

# Changing labour markets – How to prevent a mismatch between skills and jobs in times of transition

## Background paper



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## Introduction

What we do at work is changing. Not least due to digitalisation and automation, the transition towards climate neutrality and net-zero industries as supported by the Green Industrial Plan, but also as a result in a shift in EU economies and labour markets from industrial production towards a more knowledge-intensive service economy. In addition, there is an increasing need for health and care professionals due to demographic ageing and changing societal structures. If the task content of work changes or new jobs arise, the skills required to enter the labour market and to engage in work over an extended working life also need to change.

This paper explores how policymakers, employers, and other relevant stakeholders such as sectoral organisations and social partners could promote, stimulate, and facilitate individuals' possibilities for re- and up-skilling to meet employers' skills demands. If companies can access the skills needed, this has a positive effect on their productivity and competitiveness.

## Skills requirements linked to the 'twin transition'

### Drivers and nature of changing skills requirements

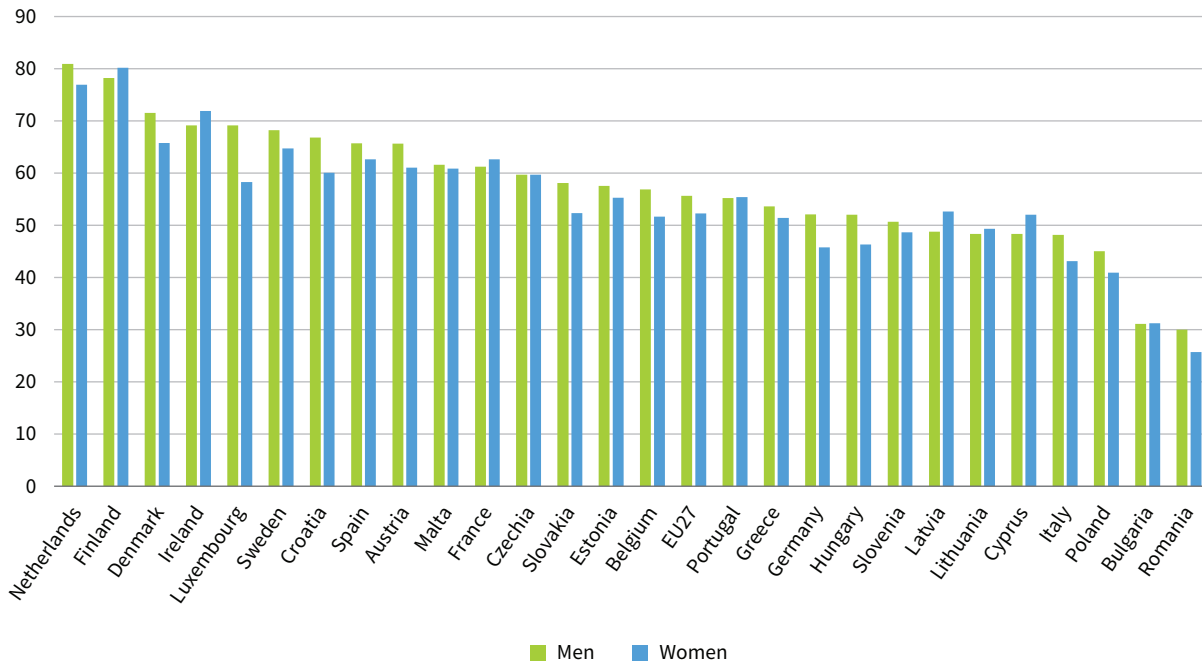
An investigation of changes in the task content, methods and tools of European jobs over the last 20 years reveals a decline in tasks requiring physical strength and the use of non-ICT machines (Bisello et al, 2019). Employment in jobs requiring physical strength and the use of machines has decreased significantly. A very different picture emerges for three other important categories of tasks: social task content, repetitive tasks and the methods of standardised tasks. In the last 20 years, there was a significant growth in jobs with more social task content relative to the rest, while at the same time there was a decline in the amount of social tasks people actually do in those (and other) jobs. A similar trend can be observed for tasks involving repetitiveness and standardisation, which can in part be explained by computer use. On the one hand, computers are replacing routine tasks (and thus displacing labour towards non-routine tasks and occupations). On the other hand, this can make the remaining tasks and occupations more routine (by making work processes more repetitive and standardised). Such trends have contributed to the rise in digital skills requirements over the last decades. These are now increasingly accompanied by a requirement for skills linked to the green transition. Both are contributing to labour and skills shortages.

## Digital skills

As digital technology advances and pervades all spheres of work and private life, digital skills are becoming indispensable for participation in the labour market and wider society. Research shows that having digital skills increases employability and job security, and that digital skills competencies are associated with a wage premium (OECD, 2016). However, despite the positive associations between digital skills and socio-economic outcomes, the existing evidence indicates that European economies are lagging in this area (Centeno et al, 2022). The lack of sufficient digital skills in the labour market has roots in both supply- and demand-side factors. On the supply side, the data demonstrate that there are large differences in the average levels of digital skills between Member States. Eurostat data shows that, in 2021, only 54% of European adults had basic digital skills, whereas the target set by 2030 is 80% (European Pillar of Social Rights Action Plan). The differences are also great across Member States, with the share of individuals having basic digital skills in 2021 ranging from 28% in Romania to 79% in Finland and the Netherlands (Figure 1). The EU average is lower for women than for men (52% compared to 56%) and this is the case for all EU countries, except for Bulgaria, Cyprus, Czechia, France, Latvia, Lithuania, and Portugal.

Digital technologies such as artificial intelligence (AI), robotic process automation software and advanced robots are increasingly used in workplaces to streamline production processes, automate menial or repetitive tasks, and monitor workflows (Eurofound, 2022a). The pandemic has contributed to the digital transformation of European workplaces, forcing employers to deploy digital technologies in various workplace processes, such as day-to-day communications, work organisation, supply chain operations, and leading to the increased usage of online and cloud solutions (Eurofound, 2022b). The second European Skills and Jobs Survey from the European Centre for the Development of Vocational Training (Cedefop) found that in 2021, 87% of workers used a computer device (a desktop computer, laptop or notebook, tablet or smartphone) for their work and, therefore, required at least basic digital skills (Cedefop, 2022). Depending on the tasks involved – ranging from sending e-mails to developing and maintaining IT systems – 52% of all EU jobs have low digital skills demands, 32% require moderate digital skills and 17% require high levels of digital skills. This is confirmed by [EU Skills-OVATE](#), where two of the top three required skills in online job advertisements are digital-related skills.

Figure 1: Share of individuals with basic or above basic digital skills, EU27 (%)



Source: Authors based on Eurostat [TEPSR\_SP410].

### Green skills – green jobs?

The transition to a green economy is the cornerstone of the European growth model. The policy proposals put forward by the European Commission under the umbrella of the European Green Deal aim to make the EU climate-neutral by setting an intermediary target of reducing net greenhouse gas (GHG) emissions by at least 55% by 2030 and achieving net zero GHG emissions by 2050.

Existing research on the aggregate employment effects of green policies in Europe suggests that changes triggered by the green transition will be small in magnitude. Forecasts differ but it is generally anticipated that net-zero policies could create between 1 million and 2.5 million jobs to 2030 if supported by the right policies. While the net employment effects may be relatively small, larger impacts are likely to unfold across sectors, occupations and tasks. One key challenge for policy relates to the absence of an agreed definition of ‘green jobs’ or ‘green skills’ (Eurofound, 2023b), leading to a difficulty in separating green jobs from other jobs and defining the associated green skills.<sup>1</sup> Using a classification developed by Dierdorff et

al (2009) and using data from the 2021 European Working Conditions Telephone Survey (EWCTS), Eurofound estimated that nearly 65% of workers in the EU27 are employed in occupations that will experience only a small impact or none from the green transition, while close to 15% are in sectors requiring enhanced skills or likely to witness growing demand linked to the green transitions. The occupations likely to be impacted by the green transition employ 20% of female workers but half of the male working population, clearly indicating that the scale of the impact of the green transition will be different for women and men (Eurofound, 2022c). Further studies are foreseen in 2023 to estimate the scope of green employment in the EU using the ESCO framework (JRC with DG EMPL 2023 forthcoming; DG ECFIN 2023 forthcoming).

### Sectoral shifts with green transition

At sector level, the green transition is expected to lead to a structural shift in employment away from carbon-intensive sectors and to an increase in demand for jobs in sectors contributing to the greening of the economy. However, the extent to which job losses in carbon-intensive sectors can help address employment

<sup>1</sup> At European level, the skills and knowledge concepts most relevant for a green labour market have been labelled in the European Skills, Competences, Qualifications and Occupations (ESCO) taxonomy. The European Sustainability Competence Framework (GreenComp) covers the knowledge, skills and attitudes needed by learners of all ages to live, work and act in a sustainable manner (including critical thinking, systems thinking and connection to nature).



needs in other sectors depends on the skills composition of workers in these sectors, the effectiveness of policy support to ensure smooth job transitions and the highly localised nature of employment in the carbon-intensive sectors, which is likely to have an impact on workers' mobility. Green industries may emerge in regions that are particularly suited to the needs of these businesses in terms of access to plentiful renewable energy or other environmental factors but may lead to jobs being created in regions already suffering from labour and skills shortages. This new industrialisation will have knock-on effects on job creation in the region, raising demand for associated public services and jobs linked to this. The forecasts also find that job creation will be unequal across the economy, with employment in sectors most linked to the green transition – such as construction – expected to register the largest increases. Other sectors predicted to grow in terms of employment are the primary sector and utilities, as well as the manufacturing of low-carbon goods and technologies, such as wind turbines or electric appliances (Cedefop, 2021; Eurofound, 2023b).

Another important element is the shift in skills patterns within sectors. Due to the fact that the green transition in production is highly knowledge- and innovation driven, the transition is likely to be skills-biased. While the largest growth compared to the baseline scenario according to different forecasts is expected in medium-skilled jobs (such as technician and other specialised professions), so far the largest job creation has been realised in high-skilled professions (OECD, 2023; Marin and Vona, 2019).

## Role of skills mismatches in explaining labour shortages

It is in the context of these employment, sectoral and occupational shifts that Europe is faced with relatively high labour and skills shortages. Eurostat data show that by the third quarter of 2022, the average EU vacancy rate had reached historic highs of around 3%. Close to a third of EU employers reported that labour shortages are a factor limiting production and service delivery (based on the European Commission's Business and Consumer Surveys). The fight for talent is most acute in countries like Austria, Belgium, Czechia, Germany and the Netherlands, although in certain sectors and occupations, shortages are evident in most Member States (Eurofound, 2023).

### Digital skills deficit

Labour shortages are acute in the ICT sector where advanced digital skills are required. Despite the increase in employment in the sector in recent years, at the current growth rate the EU is still likely to be short of the needed 20 million experts in key areas such as cybersecurity and data analysis in 2030 (European Commission, 2021). Between 2014 and 2022, the job vacancy rate in the ICT sector increased in all EU countries, except for Croatia, Ireland and Greece (Figure 2). The increase in the level of vacancies was very high in Belgium, the Netherlands and Austria – countries where the level of vacancies was already above the EU average in 2014.

**Figure 2: Job vacancy rates in the ICT sector, EU27, Q3 2014 to Q3 2022 (%)**

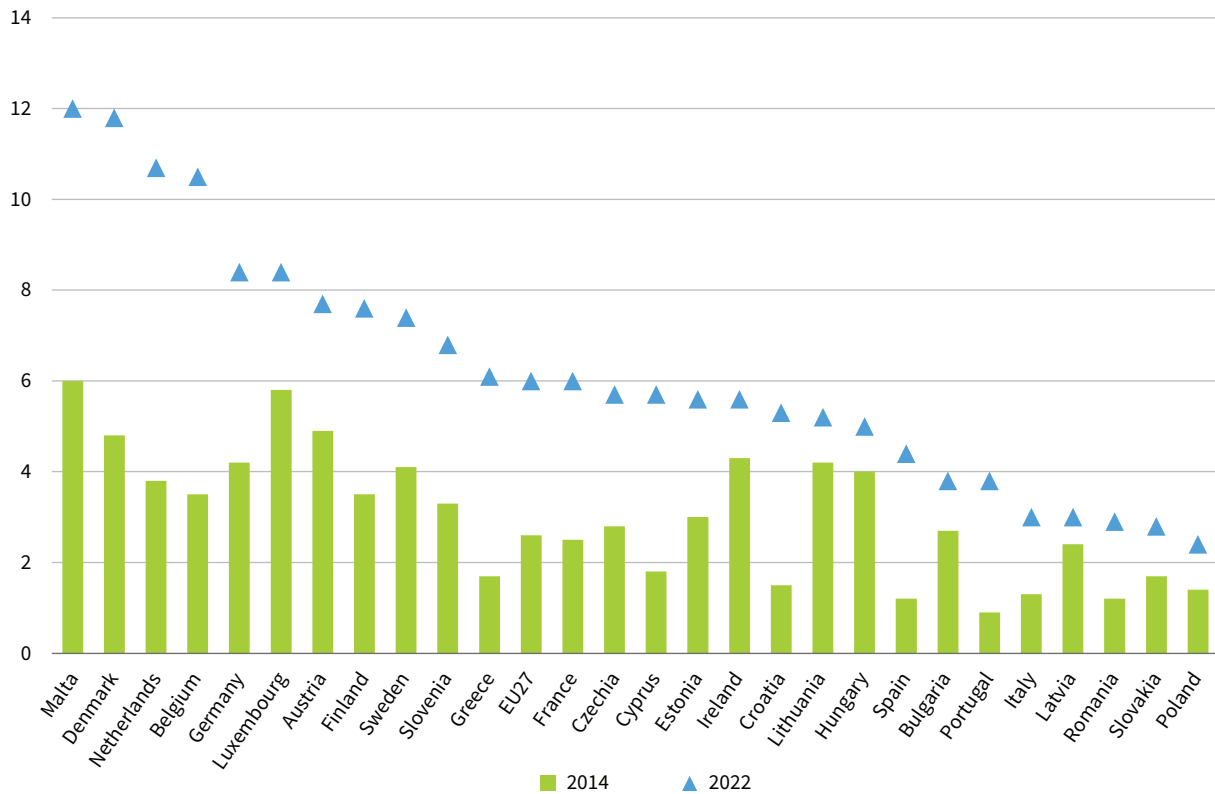
	2014-Q3	2016-Q3	2018-Q3	2020-Q3	2022-Q3	Change 2014-2022
Belgium	4.0	6.2	6.3	5.9	9.1	5.1
Netherlands	3.6	4.5	5.9	4.5	8.2	4.6
Austria	2.7	2.8	5.3	4.5	6.7	4.0
Czechia	0.8	2.8	4.5	4.4	4.4	3.6
Sweden	2.4	3.8	4.5	2.7	5.8	3.4
Slovenia	1.4	1.9	2.1	2.2	4.2	2.8
Latvia	0.7	1.9	1.7	2.1	3.5	2.8
Denmark	2.5	3.2	3.2	2.5	5.1	2.6
Germany	3.8	3.1	3.7	3.4	5.8	2.0
Hungary	2.6	3.4	3.7	2.1	4.5	1.9
Poland	1.9	2.0	2.3	1.7	3.8	1.9
Luxembourg	2.2	2.3	3.2	1.8	4.0	1.8
Estonia	1.4	3.0	2.6	1.8	2.9	1.5
Cyprus	1.1	1.1	3.1	3.2	2.5	1.4
Lithuania	1.9	2.4	2.3	2.0	3.1	1.2
Spain	0.7	1.1	1.4	0.6	1.6	0.9
Portugal	2.5	1.3	2.3	2.7	3.4	0.9
Bulgaria	0.2	0.4	0.5	0.4	1.0	0.8
Romania	0.9	1.4	1.7	0.9	1.4	0.5
Slovakia	0.4	0.7	0.9	0.4	0.6	0.2
Croatia	1.0	0.8	0.6	0.4	0.4	-0.6
Ireland	2.7	1.5	1.8	1.4	2.1	-0.6
Greece	2.4	0.5	0.7	0.2	0.4	-2.0
Malta			2.9	2.5	5.6	
Finland		2.7	2.6	1.5	4.7	
Italy		1.3	1.6	1.3	3.1	
EU27	2.3	2.6	3.0			

Source: Authors, based on Eurostat, Job vacancy statistics by NACE Rev. 2 activity – quarterly data (from 2001 onwards) [jvs\_q\_nace2]; seasonally unadjusted data.

At a more granular level, occupations reporting significant shortages in 2021 were software developers, systems analysts, application programmers, and web and multimedia developers (ELA, 2021). Furthermore,

in 2022, 6% of European enterprises had hard-to-fill vacancies for jobs requiring ICT specialist skills, an increase of 3.4 percentage points since 2014 (see Figure 3).



**Figure 3: Share of enterprises with hard-to-fill vacancies for jobs requiring ICT specialist skills, 2014 and 2022, EU27 (%)**


Source: Authors, based on Eurostat, ICT usage in households and by individuals [isoc\_ske\_itrcrn2].

### Gap in green skills

In relation to green skills, employment predictions highlight the increased demand for labour in sectors that are already facing structural labour shortages. The construction sector is a case in point. The scenario put forward by Cedefop (2021) highlights that by 2030 the sector would need to provide training for an additional 3 to 4 million workers to meet the targets set by the transition to net zero emissions, which include improvement of the energy efficiency of buildings through renovation and retrofitting to enable use of renewable energy sources. However, despite the potential for job creation, the sector is facing significant labour shortages due to a range of factors, such as workforce ageing, poor working conditions and the lack of workers having the specific skills to respond to the needs generated by the green transition, such as specialists in deep building renovation, installers of advanced technological solutions, or building information modelling managers (European Commission, 2020).

### Employee skills, employer needs – a good match?

Based on employer perceptions, results from the 2019 European Company Survey (ECS) carried out by Eurofound and Cedefop shows the average percentage of employees with skills matching job requirements in

EU establishments to be 71%. However, the level of over- and under-skilling is also significant. The average percentage of over-skilled workers is 16% while the figure for under-skilled workers is 12%. These averages refer to the overall workforce, whereas over-qualification is known to be particularly high among certain groups, including persons with a migrant background, migrants, and more recently persons from Ukraine (not covered in the ECS 2019 data). Across sectors and size of company, there is little variation in the average proportion of over- and under-skilled workers (Eurofound and Cedefop, 2020). This over-skilling and under-skilling is linked to the speed at which skills requirements change. In the EU27, only 3% of managers reported that the skills requirements of employees change very quickly and 54% reported that skills requirements do not change very quickly. (Eurofound and Cedefop, 2020). Moreover, in 45% of EU27 establishments, a small proportion of employees (less than 20%) have jobs that require continuous training. In 39% of establishments, the proportion requiring continuous training is substantial (ranging from 20% to 79%), while in 15% of establishments, the proportion is very high (80% or more). Continuous training needs are lowest in industry and highest in financial services. Larger establishments are more likely to report greater continuous training needs (Eurofound and Cedefop, 2020).

## Governments need to take active measures to meet skills and labour shortages

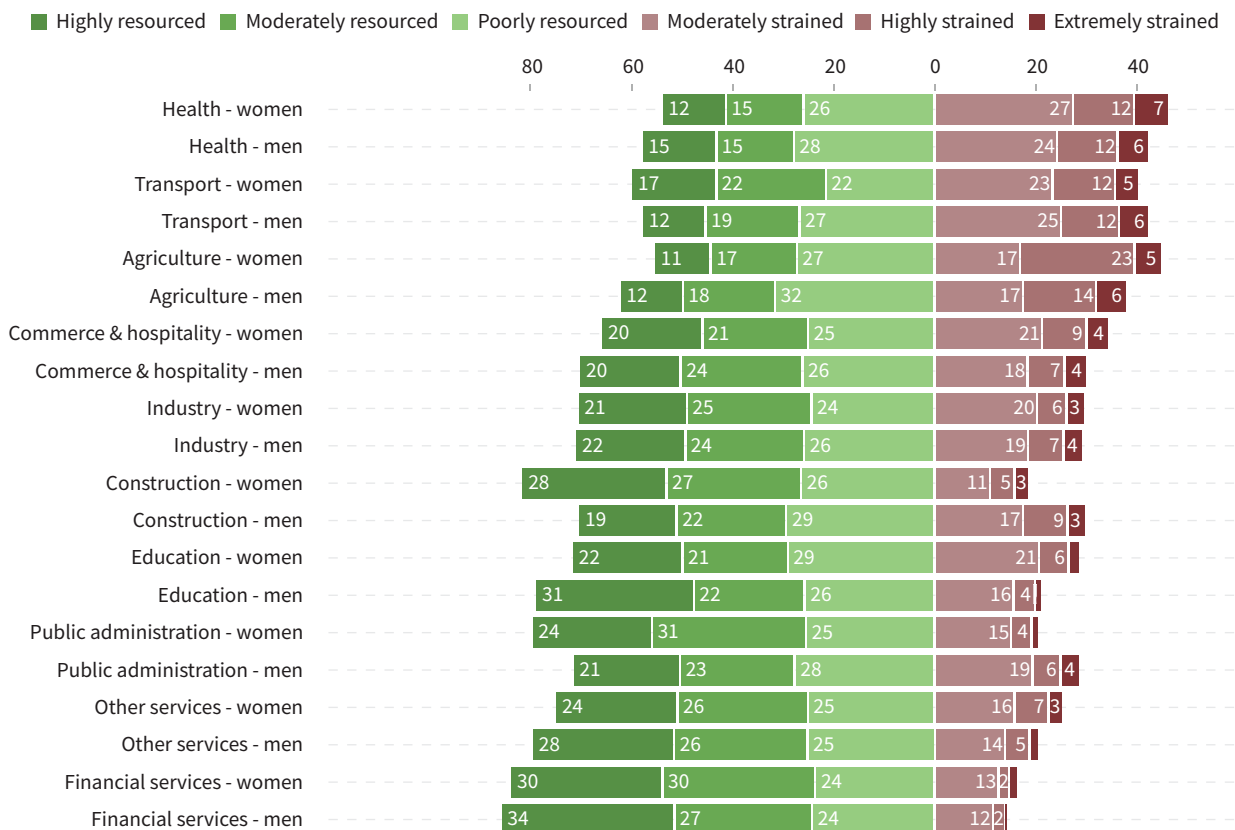
Many countries have already intervened to focus active labour market policies and broader education and training measures more strongly on the skills and occupations most in demand on the labour market (Eurofound 2023a). This includes the ramping up of digital skills training in schools and offered to jobseekers. Some Member States have put particular emphasis on attracting young people, in some cases with a specific focus on girls, into further and tertiary ICT education and training. Others are offering free digital skills courses for migrants, asylum seekers and refugees, as well as other citizens without access to digital education. In Austria, specific support is provided to unemployed people for training in shortage occupations lasting between three months and three years. In the construction sector, more emphasis is being placed on the specific skills needed in sustainable new construction and the retrofitting of homes and commercial premises. In the healthcare sector,

specialist and ongoing training courses are being offered to help address skills gaps which are particularly evident in medical and care specialisations including geriatric and mental health care.

### Job quality critical in addressing labour shortages

However, evidence shows that even where such measures exist, they are often not sufficient to solve the labour shortage issue because skills are only one – albeit important – part of the phenomenon (Eurofound 2023a). Analysis of data from the European Working Conditions Telephone Survey 2021 shows that labour shortages are particularly prevalent in sectors with poor job quality, as measured through an index which balances ‘job demands’ (such as physical and psychological hazards, work intensity and unsocial working hours) with ‘job resources’ (such as task discretion, flexible working hour and, training opportunities) (Eurofound, 2022c). The results show that the health sector is the most ‘strained’, followed by the transport sector – both sectors that are currently experiencing significant labour shortages (Figure 4).

Figure 4: Job quality index, by sector and gender, EU27 (%)



Source: Working conditions in the time of COVID-19

An analysis of measures implemented to address shortages in these sectors shows that while financial incentives can help to retain (and recruit) staff, wage-based incentives can be insufficient on their own but need to be complemented with other initiatives to improve working (and living) conditions: for instance, access to training, greater autonomy over working hours, etc. (Eurofound 2023a).

### Tackling the gender employment gap and gender segregation

Another feature which is evident when looking at the sectors experiencing shortage is the prevalence of highly gender segregated sectors and occupations, including health and long-term care, ICT and construction. Particular emphasis must therefore also be placed on addressing the gender employment gap and – in many countries in the case of women – activating under-utilised labour. In relation to the latter, an analysis of labour market slack and the employment rate of persons with disabilities and third country nationals in particular shows that untapped potential continues to exist in a tight labour market. Women remain the EU's largest untapped work force. To increase the overall number of hours in paid work carried out by women, measures in addition to training or pay may be required, such as measures to improve work-life balance and to counteract gender stereotypes. We need to understand the barriers to women's labour market integration and tackle them. Gender stereotypes are also one of the key factors behind gender segregation in the labour market.

### Increasing labour mobility within Member States

Encouraging in-country labour mobility also has an important role to play in addressing shortages. A number of policy examples studied by Eurofound addresses these issues (Eurofound, 2023a). For instance, in the healthcare sector in Latvia and Bulgaria, measures are in place to provide additional payments for medical personnel willing to relocate to more remote or rural areas where working conditions can be less attractive. In Austria, one region suffering from significant labour shortages has developed a 'welcome service' which provides workers with help in finding accommodation, in dealing with authorities or doctors, and in finding schools or childcare; the new employee's partner is also given advice on how to make a new start in their own professional life in the region. Attracting more workers to a region and fostering the creation of new business also creates the need to develop community services, such as schools, health and care systems, as well as housing and infrastructure.

### Role of social dialogue

Social dialogue plays an important role in achieving a well-functioning social market economy and in shaping the future of work. It helps to balance the interests of workers and employers and contributes to both economic competitiveness and social cohesion. In some countries, social dialogue contributes to the definition and development of skills policies at a systemic level. This includes the involvement of the social partners in setting up and amending the VET training curricula on a regular basis (for example, in Germany and Sweden) and coordinating the development of lifelong learning programmes in line with the actual and anticipated demand for skills (for example, in Cyprus, Czechia and Spain). Social dialogue at sectoral level is also used to build a shared diagnosis of hiring difficulties and to define specific solutions (for example, in France) and as an important contribution to identifying emerging skills requirements at thematic and sectoral levels (for example, in Ireland and the Netherlands). In relation to digital skills development specifically, the involvement of social partners is relatively high (European Commission, 2023). Collective agreements have a role to play in ensuring funding for training, including in relation to digital skills. With regard to the green transition, ongoing research by Eurofound on the design and implementation of regional Just Transition plans at national level indicates a lower level of involvement of social partners in this area.

### Companies play an important role when it comes to up- and re-skilling

Access to training for both women and men is a critical element in developing and upgrading the skills required to address these gaps. The company plays a pivotal role in closing at least some of these skills gaps and investment in this area would appear to be win-win. An analysis carried out by Eurofound and Cedefop based on European Company Survey data shows that managerial approaches that foster employee abilities (knowledge, skills and attitude), motivation and opportunity to use their skills are positively associated with establishment performance. This means that organisations that foster the utilisation of employee skills generally have better economic outcomes (Cedefop and Eurofound, 2023).

## Different types of learning available in companies

Learning from colleagues is the predominant approach to skills development in the largest group of establishments (45%). In 19%, the most important way to develop skills is through training, while for a further 19%, it is through learning by doing. Over one-fifth of establishments provided training courses for 80% or more of their employees in the last 12 months. A further 45% offered training to between 20% and 79% of their staff. In 34% of establishments, less than 20% of workers received training courses. Only 4% of EU27 establishments did not provide any on-the-job training activities during 2018.

## Inequalities in opportunities for training

According to the 2021 European Working Conditions Telephone Survey, close to half of employees received some type of training paid for or provided by their employer during the 12 months preceding the survey. But there are significant differences across age, gender, occupation and contract type. The shares of younger (16–24 years) and older (56 years and over) women who received training (34% and 40%, respectively) were smaller than the shares among their male counterparts. By occupation, the highest skilled received more training; in terms of contract, 47% of employees with open-ended contracts benefitted from employer-paid training, compared to 41% on fixed-term contracts and just 29.5% of temporary agency workers. Younger workers had more opportunities to learn new things on the job than workers in the middle and older age groups, while the percentage of self-employed workers who reported learning new skills in their job was 10 percentage points higher than that of employees. Similarly, more workers in the most skilled occupations learnt new things at work than in other occupations. (Eurofound, 2022c)

## Conclusions

Precise forecasts of what types of skills are needed and in which occupations, sectors and regions are notoriously difficult in a world of work that is undergoing continuous change. This calls for ongoing monitoring and the involvement of all actors to establish appropriate curricula for education and for initial and continuous vocational training. At the same time, the gaps in digital skills and in the skills required to achieve the transition to a zero-carbon economy are increasingly obvious. This requires governments to adapt the focus of active labour market policies, but also broader education and training measures. Given the differences in impact on different sectors, sectoral social partners have a role to play in designing training and retraining measures that help to close the skills gap. Companies need to facilitate this process by investing in training and organising work in such a way that supports training and on-the-job learning. A lack or mismatch of skills is, however, only one explanatory factor behind labour shortages which threaten to hamper economic growth and successful transitions. Policies that help to access untapped potential in the labour market are equally important. Increasing the attractiveness of shortage occupations and sectors through improving working conditions is a promising route, as are measures to address gender stereotypes, and support labour market access for women, migrant workers, and people with disabilities. Measures that stimulate labour mobility are also important to meet the challenges of labour and skills shortages – they also counteract structural unemployment and favour economic growth.

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