



THE SKILLS EMPLOYERS WANT!

Cedefop develops real-time skills intelligence by analysing online job vacancies

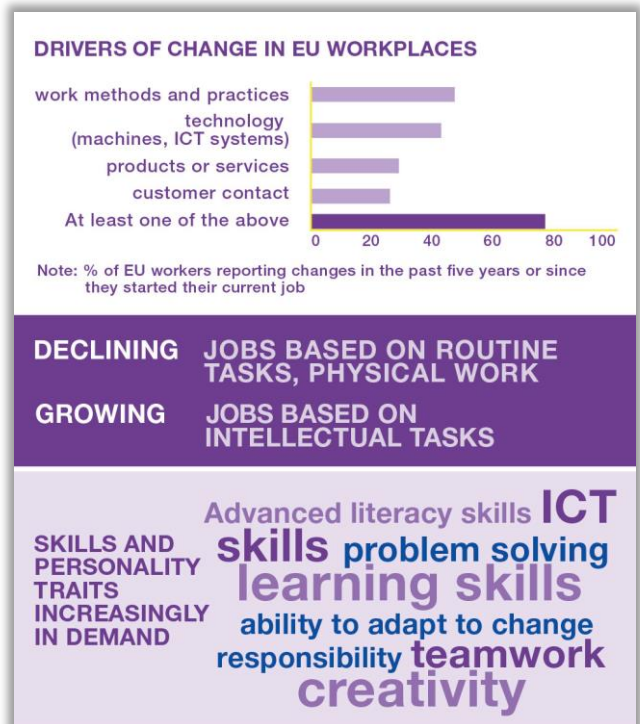
65% of children entering primary school today may ultimately end up working in completely new types of job that do not yet exist. Scott McLeod and Karl Fisch advanced this hypothesis several years ago in their widely discussed *Shift happens* analysis ⁽¹⁾. While such findings may be hard to verify empirically, it is clear that labour market change has been accelerating in recent years and that dynamics go far beyond shifts in sectors and occupations. The broad patterns of workplace transformation and of changing skill needs in today's jobs are, however, visible and give us some clues as to likely future developments (see Box 1). For example, findings from Cedefop's European skills and jobs survey ⁽²⁾ show that 43% of EU workers have seen the technologies they use at work (machines, ICT systems) change in the past five years or since they started their current job; 47% experienced changes in their working methods and practices. Such trends, which are necessarily underpinned by an array of upskilling and reskilling measures, are likely to continue in the coming years.

Job losses? Job growth? Job changes?

Cedefop's 2016 skills forecast revealed that jobs largely based on routine tasks are expected to decline, while jobs involving 21st century skills such as advanced literacy, ICT, problem solving and learning skills are projected to be on the rise. The 2018 skills forecast ⁽³⁾ pointed to a reduction in physical work and an increase in intellectual tasks requiring communication and social skills. This projection is especially valid for jobs at the top and the bottom of the skills scale where human qualities can least be replaced by machines. The resilience of

jobs requiring low skills and qualifications can be explained by the fact that these jobs often involve personal services (hotels, restaurants, caring and other proximity services) which are little affected by automation and globalisation ⁽⁴⁾ ⁽⁵⁾.

Box 1: CHANGING JOBS AND SKILL NEEDS



Source: Cedefop European skills and jobs survey (ESJS: see ⁽²⁾) and Cedefop skills forecasts 2016 and 2018.

Nevertheless, technological change and automation are potentially disruptive. Some years ago, widespread concern about massive job destruction (up to 50% according to some estimates) dominated discussions; more recent evidence points to job losses in some segments coinciding with job growth in others. Among

⁽¹⁾ The related video had been published in Wikispaces, a site created in 2005 and used by educators worldwide. Owing to financial constraints the site closed in 2018.

⁽²⁾ Cedefop (2015). *Skills, qualifications and jobs in the EU: the making of a perfect match?*

⁽³⁾ Cedefop's and Eurofound's skills forecast up to 2030.

⁽⁴⁾ Briefing note *Less brawn more brain for tomorrow's workers* on Cedefop's 2018 skills forecast up to 2030.

⁽⁵⁾ Cedefop (2018). *Automation risk in the EU labour market: a skill-needs approach.*

large global firms surveyed for the World Economic Forum's *The future of jobs report 2018*, half expect automation to lead to some reduction of their workforce by 2022, while 38% expect to increase their workforce in emerging fields and one company out of four expects to create entirely new jobs ⁽⁶⁾.

In light of changing labour market needs, skills intelligence is crucial to designing, reforming and 'future-proofing' education and training programmes. Surveys of employers, workers, graduates or the wider population can be used to collect detailed information on skills. But they are costly and time-consuming to implement, requiring substantial conceptual development and response rates warranting representative findings. Other 'traditional' methods, such as forecasts, provide useful insights into medium and long-term labour market trends but, owing to the use of proxies and time-lags between data collection and obtaining results, they are less suitable for detecting employers' changing skill needs early, for example to provide CVET relevant to labour markets.

Change is all around

When things change quickly, analysis and understanding of what is happening must rapidly follow. To seize opportunities and mitigate risks, policy-makers and businesses need timely and reliable information to anticipate and prepare for future skill needs and jobs. The Advisory Committee for Vocational Training has recently stressed the need to underpin countries' design of VET and employment policies through faster detection of trends ⁽⁷⁾. The European Commission's *New skills agenda for Europe* had already recognised in 2016 the need for developing reliable skills intelligence to map short- and long-term trends and support education and labour market actors in a context of rapid change. It had also flagged the potential of using the internet and big data analysis to improve data on skill needs and trends.

This is why, since 2015, Cedefop has been investigating how skills information in online job vacancies can be used to generate faster and more detailed skills intelligence, to complement its regular long-term Europe-wide skills forecasts, the European skills and jobs survey and the European skills index. Analysing online job vacancies is a promising approach to identify emerging jobs and skill needs, as it offers rich real-

time information about the skills employers seek. Cedefop has developed a pan-European system for collecting this information from job portals and analysing it. While modern technology has made it easier to process huge quantities of information, analysis needs to be based on sound expert judgement. The following describes the key features and sources of this work, the landscape of online job portals in the EU and the approach developed by Cedefop to turn the information contained in job postings into skills intelligence; there is also a sneak preview of first results.

Box 2: CEDEFOP'S WORK ON REAL-TIME SKILLS INTELLIGENCE

Cedefop publications

- Using online job vacancies for skills analysis: Cedefop's pan-European approach – report on methodology and analytical approach
- The online job vacancy market in the EU: Driving forces and emerging trends – synthesis report
- Background reports on the online labour market in all EU Member States

Results on Cedefop's website and Skills Panorama

- *March (early release)* – CZ, DE, ES, FR, IE, IT, UK
- *June* + AT, BE, NL, PL, SE, LU, HU, DK, PT, SK, FI
- *October* + EE, LV, LT, EL, BG, RO, CY, MT, SI, HR

Fully fledged quality-assured system available by end 2020

Understanding the online job market

There are thousands of sites advertising jobs on the web, offering jobseekers an array of search options. Some pull listings from many different sources, others from particular websites or companies. There are sites that allow jobseekers to store their CV and motivation letter and to apply directly for a job. Career advice, information on job trends, salary developments and typical interview questions may also be available. There are also sites focusing on specific regions or certain occupational fields, such as IT, finance, energy, engineering or healthcare.

Insight into how national online job markets work is a prerequisite for analysing online job vacancies and interpreting information on skills retrieved from them. Information on overall coverage of the vacancy market and differences between sectors and occupations provides clues to the representativeness of findings. Understanding employers' decisions on recruiting particular types of staff online, requires examination of the role public and private job portals play ⁽⁸⁾, the

⁽⁶⁾ World Economic Forum (2018). *The future of jobs report 2018*.

⁽⁷⁾ European Commission (2018). *The future of vocational education and training post-2020*.

⁽⁸⁾ Services offered by public (employment services) portals are free. Private portals tend to provide jobseekers with free access to online vacancies while charging employers for their services. There are national and international private portals and

services they offer and the price they charge. Knowing what types of information can typically be found in online job vacancies and being aware of trends shaping the market are other prerequisites for meaningful analysis.

Job portals have become a key recruitment channel. While they used predominantly to target highly skilled workers, many platforms today advertise jobs for almost all occupations and skill levels. Two major trends drive the use of online job vacancies.

- Digitisation and rising computer literacy have boosted online job advertisement and search. Public employment services and private job portals increasingly use digital matching tools to make online recruitment more attractive both to jobseekers and employers.
- Economic growth has led to skill shortages in certain sectors and regions, driving employers' recruitment efforts beyond their borders to reach potential candidates in other regions or countries.

While the online vacancy market is growing, not all job openings are published online. For example, specialists and executives may be headhunted, though high-skilled jobs on average are more likely advertised online. For some jobs (e.g. waiter) a note in the window may be used and for others employers prefer internal recruitment or word of mouth. To recruit scarce talent, employers approach young people in schools and universities directly.

Online vacancies are more likely in large, international firms and those in manufacturing and services (e.g. financial, ICT) and less likely in small firms and those in construction, agriculture and hospitality. Location also matters. With a higher concentration of employers in service sectors and a higher supply of skilled talents, urban areas register more online vacancies than rural ones, where print media will probably continue to play a role.

The share of vacancies published online in the EU ranges from around 50% in Greece, Portugal and Romania, to close to 100% in Estonia, Finland and Sweden ⁽⁹⁾; there are also differences between regions within countries. Countries also differ in terms of the structure of their online job vacancies market. In

aggregators (e.g. Indeed). Other players in the online job market are national newspapers, classified ads portals and websites operated by recruitment agencies (e.g. Randstad and Manpower).

⁽⁹⁾ For more information see Cedefop (2019). *The online job vacancy market in the EU: driving forces and emerging trends*.

Denmark, Finland and Malta, for instance, the market is dominated by a few leading portals and public services tend to be influential players. Ireland, Greece Italy and the UK, in contrast, have more job portals with similar market power; public employment portals are less influential compared to private actors.

Not all online vacancies are alike

Labour market characteristics impact on how employers draft online job vacancies. In labour markets where mainly formal requirements drive recruitment decisions, such as Germany or France, qualifications, fields of study and work experience play an important role. In Italy and the United Kingdom, where employers tend to be less strict on formal recruitment criteria, references to credentials in online vacancies are less common.

Job types also matter. Compared to vacancies for positions requiring higher qualifications or specific skills sets, vacancies advertising blue-collar jobs with rather modest skills requirements tend to contain relatively little information on formal qualifications and skills. They are short, emphasise work experience and commonly include 'being responsible' as a desirable trait. There are multiple factors influencing the way online job vacancies are written and used but it is possible to identify three main types of vacancy:

- vacancies presenting requirements in a prescriptive manner. Lists can be more or less extensive and can include both formal qualifications and hard and soft skills/personality traits;
- vacancies containing a neutral description of tasks with the associated formal qualifications and soft skills/personality traits;
- vacancies reflecting employer branding. These highlight the benefits of the job (environment) and describe the profile of desired candidates as a whole.

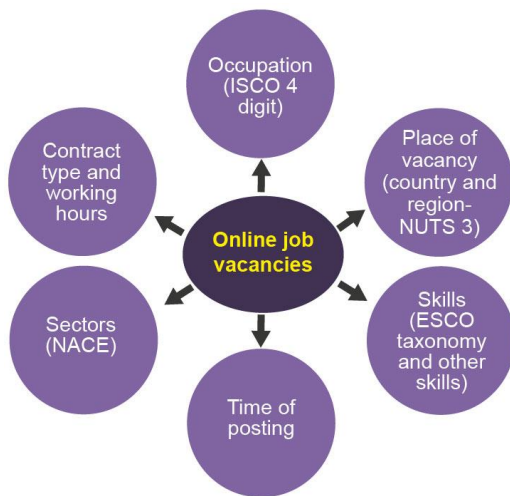
It is important to be aware that online vacancies may not offer complete overviews of the skills needed in jobs. To 'filter' applicants, employers tend to make their requirements explicit for critical skills and qualifications or for skills that are new to a job, but not for skills they can safely assume applicants are aware of. This 'incompleteness' makes the analysis of online job vacancies quite challenging.

A glimpse into the crystal ball: first insights

Since mid-2018, Cedefop's online job vacancies data retrieval system has collected around 32 million unique vacancy postings in Czechia, Germany, Spain, France, Ireland, Italy and UK. Their labour markets

equal around two-thirds of employment in the EU. 79% of the online job vacancies has been collected from private online job portals, 15% from public portals and 6% from other sources (such as newspaper websites). Big data and machine learning techniques capable of working with large volumes of text in different languages have been used to extract and classify information to make it suitable for analysis (Figure 1). Information on skills was extracted using the multilingual classification of European skills, competences, qualifications and occupations (ESCO).

FIGURE 1: INFORMATION EXTRACTED FROM ONLINE JOB VACANCIES



Source: Cedefop.

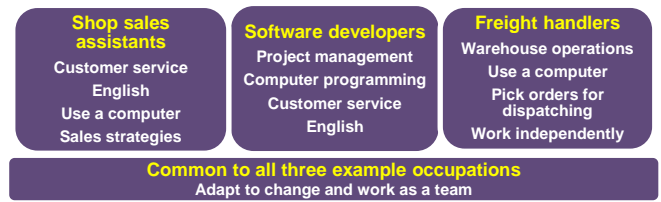
It is too early to present detailed results, but the information already collected provides some insights as to the skills employers seek. At almost three million job vacancies, the top three occupations in demand are software developers, sales assistants and freight handlers.

Although varying by country, these occupations together represent about 6 to 13% of all online job vacancies, but their relative importance differs. The share of online vacancies aimed at recruiting freight handlers is higher in Italy than in other countries. The share of online vacancies for shop sales assistants in Ireland and the UK is comparatively low. Among the three occupations considered, the share of online vacancies published to recruit software developers differs least across countries.

Looking at the skills employers demand from applicants, teamwork and adapting to change are central (see Figure 2). These soft skills are the most crucial in the three example occupations and beyond. Dealing with change in modern workplaces is a skill demanded in around three out of four online job vacancies Cedefop analysed. In two out of three,

being able to work in a team is among the skills requested by employers.

FIGURE 2: SKILLS MOST MENTIONED IN VACANCY POSTINGS FOR THREE OCCUPATIONS



Source: Cedefop.

Cedefop's system will not only provide granular information on vacancies, occupations and skills, but also help develop insight into how employers react when faced with skills shortages. When employers struggle to find the staff they need, many look beyond national borders. Initial analysis suggests that, for example, in Ireland one in four jobs posted online is addressed to job-seekers abroad.

Cedefop will continue its work on the system to ensure data quality, analyse the results in more detail and progressively release findings. It will focus on better understanding skills and jobs and on designing ways to use the information so that it benefits decision-makers in all related fields, including education and training. With time, Cedefop's system will collect more online job vacancies, and it will be possible to look at how jobs change.

Combining different perspectives and methods is often the best way to make sense of what we see. Detailed and real-time information on jobs and skills, coupled with medium- and long-term labour market trends identified using traditional methods, can benefit policy-making by deepening insight into how the world of work is changing. Understanding change is crucial to dealing with it.