



D2.1 Conceptualisations of skill shortages and skill gaps

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Summary and conclusions

The present report provides a mixed-methods approach to study the measurement and potential impacts of skill shortages and skill gaps. The measurement of skill shortages and gaps represents a significant and multifaceted methodological challenge in labour market research. Central to this issue is the definition of these concepts, as there exists a lack of consensus in the field, with various terms and definitions used interchangeably (McGuinness et al., 2018). A **skill gap** arises when existing employees are deemed to lack the necessary skills to do their current jobs effectively, whilst a genuine **skill shortage** refers to a situation where there are no qualified external candidates to fill vacant positions. As organisations and policymakers strive to align workforce capabilities with evolving market demands, the accurate identification and quantification of skills shortages and gaps have become increasingly crucial and are a clear priority for policy. We provided a comprehensive review of the various approaches employed in the literature, evaluating their respective strengths and limitations whilst providing insights into their practical applications. The research involves a desk-based approach combined with a series of national workshops designed to gather the views of key stakeholders and informants.

The first thing to note is that existing academic and policy research on skill shortages and skill gaps is extremely limited when compared to other forms of skill mismatches. Within the body of research addressing this complex issue, two predominant approaches to have emerged: (i) **employer- or employee-reported data**: this approach relies on direct feedback from employers or employees regarding their perceived skills shortages or gaps, offering valuable first-hand insights into workplace challenges; (ii) **objective indicators**: this methodology employs empirical data, primarily focusing on job vacancy data, statistics and various indirect measures, such as wage growth patterns and employment metrics. These indicators provide quantifiable evidence of mainly skills shortages in the labour market.

The literature clearly indicates that no single approach adequately captures the complexity of skill shortages and gaps and measures typically reflect available data. Ideally, a robust methodology for measuring both skill shortages and skill gaps should employ multiple measurement approaches, triangulating between employer and employee perspectives while utilising both quantitative and qualitative data. However, we currently are far from establishing robust, reliable and standardised measurement approaches to measuring skill gaps and skill shortages. As a first step, there is a clear need to develop standardised definitions and measurement protocols for both forms of skills mismatches, whilst maintaining sensitivity to sectoral and regional variations.

We provided an overview of **European countries' approaches to labour market skills foresight/anticipation**. It was found that the approach to skills anticipation/foresight varies across countries, and different levels of development and implementation are in place:

- Denmark, England, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Netherlands, Poland, Portugal, Romania, Slovakia, Spain, and Sweden, have a systematic approach to skills anticipation in place.
- Luxembourg, Cyprus, Bulgaria, Malta, and Croatia lack a systematic approach to skills anticipation.
- Czechia and Slovenia are developing their skills anticipation systems with the support of EU-funded projects.

Skills foresight/anticipation systems differ by time horizons, methodologies, implementation levels, and sectoral prioritisations. Time horizons of anticipation systems implemented at country level vary from long-term estimates (over 10 year), medium term estimates (5-10 years), or short-term estimates (1-5 years). Different methodological approaches are employed at national level and include employer

or employee surveys, expert panels, labour market analysis, advanced econometric tools and forecasting models. In terms of implementation level, most countries define their mechanism at the national level. For larger countries, there is a tendency to provide more granular insights at the regional/local level. Sector-specific forecasting is relatively common.

Detailed information has been gathered on the skills anticipation systems in the SkillsPULSE-partners countries, and these are summarised below.

In **Estonia**, the OSKA system of labour market monitoring and skills forecasting is a systematic and coordinated approach to skills anticipation, which provides sectoral and thematic studies as well as cross-sectoral forecasts of labour and skills needs and supply. They combine quantitative data (from registers, surveys, official statistics) with qualitative insights from expert interviews and discussions.

In **Greece**, the approach to skills anticipation integrates a range of activities. The Mechanism of Labour Market Diagnosis provides comprehensive information on labour market dynamics, such as supply and demand by occupation and skill level, at national, regional, and sectoral levels, using quantitative metrics. Specific institutions collect labour market intelligence data (employers surveys, job vacancy data, qualitative studies). Social partners, including trade unions and employers, actively engage in skills anticipation activities.

In **Ireland**, the principal labour market intelligence/anticipation output is contained within the annual National Skills Bulletin, which is published by the state agency SOLAS. The Bulletin generates assessments for potential skill shortages across many detailed occupations by analysing a range of indicators for each occupation over time, at a national level. It identifies occupations where shortages exist without quantifying them, thus, there are no empirical indicators of skill shortages produced.

In **Italy**, the Excelsior Employment and Training Information System (Sistema Informativo per l'Occupazione e la Formazione Excelsior) is an official survey included in Italy's National Statistical Programme. The data comprehends extensive surveys and interviews with companies in the industrial and service sectors to assess their hiring plans for the subsequent three months. The survey includes details on required professional profiles, tasks, tools, technical and soft skills, and expected recruitment challenges, identifying reasons such as skill shortages or a lack of suitable candidates. Administrative data from the Register of Enterprises are also combined.

In **Poland**, three systems/tools work together to identify both quantitative and qualitative competency gaps in the workforce. The Labour Market Forecasting System focuses on predicting occupations and sectors where demand for specific skills is expected to exceed supply, employing a simulation-based forecasting model. The Barometer analyse employer feedback, labour market data, and sectoral indicators, and provides a detailed view of occupations experiencing high demand or undersupply. The Data Blender integrates data sources such as demographic trends, sectoral studies, and employer surveys.

In **Finland**, skills anticipation exercises rely on long-term economic forecasts at a national level. The Finnish National Agency for Education (EDUFI) overviews a quantitative tool and projects labour supply/demand balances by vocational fields. The National Forum for Skills Anticipation engages representatives from employers, education providers, and labour organisations to analyse changing skills needs. The online platform Skills Needs Compass, from the Service Centre for Continuous Learning and Employment, uses AI-assisted data to provide insights into job transitions and emerging skills trends. Regionally, EDUFI supplements long-term analysis with regional and sectoral forecasts on educational needs.

In **England**, Skills England oversees the skills intelligence and provision system and analyse current and future skill needs through a variety of data sources, including visa applications, employer-reported skills shortages, job advertisements, and through a composite measure of occupational demand. The

Warwick Institute for Employment Research projects skill needs by occupation, sector, and geography. Additionally, the Employers Skills Survey and the Annual Hours and Earnings Survey offer insights into skills shortages, recruitment challenges, and wage trends, while the Skills and Employment Survey collects information from individuals about their skill levels and the extent to which they consider themselves to be under or over-skilled.

A series of **national workshops** on defining and measuring skill shortages and gaps in Europe were organised across the SkillsPULSE partners countries, with national stakeholders in attendance, including policymakers, researchers, and employers. Across countries, participants acknowledged that skills gaps and shortages represent significant challenges for policymaking, however, specific issues emerged in each country. In Italy, for instance, it was assessed that skill gaps in terms of undereducation may render the workforce less prepared to respond to global megatrends such as technological change. In Ireland and Greece, participants emphasised the detrimental impact of skill gaps and shortages on firm-level performance and productivity. It was felt that larger firms in Ireland might be better positioned to address these challenges due to their more advanced upskilling and reskilling approaches, whereas small and medium enterprises remain more vulnerable. An issue of workforce overqualification was raised in Estonia, as well as negative consequences of geopolitical tensions on the labour market.

Some countries such as Ireland, Greece, and Italy have established robust mechanisms for assessing skills mismatches. However, workshop participants in all countries highlighted challenges in the measurement framework, and the lack of consistent methodologies and definitions for skill shortages and skill gaps, particularly at a European level. Other country-specific challenges identified include the time lag between data collection and policy implementation, a lack of adequate data infrastructure/data granularity/integrated data systems across sectors, employer-centred measurement frameworks and difficulty in clearly disseminating information..

Workshop participants identified some major drivers of skill gaps and skill shortages. Demographic transitions and changes in migration patterns were deemed to have created significant labour pressures in countries like England, Greece, and Finland. Other factors cited were low wages, rising living costs and labour market regulation. It was felt that a predominance of small and medium-sized enterprises, particularly in Italy, might constrain skills development. In Finland, an increasing complexity of job requirements has been identified among the main drivers of gaps and shortages. In several countries, it was felt that there is a tendency for the educational systems to prioritise general education pathways, which often grant access to higher education but may not align closely with labour market needs. Limited access to affordable housing, elderly care, childcare, and effective public transport were highlighted as key barriers to labour mobility in countries such as Ireland and England. Rapid technological change is also seen as a driver of skill mismatches, particularly in Greece, Ireland, and Finland.

Workshop participants acknowledged that the drivers of skill gaps and shortages can vary significantly at the regional and local levels in large countries (England, Italy, Poland, Greece, Estonia, Finland), while not so much in small countries (i.e., Ireland). This is due to differences in economic activities between urban and rural regions. Moreover, the effectiveness of skills policies and initiatives can vary at regional and local levels due to resource constraints, administrative challenges, and coordination issues.