strategy means that there is a metropolitan governance that can take decisions. How those processes work, who are the actors and what makes them very sensible models?

5 BUILD ON YOUR STRENGTHS

Apart from the major metropolises worldwide, the creation of the metropolitan areas rely on governance strategies and alliances among surrounding territories[9] to achieve the objectives of resources management, urban quality or attractiveness. Creating networks of cities and agglomerations with their suburban territories, metropolises make different patterns of alliance to implement policies and projects to enhance their development. These diverse modes of cooperation allow, depending on the case, to associate additional resources, to create mass effects, to define and manage the "values of the metropolis" that are the natural resources, water, energy, know-how, the driving forces for the economic activity or for the livability of the territory.

In a complex institutional landscape, marked by multiple levels of competence, territorial co-operations exist as "spaces" for debates, coordination and projects enabling public actors to overcome the institutional barriers, while maintaining their legitimacy with their level of competence.

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[6] Eric Charmes, RIVES lab Director, ENTPE
[7] Medellin metropolitan, interview with Françoise Coupé
[8] Eric Charmes, RIVES Lab
[9] INTA first approached this topic at its 35th Congress in France (Grenoble and Lyon) focused on metropolitan development strategies and alliances worldwide

Who benefits from the resources and public services, and who is excluded? The issue of social choices, for those who are governed and those who are not, is a key point to understand the metropolitan process (Le Galès 2011).[10]

This scaling has not only morphological or territorial consequences, it raises also other dynamics. First, the transformation of socio-technical infrastructures necessary to ensure the robustness of these conurbations then flows of huge investment and financing projects to be realised (the case of the Bordeaux's decade can be mentioned here), and most importantly, socio-territorial inequalities (as the role of the city of Medellin within the AMVA, Metropolitan Area of Aburrà Valley or the role of Amsterdam in the Randstad), visible or insidious, exacerbated by powerful metropolitan dynamics.

Although scales and conditions are different from country to country, the work undertaken by local authorities pose the question of the "good" level of governance. On the topic of new territorial dimensions, several interviews have raised the issue of the regional dimension and its meaning, its identity, its ability to be identifiable.

Paris Region is trying to work on a territory that includes the metropolitan level (now concerning only the built urban areas and run by Paris Métropole created in 2009).

Currently there's not a proper regional identity as the Region, as this administrative entity is quite new but the debate ongoing is exactly on which should be, in this case, the right perimeter for the metropolitan level to be managed.

In this regard, the question of adaptation of the planning instruments to the new condition, the importance of coordination, organization and linkage, is as decisive as the central role of political guidance.

Completely another case, Bordeaux Urban District, driving the construction of the metropolitan project, asked itself and all local actors involved the following question: "What kind of city do you want in 2030? ". The dialogue has been adopted as a key tool to intertwine scales. The small-scale heart of the Bordeaux Urban District (la Cub) is acting to build the metropolitan vision on a wider level. The metropolis is already a spatial (geographic) reality because there are people who live together and have daily metropolitan practices (they commute every day from one town to another for their work, recreational activities etc.). The metropolitan area is made thus by flows, mobility functions, projects and a multiplicity of actors who interact, however today Bordeaux metropolitan has no institutional basis (no metropolitan status). There are not elected representatives.

Building a strategic vision based on the mobilization of local actors and citizen participation has emerged a collective and shared representation of the metropolis, "a metropolitan consciousness" that does not stop at the borders of the 27 municipalities.

As part of the development of the metropolitan strategy, the 27 municipalities of the CUB have been involved, as well as the County of Gironde, Aquitaine Region and the State, to help drawing this common destiny. Through the metropolitan project, policy makers agree on the path of cooperation with municipalities, major institutional partners, neighbouring districts, businesses, and all the metropolitan actors. The metropolis does not deny what exists already and it seeks to understand the issues in a systemic logic, combining actors, ambitions and territories, over passing all notions of contrasts and competition. However, some municipalities may continue to be frightened by the metropolitan process in which they can see a loss of autonomy and the weakening of the municipal level.

The Urban Community of Bordeaux has adopted a metropolitan project, whose principles and objectives are ambitious: to affirm the metropolitan dimension of Bordeaux while avoiding the dangers of an unbridled urban growth. This is likely making a metropolis, but respectful of the identity and diversity of the different municipalities, mindful of the inhabitants' future and with consideration for the environment. Because this goal can be achieved only with the involvement and permanent support of the population and with a constant dialogue between the partners based on trust and mutual respect, this metropolitan project will be implemented as it was developed: in a spirit of cooperation and consensus.[11]

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[10] Quel pouvoir pour les territoires métropolitains? Par Frédéric Gilli, Christian Lefèvre, Nathalie Roseau and Tommaso Vitale, 19/12/2012
[11] La Fabrique Métropolitaine de la CUB

In Jakarta the most visible phenomena of the most recent urban development initiatives is the leadership took by the private sector in developing new economic clusters (new housing, new-towns, industrial estates, leisure, commercial, health & institutional facilities) as well as infrastructure (toll-road, public-transport, water & sanitation) and even urban services. There is a booming of young and a more consumptive middle-class that has a voracious appetite for international-standard urban goods, services and lifestyles.

This trend has meant that governments have to adopt a new role and thus be able to change their habits which means better service-delivery abilities and optimizing infrastructure to create better business climates.

The increasing competition for private investments has meant that public goods management has to be more effective. A request of change moving from an old vertical political hierarchy towards a innovative and accountable territorial governance.

Complementarity, solidarity, cooperation together with consensus and participation are key elements to build upon a metropolitan strategy. This the case of the Coastal Development Territory (Cotonou-Porto Novo, Benin) or in the Randstad (NL) where the four main cities used to cooperate, to increase their chances of being more competitive in the context of a globalised economy and receiving more funding from the central government. But locally it translates in informal cooperations between cities, coperations of very dynamic nature and depending on the economic and political conditions. Although there is no official metropolitan governance for Randstad Holland, the cities recognised that global competition lay in the larger Metropolitan regions.

To conclude the metropolitan dimension implies coordination between actors of different kinds, relies on their ability to make decisions together, the heterogeneity and inequality between powers and new ways in which public and private actors interact. Metropolises do not just think of themselves as cities extended: they require to conceive horizontally and transversally the relations between territories, actors and institutions related to the same space. Uniqual access to services, lack of resources to implement comprehensive plans, difficulties to modernize and equip the infrastructure, emphasize the vulnerability of a metropolitan governance to be built. All these questions, too often considered strictly at a local level should be addressed at the metropolitan scale.

Sustainable Mobility in Urban and Touristic Areas

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1 ABSTRACT

Clean and efficient urban transport systems are essential for the economic, social and environmental health of a successful future Europe. However, built-up urban areas continue to be significant contributors to congestion, accidents and environmental impact and offer significant scope for improvement. Most cities and towns are confronted with a common core of environmental problems, such as poor air quality, high levels of traffic and congestion, high levels of ambient noise and greenhouse gas emissions. These problems can increase in touristic areas due to the fact that many tourists each year choose those areas as the venue for their holidays, thus resulting in a considerable increase in energy and mobility needs. The environmental problems in those areas are particularly complex as their causes are interrelated. Local initiatives to resolve one problem can lead to new problems elsewhere and can conflict with policies at national or regional level. Some regions in Europe are dynamically developing in the last decade due to the growth in tourism and the fast development is accompanied by increased traffic and rapid deterioration of the regions' natural resources on which tourism growth depends. Traffic congestions and the negative impact of transport on environment are recognized as the biggest risks to the sustainable development of the tourism sector. The problem is particularly acute in the resort complexes which expand to urban settlements during summer and early autumn. This paper aims to provide a general overview on the thematic of urban and sustainable mobility and on the related EU policies and research programmes. Moreover the activities of three projects developed in Italy by the Pole for Sustainable Mobility will be presented and compared: these projects concern the development and experimentation of electric powered vintage carriages in Rome and sustainable mobility solutions for the small Island of Ventotene and for the Pontine territory in Italy.

2 INTRODUCTION

New transport technologies offer at present a wide selection of low-impact solutions with regard to emissions and noises. Hybrid and electric powered vehicles (HEVs), show an enriching future for tourist centres and cities. These technologies will reach their maximum efficiency in combination with advanced methods of transport information and management and with the use of Renewable Energy Sources (RES). Initiatives that could be completed by decisive policies of restraint on traffic and integration of the different forms of transport, favouring pedestrian areas, primacy of public transport and incentives for the inhabitants to buy electric cars. Sustainability of transport activities is one of the main objectives pursued by the European Commission to improve environmental quality in the European Union and sustainable development has become a building block of economic policy at local, national and international level. Sustainable mobility and urban environment are currently high on policy makers' agendas for its importance in determining the quality of life in cities or in protected areas like national parks or nature reserves and for the central role played by local governments in shaping environmental policies. In order to deal with the risks deriving from the high level of pollution in these areas, the European Commission has funded several projects aimed at studying and managing the transport/environment link. One of the main goals of these projects is to identify best practices and appropriate policies to enhance sustainable transportation. However, different policies vary enormously in their effectiveness in achieving a reduction of pollution, and the time spans of the effects differ as well. Promotion campaigns need to be designed to identify the possible forms of sustainable mobility in the touristic areas and to promote them as a new service to the tourists and the citizens. General rules and objectives to obtain these results can be the followings:

- The activities need to be supported by both municipal and regional administrations in the target region.
- Alternative modes of transport and eco-friendly tours and routes need to be promoted.
- A mobility management services is required.

3   POLICY RECOMMENDATIONS AND MEASURES

To fulfill the market of EVs will require a commitment to public education, helping consumers understand the vehicles' benefits and overcome concerns that hinder their use. The media must be engaged to report on infrastructure development, and public support from influential leaders in the state and nation is critical. Also, it is vital for initial adopters to have a positive consumer experience that will contribute to widespread acceptance. It must be easy for consumers to purchase vehicles and access charging stations, be aware of relevant tax credits, get charging stations installed and become educated on the location of charging stations outside the home. Measuring the impact of these new technologies on consumers, businesses, economic prosperity and our environment is a key component in their sustainability. It is also anticipated that an influx of new technology, as well as the products and services associated with it, will encourage job growth.

3.1 Integration of policies

The establishment of synergies with other local initiatives and policies directly or indirectly related to mobility can justify the start up of a Sustainable Mobility project and help its implementation, as well as ensure its long-term viability. In this context it is essential to show a concrete link between Mobility and other issues of concern like the use of Renewable Energies. Three examples of best practices will be presented in Section 3. These projects were not stand-alone projects but were well integrated into a wider strategy of the city or the municipality. These projects demonstrated that objectives of Sustainable Mobility are more achievable if they fit into a wider strategy with respect to issues such a sustainable urban development, tourism or environmental issues.

3.2 Towards a European common charger for electric vehicles

It is important that the European Standardization Organisations bodies (CEN-CENELEC and ETSI) continue in developing a common charging system for electric cars, scooters and bicycles. European standards are developed by the European Standardisation organisations through voluntary cooperation among industry, consumers, public authorities and other interested parties for the development of technical specifications based on consensus. Standardisation tackles the interoperability of complementary products/services, requirements for safety, health or environmental performance. The standard has to ensure that all types of electric vehicles and their batteries are charged both safely and easily in all EU Member States. Thanks to this mandate plugs and connectors will use the same standard all across Europe, providing a true European solution independently of brands or countries. On the Communication of 29 April 2010 the European Commission established a roadmap for a coherent framework encouraging the market launch of electrically chargeable vehicles. In this strategy, the mandate that the Commission addresses now to CENELEC, CEN and ETSI to develop a European common solution for the charging of electric vehicles is crucial. This mandate has three objectives:

- To ensure that electric vehicles can be safely charged by their drivers.
- To ensure that electric vehicle chargers (including their removable batteries) interoperate with the electricity supply points and all types of electric vehicles. This would allow users to recharge their electric vehicles anywhere in the EU by using the same charger.
- The mandate requests the standardization bodies to consider the so-called smart-charging issues. Smart-charging will allow users to charge vehicles at off-peak times to get the lowest price and most efficient use of energy.

The design of the European standard will take into account ongoing activities in international standardization. The European Commission will continue to work closely with the standardization bodies and industry to ensure the timely development of the standard.

3.3 Regional and local level

It can be observed that many measures can be taken at regional and local levels, close to the citizen. Action on sustainable mobility will only produce all its potential gains if operations to be undertaken at Community and national levels are reflected locally and vice versa. The EU has already taken numerous initiatives in this area. An example is the Civitas programme, launched in 2000, which has helped 59 European cities with urban mobility projects. Support programmes have also been put in place to encourage public and private

investment in rational transport use (pilot actions, creation of local agency networks, etc.). Furthermore, the specific activities that are integrated into the operational development programmes for the EU cohesion policy, notably in those regions lagging behind in development, give the regions strong instruments which could be used for a wide range of different projects. Support and investments in clean urban transport, support to small and medium sized enterprises as well as related research and development are options to be mentioned. When this potential for transport efficiency is mobilized, one has, however, to respect the specific provisions of cohesion policy programming, partnership and management. It should also be further discussed how to find solutions for the growing problems caused by city centre congestion. City transport is above all a matter for local and national authorities, the EU should contribute to find solutions in the face of the deterioration in the quality of life which this problem causes, and which goes hand-in-hand with a truly enormous waste of energy. Local authorities have then an important role to play by providing and promoting sustainable solutions in their cities. Then again, there is the eternal problem of financing. Regulatory measures are certainly needed, but we must also be able to back them up with investments. Currently available financing products as developed by banks are not always suitable for the scale of many small projects, whereas the aggregate benefit such smaller projects can provide as a whole is substantial. There is a huge potential for investments in small-scale sustainable mobility projects throughout Europe. They will often be highly feasible, especially when including the aspects of Intelligent Transport Systems and environmental benefits. But financing of such projects, especially in the less developed regions of Europe, needs 'facilitation' to happen. Given the small scale and dispersed nature of the projects to be funded, it would seem that action is in any event best initiated at local or regional level. Funds to support the projects for the improvement of transport efficiency have been very successful in many Member States, and it should be considered how best practices can be repeated and improved.

3.4 Outlook on Research: what next?

Further technology - and policy oriented research to develop sustainable mobility in urban areas should allow to obtain the following needs and goals:

- Increased interoperability of transport infrastructures for different modes.
- Alternatives to traditional fossil fuels and increased fuel efficiency of vehicles.
- Noise and pollutant emission reduction technologies.
- Intelligent Transport Systems.
- Increased accessibility and comfort of public transport.
- More sustainable urban structures.
- Public acceptance of measures to create more sustainable transport systems.

Urban mobility can be improved through the developing of new ICT based services like travel information, positioning systems for vehicles, cyclists and pedestrians, fleet management systems and more attractive car and bike sharing schemes. Research should also aim at better integrate different public and private transport systems (sharing of infrastructure between passenger and freight transport, tram-train systems, bus rapid transit lanes, park&ride facilities, urban freight distribution logistics terminals, electric and hybrid vehicles, etc.).

4 THE EXAMPLE OF THREE RESEARCH PILOT PROJECTS

In this paragraph the activities and the results of three projects developed in Italy will be described. The three projects have been selected to illustrate different sustainable mobility applications. The projects are the following:

- Project 1: Developing and Experimentation of Electric Powered Vintage Carriages in Rome.
- Project 2: Sustainable Mobility Solutions for the Island of Ventotene.
- Project 3: Sustainable development of the Pontine territory: the 'Pianura Blu' project.

The three projects have the common characteristics to be implemented in touristic areas and to test 'greener' transport solutions. Project 1 has the goal to analyze the possibility of substituting the traditional touristic horse powered carriages in Rome with innovative electrically powered ones; Project 2 aims to stimulate the

use of sustainable mobility solutions on the small island of Ventotene introducing electric and hybrid vehicles in the Municipal fleet and realizing the appropriate infrastructures. Project 3 foresees the design and implementation of a large integrated mobility system in the Pontine territory in the region of Lazio. The three projects can be considered best practices and represent examples that can be repeated and improved elsewhere.

4.1 Project 1: Development and Experimentation of Electric Powered Vintage Carriages in Rome.

The main goal of the project is the development of an innovative electrically-powered vintage carriage (Botticella) and its experimentation in the touristic centre of Rome. For the realization of the project two different phases have been foreseen: the first phase have seen the designing and the construction of two prototypes of the electric vehicle and it will be concluded in 2013; the second phase will be later carried out and sees the integration of the first two prototypes in the municipal fleet. Actually Rome Municipality is already testing electric assisted rickshaws for freight and passenger transport in the inner zone of the city. Public charging stations have been already installed at selected sites in the city to charge private and public electric vehicles. Moreover in the city centre there are 44 traditional horse-drawn carriages that, according to the urban plans drawn up by the Municipality, will be confined to parks during the week and allowed in the centre only at weekends. The plans foresee also the replacement of the horse-drawn carriages on weekdays by a fleet of electrically-powered vintage cars. Results from the first phase have seen the complete design of the electric vehicle and the analysis of the related regulations and standards. Figure 1 shows the final design of the vehicle: particular attention has been given in using innovative and sustainable materials and technologies trying to respect and maintain the vintage style of the traditional roman Botticella.
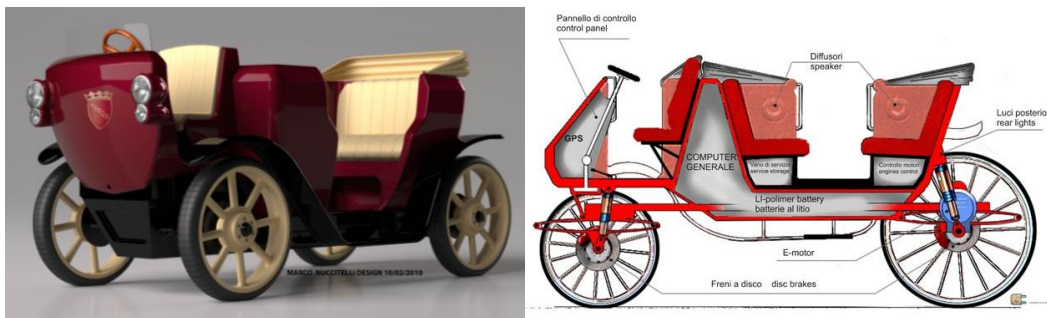

Figure 1 ad 2: The design of the new electric powered Botticella and its main components.

Figure 2 illustrates the main components of the prototype. A list of guidelines and specific indicators has been individuated in order to monitor and evaluate the activities that will be carried out during the experimental phase. The indicators will allow to evaluate the success of the measures and services demonstrated within the Project, in terms of technical features, energy and environmental issues, user acceptance, impacts and financial issues. Assessment objectives, expected impacts, measures of performance, reference cases and measurement methods have been also identified. This will allow to highlight the overall performances of the measures and services that will be demonstrated within the Project. Moreover, georefential mobile units and safety and touristic information unit have been identified and will be installed on the prototypes (rickshaws and electrically-powered vintage cars) and will be integrated with a set of sensors used to monitor the territory and the service. This pilot service will be monitored in order to measure strengths and weaknesses of the scheme. This will involve measurement of energy use, distances travelled, numbers of passengers transported, and the analysis of the data to measure efficiency and effectiveness of the scheme in relation to the organizational and management costs, the safety of drivers and passengers and environmental and energy efficiency indicators. Other objectives will be to support, co-ordinate and monitor the local assessment activities in order to guarantee their consistency with the joint overall evaluation approach and to analyze and report the project results, highlighting also similarities and differences of results among other cities in Italy and Europe (cross-comparison), and drawing conclusions on their transferability. The project has been financed by the Municipality of Rome through the Bioparco Foundation and is being developed by the Pole for Sustainable Mobility (POMOS), Sapienza University of Rome.

4.2 Project 2: Sustainable Mobility Solutions for the Island of Ventotene.

The main purpose of this project is to study pathways that lead to sustainable energy systems for the small island of Ventotene in Italy. The project looks into several aspects such as renewable energy penetration, efficient energy use, clean transportation options, monitoring and fleet management. The project has been financed by the Lazio regional government with the participation of the Municipality of Ventotene and it has been developed by POMOS and various private partners. The project had a duration of six month split up in two periods of 3 months corresponding to the 2009 and 2010 summer seasons. The main goals of the project were to analyze sustainable mobility models on the island through the implementation of a local sustainable mobility programme and the introduction and development of the following systems:

Electric Vehicles Fleet: The first activity was to add seven 100% electric vans to the Municipal fleet. These are commercial Porter Piaggios using a pure electric drive train which only consumes electric energy (see Figure 3).

Figure 3 and 4: The electric vehicles fleet and some of the hybrid and electric prototypes experimented in the project.

The vans will be mainly used during the touristic season for transportations from the port to the centre of the island with an estimated average of 15 daily kilometers traveled on the island for each vehicle. The vans will be also used to test the on board systems. Moreover a selection of other commercial electric and hybrid vehicles and prototypes developed by POMOS will be also tested on the island as well as the use of different kind of batteries (see Figure 4).

Experimental on board systems for the telemetry and the control of the vehicles: The fleet was equipped with on board telemetric device to locate the vehicles, and send that data over network. Direct connection of the device diagnostic bus can allows the automatic collection of vehicle performance data to support preventive maintenance. The on board system also includes a PC with a touch screen that is used to show data and information. A multimedia software was developed to provide to the drivers and the travelers audio and video messages according to the position of the vehicle. The system calculates the real-time location of any vehicle, then data are transmitted to a central server situated in the City Hall building and can be used immediately for daily operations and archived for further analysis too. The system can be used to monitor on-time performance and can be used for service planning, safety and security, traveler information and entertainment, vehicle component monitoring, and data collection.

Environmental monitoring system: The use of a compact air pollution analyzer was planned for environmental monitoring. The analyzer has an air quality sensors module for several kinds of gaseous pollutants (CO, NO_2, SO_2, O_3). It can be easily installed either on outdoor fixed emplacements or onboard of any kind of mobile vehicle (car, van, scooter, bicycle, segway) and operated both as a kinematic and static units to create an air quality monitoring control network. The air pollution analyzer is made to operate under software control by an external controller unit dealing with satellite positioning and data transmission to a remote control centre. Data are sent to the server and displayed and analyzed using a software tool.

Wireless communication system: An outdoor Wireless Mesh Network (WMN) was designed and created to cover most of the territory of the island.

Intelligent charging systems and integration with Renewable Energy Sources: Charging stations have been installed at selected sites on the island to create a small Intelligent Networked Charging Infrastructure for

EVs. The charging stations keep track of charging times and other data to allow remote monitoring of their utilization and correct functioning. The project foresees the installation of a main charging station located in the night deposit of the vehicles and of a public network of three charging stations integrated with photovoltaic generators (PV) with the general objective to study and promote the use of PV energy to charge EVs on the island territory. A first integrated PV station has been designed, built and installed for charging the electrical vehicles and other two stations will be afterwards installed (see Figure 5).

Figure 5: The integrated photovoltaic charging station

The charging stations have been used during the experimental phases of the project to charge the Municipal electric fleets and the experimental prototypes. In the future, citizens with plug-in electric vehicles will be also able to charge their cars or scooters at these stations, located at convenient places around the island. All the experimental results and data coming from the charging infrastructure will be used to learn more about what is needed to support electric vehicles as they become more common on the island. The increased use of electric vehicles will impact electric utilities and the infrastructure for providing electricity to customers. The installation and the utilization of the Charging Stations will help to understanding of things such as how this infrastructure works, how consumers want to use it, driving and charging patterns, and interconnection with the electricity grid and with RES.
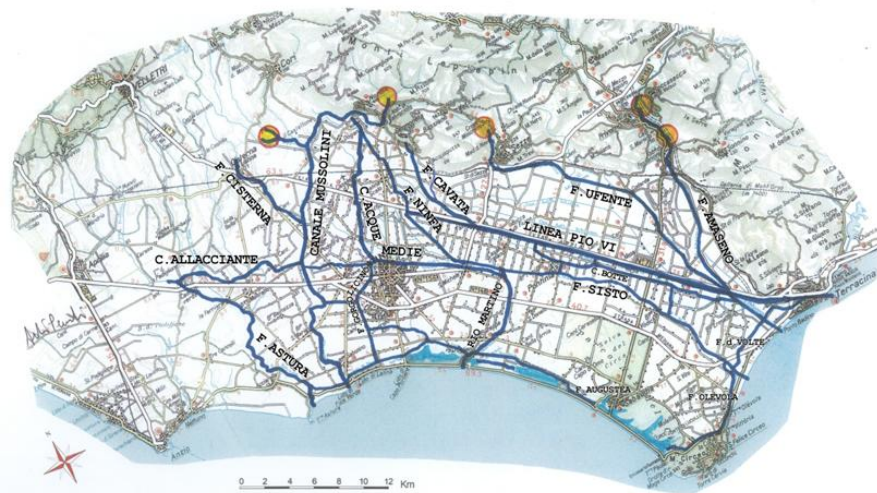

Fig. 6. Current navigable general plan of the Pontine Area

4.3 Project 3: Sustainable development of the Pontine territory: the 'Pianura Blu' project.

This project, named 'Pianura Blu", aims at the touristic exploitation of a large naturalistic area configuring mixed routes (waterways, channels and bicycle/pedestrian paths) out of the road network paths and expanding the concept of land sustainable mobility to waterways and coastal lakes that characterize all the Pontine area. The goal is the restoration of historical, archaeological and natural zones in an innovative way and with the use of new technologies and environmentally sustainable means of transportation. A mobility system integrated with the mainland will be studied and implemented. The system will allow to manage the fleet and the infrastructures assuring safe routes and the exploitation of historical / cultural sites. The project foresees the following main phases:

- Study of the navigability of the channels and lakes and their integration with pedestrian and cycle paths.

- Study of the accessibility of the channels with land transportation systems.

- Study and implementation of full electric propulsion boats and electric assisted bicycles.

- Implementation of charging infrastructures integrated with renewable sources.

- Integration of telecommunication infrastructures and related fleet management services.

- Development of monitoring systems and on board sensors.

- The project will represent an open-air laboratory for testing new mobility solutions and to validate results of research activities carried out at POMOS.

The projects foresees the use of small electric boats for the navigation of inland waters and terrestrial zero emission vehicles like conventional and electric assisted bicycles and other types of light electric vehicles developed specifically for the project. The whole mobility system will be supported by charging infrastructures also integrated with renewable energy systems and telematic infrastructures for fleet tracking and other functions. Figure 6 shows the current navigable general plan of the Pontine Area and Figure 7 illustrates the possible future development of all the navigable routes including the excavation of new small watercourses connecting the main channels and rivers and the exploitation of ancient navigable routes.
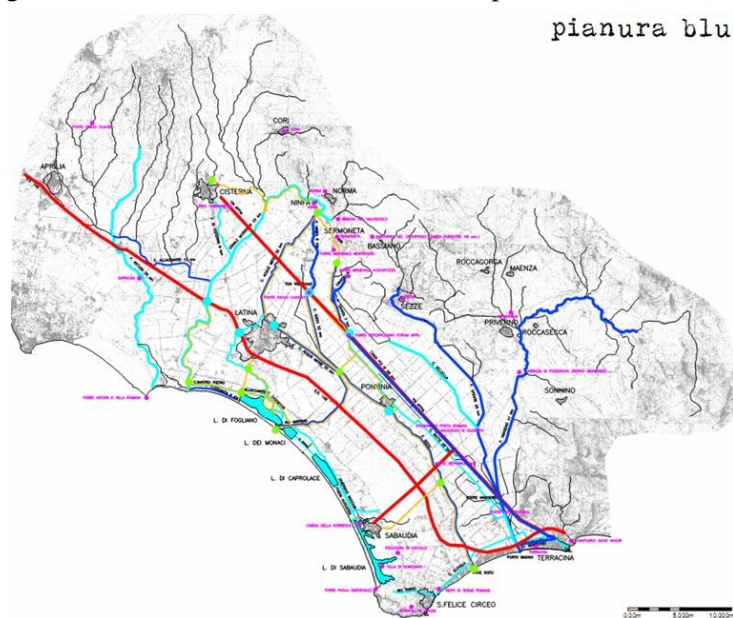

Fig. 7. Future development of the navigable routes.

An ambitious objective is also the historical and archeological enhancement of the area through the use of the latest sustainable technologies in order to attract a higher number of tourists. The project should also stimulate the growth of local production, promoting local activities and products in the territories along the touristic routes. With the configuration of the mixed routes (channels-paths) the tourists will be able to come into a deep contact with local production and resources. The project involves the construction of 100% environmental-friend boats. This eco compatible boats will be realized with recycled materials and will use low consumption electric propulsion motors integrated with renewable energy systems and with a limited use of chemical accumulators. A first prototype, named Valentino I, has been developed by POMOS and it is shown in Figure 8.

Fig. 8. Valentino I: the first developed boat prototype integrated with photovoltaic generators.

The boat's structure has been designed taking into account universal design concepts (mainly ergonomics and accessibility) and presents a particular system of rotor blades to allow navigation even in those sections of the channels in which the abundant algae would not allow the use of a classic propeller. Everything is set to safeguard the protection of flora and fauna. In addition, the boat it is equipped with a photovoltaic roof and it is prepared for the installation of a series of sensors capable of monitoring the quality of water.

To summarize, the realization of this project will lead to:

- Actions to raise public awareness on the issue of ecomobility.
- Tourist use of a wide geographical area.
- A significant enhancement of the image of the territory.
- The exploitation of natural and archaeological resources of the landscape.
- The development of trade and stimulus to the creation of consortium activities.
- An increased value of local products.
- A strong visibility at national and international level.

5 CONCLUDING REMARKS

Three projects aiming at using clean vehicles in touristic areas have been presented in the previous section. The three projects represent a concrete example of how the concept of sustainable mobility can be applied in touristic centers and territories. The projects have significant effects in social terms: the electric Botticella in Rome, the electric fleet in Ventotene and the ambitious Laguna Blu project, represent strong and effective examples to make citizens and tourists aware of the concrete possibility of use clean transport systems in their holidays. The projects have significant effects as well as in terms of air pollution and noise. The results so far have proved that the proposed solutions can offer high benefits to the environment. However, the successful implementation is only possible with the help of public funding in the beginning, especially in the field of Electric Vehicles (EV) promotion. Today the use of EVs can contribute significantly to the reduction of the environmental pollution and despite the history of EVs being as old as the internal combustion engines, the recent technological evolution can make electric transport competitive with respect to conventional transport. Nevertheless, an effort should be made by the industry and governments to protect the environment, through economical incentives to develop and acquire EVs. From the analysis of the first two projects emerges that to implement electric fleets in urban or touristic areas it is absolutely essential the creation of an electric infrastructure to park and charge the vehicles. In fact electric and plug-in hybrid vehicles must be charged while parked and to successfully implement projects like the ones presented in this paper, the parking/charging infrastructure need to be considered and created. It can be useful to identify three main categories: Residential, Private and Public.

- Residential includes single and multi-family housing, as well as apartment complexes. Charging should be accessible for all forms of parking: garage, driveway or parking lot.

- Private Sector charging includes parking at workplaces, shopping centers or other locations where neither the vehicle owner nor the municipality owns the parking space.

- Public charging includes on-street parking and any public lot or parking deck.

A number of issues need to be considered in response to these needs. Though there may be variation in cost for the vehicle or parking space owner, the infrastructure for the charging stations is consistent. To ensure proper installation and safeguard consumers, training and certification need to be provided. The upfront costs that can sometimes slow adoption of new technologies need to be minimized. Along with infrastructure, support will also be needed for maintaining and servicing the vehicles. While these vehicles are projected to have lower maintenance costs, a trained workforce must be available to service them and to enable maintenance-providers with the tools and training necessary to support these new vehicles.

6 ACKNOWLEDGEMENTS

7 REFERENCES

Calenne, F., Fabbri, G., Mascioli, F. M. F., Valentini, S., (2010). Sustainable Mobility Models for the Island of Ventotene, The International Multi-Conference on Complexity, Informatics and Cybernetics: IMCIC 2010, April 6, Orlando, Florida, USA.

ELVA Consortium, Societal scenarios and available technologies for electric vehicle architectures in 2020, Technical Review, [Online]. Available at: http://www.elva-project.eu.

European Commission, (2001). European transport policy for 2010: time to decide, White Paper, COM(2001)370, CEC, 2001, Brussels.

Hewicker, C., Hogan, M., Mogren, A., Power Perspectives 2030: On the Road to a Decarbonised Power Sector", ECF, Available at: http://www.roadmap2050.eu.

Intelligent Transportation Systems: Sustainable Mobility Pilot Research Projects in Touristic Areas, Thematic Fiches from the Press4transport consortium, June 2010, www.press4transport.eu , [on line].

Italian Ministry of Environment (2001). Island of Ventotene integrated program. Program for the environmental sustainability, energy efficiency and renewable energies in Italian minor islands, [in Italian].

Reiner, R., Cartalos, O., Evrigenis, A., Viljamaa, K., (2010). Challenges for a European Market for Electric Vehicles, European Parliament's Committee on Industry, Research and Energy, IP/A/ITRE/NT/2010004.

www.press4transport.eu, Virtual Press Office to improve EU Sustainable Surface Transport research media visibility on a national and regional level, [on line].

Fabbri, G., Calenne, F., London, M., Boccaletti, C., Cardoso, A.J.M., Frattale Mascioli, F.M., Development of an On-Board Unit for the Monitoring and Management of an Electric Fleet, ICEM 2012.