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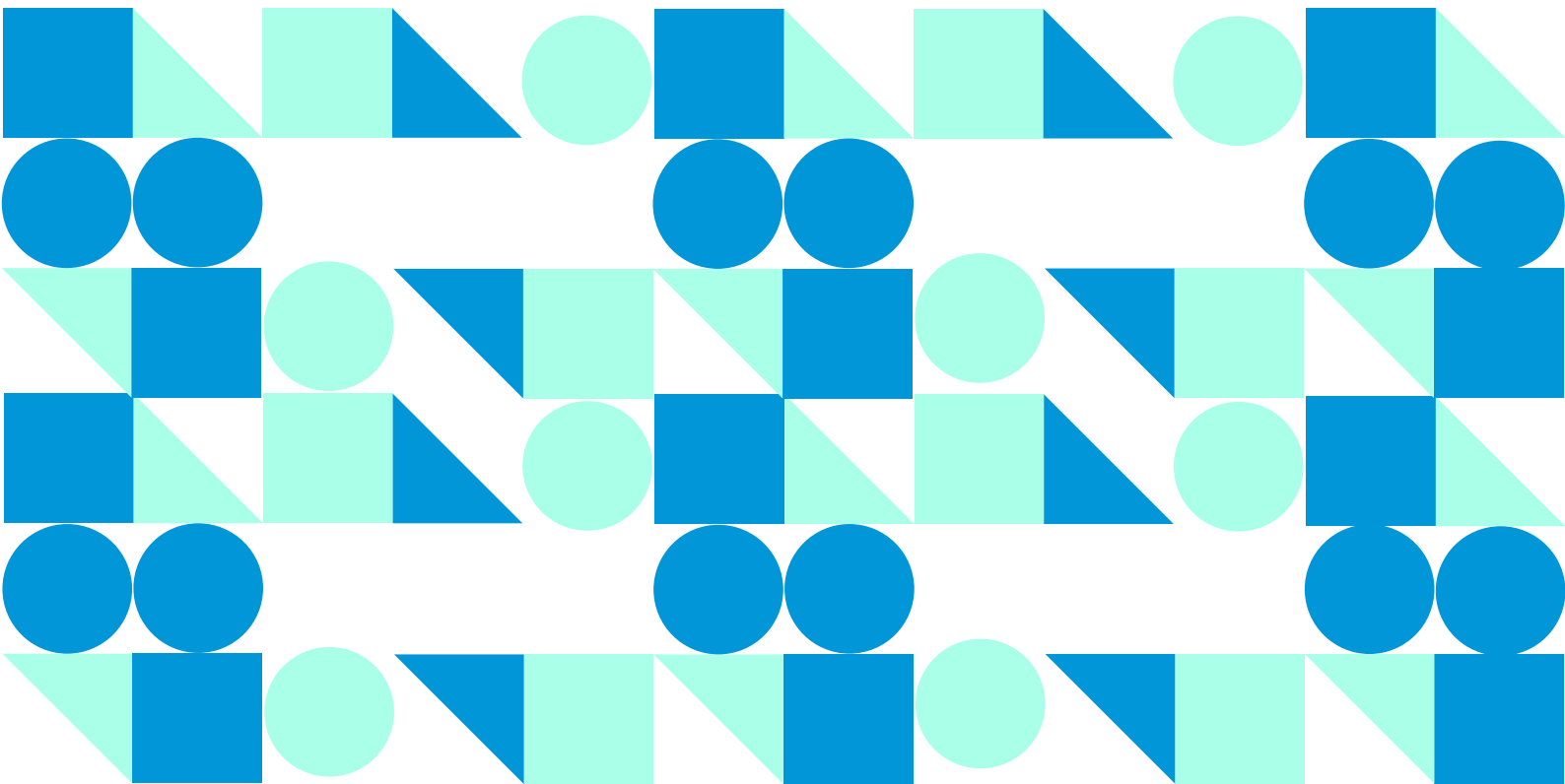
Research paper

Preparing for 2040

Four AI-powered scenarios for the future of continuing skills development



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Four AI-powered scenarios for the future of continuing skills development

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The **European Centre for the Development of Vocational Training** (Cedefop) is the European Union's reference centre for vocational education and training, skills and qualifications. We provide information, research, analyses and evidence on vocational education and training, skills and qualifications for policymaking in the EU Member States. Cedefop was originally established in 1975 by Council Regulation (EEC) No 337/75. This decision was repealed in 2019 by Regulation (EU) 2019/128 establishing Cedefop as a Union Agency with a renewed mandate.

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Foreword

In order for everyone to thrive amid rapid technological advancements, demographic changes, climate challenges and economic uncertainties, empowering the wider workforce to acquire, sustain and continuously enhance their skills is critical. The 'Union of Skills' powerfully reinforces this, stating that 'putting people first and investing in skills delivers exponential returns', underscoring the social and economic necessity of lifelong skills development. However, the accelerating pace of change in our economies and societies demands a bold shift, requiring innovative, adaptive approaches to keep pace with this exponential trajectory.

Despite this urgency, adult participation in continuing skills development remains insufficient. As technological and societal demands intensify, this gap is likely to widen, with the need for upskilling and reskilling becoming universal across the adult population. Proactively anticipating future trends is essential for preparing effectively and addressing these challenges head-on.

Among the future trends shaping continuing skills development, artificial intelligence (AI) stands out as the most influential and yet unpredictable force. Its rapid evolution and the profound changes it will bring to economies, labour markets and societies remain uncertain in scope and speed, necessitating adaptive strategies to harness AI's potential.

Whatever the scenario – whether optimistic or dystopian – one truth remains clear: embracing the future requires a fundamental shift in approach. Integrated ecosystems that leverage all learning contexts – institutional, self-directed and workplace – must be developed to tackle future challenges effectively and maximise impact.

This publication presents the outcomes of the first phase of the European Centre for the Development of Vocational Training (Cedefop)'s foresight study, which explores a visionary approach to continuing skills development. By leveraging foresight methodologies, the study outlines four AI-driven scenarios to guide stakeholders in shaping a resilient, inclusive and future-ready continuing skills development ecosystem for 2040.

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Background

In today's rapidly changing world, continuing skills development is crucial for the success and prosperity of businesses and societies. As technological advancements, demographic shifts and economic uncertainties transform the labour market, lifelong learning and skills development are more important than ever.

However, as argued in the European Centre for the Development of Vocational Training (Cedefop) strategic paper *Shaping Learning and Skills for Europe: A time for commitment*, it becomes clear that the traditional model of continuing vocational education and training (CVET) is no longer sufficient in a world shaped by fast-paced technological disruption and changing work environments. Skills development is a continuous process that extends across an individual's life course (lifelong) and diverse contexts (life-wide), including workplaces, communities and digital environments. The traditional CVET model, under the educational and training systems, often neglects the life-wide dimension of learning, prioritising structured, institutionally provided (formal and non-formal) education and training over informal and experiential learning acquired at and through work or through self-directed learning.

In contrast, the emergence of digital learning ecosystems, such as artificial intelligence (AI)-driven platforms and social media networks, offers new opportunities for flexible and self-directed learning. Moreover, the divide between learning and working is dissolving, making learning at and through work essential for innovation and competitiveness.

As we look to the future, it is clear that modern strategies and practices for adults' continuing skills development must acknowledge workplaces as lifelong learning spaces and must integrate a range of learning approaches, including experiential learning, peer-based knowledge exchange and project-based and technology-mediated learning, alongside traditional methods and approaches. By doing so, we can create a more integrated and effective system for skills development, one that leverages the strengths of institutional, self-directed and workplace learning for maximum impact. Recognising the value of these diverse learning pathways is key to building resilient, future-ready workforces and represents a fundamental paradigm change in the EU adult skills development policy.

Cedefop foresight study on continuing skills development by 2040

To prepare for the future and better understand the potential opportunities and challenges in continuing skills development, Cedefop has launched a strategic foresight study. This study aims to create a shared and comprehensive vision for continuing skills development by 2040, along with alternative scenarios and strategic objectives.

The study has examined the complex relationships between labour market trends, societal shifts, environmental factors and technological advancements that will shape skills development needs and approaches by 2040. By analysing these interactions, we can gain a deeper understanding of the challenges and opportunities that lie ahead and develop a clear vision for continuing skills development that is supported by all stakeholders.

To achieve this, the study has employed a combination of methods, including scenario building, scenario exploration and vision building. The scenario-building phase involved (1) identifying key trends that will influence future developments in continuing skills development, (2) analysing their potential impact and uncertainty, (3) using morphological analysis to identify distinct evolution paths, (4) developing scenario outlines and (5) validating the scenario outlines through a semi-Delphi survey. This process resulted in the development of four scenarios that offer alternative perspectives on how different features and conditions related to continuing skills development might evolve by 2040.

Throughout the study, Cedefop has engaged with a diverse range of stakeholders, including futurists and experts, policymakers at various levels, employee and employer representatives, civil-society organisations and education, training and guidance providers. This collaborative approach has ensured that the study's findings are informed by a wide range of perspectives and expertise.

This publication presents the findings from the scenario-building phase of the study. The results of the scenario exploration and vision-building phases will be published in 2026.

Four AI-powered scenarios for continuing skills development by 2040

The four scenarios are centred around the trend of AI use and its interplay with several other trends, presenting a range of possible futures. Based on the trend and morphological analyses, AI has emerged as the trend most likely to influence future developments in the continuing skills development of adults out of all

identified trends (Chapter 2). In both iterations of trend analysis, experts rank all AI-related trends as highly impactful (influencing most other trends) and highly uncertain in relation to their future evolution or trajectory (with experts unsure about the speed and volume of change with which the AI trends will materialise) (Figure 1).

These futures span from a very positive outlook, where AI enhances human capabilities and social good, to a dystopian future, where AI is deployed primarily for control and profit maximisation and where most jobs are lost, with those that remain often precarious, low-paying and lacking in benefits.

These scenarios are not predictive but rather exploratory, aiming to identify areas that require attention, threats that need to be addressed and opportunities that should be leveraged. By exploring potential future developments, these scenarios can inform the creation of a shared vision for continuing skills development and guide the setting of strategic objectives for 2040.

The main assumptions and driving trends underpinning each of the envisaged scenarios can be summarised as follows.

Scenario A: a future of opportunities – technology-driven competition for talent. It is 2040. The EU labour force is diminishing, due to the ageing of the population and slowing migration flows. However, the economy is booming and creating new jobs, fuelled by technological innovations and the impact of AI. Business activities thrive, but, as the supply and demand for skills go in opposite directions and skills shortages grow, recruitment challenges deepen further and the competition for talent becomes fiercer than ever. The labour market is increasingly tight. Most workers and organisations benefit from AI advancements. Human-centric skills remain crucial. Talent retention becomes a priority for more employers. Purpose-driven careers gain momentum and become an option for a growing number of people. Technological change and the rising demand for continuing skills development encourage the further integration of learning environments into workplaces. Boundaries in institutional education and training will continue to blur or may even disappear completely. Skills development systems become more flexible, accessible and responsive to the diverse needs of the workforce, enabling smoother transitions and progress in individuals' learning journeys. Finally, new nontraditional stakeholders emerge as frequent creators of learning content.

Scenario B: left alone to ride the tide – navigating the AI shock waves on jobs. It is 2040. Successive waves of AI transformation have fundamentally reshaped the workplace, sending shock waves through the workforce and affecting different populations in radically different ways. As both the state and employers step back from workforce skills development, working-age adults are largely left to

their own devices, navigating technological tides and striving to keep their skills relevant, with varying degrees of success. Some ride the waves skilfully, while others struggle to stay afloat, creating what we now call a 'two-tier workforce'. AI disrupts most jobs and businesses in Europe. Individuals are responsible for their ongoing skills development. Changes are hard to manage and only some parts of the population benefit. Other parts, smaller in number, face challenges in adapting and struggle to remain in employment at the expense of their mental, physical and socioeconomic well-being.

Scenario C: staying afloat – AI opportunities missed. It is 2040. The rise of AI is continuing but at a modest pace, leading to moderate transformations of tasks and jobs rather than extensive disruptions. The pace of change is generally manageable for employers, workers and the EU Member States, and incremental changes usually suffice. At the same time, the potential of AI to improve economic and social conditions is not fully tapped, as the investment and engagement of stakeholders in AI varies across sectors, Member States and population segments. Changes are manageable and some parts of the population benefit, but many miss out on the opportunities, and some keep struggling. The importance of skills development and skills utilisation stays at today's levels, as does the share of people who self-direct their careers. There is no significant push for the seamless integration of the various education and training options. Learning content is still generated mostly by traditional stakeholders. AI's influence on learning, teaching and career guidance remains limited.

Scenario D: AI unleashed – dominating the world of work and societies. It is 2040. The use of AI technologies and automation has taken over in all areas of life and work, transforming the fabric of society and leading to unprecedented job losses across all sectors, industries and skills levels. A few players control the AI landscape, exerting substantial influence over policymakers, the economy and society. The impact on workers is disruptive. With AI taking over most tasks, workers are increasingly employed under non-standard contracts, with limited access to skills development, job security and benefits. Companies have no interest in investing in the skills development of a disposable workforce, and investments are limited to advanced AI-related skills for a small portion of their workforce. Workers are left to bear full responsibility for their own skills development and struggle to adapt and keep up with frequent and involuntary career changes. The decline of traditional employment and unionised jobs has weakened the power of trade unions, leaving workers without a strong advocate for their rights and interests. Insufficient regulations and oversight have created a power imbalance, threatening democracy and exacerbating environmental degradation. AI has revolutionised skills development, blurring the lines between

formal and non-formal education and training and introducing new AI-powered tools and roles.

Cross-cutting areas of concern and tension

Despite their differences, the scenarios above share several common features, while revealing a complex and multifaceted landscape of future challenges and opportunities. These underlying issues vary in intensity across the scenarios but are crucial to consider when developing a shared vision for the future of continuing skills development and its strategic objectives.

(a) **AI's dual potential.** AI holds tremendous potential to enhance human capabilities, drive innovation and improve societal outcomes. In Scenario A, AI is leveraged to create new opportunities for economic growth, social mobility and environmental sustainability, leading to improved quality of life for individuals, economies and societies. However, AI's dual potential also poses significant risks, particularly when its deployment is driven primarily by the desire for control and profit maximisation. As shown in Scenario D, unchecked AI advancement can lead to a concentration of power and wealth, exacerbating social and economic inequalities and undermining democratic institutions. Further, AI's impact can be more nuanced and complex, as evident in Scenario B, where the benefits and impacts of AI are unequally distributed. Those who are already privileged are able to leverage AI to further enhance their positions, while those who are marginalised are left behind, facing significant barriers to access, participation and social mobility. However, there are also risks in modest AI uptake, as depicted in Scenario C, where a lack of investment in AI and the failure to harness its potential leads to stagnation and complacency, ultimately resulting in a loss of competitiveness and innovation and a missed chance to address pressing societal challenges, such as climate change, social cohesion and education.

(b) **Workplace transformation challenges.** The integration of AI into the workplace creates a tension between two approaches: one focuses on automation and efficiency, and the other prioritises the enhancement and empowerment of human capabilities. This dichotomy has profound implications for workforce development, job quality and the integration of learning and work. In Scenario A, automation is leveraged to liberate workers from routine tasks, enabling them to pursue purpose-driven careers and invest in meaningful jobs. This creates a virtuous cycle of upskilling and reskilling, where workers can transition to higher-value roles and employers can benefit from a more skilled and engaged workforce. In stark contrast, Scenario B reveals a fragmented

landscape, where some companies use AI to augment human capabilities, while others prioritise replacement. This creates a stratified workplace, where some workers thrive in dynamic, tech-enabled environments, while others are relegated to routine, low-skilled roles with limited career prospects. The outlook is even more dire in Scenario D, where AI technologies displace most human jobs, forcing workers to compete with machines for a dwindling number of positions. Individuals lose control over their career trajectories, facing frequent and involuntary changes due to circumstances beyond their control. However, there is also a middle ground, as in Scenario C, where AI supports humans in a relatively smooth mode of coexistence. In this scenario, many jobs continue to rely on technical skills that are enhanced by AI-related solutions, and jobs based on repetitive tasks are not widely replaced. Jobs and tasks evolve gradually rather than radically, keeping skills needs moderate, except in the sectors most exposed to technological change.

(c) **Learning, guidance and counselling transformation.** The integration of AI into learning, guidance and counselling processes holds significant promise for enhancing the quality and effectiveness of these services. However, realising these benefits depends on the development and implementation of responsible frameworks, human-centred design principles and decision-making processes that prioritise learner agency and well-being. In Scenario A, advances in AI enable the creation of tailored, adaptive learning environments that cater to the unique needs and preferences of individuals. This approach has the potential to promote greater inclusivity and equity in education. On the contrary, both Scenario B and Scenario D, albeit to varying degrees, underscore the risks of exacerbating disparities and further marginalising disadvantaged individuals. Further, these scenarios also warn of the potential consequences of over-reliance on a learning ecosystem dominated by tech platforms and AI-powered training systems, including increased isolation, heightened anxiety and adverse effects on mental and physical health. In Scenario C, AI instead supports learning, guidance and counselling practices, without challenging the roles of practitioners.

(d) **The individual responsibility gap.** The increasing expectation for individuals to take charge of their own skills development and career paths poses a significant challenge, particularly for those who lack the necessary capacity, resources or support to do so effectively. This gap is likely to exacerbate existing socioeconomic disparities, as individuals from disadvantaged backgrounds may struggle to navigate the rapidly changing job market and access opportunities for upskilling and reskilling. In Scenarios B and D, this gap is particularly pronounced, as workers are left to fend for themselves. In contrast, Scenarios A

and C present more optimistic outlooks, where individuals are better equipped to cope with changes in the job market.

(e) **Changing employment landscape.** The employment landscape is undergoing a significant transformation, characterised by the rise of nontraditional, often precarious employment arrangements alongside traditional models. This shift is marked by significant regional and sectoral variations, which affect worker security and representation and pose challenges for social dialogue and collective bargaining. The pace and nature of this transformation vary across scenarios. In Scenario A, the transition is smooth, with workers benefiting from flexible work arrangements and providing services to multiple employers. In contrast, Scenarios B and D depict a more drastic shift, where traditional employment is replaced by micro-tasks, project-based work and temporary relationships. However, the outcomes differ: in Scenario B, new forms of worker representation emerge, while, in Scenario D, the erosion of trade unions leaves workers without a strong voice to safeguard their rights and interests. Scenario C presents a more nuanced picture, with a modest increase in nontraditional forms of employment. However, in this model, social dialogue struggles to establish an updated network of social protection suitable to this relatively modest transformation, and worker participation in trade unions declines.

(f) **Widening inequalities.** The widening inequalities among individuals, regions, businesses, occupations and sectors are driven by differing capacities to adapt to technological changes. This leads to a gap between those with access to opportunities and those without. Scenarios B and D exacerbate this issue, with remote work and AI technologies creating ‘opportunity deserts’ and geographical polarisation, respectively. This results in a brain drain and limited access to quality education and employment and perpetuates inequality. In contrast, Scenario C presents a nuanced picture, where AI benefits are not universally shared, and Scenario A offers an optimistic outlook, with a thriving economy and declining inequalities, but only if the digital divide is managed and opportunities are inclusive.

Implications for social dialogue

The four scenarios have a profound impact on the roles and responsibilities of stakeholders and the evolution of social dialogue. Understanding these changes is crucial for developing a common vision for continuing skills development that is shared and endorsed by all stakeholders.

Preliminary reflections suggest that traditional models of social dialogue will need to adapt and transform to address the challenges and opportunities presented by the changing landscape. In Scenarios A and C, labour relations are expected to remain relatively stable, but the nature of social dialogue differs significantly between the two. In Scenario A, social dialogue is strengthened through collaborative efforts between trade unions, employers' organisations and governments, which work together to address the challenges and opportunities of technological change. The growing importance of nontraditional employment arrangements motivates trade unions to expand their support to workers who are not covered by traditional employment contracts, ensuring that all workers have access to representation and protection. In Scenario C, in the absence of major overhauls and massive lay-offs across the board, social dialogue is more nuanced and context-dependent, with a focus on better identifying skills needs and developing suitable training offers to ensure that no learner group is left behind. While certain industries may require more significant adaptations to new work organisation and employment models, social dialogue in general is focused on promoting lifelong learning and skills development.

In contrast, Scenarios B and D present more challenging landscapes for social dialogue, characterised by fragmentation, reactiveness and a lack of strategic planning. In Scenario B, there is a significant shift away from traditional tripartite social dialogue towards a more fragmented and reactive model of social coordination, characterised by company-specific negotiations and limited to basic framework conditions. This leads to a lack of strategic planning and proactive engagement, with negotiations focusing on short-term gains and damage control rather than long-term benefits. In Scenario D, the erosion of traditional industrial relations and collective bargaining has severely weakened social dialogue, leaving workers and vulnerable groups without a strong voice. As a result, negotiations are fragmented and reactive, prioritising the interests of employers and corporations over those of workers and neglecting critical concerns such as job security, working conditions and environmental sustainability.

Across all scenarios, there is a pressing need to adapt to the changing nature of work and the economy. This requires a willingness to experiment with new forms of worker representation and social protection, prioritise lifelong learning and skills development and ensure that all workers have a voice in the decision-making process. By doing so, social dialogue can play a critical role in promoting a more inclusive and equitable economy, where the benefits of AI and technological progress are shared by all and where workers' rights and interests are protected and advanced.

Next steps: co-creating a common vision

Building on the outcomes of the first phase of this research, the next phase will engage diverse groups of stakeholders with roles and responsibilities in continuing skills development. Together, we will co-create a common vision, including strategic objectives, to ensure that all stakeholders are aligned and working towards a shared goal. This collaborative approach will be essential for addressing the complex challenges and opportunities identified in this foresight study and for shaping a strategy for future continuing skills development that is equitable, sustainable and supportive of lifelong learning.

CHAPTER 1.
Introduction

1.1. Background and policy context

Continuing skills development will play an increasingly pivotal role in shaping the future of work and society and will go beyond institutional education and training and the traditional model of continuing vocational education and training (CVET). In today's rapidly evolving global landscape, the success and prosperity of businesses and societies hinge on the ability of individuals to acquire, maintain and continuously enhance their skills.

As technological advancements (Cedefop, 2025a), demographic shifts, climate change (Cedefop & UNESCO-UNEVOC, 2025) and economic uncertainties reshape the nature of work and the demands of the labour market, the importance of lifelong learning and skills development cannot be overstated. As stressed in the 'Union of skills' initiative (European Commission, 2025), putting people first and investing in skills pays off many times over.

By encompassing the provision of, support for and active participation in adult learning activities that focus on acquiring and improving job-relevant skills through various on-the-job and off-the-job learning opportunities, continuing skills development enables workers to remain competitive and adaptable in a changing labour market. While the importance of continuing skills development is widely acknowledged (Cedefop, 2020), current efforts to advance it systematically face significant challenges. Looking to the future, it becomes clear that the traditional CVET offered by institutions in the education and training system is no longer sufficient in a world shaped by fast-paced technological disruption and evolving work environments (Cedefop, 2022). Skills development is a continuous process that extends across an individual's life course (lifelong) and diverse contexts (life-wide), including workplaces, communities and digital environments. However, the traditional CVET model often neglects the life-wide dimension of learning, prioritising structured, institutionally provided learning and training over informal and experiential learning acquired at and through work or through self-directed learning (Cedefop, 2025c).

The emergence of digital learning ecosystems, including generative artificial intelligence (AI)-driven platforms, social media networks and other digital tools, marks a significant shift in the way individuals learn and develop skills. These innovative platforms offer powerful alternatives to conventional training formats, providing learners with more autonomy and agency and enabling more flexible and

self-directed learning journeys. Further, the divide between learning and working is increasingly dissolving, making learning at and through work essential for innovation, business competitiveness and organisational adaptability (Cedefop, 2025b).

Therefore, to remain effective, modern strategies and practices for adults' continuing skills development must acknowledge workplaces as lifelong learning spaces and must integrate a range of learning approaches, including experiential learning, peer-based knowledge exchange and project-based and technology-mediated learning, alongside traditional methods and approaches. It is not about choosing between institutional, self-directed and workplace skills development contexts but rather creating integrated systems that leverage all of these contexts for maximum impact. Recognising the value of these diverse learning pathways is key to building resilient, future-ready workforces and represents a fundamental paradigm change in EU adult skills development policy (Cedefop, 2025c).

Several recent EU policy documents, including those pertaining to the Union of skills, stress the need for a significant shift in approach and increased investment in skills to effectively tackle future challenges. The stakes are too high to let the gap between the current reality and the desired future continue widening.

To prepare for the future and gain an in-depth understanding of potential possibilities and challenges in the field of continuing skills development, the European Centre for the Development of Vocational Training (Cedefop) has embarked on a strategic foresight study aiming to craft a common and comprehensive vision for continuing skills development by 2040, accompanied by strategic objectives.

1.2. Objectives and methods

By looking to the future, Cedefop's strategic foresight study on continuing skills development explores how various forces may shape skills development needs and approaches by 2040. It examines the intricate relationships between labour market evolution, societal trends, environmental factors and technological advancements, and also their combined impact on workforce skills development, as well as education and training. Understanding these interconnections is crucial to achieving a clear and comprehensive vision for continuing skills development that is agreed upon and supported by all stakeholders.

The specific objectives of this strategic foresight study are to:

(a) develop a common vision for continuing skills development by 2040, based on stakeholders' common interests and strategic goals, accompanied by a clear and agreed vision statement;

(b) identify how different stakeholder types can contribute to the materialisation of the vision.

The foresight study has engaged with a large pool of stakeholders relevant to continuing skills development throughout different stages of the process. These stakeholders have included futurists and experts, policymakers at various levels, employee and employer representatives, civil-society organisations and education, training and guidance providers.

The strategic foresight study is built around three phases.

(a) **Scenario building** (from September 2023 to November 2024) combined different methods and was built on the findings of a foundation and explorative study on promoting lifelong learning of adults through CVET systems and upskilling pathways (Cedefop, 2025b). This study applied exploratory and normative foresight methods to identify emerging trends in and of relevance for adults' skills development in all its formats and contexts: institutional, workplace and digital. Upon further examination of these findings, Cedefop identified, through a literature review and discussions with experts, the trends most likely to influence future developments in the continuing skills development of adults by 2040 (Step 1, from September to October 2023). Trends were then analysed, with experts and stakeholders, in terms of their potential impact on each other and the level of uncertainty regarding how they will evolve in the future under two iterations (Step 2, from October to November 2023). Through morphological analysis (Step 3, from December 2023 to March 2024), four distinct evolution paths emerged, which resulted in four scenario outlines (Step 4, April 2024). These were discussed in an online expert workshop in May 2024 and validated through a semi-Delphi survey from October to November 2024 (Step 5).
(b) **Scenario exploration** (from December 2024 to January 2025) included discussions of the different scenarios with a broad set of stakeholders to understand how the stakeholders saw their roles in each of the proposed scenarios (in a second, online, workshop in January 2025).
(c) **Vision building** (from February to December 2025) was based on the two phases above and involved different groups of stakeholders with roles and responsibilities in continuing skills development.

This publication presents the findings from the scenario-building phase. The findings from the scenario exploration and vision-building phases will be published in 2026.

CHAPTER 2.

Developing the scenarios

2.1. Step 1: trend identification

The process of identifying the trends most likely to influence future developments in the continuing skills development of adults by 2040 started with a literature review, leading to the identification of two clusters of trends:

(a) trends that affect sustainability, productivity and competitiveness – such as technological innovation, deglobalisation and competition for resources, urbanisation, new types of business models, and sustainability, which drive the demand for a highly skilled and adaptable workforce capable of contributing to economic growth;

(b) trends that affect the workforce transformation – such as a shrinking labour force, increased relevance of migration, increased participation in tertiary and higher education, diversification of education and learning, and evolving needs and expectations of the workforce – which underscore the dynamic nature of workforce transformation and the complexities of fully and equitably using its potential.

These findings were further refined through discussions with experts in two webinars (webinars 1 and 2, which took place on 29 September 2023 and 9 October 2023, respectively). In particular, the webinars aimed to provide a space to collectively reflect on and discuss the trends identified through the literature review.

The discussion of the trends identified through desk research (webinar 1) led to the following conclusions.

(a) Experts recommended differentiating between trends that they described as ‘determined/deterministic’, such as demographic change, and trends where there is scope for political/policy choices.

(b) The three clear key ‘deterministic’ trends are: (i) technological change, (ii) demographic change and (iii) climate change. Of these, technological change is likely to have the biggest impact, as it affects all aspects of life (and work organisation).

This led to a rationalisation of the list of ‘non-deterministic’ trends using the social, technological, economic, environmental and political trends and values (STEEPV) framework, which was shared with the experts ahead of the second webinar (9 October 2023).

As a result, 14 trends (see Annex 1) were explored further during the second expert webinar. The second webinar had two aims: to further develop the trends identified and better understand the links between trends and the (potential) impact of trends on each other and also to assess the level of uncertainty regarding how the trends will evolve in the future (see Step 2).

The outcomes of the second expert webinar and further exploration of trends related to education led to further refinement of the list of trends. Following the STEEPV framework in order to be as comprehensive as possible, Cedefop identified 21 trends that are most likely to influence future developments in the continuing skills development of adults by 2040. These are presented in Table 1.

Table 1. **Trends discussed in the stakeholder meeting**

Trend	Description
(1) Growing importance of sustainability policies and eco-conscious consumer values (En, P, V)	The relevance of green and circular economy increases due to environmental awareness and climate change concerns, regulatory pressures and policies, resource scarcity, consumer preferences and market demand.
(2) Pursuit of purpose-driven careers continues to gain momentum (V)	(Prospective) employees prioritise a sense of purpose, work–life balance and opportunities for personal and professional growth.
(3) Sustainability practices are becoming more frequent across most businesses and industries (En, Ec)	Businesses adopt new, eco-friendly business models and value propositions that meet the growing demand for sustainable products and services.
(4) Industries and business models facing major disruptions (Ec, T)	There is a rapid transformation of industries, jobs and tasks due to technical innovation. Traditional companies face new competitors or innovations that undermine their business models and their ability to remain competitive. There is deglobalisation and competition for resources.
(5) Increasing replacement of human jobs by machines and AI (T)	Automation and AI continue to outpace human labour (i.e. move faster than the creation of new jobs) across the spectrum of skills and qualifications (low-skilled jobs exposed to robots and automation; high-skilled jobs exposed to AI uptake). There are job losses and pressure on wages.
(6) Shrinking labour force in the EU (S, P)	Ageing occurs. The shrinking of the population continues. The activity rate of women continues to lag. Skills obsolescence increases and outpaces the activation of population segments that are outside the labour market.
(7) Increasing irregular migration flows into the EU (S)	The significance of irregular or forced migration into the EU increases, accelerated by increased conflicts and violence, climate change and economic disparities.
(8) Increasing international competition for talent (Ec, P)	There is competition within the EU and globally (e.g. with the United States and Canada) to attract a skilled workforce, including in critical sectors and sectors with severe skills shortages.

Trend	Description
(9) Increasingly fragmented working lives (Ec, S)	Shift from standard to non-standard employment continues. Platform work increases. Career paths appear much more fragmented, uncertain and non-linear than in the past, and labour market transitions are increasingly frequent.
(10) Loyalty between employer and employee erodes (due to remote work, gig economy and independent work) (Ec, S)	(Excessive) flexibility and non-standard employment weaken traditional employment benefits, challenging job security.
(11) Rise in self-directed professional trajectories and independent career management (Ec, V)	Either out of pursuit of flexibility and autonomy or because of changes in workplaces (information and communication technology (ICT)-based work, gig economy), employees look to build their own careers, moving away from traditional pathways.
(12) Rising importance of skills development and utilisation in the workplace (Ec, S)	Reliance on state-driven education and training is not sufficient to cover skills needs. There is a heightened focus on skills development and skills utilisation at the company level instead.
(13) Increasingly faster pace of changes in jobs and tasks and greater need for adaptation by the working population (T)	Rapid technological changes and digitalisation change the nature of tasks within jobs and change jobs as a whole. New occupations emerge as others fade away, and the activities of employees within the same roles are increased or transformed.
(14) Jobs will focus heavily on social and emotional skills, creativity, innovation, complex problem-solving and digital skills (Ec, S)	Disruptions in business processes and models require swift adaptation from employees and a wide range of skills beyond merely technical ones. Jobs relying on personal and interpersonal skills are less susceptible to replacement by technology.
(15) Increasing importance of the inclusiveness of education and training and skills development (S)	There is an activation of less-represented population groups to remedy skills shortages. The importance of integrating migrants grows. The significance of the social inclusion role of education and training increases due to higher risks of people being left behind due to technological change and growing inequalities in access to jobs and education and training.
(16) Traditional boundaries in education and training are blurring (S)	Boundaries between initial VET, CVET and higher education become blurry, underpinned by the digitalisation and modularisation of training provision. Providers extend their offers to new audiences through programmes that were traditionally offered by different education and training segments.
(17) Increasingly fluid and dynamic learning environments supported by diverse content generation: employer-generated, peer-generated, user-generated and AI-generated (T)	More training content is developed in real time and be adjusted to the realities of specific employers, peers, professional communities, the experience and initiative of users/learners themselves or AI. Diversification of education and learning is facilitated by online courses and digital platforms. The importance of non-accredited training grows and there is less focus on formal qualifications.

Trend	Description
(18) Increasing use of AI and technologies in education and training (T)	AI and digital technologies are increasingly used to produce new training content, offer training tools and deliver training and therefore require new pedagogies.
(19) AI tutors transforming the roles of teachers and trainers (T)	Teachers and trainers will need to become coaches and mentors facilitating learning rather than conveyors of knowledge. Offer of knowledge by AI tutors and management of knowledge by AI-powered digital platforms increase.
(20) Increase in take-up of AI in guidance and counselling to increase quality and efficiency (T)	AI and digital technologies are increasingly used to inform guidance and counselling services, content and practices.
(21) Chatbots and virtual assistants will increasingly deliver basic guidance and counselling services digitally (T)	Guidance and counselling services are provided to beneficiaries via AI and digital technologies, with or without human supervision.

NB: Trends have been labelled in accordance with the STEEPV framework. S = social, T = technological, Ec = economic, En = environmental, P = political and V = values.

Source: Cedefop.

The list of 21 trends was discussed with the stakeholders participating in the meeting on 8 November 2023 in Brussels (see Step 2). Stakeholders at the meeting included EU-level representatives of social partners (e.g. employers and trade unions), chambers of commerce, VET providers and academics/researchers, together with experts from the European Commission, the European Economic and Social Committee and Cedefop.

2.2. Step 2: trend analysis

The trend impact and uncertainty analyses were carried out in two iterations: in the second expert webinar of 9 October 2023, the experts were asked to carry out the impact and uncertainty analyses for 14 trends, whereas, at the in-person stakeholder meeting of 8 November 2023, the stakeholders were asked to carry out the same exercise for the 21 identified trends.

Trends were analysed in terms of their (potential) impact on each other and in terms of the level of uncertainty regarding how they will evolve in the future. The output of this step was an impact–uncertainty matrix (Figure 1), which consolidates the results of the two iterations.

Participants were asked first to identify the links between the trends and how the changes in one trend may affect changes in another (either negatively or

positively), irrespective of other relevant factors ([1]), and second to assess the strength of the links (whether the link is strong or less strong). In so doing, they helped identify interdependencies among trends, which allowed for the impact of each trend on the others to be captured. Further, participants were asked to identify the degree of (un)certainty regarding how each trend will evolve in the future: low, medium or high (un)certainty. Higher scores were assigned to trends for which they were less certain about how they may evolve (i.e. an unclear trajectory or direction of the trend's evolution). Trends with evolutions that they deemed to have a clearer and more certain trajectory were assigned lower scores.

Examples of how the information in the matrix needs to be understood include the following points.

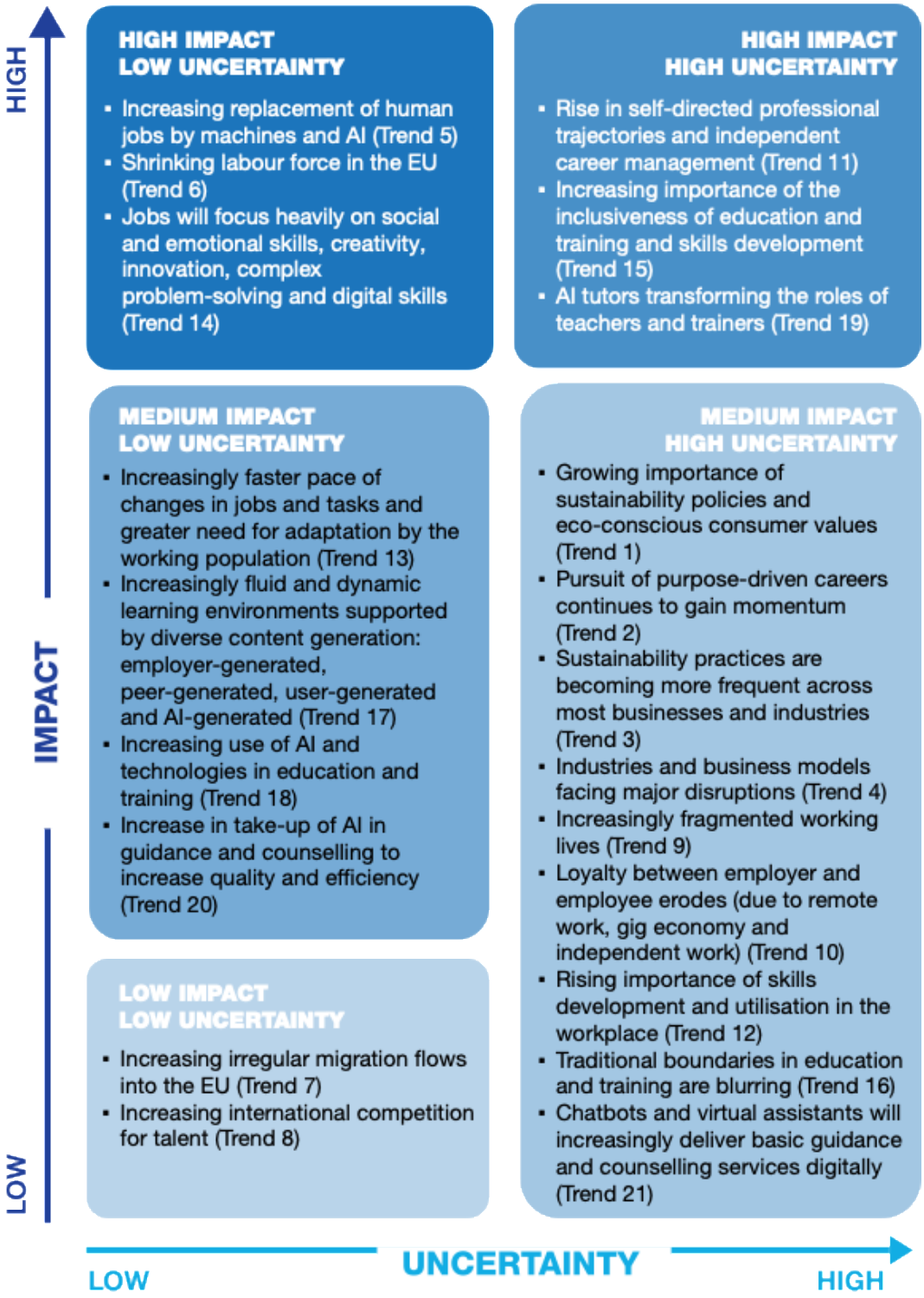
(a) The trend 'Increasingly faster pace of changes in jobs and tasks and greater need for adaptation by the working population' was assessed by the participants as being highly certain and highly impactful (influencing most other trends).

(b) The trend 'Increasing replacement of human jobs by machines and AI' was assessed as highly impactful but there was no agreement on the level of uncertainty (which was considered low by some experts and high by others), which resulted in a medium level of uncertainty.

(c) The trend 'Rise in self-directed professional trajectories and independent career management' was considered highly impactful and highly uncertain, as most participants argued that it was uncertain if the trend would apply to the whole population or only to certain segments (e.g. the more qualified, autonomous ones).

([1]) A positive link indicates that, as one trend increases, the other trend also increases – that is, it signifies a positive influence of trend A on trend B, meaning that trend A reinforces trend B. A negative link indicates that, as one trend increases, the other trend decreases – that is, it signifies a negative influence of trend A on trend B, meaning that trend A weakens trend B.

Figure 1. **Impact–uncertainty matrix**



NB: This figure is a product of the online webinar on 9 October 2023 and the in-person Brussels stakeholder meeting on 8 November 2023.

Source: Cedefop.

2.3. Step 3: morphological analysis

The next step involved identifying possible alternative evolutions for each trend and exploring their links to identify distinct evolution paths. Cedefop applied the morphological analysis method, which makes it possible to identify, structure and investigate the total set of possible relationships contained in a given multidimensional, complex object of analysis.

2.3.1. Reformulation of trends

First, for the purpose of the morphological analysis, Cedefop 'neutralised' the titles of the trends (removing any value statements and ensuring that they did not point towards a specific evolution end point). This step was important so that Cedefop could then proceed with the identification of the possible meaningful and easy-to-understand evolutions of each trend. At the same time, Cedefop also split compound trends into different parts and improved how some of the trends were formulated.

Examples of these adaptations include the following.

(a) Trend 1, 'Growing importance of sustainability policies and eco-conscious consumer values', was both neutralised and split in two:
   i. 'Importance of sustainability policies',
   ii. 'Importance of eco-conscious consumer values';
(b) Trend 5, 'Increasing replacement of human jobs by machines and AI', was reformulated as 'AI influence on jobs';
(c) Trend 9, 'Increasingly fragmented working lives', was reformulated as 'Frequency of career/employer changes over time';
(d) Trend 14, 'Jobs will focus heavily on social and emotional skills, creativity, innovation, complex problem-solving and digital skills', was reformulated as 'Importance of human-centric skills';
(e) Trend 15, 'Increasing importance of the inclusiveness of education and training and skills development', was reformulated as (the neutral) 'Importance of the inclusiveness of education and training and skills development'.

Annex 1 provides an overview of how the trends used in Steps 1 and 2 were reformulated and adapted in Step 3.

As a result of this exercise, the final list of trends examined from this point onwards consists of '21 trends (including Trend 1a and Trend 1b)'.

2.3.2. Identification of possible evolutions for each trend

After each trend was adapted and/or neutralised, possible evolutions were identified for each one. The evolutions for each trend were distinct from each other,

reflecting different hypotheses regarding how the trend could develop by 2040. For example, for Trend 1a, the following evolutions were imagined:

(a) sustainability policies are the norm across most/all sectors and policy areas;
(b) sustainability policies remain fragmented and are only applied in a limited number of sectors and policy areas;
(c) sustainability policies decrease in importance/they are no longer a key factor influencing policy decisions.

Similar statements (evolutions) were identified for all trends. Annex 2 presents the possible evolutions that were identified for all trends as part of the morphological analysis exercise.

2.3.3. Emergence of distinct evolution paths

Once the possible evolutions were developed for each trend, Cedefop identified the ways that these evolutions were linked together. This led to the emergence of different evolution paths. This process was informed by the impact–uncertainty matrix (Figure 1) and guided by the following key questions (in order of importance).

(a) Which are the most uncertain trends and which are the most impactful? How are they affected by and how do they affect each of the other trends?
(b) Which are the most important and most certain trends that should be part of any scenario? How are they affected by and how do they affect each of the other trends?
(c) What kind of scenarios emerge?

The linkages established between the different evolutions produced four clear, distinct evolution paths (Annex 3). These were the basis for the development of the four scenario outlines.

2.4. Step 4: development of scenario outlines

Based on the morphological analysis and the four identified evolution paths (Annex 3), Cedefop developed four scenario outlines for exploring future alternatives, which can then form the basis upon which a vision can be developed for skills development by 2040. The titles and basic premises of each scenario are outlined below, with a detailed comparison of the scenarios across various dimensions provided in Annex 4.

(a) **A future of opportunities – technology-driven competition for talent.** This scenario is built around evolution path 1, starting from the premise that the

impact of AI on job creation is predominantly positive, with most workers and organisations benefiting from it.

(b) **Left alone to ride the tide – navigating the AI shock waves on jobs.** This scenario is built around evolution path 2, starting from the premise that AI disrupts most jobs and businesses. Changes are hard to manage and only some segments of the population benefit.

Staying afloat – AI opportunities missed. This scenario is built around evolution path 3, starting from the premise that AI leads to moderate transformations of tasks and jobs rather than extensive disruptions. Changes are generally manageable and some parts of the population benefit, but many miss out on the opportunities and some keep struggling.

(c) **AI unleashed – dominating the world of work and societies.** This scenario is built around evolution path 4, starting from the premise that AI disrupts economies and societies. It replaces almost all jobs and serves only the few controlling it/a few powerful elites. Social inequalities grow, and people are left alone/unsupported.

These scenario outlines were presented and discussed during the first online workshop in May 2024. Experts invited to the workshop discussed the internal consistency of each scenario, elaborated on their key features and suggested additional features to complement the full descriptions of the scenarios.

2.5. Step 5: semi-Delphi survey

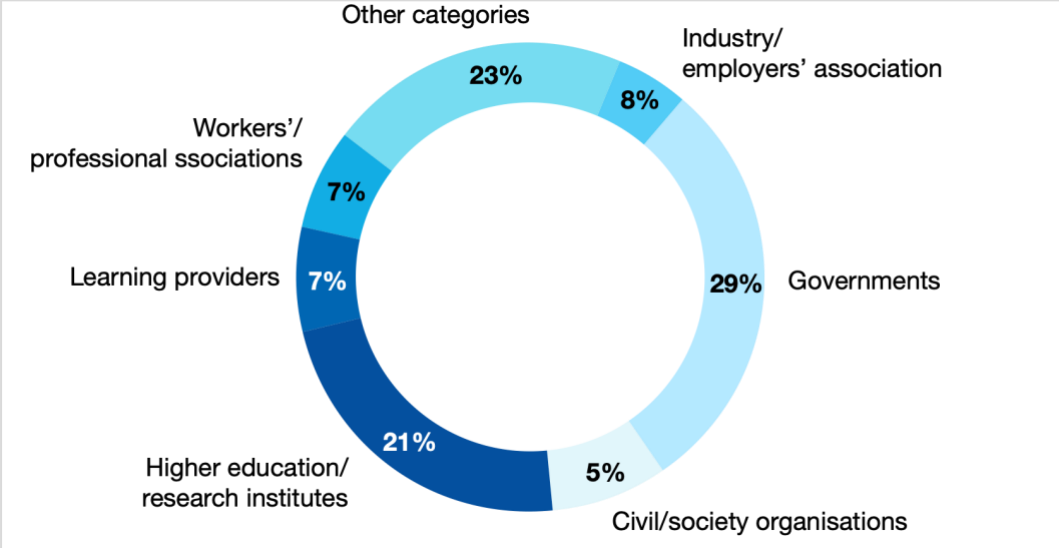
As a final step in the scenario-building phase and building on the outcomes of the first online workshop, Cedefop conducted a semi-Delphi survey from October to November 2024. The survey aimed to gather expert opinions on the likelihood and characteristics of the four distinct scenarios that will shape the future labour market and adult learning landscape by 2040.

The questionnaire (Annex 5) included scenario-specific questions that addressed the scenario features and evolutions that were identified during the first online workshop as needing more clarification. In other words, the questions differed for each scenario, as they were tailored to explore the unique aspects of each scenario that required further insight. The questionnaire included structured questions to gauge participants' agreement or disagreement with specific statements, their supporting arguments and their confidence levels in their predictions.

A total of 132 respondents from various sectors completed the survey, including 10 from industry or employers' associations, 39 from governments, 7

from civil-society organisations, 28 from higher education / research institutes, 9 from learning providers, 9 from workers' or professional associations and 30 from other categories.

Figure 2. **Semi-Delphi survey respondents**



Source: Cedefop.

The subsequent chapters (Chapters 3-6) will delve into the details of each scenario, outlining the underlying assumptions that have emerged from the morphological analysis and the insights gathered through the semi-Delphi survey. The consolidated scenarios, which have been further refined based on the findings of the semi-Delphi survey, are presented in Chapter 7.

CHAPTER 3.

Scenario A assumptions: a future of opportunities - technology-driven competition for talent

3.1. Assumptions

3.1.1. Setting the scene

The EU labour force is diminishing, due to the ageing of the population and the slowing of irregular migration flows. At the same time, the EU labour market still expands and creates more jobs, driven by technological transformation and the impact of AI. The influence of skills and job disruption driven by AI is a positive one: benefits apply to most workers and organisations. At the individual level, AI allows for the replacement of repetitive and low-skilled tasks, but, at the same time, it creates demand for higher-level skills and jobs, pushing for the upskilling and reskilling of the ever-shrinking workforce. Human-centric skills are placed in the spotlight. They become much more significant than they are today.

The technology does not solve the climate change crisis. The impact of human activities on the environment is profound and recognised as such by most. Sustainability actions become the core of most policy areas, and, for most people, eco-consumer values are an important consideration.

3.1.2. Employers' behaviour

The benefits of AI cut across all types and sizes of organisations, creating positive disruptions in all economic sectors. Existing jobs are rarely destroyed by the technological transformation of economic activities, so the disruption is seen as moderate in relation to the extent of the transformation it causes but significant in scale, and most companies and organisations adapt reasonably well.

Employers are forced to pay more attention to workers' loyalty and to attract and retain talent, as the supply of skills available on the job market dwindles. The pressure on employers is felt across borders, and the international competition for talent intensifies. It also emphasises the importance of skills development and utilisation in the workplace, either significantly or moderately. As the gap between skills and jobs available widens, employers turn to previously untapped talent sources, such as disadvantaged groups. To engage them, they need to emphasise inclusiveness in businesses and organisations.

As sustainability practices grow in importance for both policymakers and individuals, they become standard in most organisations and economic sectors.

3.1.3. Individuals' behaviour

Most workers benefit from these trends. The abundance of jobs due to technological transformation and AI, the decline of the available workforce and advanced technology adoption in learning and counselling environments offer greater opportunities to shape people's career pathways. The pace of voluntary job changes increases as people pursue better career opportunities.

The moderate rate of business disruption also means that changes in tasks and skills needs in workplaces are manageable, and workers can largely cope with them. The continuing job creation offers more opportunities for workers, and more people start to invest in purpose-driven careers, seeking higher satisfaction and more meaningful work. Employees' loyalty to employers inevitably erodes. Independent career management goes hand in hand with this development and becomes an option for most, or at least an ever-rising group of, people.

3.1.4. Continuing skills development and guidance delivery

Education and training will not be spared from AI-driven transformation, as AI will affect all its segments. AI will significantly transform the roles of teachers and trainers, who will be able to scale up their support to learners. Learning content will be increasingly created by a host of new stakeholders, not only new formal ones but also many nontraditional ones, including AI creators. As a result, boundaries in education and training will continue to blur or may even disappear completely.

AI will also start to significantly power guidance and counselling services, bringing more support and functions and empowering guidance and counselling professionals. AI tools will be used in basic guidance and counselling support and possibly also in advanced support, but still under the supervision of the guidance and counselling professionals.

3.1.5. Skills policy

These developments bring new challenges for skills and learning policies. The importance of inclusiveness in education and training rises substantially, as technology-driven job creation and the shrinking labour force make the previously untapped vulnerable and disadvantaged groups of workers increasingly important.

Most people and organisations embrace sustainability approaches, making these approaches increasingly important in curricula and skills development.

AI significantly disrupts the delivery of learning and career counselling, calling for substantial changes in the management, organisation and skills development of learning and career professionals.

Skills shortages continue to grow, calling for increased cooperation between employers, learning providers and policymakers to enhance skills utilisation.

3.2. Testing the assumptions: semi-Delphi results analysis

3.2.1. By survey question

The semi-Delphi survey included seven questions related to this scenario's assumptions. Their analysis yields the following results.

3.2.1.1. *Impact of skills shortages on inclusiveness and diversity in hiring (A1)*

One of the important assumptions in this scenario is generally supported by survey respondents, with 82% either 'strongly' or 'somewhat' agreeing that there is a positive link between skills shortages and growing inclusiveness and diversity in hiring. Despite the overall support for the statement, most respondents (58%) also point out that employers are always likely to prioritise alternative solutions, such as automation or outsourcing, to address skills shortages. 47% of respondents share a similar opinion: while they acknowledge that diversity and inclusiveness will rise, they think that there will still be space for the business sector 'to do more'.

Additionally, 31% of respondents argue that, although skills shortages are already severe now, there is no substantial link between inclusiveness and skills shortages. A roughly equal share of respondents acknowledge that diversity and inclusiveness are on the rise, but they attribute it to different factors, such as the overall growing sense of corporate responsibility.

Based on the survey results, we can conclude that the linkage between skills shortages and inclusiveness and diversity exists, but it should not be considered very strong.

3.2.1.2. *Ability of workers to design their career trajectories independently (A2)*

In the narrative of the scenario, the ability of workers to design their career trajectories independently is also linked to a general skills shortage situation, which is hypothesised to give workers the upper hand and a greater freedom of choice. While a majority of survey respondents (71%) support this logic, only 15% strongly agree with the assumption, while 56% 'somewhat agree', indicating that the majority of respondents think that other factors could also contribute to the development of career trajectories. Further, most respondents (82%) think that workers' capacity to autonomously manage their careers and skills development largely depends on their qualifications and skills and that personal attributes are

more important for the active shaping of one's career than the availability of jobs (47% of respondents expressed that opinion). Only 30% of respondents think that skills shortages and talent scarcity will empower most workers to put a greater emphasis on their happiness, personal growth and the meaningfulness of their jobs. The same share of respondents reason that this will also be supported by technological developments in skills development and recognition and by the progressive integration of different learning systems.

Overall, we can conclude that some degree of a positive shift in workers' capacity to autonomously manage their careers could happen, but some concerns remain on the scale of this development.

3.2.1.3. *Distinctions between formal education, non-formal learning and different educational levels (A3)*

This question is about whether respondents believe that, by 2040, the distinctions between formal education, non-formal learning and different educational levels will have significantly diminished or disappeared, leading to a more integrated and flexible approach to lifelong learning under this scenario. 68% say that they either 'strongly' (27%) or 'somewhat' (41%) agree that such development is plausible. The higher share of respondents opting to answer 'somewhat agree' indicates that there are some reservations regarding the scale of the possible future integration of different parts of the education and training sector.

While smaller shares of respondents (30-40%) express the view that the future will see a growing merger of formal and non-formal education systems, driven both by the increasing demand for upskilling and by technological advancements and the use of digital learning platforms, the majority of responses reflect more moderate views.

In support of more moderate integration, 65% of the respondents believe that 'formal education systems adapt to incorporate more non-formal elements rather than disappearing entirely'. 47% of the respondents also suggest that 'core distinctions between formal and non-formal learning [will] remain, [but] with increased recognition and integration of diverse learning experiences'. Some respondents (17%) also point out that established educational institutions and accreditation systems resist significant changes, maintaining clear distinctions between formal and non-formal education, thus slowing down the integration processes.

We can conclude that the distinctions between formal education, non-formal learning and different educational levels will likely further erode, but it is highly unlikely that we will see a fully integrated and flexible system by 2040.

3.2.1.4. *Integration of environmentally and socially responsible practices into government policies and business operations (A4)*

There is a higher degree of optimism regarding this question among survey respondents, as nearly 79% agree that such a development is plausible. However, only a minority of respondents (25%) strongly agree with the assumption, while 54% somewhat agree.

Almost half of the respondents (46%) point to 'growing consumer awareness and preference for sustainable products' as a key driver for businesses to adopt more responsible practices. A similar proportion (44%) note that they agree with the statement 'Environmental challenges become more severe. Governments implement stricter regulations, which both businesses and the public embrace.' Finally, 35% of the respondents acknowledge that new technologies are making it easier and more cost-effective for businesses to implement sustainable practices.

However, the scale of such development remains a question, as a significant share of respondents (42%) think that businesses and governments will still prioritise short-term economic gains over long-term environmental and social sustainability, despite the environmental challenges ahead. In this regard, many respondents point to recent developments highlighting another challenge, arguing that political and security challenges seem to push back the green agenda in Europe.

In between optimism and pessimism, over one third of participants raise the issue of regional and company-size disparities in the adoption of environmentally and socially responsible practices.

Despite these challenges, the conclusion remains cautiously optimistic. The drivers of change, including growing consumer awareness, stricter regulations and technological advancements, are robust and unlikely to dissipate. The necessity for sustainable practices, driven by increasingly severe environmental challenges, will continue to push governments and businesses to adapt. While short-term economic interests and political challenges may slow progress, the long-term benefits of sustainability are becoming increasingly evident.

3.2.1.5. *Importance of human-centric skills (A5)*

There is an overwhelming consensus that human-centric skills will remain indispensable in future labour markets. 88% of respondents support this statement, with almost half of them (43%) 'strongly agreeing' ([2]).

45% of respondents suggest that 'the uptake of AI leads to new job creation in general and demand for all types of skills increases', and a similarly significant

([2]) This is the highest share of 'strongly agree' responses in the whole survey, across the four scenarios.

proportion (44%) suggest that further development of human-centric skills will be necessary to stay relevant in the market, amid the replacement of routine skills by AI. A smaller share of respondents (19%) think that the demand for human-centric skills is and will remain independent of any AI developments.

The question, however, remains a bit polarising, as a still relatively high share of respondents (28%) believe that AI capabilities will develop so quickly that they will increasingly be able to replace human-centric skills as well.

Despite that, we can conclude with a high level of confidence that the demand for human-centric skills will not erode and will possibly grow even further.

3.2.1.6. *Prioritisation of employee retention strategies by employers (A6)*

This question asks respondents whether they believe that, as a result of persistent skills gaps and talent scarcity in this scenario, employers in 2040 will increasingly prioritise employee retention strategies and implement more robust measures to maintain and develop their existing workforce.

84% of respondents support this statement, although the share of those who 'somewhat agree' (56%) is twice as high as those who 'strongly agree' (28%).

In support of more rapid growth in employee retention strategies, 37% of respondents think that skills shortages will affect most sectors/jobs, forcing a majority of employers to care more for their workforce. However, the majority opinion (57%) is that 'talent and workforce retention strategies depend mainly on the company culture and the extent of job turnover in a specific workplace'. Over two fifths of respondents point out sectoral differences, stating that companies in sectors with a lower value added and/or the prevalence of routine types of jobs may not feel the pressure and that this development will largely concern only 'jobs where specialised or unique skills are required'.

Overall, it seems that employee retention strategies may expand moderately. They will become more important in sectors with higher value added, where specialised skills matter more, and are more difficult to replace. Such sectors and businesses will become more exposed to skills shortages, and therefore invest more in their workforce.

3.2.1.7. *Further tightening of EU labour markets (A7)*

Finally, the last question under this scenario asks respondents whether they believe that, as the EU labour force continues to decline, labour markets in 2040 will be even tighter (there will not be enough workers to fill all the available jobs). 85% of respondents agree with this assumption, with 36% 'strongly' and 47% 'somewhat' agreeing.

Those who do not fully agree with the suggestion of increased labour market tightness give compelling arguments. 50% of respondents believe that 'technological advancements and automation [will further] reduce the need for human workers, offsetting the impact of a declining labour force'. Many respondents (44%) also have faith in policies promoting longer working lives, which, coupled with advances in healthcare, could help maintain a stable workforce despite demographic changes. Finally, one third of respondents note that the EU can still effectively address its declining native workforce through immigration.

Therefore, despite the expected tightening of labour markets, the survey results suggest that the EU's labour market challenges can be addressed through a dynamic and adaptive approach, based on the potential of technological advancements, policies promoting longer working lives, immigration and other solutions.

3.2.1.8. *Confidence patterns*

Aside from stating their agreement or disagreement with some key scenario assumptions, the respondents also indicate how confident they are in their answers. For the most part, the respondents display high levels of confidence, with the share of those either 'very' or 'somewhat' confident exceeding 90%. Only questions on the importance of human-centric skills (A5) and the further tightening of EU labour markets (A7) seem to be a bit less clear-cut, but even in these two cases the share of 'confident' answers is over 80%.

Respondents who tend to disagree with the scenario statements are, on average, less confident than those who agree.

3.2.2. Cross-cutting themes and tensions – key messages

The most positive scenario was initially built around some ambitious expectations. Its backbone was evolution path 1 (Annex 3), which anticipated major advances in various policy areas, such as sustainability, inclusiveness, education and training landscape integration or freedom for individuals to pursue purpose-driven careers.

While the survey respondents do not object to the general positive heading of these trends within the scenario, in some cases, they are cautious regarding the magnitude of the likely change.

3.2.2.1. *Inclusiveness and diversity in hiring will gain ground, but perhaps less quickly than hoped*

While respondents recognise an improvement in conditions for greater inclusiveness and diversity in workplaces, they also note that employers often prioritise other strategies to address labour shortages, rather than fully leveraging

the potential of minority or disadvantaged groups. As a result, the scenario suggests a more moderate expansion of inclusiveness and diversity in the workplace.

3.2.2.2. *More workers will be able to shape their career trajectories independently*

The scenario builds on the premise of workers' gains, but it is more moderate in some of its implications. While workers will be better off generally, benefiting from persistent skills shortages, only some will take advantage of this and use the opportunity to shape their careers independently, seeking higher satisfaction and more meaningful work. As survey respondents emphasise, a worker's ability to self-direct their career and skills development hinges on their individual qualifications, skills and mindset, regardless of favourable labour market conditions.

3.2.2.3. *Distinctions between formal education, non-formal learning and different educational levels will further diminish*

Although some progress is anticipated in breaking down traditional barriers between formal and non-formal learning pathways, the full integration of skills development systems will remain an aspirational goal. Nonetheless, the system is expected to become more flexible, accessible and responsive to the diverse needs of the workforce, enabling smoother transitions and progress in individuals' learning journeys.

3.2.2.4. *Environmentally and socially responsible practices will be increasingly integrated into government policies and business operations*

On the sustainability front, the consensus leans towards a more ambitious trajectory. Although valid concerns about prioritising short-term economic gains and emerging issues like European security may temporarily overshadow the green agenda, the escalating reality of climate change will ultimately compel decisive actions by both governments and businesses.

3.2.2.5. *Importance of human-centric skills may rise significantly*

Respondents overwhelmingly agree that human-centric skills will remain essential in future labour markets, validating a key assumption of the scenario. Although a minority of respondents express concern that AI could potentially replace these skills, the majority remain confident that human-centric skills will remain unaffected by AI advancements or even benefit from them, as technology creates new opportunities that accentuate the value of uniquely human abilities.

3.2.2.6. *Employee retention strategies will gain ground – somewhat*

Most respondents expect more employers to prioritise workforce retention and care, but they also note that effective talent management strategies depend on a company's unique culture and turnover rates in different industries, which shape human resources strategies. As a result, this trend is unlikely to be universally applied across all companies and sectors. The consolidated scenario reflects this nuanced view, adopting a moderate stance on the issue.

3.2.2.7. *Further tightening of EU labour markets may not happen*

Respondents express optimism that various solutions, including job automation, increased longevity and productivity and targeted migration, will effectively mitigate labour market and skills shortages. As a result, the consolidated scenario suggests a future that is not drastically different from the current landscape, with these solutions helping to maintain a relatively stable status quo.

CHAPTER 4.

Scenario B assumptions: left alone to ride the tide – navigating the AI shock waves on jobs

4.1. Assumptions

4.1.1. Setting the scene

In this scenario, existing jobs undergo profound and rapid transformation by 2040, driven by AI. As AI technology advances, traditional roles evolve, requiring individuals to enhance their skills and knowledge to adapt to the changing landscape and stay in employment. While some jobs may be replaced by AI and other novel jobs may be created, most of the existing jobs are transformed by AI through either augmentation or redefinition. In the former case, AI tools and systems enhance human capabilities, enabling individuals to perform tasks more efficiently or effectively. In the latter case, jobs evolve to accommodate new technologies and tasks, leading to changes in job responsibilities and skills requirements. The nature of people's jobs changes, with implications for job quality, sense of meaning at work, autonomy, competence, relatedness and overall well-being at work. Although certain segments of the population are equipped to mitigate the impact of AI on job prospects and reap its benefits, excelling in their careers, there are other, albeit smaller, groups who face challenges in adapting. These individuals experience adverse effects, struggling to maintain employment, which takes a toll on their mental, physical and socioeconomic well-being.

Socioeconomic disparities are poised to intensify across the EU workforce, and the polarisation of the workforce deepens.

Fast-moving AI technological advancements disconnect from sustainable economic growth and competitiveness, with most businesses prioritising technology-driven growth over sustainability values and environmental concerns. This shift diminishes the significance of sustainability policies. However, a clash emerges as eco-conscious consumer values gain prominence among the majority of the population, driven by the emergence of new generations and a shift in societal norms.

Individuals bear responsibility for acquiring new technical skills related to AI technology and, more importantly, human-centric skills such as problem-solving, creativity and adaptability. The value of non-routine and cognitive tasks increases. Additionally, AI creates demand for roles that involve managing and interpreting AI systems and overseeing ethical and regulatory considerations related to AI

deployment. This scenario underscores the importance of reskilling and upskilling initiatives to ensure workforce resilience and sustained, high-quality employment opportunities amid technological disruption.

This evolution occurs against a background where the EU labour force experiences a decline or stagnates at best.

4.1.2. Employers' behaviour

AI brings about disruption quickly and across many industries and business models, making it hard to manage, in particular for the companies that fail to adapt and keep pace with emerging domestic and global competition.

Companies do not apply responsible sustainability practices across the entire life cycle of AI technology, from design and development to deployment and disposal. The increasing and extensive development and use of AI technology implies an increase in the levels of energy and resource consumption, and policies fail to address these developments for fear of undermining competitiveness. Only a minority of businesses and industries are driven by sustainability values and practices.

Businesses in the EU compete for talent and skills both within the EU and globally. With remote work, the EU workforce can work for international companies outside the EU without the need to relocate, which deepens the international competition for skills and talent.

Businesses also increasingly need a workforce to carry out micro-tasks that are better suited to humans than computers e.g. to improve upon and test the accuracy of machine learning algorithms.

The employment landscape is dynamic and competitive. Micro-tasking and micro-jobs being delivered online are on the rise. The forms of employee-employer relationships are diverse, traditional models of employment become less prevalent and loyalty erodes; more employers promote new/nontraditional forms of employer-employee relationships and more people choose to follow those.

Many companies neglect to prioritise employee skills development and utilisation, leaving such initiatives largely in the hands of the employees. Fostering inclusiveness is not a priority for employers.

4.1.3. Individuals' behaviour

Individuals are increasingly adopting a 'freewheeling' approach to work, whether by choice or out of necessity. They frequently change their jobs, careers and employers over time both voluntarily and involuntarily (through micro-tasking, micro-jobs, short-term or precarious contracts, frequent lay-offs, etc.). As more and more people choose to enter new/nontraditional forms of employer-employee

relationships, traditional models of employment become less prevalent and the loyalty between employer and employee increasingly erodes.

Eco-conscious consumer values gain prominence among the majority of the population, driven by the emergence of new generations and a shift in societal norms, despite or because of the dominance of the AI race in policy cycles at the expense of sustainability concerns. This clashes with the economic development model fuelled by extensive development and use of AI technologies.

Various segments of the workforce are able to manage their careers independently and embrace self-directed professional paths and aim for purpose-driven careers. Other segments of the workforce struggle to manage these transitions, facing challenges in adapting to the evolving labour market and finding stability in their careers.

With online and remote work, individuals compete with the workforce globally. Individuals bear full responsibility for ensuring the relevance of their skills, navigating the ever-evolving landscape of the labour market and swiftly adapting to the transformation waves driven by AI advancements. While various segments of the workforce possess the necessary qualifications, skills and autonomy to meet these demands, other cohorts are inevitably left behind. This may stem from their inability to acclimate to the dynamic job market, failing to keep pace with skills demands, or their falling victim to the adverse effects of technological alienation, profoundly affecting mental health, social connections and overall well-being. Consequently, socioeconomic disparities are poised to intensify across the EU workforce, and the polarisation of the workforce deepens.

4.1.4. Continuing skills development and guidance delivery

The adult skills development landscape is complex and fluid. Alongside traditional stakeholders in the formal and non-formal segments of the education and training system, a multitude of new, nontraditional stakeholders (including peers, users and also tech companies offering AI-powered training platforms) offer upskilling and reskilling initiatives. To different extents, all use AI technology in data analysis and the generation of content. New formal stakeholders, such as tech companies, are leading content generation efforts in or outside partnerships with traditional stakeholders and industry. The boundaries between different segments of education and training are dissolving, with full integration between formal and non-formal education across levels and strands. Individuals face the challenge of navigating this landscape and understanding the diverse array of learning opportunities available to them. There are concerns over quality, privacy, ethics, inclusiveness and access in this evolving environment. Still, regulations fail to address these concerns.

In this evolving landscape, the roles of teachers and trainers are being significantly transformed by AI. They will be part of multidisciplinary teams (with tech experts and industry professionals) that train AI models and develop content.

AI plays a pivotal role in empowering guidance and counselling tools and services, facilitating in-depth analysis, pattern identification and personalised suggestions for individuals and practitioners alike. As the availability and capability of AI-driven tools and services for career guidance continue to expand, individuals may gain enhanced support in navigating their professional trajectories effectively, which particularly benefits specific segments of the workforce. This evolution leads to a significant transformation in the role of professional counsellors.

4.1.5. Skills policy

While various segments of the workforce possess the autonomy to navigate and effectively adapt to changes, there are other, albeit smaller, groups who lack this capacity. However, neither the state nor employers prioritise inclusiveness and equal access to opportunities, including through education, training and continuing skills development. Instead, diversity and equality initiatives are left to civil society, while trade unions are too weak to make substantial contributions.

4.2. Testing the assumptions: semi-Delphi results analysis

4.2.1. By survey question

Analysis by survey question yields the following results.

4.2.1.1. *Workforce ability to cope with the rapid changes in the labour market (B1)*

Experts show moderate agreement on the workforce's ability to adapt to rapid changes, with a clear majority (70%) expecting moderate adaptation levels (expecting 50-79% of the workforce to be able to cope with the rapid changes in the labour market). While this represents the strongest single-response percentage among all topics, it falls short of traditional consensus thresholds. The confidence levels are moderate (3.06 out of 4.0), with most experts (68%) being only 'somewhat confident' in their predictions. This measured optimism is tempered by the recognition of significant challenges, particularly regarding mental health impacts and socioeconomic disparities that could create uneven adaptation patterns, as evidenced by the 18% expecting lower adaptation levels (< 50%) and only 12% anticipating high adaptation levels (≥ 80%).

4.2.1.2. *Workers (having to) take personal responsibility for skills development and career progression (B2) and workers' readiness for autonomous learning (B3)*

A striking tension emerges regarding skills development responsibility. While there is strong agreement (92%) that workers will (have to) take more personal responsibility for their development, experts express significant doubts about workforce readiness for this shift. Only 53% believe that a majority will be ready for autonomous learning, with 41% expecting less than half of the workforce to be prepared. This disconnection between expected responsibility and predicted capability represents one of the most significant tensions in the findings, despite relatively high confidence in these predictions (3.13 out of 4.0 for the responsibility shift; 3.05 out of 4.0 for learning readiness). This creates a problematic scenario where people will be given responsibility for something many are not capable of managing effectively.

4.2.1.3. *Nontraditional stakeholders and forms of delivery dominating continuing skills development (B4)*

The learning landscape appears set for significant change, with 76% of experts expecting nontraditional stakeholders to dominate skills development. However, this comes with notable concerns about quality assurance and equity. The transformation of learning through AI receives the lowest confidence levels among all topics (2.97 out of 4.0), suggesting uncertainty regarding how this technological integration will unfold.

4.2.1.4. *Nontraditional employment outpacing traditional full-time, long-term employment (B5)*

Experts anticipate moderate changes in employment patterns, with 51% expecting traditional employment to decline below 40%. This prediction comes with relatively high confidence (3.08 out of 4.0), but reveals important tensions between innovation and stability. The responses suggest a future where traditional and new forms of employment coexist, with significant variations across sectors and regions.

4.2.1.5. *AI augmenting rather than replacing human capabilities (B6)*

When considering AI's role in transforming work organisation, experts' responses suggest significant uncertainty regarding whether augmentation will prevail over replacement. While 54% expect moderate adoption of AI as an augmentation tool (in 50-79% of businesses), a substantial 27% expect less than half of businesses to prioritise augmentation, potentially indicating significant replacement in other cases. Only 19% are highly optimistic about widespread augmentation. The

arguments reveal concerns about cost-effectiveness potentially driving replacement rather than augmentation, despite regulatory frameworks and ethical considerations favouring augmentation. This suggests a future where the balance between AI augmentation and replacement may depend heavily on economic factors, regulatory frameworks and sector-specific conditions.

4.2.1.6. *AI-transformed learning (B7)*

While a majority of experts (71%) believe that AI-transformed work organisations will support learning and development, there are significant concerns about implementation challenges and potential negative impacts. The moderate agreement (54% somewhat agree) suggests cautious optimism rather than strong conviction, and the substantial minority expressing disagreement (29%) highlights significant risks to learning-conduciveness. The arguments reveal a crucial distinction between AI's potential to enhance learning and the organisational challenges of implementing it in a way that genuinely supports human development. Low confidence levels (2.97 out of 4.0) suggest significant uncertainty about the ability of organisations to create truly learning-conducive environments in AI-transformed workplaces.

This interpretation emphasises that learning-conduciveness in AI-transformed workplaces is not automatic but depends on conscious organisational choices regarding how AI is implemented and managed.

4.2.1.7. *Emergence of new forms of worker representation and weakening of traditional unionisation (B8)*

The future of worker representation receives one of the stronger consensuses (80% combined agreement on transformation), with experts expecting evolution rather than dissolution of collective representation. This comes with moderate confidence (3.01 out of 4.0) and reveals interesting tensions between traditional and emerging forms of worker organisation.

4.2.1.8. *Confidence patterns*

Confidence levels reveal interesting patterns. Experts show higher confidence in predictions about human-centred changes (e.g. personal responsibility and traditional employment evolution) and lower confidence in technology-dependent transformations (e.g. AI integration and learning environment changes). This suggests greater certainty about human behavioural patterns than technological integration outcomes.

4.2.2. Cross-cutting themes and tensions – key messages

From the findings summarised above, several persistent tensions emerge.

4.2.2.1. *Gap between increased responsibility for skills development and workforce readiness for autonomous learning*

This gap emerges as perhaps the most significant tension. While experts strongly believe that individuals will (have to) take greater responsibility for their skills development, they express serious doubts about people's readiness for this shift.

This tension highlights the critical importance of building capability alongside increasing responsibility, rather than simply shifting responsibility without ensuring capability. It suggests the need for a more nuanced approach to workforce development that recognises and addresses this fundamental disconnect.

4.2.2.2. *Tension concerning the ability of the workforce to adapt to labour market changes, the increase/magnitude of disparities and people's capability for autonomous learning*

The data suggests two distinct patterns of adaptation. The first represents basic functional adaptation – maintaining employment and operating within changed environments – which experts believe most workers can achieve with appropriate support. The second represents higher-order adaptive capacity, marked by autonomous learning and proactive skills development, which experts view as more challenging to achieve.

This two-tier adaptation pattern helps explain the apparent contradiction between overall adaptation optimism and concerns about workforce disparities. The challenge is not whether workers will adapt at all but rather how they will adapt and how sustainable their adaptation will be.

While catastrophic failure to adapt may be limited, the quality and sustainability of adaptation is expected to vary significantly based on people's capacity for autonomous learning and the availability and effectiveness of support structures for those requiring guided adaptation.

4.2.2.3. *Speed–adaptation tension*

This tension that emerges from the findings reflects the fundamental challenge of human adaptation to accelerating change. The rapid pace of technological advancement creates continuous pressure for learning and adaptation, often exceeding comfortable human capacity. This manifests in increasing cognitive load, stress and potential burnout, raising questions about sustainable paths forward that respect human limitations while maintaining necessary progress.

4.2.2.4. *Human–AI integration challenges*

The tension regarding human–AI integration emerges as a defining concern for the coming decades. While AI promises significant benefits in augmenting human capabilities, maintaining meaningful human agency and judgement becomes increasingly complex. This tension manifests in practical questions about role definition, skills development focus and the ability to maintain human purpose in increasingly automated environments.

4.2.2.5. *Critical tensions in AI integration in organisations*

While AI might have the potential to enhance learning and development, realising this potential depends heavily on organisational choices about how AI is deployed and managed. The same AI capabilities could either empower workers or constrain them, depending on implementation decisions.

The question of agency appears repeatedly in expert concerns. While AI might provide powerful tools for learning and development, there is significant uncertainty about whether organisations will implement these tools in ways that enhance human agency rather than diminish it. The spectre of algorithmic management and its potential to dehumanise workplace relationships looms large in expert concerns.

The economic dimension adds another layer of complexity. Experts recognise that, while augmentation might be the stated goal, economic pressures could push organisations towards replacement in practice. This creates a potential tension between organisational learning needs and short-term economic imperatives.

Perhaps most significantly, the analysis suggests that AI integration is not simply a technical challenge but a complex socio-technical transformation. Success appears to depend not just on the technology itself but on a delicate balance of organisational choices, management approaches and support systems.

CHAPTER 5.

Scenario C assumptions: staying afloat – AI opportunities missed

5.1. Assumptions

5.1.1. Setting the scene

In 2040, the rise of AI is continuing but at a modest pace, leading to moderate transformations of tasks and jobs rather than extensive disruptions. AI-related regulation offers a framework that protects individuals (as citizens or consumers) and addresses legal and ethical considerations. Risks from AI systems are significantly mitigated.

Some sectors and workers manage to grasp the opportunities brought by AI to improve their efficiency, productivity and competitiveness, but AI advancements are not widely spread across the services of all sectors or for the greater public good.

In terms of challenges, AI puts pressure on some sectors or jobs, but, in general, there is no extensive replacement of the human workforce. Although it is without full integration, AI can support humans in certain jobs or tasks in a relatively smooth mode of coexistence. In some cases (but not all), employers look for staff with skills that complement AI.

As technology, including AI, changes tasks and jobs moderately, the pace of change is generally manageable for both employers and workers. Workers' technical skills often remain relevant, and, with limited fear of possible replacement, human-centric skills are essential in some jobs, but not all and not with the same urgency or intensity of other scenarios. There is no widespread need for heavy investment in skills development in the workplace.

As most companies, individuals and societies feel they are able to cope with technological change, there is no further push for a major paradigm shift for European economies and societies. In this context, sustainability gains no further traction in the policy agenda or individual preferences and behaviours. Sustainability policies influence only a limited number of sectors and policy areas. The importance of eco-conscious values has increased, but in essence they drive the preferences and behaviours of only some parts of the population. Only specific sectors or parts of the population understand and value highly the benefits of greener economies and societies. On the other hand, sustainability puts pressure

only on some sectors or individuals, especially those in regions and sectors that still undergo significant transitions to new forms of energy.

The European labour force has stopped shrinking (e.g. as a result of activation or migration policies), not putting additional pressure on European economies. Able to manage transformations in the nature of work, Europe keeps attracting non-EU nationals, including through moderately increased irregular migration flows (e.g. under the pressure of geopolitical and environmental turbulences or for the prospect of a better life).

5.1.2. Employers' behaviour

In this context of moderate transformations brought on by AI, greening and workforce size, the pressure on industries to adapt is rather modest and their business models are not drastically disrupted. Disruption is prominent for only some, especially those most exposed to rapid technological changes.

Likewise, sustainability practices are implemented in some businesses and industries: those most affected by relevant policies or consumer preferences. In these sectors, technology (including AI) may present a significant opportunity that underpins sustainability objectives. However, for many other companies and sectors, greening stands low in their considerations and priorities.

As jobs and tasks do not undergo extreme transformations, skills needs are not extremely acute apart from in specific sectors that are more exposed. In general, employers have good prospects for finding a qualified workforce and their upskilling and reskilling needs are rather moderate.

Therefore, skills development and utilisation in the workplace is an important factor only for certain sectors: those that are most exposed to changes driven by the twin transitions, which cannot find staff for jobs that are at the heart of these changes.

Sectors that face particularly acute skills shortages can also turn to hiring qualified staff from abroad, but, beyond those sectors, the international competition for talent is not significant for most parts of the economy.

As workers' skills do not rapidly become obsolete and AI does not significantly replace workers, organisations are generally able to adapt to changes with their current staff. Therefore, there is less pressure for major organisational overhauls resulting in, for example, outplacements and lay-offs to cope with change, and the loyalty of employers to their workers is not further challenged.

5.1.3. Individuals' behaviour

The modest levels of transformation and disruption put less pressure not only on organisations but also on individuals. Apart from those in jobs and tasks extremely affected, most workers are generally able to manage changes. Many segments of

the workforce possess the necessary qualifications, skills and autonomy to meet the demands of modest transformations, so further development and utilisation of their skills in the workplace is not a leading concern in most sectors and organisations.

In this context, employees are not frequently faced with the need for involuntary career/employer changes. Such changes may be an option, a matter of their own decision, but in most cases they are not a necessity driven by technological disruptions and transformations. Although given some options to change jobs on their own initiative, many workers may prefer to remain loyal to their current employers, especially since many of these employers are in a position to meet the 'manageable' skills development needs and cope with changes without putting additional pressure on their staff and undermining their working conditions.

On a similar note, some segments of the population may be inclined to follow their own, self-directed professional trajectories, often pursuing purpose-driven careers, but these are neither a need nor a choice due to preference for the general population.

5.1.4. Continuing skills development and guidance delivery

The pressure for skills development is moderate. The need to upskill or reskill individuals is usually addressed relatively easily by the 'traditional' stakeholders, without the need for different stakeholders to assume roles in the skills development landscape. Likewise, there is less pressure on new stakeholders to generate training content, as traditional stakeholders may sufficiently meet the needs of the modest overall transformations. Therefore, the scenario does not require greater integration of education and training provision, and the boundaries between education and training strands remain similar to where they stand today.

AI and digital technologies support education and training, but with no major impact. AI use has increased modestly and slowly in all types of learning environments and may be used more extensively and significantly only in some segments. AI is also used to support guidance and counselling services but only moderately, as the frequency of career changes and individual career trajectories affect only some parts of the workforce and human coaches are sufficient to support these needs.

In this context, the roles of teachers and trainers or guidance and counsellor practitioners are not significantly transformed by AI. Teachers and trainers are using AI to a limited extend, for example for content creation (e.g. animation, videos, spoken narrative) or somewhat more often but still in selected tasks. There is no pressing need for a more widespread use of AI in teaching/training. The core roles of teachers and trainers remain unchanged. Likewise, AI does not interact

directly with guidance and counselling beneficiaries at all or it is used to provide basic services while still under the supervision of human counsellors.

5.1.5. Skills policy

In a context of modest transformation, organisations are mostly in a position to cover their skills needs, with limited additional investments in recruitment or training. Likewise, most individuals can cope with changes and find themselves active in the labour market, perhaps with moderate investment from their side in personal growth (transversal skills) to remain relevant in AI-enhanced work environments.

Therefore, the inclusiveness of education and training and skills development is a lower priority. Most sectors and companies do not need to invest and engage in training people outside or at the brinks of the labour market and focus their training investment exclusively on their own staff. It is typically the state and trade unions that push for greater inclusiveness, usually with a view to helping under-represented/vulnerable groups. With there being relatively lower AI replacement rates, fewer overall technological changes and less urge to change careers, the state does not need to step up its involvement in upskilling and reskilling.

5.2. Testing the assumptions: semi-Delphi results analysis

5.2.1. By survey question

Analysis by survey question yields the following results.

5.2.1.1. *Impact of geopolitical developments and political choices on the uptake of AI (C1)*

Participant views are split regarding whether geopolitical developments and the political decisions of EU countries by 2040 could limit the adoption of AI: 48% agree or somewhat agree with that possible evolution, while 52% disagree or somewhat disagree.

When indicating arguments that justify their overall assessment, half of the respondents (50%) believe that the EU countries will regulate the expansion of AI in more fields to address security-related concerns (on top of others, such as ethical ones), which will keep the AI uptake at modest levels. On the other hand, 30% of respondents think that geopolitical considerations will lead to intensified AI investments, as they view AI as a critical area for Europe's geopolitical security and competitiveness.

In terms of political priorities, only one third of respondents agree with the argument that governments will be willing to finance start-ups for new AI-related technologies to emerge and mature, regardless of the level of uptake by companies and citizens. On the contrary, 25% believe that the EU countries lack a strong motivation to incentivise AI advances, as they have so far been driven by investments in specific industries and sectors with the most financial benefits. One out of four respondents believe that social dialogue and policy attention to securing jobs may slow down investment in AI through regulations aiming to protect employees from AI-driven job displacement.

The contrasting views on the future evolution of AI uptake on the basis of (geo)politics signal that this factor alone might not offer a definitive assessment of this key scenario (modest AI uptake). While the responses do not make it clear whether political decisions and geopolitical choices alone will limit AI adoption at a modest level, which is a key scenario assumption, or whether these factors will support a more rapid expansion, they do reveal that the political decisions around AI promotion or control may influence its possible uptake. Only 9% agree with the argument that AI adoption will become unstoppable, driven by economic factors alone, unaffected by regulations or geopolitical dynamics.

5.2.1.2. *Importance of technical/vocational skills in relation to human-centric skills in a context of modest AI uptake (C2)*

Participants strongly agree with the statement that, in this scenario, a modest uptake of AI will mean that technical and vocational skills have the same level of importance as human-centric skills in 2040: 32% strongly agree and 50% somewhat agree, with high levels of confidence in their views (80% are somewhat or very confident).

This is supported by strong agreement for arguments such as that, as AI will not replace human labour across all sectors, many jobs will continue to rely on the technical skills possessed by the workforce (63%). Technical skills will remain relevant and evolve to facilitate the use of and coexistence with AI-related solutions. Similarly, 44% of respondents believe that advanced technical skills, such as programming and data processing, will become increasingly important to create AI-supported solutions and make them widely applicable and accessible.

On the other hand, about a third of respondents agree with the argument that, regardless of AI advancement and fear of replacement, human-centric skills will be more important because they allow for innovation and agile adaptation to production changes and because they are among the most difficult to replace with AI, especially in the short term, across all jobs and sectors.

As the majority of respondents consider technical skills either equally or more important than human-centric skills, it is clear that in this scenario these skills matter significantly for the workforce and employers.

5.2.1.3. *Ability and relevance of social protection to address AI-related challenges (replacement, access to training and jobs) (C3)*

About 60% of respondents agree or somewhat agree with the statement that, by 2040, social protection of workers will have become less effective and will not have managed to keep up with the challenges brought by AI, such as AI expansion (even if modest in this scenario), workforce displacement and access to training and jobs.

When presented with arguments to support their assessment, slightly more than half of all respondents agree that nontraditional forms of employment will become more common, leading to a decline in workers' participation in trade unions, and 31% state that social dialogue will fail to create an updated protection network suited to an AI-driven economy. Moreover, a smaller but significant group (18%) argue that employers might exploit fears surrounding AI replacement to lower wages and working conditions, even if the actual level of replacement remains minimal.

On the other hand, 30% argue that social partners and governments, already addressing ongoing trends such as labour shortages, the rise of nontraditional forms of employment and Gen Z's reluctance to find regular employment, will develop new social protection frameworks. Similarly, 25% believe that the modest pace of AI transformation will ease pressures for major organisational overhauls, allowing social dialogue to deliver adequately protective agreements.

There are also respondents with the opinion that the social protection of workers will vary based on the social dialogue outcomes in different sectors. While the sectoral perspective is not the prevailing argument used to assess the main statement, it is a significant factor. One third of all respondents (34%) agree with the argument that sectors that face greater shortages will engage in social dialogue, which will result in satisfying working conditions and worker protection, whereas sectors more exposed to AI replacement or facing fewer hiring challenges may not see similar outcomes.

Although this scenario still leaves room for modern, sufficient frameworks to be put in place as a result of current debates linked to shortages and workforce transformations, there are significant concerns that social protection is likely to lose ground.

5.2.1.4. *Future of jobs based on repetitive tasks (C4)*

Most respondents agree or strongly agree (61% in total) with the suggestion that an overall modest AI uptake in industries will allow jobs based on repetitive tasks to maintain their relevance and still represent a 15-20% share of all jobs.

A striking observation is that nearly three quarters of respondents (73%) agree with the argument that the extent of job replacement in roles involving repetitive tasks depends on the economic benefits perceived by industries. While some industries may see significant advantages in replacing such jobs with AI, others may be less affected. In line with this reasoning, 33% of all respondents also argue that, in industries reliant on repetitive tasks, investing in and introducing AI solutions might not be the profitable option. Similarly, 18% think that employers may exploit fears of AI replacement to push employees to increase outputs, agree to lower wages and accept poorer working conditions, making it more cost-effective to retain human labour for these tasks.

Conversely, 34% of all respondents argue that AI will become increasingly efficient and profitable for employers in performing repetitive tasks, regardless of the impact on wages and working conditions. In the same direction, 20% of respondents agree with the argument that humans will likely be replaced in repetitive jobs because regulations aiming to improve working conditions in such jobs will make human work less profitable for employers.

In short, there seem to be several parameters that favour the existence of jobs based on repetitive tasks, although often for wrong reasons that lower the bar, for example through actions that make these jobs more precarious. For a striking three quarters of all respondents, it is thought that the decision to replace or keep a human workforce is likely to vary by sector, depending on the potential financial benefits each sector sees, based on factors such as the availability of cheap labour, in relation to the costs of introducing AI-based alternatives. Still, overall, more respondents agree that jobs based on repetitive tasks will maintain their relevance and still represent a 15-20% share of all jobs in this scenario.

5.2.1.5. *Level of investment of private sector in training adults, in the context of moderate transformation (C5)*

More than two thirds of respondents believe that this scenario of moderate transformation of tasks and jobs will lead to little investment in adult training from the private sector, especially for people who are not already employed by companies but could be potentially part of their future workforce (such as unemployed or low-skilled) (18% strongly agree; 50% somewhat agree).

When asked which arguments better support their overall assessments, most respondents (61%) acknowledge that the varying levels of private-sector

investment in training adults depend on the jobs and sectors in question: companies decide to train existing staff, hire new staff or train the general population based on the cost-effectiveness of each option in their own context.

Looking at other arguments pointing towards a limited private-sector investment in training, 28% of all respondents are of the opinion that, since companies will not face major difficulties in hiring, they will rely on training for adults that is led and/or financed by the state and will be able to focus their own training investments on existing staff. Moreover, 31% of all respondents declare that the training of specific segments of the adult population – namely, under-represented segments or segments on the brinks of the labour market – is a priority only for the state and the trade unions; conversely, only 14% declare that companies might instead be more prone to offer training to specific demographics.

Looking at arguments in the opposite direction – that is, that employers will invest more in training for adults beyond their existing staff – respondents offer different reasons. 23% of all respondents believe that employers will do so to contribute to training a future workforce for the whole sector beyond their own needs, while some respondents also think technological advancements (21%) or demographic changes (20%) will be a reason for increased investment.

Despite these arguments in favour of the heavier investment of employers in training the broader population, such an investment does not seem to represent the most likely evolution in this scenario. While sector-specific variations or overall technological and demographic pressures should be acknowledged, 68% of all respondents point towards the likelihood of the private sector's rather limited investment in training adults.

5.2.1.6. *Future of greening/sustainability as a major paradigm shift for European economies and societies (C6)*

Respondents offer a very mixed picture when asked if the modest technological transformation will not lead to any further push for a paradigm shift for European economies and societies towards greening and sustainability. About half (47%) agree or somewhat agree that there will be no further push, while the other half (53%) disagree or somewhat disagree with the proposed statement.

When asked to indicate arguments that support their assessment, there are no arguments strongly favouring the statement that the push towards greening will be reinforced or weakened. In the first direction (stronger push), respondents argue that sustainability will keep growing in importance among citizens (45% of all respondents), among policymakers and states (34% of all respondents) and among employers and companies (27% of all respondents). Moreover, 17%

suggest that even a modest uptake of AI will positively affect production efficiency and support sustainability.

At the same time, these figures are balanced by arguments that point away from a further sustainability push: about one third of all respondents believe that eco-conscious values will drive the behaviour of only parts of the population (30%), as general awareness does not always translate into specific consumer behaviour. Similarly, one third believe that sustainability policies will affect only a limited number of sectors and policy areas (27%).

There is a potential positive view of why sustainability will lose further traction (for those who claim it will do so in this scenario): 14% of all respondents argue that sustainability is not gaining greater prominence on policy agendas because the modest scale of technological transformation reduces the urgency for significant transitions, and 23% believe that in this scenario most companies and individuals feel adequately equipped to handle technological change without the need for a paradigm shift. In other words, for many respondents who argue that there will be no further push for a paradigm shift regarding sustainability, this might be because the scenario brings fewer shocks and threats and allows more room for gradual adaptation.

5.2.1.7. *Confidence patterns*

For most questions regarding this scenario, respondents show high levels of confidence in their responses: 80% or more are very or somewhat confident in their responses in relation to the importance of technical skills, the reduced relevance or effectiveness of social protection, the continuing existence of jobs based on repetitive tasks and the movement away from a greener paradigm.

Their confidence levels are relatively lower regarding the impact of geopolitical and political decisions on AI uptake (C1, 67% very or somewhat confident) and the investments of the private sector in training people beyond their staff (C5, 68% very or somewhat confident).

5.2.2. Cross-cutting themes and tensions – key messages

Scenario C reflects a moderate adoption of AI in Europe, highlighting that a modest transformation may not be excessively disruptive, allowing traditional systems to persist while incremental changes reshape the workforce and policy priorities. The following key messages and tensions emerge from the Delphi findings.

5.2.2.1. *The extent of AI adoption and the outreach of its benefits will depend on political decisions*

In this scenario, AI is not an unstoppable force. When examined in terms of politics or geopolitics, the overall scenario assumption about limited AI uptake is partly questioned; the magnitude of the uptake is dependent on related choices. Although respondents generally agree that geopolitical dynamics and European regulations will influence the uptake of AI, there is no clear conclusion on whether these factors will limit or increase this uptake. On the one hand, respondents recognise the importance of AI for Europe's geopolitical strategy, but, on the other hand, the intensity of state investment in and promotion of AI may depend on how national-level stakeholders assess its use in the geopolitical context: will it be mostly an opportunity for security and geopolitical strength or a threat to them? Similarly, in this scenario, the basis of (private sector) economic benefit alone does not guarantee investments in AI or AI's wide use across all sectors and populations. Therefore, the expansion of its potential benefits to more audiences will depend on the decision of governments to invest in and promote far-reaching applications for the general population and for smaller companies.

5.2.2.2. *Future of jobs based in repetitive tasks depends on perceived costs and benefits*

Although less drastic than in other scenarios, the expansion of AI in more sectors and occupations might appear to be a threat for people working in jobs that are based on repetitive tasks (which represent 15-20% of all jobs). However, in this scenario, most respondents feel that such jobs are likely to keep representing similar shares, and the actual evolution regarding the potential replacement of humans by AI and automation is perceived to be dependent on factors such as the cost of implementation and the availability of cheap labour in comparison with the costs of introducing AI-based alternatives. Sectors that might see a clear financial benefit from replacing their human workforce will turn to AI, but it is also possible that, in other sectors, the looming fear of AI will be used to lower the bar in terms of wages or working conditions, rendering human work even cheaper and therefore more profitable than AI options. Therefore, the question is not only about securing jobs based on repetitive tasks, but safeguarding certain levels of quality, reward and social protection in such jobs.

5.2.2.3. *Social protection frameworks may still exist, but not fully capable to address challenges related to AI expansion and access to jobs*

On the one hand, this scenario anticipates moderate transformations, does not represent a major overhaul in labour relations and still leaves time and room for modern, sufficient frameworks to be put in place to meet emerging work

organisation and labour market realities. On the other hand, even a modest further uptake of nontraditional forms of employment results in declining participation in trade unions and reduced effectiveness of social dialogue that can create an updated protection network suited to an AI-driven economy. This accentuates concerns about the future of low-skilled workers, including those employed in jobs with repetitive tasks. Social dialogue may result in more satisfactory protection frameworks in sectors undergoing shortages, which will need to create more appealing work conditions.

5.2.2.4. *Private investment in training will be only marginally extended beyond existing company staff*

Private-sector investment in training is perceived as sector-specific and cost-driven, reflecting limited incentives to train the broader adult workforce. Not faced with major shortages and overhauling technological changes, companies will generally be able to hire skilled workers without directly contributing to their training, focusing their resources on their existing staff. More respondents argue that the private-sector investment in skills development will be rather limited and fewer think it will increase. The state will bear the larger share of responsibility and costs for broader adult training, even more so for certain population groups that are less advantaged or participate less in training or employment. Only a small section of employers that face particular shortages, undergo drastic technological transformations or have relatively specific demographic pressures (e.g. ageing workforce) will be more inclined to assume additional costs and responsibilities to train individuals that are not part of their current staff.

CHAPTER 6.

Scenario D assumptions: AI unleashed – dominating the world of work and societies

6.1. Assumptions

6.1.1. Setting the scene

In this scenario, AI, technological advancements and automation increase in all areas of life and work in 2040, resulting in massive job losses across all sectors, industries and skills levels. A few individuals, companies or organisations own and control AI and AI-related technologies and use them individualistically to pursue growth, profit and wealth and to remain competitive.

AI increasingly inserts itself into all human activities, and policymakers are caught unprepared to address the legal and ethical impacts of the fast-moving developments in generative AI technologies. No regulation safeguarding citizens' rights in light of AI developments is implemented.

The individuals, organisations and companies owning and controlling AI and technologies progressively exert their influence over policymakers who are unable (or unwilling due to their dependence on AI and other technologies) to respond to disruptions. This results in the rise of authoritarian powers at the service of (or controlled by) the few owning and controlling AI and other technologies and at the expense of collective well-being, social cohesion and democratic processes.

Jobs and tasks change extremely quickly and across the board, and individuals struggle to adapt. Swift adaptation to the extremely fast-paced changes brought about by AI and technological advancements lead to a sharp increase in the importance of human-centric skills across almost all jobs, as these are the skills sets that are hardest for AI to replace in a short time span (15 years). Nonetheless, due to the ripple effects of AI/machines on jobs, skills development and skills utilisation in the workplace drop sharply. Individuals, in their struggle to remain employable, are left alone to bear responsibility for their own skills development, as companies have little incentive to offer retraining opportunities for tasks/jobs that can be taken over by machines. Without the support of those owning and controlling these technologies, policymakers are unable to offer retraining opportunities that keep up with the fast-changing developments in the labour market driven by AI and technological advancements. In turn, large segments of the population are completely pushed out of the labour market and increasingly

experience unemployment, poverty and social exclusion. Dissatisfaction among citizens grows.

In the context of a system controlled by the few, where AI and technological advancements fuel the race for economic growth and profit, environmental mitigation policies and sustainability practices lose ground. Policymakers have less leverage for (and interest in) promoting and implementing sustainability and greening policies, as these may hinder competitiveness and growth. In this hostile environment, individuals significantly lose their agency to hold eco-conscious consumer values and they prioritise their own survival over environmental concerns.

This scenario develops against the backdrop of increasing labour force decline due to population ageing and declining fertility rates. However, irregular migration flow into the EU increases as individuals are pushed to move towards places where they see the remaining limited opportunities are available for them. This in turn leads to social tensions and dissatisfaction in local populations.

6.1.2. Employers' behaviour

Industries and business models experience fast disruptions on a large scale, resulting in jobs and tasks in the workplace changing at a scale and speed that cannot be effectively addressed.

Companies focus on technology-driven growth at the expense of sustainable practices and social inclusion. To remain competitive and profitable, companies prioritise the adoption of swift AI/technological advancements and upgrades, despite high levels of energy consumption and waste generation.

International competition for talent loses ground, as demand for human jobs is reduced, and is limited to only those specific sectors where AI is not yet able to fully replace human jobs. Traditional models of employment, therefore, become less prevalent, and companies resort more and more to gig workers and other workers in non-standard forms of employment to perform their tasks. Consequently, workplace upskilling and reskilling is no longer considered a company responsibility, and the importance of skills development and utilisation in the workplace loses importance.

Employers' and workers' needs and values (quick adaptation to transformation geared towards growth and profits versus skills development opportunities, career progression and well-being) increasingly diverge, and loyalty between employers and employees erodes. Inclusiveness is not a priority for employers/organisations.

6.1.3. Individuals' behaviour

The entire workforce faces pressure from AI and technological developments. All jobs and occupations across all sectors and at all skills levels (low, medium, high) are affected. Most human jobs are destroyed and replaced by AI. In turn, human job demand shrinks, and the position of workers in the labour market weakens, leaving large segments of the population behind and vulnerable.

Jobs and tasks change extremely quickly and across the board. Workers are increasingly employed to perform those tasks where AI has not yet been able to replace humans and/or are hired to train machines. Aspects of workplace well-being and good-quality jobs (e.g. skills development, challenging/complex jobs, autonomy, contributions to organisational decision-making) lose ground, and individuals struggle to adapt. They are left with little opportunity to pursue purpose-driven careers and experience frequent and involuntary career changes due to circumstances beyond their control. This in turn erodes the loyalty between employers and employees, as individuals are left alone to navigate their uncertain and fragmented career paths. Competing with many others for a reduced number of jobs, individuals increasingly lose the ability to pursue self-directed professional trajectories and engage in independent career management.

Employers no longer have an interest in developing the skills of a disposable human labour force, and workers bear full responsibility for the upskilling and reskilling needed in order to try to cope with the increasing disruptions brought about by AI and technological advancements. Skills development is focused on developing the skills needed to perform those tasks that AI technologies cannot yet do, regardless of job satisfaction values or workers' well-being.

6.1.4. Continuing skills development and guidance delivery

AI completely takes over education and training, and formal education as we know it ceases to exist. AI use in education and training increases rapidly and across all types of learning environments. Training content is heavily generated by nontraditional sources or stakeholders (AI, peers, users) and new formal stakeholders (e.g. professional associations) lead content generation. AI powers guidance and counselling tools and services in terms of analysis, identification of patterns and suggestions to fully AI-powered practitioners.

New roles powered by AI emerge, and traditional roles no longer exist. AI tutors replace teachers and trainers in training delivery, and advanced career guidance services are offered by AI-powered tools.

6.1.5. Skills policy

Inclusiveness and equal access to opportunities are not a priority for any stakeholder, and individuals are left alone and unsupported. Companies race to

adapt and exploit AI advancements in order to stay competitive and pursue economic growth and profit. Trade unions no longer have the power to exert their influence and to safeguard workers' rights and interests. AI technologies dominate all aspects of work and life and, in turn, those owning and controlling these technologies exert their full dominance over public institutions and decision-makers, who rely on these technologies to run all aspects of societies and economies.

6.2. Testing the assumptions: semi-Delphi results analysis

6.2.1. By survey question

Analysis by survey question yields the following results.

6.2.1.1. *Erosion of democracy and social cohesion (D1)*

The first survey question explores the potential impact of AI on democratic processes, well-being and social cohesion. Specifically, it suggests that private entities owning and controlling AI technologies will rule the democratic stage, giving rise to authoritarian powers. A significant majority of respondents concur with this scenario statement (43% somewhat agree and 20% strongly agree), with slightly over half of the respondents (52%) reporting feeling somewhat confident in their predictions and 18% being very confident.

This concern is rooted in the idea that policymakers will struggle to keep pace with technological advancements from the private sector, resulting in a lack of regulatory frameworks to safeguard citizens' rights. This, in turn, is expected to disempower citizens and fuel the rise of polarised movements, as individuals become more disillusioned with the democratic process. The manipulation of algorithms to influence user satisfaction, engagement, political views and awareness is also seen as a significant threat to democracy, as it can erode trust, foster extremism and create 'filter bubbles' that reinforce existing biases.

However, 55% of respondents also note that this could fuel bottom-up anti-technology movements, which could potentially counteract the negative effects of AI on democracy and promote a more nuanced understanding of the complex relationships between technology, power and society. This counteraction argument is also put forward by respondents who do not agree with this scenario assumption and who primarily believe that the populism and fake news generated by uncontrolled AI and technological development will fuel bottom-up anti-technology movements. A minority of respondents also suggest that AI could have

a positive impact on democracy, leading to greater inclusion and strengthened democratic institutions through automated decision-making with built-in fairness, participation and transparency. Among their other suggestions, some respondents highlight the importance of addressing the increasing power of big tech companies in a capitalist and neoliberal society, emphasising that the Member States and policymakers have a responsibility to mitigate the effects of AI on citizens and democracy, underscoring the need for a more nuanced and context-specific approach to AI governance.

6.2.1.2. *Role of human-centric skills (D2)*

A significant majority of respondents (54% somewhat agree and 18% strongly agree) believe that human-centric skills, such as critical thinking, leadership and emotional intelligence, will become more important in the future, despite the significant alterations that generative AI technologies will bring to the job market. Nearly 60% of respondents feel somewhat confident in their predictions and 21% report being very confident.

Respondents who agree with this scenario argue that human-centric skills will become more important in the future due to their difficulty in being replaced by machines by 2040 and their ability to facilitate agile adaptation to change in a rapidly evolving labour market. They also argue that jobs will change depending on the type of skills required, with tasks relying on technical skills being automated and disappearing, while those relying on human-centric skills will become more important. However, respondents also note that the way that these skills are developed and utilised will change, with questions arising about who will be responsible for supporting skills development (employers, the state or individuals), where skills will be developed (in the workplace or through individual initiative) and how skills will be utilised in workplaces where machines are increasingly prevalent. For example, some respondents (23%) express concern that AI's effects on jobs will limit people's opportunities to develop and use human-centric skills, which in turn will lose importance and will be mastered by a select few at their own expense. A similar number of respondents (21%) even envisage a dystopian scenario where AI technologies develop human-centric skills.

6.2.1.3. *Gap in safeguarding workers (D3)*

Respondents also agree that, by 2040, the increased adoption of generative AI technologies and automation will have led to significant job losses and transitions in the workforce. This will result in a differentiated treatment of workers, particularly in terms of investments in skills development and hiring processes. For instance, over 40% of respondents believe that companies will invest in the skills

development of a limited share of their high-skilled workforce related to AI generative technologies, leaving others vulnerable and potentially excluded from the labour market. Further, some (21%) are concerned that access to employment and training will rely on fully automated processes, with no checks and limitations in place to counterbalance biases in access to opportunities, such as discrimination, misuse of data and privacy issues. This vulnerability is exacerbated by the diminished influence of trade unions in safeguarding workers' rights.

Interestingly, a quarter of respondents see potential for bottom-up movements promoting diversity and inclusivity in workplaces and labour markets. However, an equal percentage of respondents believe that inclusiveness will not represent an issue, as the automation and replacement of some tasks and jobs will result in people working fewer hours rather than people being fired. A smaller group (15%) suggests that AI-driven displacement of jobs could help address demographic challenges, reducing the relevance of labour market activation.

Nonetheless, only 11% think the economic benefits of AI will be equitably redistributed and contribute to social welfare improvements. Amid these concerns, pervasive job losses may lead to more people seeking purpose through activities like volunteering, community engagement and spending time with loved ones. Other opinions, highlighted by 5% of respondents, suggest that AI will have a dual impact on the labour market: while some jobs will be lost, new opportunities will emerge, particularly in sectors like healthcare, education and environmental care.

6.2.1.4. *AI takes over education and training (D4)*

Findings suggest that, despite the transformative potential of AI, formal education at all levels will not disappear. Overall, a large majority of respondents, nearly 70%, believe that formal education will continue to exist, albeit with significant changes. One of the key changes expected is increasing collaboration between public institutions and private stakeholders in the design and delivery of learning programmes. A notable 53% of respondents think that public institutions involved in education and training will work together with private stakeholders to create hybrid approaches that combine the strengths of both sectors. This collaboration is expected to lead to more innovative and effective learning programmes. Overall, most respondents envisage a future where AI enhances training through diverse delivery channels, with a stronger focus on human-centric skills and the integration of online learning and project-based modules.

Another important trend is the shift towards non-formal and informal continuing education. In fact, 30% of respondents anticipate that, while initial education will remain formal, continuing education will become more and more non-formal and informal. There are, however, some diverging views: a limited share of

respondents (15%) suggest that the rise of uncontrolled AI-generated learning opportunities will push policymakers to reinforce traditional formal education. On the contrary, 11% believe that formal qualifications will vanish entirely, with private-sector stakeholders assuming responsibility for awarding credentials in the labour market.

6.2.1.5. *Training content generation (D5)*

According to the findings, respondents anticipate that a significant portion of training content will be generated by nontraditional sources and stakeholders, such as AI, peers and users, by 2040. While respondents are cautiously optimistic about the potential for nontraditional sources and stakeholders to generate high-quality training content, they also recognise the importance of collaboration between public and private institutions in creating and delivering learning and training programmes. For instance, 65% of respondents believe that AI-generated tools, such as virtual and augmented reality, will enhance existing learning methods and pedagogies rather than replace them. This suggests that respondents see AI as a complementary tool that can improve the quality and effectiveness of training content, rather than as a replacement for traditional methods. In line with previous findings, 60% of respondents think that public institutions will collaborate with private stakeholders to create and deliver learning and training. This collaboration is seen as essential for staying relevant in a rapidly changing education and training landscape, where the needs of learners and employers are evolving quickly. Interestingly, nearly half of those respondents (34%) believe that private stakeholders will take the lead in content generation, while only 11% think traditional formal institutions will disappear entirely, with new formal stakeholders, like professional associations, taking over content generation. Some respondents also suggest that private stakeholders will increasingly play a more relevant role in continuing skills development in the workplace, but a less relevant role in initial formal education and training. This suggests that respondents expect private stakeholders to play a more prominent role in shaping the future of training content, especially in the workplace, but also recognise that traditional institutions will continue to have a role to play.

6.2.1.6. *Replacing teachers, trainers and career guidance professionals (D6)*

Findings strongly reject the idea that AI tutors and AI-powered tools will have replaced teachers and trainers in training delivery and in advanced career guidance services by 2040.

On the contrary, respondents see AI as a supportive tool for tasks like generating learning examples and aiding in assessments. This perspective

suggests that respondents value the unique skills and qualities that human teachers and trainers bring to the education process, and that AI is seen as a complementary tool rather than a replacement. For example, respondents emphasise that AI cannot fully replace educators due to their essential human skills, such as motivating students, providing feedback and guiding the learning process. Moreover, 37% anticipate that the secondary effects of AI tools, such as increased isolation, anxiety and health issues, will spark grassroots movements opposing their expanded use. This concern highlights the potential risks and unintended consequences of relying too heavily on AI in education and the need for a more nuanced and balanced approach to the integration of technology into the classroom. Less than a quarter of respondents think AI will replace teachers and trainers in continuing formal education, leaving their roles in initial education intact. Overall, the findings suggest that human teachers and trainers will continue to play vital roles in education, with AI serving as a supportive tool to enhance the learning experience.

6.2.1.7. *Erosion of eco-consciousness (D7)*

Findings from the semi-Delphi survey reveal an interesting dynamic regarding the potential decline of sustainable and eco-conscious practices by 2040. When asked to consider the relevance of these practices for individuals and businesses, most respondents (43% somewhat disagree and 16% completely disagree) reject the notion that they will lose importance. The distribution of arguments reveals a relatively homogeneous perspective, with 54% of respondents suggesting that sustainability and environmental protection will continue to be valued by parts of the population and activist groups. Further, 41% believe that the irreversible nature of climate change will lead all parties involved to recognise the importance of environmental mitigation.

However, there are some concerns that the pursuit of technological advancements, particularly in AI, might come at the expense of sustainable practices. Specifically, 38% of respondents express concerns that companies will prioritise the adoption of AI technological advancements at the expense of sustainable practices, and 30% anticipate that public institutions will also favour economic competitiveness and growth over sustainability and greening policies. Despite these concerns, 34% expect the development of AI-based solutions to support sustainability efforts, and 29% argue that current investments in green initiatives, legal obligations and environmental, social and governance (ESG) compliance efforts ensure the continued relevance of sustainability and climate mitigation policies. Overall, the findings suggest that, while there are concerns about the potential erosion of eco-consciousness, a majority of respondents

believe that sustainable and eco-conscious practices will remain important for individuals and businesses in 2040.

6.2.1.8. *Impact on migration flows (D8)*

The final question for respondents explores the potential effects of AI on migration flows, specifically whether the impact of AI on jobs will drive individuals to migrate to areas with remaining opportunities, thereby affecting both regular and irregular migration flows. More than half of respondents (55%) believe that AI technologies will exacerbate geographical polarisation, resulting in the concentration of low-skilled workers in countries with less AI-dominated economies or those in the early stages of AI adoption, while high-skilled workers will be drawn to nations with AI-advanced economies. This, in turn, will have significant implications for countries where generative AI technologies have not yet become pervasive in the economic and social systems.

Along this line of thought, 48% of respondents indicate that regular migration flows will be shaped by international competition for AI-skilled talent, as countries with advanced AI capabilities will attract highly skilled workers. An additional 29% believe that AI will only affect sectors where human jobs cannot be fully replaced by automation. However, only a small proportion of respondents (16%) think that irregular migration will decrease due to job shortages caused by AI. A minority of respondents (6%) offer alternative perspectives, highlighting the evolving nature of work, such as the rise of remote work, and the quality of life offered by host countries as additional factors that will influence migration patterns. Overall, the findings suggest that AI is likely to have a profound impact on migration flows, driving geographical polarisation and shaping the movements of skilled and unskilled workers across borders.

6.2.1.9. *Consistency of views*

Analysis of the semi-Delphi survey reveals that respondents who tend to have a dystopian view of AI's impact on society and work tend to express this perspective consistently throughout the scenario development. Similarly, those with a positive view of AI's impact also tend to maintain their perspective, with some exceptions. Notably, even respondents who do not see negative effects of AI on democracy and social cohesion tend to acknowledge potential negative consequences for jobs and worker protection, suggesting that the impact of AI on employment and social welfare is a more widely accepted and pressing concern for respondents.

A mixed pattern is observed with regard to sustainability and eco-conscious behaviours. Survey results suggest that green and sustainability practices will remain a priority for both individuals and businesses. Interestingly, this opinion is

also shared among those who think that AI may have a negative impact on democratic processes (those who 'somewhat agree' with D1), therefore suggesting that sustainability will not necessarily lose importance even in a dystopic future. It is important to stress, however, that this argument does not hold among those who strongly believe in the detrimental impact of AI on democratic processes and social cohesion (those who 'strongly agree' with D1), as they strongly agree that sustainability and eco-conscious behaviours will lose importance for all, highlighting that they feel strongly that AI will negatively affect both democratic processes and sustainability/eco-conscious behaviours.

6.2.2. Cross-cutting themes and tensions – key messages

From the findings summarised above, the following key messages and tensions emerge.

6.2.2.1. *Impact of AI on jobs and workers: workers versus companies and the decline of traditional roles*

Increased adoption of generative AI technologies and automation leads to a scenario where tensions arise between companies and workers. Extensive AI take-up is expected to negatively affect jobs and workers, with concerns about job displacement, worsening job quality and the unequal distribution of economic gains.

Concentration of power in the hands of a few players, combined with policymakers who struggle to balance economic growth and social cohesion, may result in the unequal distribution of the benefits and risks associated with AI, with some groups potentially disproportionately affected by job displacement and other negative consequences. Interestingly, this also affects small and medium-sized enterprises, which may lack the resources and capacity to keep up with advancements in new technologies and may therefore be pushed out of the labour market, resulting in further job losses and rising inequalities.

Opportunities for skills development are also affected. Companies are less likely to invest in the skills development of a disposable workforce employed on a short-term-needs basis, while policymakers are unable to engage employers in offering training and employment opportunities for the workforce. This is exacerbated by the erosion of power of traditional trade unions, due to the decline of employment in traditionally unionised jobs, the pervasiveness of nontraditional forms of employment and an over-reliance on task-based contracts (which are traditionally non-unionised). As a result, workers are left alone and unsupported to navigate their uncertain careers.

6.2.2.2. *Balancing innovation and regulation: a multifaceted governance approach*

The scenario is characterised by a sharp tension between the need for innovation and progress on the one hand and the need for regulation and oversight to protect social welfare and ensure equal access to opportunities on the other hand. In this scenario, companies are driven by profit and progress, and policymakers have limited ability to prioritise social welfare and sustainability if these hinder growth. Ultimately, findings stress the importance of developing policies that address the potential impacts of AI on job displacement and worker protection and ensure that the benefits of AI are shared equitably, and its negative consequences are mitigated.

6.2.2.3. *Importance of human-centric skills*

Human-centric skills (e.g. critical thinking, leadership and emotional intelligence) emerge as particularly relevant for navigating difficult times and adapting to changes in the job market. These skills are less likely to be quickly replaced by machines, making them essential for finding and keeping employment. However, there is uncertainty regarding how and where these skills will be developed and used, with questions arising about who will be responsible for supporting their development (employers, the state or individuals), where they will be developed (in the workplace or through individual initiative) and how they will be utilised in workplaces where machines are increasingly prevalent. Some Delphi survey respondents even envisage a dystopian scenario where AI technologies develop human-centric skills, rendering the skills obsolete for workers.

6.2.2.4. *Transformation of education and training*

Interestingly, in the field of education and training, the impact of extensive AI take-up is generally seen as positive. While education and training will undergo profound changes, the expectation that AI will completely take over education and training, rendering formal education obsolete, is strongly rejected.

Similarly, AI will not be replacing traditional stakeholders such as public institutions, teachers, trainers and career guidance counsellors. Rather, new forms of cooperation between traditional and new stakeholders are expected to emerge, and AI is expected to enhance existing methods and tools for continuing skills development, making them more innovative, effective and responsive to the changing needs of the labour market.

The potential for AI to exacerbate existing inequalities in access to education and training is a concern, particularly for marginalised and vulnerable groups, with risks of increased isolation, anxiety and health issues. This calls for oversight to

ensure that the increasing role of nontraditional stakeholders in content generation does not worsen existing inequalities. Policymakers and education, training and guidance institutions must work to develop a more nuanced and balanced approach to the integration of technology into education, one that prioritises the needs and well-being of students and practitioners alike.

6.2.2.5. *Geographical polarisation*

International competition for AI-skilled talent will drive regular migration flows and result in geographical polarisation: high-skilled individuals in countries with advanced technologies and low-skilled individuals in countries lagging behind.

6.2.2.6. *Sustainability paradox*

While it is believed that the pressing issue of climate change will prompt some companies to invest in AI-based solutions to mitigate its effects and in turn drive sustainable development and equitable growth, most companies will still prioritise economic growth, with its resulting high levels of energy and waste consumption, at the expense of environmental mitigation. In a similar fashion, policymakers will have little leverage and power to implement sustainable practices if they hinder growth and competitiveness. Current investments in green initiatives, legal obligations and ESG compliance efforts may ensure that sustainability and climate mitigation policies continue to be relevant.

CHAPTER 7.

Consolidated scenarios

This chapter presents the four consolidated scenarios, as refined after discussions with experts during the first workshop (May 2024) and analysis of the findings from the semi-Delphi survey presented in the previous chapters.

7.1. Scenario A: a future of opportunities – technology-driven competition for talent

It is 2040. The EU labour force is diminishing, due to the ageing of the population and slowing migration flows. However, the economy is booming and creating new jobs, fuelled by technological innovations and the impact of AI. Business activities thrive, but, as the supply and demand for skills go in opposite directions and skills shortages increase, recruitment challenges deepen further and the competition for talent becomes fiercer than ever. The labour market is very tight.

The technological advancements increasingly enable the automation of repetitive and low-skilled tasks and free up workers to pursue more fulfilling careers. Rather than displacing workers, this shift creates opportunities for those in the occupations affected to upskill and reskill, transitioning into higher-value roles. As a result, human-centric skills have taken centre stage, becoming increasingly vital for harnessing the full potential of automation and digitalisation. By leveraging these skills, workers can complement AI-driven technologies, driving innovation and growth in their organisations.

This does not solve the climate change crisis. The impact of human activities on the environment is profound and now recognised as such by most. Sustainable considerations become the core of most policy areas, and, for most people and a rising number of businesses, they become a standard, supported by new, innovative solutions facilitated by technological progress.

Most workers benefit from these trends and from changes in the skills development landscape. The abundance of jobs and advanced technology adoption in learning and counselling environments offer greater opportunities for shaping people's career pathways and increasing the pace of job changes. The changes in tasks and skills needs in workplaces are thus manageable and workers can largely cope with them. More people start to invest in purpose-driven careers, seeking higher satisfaction and more meaningful work. Employees' loyalty to employers inevitably erodes. More workers also take advantage of flexible work

arrangements and provide their services to different employers and even across different countries.

The skills development landscape undergoes a profound transformation, also driven by the pervasive influence of AI. Advances in AI enable the creation of tailored, adaptive learning environments that cater to the unique needs and preferences of individuals. Further, AI elevates learning experiences through the development of immersive augmented and virtual reality environments. These simulated settings replicate real-world scenarios, allowing learners to engage in experiential learning, make mistakes and gain valuable insights in a safe and controlled space.

The landscape of learning content creation is expanding, with a diverse range of stakeholders – including both traditional and nontraditional providers – contributing to a vast array of skills development resources. While this proliferation of content presents numerous opportunities, it also brings some challenges. For instance, people may struggle to identify the most relevant and effective content tailored to their needs, amid the overwhelming abundance of options. Moreover, the growing reliance on digital delivery may lead to concerns around excessive screen time and its potential negative effects on people's well-being, particularly if virtual and augmented reality technologies become more widespread. People with limited digital literacy or those residing in areas with inadequate digital infrastructure may need more support to ensure that they also reap the benefits of the digital transformation of continuing skills development.

The proliferation of digitally delivered learning also brings other positives, as it leads to a more open and interconnected skills development system. Boundaries between different modes of delivery – such as in-person and online learning – diminish, and micro-credentials become increasingly recognised and valued within expanded digital learning environments. This change, in turn, accelerates the erosion of traditional boundaries between formal and non-formal learning pathways. To support the continuing skills development of the workforce, the education and training system becomes more flexible, accessible and responsive to the diverse skills development needs of the workforce population, facilitating smoother progress and transitions in the workforce's learning pathways.

AI also significantly transforms the roles of teachers and trainers and scales up the support they provide to adult learners. The increasing amount of learning content, the growing number of content creators and the increasingly digitalised nature of learning provision pose challenges for teachers and trainers: they are required to master the new technologies and develop skills that will allow them to deploy these skills effectively in learning environments. Further digitalisation in

education helps customise learning content and environments to personal needs, which greatly helps individuals from disadvantaged backgrounds.

AI increasingly powers guidance and counselling services, enhancing their effectiveness and expanding their capabilities. This not only brings additional support to adult learners but also empowers guidance and counselling professionals to focus on higher-value tasks. Many adult learners are now experimenting with AI-driven learning assistants, which utilise advanced mapping techniques to identify the learners' skills, potential and areas for development, providing personalised learning recommendations. As AI tools become more sophisticated, they are integrated into both basic and advanced guidance and counselling support, but usually still under the supervision of qualified professionals. As adult learners face an overwhelming array of choices, the need for expert guidance and support becomes even more critical, making the roles of guidance and counselling professionals more vital than ever.

7.2. Scenario B: left alone to ride the tide – navigating the AI shock waves on jobs

It is 2040. The workplace has been fundamentally reshaped by successive waves of AI transformation, with shock waves affecting sections of the workforce population in radically different ways. Left largely to their own devices as both the state and employers step back from workforce skills development, working-age adults navigate these technological tides and strive to keep their skills relevant, with varying degrees of success. Some ride the waves skilfully, while others struggle to stay afloat, creating what we now call a 'two-tier workforce':

- tier 1: those who fully embrace individual responsibility and thrive;
- tier 2: those who struggle with increased individual responsibility and fall behind.

This division reflects how individuals cope with the increased responsibility for their own development in transformed labour markets. While most individuals find ways to adapt to the new environment, the quality and sustainability of their adaptation vary dramatically, leading to deepening disparities over time.

Those workers who started with advantages – better quality education, financial resources, geographical location and social capital – skilfully navigate these waters, investing in their skills development, taking calculated career risks and bouncing back from setbacks. Meanwhile, those starting from disadvantaged positions increasingly struggle to keep pace, creating deepening socioeconomic divides.

Most companies have stepped back from comprehensive employee development, focusing instead on immediate needs and technological

advancement. They compete globally for the top talent while investing minimally in their broader workforce. This has created a self-reinforcing cycle where skilled workers become more valuable while other workers risk obsolescence.

AI's integration varies dramatically across organisations and sectors. While some companies use AI to augment human capabilities, others have opted for replacement, when economically advantageous. The new digital divide is no longer solely about access to technology; it centres on the ability to effectively leverage AI-powered tools and platforms. Some workers rapidly advance their careers using these resources, while others feel overwhelmed or are unable to utilise these tools effectively and thus move towards low-skilled/low-quality jobs, rather than unemployment, as labour markets are tight.

The workplace itself has become increasingly stratified. Some workers operate in highly dynamic, tech-enabled environments rich with growth opportunities. Others find themselves confined to routine, lower-skilled roles with limited advancement possibilities. This occupational polarisation reinforces existing disparities, creating what many call 'disparity spirals': self-perpetuating cycles where a disadvantage in one area compounds difficulties in others.

A striking tension exists between technology-driven growth and sustainability values. While businesses aggressively implement AI solutions, often at significant environmental cost, younger generations increasingly demand sustainable practices. This unresolved conflict manifests in various ways: younger workers increasingly avoid employers with poor environmental records, preferring temporary project-based work that aligns with their values over traditional career paths, and some opt out entirely from high-carbon sectors despite these offering better compensation. Companies face mounting challenges in attracting and retaining young talent, leading to a generational divide in workforce participation patterns and career choices that further fragments the labour market.

Traditional employment has become a privilege of the few, replaced by an ever-changing tapestry of micro-tasks, project-based work and temporary employment relationships. Mirroring this situation, new forms of worker representation emerge, primarily in sectors with more fluid employment relationships and among younger workers, who prefer more flexible, cause-oriented forms of collective action (which traditionally rarely covered issues such as social justice and inclusiveness). Traditional unionisation is weakened and cannot effectively support those lagging behind.

The learning landscape has transformed into a complex ecosystem dominated by tech platforms and AI-powered training systems. Here, we see a striking skills-based polarisation. Success requires meta-learning abilities (i.e. learning how to learn), adaptability and resilience, not just technical skills. Those who master these

capabilities thrive in continuous change, while those who do not become increasingly marginalised. This adaptation gap is not necessarily age-related, as many might assume, but strongly correlates with educational background, access to resources, mental health and previous learning experiences.

Geographical location has become both more and less relevant. While remote work has opened global opportunities for some, it has also created 'opportunity deserts' in regions lacking robust technological infrastructure or high-quality educational institutions to provide inhabitants with a solid basis to continue learning in adulthood. Urban centres with strong innovation ecosystems pull further ahead, while other areas face a self-reinforcing cycle of disadvantage, with limited access to quality education, advanced technology and skilled employment opportunities.

The human cost is evident in rising mental health challenges. Those struggling to keep pace experience increased anxiety, stress and feelings of inadequacy, creating another layer of disadvantages, as these challenges further impair learning and adaptation capabilities. These individuals are the ones who are pushed into unemployment and inactivity.

Life in 2040 starkly demonstrates that technological progress does not automatically translate to societal progress. While we have the tools for unprecedented advancement, their benefits remain unevenly distributed, creating an increasingly polarised society where initial advantages or disadvantages become more pronounced and harder to overcome. We are all riding the AI tide, but some are surfing while others are struggling to tread water.

7.3. Scenario C: staying afloat – AI opportunities missed

It is 2040. The rise of AI is continuing but at a modest pace, leading to moderate transformations of tasks and jobs rather than extensive disruptions. The pace of change is generally manageable for employers, workers and Member States, and incremental changes usually suffice. At the same time, the potential of AI to improve economic and social conditions is not fully tapped, as the investment and engagement of stakeholders in AI varies across sectors, Member States and population segments.

In this scenario, AI is not an unstoppable force, and the geopolitical developments and political decisions of EU countries are one reason for its relatively slow uptake, including because regulations against its uncontrolled expansion are commonly expected in this scenario. On the other hand, geopolitical developments and political decisions may have less of a blocking effect than what was described in the initial scenario assumptions. Geopolitical safety may call for

the continuation or, in some cases, intensification of AI investments in Europe, rather than driving funding massively away from AI-related technologies in favour of other defence and security expenditures.

In a context of moderate technological transformation, EU countries do not always have a strong motivation to incentivise AI advances or cover the (start-up) costs that allow new technologies to emerge and mature. In the absence of a prominent state push across many policy domains, AI expansion is usually driven by those specific sectors and industries that see the most financial benefits. This also means that, while some sectors (and workers) manage to grasp the opportunities brought by AI to improve their efficiency, productivity and competitiveness, AI advances are not at the service of all sectors or for the greater public good.

On the other hand, as AI-related technologies are not an overwhelming driving force for competition in all industries, the pressure on individual companies to adapt is also modest. Existing business models are not drastically disrupted, and such disruption is prominent for only some sectors or regions, especially those most exposed to rapid technological changes.

As a result, in general, there is no extensive replacement of the human workforce. AI supports humans in certain jobs or tasks, in a relatively smooth mode of coexistence. Many jobs continue to rely on the technical skills that the human workforce possesses and are further enhanced to facilitate the use of and coexistence with AI-related solutions; for the same reason, higher-level technical skills (e.g. programming, data processing, interface design) gain importance. As technical skills are still valued, there is no urgent need to switch attention to human-centric skills to avoid AI replacement. Human-centric skills gain importance in some jobs, especially to support innovation, but are not the main path to keep people employed. Not only do technical skills still matter significantly, but jobs based on repetitive tasks are not massively replaced. The economic benefit from doing so varies significantly among sectors, and the decision to replace or keep the human workforce depends on the comparative cost of investing in AI versus the cost of human labour; human workers might, however, be pushed to lower levels in this type of jobs.

Jobs and tasks evolve gradually rather than radically, keeping skills needs moderate, except in the sectors most exposed to technological change. In general, employers have good prospects for finding a qualified workforce and their upskilling and reskilling needs are rather moderate. Upskilling and reskilling needs are met effectively through established institutional frameworks, without requiring new players in the continuing skills development landscape. AI and digital technologies support competence development, but with no major impact on the

way training is delivered, and professional roles in learning and guidance (teachers, trainers, guidance practitioners) remain largely unchanged.

In this context, there is no widespread need for heavy investment in continuing skills development in the workplace. Additional investment by the private sector in training adults depends on the jobs and sectors in question. In some cases, companies assume a role in training adults beyond their own workforce, with a proactive view to securing a future workforce for the sector amid technological or demographic changes. However, as these developments are modest, it is more common for companies to be focused mostly on training their own staff. They decide to train existing staff, hire new staff or train the general population on the basis of the cost-effectiveness of each option in their own context.

AI and the automation-based economy support some modest increases in nontraditional forms of employment, although without an extensive overhaul across the board. Still, social dialogue does not always manage to establish an updated network of social protection that functions well in this context, and the participation of workers in trade unions loses ground as nontraditional forms of employment (e.g. platform-based work) become more frequent. As employers generally manage to cope with change without putting additional pressure on employees, lay-offs and involuntary career/employer changes are not extensive and do not represent a major social challenge. Such changes may be an option, a matter of their own decision, but in most cases they are not a necessity driven by technological disruptions and transformations.

Although modest technological developments alone do not call for an urgent paradigm shift in EU economies and societies, sustainability does not entirely lose its traction in the policy agenda or individual preferences and behaviours. Especially when it comes to individuals (citizens), eco-conscious values and sustainability remain important or gain prominence, although general awareness does not always translate into specific consumer behaviour. When it comes to the state, policymakers and companies, sustainability is not always a priority: in some cases, it grows in importance; in other cases, sustainability policies influence only a limited number of sectors and policy areas. Green skills are not high in employer demand and therefore not a priority for state or private training stakeholders. The relatively manageable technological transformations of this scenario, with the absence of major shocks, may also allow for gradual adaptation when it comes to sustainability: there may be sufficient time for new greener practices to be established in the economy and society without the need for a major shift by 2040.

7.4. Scenario D: AI unleashed – dominating the world of work and societies

It is 2040. The use of AI technologies and automation has taken over in all areas of life and work, transforming the fabric of society and leading to unprecedented job losses across all sectors, industries and skills levels. The consequences of this transformation are far-reaching, with significant implications for the economy, the environment and human well-being.

A few major players own and control AI technologies and have emerged as the dominant force in the global economy. They harness the power of AI to drive growth and expand their market shares, while progressively exerting their influence over policymakers who are caught unprepared or unwilling to address the resulting legal and ethical impacts. No regulation safeguarding citizens' rights in light of AI developments is implemented. The lack of oversight and accountability creates an environment in which corporations are free to prioritise profits over people, leading to widespread disillusionment and social unrest. Democracy is increasingly undermined and extremist movements, fuelled by anger and frustration, begin to emerge, threatening the stability of societies worldwide. While citizens are left disempowered, some bottom-up anti-technology movements arise.

Environmental mitigation policies and sustainability practices are imperilled. While climate change is acknowledged, companies focus on technology-driven growth and prioritise the adoption of swift AI/technological advancements and upgrades despite high levels of energy consumption and waste generation; few companies invest in the development of AI-based solutions that are designed to support sustainability initiatives. Despite the urgent need for sustainability and environmental protection, policymakers have less leverage for (and interest in) promoting and implementing sustainability and greening policies, as these may hinder competitiveness and growth. In this hostile environment, while parts of the population and activist groups still value sustainability and protecting the environment, individuals significantly lose their agency to hold eco-conscious consumer values and they prioritise their own survival over environmental concerns.

The labour force continues to decline due to population ageing and declining fertility rates; some policymakers view the replacement of human jobs by AI/machines as a counterbalancing factor to the rising demographic challenges. At the same time, AI affects both regular and irregular migration flows, as individuals are pushed to move towards places where they see the remaining limited opportunities are available for them. AI technologies drive geographical polarisation, with low-skilled workers concentrated in countries with less AI-

dominated or emerging economies and high-skilled workers concentrated in nations with AI-advanced economies. This also creates a brain drain in some regions, as talented individuals seek opportunities in areas with more advanced technological infrastructure.

Jobs and tasks change extremely quickly and across sectors, occupations and skills levels. The entire workforce faces pressure from AI technologies: most human jobs are replaced by AI, and workers are increasingly employed under non-standard forms of employment contracts to perform those tasks where AI has not yet been able to replace humans (e.g. personal service jobs such as domestic staff in private households and/or jobs training machines). Despite advances, AI technologies have not yet perfected AI-generated versions of human-centric skills and, therefore, tasks relying on technical skills are fully automated, while tasks and jobs relying on human-centric skills become more sought after.

Access to employment and continuing skills development relies on fully automated processes, no checks and limitations are in place to counterbalance biases in access to opportunities (e.g. discrimination, misuse of data, privacy issues) and recruitment is limited to highly AI-skilled individuals. Companies resort increasingly to gig workers and other workers in non-standard forms of employment to perform their tasks, and they see little incentive to develop the skills of a disposable human labour force. Company-supported skills development is therefore limited to developing the AI-related skills of a small number of their workforce, and aspects of workplace well-being and good-quality jobs (e.g. skills development, challenging/complex jobs, autonomy, contributions to organisational decision-making) lose ground.

Due to the ripple effects of AI/machines on jobs, workers have fewer opportunities to use and develop their skills, including human-centric ones, in the workplace. They struggle to adapt to disruptions and are left alone and unsupported to bear responsibility for their own skills development. Policymakers are unable to support equal access to employment and skills development opportunities without the support of those owning and controlling the technologies driving these changes. Similarly, due to the sharp decline in traditional forms of employment and the loss of unionised jobs, trade unions no longer have the power to exert their influence and to safeguard workers' rights and interests.

As a consequence, human agency is eroded and workers are left alone to navigate their uncertain and fragmented career paths. Competing with many others and with machines for a reduced number of jobs, individuals increasingly lose the ability to pursue purpose-driven careers and experience frequent and involuntary career changes due to circumstances beyond their control.

AI advances radically transform skills development across all segments, dissolving traditional boundaries between formal and non-formal provision. Established institutions resort to forming alliances with private stakeholders to maintain their relevance for both content generation and its delivery. AI use grows rapidly across all learning environments, with content increasingly generated through nontraditional sources (AI, peers, users) and enhanced by AI-powered tools such as virtual and augmented reality.

AI powers guidance and counselling tools and services in terms of analysis, identification of patterns and suggestions to fully AI-powered practitioners. New roles powered by AI emerge, but the human roles of teachers, trainers and career guidance professionals are not completely replaced.

CHAPTER 8.

Concluding remarks and next steps

The Cedefop foresight study on continuing skills development by 2040 analyses the transformative potential and challenges posed by AI and other trends of relevance for continuing skills development, including demographic shifts, climate change and evolving labour markets. Through four distinct scenarios – ranging from an optimistic vision of AI-driven talent competition to a dystopian outlook on AI dominance – the study underscores the urgent need for innovative, inclusive and adaptive approaches to continuing skills development. These scenarios are not predictions but exploratory tools to identify opportunities, mitigate threats and guide stakeholders towards a shared vision for a resilient skills ecosystem.

A central theme across all scenarios is the critical role of integrated learning systems that leverage institutional, self-directed and workplace contexts to maximise impact. Scenario A highlights the potential for AI to enhance human-centric skills and foster purpose-driven careers, provided inclusivity and sustainability are prioritised. In contrast, Scenarios B and D reveal the risks of unequal access to skills development, exacerbating socioeconomic disparities and undermining social cohesion. Scenario C, with its modest AI uptake, warns of missed opportunities for innovation if investment and engagement remain uneven. Collectively, these scenarios emphasise that the future of skills development hinges on collaborative efforts to balance technological advancement with social equity and environmental responsibility.

The study also reveals the evolving nature of social dialogue, which must adapt to address nontraditional employment models and ensure worker representation. Scenarios A and C suggest pathways for strengthened collaboration among trade unions, employers and governments, while Scenarios B and D highlight the consequences of fragmented dialogue, where workers are left vulnerable. To navigate these challenges, stakeholders – policymakers, educators, social partners and civil society – must co-create a vision that prioritises lifelong and life-wide learning and continuing skills development, individual empowerment, equitable access to opportunities and robust governance of AI technologies.

As the next phase of this research unfolds, engaging diverse stakeholders to develop strategic objectives will be essential. By fostering a shared commitment to continuing skills development, the EU can build a future-ready workforce capable of thriving in an AI-driven world and ensure that technological progress translates into inclusive, sustainable and equitable societal outcomes.

Acronyms

AI	artificial intelligence
Cedefop	European Centre for the Development of Vocational Training
CVET	continuing vocational education and training
ESG	environmental, social and governance
EU	European Union
ICT	information and communication technology
STEEPV	social, technological, economic, environmental and political trends and values
UNESCO-UNEVOC	International Centre for Technical and Vocational Education and Training of the United Nations Educational, Scientific and Cultural Organisation
VET	vocational education and training

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Annex 1.
Adaptation of trends throughout the exercise

Webinar 2 (October 2023)	In-person stakeholder meeting (November 2023)	Morphological analysis
1. Sustainability policies and eco-conscious consumer values are on the rise	1. Growing importance of sustainability policies and eco-conscious consumer values	1a. Importance of sustainability policies
		1b. Importance of eco-conscious consumer values
2. Pursuit of purpose-driven careers continues to gain momentum	2. Pursuit of purpose-driven careers continues to gain momentum	2. Pursuit of purpose-driven careers
3. Sustainability practices are becoming standardised across most businesses and industries	3. Sustainability practices are becoming more frequent across most businesses and industries	3. Sustainability practices across businesses and industries
4. Industries and business models facing major disruptions (e.g. traditional companies facing new competitors or innovations that undermine their business)	4. Industries and business models facing major disruptions	4. Disruption in industries and business models
5. Increasing replacement of human jobs by machines and AI	5. Increasing replacement of human jobs by machines and AI	5. AI influence on jobs
7. Ageing in the EU	6. Shrinking labour force in the EU	6. Labour force in the EU
8. Shrinking labour force in the EU	7. Increasing irregular migration flows into the EU	7. Irregular migration flows into the EU
9. Increasing migration flows into the EU		
10. Increasing international competition for talent	8. Increasing international competition for talent	8. International competition for talent
11. Increasingly fluid working lives	9. Increasingly fragmented working lives	9. Frequency of career/employer changes over time
12. Loyalty between employer and employee erodes (due to remote work, gig economy and independent work)	10. Loyalty between employer and employee erodes (due to remote work, gig economy and independent work)	10. Loyalty between employers-employees (due to remote work, gig economy and independent work)

Webinar 2 (October 2023)	In-person stakeholder meeting (November 2023)	Morphological analysis
13. Rise in self-directed professional trajectories and independent career management	11. Rise in self-directed professional trajectories and independent career management	11. Self-directed professional trajectories and independent career management
	12. Rising importance of skills development and utilisation in the workplace	12. Importance of skills development and utilisation in the workplace
	13. Increasingly faster pace of changes in jobs and tasks and greater need for adaptation by the working population	13. Pace of changes in jobs and tasks and greater need for adaptation by the working population
6. Jobs will focus heavily on social and emotional skills, creativity, innovation, complex problem-solving and digital skills	14. Jobs will focus heavily on social and emotional skills, creativity, innovation, complex problem-solving and digital skills	14. Importance of human-centric skills
	15. Increasing importance of the inclusiveness of education and training and skills development	15. Importance of the inclusiveness of education and training and skills development
	16. Traditional boundaries in education and training are blurring	16. Boundaries in education and training
	17. Increasingly fluid and dynamic learning environments supported by diverse content generation: employer-generated, peer-generated, user-generated and AI-generated	17. Content generation
14. Increase in the take-up of AI and technologies in education and training, guidance and counselling	18. Increasing use of AI and technologies in education and training	18. The level of use of AI and technologies in education and training
	19. AI tutors transforming the roles of teachers and trainers	19. AI tutors transforming the roles of teachers and trainers
	20. Increase in take-up of AI in guidance and counselling to increase quality and efficiency	20. The take-up of AI in guidance and counselling to increase quality and efficiency
	21. Chatbots and virtual assistants will increasingly deliver basic guidance and counselling services digitally	21. AI transforming the roles of guidance and counselling professionals

Source: Cedefop.

Annex 2.
Possible evolutions of trends

Trend	Possible evolutions			
1a. Importance of sustainability policies	Sustainability policies become the norm across most/all sectors and policy areas	Sustainability policies remain fragmented and are only applied in a limited number of sectors and policy areas	Sustainability policies decrease in importance / they are no longer a key factor influencing policy decisions	
1b. Importance of eco-conscious consumer values	The importance of eco-conscious consumer values spreads across the majority of the population (due to the rise of new generations / generation change, etc.)	The importance of eco-conscious consumer values increases mildly but still remains important only to a part of the population	The importance of eco-conscious consumer values decreases significantly and is of interest to a smaller part of the population than it is today	
2. Pursuit of purpose-driven careers	Pursuing purpose-driven careers continues to gain significant momentum and is a key factor in career choices in many workforce segments	Pursuing purpose-driven careers affects the choices of some segments of the workforce	Pursuing purpose-driven careers stops gaining momentum and only in exceptional cases affects career choices of the workforce	
3. Sustainability practices across businesses and industries	Sustainability practices become the standard across most/all industries and organisations	Sustainability practices are implemented across some businesses and industries	Sustainability practices affect a limited group of businesses and industries (exceptionally)	
4. Disruption in industries and business models	Disruption is fast-paced and happens across many industries and business models (hard to manage)	Disruption is moderate and affects some industries and business models (medium difficulty to manage)	Disruption is slow and affects only a few industries and business models (manageable)	
5. AI influence on jobs	AI predominantly brings job creation	AI predominantly brings job destruction	AI brings substantial job transformation	AI brings moderate job transformation

Trend	Possible evolutions			
6. Labour force in the EU	Labour force in the EU grows	Labour force stabilises/decreases, but not significantly	Labour force in the EU continues to decline	
7. Irregular migration flows into the EU	Irregular migration flows do not increase	Irregular migration flows increase, but not significantly	Irregular migration flows increase significantly	Irregular migration flows cease to exist
8. International competition for talent	International competition for talent is significant, affecting most sectors	International competition for talent is moderate/modest, affecting several sectors	International competition for talent is insignificant, affecting only a few sectors	
9. Frequency of career/employer changes over time	Frequency of career/employer changes increases and changes are mainly voluntary (increasingly more people embrace changes in their careers)	Frequency of career/employer changes increases and changes are mainly involuntary due to circumstances beyond people's control (lay-offs, economic restructuring, job instability, etc.)	Frequency of career/employer changes increases for mixed reasons (changes are either voluntary or involuntary)	Frequency of career/employer changes remains stable
10. Loyalty between employer and employee changes (due to remote work, gig economy and independent work)	Loyalty is stronger because organisations want to attract and retain talent in a more fluid and competitive labour market	Within traditional models of employment, loyalty erodes because of the failure of organisations to adapt to new forms of work (e.g. remote work) and employees' expectations (e.g. empowerment, well-being)	Loyalty erodes because traditional models of employment become less prevalent (increasingly more people choose to enter new/nontraditional forms of employer-employee relationships)	Loyalty of employers to their workers is not further challenged
11. Self-directed professional trajectories and independent career management	Self-directed professional trajectories and independent career management are an option for most/all individuals (inclusive)	Self-directed professional trajectories and independent career management are an option for more workforce segments (modest growth)	Self-directed professional trajectories and independent career management keep applying to some / the same workforce segments	Self-directed professional trajectories and independent career management lose ground

Trend	Possible evolutions			
12. Importance of skills development and utilisation in the workplace	The importance of skills development and utilisation in the workplace rises significantly across most sectors	The importance of skills development and utilisation in the workplace rises moderately, affecting some sectors	The importance of skills development and utilisation in the workplace remains stable, affecting only the most exposed sectors	The importance of skills development and utilisation in the workplace falls because of AI/machines
13. Pace of changes in jobs and tasks and greater need for adaptation by the working population	Jobs and tasks change extremely quickly and across the board – adaptation is very challenging	Jobs and tasks change, but at a slower pace or only in a few sectors – adaptation is more manageable	Jobs and tasks do not change quickly	
14. Importance of human-centric skills	Human-centric skills are extremely significant across most/all jobs	Human-centric skills remain important, at moderate levels, for some jobs	Human-centric skills lose importance	
15. Importance of the inclusiveness of education and training and skills development	Inclusiveness is a key factor in state, trade union and employer decisions (with most employers actively contributing)	Inclusiveness is key for states and trade unions but moderately important for employers (some employers actively contribute, while some don't)	Inclusiveness is key only for states and trade unions and is not a priority for employers	Inclusiveness is not a priority for any of the stakeholders
16. Boundaries in education and training	There are no boundaries – full integration (between formal and non-formal, across levels, across strands)	Boundaries continue blurring – great integration into the education and training system	Boundaries stop blurring – remain as they are (modest integration)	Boundaries are reinforced – education and training options become more distinct than they are today
17. Content generation	Training content is very frequently generated by nontraditional sources/stakeholders (AI, peers, users)	New formal stakeholders lead content generation (e.g. professional associations)	Training content keeps being generated by traditional sources/stakeholders (formal curricula dominate)	

Trend	Possible evolutions			
18. The level of use of AI and technologies in education and training	The use of AI and technologies in education and training increases rapidly across all types of learning environments	The use of AI and technologies in education and training increases slowly across all types of learning environments	The use of AI and technologies in education and training increases rapidly, but only within certain types of learning environments	The use of AI and technologies in education and training stagnates or even declines
19. AI tutors transforming the roles of teachers and trainers	AI tutors are able to fully replace teachers and trainers	AI significantly transforms the role of a teacher or trainer	AI tutors increasingly support teachers and trainers in selected tasks; the core of the teachers and trainers' roles remains unchanged	The role of AI is limited to supporting content creation
20. The take-up of AI in guidance and counselling to increase quality and efficiency	AI significantly powers guidance and counselling tools and services in terms of analysis, identification of patterns and suggestions to practitioners	AI supports guidance and counselling tools moderately	AI's contribution to the functions of guidance and counselling tools is minimal	
21. AI transforming the roles of guidance and counselling professionals	AI offers advanced services autonomously (career guidance practitioners are not needed)	Users can receive AI support in advanced career guidance services under the supervision of professional counsellors	Users can receive AI support in basic career guidance services under the supervision of professional counsellors	AI does not interact directly with the users of career guidance services; the role of counsellors remains unchanged

NB: These trend evolutions are as identified in the morphological analysis.
Source: Cedefop.

Annex 3.
Evolution paths

Trend	Evolution path 1 AI has a positive impact on job creation, with most workers benefiting from it	Evolution path 2 AI disrupts most jobs and businesses; it's impact is hard to manage and only some segments of the population benefit	Evolution path 3 AI leads to moderate transformations of tasks and jobs rather than extensive disruptions; changes are generally manageable and some parts of the population benefit	Evolution path 4 AI disrupts economies and societies, replaces almost all jobs and serves only the few controlling it / a few powerful elites; social inequalities grow, and people are left alone/unsupported
1a. Importance of sustainability policies	Sustainability policies **are the norm** across most/all sectors and policy areas	Sustainability policies **decrease in importance**/ they are no longer a key factor influencing policy decisions	Sustainability policies remain fragmented and are only applied **in a limited number** of sectors and policy areas	Sustainability policies **decrease in importance**/they are no longer a key factor influencing policy decisions
1b. Importance of eco-conscious consumer values	The importance of eco-conscious consumer values **spreads across the majority** of the population (due to the rise of new generations/ generation change…)	The importance of eco-conscious consumer values **spreads across the majority** of the population (due to the rise of new generations/ generation change…)	The importance of eco-conscious consumer values **increases mildly** but still remains important only to a part of the population	The importance of eco-conscious consumer values **decreases significantly** and is of interest to a smaller part of the population than it is today
5. AI influence on jobs	AI predominantly brings **job creation**	AI brings **substantial job transformation**	AI brings **moderate job transformation**	AI predominantly brings **job destruction**
6. Labour force in the EU	Labour force in the EU continues to **decline**	Labour force in the EU continues to **decline**	Labour force **stabilises**/decreases, but not significantly	Labour force in the EU continues to **decline**
7. Irregular migration flows into the EU	Irregular migration flows **do not increase**	n/a	Irregular migration flows **increase, but not significantly**	Irregular migration flows **increase significantly**

Trend	Evolution path 1 AI has a positive impact on job creation, with most workers benefiting from it	Evolution path 2 AI disrupts most jobs and businesses; it's impact is hard to manage and only some segments of the population benefit	Evolution path 3 AI leads to moderate transformations of tasks and jobs rather than extensive disruptions; changes are generally manageable and some parts of the population benefit	Evolution path 4 AI disrupts economies and societies, replaces almost all jobs and serves only the few controlling it / a few powerful elites; social inequalities grow, and people are left alone/unsupported
14. Importance of human-centric skills (*)	Human-centric skills are **extremely significant across most/all** jobs or Human-centric skills remain important, at **moderate levels, for some** jobs	Human-centric skills are **extremely significant across most/all** jobs	Human-centric skills remain important, at **moderate levels, for some** jobs	Human-centric skills are **extremely significant across most/all** jobs
3. Sustainability practices across businesses and industries	Sustainability practices **become the standard** across most/all industries and organisations	Sustainability practices affect a **limited** group of businesses and industries (exceptionally)	Sustainability practices are implemented **across some** businesses and industries	Sustainability practices affect a **limited** group of businesses and industries (exceptionally)
4. Disruption in industries and business models	Disruption is **moderate and affects some** industries and business models (medium difficulty to manage)	Disruption is **fast-paced and happens across many** industries and business models (hard to manage)	Disruption is **moderate and affects some** industries and business models (medium difficulty to manage)	Disruption is **fast-paced and happens across many** industries and business models (hard to manage)
8. International competition for talent	International competition for talent is **significant, affecting most** sectors	International competition for talent is **significant, affecting most** sectors	International competition for talent is **insignificant, affecting only a few** sectors	International competition for talent is **insignificant, affecting only a few** sectors
10. Loyalty between employer and employee changes (due to remote work, gig economy and independent work)	Loyalty is **stronger** because organisations want to attract and retain talent in a more fluid and competitive labour market	Loyalty **erodes** because traditional models of employment become less prevalent (increasingly more people choose to enter new/nontraditional	Loyalty of employers to their workers is **not further challenged**	Loyalty **erodes** because traditional models of employment become less prevalent (increasingly more people choose to enter new/nontraditional forms of

Trend	Evolution path 1 AI has a positive impact on job creation, with most workers benefiting from it	Evolution path 2 AI disrupts most jobs and businesses; it's impact is hard to manage and only some segments of the population benefit	Evolution path 3 AI leads to moderate transformations of tasks and jobs rather than extensive disruptions; changes are generally manageable and some parts of the population benefit	Evolution path 4 AI disrupts economies and societies, replaces almost all jobs and serves only the few controlling it / a few powerful elites; social inequalities grow, and people are left alone/unsupported
		forms of employer-employee relationships)		employer-employee relationships)
12. Importance of skills development and utilisation in the workplace	The importance of skills development and utilisation in the workplace **rises significantly** across most sectors	The importance of skills development and utilisation in the workplace **falls** because of AI/machines	The importance of skills development and utilisation in the workplace **remains stable**, affecting only the most exposed sectors	The importance of skills development and utilisation in the workplace **falls** because of AI/machines
15. Importance of the inclusiveness of education and training and skills development	Inclusiveness is a **key factor in state, trade union and employer decisions** (with most employers actively contributing)	Inclusiveness is **not a priority for any** of the stakeholders	Inclusiveness is key **only for states and trade unions** and is not a priority for employers	Inclusiveness is a **key factor in state, trade union and employer decisions** (with most employers actively contributing) or Inclusiveness is **not a priority for any** of the stakeholders
2. Pursuit of purpose-driven careers	Pursuing purpose-driven careers continues to **gain significant momentum** and is a key factor in career choices in many workforce segments	Pursuing purpose-driven careers affects the **choices of some** segments of the workforce	Pursuing purpose-driven careers affects the **choices of some** segments of the workforce	Pursuing purpose-driven careers **stops gaining momentum** and only in exceptional cases affects career choices of the workforce
9. Frequency of career/employer changes over time	Frequency of career/employer changes **increases and changes are mainly voluntary**	Frequency of career/employer changes **increases for mixed reasons** (changes are	Frequency of career/employer changes **remains stable**	Frequency of career/employer changes **increases and changes are mainly involuntary** due to

Trend	Evolution path 1 AI has a positive impact on job creation, with most workers benefiting from it	Evolution path 2 AI disrupts most jobs and businesses; it's impact is hard to manage and only some segments of the population benefit	Evolution path 3 AI leads to moderate transformations of tasks and jobs rather than extensive disruptions; changes are generally manageable and some parts of the population benefit	Evolution path 4 AI disrupts economies and societies, replaces almost all jobs and serves only the few controlling it / a few powerful elites; social inequalities grow, and people are left alone/unsupported
	(increasingly more people embrace changes in their careers)	either voluntary or involuntary)		circumstances beyond people's control (lay-offs, economic restructuring, job instability, etc.)
11. Self-directed professional trajectories and independent career management	Self-directed professional trajectories and independent career management are **an option for more** workforce segments (modest growth) or Self-directed professional trajectories and independent career management are **an option for most/all** individuals (inclusive)	Self-directed professional trajectories and independent career management are **an option for more** workforce segments (modest growth)	Self-directed professional trajectories and independent career management **keep applying to some / the same** workforce segments	Self-directed professional trajectories and independent career management **lose ground**
13. Pace of changes in jobs and tasks and greater need for adaptation by the working population	Jobs and tasks change, but **at a slower pace or only in a few sectors** – adaptation is more manageable	Jobs and tasks change **extremely quickly and across the board** – adaptation is very challenging	Jobs and tasks change, but **at a slower pace or only in a few sectors** – adaptation is more manageable	Jobs and tasks change **extremely quickly and across the board** – adaptation is very challenging
16. Boundaries in education and training	There are **no boundaries – full integration** (between formal and non-formal,	There are **no boundaries – full integration** (between formal and non-formal,	Boundaries **stop blurring** – remain as they are (modest integration)	There are **no boundaries – full integration** (between formal and non-formal, across levels, across strands)

Trend	Evolution path 1 AI has a positive impact on job creation, with most workers benefiting from it	Evolution path 2 AI disrupts most jobs and businesses; it's impact is hard to manage and only some segments of the population benefit	Evolution path 3 AI leads to moderate transformations of tasks and jobs rather than extensive disruptions; changes are generally manageable and some parts of the population benefit	Evolution path 4 AI disrupts economies and societies, replaces almost all jobs and serves only the few controlling it / a few powerful elites; social inequalities grow, and people are left alone/unsupported
	across levels, across strands) or Boundaries **continue blurring** – great integration into the education and training system	across levels, across strands)		
17. Content generation	Training content is **very frequently generated by nontraditional** sources/stakeholders (AI, peers, users) or **New formal stakeholders lead** content generation (e.g. professional associations)	Training content is **very frequently generated by nontraditional** sources/stakeholders (AI, peers, users)	Training content keeps being generated by **traditional sources/stakeholders** (formal curricula dominate)	Training content is **very frequently generated by nontraditional** sources/stakeholders (AI, peers, users) or **New formal stakeholders lead** content generation (e.g. professional associations)
18. The level of use of AI and technologies in education and training	The use of AI and technologies in education and training **increases rapidly across all types** of learning environments	The use of AI and technologies in education and training **increases rapidly across all types** of learning environments	The use of AI and technologies in education and training **increases slowly** across all types of learning environments or The use of AI and technologies in education and training **increases**	The use of AI and technologies in education and training **increases rapidly across all types** of learning environments

Trend	Evolution path 1 AI has a positive impact on job creation, with most workers benefiting from it	Evolution path 2 AI disrupts most jobs and businesses; it's impact is hard to manage and only some segments of the population benefit	Evolution path 3 AI leads to moderate transformations of tasks and jobs rather than extensive disruptions; changes are generally manageable and some parts of the population benefit	Evolution path 4 AI disrupts economies and societies, replaces almost all jobs and serves only the few controlling it / a few powerful elites; social inequalities grow, and people are left alone/unsupported
			rapidly, but only within certain types of learning environments	
19. AI tutors transforming the roles of teachers and trainers	AI tutors **increasingly support** teachers and trainers in selected tasks; the core of the teachers' and trainers' roles remains unchanged	AI **significantly transforms** the role of a teacher or trainer	AI tutors **increasingly support** teachers and trainers in selected tasks; the core of the teachers' and trainers' roles remains unchanged or The role of AI is **limited to supporting content creation**	AI tutors are **able to fully replace** teachers and trainers
20. The take-up of AI in guidance and counselling to increase quality and efficiency	AI **significantly powers guidance and counselling tools and services** in terms of analysis, identification of patterns and suggestions to practitioners	AI **significantly powers guidance and counselling tools and services** in terms of analysis, identification of patterns and suggestions to practitioners	AI **supports guidance and counselling tools moderately**	AI **significantly powers guidance and counselling tools and services** in terms of analysis, identification of patterns and suggestions to practitioners
21. AI transforming the roles of guidance and counselling professionals	Users can receive AI support in **advanced** career guidance services **under the supervision** of professional counsellors or	Users can receive AI support in **advanced** career guidance services **under the supervision** of professional counsellors	Users can receive AI support in **basic** career guidance services **under the supervision** of professional counsellors	AI offers **advanced services autonomously** (career guidance practitioners are not needed)

Trend	Evolution path 1 AI has a positive impact on job creation, with most workers benefiting from it	Evolution path 2 AI disrupts most jobs and businesses; it's impact is hard to manage and only some segments of the population benefit	Evolution path 3 AI leads to moderate transformations of tasks and jobs rather than extensive disruptions; changes are generally manageable and some parts of the population benefit	Evolution path 4 AI disrupts economies and societies, replaces almost all jobs and serves only the few controlling it / a few powerful elites; social inequalities grow, and people are left alone/unsupported
	Users can receive AI support in **basic** career guidance services **under the supervision** of professional counsellors			

(*) For this exercise, 'human-centric skills' refers to social and emotional skills, creativity, innovation and complex problem-solving. This is close to what is also referred to as 'soft skills'.

NB: n/a, not applicable.

Source: Cedefop.

Annex 4.
Scenario overview

Scenario features	Scenario A: a future of opportunities – technology-driven competition for talent	Scenario B: left alone to ride the tide – navigating the AI shock waves on jobs	Scenario C: staying afloat – AI opportunities missed	Scenario D: AI unleashed – dominating the world of work and societies
AI uptake	Extensive	Extensive	Modest	Extensive
Benefits from AI/tech	Widely available; opportunities for most individuals/companies	Not widely available; skills-based polarisation and social divide	Not widely available; mostly tapped by some sectors/industries	Limited to a few entities that own and control AI technologies
Ability to cope with change	Most individuals and companies manage successfully	Not everyone manages, fuelling growing disparities; skills development is responsibility of the individual	Most individuals and companies (just) cope	Dramatic difficulty; skills development is responsibility of the individual
Employment forms	Flexibility and mobility preferred by individuals	Nontraditional employment outpaces full-time, long-term employment	No push for major transformations	Non-standard forms of employment become the norm
Labour relations	Peaceful; high employment and skills development reduce tensions	Tense; new forms of worker representation emerge, traditional unionisation weakens	Modestly peaceful; social protection frameworks do not always keep pace with new forms of work	Extremely tense; power of trade unions drops significantly
AI impact on jobs	Transformation, not replacement: opportunities in higher-value roles	Mixed: augmentation marginally prevails over replacement	Replacement varies across sectors, as depends on cost-benefit analysis	Massive job losses across the board; extensive replacement

Scenario features	Scenario A: a future of opportunities – technology-driven competition for talent	Scenario B: left alone to ride the tide – navigating the AI shock waves on jobs	Scenario C: staying afloat – AI opportunities missed	Scenario D: AI unleashed – dominating the world of work and societies
Skills most needed	Human-centric skills take centre stage	Meta-learning, adaptability, resilience	Technical skills still highly relevant	Highly developed AI-related skills
Inequality	Decreases; scale depends on managing the digital divide	Deepens among individuals and locations with 'opportunity deserts' in certain areas	No additional pressure	Drastically deepens
Learning landscape	Profound transformation; benefits most people	Complex ecosystem, tech-/AI-dominated	AI-supported but not largely transformed	Profound transformations; new AI-powered roles emerge
Sustainability	Growing importance for most parties	Young people concerned; tension from sustainability goals not matching AI/tech advances	Not losing traction, but mostly a concern of individuals	At risk / losing traction; individuals prioritise economic survival

Source: Cedefop.

Annex 5.
Semi-Delphi survey

Cedefop foresight study on continuing skills development in the next 15-20 years
Expert's Delphi-style survey

Fields marked with * are mandatory.

Informed consent form

Please confirm your consent to participate in the survey by checking the boxes below.

	Yes	No
* I have read and understood the invitation e-mail and the purpose of this Delphi-style survey.	○	○
* I consent to anonymised quotations from my answers to be used in reports, publications, and other publicly available outputs (e.g., infographics, etc.) arising from the study.	○	○

Your details

Please enter your contact information. We will use this information only for research purposes (ensure that the same experts reply to both survey rounds), invite you to the second round of the survey, and send you a summary report with the results.

* **First name**
* **Family name**
* **Organisation**
* **Contact email**

* **My primary field of expertise is (please select one from the list):**
  - ○ Labour market
  - ○ Learning or skills development
  - ○ Digitalisation

- Foresight or research
- None of the above

Please clarify: *Text of 2 to 300 characters will be accepted*

* **I currently represent** (please select one from the list)
- Industry or employer association
- Government
- Civil society organisation
- Higher education or research organisation
- Learning provider
- Worker or professional association
- Other

Please, specify: *Text of 2 to 150 characters will be accepted*

Four scenarios for the future

Continuing skills development will play an increasingly pivotal role in shaping the future of work and society. It encompasses the provision of, support for, and active participation in adult learning activities that focus on acquiring and improving job-relevant skills through various on-the-job and off-the-job learning opportunities, enabling workers to remain competitive and adaptable in a changing labour market.

While the importance of continuing skills development is widely acknowledged, the current efforts fall short of meeting the demands posed by the rapidly evolving labour market and future challenges.

Cedefop has developed four future scenarios, that offer alternative views on how different features and conditions relevant to continuing skills development might evolve in the next 15-20 years. Each survey part (A-D) briefly introduces one of the scenarios and provides a link to its full description.

Each scenario compiles a set of different features and conditions related to several trends relevant to continuing skills development. Please note that this Delphi-type survey considers various possible futures, including less probable ones. Therefore, the purpose of this survey is not to see which scenario is more plausible, but to **consolidate our assumptions/statements on selected features in the context of a specific scenario.**

You are asked to provide your views on how different scenario features are likely to develop in 15-20 years from now in Europe. For each assumption or statement, you are given:

(a) Options on your agreement/disagreement to the statement or the extent of its application **within the context of a specific scenario** – you can select one option.
(b) A list of arguments that supports your view on the statement – you can select up to three or add yours (free text).
(c) Options on the degree of confidence in your prediction, which might reflect the uncertainty of the statement evolution, or the level of your expertise in the specific statement – you can select one option.

The last part (E) allows you to share with us your general feedback and ideas that are not specific to any of the scenarios.

Estimated time required for completion: 45-60 minutes.

It is possible to save a draft of your responses and return to complete the survey at a later stage.

A. A future of opportunities – technology-driven competition for talent

Scenario assumptions

In this scenario, most workers and organisations in Europe benefit from AI advancements. Skills shortages deepen and competition for talent stiffens, while human-centric skills (human attributes such as emotional intelligence, critical thinking, leadership, and complex problem-solving) remain crucial. Talent retention becomes a critical issue for employers, as does on and off-the-job skills development and utilisation.

Purpose-driven careers (i.e. people align their work with personal values, aiming to contribute positively to society, or drive change in areas like social justice, sustainability, education, or health) gain momentum. Technological change and growing demand for continuing skills development bring forth full integration of a learning environment in businesses (i.e. working places become lifelong learning spaces). Boundaries between different types and forms of learning diminish, perhaps even disappear completely. Many new, non-traditional actors emerge as frequent creators of learning content, often leveraging AI. Please download the full scenario description here.

We want to test how some features of this scenario might roll out in the next 15-20 years in Europe. Please read and assess the following statements in the context of the present scenario.

A1. In this scenario, in 15-20 years, skills shortages force most employers to embrace inclusiveness and diversity in hiring and promotion (employers actively seeking, including, and advancing individuals from a wide range of

backgrounds) to better tap into all existing sources of talent. Do you agree with this assumption?

- ○ Strongly agree
- ○ Somewhat agree
- ○ Somewhat disagree
- ○ Completely disagree

A1a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones: *between 1 and 3 choices*

- ☐ Employers use alternative means to deal with skills shortages (for example via automation, outsourcing …).
- ☐ Skills shortages are already severe, but we do not see that employers substantially lean on inclusive hiring and promotion practices. There is no link between skills shortages and the growth of inclusiveness and diversity in the business sector.
- ☐ It may happen to a certain degree, but the business sector still could be more inclusive in hiring and promotion.
- ☐ Inclusiveness and diversity in hiring and promotion rises because, in a global skills shortage situation, outsourcing (i.e. hiring external workers or companies, often from other countries) will no longer be an option.
- ☐ The rise of inclusiveness in hiring and promotion at the workplace will be mainly driven by other factors than skills shortages (for example, rising corporate responsibility etc.).
- ☐ Other opinion(s). Please specify below:

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

A1b. How confident are you in your prediction?

- ○ Very confident
- ○ Somewhat confident
- ○ Not very confident
- ○ Not at all confident

A2. In this scenario, in 15-20 years, a growing number of workers can design their career trajectories and learning journeys independently, taking advantage of widespread skills shortages and abundant job opportunities. What do you think of such a connection?

- ○ Strongly agree
- ○ Somewhat agree
- ○ Somewhat disagree
- ○ Completely disagree

A2a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones: *between 1 and 3 choices*

- ☐ Skills shortage and talent scarcity empower most workers to put a greater emphasis on their happiness, personal growth, and the meaningfulness of their jobs. They gain more courage to pursue better jobs.
- ☐ Most workers are more autonomous in designing their career trajectories and learning journeys, as technological developments and learning system integration have made learning and skills recognition more accessible and efficient.
- ☐ Workers' capacity to autonomously manage their careers and skills development depends on their qualifications and skills. Mostly those with higher-level skills and better access to learning opportunities can actively shape their careers and skills development.
- ☐ Personal attributes (willingness to risk, entrepreneurship, adaptability …) are more important for the active shaping of one's career than the availability of jobs. Mostly people possessing these attributes are able to actively shape their careers, but they will still be a minority.
- ☐ Other opinion(s). Please specify below:

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

A2b. How confident are you in your prediction?

- ◯ Very confident
- ◯ Somewhat confident
- ◯ Not very confident
- ◯ Not at all confident

A3. In this scenario, in 15-20 years, the distinctions between formal education, non-formal learning and different educational levels, may significantly diminish or even disappear, leading to a more integrated and flexible approach to lifelong learning. Do you agree this can happen?

- ◯ Strongly agree
- ◯ Somewhat agree
- ◯ Somewhat disagree
- ◯ Completely disagree

A3a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones: *between 1 and 3 choices*

- ☐ Technological advancements and digital platforms seamlessly integrate various forms of learning, making traditional distinctions obsolete.
- ☐ The increasing demand for continuing upskilling in the workforce drives the merger of formal and non-formal education systems for more efficient, lifelong learning.

- ☐ While some blending of educational approaches occurs, core distinctions between formal and non-formal learning remain, with increased recognition and integration of diverse learning experiences.
- ☐ The boundaries between educational levels may become more flexible, but formal education systems adapt to incorporate more non-formal elements rather than disappearing entirely.
- ☐ Established educational institutions and accreditation systems resist significant changes, maintaining clear distinctions between formal and non-formal education.
- ☐ Employers and industries continue to value traditional credentials, preserving the relevance of distinct educational levels and formal qualifications.
- ☐ Other opinion(s), please specify below.

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

A3b. How confident are you in your prediction?

- ◯ Very confident
- ◯ Somewhat confident
- ◯ Not very confident
- ◯ Not at all confident

A4. In this scenario, in 15-20 years, environmentally and socially responsible practices are widely integrated into government policies and business operations across diverse industries and all types of employers. Do you agree with this statement?

- ◯ Strongly agree
- ◯ Somewhat agree
- ◯ Somewhat disagree
- ◯ Completely disagree

A4a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones: *between 1 and 3 choices*

- ☐ Environmental challenges become more severe. Governments implement stricter regulations, which both businesses and the public embrace.
- ☐ Growing consumer awareness and preference for sustainable products and services are driving businesses to adopt more responsible practices.
- ☐ New technologies are making it easier and more cost-effective for businesses to implement environmentally friendly solutions.
- ☐ Despite severe environmental challenges, businesses and governments still prioritize short-term economic gains over long-term environmental and social sustainability.
- ☐ While some countries have made significant progress, others lag in integrating responsible practices into policies and business operations.

- ☐ Many businesses, especially smaller ones, may find it challenging to implement environmentally and socially responsible practices due to perceived high costs.
- ☐ Environmental challenges are pushed back from policy agendas by other issues, perceived as more important by stakeholders (security, migration, unfavourable economic developments leading to cuts in investments and people's disposable income).
- ☐ Other opinion(s), please specify below.

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

A4b. How confident are you in your prediction?

- ○ Very confident
- ○ Somewhat confident
- ○ Not very confident
- ○ Not at all confident

A5. In this scenario, in 15-20 years, as AI capabilities expand and become more pervasive across industries, there is a corresponding increase in the value placed on human-centric skills in the workforce (critical thinking, problem-solving, analytical skills, creativity, decision-making, empathy, active listening, presentation skills, digital literacy, strategic thinking, etc.). Do you agree that this connection is plausible?

- ○ Strongly agree
- ○ Somewhat agree
- ○ Somewhat disagree
- ○ Completely disagree

A5a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones: *between 1 and 3 choices*

- ☐ AI developments have no relation to the demand for human-centric skills, these two are independent.
- ☐ AI capabilities develop so quickly that it is increasingly able to replace human-centric skills as well.
- ☐ AI replaces only routine skills and force workers to invest in the further development of human-centric skills to stay relevant in the job market.
- ☐ AI penetrates only selected jobs or industries, and its impact on the demand for human-centric skills are minimal.
- ☐ The uptake of AI leads to new job creation in general, and demand for all types of skills increases.
- ☐ Other opinion(s), please specify below.

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

A5b. How confident are you in your prediction?

- ○ Very confident
- ○ Somewhat confident
- ○ Not very confident
- ○ Not at all confident

A6. In this scenario, in 15-20 years, as a result of persistent skills gaps and talent scarcity, employers increasingly prioritise employee retention strategies and implement more robust measures to maintain and develop their existing workforce. Do you agree that this connection is plausible?

- ○ Strongly agree
- ○ Somewhat agree
- ○ Somewhat disagree
- ○ Completely disagree

A6a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones: *between 1 and 3 choices*

- ☐ Companies apply other means to cope with skills shortages (automation, outsourcing ...), rather than prioritising the retention of their workforce (through training, on-the-job skills development, skills utilisation, etc.).
- ☐ Only companies in some sectors prioritise the retention of their workforce (through training, on-the-job skills development, skills utilisation, etc.). Companies in sectors with a lower value-added and/or prevalence of routine types of jobs are not affected.
- ☐ Only employees in jobs where specialised or unique skills are required benefit of employers' retention strategies.
- ☐ Talent and workforce retention strategies depend mainly on the company culture and the extent of job turnover in a specific workplace. They are influenced by the general skills shortage situation.
- ☐ Skills shortages affect most sectors/jobs, forcing most employers to care more for their workforce.
- ☐ Other opinion(s), please specify below.

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

A6b. How confident are you in your prediction?

- ○ Very confident
- ○ Somewhat confident
- ○ Not very confident
- ○ Not at all confident

A7. In this scenario, in 15-20 years, the labour force in the EU continues to decline, making the labour markets even tighter (there are not enough workers to fill all the available jobs). Do you agree with this development?

- ◯ Strongly agree
- ◯ Somewhat agree
- ◯ Somewhat disagree
- ◯ Completely disagree

A7a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones: *between 1 and 3 choices*

- ☐ EU effectively addresses its declining native workforce through immigration.
- ☐ Technological advancements and automation reduce the need for human workers, offsetting the impact of a declining labour force.
- ☐ Increased retirement ages and policies promoting longer working lives coupled with advances in health care help maintain a stable workforce despite demographic changes.
- ☐ The EU enlarges as some of the candidate countries successfully enter the bloc. The EU workforce deficit is partially solved by the extensive relocation of companies coming from industries with the most severe shortages into these new Member States.
- ☐ The EU does not expand, and severe limitations of migrant inflow exacerbate the skills shortages.
- ☐ Companies react to by extensive relocation of their activities out of the EU.
- ☐ Other opinion(s), please specify in the box below.

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

A7b. How confident are you in your prediction?

- ◯ Very confident
- ◯ Somewhat confident
- ◯ Not very confident
- ◯ Not at all confident

B. Left alone to ride the tide: Navigating the AI shockwaves on jobs

Scenario assumptions

In this scenario, AI disrupts most jobs and businesses in Europe. Individuals are responsible for their ongoing skills development, keeping up with changing skills requirements, and maintaining their employability. Changes are hard to manage and only some parts of the population benefit. Other parts, smaller in number, face challenges in adapting resulting in struggles to remain in employment with associated costs to their mental, physical, and socio-economic well-being. There is a resulting polarisation of the workforce. Please download the full scenario description here.

We want to test how some features of this scenario might roll out in the next 15-20 years in Europe. Please read and assess the following statements **in the context of the present scenario.**

B1. In this scenario, in 15-20 years, Generation Z (born approximately between 1997 and 2012) and Generation Alpha (born from approximately 2013 onwards) account for more than 60% of the total workforce, alongside some Millennials (who are in their late 50s to early 60s) and potentially some Gen X (who are in their 60s and 70s). The workforce is able to cope with the rapid changes in the labour market in the proportion of:

- ○ 80% or more
- ○ Between 50% and 79%
- ○ Less than 50%

B1a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones: *between 1 and 3 choices*

- ☐ The high majority is technologically savvy and highly qualified across all sectors.
- ☐ There are significant sectoral variations, with some industries dominated by younger generations while others maintain a more balanced age distribution.
- ☐ Even if the high majority is highly qualified, knowledge is superficial.
- ☐ People from disadvantaged socioeconomic backgrounds and living in disadvantaged rural and urban areas do not have access to quality education.
- ☐ Older workers (in their 50s and above) are typically less able to manage, cope with the changes.
- ☐ A significant portion of the workforce experience mental health challenges due to the pervasive use of technology in both professional and personal spheres, potentially leading to increased social isolation and feelings of disconnection.

- [ ] Constrained public budgets limit governmental capacity to provide comprehensive support for workforce adaptation, potentially exacerbating skills gaps and socioeconomic disparities
- [ ] Other opinion(s), please specify below.

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

B1b. How confident are you in your prediction?

- ( ) Very confident
- ( ) Somewhat confident
- ( ) Not very confident
- ( ) Not at all confident

B2. In this scenario, in 15-20 years from now, workers (have to) take personal responsibility for their continuing skills development and career progression:

- ( ) Strongly agree
- ( ) Somewhat agree
- ( ) Somewhat disagree
- ( ) Completely disagree

B2a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones: *between 1 and 3 choices*

- [ ] Public policy and resources primarily focus on initial education and training, particularly higher education, leaving continuing skills development to individuals.
- [ ] Public policies emerge to support individual continuing skills development, creating a shared responsibility model between workers, employers, and the state.
- [ ] Public policy and resources primarily focus on the disadvantaged groups.
- [ ] Employers do not provide sufficient support for continuing skills development, shifting the responsibility to individuals.
- [ ] While workers bear more responsibility, employers still play a crucial role in providing resources and opportunities for continuing skills development.
- [ ] There is a strong preference for self-directed and peer-to-peer learning among workers across the board.
- [ ] There is a strong sectoral variation, with workers in rapidly evolving fields like tech taking more personal responsibility than those in more traditional sectors.
- [ ] There is a strong variation by age groups, with people from Generation Z and Generation Alpha taking more responsibility.
- [ ] The rise of the gig economy and project-based work naturally encourage more autonomous continuing skills development and personal initiative in career management.

- ☐ Increased individualization in society leads to workers taking more personal responsibility for their continuing skills development.
- ☐ The degree of personal responsibility depends on socioeconomic factors, potentially widening the skills gap between different segments of the workforce.
- ☐ Other opinion(s), please specify below.

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

B2b. How confident are you in your prediction?

- ○ Very confident
- ○ Somewhat confident
- ○ Not very confident
- ○ Not at all confident

B3. In this scenario, in 15-20 years from now, what share of the workforce is ready for autonomous learning:

- ○ 80% or more
- ○ Between 50% and 79%
- ○ Less than 50%

B3a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones: *between 1 and 3 choices*

- ☐ Most workers (irrespective of their generation) have developed strong meta-skills such as learning how to learn, resilience, and adaptability, enabling them to take charge of their own skills development.
- ☐ While a majority is prepared for autonomous learning of job-specific skills, fewer are ready for the metacognitive aspects of self-directed learning.
- ☐ The level of preparedness correlates strongly with educational background, creating potential disparities in workforce adaptability.
- ☐ Preparedness for autonomous learning is high in technical skills but lower for soft skills and leadership capabilities.
- ☐ Preparedness varies greatly between different age groups within the workforce, with younger generations (Generation Z and Generation Alpha) generally more adapted to autonomous learning.
- ☐ The readiness for autonomous learning is influenced by the quality and accessibility of AI-powered learning tools and platforms.
- ☐ Information overload and decision fatigue in choosing learning paths hinder workers' ability to effectively manage their own continuing skills development.
- ☐ Workers lack long-term planning skills due to the fast-paced, short-term nature of digital content, making it difficult to manage career progression.
- ☐ Psychological problems caused by increased isolation and feeling of alienation hinder people's capacity and will to manage their continuing

skills development autonomously.
- ☐ The pressure to constantly upskill can lead to anxiety and burnout impacting capacity for self-directed learning.
- ☐ Socio-economic disparities and geographical inequalities still account for people's lack of capacity to engage in continuing skilling autonomously.
- ☐ Other opinion(s), please specify below.

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

B3b. How confident are you in your prediction?
- ◯ Very confident
- ◯ Somewhat confident
- ◯ Not very confident
- ◯ Not at all confident

B4. In this scenario, in 15-20 years, continuing skills development is dominated by non-traditional actors (peer-to-peer learning networks, industry-specific online communities, tech companies which develop learning platforms) and forms of delivery.
- ◯ Strongly agree
- ◯ Somewhat agree
- ◯ Somewhat disagree
- ◯ Completely disagree

B4a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones: *between 1 and 3 choices*
- ☐ Tech giants and AI companies become major providers of skills development programmes, leveraging their technological expertise and data analytics capabilities.
- ☐ AI-driven personalised learning assistants become a primary mode of continuing skills development, adapting in real-time to individual learning needs and preferences.
- ☐ Global online communities centered around specific skills or industries emerge as key players in continuing skills development.
- ☐ Training providers are not able to compete with new, non-traditional content generation and are out of the market unless they team up with big tech companies and online platform developers.
- ☐ Industry consortiums create their own specialised training programmes and certifications, bypassing traditional educational institutions.
- ☐ Certain traditional actors (such as universities, tertiary technical and vocational education institutes) are regarded and act as strongholds of quality continuing skills development and still play a role.
- ☐ Other opinion(s), please specify below.

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

B4b. How confident are you in your prediction?

- Very confident
- Somewhat confident
- Not very confident
- Not at all confident

B5: In this scenario, in 15-20 years, traditional full-time, long-term employment drops to less than 40%, outpaced by non-traditional forms (blockchain or smart contracts, platform work, project-based contracts).

- Strongly agree
- Somewhat agree
- Somewhat disagree
- Completely disagree

B5a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones: *between 1 and 3 choices*

- Regulations curtail the use of non-traditional forms of employment.
- The evolving business landscape drives demand for highly specialised, project-specific expertise, encouraging a shift towards more flexible, task-oriented employment models that can quickly adapt to changing market needs.
- Global talent acquisition becomes increasingly prevalent as businesses seek to leverage diverse skills sets and perspectives, facilitated by remote work technologies and evolving international labour regulations.
- The shift away from traditional employment is most pronounced in the tech and creative industries, while traditional sectors like healthcare and education maintain higher levels of traditional employment.
- All businesses still use traditional full-time, long-term employment for some employees.
- While traditional employment decreases overall, it remains the dominant form in regions with strong labour protections and union presence.
- The shift away from traditional employment is more extreme in urban areas, creating an urban-rural divide in employment patterns.
- Younger generations (Generation Z and Generation Alpha) are more entrepreneurial-minded, prefer multiple contracts and work experiences.
- Other opinion(s), please specify below.

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

B5b. How confident are you in your prediction?

- Very confident
- Somewhat confident
- Not very confident
- Not at all confident

B6. In this scenario, in 15-20 years, adoption of AI leads to transformation in work organisation augmenting rather than replacing human capabilities in:

- 80% or more businesses
- Between 50% and 79% businesses
- Less than 50% businesses

B6a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones: *between 1 and 3 choices*

- Tight labour markets lead to the adoption of AI to complement human capital across sectors, businesses and geographical locations, with many AI applications aiming at augmenting rather than replacing human capabilities.
- Adoption of AI to complement human capital vary strongly by sectors and geographical locations.
- Regulatory frameworks and ethical considerations guide AI adoption towards augmentation rather than replacement in most businesses.
- The rapid advance of AI capabilities makes it more cost-effective for businesses to replace rather than augment human workers in many roles.
- The need for human oversight and decision-making in AI systems ensure that augmentation remains the primary mode of AI integration in most businesses.
- Other opinion(s), please specify below.

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

B6b. How confident are you in your prediction?

- Very confident
- Somewhat confident
- Not very confident
- Not at all confident

B7. In this scenario, in 15-20 years, AI-transformed work organisation is learning-conducive (employers actively support, encourage, and facilitate continuing learning and skills development).

- Strongly agree
- Somewhat agree

- Somewhat disagree
- Completely disagree

B7a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones: *between 1 and 3 choices*

- AI systems take over routine tasks, allowing humans to focus on more creative and strategic work that leverages uniquely human skills.
- Human-AI teams become common, with AI assistants working alongside humans to increase productivity and innovation.
- AI enhances human cognitive capabilities, such as memory and information processing, through seamlessly integrated interfaces.
- AI systems take on the role of intelligent advisors, providing suggestions and options for humans to make final decisions. AI enables more flexible and distributed work arrangements by facilitating remote collaboration and virtual presence.
- AI favours project and team-based work and the creation of multi-national and pluri-disciplinary teams.
- AI adoption leads to micro-tasking and working in isolation.
- Algorithm-based human management leads to a dehumanization of the workplace with people being demotivated and disengaged from professional growth.
- Other opinion(s), please specify below.

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

B7b. How confident are you in your prediction?

- Very confident
- Somewhat confident
- Not very confident
- Not at all confident

B8. In this scenario, in 15-20 years from now, traditional unionization is weaker, but new forms of worker representation emerge.

- Strongly agree
- Somewhat agree
- Somewhat disagree
- Completely disagree

B8a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones: *between 1 and 3 choices*

- Increased remote work and gig economy participation lead to worker disconnection.
- Digital platforms and social media facilitate the rise of decentralised,

grassroots worker advocacy groups that can quickly mobilize around specific issues.
- ☐ Traditional unions retain strength in sectors with a history of strong labour organization, such as healthcare, education, and some manufacturing industries.
- ☐ The gig economy and project-based work necessitate new models of collective bargaining that can accommodate non-traditional employment relationships.
- ☐ Global digital labour platforms may lead to the emergence of transnational worker alliances, challenging the traditional nation-based union model.
- ☐ Younger generations may prefer more flexible, cause-oriented forms of collective action over traditional union membership, leading to episodic rather than sustained labour movements.
- ☐ Other opinion(s), please specify below.

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

B8b. How confident are you in your prediction?

- ◯ Very confident
- ◯ Somewhat confident
- ◯ Not very confident
- ◯ Not at all confident

C. Staying afloat: AI opportunities missed

Scenario assumptions

In this scenario, AI leads to moderate transformations in tasks and jobs across Europe, rather than extensive disruptions. Changes are manageable and some parts of the population benefit, but many miss out on the opportunities, and some keep struggling. Skills shortages do not grow, and loyalty levels between employers and employees remain unchanged. The importance of skills development and utilisation stays at today's levels, as well as the share of people who self-direct their careers. There is no significant push for further blurring of the various education and training options. Learning contents are still generated mostly by traditional actors. AI's influence on learning, teaching and career guidance remains limited. Please download the full scenario description here.

We want to test how some features of this scenario might roll out in the next 15-20 years in Europe. Please read and assess the following statements **in the context of the present scenario.**

C1. In this scenario, in 15-20 years, geopolitical developments and political choices of European countries keep the AI uptake at modest levels.

- ○ Strongly agree
- ○ Somewhat agree
- ○ Somewhat disagree
- ○ Completely disagree

C1a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones. *between 1 and 3 choices*

- ☐ European countries keep focused on defence and security, therefore diverting funding away from the wider expansion of AI-related technologies and initiatives in other domains.
- ☐ European countries regulate the expansion of AI in more fields to address security-related concerns (on top of others, such as ethical ones).
- ☐ In the context of modest transformations, European countries do not have a strong motivation to incentivise AI advances – the latter is driven by investments in specific industries and sectors that see the most financial benefits in such investments.
- ☐ Political priorities and reinforced social dialogue result in regulation protecting employees from AI replacement, which in turn refrains investments for its rapid expansion.
- ☐ Regardless of the uptake of AI advances by companies and citizens, European states are willing to finance start-up costs for new technologies to emerge and mature.
- ☐ AI becomes a major field for geopolitical safety and superiority for Europe, and investments in AI intensify.

- [ ] Other opinion(s), please specify below.

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

C1b. How confident are you in your prediction?

- ( ) Very confident
- ( ) Somewhat confident
- ( ) Not very confident
- ( ) Not at all confident

C2. In this scenario, in 15-20 years, the modest AI uptake means that technical/vocational skills are as important as human-centric skills (critical thinking, problem-solving, analytical skills, creativity, decision-making, empathy, active listening, presentation skills, digital literacy, strategic thinking, etc.) across jobs and sectors.

- ( ) Strongly agree
- ( ) Somewhat agree
- ( ) Somewhat disagree
- ( ) Completely disagree

C2a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones. *between 1 and 3 choices*

- [ ] As the replacement of human labour by AI is not widespread across sectors, many jobs continue to rely on the technical skills that the human workforce possesses. Technical skills of the workforce remain relevant and are enhanced to allow the use of and coexistence with AI-related solutions.
- [ ] Higher-level technical skills (e.g. programming, data processing, interface design) gain importance, so that AI-supported solutions are produced and become widely applicable and available.
- [ ] The fear of replacement in low/middle-skilled jobs pushes employees to intensify their work efforts to keep their jobs – therefore technical skills remain relevant and are intensively used in such professions.
- [ ] Regardless of AI advancement and (fear of) replacement, human-centric skills become more important than technical ones because they allow innovation and agile adaptation to production changes.
- [ ] Even though replacement by AI is not widespread across sectors, it affects first jobs relying on technical skills, which therefore lose importance over human-centric ones.
- [ ] Human-centric skills are far more important, as they are the hardest to be replaced by AI in a relatively short time span in all jobs and/or sectors.
- [ ] Other opinion(s), please specify below.

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

C2b. How confident are you in your prediction?

- Very confident
- Somewhat confident
- Not very confident
- Not at all confident

C3. In this scenario, in 15-20 years, the social protection of workers loses ground, failing to address challenges related to AI expansion/replacement, or access to training and eventually jobs.

- Strongly agree
- Somewhat agree
- Somewhat disagree
- Completely disagree

C3a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones. *between 1 and 3 choices*

- Social dialogue fails to produce an updated network of protection that functions well in the context of a more AI-based/automation economy.
- Participation of workers in trade unions loses ground as non-traditional forms of employment become more frequent (e.g. platform-based work).
- Employers frequently use the looming fear to reduce wages and downgrade working conditions, even if the actual replacement remains modest.
- Sectors that face greater shortages engage in social dialogue that results in satisfying working conditions and worker protection, while others that are more open to AI replacement or face fewer hiring difficulties do not.
- Social partners and states have already devised new frameworks for social protection to meet the ongoing (current) trends in the labour market, such as skills shortages, increase in non-traditional forms of employment, and resignation / lack of motivation of Gen Z to find regular employment.
- In a context of modest transformations, there is less pressure for major organisational overhauls, which allows the application of sufficiently protective terms for workers as a product of social dialogue.
- Other opinion(s), please specify below.

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

C3b. How confident are you in your prediction?

- Very confident
- Somewhat confident

- Not very confident
- Not at all confident

C4. In this scenario, in 15-20 years, the modest AI uptake in industries means that jobs based on repetitive tasks are still important and represent a significant share of all jobs (e.g. 15-20%).

- Strongly agree
- Somewhat agree
- Somewhat disagree
- Completely disagree

C4a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones. *between 1 and 3 choices*

- Such jobs continue to exist, as in such industries based on repetitive tasks, AI becomes a less profitable production option and employers in such industries have fewer incentives to meet the costs of introducing AI options.
- The employers use the looming fear of AI replacement to intensify their employees' output, lower wages and working conditions, thus making it more profitable if humans perform these jobs.
- Replacement of jobs based on repetitive tasks varies among sectors: such jobs are being replaced if an industry sees significant economic benefit, but some, in other industries, may be less affected.
- Regardless of the pressures on workers' wages and working conditions, AI anyway becomes more efficient in such tasks (and more profitable for employers).
- As regulations aiming at improving working conditions in jobs based on repetitive tasks make them less profitable for employers if performed by humans (compared to AI), therefore humans are mostly being replaced in such jobs.
- Other opinion(s), please specify below.

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

C4b. How confident are you in your prediction?

- Very confident
- Somewhat confident
- Not very confident
- Not at all confident

C5. In this scenario, in 15-20 years, moderate transformation leads to little investment from the private sector in training adults, especially when they are not company staff.

- ◯ Strongly agree
- ◯ Somewhat agree
- ◯ Somewhat disagree
- ◯ Completely disagree

C5a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones. *between 1 and 3 choices*

- ☐ Companies do not face major hiring difficulties, so they rely on training of adults led and/or financed by the State and focus their own training investments on existing staff.
- ☐ Training of specific segments of adult population, i.e. less represented, or on the brinks of the labour market, is a priority only for the state and the trade unions.
- ☐ Company training varies by group: employers may be more prone to offer training to specific demographics, e.g. unemployed women over people over 50 or refugees/migrants.
- ☐ Depends on the jobs and sectors in question, e.g. companies decide to train existing staff, hire or train the general population on the basis of cost-effectiveness of each option in their own context.
- ☐ Employers follow an occupational logic in training, investing in future workforce able to meet future sector needs rather than their own current ones.
- ☐ Technological changes alone (e.g. digital divide) urge employers to invest in training adults outside their staff, to ensure there is sufficient workforce.
- ☐ Demographic changes alone (ageing, increased share of population of migrant background) urge employers to invest in training adults outside their workforce, to ensure there is a sufficient supply of skills and labour.
- ☐ Other opinion(s), please specify below.

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

C5b. How confident are you in your prediction?

- ◯ Very confident
- ◯ Somewhat confident
- ◯ Not very confident
- ◯ Not at all confident

C6. In this scenario, in 15-20 years, the modest technological transformation does not lead to any further push for a major paradigm shift for European economies and societies favouring greening/sustainability.

- ◯ Strongly agree
- ◯ Somewhat agree
- ◯ Somewhat disagree
- ◯ Completely disagree

C6a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones. *between 1 and 3 choices*

- ☐ Most companies and individuals feel they are able to cope with technological change and do not seek drastic changes in consumption and production paradigms.
- ☐ Sustainability gains no further traction in the policy agenda because there is less interest to add pressure for significant transitions since the overall transformations are modest and manageable.
- ☐ Sustainability policies influence only a limited number of sectors and policy areas.
- ☐ Eco-conscious values drive the preferences and behaviours of only some parts of the population – general awareness does not always translate to specific consumer behaviour.
- ☐ Even the modest AI uptake has a positive impact on production efficiency, and AI-based solutions are designed to support sustainability initiatives.
- ☐ Regardless of the ability to manage challenges from AI/technology-related transformations, sustainability keeps growing in importance among citizens.
- ☐ Regardless of the ability to manage challenges from AI/technology-related transformations, sustainability keeps growing in importance among employers/companies.
- ☐ Regardless of the ability to manage challenges from AI/technology-related transformations, sustainability keeps growing in importance among policy-makers and states.
- ☐ Other opinion(s), please specify below.

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

C6b. How confident are you in your prediction?

- ◯ Very confident
- ◯ Somewhat confident
- ◯ Not very confident
- ◯ Not at all confident

D. I unleashed: dominating the world of work and societies

Scenario assumptions

In this scenario, AI disrupts economies and societies and brings large-scale job destruction in Europe. Companies race to adapt and exploit AI advance to stay competitive and pursue economic growth and profit. While skills development and utilisation at the workplace falls and most skills decline in importance, human-centric skills (human attributes such as emotional intelligence, critical thinking, leadership, and complex problem-solving) are more important than ever. Employers no longer have interest in developing the skills of a disposable human labour force, and workers bear full responsibility for their skills development needs in order to try to cope with increasing disruptions. International competition for talent loses ground, as demand for human jobs is reduced. Traditional models of employment therefore become less prevalent, and companies resort more and more to gig workers and other workers in nonstandard forms of work for performing their tasks. The loyalty between workers and employers erodes as a result. With fewer opportunities in the job market, purpose-driven careers stop gaining momentum. Career changes are frequent but mainly involuntary. Jobs and tasks change extremely fast, and adapting to changes is very difficult. AI's impact on learning and career guidance is significant and can fully replace teachers and trainers. Please download the full scenario description here.

We want to test how some features of this scenario might roll out in the next 15-20 years in Europe. Please read and assess the following statements **in the context of the present scenario.**

D1. In this scenario, in 15-20 years, AI disrupts democratic processes. Private entities owning and controlling AI technologies rule the democratic stage and lead to the rise of authoritarian powers at the expense of collective well-being and social cohesion.

- ○ Strongly agree
- ○ Somewhat agree
- ○ Somewhat disagree
- ○ Completely disagree

D1a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones.

between 1 and 3 choices

- ☐ Policymakers cannot keep up with the rapid pace of technological developments coming out of the private sector. No regulation safeguarding citizens' rights in light of AI developments is implemented. Citizens are disempowered and polarised movements rise.
- ☐ Rise of automated decision-making (decisions are made by automated

means and without human involvement). Algorithms abused to impact user satisfaction, engagement, political views and awareness. Democracy is weakened and extremism rise.
- ☐ Rise of automated decision-making with built-in fairness, participation, and transparency. Democracy is strengthened and vulnerable and marginalised groups are given a voice.
- ☐ Populism and fake news generated by uncontrolled AI and technological development in turn fuel bottom-up anti-technology movements.
- ☐ Other opinion(s), please specify below.

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

D1b. How confident are you in your prediction?
- ○ Very confident
- ○ Somewhat confident
- ○ Not very confident
- ○ Not at all confident

D2. In this scenario, in 15-20 years, generative AI technologies change and destroy jobs on a large scale. The importance of human-centric skills such as emotional intelligence, critical thinking, leadership, and complex problem-solving, rises.
- ○ Strongly agree
- ○ Somewhat agree
- ○ Somewhat disagree
- ○ Completely disagree

D2a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones. *between 1 and 3 choices*
- ☐ Human-centric skills are the hardest to replace and automated by AI in a relatively short time span (15-20 years) in all jobs and/or sectors.
- ☐ Due to AI/machines rippling effects on jobs, people have less opportunities to use and develop their skills, including human centric skills. Human centric skills lose importance and are mastered by few at their own cost.
- ☐ AI technologies have developed their own AI generated human centric skills. Inherently human 'Human centric skills' remain important only in few sectors and jobs where AI and technologies are not yet in place.
- ☐ Regardless of AI advancements and job destruction, human-centric skills become more important because they allow innovation and agile adaptation to disruptions.
- ☐ AI affects first jobs relying on technical skills. These jobs lose importance over those relying on human-centric ones.
- ☐ Jobs change but not necessarily disappear. Tasks relying on technical

skills are automated and some human jobs disappear. Tasks and jobs relying on human-centric skills become more important.

- [ ] Other opinion(s), please specify below.

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

D2b. How confident are you in your prediction?

- ( ) Very confident
- ( ) Somewhat confident
- ( ) Not very confident
- ( ) Not at all confident

D3. In this scenario, in 15-20 years, job losses and extensive job changes from increased use of generative AI technologies and automation are not counterbalanced by measures safeguarding workers' rights and ensuring equal access to opportunities in the labour market and training.

- ( ) Strongly agree
- ( ) Somewhat agree
- ( ) Somewhat disagree
- ( ) Completely disagree

D3a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones. *between 1 and 3 choices*

- [ ] Access to employment and training rely on fully automated processes. No checks and limitations are in place to counterbalance biases in access to opportunities (discrimination, misuse of data, privacy etc.).
- [ ] Companies invest in the skills development of a limited share of their workforce related to AI generative technologies.
- [ ] Recruitment is limited to highly AI/technology skilled individuals. Others are pushed out of the labour market and vulnerable. Trade unions no longer have the power to exert their influence and to safeguard workers' rights and interests.
- [ ] Rise of bottom-up (grassroots) movements advocating for diversity and inclusivity at the workplace and in labour markets.
- [ ] Economic gains from AI advancements are redistributed among the population (social welfare increases). Pervasive job losses are accompanied by more people valuing purposeful work (volunteering, community service, time with friends and family).
- [ ] Automation and replacement of some tasks and jobs results in people working less hours rather than people being fired. Inclusiveness is not an issue.
- [ ] Labour market activation is no longer relevant. Replacement of human jobs by AI/machines counterbalances demographic challenges.
- [ ] Other opinion(s), please specify below.

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

D3b. How confident are you in your prediction?

- Very confident
- Somewhat confident
- Not very confident
- Not at all confident

D4. In this scenario, in 15-20 years, AI takes over education and training completely and formal education no longer exists.

- Strongly agree
- Somewhat agree
- Somewhat disagree
- Completely disagree

D4a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones.

between 1 and 3 choices

- Formal education system at all levels (initial and continuing) is transformed by AI technologies but does not disappear.
- Initial education remains formal. Formal continuing education no longer exists and it is fully replaced by continuing non-formal and informal education and training.
- The proliferation of uncontrolled AI generated offers of learning and training result in policy makers' efforts to strengthen traditional formal education.
- Formal qualifications disappear and private sector actors award qualifications in the labour market.
- Formal education remains relevant but public institutions in the field of Education and Training ally with private actors to generate and deliver learning and training and to remain relevant.
- Other opinion(s), please specify below.

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

D4b. How confident are you in your prediction?

- Very confident
- Somewhat confident
- Not very confident
- Not at all confident

D5. In this scenario, in 15-20 years, training content is heavily generated by non-traditional sources/actors (AI, peers, users). In what percentage?

- ◯ 80% or more training content generated by non-traditional sources/actors
- ◯ Between 50 and 79%
- ◯ Less than 50%

D5a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones.

between 1 and 3 choices

- ☐ Traditional formal actors disappear completely, and new formal actors lead content generation (e.g. professional associations).
- ☐ Private actors lead content generation.
- ☐ AI-generated tools such as virtual and augmented reality enhance rather than replace existing learning delivery/pedagogies.
- ☐ Public institutions in the field of education and training (E & T) ally with private actors to generate and deliver learning and training and to remain relevant.
- ☐ Other opinion(s), please specify below.

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

D5b. How confident are you in your prediction?

- ◯ Very confident
- ◯ Somewhat confident
- ◯ Not very confident
- ◯ Not at all confident

D6. In this scenario, in 15-20 years, AI takes over the role of teachers and trainers and career guidance professionals: AI tutors replace teachers and trainers in training delivery, and advanced career guidance services are offered by AI-powered tools.

- ◯ Strongly agree
- ◯ Somewhat agree
- ◯ Somewhat disagree
- ◯ Completely disagree

D6a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones. *between 1 and 3 choices*

- ☐ AI tools completely replace teachers and trainers, making their roles redundant.
- ☐ AI help teachers and trainers in some of their tasks (e.g. generating leaning examples, quick quizzes, supporting assessment) but does not replace their human role in the system.

- [ ] AI takes over the role of teachers and trainers in continuing formal education, but does not affect their role at the initial level.
- [ ] Rise of bottom-up (grassroots) movements against increased use of AI tools in learning and training delivery due to secondary effects (increased isolation, anxiety, ill health etc.).
- [ ] Other opinion(s), please specify below.

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

D6b. How confident are you in your prediction?

- ( ) Very confident
- ( ) Somewhat confident
- ( ) Not very confident
- ( ) Not at all confident

D7. In this scenario, in 15-20 years, sustainable and eco-conscious practices decline and become less of a priority for both individuals and businesses.

- ( ) Strongly agree
- ( ) Somewhat agree
- ( ) Somewhat disagree
- ( ) Completely disagree

D7a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones. *between 1 and 3 choices*

- [ ] Companies focus on technology-driven growth at the expense of sustainable practices. To remain competitive and profitable, companies prioritise the adoption of swift AI/technological advancements and upgrades despite large energy consumption and waste generation.
- [ ] Public institutions have less leverage (and interest) to promote and implement sustainability and greening policies as these may hinder competitiveness and growth.
- [ ] Parts of the population and activist groups still value the importance of sustainability and protecting the environment.
- [ ] Development of AI-based solutions that are designed to support sustainability initiatives.
- [ ] Current extensive green investments and legal requirements and pledges to comply with ESG standards result in sustainability and climate mitigation policies to remain relevant.
- [ ] Climate change is real and cannot be reversed. Environmental mitigation is understood as important by all actors.
- [ ] Other opinion(s), please specify below.

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

D7b. How confident are you in your prediction?

- ◯ Very confident
- ◯ Somewhat confident
- ◯ Not very confident
- ◯ Not at all confident

D8. In this scenario, in 15-20 years, AI's rippling effects on jobs result in individuals migrating towards places where they see the remaining limited opportunities for them, affecting both regular and irregular migration flows.

- ◯ Strongly agree
- ◯ Somewhat agree
- ◯ Somewhat disagree
- ◯ Completely disagree

D8a. Select at least 1 and a maximum of 3 arguments from below that best represent your view on the statement. You can also add up to 3 new arguments, if considerably different from existing ones. *between 1 and 3 choices*

- ☐ Lack of jobs due to AI decreases irregular migration.
- ☐ International competition for talent loses ground and affects only those specific sectors where AI is not yet able to fully replace human jobs.
- ☐ International competition for AI-skilled talents drives (regular) migration flows.
- ☐ Migration flows affect countries where generative AI technologies have not yet dominated the economic and social system. Geographical polarisation of low-skilled people in less AI-dominated/emerging countries vs high-skilled in AI-advanced countries.
- ☐ Other opinion(s), please specify below.

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

D8b. How confident are you in your prediction?

- ◯ Very confident
- ◯ Somewhat confident
- ◯ Not very confident
- ◯ Not at all confident

E. Conclusion

E1. Thank you for completing this questionnaire. If there is anything else you would like to add, please use the space below.

If you have other opinion(s), please outline up to 3 new arguments by listing them distinctly below (*Text of 2 to 1 000 characters will be accepted*)

Preparing for 2040

Four AI-powered scenarios for the future of continuing skills development

This publication presents the first findings of a Cedefop foresight study aiming to craft a vision of the future of continuing skills development up to 2040, accompanied by strategic goals.

Four AI-powered scenarios offer alternative viewpoints on how different features and conditions relevant to continuing skills development might evolve by 2040. Woven around trend of AI use and its interplay with several other trends, the scenarios depict different futures spanning from a very positive outlook, where AI enhances human capabilities and social good, to a dystopian future, where AI is deployed primarily for control and profit maximisation and where most jobs are lost, with those that remain often precarious, low-paying and lacking in benefits.

By examining possible future evolutions, these scenarios highlight key challenges and opportunities that may shape the future of skills development and inform the development of a common vision and strategic goals.

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