



# Mutual Learning Programme

DG Employment, Social Affairs and Inclusion

Host Country Paper

## Supporting the qualification framework: labour market information systems, graduate tracking and labour market forecasting in Croatia

Peer Review on 'Forecasting skills for labour market needs'

Zagreb, Croatia, 14-15 March 2024

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# **Mutual Learning Programme**

## **Peer Review on ‘Forecasting skills for labour market needs’**

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### Acronyms

ALMA	Advanced Labour Market Analysis module
ASHE	Agency for Science and Higher Education
CEDEFOP	European Centre for the Development of Vocational Training
CBS	Croatian Bureau of Statistics
CES	Croatian Employment Service
CPII	Croatian Pension Insurance Institute
CROQF	Croatian Qualification Framework
ESCO	European Skills, Competences, Qualifications and Occupations classification
ISCED-F	International Standard Classification of Education Fields
ISCO	International Standard Classification of Occupations
HEI	Higher education institutions
MSE	Ministry of science and education
NACE	Statistical classification of economic activities
NEET	Not in Employment, Education or Training
NKZ	National Occupational Classification
VET	Vocational education and training

## 1 Introduction

This paper has been prepared for the Peer Review on Forecasting skills for labour market needs held in Zagreb, Croatia, in March 2024, within the framework of the Mutual Learning Programme. It is set to lay out state of the art with respect to the combination of technical resources, analytical endeavours and policy efforts mobilised in the Republic of Croatia to provide and apply labour-market evidence base with the view to improving education provision to fit the current and future labour market needs.

Therefore, this paper will start with a birds-eye overview of labour market developments and mismatch challenges in Croatia (section 2), moving on through policy tools intent to overview those challenges. It then analyses the main labour market intelligence tools and graduate tracking efforts and explores the existing recommendation mechanism and forecasting exercises built upon those foundations. In doing so, this overview will examine how each of those policy measures affected policy processes in the education and training systems.

The review will include international initiatives and tools (such as the CEDEFOP toolbox, ESCO or the Eurograduate initiative) only insofar they are utilised in the ongoing processes at the national level.

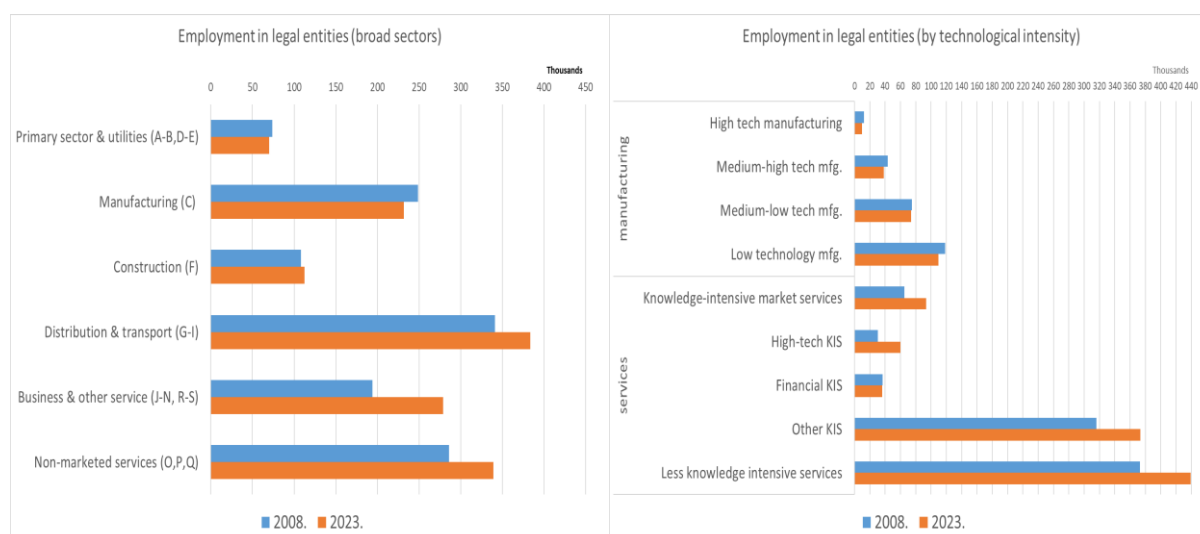
Having in mind strong policy ambitions of the government of Croatia in this field, both concerning the development of tools and their utilisation, the paper concludes with reflections on lessons learned from past efforts and tools their potential and challenges in fulfilling those ambitions.

## 2 Situation in Croatia

After the prolonged recession in the 2009-2014 period and the accession to the EU in 2013, the labour market situation in Croatia has markedly improved, both in absolute and relative terms. In this fifteen-year period, the total registered employment declined from 1,555,000 in 2008 down to 1,342,000 in 2014, then steadily increasing (despite the Covid-19 pandemic) to 1,640,000 in 2023 (CBS, 2024).

In sectoral terms (Figure 1), the employment in the extractive and transformative sector have not recovered to the pre-recession level, with a slightly higher relative decline in medium and high-tech manufacturing. The employment growth emerged in distribution and transport (including tourism), non-marketed (mostly public) services and within business and other services. Most of increase was in the knowledge-intensive sectors, with buoying knowledge-intensive market services and high-tech services sector (where employment computer programming and related firms exploded from 6,600 in 2008 to 34,000 persons, or 2% of total employment in 2023).

Figure 1. Change in the sectoral structure and technological intensity of employment in Croatia, 2008-2022



Source: CBS (2024).

The occupational structure strongly turned towards the professionals within the same period, whose share almost doubled, but has yet failed to catch-up with EU average (Table 1). There was a stronger contraction in the share of technicians and clerical workers in Croatia than in EU-27 in general, and similar expansion of service and sales workers (albeit from a higher base). The share of agricultural workers has contracted strongly, converging towards the EU average. The share of workers employed in blue-collar craft or machine operator occupations has shrunk over the period to a lesser extent than in the EU in general, currently making for above-average share. Unlike most EU countries, the share of elementary occupations has grown, converging towards the EU average, as did the broad occupational structure in general.

Table 1. Change in the occupational and educational structure of persons in employment 2008-2022, Croatia and EU-27

	Croatia			EU-27		
	2008	2022	Δ 08-22	2008	2022	Δ 08-22
<b>Occupational structure</b>						
Managers	5.2%	4.1%	<b>-21%</b>	7.1%	5.0%	<b>-29%</b>
Professionals	9.7%	17.6%	<b>82%</b>	13.6%	21.6%	<b>58%</b>
Technicians and associate professionals	15.2%	13.4%	<b>-12%</b>	16.9%	16.0%	<b>-5%</b>
Clerical support workers	12.1%	9.9%	<b>-18%</b>	10.4%	10.0%	<b>-4%</b>
Service and sales workers	15.6%	19.3%	<b>24%</b>	13.3%	15.9%	<b>20%</b>
Skilled agricultural, forestry and fishery workers	9.3%	3.4%	<b>-63%</b>	4.4%	2.8%	<b>-36%</b>
Craft and related trades workers	14.2%	12.8%	<b>-10%</b>	14.7%	11.6%	<b>-21%</b>
Plant and machine operators and assemblers	10.6%	10.3%	<b>-2%</b>	9.0%	7.6%	<b>-15%</b>
Elementary occupations	7.6%	8.0%	<b>5%</b>	9.6%	8.4%	<b>-12%</b>
<b>Education structure</b>						
Less than upper secondary education (levels 0-2)	17.2%	6.6%	<b>-61%</b>	24.2%	16.5%	<b>-31%</b>
Upper secondary education (levels 3 and 4)	64.2%	64.3%	<b>0%</b>	50.0%	46.3%	<b>-7%</b>
Tertiary education (levels 5-8)	18.7%	29.1%	<b>56%</b>	25.7%	37.1%	<b>44%</b>

Source: Eurostat [*lfsa\_egais*], [*lfsa\_egaed*].

The educational structure of the workforce has improved considerably as well (Table 1). In particular notable is the reduction of workers with no upper secondary education, a steady share of about two-third workers with upper secondary education, and a notable increase in the number of tertiary educated workers up to 496,000 or 29% of workforce in employment. While observed changes are more intensive in the relative terms, the

improvement in tertiary educated workers has not caught up with the EU average. On the labour market inflow side, the structure is very favourable with regards to early leavers from education and training, down to 2.3% from 4.4% (cf. 9.6% in EU-27). Also, more than 95% of population 20-45 has at least upper secondary education) [edat\_lfse\_01]. Yet concerning tertiary education achievement among 25-34 [edat\_lfse\_03], despite almost doubling from 19.9% to 35.5% over the period, this remained short from the EU average (42%) and target (45%).

Those developments occurred in a context of the demographic crunch, as working age population (20-64) declined by 14.1%, from 2,623,000 to 2,253,000 (cf. 2.5% in EU-27) [demo\_pjan]. The population is forecast to decline further by a similar degree by 2040, to 1,931,000 under the baseline Europop2023 scenario [proj\_23np]. Currently the cohort aged 20 (37,700) is only two-thirds the size of the cohort aged 60 (55,900). This leads to an annual replacement shortfall of about 18,000 persons, even despite the outmigration (Matković, 2020).

Table 2. Employment and unemployment rates by education level, Croatia and EU-27 2008-2022

	Croatia				EU-27			
	Total	Primary	Secondary	Tertiary	Total	Primary	Secondary	Tertiary
Employment rate (20-64)	69.7	40.4	69.2	84.7	75.5	57.4	74.5	86.9
Employment rate of recent graduates			74.0*	80.7			77.4*	86.7
Unemployment rate	7.0	11.9	7.2	5.3	6.2	12.2	5.7	3.8

Note: \* Secondary vocational. Sources: Eurostat LFS, [lfsa\_ergaedn], [lfsa\_urgaed], [edat\_lfse\_24].

With an increasing demand and dwindling supply, the labour market has tightened considerably over the recent years, as the employment rate (20-64) increased from 64.9% in 2008 to 69.7% in 2022. However, this is still far behind the EU average (Table 2) and the 78% employment rate 2030 EU target. Employment rate in Croatia is sub-par for all levels of education held by workers. Also, the gap with the EU average is greater the lower the level of degree. For youth graduating from the education system, the patterns differ slightly, with recent tertiary graduates in Croatia currently lagging further behind their EU peers compared to the vocational secondary education graduates. With improvement in education structure, the incidence of over-qualification [lfsa\_eoqgan2] has increased from 11.3% in 2008 to 16.4% in 2022, yet it is still lower than in EU at large (22.2%).

Unemployment has decreased notably since the 2008-2024 crisis, from 17.3% in 2014 to 7.0% in 2022, just slightly over the EU average. With the average number of registered unemployed decreasing from 345,000 to the record low of 109,000 between 2013 and 2023 and cohort size shrinking, the unmet labour demand was increasingly addressed via the work permits for third-country nationals. The annual quotas increased from 2,300 in 2016 to 78,400 in 2020. Their growth continued with the liberalisation of permit regime since 2021, reaching 172,500 annual permits in 2023 (initial and extensions)<sup>1</sup>, with about two-thirds in construction, tourism and hospitality sectors. Indicative of existing skill shortages, the introduced labour migration regime currently waives the “labour market (supply) test” for 52 occupations deemed to have no local workforce at disposal. Out of those, 49 are occupations in sales and services, blue-collar and elementary occupations (ISCED 5, 7, 8,

1 Due to anecdotal high fluctuation and LFS not being undertaken in the worker residences and collective housing, this population is largely absent from the Eurostat LFS derived labour market statistics, likely leading to underestimation of employment rate and overestimation of occupational/educational structure of the actual Croatian workforce.



9). The only exception are three occupations in the IT sector (programmer, system administrator and User Interface designer).

### 3 Policy measures

Since the late 2000s, the development of the Croatian qualification framework (CROQF) emerged as the main policy instrument to address existing and emerging skill mismatches, featuring prominently in the national reform plans and strategic documents over the past decade. Based on the European qualification framework, the CROQF Act was adopted in 2013, the bylaws in 2014, the registers in 2016, with occupational standards being developed since 2017 and the qualification standards since 2020 (Matković & Buković, 2022), and registers since the 2021 reform. This framework in turn set the expectations for a detailed evidence-base concerning current and prospective state of play in the labour market, content of occupations and qualifications, as well as labour market outcomes associated to holding qualifications.

Based on this, the national efforts to set up the skills intelligence and forecasting in Croatia have developed in several distinct directions and purposes. One set of tools focused on providing granular and up-to-date picture of the labour market (covered in section 3.1). Another traced the subsequent careers of graduates (section 3.2). The third instrument involved efforts to forecast the future labour market needs (section 3.3). The second and third of those ventures were often based on the labour market information systems.

#### 3.1 Labour market information systems

There are two distinct types of information about the labour market offered by the existing systems in Croatia. Firstly, they are informing about the structure and changes in the labour market; employment, unemployment, demand, wages and working conditions in the sectors, industries, or occupations, often at regional level. Such an approach is fit for observing the “change between”, as some sectors or occupations ascend or phase out. The second, which emerged late in Croatia, reports the content of occupations and qualifications, as such qualitative data is allowing for assessing the similarity between the occupations (or qualifications) and changes within them, as well as accounting for macro-trends.

##### 3.1.1 Information about the labour market structure

The early efforts to collect the labour market information relied upon the Labour Force Survey (set up in Croatia in 1997) and sector-county aggregates from the administrative tracking, both run by Croatian Bureau of Statistic (CBS). This was on occasions supplemented with the data from Croatian Employment Service (CES), due to the legal mandate of CES to analyse the labour market developments. The endpoint of such approach was 2013 CES [Labour Market Indicators portal](#) developed within the project “CES Services to clients: Improving Lifelong Career Guidance and ICT Support”. The Advanced Labour Market Information System, which could explore and combine microdata from several domains, was conceived within the same project. The Ministry of Labour committed to its development over several iterations over several years, using it to support the CROQF evidence base.

The current iteration of this system is the [Portal for advanced tracking of labour market](#). Released in 2022, it provides pre-prepared semi-annual digital profiles of the employment, unemployment, and education in each of the CROQF sectors (most recent 1<sup>st</sup> half of 2022), a live directory of national occupational classification, a register of regulated professions, as well as the Advanced Labour Market Analysis (ALMA) module for registered users. Hosted with the national Shared Service Centre infrastructure, this system is currently the first of its kind. It retrieves and combines the individual-level register data going back to 2018 from the various institutions (the CES, the Croatian Pension Insurance Institute (CPII)

and the Ministry of Science and Education (MSE), with the Central Registry of Affiliates and Financial Agency pending). This data is used to compute data reports presented via Tableau software. Currently, there are 22 topical dashboards, in most instances offering monthly snapshots of employment or unemployment stocks, organized by 25 CROQF sectors.<sup>2</sup> In most cases, there are possibilities to drill down to the selected county, municipality, occupation, level of education, gender or age group, but their use cases are not always obvious. As well, there is space for further improvement of dashboards and visualizations, as currently there are limited options for observing flows and trends or comparing chosen entities over time and no possibility of bookmarking a defined view.

Notably, the ALMA provides further detail on the occupations by applying the skill and occupation associations from the ESCO framework, allowing for the competence-based matching in the future, in particular if linked with the CROQF occupational register, or individual assessment of skills.

As well, the ALMA includes an effort to follow the labour market outcomes by mapping educational career pathways of employed and unemployed persons, as well as the subsequent labour market status of students from individual higher education programmes. While being based on the stock of students and not the flow of graduates, and not fileting out the persons who continued with education, this provides a solid foundation for a register-based graduate tracking.

At this point, the methodology for the creation of the occupational standards (MROSP, 2023, pp. 36–46) mandates the use of ALMA for identifying sectoral and analytical foundation for new (not updated) CROQF standards, therefore creating a specific need for this module. In line with this, currently the system has 80 users from 31 institutions (out of which 13 science and education institutions and 9 government bodies and agencies). They have mostly registered for the purposes of preparing the occupation standards, competence sets or the project-based labour market analysis.

### 3.1.2 Information about the job contents

Prior to the implementation of the CROQF register, there was no tool in Croatia describing the content of occupations, such as the common job tasks, skills and competences required in any given occupation.

The national occupational classification (NKZ) adopted in 1998 contained 3,861 occupational titles, mapped over the ISCO scheme, but it contained no descriptors apart from the title of the occupation (and in some cases synonyms). Without consensus about the standard job contents, it was difficult to unpack the occupation as to provide the relevant training courses, competence-based matching, or even reliably classify worker into the occupational categories. This proved a “translation challenge” for the CES, as both vacancies and employment dispositions were set in terms of occupational titles. With the occupation standard registry growing fast lately understanding of what is “within” any given occupation is being standardised<sup>3</sup>. As of February 2024, there are in total 559 occupation standards with 4,639 competence sets, a similar number of key job tasks, and an order or magnitude larger number of individual competences and activities.

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<sup>2</sup> The CROQF sectors do not correspond with industrial (NACE) nor UNESCO education fields (ISCED-F), but are home-grown and coherent with national classification of education and science, originating in administrative categorization of vocational education (sectors 1-14), and national classification of fields of science and arts (sectors 15-25). Sectoral councils have negotiated categorization of occupations into CROQF sectors, therefore one CROQF sector spans over several industrial (NACE) sectors.

<sup>3</sup> The implementation of occupation register enabled updating of occupations titles and classification, whose number was halved to 1899 (Odluka o Utvrđivanju Popisa Pojedinačnih Zanimanja Prema Nacionalnoj Klasifikaciji Zanimanja NKZ 10, 2023)

The contents of all occupational standards are publicly available and machine readable. There is a large potential in utilising those for developing tools to estimate dependencies and similarities between the occupations, implement the competence-based matching and career guidance. As well, this will allow for tracking changes in job content as the occupational standards get updated. The first such effort is the [Catalogue of digital and green skills](#). This is an ongoing classification exercise that utilised the machine learning technique to identify the subsets of green and digital skills from the existing inventory of ESCO and CROQF skills. Users can browse those skills in the page, identify occupations they belong to, and follow links to the education programmes providing such skills through the voucher scheme (if any).

## 3.2 Graduate tracking efforts

With the 2017 Council Recommendation on tracking graduates and subsequent output of the EC expert group on graduate tracking (2018-2020) (European Commission, 2021), the efforts to follow up graduates in their early careers have intensified in Croatia, with support of the European Network of Graduate Tracking. As well, from the bottom-up perspective, the institutional accreditation process, the requirements of new qualification standards and ever-smaller cohorts encouraged the educational institutions towards instigating or participating in the graduate tracking efforts. A national group for the development of a graduate tracking system was established in 2018 to this purpose. However, it has largely been dormant since 2021. As well, the CROQF Act introduced the mandate that “*ministry responsible for labour shall perform... monitoring the employability of persons with acquired qualifications*” (Article 11).

With all these facets, over the past decade, a multitude of persistent efforts were undertaken, both with the register and survey-based tracking. They have not yet led to a comprehensive national graduate tracking system based on a legal mandate, but are steadily moving towards it, as described below.

### 3.2.1 Register-based tracking

Linking the education and employment register data is an attractive venue for producing real-time, low-effort, high-reliability estimates of the labour market outcomes of education. However, in the absence of education registers and uncertainties about the data merging authority, most efforts up until now were not comprehensive and did not yield a sustained mechanism.

The earliest efforts focused on the CES register only and VET data (ASOO, 2011), tracing the employment and occupational outcomes of VET graduates who entered the CES register from their education. Notably, the key indicators from those analyses at the programme level were provided with VET sectoral profiles, as foundation for the VET occupational standards, qualifications and curricula.

Without a comprehensive tertiary education register, the Ministry of Education and Science managed an ad hoc collection on 2008-2013 professional study graduates from Polytechnics and Schools of professional higher education (but not universities or academic track studies). These were merged with the employment and unemployment register to provide the programme and institution-level estimates on employment origins, destinations, and (mis)matches. This was largely successful and led to a proof-of-concept publication (Rimac & Ogresta, 2017). However, it was not widely publicised or discussed and it was not repeated or extended to university studies.

In the context of the EU's Youth guarantee, another effort was made to identify inactive NEETs via an EU-funded project “Establishment of a NEET monitoring system”. To that purpose, the CES and CPII register data was merged with the by-then established register of pre-tertiary education (*e-matica*), and the Information System of Student Rights (ISSP). They are managed for the MSE by two different institutions (CARNET and SRCE). The

resulting effort observing destinations of 2016/7 cohort of students was only partially successful (Tomić et al., 2018), and indicated a need for a continuous data exchange instead of one-off efforts.

However, the same registers were connected successfully a few years later for the ALMA (presented in section 3.1.1), in what is intended to become a permanent data retrieval system (currently, education data was not updated since 2021). The “career tracing” dashboard in ALMA can currently be set up in such a fashion as to observe outcomes of students from last year, and even with current data, the query could be easily improved to show outcomes for persons who exit the education.

The data source challenges are (very)slowly being resolved, a fact largely helped by the establishment of national Shared Service Center by Central State Office for Digital Society Development, as well as long-awaited adoption of the Bylaw on the content and use of information systems in the higher education (Pravilnik o Sadržaju i Korištenju Informacijskih Sustava u Visokom Obrazovanju, 2023)<sup>4</sup>. However, the utilisation of past efforts of registry-based tracking in the policy and public domain has consistently fallen short of its potential.

### 3.2.2 Survey-based tracking

In the higher education, national efforts on graduate tracking were instigated by the Agency for Science and Higher Education (ASHE) in 2015. Regular surveys are run from 2017, and have matured since, as their coverage has grown to 21.6% of national graduate cohort having completed the most recent 2023 survey. In line with options put forward by the EC expert group on graduate tracking (European Commission, 2021), the shorter national surveys (five so far) ran by ASHE (Glunčić, 2022; Matković et al., 2023; Pažur Aničić et al., 2018) alternate with the (2018 and 2022) Eurograduate efforts led by the MSE and run by a scientific consortium (Rimac, 2020). While as of now, no integrated data browsing system has been set up (not least due to changes in the survey content), involved higher education institutions each receive their institutional report that they can (but are not obliged to) use it in the (re)accreditation process.

In the initial vocational education, the graduate tracking surveys are promoted by the Agency for Vocational Education and Training and Adult Education (AVETAE) within the European Quality Assurance Framework in Vocational Education and Training National Reference Point supported within the Erasmus+ framework. Here a bottom-up approach was taken over three pilot phases since 2017, involving 3 then 7 then 15 schools to execute and analyse a tracer survey following the set methodology (Bacalja, 2021). So far, the effort has included 5% of VET schools, reaching 1.6% of the cohort, but with substantial bias within the schools towards more prestigious courses and successful students. At this point, a scaling up is considered, as an integrated online platform has been developed where schools can sample students from the register, run online surveys and retrieve basic reports.

In general, survey-based tracking efforts have generated greater stakeholder involvement and public visibility, in particular those regarding the higher education (most recent example being the 2023 Eurograduate launch, or most recent graduate tracking survey report). Both in the cases of VET and HE graduate tracking, the involvement and support of quality assurance bodies (competent agencies) seem to be of great importance, even without “hard-wired” obligation for institutional participation or application of survey results in their administrative or funding procedures.

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<sup>4</sup> This bylaw mandates a central register of diplomas, containing all the required information for effective graduate tracking, which is about to become operative in early 2024.

### 3.2.3 Labour Market Policy evaluations (of training programmes)

With regards to the adult education graduate tracking, the European Social Fund mandated the outcome monitoring for participants of interventions, resulting in several survey follow-ups and counterfactual evaluations were undertaken since 2010 (Bejaković et al., 2016; Matković et al., 2012; Mousios et al., 2021; Taylor et al., 2021). Consistent with the international findings, the majority of those identified some positive medium-term effects for some (less skilled) groups, leading to some improvement in the ALMP design (e.g. vouchers). Being partial by design (targeting ALMP or only ESF beneficiaries), these monitoring and evaluation results were not utilised to assess outcomes of individual adult learning courses and providers.

However, so far such efforts were not systematic and did not cover entire adult education sector. There is no comprehensive register of adult education participants, or general legal foundation for such effort. The national adult education information system (*Nacionalni informacijski sustav obrazovanja odraslih – NISOO*) mandated in the 2021 Adult education act (*Zakon o Obrazovanju Odraslih*, 2021) will contain data on the candidates and attendees, with outcomes of participants being a part of quality assurance guidelines (standards 1.4 and 3.2 in ASOO, 2023). It is currently still under development. In the meanwhile, the greatly expanded pool of adult education attendees (via the voucher scheme) will allow for the impact assessment of the courses on offer.

## 3.3 Forecasting efforts

Over the past decade, not many developments have emerged concerning the employment or skill forecasting. The only regular mechanism, the “Recommendations for enrolment and granting policy in education” set up in 2010, is still in force. There was one commissioned attempt at developing a mid-term forecast, and a few sectoral strategies included sectoral employment forecasts. These are presented in turn below.

### 3.3.1 The enrolment recommendation framework

Faced with the external shock of the 2008 recession, a new mechanism orienting education supply towards the labour market needs was introduced with 2010 “Governmental decree on monitoring, analysis and forecasting of labour market needs for individual vocations”. It mandated the CES to annually produce the “[Recommendations for enrolment and grant policies in education](#)”.

In order to be directly applicable, the recommendations are not framed in terms of skills or occupations, but towards the individual education programmes corresponding to occupations with prospective lack or excess of workers.

Each year, a list of programmes deemed to need increased or decreased enrolment or grants is compiled for each of 21 counties by the local CES labour market experts. In a typical county, the list contains a few dozens of programmes with a simple recommendation to “increase” or “reduce” enrolment, whereas the majority of programmes are not mentioned. There are about 1,200-1,600 items per year (about half for the vocational education, half for the higher education), and their distribution and direction changes slowly over the time, as the labour market environment changes (Matković & Šabić, 2022). When compiling the recommendation list, which is produced locally, experts have a large discretion but are due to consider a broad range of quantitative and qualitative inputs such as the existent planning, vacancies and employer surveys, employment outcomes, job mediation experience and existing education capacities.

Leaving much to the expert discretion, based upon multitude of sources, and without any written justification, recommendations are anecdotally criticised for not being based on solid or transparent evidence, and (contrary) of not being precise enough in terms of the scope of adjustment needed.

Recommendations are public but not widely published, and distributed to schools, counties and Ministry well before start of the capacity determining process for the following school year. However, the decree for the Recommendations does not mandate any enforcement mechanism for them. The education sector institutions can (and do) not only ignore, but change their capacities contrary to recommendations, without any need for justification. The weak traction of recommendations was confirmed in a recent analysis (Matković, 2023) of correspondence between the entry places and actual enrolments in publicly funded with respective set of county-level recommendations in the Croatian VET system over 2013-2021 period. Analysis of observed changes in the administratively allowed places in the VET courses indicates a low level of responsiveness of the education system stakeholders to the Recommendations, with institutions often adjusting capacities in opposite direction, while demographics and unfilled capacities play a greater role in determining the actual change. Notably, the direct effect of Recommendations on the enrolment demand was not identified.

There are two main challenges with the current instrument. One is the validity of recommendations. This is very difficult to confirm or disapprove them, as there is no clear counterfactual, and “which education should be developed” is not a purely technical issue with a single correct answer. While the quality of inputs for recommendations could be improved (e.g. by better graduate tracking, revealing labour market information system or detailed forecast models) it is not obvious that it would make recommendations more plausible to actors affected by them. As well, centralising the process, mandating indicators and econometric modelling, or quantifying recommendations would resolve some issues, but open up different venues of criticism. The second challenge is the lack of consequence of Recommendations. Those might be enforced in soft or hard fashion, but this will certainly introduce additional disputes over their validity and put pressure towards experts putting forward recommendations. Negotiating a workable solution between the stakeholders involved seems necessary regardless of the technical tools used.

### 3.3.2 Formal national forecasting models

Soon after adoption of the CROQF Act, the Ministry of science and education commissioned a mid-term forecasting study from the Institute of Economics (Tkalec et al., 2016), tailored to the national sectors.

The projection effort was a composite based on the modelling of national sectoral time series and Cedefop sectoral projections adjusted with input-output tables to estimate projections at the national level. This effort turned out more conservative than the actual developments (Table 3), predicting 3.7% employment growth in the 2014-2020 period versus the actual growth of 19.2%. Still, net of the general employment change, at the level of merged industrial sectors, the model performed reasonably well. It was underestimating the relative increase in construction and being overoptimistic about a relative shift in the non-marketed services.

The goal of the exercise was to model the employment change in the CROQF sectors, which are occupation-based (every occupation is assigned to one sector). This was made possible by applying projections on the occupational structure of each industrial sector, and subsequently aggregating occupations into the CROQF sectors. This led to range of projected changes of employment in individual CROQF sectors between 9.8% (Tourism and hospitality) and -8.8% (Textile and leather).

Table 3. Projected and actual development of sectoral structures 2014-2020, employment change, Croatia (in thousands)

	2014 (baseline)	2020 (projected)	2020 (actual)	Δ (projected)	Δ (actual)
<b>National forecasting model:</b>					
Primary sector & utilities (A-B,D-E)	64.0	62.0	69.7	-2.1	5.7
Manufacturing (C)	198.1	192.9	229.6	-5.1	31.6
Construction (F)	72.0	75.3	100.1	3.3	28.1
Distribution & transport (G-I)	291.8	306.0	354.3	14.1	62.5
Business & other service (J-N, R-S)	192.5	216.9	244.1	24.4	51.5
Non-marketed services (O,P,Q)	294.5	300.7	328.8	6.3	34.3
<b>Sectoral strategies:</b>					
Manufacturing (2014 Industrial strategy)	198.1	297.2	229.6	99.1	31.6
Construction (2014 Industrial strategy)	72.0	85.6	100.1	13.6	28.1
Information and Communication (2014 Industrial strategy)	33.3	38.5	45.1	5.2	11.8
Accommodation and Food Service Activities (2013 Tourism strategy)	55.7	72.7	85.3*	17.0	29.7

Note: In case of sectoral strategies, the most ambitious scenarios were on display. \*2019

Sources: (CBS, 2024; Ministarstvo gospodarstva, 2014; Strategija Razvoja Turizma Republike Hrvatske Do 2020. Godine, 2013; Tkalec et al., 2016)

After being published with little publicity, despite being a fine primer in forecasting approaches and methods, and offering simple projections of change, this forecast received no attention (or even vocal criticism) from either labour market stakeholders (sectoral councils), policymakers and planners, academia nor media. Thus, this forecasting exercise failed its primary purpose to serve as a baseline for policymaking in the field. Before engaging in another forecasting exercise at the national level, it will be crucial to reflect on stakeholders involved, expectations and shortcomings of this one (both with regards to its method and process), in order to achieve better impact next time around.

More recently, a McKinsey effort at forecasting was published, with support from Ministry in charge of labour (McKinsey & Company, 2021). This effort relied upon McKinsey Global Institute Automation and post-COVID models, job traits based on the US LBS and O\*NET data. Those were combined with the CBS data on employment structure in order to forecast developments up until 2030. The results provided a detailed forecast of sectoral and regional employment impact of forthcoming automation (affecting up to 22% of total work hours until 2030), opportunities with increased demand for new jobs and occupations (310,000), as well as forthcoming skill transitions and requirements (with 140,000 workers forecasted to switch occupation). This publication explores both challenges within and between occupations, with heavy accent on talent transformation, and recommends policy priorities for various stakeholders. Being fairly recent, it is hard to assess performance of those forecast, but this effort has not received much spotlight in the public sphere or academia so far. As well, it arrived too late to feed in the current set of strategic documents.

### 3.3.3 Forecasting in the strategic documents

Several strategic policy documents from the mid-2010s included projections of employment development in the sectors involved, conditional on their implementation (Ministarstvo gospodarstva, 2014; Strategija Razvoja Turizma Republike Hrvatske Do 2020. Godine, 2013). In both cases, methodology was opaque and employment implications were not at the forefront of those detailed strategic documents.

When checked against the actual developments in the sectors covered, the strategic documents seem to have been overly optimistic with regard to the manufacturing (actual development covering but a third of those projected), and conservative with regards to

Construction, ICT and Tourism, actual growth in each being twice the size of projected employment growth.

The current headline strategic documents, such as the National development strategy Croatia 2030, or National Recovery and Resilience plan, do not set up sectoral or occupational targets or model sectoral labour market developments in a quantifiable fashion. Such sectoral forecasts are neither present in the [16 analytical reports the national development strategy is based on](#). The one partial exception is the 2023 Smart Specialization Strategy (MINGOR, 2023) which assesses labour force shortages for each activity when benchmarking Croatia's Value Chains in all observed sectors<sup>5</sup>.

Apart from an absence of actual forecasting in inputs or outputs of the most strategic documents, no forecasting exercises were commissioned or discussed so far among stakeholders in the National Council for Human Resource development or in the National Economic and Social Council.

### 3.3.4 “Bottom up” focused occupational forecasting in practice

When elaborating on strategic, sectoral and analytical foundations of any given occupation, or justifying labour market relevance of their programme, as legally required, many applicants of new occupational standards, qualification standards or study programmes engage in a partial exercise in forecasting, often with tunnel vision set towards particular sector, occupation, or qualification in focus. Such forecasts are often submitted with the applications but seldom published. “Competitive forecasting” can be easily seen as motivated and inherently biased, but it is important acknowledging, because it is the one type of forecasting that most stakeholders are acquainted with.

In more nuanced terms, the process of submission and revision of occupational standards allows to explore future developments within occupation, as specific ways of doing tasks change and skills wane or grow in importance.

While often not highly sophisticated in terms of labour market study methodology, those ought to be acknowledged, being adept at providing the topical expertise and having a greater familiarity with realities of given labour market niche than the general labour market analyst or administrator.

## 4 Challenges and lessons learnt

Most of the information systems and tracing instruments in Croatia presented in section 3 share a rather long timeframe and several project cycles within which they have been developed and improved. To large extent, those are in function of implementing the CROQF legal framework, by providing the evidence-based foundations for improving the education via a definition of qualification and occupational standards. As the tools took years to develop, the policy processes they have been supposed to guide were either delayed or modified to work with the limited data at hand. This was reducing the impact and visibility of tools once they became available and instigating another EU-funded project-based cycle of their development.

The formal forecasting efforts, on the other hand, were one-off and far apart. The Enrolment Recommendations Framework emerged quickly in the time of crisis with internal CES resources and modest data requirements<sup>6</sup>, yet has demonstrated impressive staying power for a labour market instrument over the fourteen years of its existence. Despite the lack of

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<sup>5</sup> Those originate in 2017-2018 „World Bank Croatia Competitiveness Reinforcement Initiative“which provided a series of sectoral reports on strategic segmentation.

<sup>6</sup> The green and digital skills catalogue makes for another such innovation taking little time to materialize and well utilizing newly available resources.



its enforcement mechanism, its outputs that are easy to understand, and “soft” nature of recommendations might have all contributed to its persistence.

The normative and technical challenges of the data availability seem to be waning but are still present. Higher and adult education registers are work in progress, the tax register data is not connected with the ALMA, and the employment register data is not utilised to its full potential. Relative to developments in other countries during the past two decades, this might indicate increasing lag, but as well an opportunity to catch up.

The technical outputs of the instruments presented here, while being based upon a policy framework (such as the CROQF, the graduate tracking Recommendation or quality assurance), are seldom used as inputs into the policy process. This might be due to the need to build further their ownership within the government, as tools are often commissioned externally and developed at an arms-length by “out of house” by experts and consultancies, at a distance from the policy development. By the time the project is complete, the policy agenda has often moved on. Moreover, stakeholders other than ones commissioning the effort when not substantially engaged initially, and subsequently tend to stay aside. All this likely leads to the observed lack of feedback on the existing tools (even with more visible ones like survey-based graduate tracking), and a more constructive articulation of specification and purposes for information/forecasting systems. Engaging a broader set of labour market and education stakeholders in the process involving data and forecasting seems necessary. Here, the National Council for Development of Human Potential might provide an adequate platform for this.

The current legally mandated use cases for labour market information systems and graduate tracking with regards to the CROQF standards and quality assurance processes does lead to the better acquaintance of education system and labour market actors with those tools. Yet when used for such a purpose, and without a robust and valid common set of indicators to refer to, it can lead to the bottom-up “advocacy forecasting”, as each party involved cherry-picks data views and interpretations most supportive to its case.

To develop a plausible scenario about the future developments, the labour market forecasting needs a solid and widely accepted foundation in the knowledge about current patterns and (recent) historical trends (indicating both changes structural and within occupations). This is something that the graduate tracking and labour market information systems can provide. Such insights provide a solid prerequisite and a non-speculative foundation for tuning in the education system in line with the existing societal needs and challenges.

The first functional labour market forecasting model in Croatia is yet to be built, with prior experiences and newly available data resources providing a good lead for doing it well. Yet, however rich and technically competent on its own, it will be successful only insofar as it leads to a discussion among a broad set of labour market and education system actors about the possibilities to improve system to meet the current and future challenges.<sup>7</sup>

Whether it is about information systems, graduate tracking or forecasts, those are best used as one of the evidence-base policy inputs for policymaking process inclusive of all stakeholders, and not as an automatism imposing data-driven rules or quantitative targets to the education and labour market institutions or programmes.<sup>8</sup> They are best used as empowering tools while collaboratively shaping up the education system of tomorrow.

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<sup>7</sup> In the absence of national forecasting model, the European Cedefop skills forecast for Croatia might serve well for such a deliberative process, at least with regard to broad sectoral and occupational groups.

<sup>8</sup> Here it is worth mentioning Goodhart's law "When a measure becomes a target, it ceases to be a good measure".

## 5 Discussion points, success factors and transferability

The various forecasting and skills needs anticipation efforts described in this discussion paper shown an ongoing incremental development of evidence-based environment to manage the transformation of the labour market and education system in Croatia. While their ownership is national and championed by the respective competent ministries and agencies, the efforts were consistently backed within the EU policies framework (such as the EQF, graduate tracking), forecasting and skills classification tools (the Cedefop skills forecast, ESCO), policy coordination processes (the European semester), as well as the technical assistance and EU funding (starting with IPA, mostly relying upon the ESF).

The stage for further ambitious development in the current decade is firmly set by the orientations in the top-level strategic documents (such as the National development strategy Croatia 2030, National Recovery and Resilience plan) as well as the current sectoral strategies (the National Plan for Work, Occupational Safety and Employment and the National Plan for the Development of the Education System).

The transferability of this experience outside of the Croatian context is limited. Many experiences described here is an effort of catching up with the practices that are well-established in many EU countries. In the Croatian context, the practices to date yielded increasingly workable but yet not ground-breaking results.

While most pertinent discussion points emerging from this review have already been set as the guiding discussion questions in the peer review agenda, there are two discussion points that might have value added from the Croatian perspective:

- How to most efficiently integrate the EU level labour market information and forecasting tools with national efforts (e.g. ESCO, EURES, and the array of Cedefop products)
- How could graduate tracking efforts be integrated with the skill forecasting exercises?

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