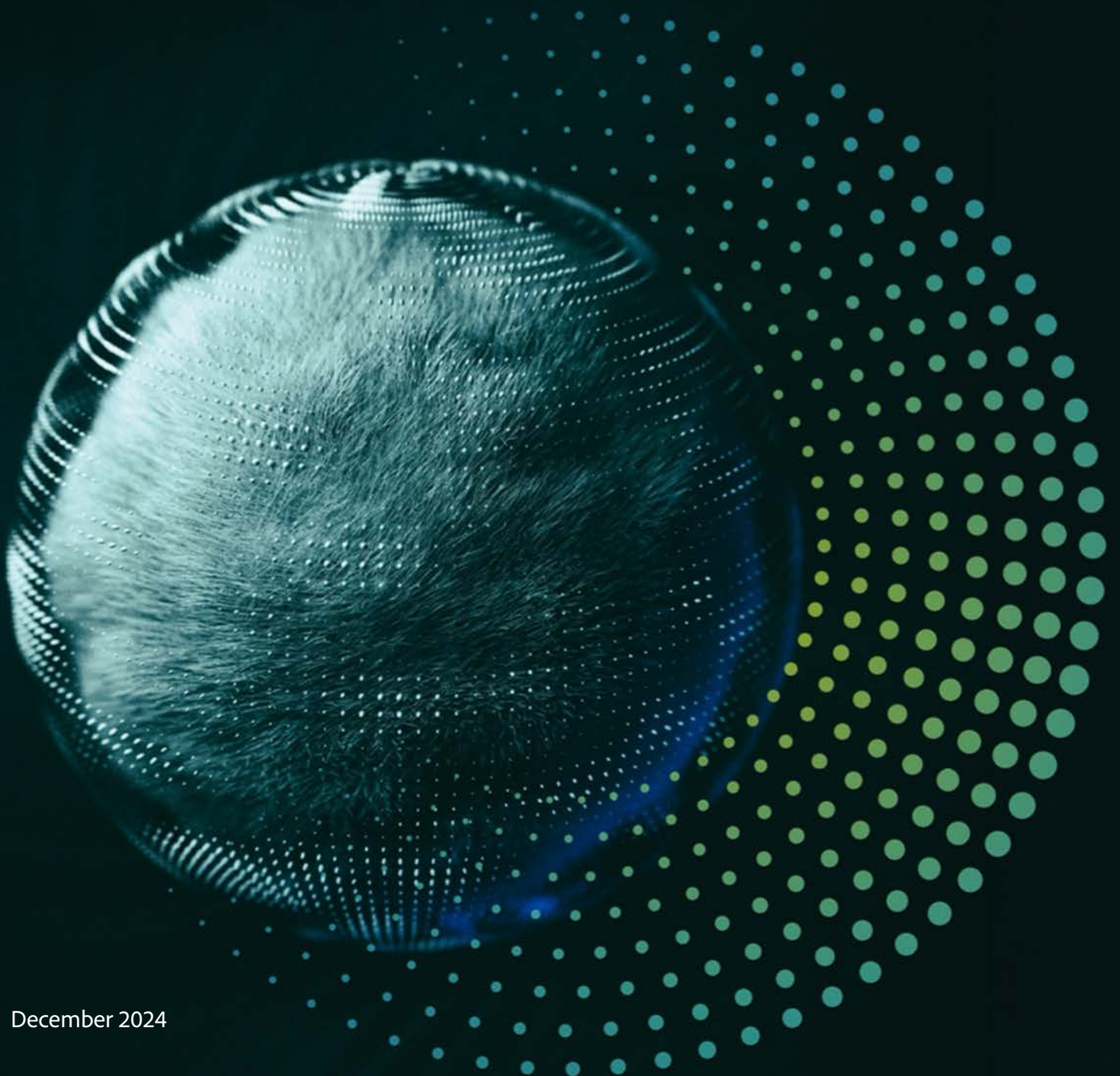




NAVIGATING TOMORROW:

Mastering Skills in a Dynamic Global Labor Market



December 2024

ABSTRACT

This report examines the impact of global forces on the labor market and skill demand, focusing on four major factors:

1. Economic globalization
2. Shifting demographic patterns,
3. The pace of technological change,
4. The emergence of climate change.

These forces are reshaping the labor market, creating new challenges and opportunities for workers, businesses, and policymakers.

The report goes on to examine how these four factors affect skill demand by reviewing existing knowledge and surveying labor market participants in 14 countries. It emphasizes lifelong learning, upskilling, and reskilling for future global economy demands, reviewing strategies and best practices in order to adapt. It also poses questions for further discussion.



A satellite night view of Earth, showing the glowing patterns of city lights and urban areas against the dark background of the planet. The coastline of the Gulf of Mexico is visible on the left side of the image.

ACKNOWLEDGEMENTS

i. ACKNOWLEDGEMENTS

The report was led and written by Sylvain Cote. Its success benefited from a diverse group of individuals, whose expertise, professionalism and dedication have been invaluable. I extend my gratitude to the members of the Scientific Committee, including Dr. Ahmed Alzahrani, Deputy Minister at the Ministry of Human Resources and Social Development; Dr. Johannes Koettl of the World Bank Group, Dr. Seamus McGuinness from the Economic and Social Research Institute, and Peter Rademaker of the International Labor Organization, have provided critical guidance that shaped the report's early direction. Thanks also go to Takamol Holding and Richard Attias & Associates for their support.

In closing, it is with deep appreciation that I reflect on the opportunity I have been given to write this report, and I look forward to continued involvement in driving labor market developments globally.

ii. EXECUTIVE SUMMARY OF KEY FINDINGS AND INSIGHTS

We carried out a survey aimed at 14,000 of participants in 14 countries across the globe. We wanted to find out their thoughts on how global forces was affecting them on their upskilling decisions and what strategies they were using to adapt to these challenges. Here is a summary of what we found:



While globalization was acknowledged as the second most important influence, respondents identified the rapid pace of technological change as the largest disruptor of skills.



In countries where technology is a newer force, labor market participants are more inclined to acquire new skills to bridge the gap between current capabilities and the demands of a technologically evolving job market.



Findings showed that population ageing was generally not deemed important among European and Japanese respondents despite their populations being among the oldest in the world. Its significance was, however, considered more important among Chinese respondents.



Despite being a high-profile issue, climate change was generally not considered as having a determining impact on the decision to upskill or reskill. However, for respondents in countries like Vietnam and China, climate change significantly impacted upskilling. The level of education significantly impacts the perception of skill requirements and training needs. Survey responses clearly show that those with higher education levels were significantly more inclined to take proactive steps towards acquiring new skills and felt confident in dealing with an accelerated pace of skill development. In contrast, about 30% of respondents doubt they can keep up in the future.



When asked whether robots or computers could eventually take over their jobs, only 22% of labor participants believed that scenario was likely. However, there was a noticeably higher proportion of technologically anxious respondents in China. While male respondents tend to favor management and STEM skills, female respondents focus more on socio-emotional skills.



Most respondents believe that the primary responsibility for reskilling and upskilling lies with themselves, highlighting a labor market that highly values self-improvement and adaptability.

ii. EXECUTIVE SUMMARY OF KEY FINDINGS AND INSIGHTS



Respondents showed a strong preference for personal, alternative training. Online courses were the most popular methods for individuals to pursue further training, while on-the-job training was highly considered. Self-learning was also popular, especially for older, high-income and high-skilled workers.



Survey responses suggest that employers have prioritized enhancing the skills and competencies of existing employees, rather than seeking skills externally.



For an important proportion of respondents, time and financial constraints emerged as the most significant barriers. Misaligned education systems and poor coordination between government, businesses, and unions were also deemed relevant but of secondary importance.



Education and training systems were seen as falling short in their capacity to adapt to the evolving skill requirements. This view was particularly shared among younger age groups (18-34) and university-educated individuals. Among countries, the dissatisfaction was highest among respondents from China, India, and Vietnam. Conversely, the lowest level of dissatisfaction was in the United Kingdom and Australia.



Businesses were often seen as the most reliable entities for supporting upskilling or reskilling efforts. Incidentally, the government and unions were perceived as the least trusted partners in their training strategies. Only in Saudi Arabia (35%) and India (31%) did the government enjoy a substantial share of trust. While unions were perceived as the least trustworthy partners in support of their training strategies, it was among European respondents that they had the highest level of support.



The top priority identified by respondents was a call to make education and training systems more relevant, and the second one was related to financial assistance.

A low-angle, upward-looking photograph of several modern skyscrapers against a clear, light blue sky. The buildings are made of glass and steel, with many windows visible. In the upper left, a construction crane with bright lights is visible. The perspective creates a sense of height and scale.

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1. SETTING THE CONTEXT

Change can be disruptive. The global labor market is caught in a dynamic interplay of forces that complement and contradict each other. Globalization, demographic shifts, technological advancements, and actions against climate change are collectively reshaping the essence of work, labor market participants' expectations, and the skills required for career growth and adaptability.

Economic globalization has created a more interconnected world, leading to a greater mobility of labor and capital. This connectivity has resulted in a competitive global job market where labor cost, skills and productivity are at a premium. Concurrently, shifting demographic patterns, such as ageing populations in developed countries and youth bulges in developing regions, are reshaping labor supply and demand dynamics. Technological advancements are automating routine tasks, creating new job categories, and transforming the workplace, necessitating continuous skill development for the workforce. Moreover, the emergence of climate change is prompting governments and industries to adopt sustainable practices, driving demand for 'green jobs' while phasing out others.

These forces create opportunities and challenges for workers, employers, and policymakers. They also necessitate greater flexibility, diversity, and a continuous learning mindset, as individuals try to navigate a labor market that is more dynamic and unpredictable than ever before. Human capital and skill development matter to navigate the changes brought by these global forces.

Diversifying a workforce

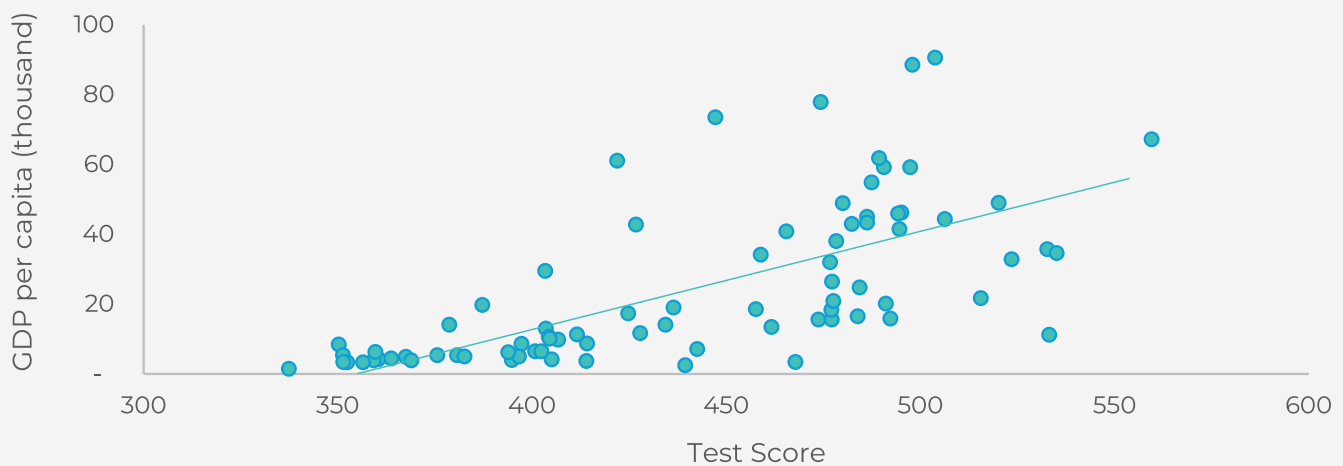
As the labor market shifts, the demand for a skilled workforce with diverse capabilities is on the rise.¹ Through continuous learning and skill development individuals who invest in their human capital position themselves more favorably in the job market—more likely to experience career growth, job satisfaction, and financial stability. Moreover, human capital is not static; it can be developed and enriched over time, allowing individuals the opportunity to actively shape their career trajectories. Employers also play a pivotal role in nurturing human capital by providing training and development opportunities, recognizing that a skilled workforce is integral to organizational success and competitiveness.

¹ For seminal work on human capital, see: Schultz, 1961, and Becker, 2009.

1. SETTING THE CONTEXT

The empirical evidence on human capital and economic growth is robust, with numerous studies demonstrating that countries prioritizing human capital development tend to experience higher economic growth rates (Fig. 1.1)². However, it is important to emphasize that the relationship between human capital and economic growth is also bidirectional. On one hand, investing in education and skills development (human capital) drives economic growth by enhancing the productivity and innovation capacity of the workforce. On the other hand, as the economy grows, it generates more resources that can be reinvested into education and training programs, further boosting human capital. This cyclical process underscores the importance of both investing in human capital and fostering economic growth to achieve sustainable development and improved educational outcomes.

Figure 1.1. The relationship between economic growth and human capital is positive



Source: Conference Board, OECD PISA scores

Resilience and adaptability, however, require the ability to learn and to keep learning. Foundational education plays a pivotal role in this process, laying the groundwork for critical thinking, problem-solving, and social-emotional skills, which are essential throughout one's working life. Where change is the only constant, education is not just a preliminary phase of academic pursuit but a lifelong investment that pays dividends as it reinforces resiliency and adaptability.

² For examples: Solow (1956), Swan (1956), Nelson and Phelps (1966), Romer (1986), Lucas (1988), Mankiw et al. (1992), De la Fuente and Domenech (2001), Barro and Sala-i-Martin (2004), Gyimah-Brempong and Wilson (2004), Hanushek and Woessmann (2008), Hartwig, (2010), Hanushek (2013), Qadri and Waheed (2014), Ogundari and Awokuse (2018).

1.1 THE EVOLVING SKILL DEMAND IN GLOBAL LABOR MARKETS AND THEIR IMPLICATIONS

While promising growth and productivity, global forces also bring about fear and apprehension, especially regarding technological change. As technology advances, machines and algorithms are increasingly capable of performing tasks that were once the exclusive domain of human workers. This shift has the potential to reshape the job market, particularly in industries that rely heavily on routine and repetitive tasks. While some view this evolution as an opportunity for human workers to engage in more creative and complex roles, others worry about the economic and social implications of widespread automation, with groups of workers unable to keep pace.

According to a report from the PEW Research Institute, more than 82% of Americans are worried that automation will “definitely or probably” be displacing them from their jobs (PEW, 2019). Taking how quickly automation has developed into account, these fears appear warranted. While the United States is home to 310,700 industrial robots, and that number increases by at least 40,000 each year, China

installed 268,200 industrial robots in 2021, which is almost 52% of all new industrial robot installations across the globe for the year (International Federation of Robotics, 2024). Another fear is that automation could potentially eliminate 400 to 800 million jobs by 2030 (McKinsey Global Institute, 2017). In the US alone, this potential is estimated at 73 million jobs, equating to 46% of current jobs. The impact on emerging countries could also be substantial (Chang and Huynh, 2016).

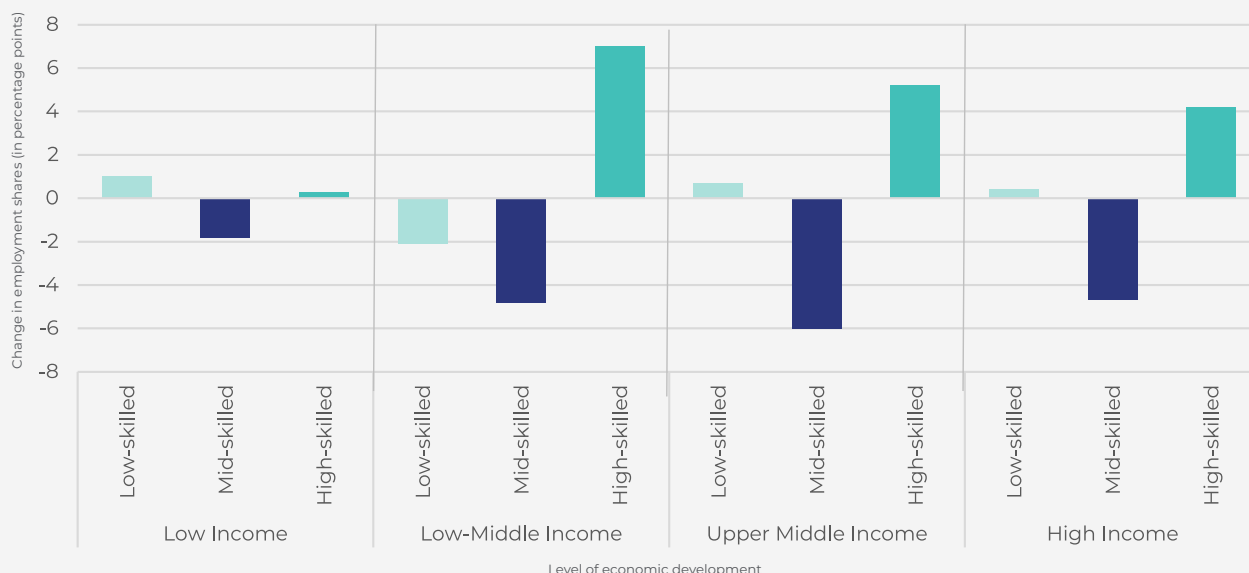
The barbell effect

The polarization of employment is another issue that has been creating anxiety. The demand for workers in middle-skilled production, clerical, and administrative support occupations has eroded in the face of globalization and automation. The labor market, which has emerged, has been characterized as increasingly resembling a “barbell economy”—a trend which has taken place in both developed and developing countries (Autor & Reynolds, 2020; Autor, 2019) (Fig. 1.2).³

³ A “barbell economy” is characterised by a situation where there are fewer and fewer wealthy people at the top, more and more people at the bottom, and fewer and fewer people in the centre.

1.1 THE EVOLVING SKILL DEMAND IN GLOBAL LABOR MARKETS AND THEIR IMPLICATIONS

Figure 1.2. Job Polarization in low- to high-income countries



Source: ILO, 2018

While low-skilled workers have been most negatively affected, groups such as young and females have also struggled. Recently, some law firms began using Artificial Intelligence (AI) to do the work once done by entry-level law clerks—positions crucial to gaining experience in a very competitive industry. These challenges have created other inequalities. A UK survey revealed that over 70% of the jobs deemed at high risk of automation are currently held by females (ONS, 2019).

On the other hand, skilled non-routine workers have experienced significant improvements in their employment conditions and opportunities. This is largely due to the increasing demand for jobs that require complex problem-solving abilities, creativity, and critical thinking—skills that are less likely to be automated and can adapt to the evolving needs of the modern economy. However, access to these skilled positions is not always equitable, especially in STEM (Science, Technology, Engineering, and Mathematics) fields. Despite progress, females continue to be underrepresented in these fields. (UNESCO, 2022)

1.1 THE EVOLVING SKILL DEMAND IN GLOBAL LABOR MARKETS AND THEIR IMPLICATIONS

Keeping pace with change

As the labor market undergoes an evolution, the acquisition of new skills emerges as the foundation for a robust workforce, essential for excelling in an increasingly competitive global economy. It also emphasizes the importance of adaptability, enabling individuals to navigate intricate and dynamic work environments.

Skill imbalance remains a significant challenge for many countries, potentially lowering labor productivity and economic growth, along with widening social inequalities as those without the right skills can struggle in a competitive job market. The mismatch between the skills available and those in demand differ across countries (Table 1.1). The United States and Australia appear to balance digital/scientific skills with communication/social abilities the best. Additionally, most countries have an acute training and education skill deficit, posing a challenge as the demand for upskilling and reskilling grows in an evolving labor market.⁴

Table 1.1 Skill imbalance across selected OECD member and non-member countries

	Cognitive skills	Digital skills	Scientific knowledge	Communication skills	Social skills	Physical skills	Education & training
Australia	-0.03	-0.278	-0.056	-0.349	-0.266	-0.385	0.566
Norway	0.022	0.111	0.299	0.062	-0.098	-0.318	0.033
Spain	0.036	0.083	0.258	-0.088	-0.108	-0.348	0.335
United Kingdom	0.095	0.109	0.273	0.009	0.088	-0.446	0.501
United States	0.077	-0.093	-0.251	0.13	-0.105	-0.088	0.27
Brazil	0.088	-0.024	0.077	-0.01	0.096	0.271	0.233
South Africa	0.089	0.024	-0.142	0.119	0.08	-0.19	0.28

Source: OECD Skills for Jobs database 2022. A positive value (red) indicates a skill shortage, while a negative value (green) points to a skill surplus. The larger the absolute value, the larger the imbalance.

Education is key

The state of educational performance across countries casts a shadow on the sufficient conditions required to help turn this situation around. To be able to anticipate shifts and adapt to new competencies, a strong learning foundation is essential. Research has demonstrated that early investment in children's education yields significant improvements in academic performance. For instance, children who benefit from such investments often outperform their peers in PISA assessments, sometimes scoring up to 50 points more in critical areas like reading, math, and science.

⁴ A skill gap refers to the absence of certain skills in the workforce that are necessary for the jobs available, indicating a deficiency in qualifications among job seekers for the current market demands. On the other hand, a skill mismatch occurs when there is a discrepancy between the skills that employees have, and the skills required for their current job.

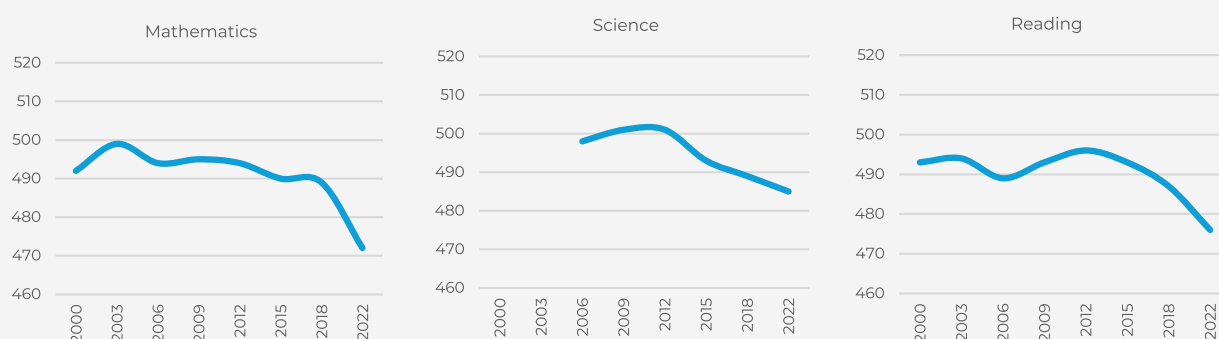
1.1 THE EVOLVING SKILL DEMAND IN GLOBAL LABOR MARKETS AND THEIR IMPLICATIONS

Furthermore, these educational advantages translate into more favorable labor market outcomes, with increases in productivity and earnings reaching up to 25%. (Heckman et al., 2014). This significant boost is attributed to the socio-economic skills and cognitive development created during early childhood, which enhance educational attainment and job prospects later in life. Students who fall behind during critical early years face significant challenges in catching up at a later stage (OECD, 2007; Keuroghlian & Knudsen, 2007; Jones, 2000; Crawford et al., 1996). These insights underscore the importance of early intervention and sustained support to prevent long-term academic disparities.

However, research reveals a sobering global picture: at least two-thirds of the world's youth do not reach basic skill levels, ranging from 24% in North America to 89% in South Asia and 94% in Sub-Saharan Africa (Gust et al. 2024). Anxiety about schooling experience appears to be extending to more developed countries as well.

The OECD's Programme for International Student Assessment (PISA), which measures 15-year-old abilities in mathematics, science and reading, indicates that high and low achieving students' scores started to decline by 2010 and accelerated after 2018. Average scores in mathematics have fallen by a record 15 points. At the same time, scores in reading fell 20 points. Science performance did not change as significantly but has nonetheless been on a downward trend in the past 10 years. The decline across these three disciplines may be attributable to underlying structural factors which should be taken seriously (Fig. 1.3).

Figure 1.3. PISA Scores based on OECD average



Source: OECD PISA, 2022.

1.1 THE EVOLVING SKILL DEMAND IN GLOBAL LABOR MARKETS AND THEIR IMPLICATIONS

Lack of accessibility and inclusiveness have also contributed to the challenge, with some populations increasingly being left behind. For instance, only about half of workers have access to adequate training opportunities today (WEF, 2023). Several countries have a large proportion of individuals who are completely detached from the labor market. This population, called NEET, consists of 15- to 24-year-olds who are not in employment, education or training. The global youth NEET rate of young women doubled that of young men in 2023—at 28.1 per cent and 13.1 per cent, respectively (ILO, 2024). This group is more prevalent in less developed countries.

Another concern is the potential disconnect between skills taught in schools and those in demand in the labor market. Many countries facing a skills gap crisis are having ongoing debates about whether there may be an overemphasis on formal education and training at the expense of more responsive, practical learning pathways.

Traditional models, which often emphasize one-time education followed by a stable career path, appear no longer sufficient in a world where technological advancements and market demands can render skills obsolete at an unprecedented pace.

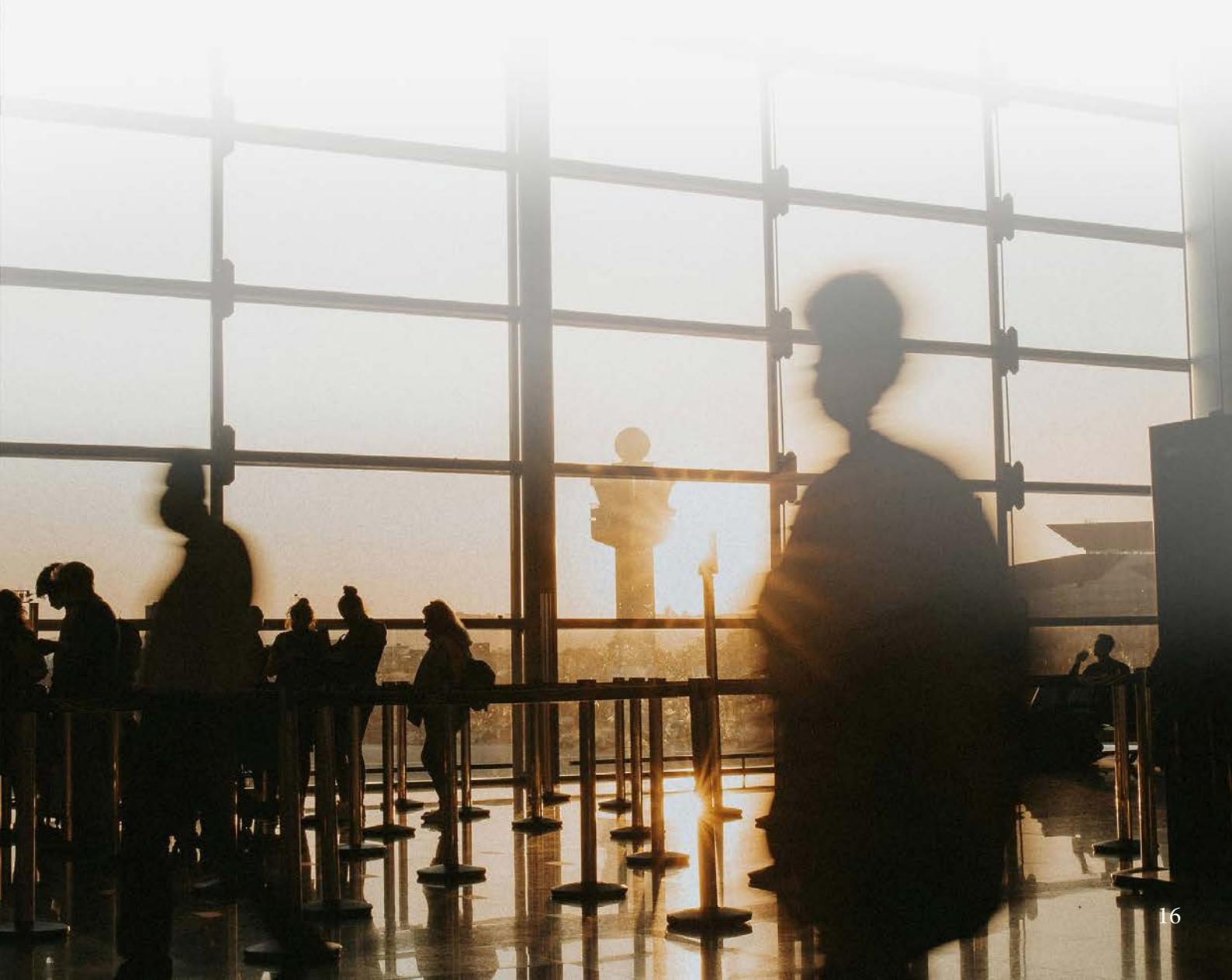
While a dynamic approach to continuous learning and development that integrates lifelong learning as a core employment component, appears more appropriate, such a shift is not without its hurdles. Traditional educational qualifications have long served as a benchmark for employers to gauge candidates' skills and potential. As we transition to new learning forms, there are questions about whether these alternative credentials will be recognized and valued uniformly across different sectors and industries. It is a complex challenge that may require collaboration between educators, employers, and policymakers to ensure the workforce is equipped for the future.



1.2 MAIN OBJECTIVE AND SCOPE OF THE REPORT

The main objective and scope of the report is to examine how global dynamics are affecting the job market and skill needs. Unlike other reports that may rely heavily on quantitative data or top-down policy analysis, this report centres on a comprehensive survey that captures individuals' attitudes, expectations, and strategies regarding upskilling and reskilling in 14 countries. It delves into the subjective experiences of those directly affected by economic globalization, demographic shifts, technological progress, and environmental changes, offering a unique, ground-level viewpoint of the labor market.

It then critically evaluates existing policy approaches and highlights recent innovative strategies to bridge the skill gap, thus providing a nuanced understanding of the challenges and potential solutions. In doing so, it sets the stage for a dialogue on, among other things, the adequacy and responsiveness of existing forms of education and training, alternative credentials, trust in institutions and stakeholders, and the right types of support that should be prioritized.



1.3 CONCEPTUAL FRAMEWORK

In undertaking the analysis, the report is guided by the conceptual framework illustrated in Figure 1.4, which focuses on the four global forces described earlier and their impact on skill demand. The populations at the center of the report are labor market participants, that is, those who are employed, unemployed and self-employed. It sometimes refers to excluded groups, such as those not in education, employment, or training (NEET), but only when relevant to the discussion.

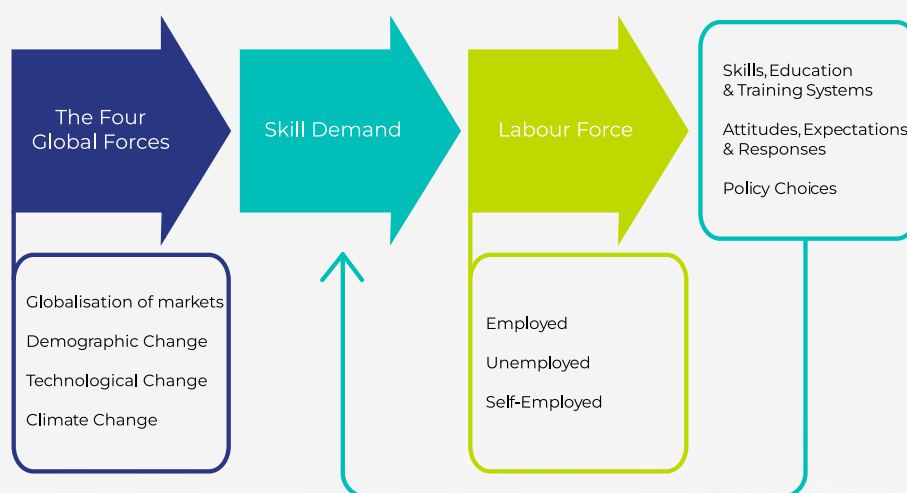
The framework suggests that global forces are skill-biased and require labor market participants to constantly upskill and reskill. While upskilling refers to learning new skills or enhancing existing ones within one's current field to remain competitive, reskilling involves acquiring new skills for a different role or industry.

The next step evaluates the attitudes and expectations of labor market participants vis-à-vis these challenges and their perspectives for the future. Their shared responses are used to assess how they perceive the performance and relevance of current education and training systems, and policies. They also provide directions on what to prioritize to support them through the new skill paradigm.

The report differentiates between educational attainment, qualifications, and skills. Educational attainment refers to the highest level of education completed, while qualifications are official confirmations of this education. As defined by the International Labour Organization (ILO), skills encompass a range of abilities that enhance employability, including teamwork, problem-solving, and ICT skills.

Unlike educational qualifications, skills can be acquired through experience and are more difficult to measure. The report also recognizes the influence of institutions on human capital development, noting that good governance and stable environments foster improvement, while poor governance can hinder it.

Figure 1.4 Conceptual framework



1.4 DATA AND METHODOLOGICAL UNDERPINNINGS

The report relies on several sources of information. To describe trends and developments in the global labor market, we rely on the literature, reports, case studies, and statistics from various international organizations. Data from international organizations provide a comprehensive overview of global trends and statistics, which is crucial for the accuracy and reliability of our analysis.

By integrating this diverse range of data, we ensure that our findings reflect the complex, interconnected nature of today's global landscape. Although there are cases where statistics may not be available, we attempt, when possible, to complement using other sources of information. The following is a list of primary data used for this study:



The report relies on data from the United Nations Population Database for general demographic and population trends. This comprehensive source of global demographic data includes detailed information on fertility, mortality, migration, and population structure.



For economic data, we use the World Bank Development indicators, a comprehensive set of data that measures various aspects of the world's economies. These indicators cover many areas, including economic growth, climate change, poverty, and more.



For the labor market, we use data from the International Labor Organization (ILOSTATS), a crucial resource for tracking a wide array of indicators, including employment rates, unemployment, working conditions, and wages. We complement the latter with data from the OECD and World Bank databases.



For education, we use several data sources. For general statistics on education, UNESCO's Institute for Statistics (UIS) provides an array of data on enrolment, attainment, and fields of study. For performance, we rely on:



1. TIMSS (Trends in International Mathematics and Science Study). A global assessment that measures the mathematics and science achievement of fourth and eighth graders)



2. PISA (Programme for International Student Assessment). An initiative of the OECD to evaluate education systems worldwide by testing the literacy of 15-year-old students on reading, mathematics and science.⁵

1.4 DATA AND METHODOLOGICAL UNDERPINNINGS

As mentioned earlier, the main feature of this report is an innovative survey that questions labor market participants’ attitudes, fears and expectations about their skill sets and prospects in the face of main global trends. The survey was distributed across various social media platforms, targeting specific demographics that match the research criteria. The survey also used data quality processes to sift out fraudulent and disengaged respondents, enhancing the reliability of the insights.

Data was collected across 14 countries, selected from seven distinct regions: Asia, the Middle-East, Africa, Europe, North America, South America, and Oceania. (Table 1.2). For each country, the sample size was set at 1,000 for a total of 14,000. Individuals aged 18+ who were employed, unemployed, or self-employed took part in the survey.

By employed, we mean those who are employees, while self-employed are individuals working for themselves. Unemployed follow the international definition of people who are jobless but looking for a job. More details about the sample and the methodology is available in the annex.

Table 1.2. Country coverage

Australia	Norway
Brazil	Saudi Arabia
China	South Africa
India	Spain
Japan	UK
Jordan	USA
Nigeria	Vietnam

This wide coverage permits a greater collection of experiences and outcomes. The countries vary by size (e.g., India, China vs. Jordan, Norway) and economic performance. Table 1.3 offers an overview of this heterogeneity among the countries included in the study. While there are some age-related differences due to international statistical standards, the table aims to provide a snapshot for each country for informational purpose.

For its survey analysis, the report mostly uses descriptive statistics, complemented by conditional inference tree analysis. The latter method, unlike traditional decision trees, is particularly adept at mitigating selection bias—a common issue where certain results are favored based on the model’s structure. It is designed to select variable combinations that best predict outcomes, assessing relationships and effects without assuming a specific data distribution.

⁵ The OECD recently added creative thinking to its PISA tests, but country coverage is still too limited and therefore could not be used for the report.

1.4 DATA AND METHODOLOGICAL UNDERPINNINGS

Table 1.3. Key descriptive statistics across the 14 countries, 2023

	GDP per capita	Population	Working age population	Employed	Participation	Unemployed	Youth not in employment, education or training (NEET)
	Current US\$	Million			%		
Australia	64,712	27	22	14	67.2	3.7	7.9
Brazil	10,044	216	172	99	62.8	7.9	20.6
China	12,614	1,411	983	740	70.9	5.1	11.6
India	2,485	1,429	883	472	55.8	4.2	23.5
Japan	33,834	125	110	67	62.9	2.6	3.1
Jordan	4,482	11	8	2	33.2	18.4	31.5
Nigeria	1,621	224	9	71	82.6	3.1	11.8
Norway	87,962	6	5	3	65.7	3.6	5.4
Saudi Arabia	28,895	32	23	14	61.1	4.0	17.0
South Africa	6,253	60	45	17	55.0	32.1	34.0
Spain	32,677	32	42	21	58.1	12.2	9.9
United Kingdom	48,867	68	55	33	62.2	4.0	12.8
United States	81,695	335	267	161	62.6	3.6	11.2
Vietnam	4,347	99	77	55	72.2	1.6	10.8

*This table is meant to show main differences across key economic indicators across the countries studied. It is not a representation of the survey sample discussed above.

Source: GDP per capita: World Bank, World Development Indicators. Population: United Nations Population Division. World Population Prospects, 2023, Revision, except for Saudi Arabia (GaStat 2022 Census). Labour market information: International Labour Organisation. NEET figures for Japan and Jordan are from 2019 and 2022 respectively.

Number of employed for China: National Bureau of Statistics of China. Except for population (age 0+), all other groups are age 15+. The other exception is NEETs (age 15-24).

1.5 STRUCTURE OF THE REPORT

This report is structured into four sections to convey the complexities of the four global forces and their influence on the demand for skills..



Section one introduces the context and organizational structure of the report.



Section two explores the four major forces transforming the labor market and skill demand: globalization, demographic shifts, technological advancements, and climate change. It examines these forces, their impact on the labor market and the challenges and opportunities they present for the active population.



Section three provides an analysis and interpretation of survey results. Labor market participants in 14 countries were questioned on their attitudes and expectations concerning the current and future impact of global forces on their work and skill conditions.



Section four discusses the policy implications, using insights from the survey's responses. After assessing the labor force's readiness to adapt to changing skill demands, it then explores emerging training approaches and discusses their constraints and challenges. It concludes by raising some issues for further discussion, including whether there is still a pivotal role for government within this new paradigm.

This report structure clearly presents how these forces are continuously shaping the professional landscape, ensuring readers can grasp the evolving nature of skill requirements in the global economy.



A photograph of two workers in a factory setting, shaking hands. The worker on the left is wearing a red cap and a dark jacket. The worker on the right is wearing a plaid shirt and overalls. The background shows industrial structures and lights, all with a blue tint.

HOW GLOBAL FORCES HAVE TRANSFORMED THE LABOR MARKET LANDSCAPE

2. HOW GLOBAL FORCES HAVE TRANSFORMED THE LABOR MARKET LANDSCAPE

In the global economy, four megatrends stand out:

1. The globalization of markets
2. Shifting demographics
3. Rapid technological advancements
4. Actions against climate change

These global forces are not just reshaping commerce and industry, they are fundamentally altering the demand of labor, redefining the quality and availability of jobs, and dictating the necessary skills and qualifications to contribute to the workforce.

These four global forces do not move independently. They have, in fact, important interactive effects. Disentangling the influences of concurrent megatrends on labor markets presents a complex challenge, as these trends work simultaneously and are also deeply interconnected. For instance, heightened trade liberalization and global competition help catalyze the adoption of new technologies and innovation. Likewise, the ageing population trend may be advancing the innovation and implementation of technologies that substitute human labor. Certain trends work together; for example, the escalating demand for skilled labor is likely a consequence of both the ageing population and technological advancements. On the other hand, some trends may have conflicting effects. Emerging economies are witnessing new manufacturing employment opportunities due to global trade, yet they are simultaneously dealing with the rise of labor-substituting technologies.

This section provides an overview of the impact of these four megatrends on global labor markets and the evolving demand for skills. Through this exploration, we will show the intricate relationship between these powerful trends and their impact on the workforce, subsequently offering insights into the future trajectory of employment and skill demand.



2.1 GLOBALIZATION AND MIGRATION

Economic globalization is not a recent development but a process that has been evolving. Historians have traced it back to the first movement of people out of Africa. Others identified its origin to the 1st century BC when Chinese traders sold luxury products on a stretch of thousands of kilometres in what became called the Silk Road. This process continued with Islamic merchants who sold mainly spices around the Mediterranean and as far as Indonesia. European empires later set up global supply chains in their colonies. While these exports were small in value and restricted to geographical areas, they nonetheless did establish the foundations of the global trade links we know today.

The past two decades have accelerated this development, marked by the further integration of economies and the unprecedented expansion of trade and investment flows. It is estimated that over 3 billion people have experienced the impacts of globalization in various forms. Goods-related trade is no longer limited to raw materials and final goods but increasingly consists of intermediate goods, which are inputs into the production of other intermediate or final goods.

Economic globalization refers to the growing interconnectedness of economies worldwide, primarily through exchanging goods, services, and capital across borders.

This concept encompasses the movement of people and labor and the transfer of knowledge and technology internationally.

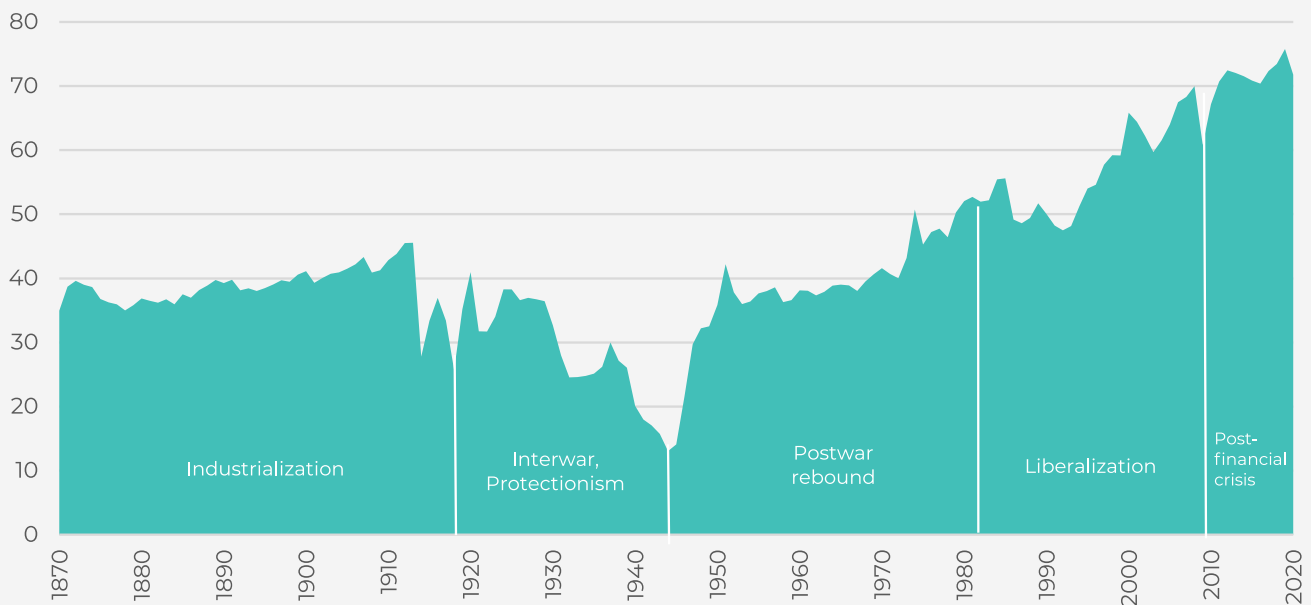
Additionally, globalization can have significant cultural, political, and environmental aspects.

Key factors include technological advancements in communication and transportation, the rise of the internet, and major political changes like the fall of the Berlin Wall and the dissolution of the Soviet Union. The establishment of the World Trade Organization in 1995 further promoted trade liberalization. The rise of BRICS countries⁶—Brazil, Russia, India, China and South Africa—helped reshape global trade patterns, with a notable increase in unfinished goods, components, and services trade. Facilitated by the emergence of the digital revolution and the internet, trade in services has grown in importance flowing as global companies outsourced various service functions to foreign-owned subsidiaries (i.e., offshoring) or to foreign contractors (i.e., outsourcing).⁷ Key sectors such as transportation, communication, finance, business, and professional services have been instrumental in shifting the dynamics of global trade, with services playing an increasingly crucial role.

2.1 GLOBALIZATION AND MIGRATION

The ‘trade openness index’, which measures the ratio of total trade (exports plus imports) to global GDP, has been used to quantify the influence of trade on global economic activity. This index has shown a steady increase, indicating how significant trade transactions have become over time (Fig. 2.1). Since the 1990s, globalization has significantly increased trade volumes, with global exports reaching nearly \$24.9 trillion in 2023.

Figure 2.1. Global trade openness since 1870, through difference phases (%)



India and China have evolved to become major IT and manufacturing hubs, doubling their exports as a percentage of GDP. China currently accounts for about 20% of global manufacturing exports—it was less than 1% in 1980 (UNCTAD, 2021). This integration of trade has led all major manufacturers worldwide to depend on China for at least 2% of their industrial inputs (Baldwin et al., 2023). This reliance underscores China’s dominance in producing intermediate goods, which are essential components used in manufacturing final products. Despite efforts to diversify supply chains and reduce dependence on China, its position as a manufacturing superpower remains strong. China continues solidifying its position as the dominant manufacturing and global supply chain player with near-shoring efforts.

⁶ Egypt, Ethiopia, Iran, Saudi Arabia, and the United Arab Emirates (UAE) were invited to become members effective January 1, 2024.

⁷ During the early 1990s, a shift began in Silicon Valley as tech firms began outsourcing software coding roles to India. This movement grew to encompass a broader spectrum of IT and business processes, including data entry, back-office functions, and customer service centers. Over time, Indian experts took on increasingly complex tasks such as software engineering and microchip design, traditionally held by higher-paid workers in developed economies. This evolution is detailed in the work of Engardio, Bernstein, and Kripalani (2003).

2.1 GLOBALIZATION AND MIGRATION

While most countries saw a rise in trade, this was not the case for all. For example, Saudi Arabia and Jordan experienced a downturn in exports. In Saudi Arabia, this decline was partly due to the nation's strategic shift from its traditional oil-based economy to other sectors as part of its broader economic diversification efforts. Jordan, on the other hand, faced challenges in maintaining its export levels due to various economic and regional factors⁸.

Globalization has also led to a more interconnected supply chain, where different stages of production are located in different countries according to their comparative advantage. The global share of imported intermediate inputs in gross exports varies significantly across regions and countries. On average, imported intermediate inputs account for about one-quarter of the exports of OECD economies. For large developing economies like China and Brazil, intermediate inputs represent close to three-quarters of their imports. In the European Union, this share is even higher. In 2023, intermediate services made up 73 % of total services exports and 82 % of total services imports. In the same year, intermediate goods made up 50 % of total goods exports and 59 % of total goods imports (OECD database, 2023).

The evolution of trade also illustrates that economic growth and development are not just about accumulating capital but also about a countries diverse and complex productive capabilities. This is because exports increasingly entail a higher degree of specialization, which can encourage the development of a more diversified and sophisticated economy (Hidalgo & Hausmann, 2009). Human capital, including skills and knowledge, is at the heart of this sophistication.

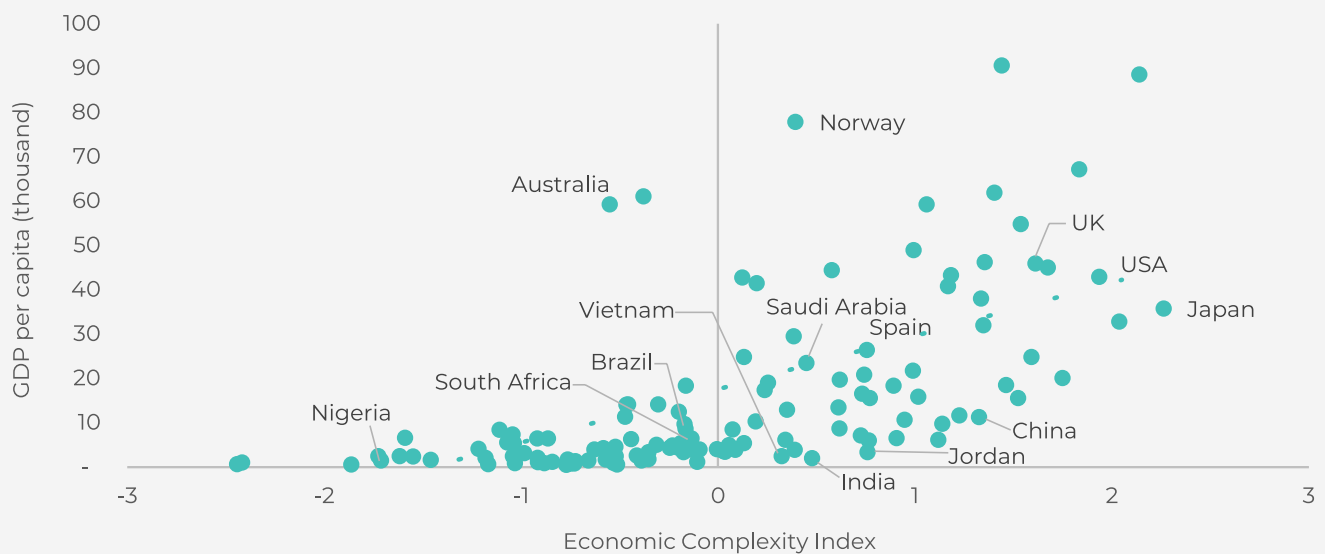
Economic complexity differs across countries (Fig. 2.2). The countries covered in this report show that Japan, the United Kingdom and the United States have higher economic complexity scores due to a mix of diverse and sophisticated industries ranging from financial services to manufacturing. China has rapidly progressed along its value chain, and is not far behind. Other factors supporting complex economic activities are robust infrastructures, regulatory environments, and strong research and development investment.

⁸ Conflicts in neighboring countries have disrupted trade routes and affected economic stability. Jordan's limited natural resources and high energy tariffs also increase production costs, making its exports less competitive.

2.1 GLOBALIZATION AND MIGRATION

Less diversified economies, especially those which rely on resources, such as Nigeria, Australia, and, to a lesser extent, Saudi Arabia and Norway, do not perform as well. Their lower economic complexity scores can be explained by their reliance on a narrow range of primary exports, such as oil for Nigeria, Saudi Arabia and Norway, and mining and agriculture in the case of Australia.

Figure 2.2. Economic Complexity



Source: Atlas of Economic Complexity, World Bank, 2021

The economic complexity framework relies on higher skills because they allow a country to make different kinds of goods and services that are sophisticated and knowledge-intensive. The more complex an economy, the more it shows a higher level of productive knowledge and skills among its workers, which helps to achieve sustained economic growth over time.

While globalization can create new job opportunities in higher-value-added activities, the increased competition, which it fosters, can also pressure companies to seek cost efficiencies, sometimes at the expense of employment and labor conditions (e.g., Amiti and Wei, 2005; Baldwin & Robert-Nicoud, 2014; Grossman & Rossi-Hansberg, 2008). It can significantly affect specific sectors, particularly those vulnerable to outsourcing and automation (e.g., Autor et al., 2013; Crinò, 2009; Geishecker, 2008).

2.1 GLOBALIZATION AND MIGRATION

Globalization and the mobility of labor

Globalization has also encouraged the migration of labor, with important implications. Worldwide migration has doubled in the past decades, resulting in greater circulation of people. The UN reports that international migrants worldwide went up from 173 million in 2000 to 281 million in 2020, amounting to 3.6% of the world's population. This is one percentage point more than in 1980. In the last twenty years, the international migrant population rose by an average of 2.4 per cent each year.

Within it, the influx of skilled migrants can intensify competition for jobs. Skilled migrants often bring specialized knowledge and experience, making them attractive to employers seeking to fill labor market gaps. This can lead to increased competition, particularly in sectors where the skills of migrants and local workers overlap. While some local workers may face increased competition, the presence of skilled migrants can also stimulate economic growth and job creation.

Migrants often contribute to innovation and productivity, which can lead to the development of new industries and the expansion of existing ones. Additionally, skilled migrants may start their own businesses, further creating job opportunities for both locals and other migrants. Migration has also led to the rise of the 'digital nomad'—a person who can work from anywhere in the world (Roos & Shroff, 2017).

The global competition for talent also extends to students, with countries like the United States, Canada, and Australia leading the charge. Canada and Australia boast the highest proportions of highly educated immigrants, with nearly two-thirds of their foreign-born populations holding advanced degrees. This focus on attracting skilled immigrants is part of their broader strategy to enhance economic growth and innovation.⁹

⁹About 55.3% of recent immigrants and 39.8% of established immigrants had a bachelor's degree or higher. These favorable statistics hide, however, issues related to foreign credential recognition (in Canada, for instance, 25.8% of newly landed immigrants, aged 25 to 64, with a degree completed outside Canada, claimed to be overqualified in their jobs).

2.1 GLOBALIZATION AND MIGRATION

The United States, however, remains the top destination for college-educated immigrants. As of 2022, 35% of all 40.8 million immigrant adults ages 25 and older had a bachelor's degree or higher, a rate similar to that of U.S.-born adults (Batalova, 2024). Newer arrivals tend to be better educated—48% of immigrants who entered the country between 2020 and 2022 held at least a bachelor's degree (Pew Research Center, 2019).¹⁰ Engineering, math and computer science, and business and management are the most popular fields of study for international students, accounting for more than half of the total (56%). In 2018, more than half of all advanced STEM degrees awarded by U.S. colleges and universities went to international graduates.¹¹ A study by Grogger and Hanson (2015) suggests that, historically, a substantial portion of these individuals chose to remain in the United States after completing their degrees, contributing to the country's intellectual capital and economic growth. The intention to stay in the U.S. for extended periods is more prevalent among Ph.D. recipients from countries like China and India, which are significant contributors to the U.S. science and engineering talent pool. This large number is partly due to the diverse pathways available for highly educated individuals to study and work in the U.S., such as the H-1B visa program and the Optional Practical Training program.

The migration of skilled professionals from low-income countries has long been a significant concern for developing nations. When highly skilled individuals emigrate, it often results in a substantial loss for their home countries, as the investment in their education and training cannot be recouped. This phenomenon, known as “brain drain,” can exacerbate labor shortages in critical sectors such as healthcare, education, and technology. However, there is also evidence of a potential “brain gain” when these individuals return home, bringing with them enhanced skills, knowledge, experience and networks that can contribute to the development and growth of their origin countries. This return migration can therefore help mitigate some of the negative impacts of brain drain and foster innovation and progress in various fields (World Bank, 2019).

¹⁰ The U.S. had approximately 14.7 million immigrants aged 25 and older with a postsecondary diploma or college degree, significantly outpacing Canada (4.4 million) and the UK (3.4 million).

¹¹ Based on analysis of tables from the Digest of Educational Statistics 2019, published by the National Center of Education Statistics under the Department of Education. For reference, see “Table 323.30 Master's degrees conferred by postsecondary institutions, by race/ethnicity and field of study: 2016-17 and 2017-18” and “Table 324.30 Doctor's degrees conferred to males by postsecondary institutions, by race/ethnicity and field of study: 2016-17 and 2017-18”.

2.1 GLOBALIZATION AND MIGRATION

Over the decades, globalization has gathered more and more momentum. And the question about globalization is not whether it will continue, but at what pace. At the same time, there have been recent signs of a certain recalibration of global connections, with some sectors and regions exhibiting a preference for 'friendshoring' (engaging more with politically aligned or trusted nations). Although the future course of economic globalization is difficult to predict with much certainty, factors such as political policies, economic conditions, and cultural exchanges will continue to influence its speed and direction. As it drives the need for a diverse set of skills, including language proficiency and cultural awareness, globalization is expected to continue creating new opportunities and challenges for workers, firms and policymakers.



2.2 DEMOGRAPHIC SHIFTS

French philosopher, Auguste Comte, once affirmed that “demography is destiny.” He suggested that demographic trends, such as birth rates, age distributions, and migration patterns, were pivotal in shaping economic, political, and cultural developments. Future demographic changes have indeed profound implications for policymaking and planning. As populations age, countries may face challenges related to shrinking labor forces, while those with youthful populations might struggle to offer sufficient levels of employment and education opportunities. Thus, understanding demographic outcomes is crucial for anticipating issues related to employment and the demand for skills.

According to the United Nations, the world population is predicted to expand from 7.349 billion in 2015 to 9.725 billion in 2050, with China and India accounting for 35.6% of the total (Fig. 2.3). At the country level, India and Nigeria, and to a lesser extent the United States, are the countries with the best population growth prospects. Although Asia will continue to be the most populous region in the world with 5.7 billion, Africa is expected to account for a large portion of future growth, with 26 countries on the continent likely to double in size. Key factors behind current and future demographic shifts are interconnected but also diverse. Fertility, mortality, and migration are the primary variables contributing to population change. Economic development, education, and social norms also play significant roles in influencing demographic patterns.

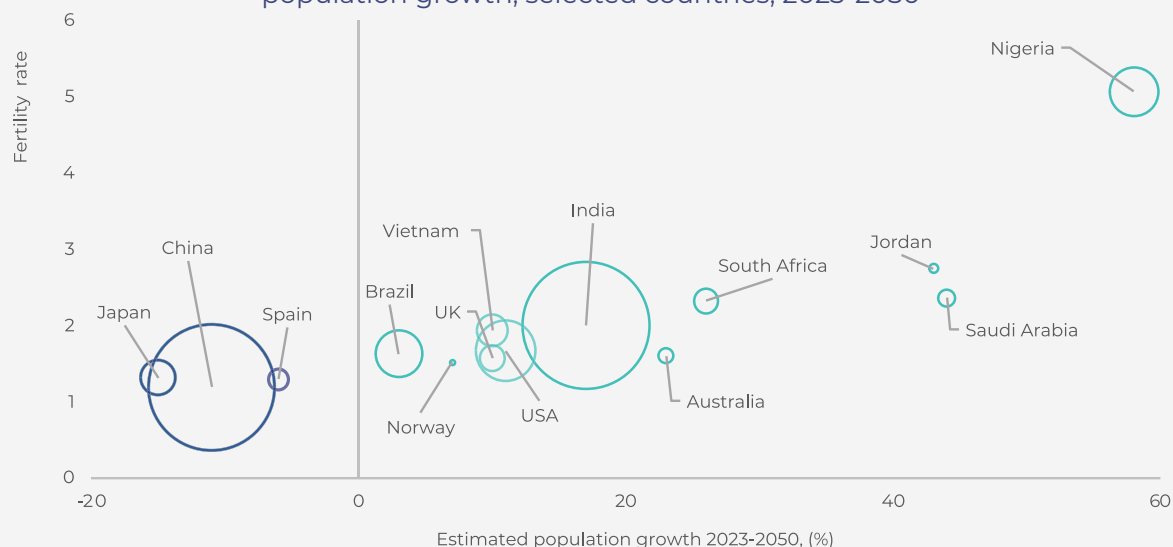
An ageing population

The world population will be ageing during the next half century—primarily driven by longer life expectancies and declining birth rates. A few countries, such as Nigeria, Jordan, and South Africa, will not be impacted in the short term, given their higher fertility rate (Table 2.1). This also applies to Saudi Arabia¹², although it has experienced a 43% decline in its fertility rate since 2000. However, most countries' fertility rate is below the replacement level of 2.1 live births per woman, which will accelerate population ageing.

¹² The situation in Saudi Arabia is different as over a third of its population are migrant workers and their dependents. The level of this sub-population fluctuates according to economic activities in the country.

2.2 DEMOGRAPHIC SHIFTS

Figure 2.3. Current population levels and estimated population growth, selected countries, 2023-2050



Source: United Nations, World Population Prospects, medium variant, 2024. Size of bubble shows the size of the population in 2023.

With a fertility rate of 1.2, China faces dire demographic prospects among the listed countries. Even though the government abandoned its one-child policy in 2016 and subsequently introduced a three-child policy, backed by tax and other incentives, Chinese women are still choosing to have fewer children or opting to have them later in life.¹³ In fact, China reached its population peak in 2021 and is now expected to be on a declining path for the next decades.

Table 2.1 Indicators of population ageing

	Panel A: Median age of the population			Panel B: Total Fertility Rate (live births per woman)		
	2000	2023	2050	2000	2023	2050
Australia	34.4	37.5	43.6	1.8	1.6	1.7
Brazil	24.3	33.6	43.6	2.3	1.6	1.6
China	28.9	39.0	50.7	1.6	1.2	1.4
India	21.6	28.2	38.1	3.4	2.0	1.8
Japan	40.7	49.1	53.6	1.4	1.3	1.5
Jordan	18.6	24.6	32.9	3.9	2.7	2.0
Nigeria	17.0	17.2	22.4	6.1	5.1	3.0
Norway	35.8	39.8	44.8	1.9	1.5	1.6
Saudi Arabia	21.2	30.6	38.8	4.1	2.4	1.9
South Africa	20.9	27.6	33.1	2.4	2.3	1.9
Spain	36.4	44.8	52.8	1.2	1.3	1.5
United Kingdom	36.6	40.1	44.9	1.6	1.6	1.6
USA	34.2	38.1	43.1	2.0	1.7	1.7
Vietnam	22.9	32.8	40.7	2.1	1.9	1.5
World	25.2	30.5	35.9	2.7	2.3	2.1

Source: UN Department of Economic and Social Affairs, 2022 The old-age to working-age demographic ratio is defined as the number of individuals aged 65 and over per 100 people of working age defined as those at ages 20 to 64. This indicator is measured as a percentage.

¹³ Many reasons can account for the decline. According to the YuWa Population Research Institute, a Beijing- based think tank, China is one of the world's most expensive places for child-rearing; the average cost of raising a child to age 18, as of 2019, is \$76,629 – or 6.9 times China's per capita GDP that year. In the U.S., for comparison, the figure was 4.11 times per capita GDP.

2.2 DEMOGRAPHIC SHIFTS

By 2050, nearly 39% of China's population is projected to be over 60 years old. China's median age is already slightly higher than the United States. It will be significantly higher by 2050, 50.7 compared to 43.1. Despite the UN anticipating a small rebound by 2050, the Shanghai Academy of Social Sciences forecasted China's population was to begin decreasing by about 1.1%, or 15 million, each year, pushing its 1.41 billion population to about 587 million in 2100.¹⁴ By around 2080, China's elderly population is expected to outnumber its working-age population. These developments will precipitate the ageing of its population and the subsequent shrinking of its labor force. By comparison, while India is also ageing rapidly, it is still comparatively young. At 28 in 2023, its median age will reach 38 in 2050.

Other countries that will experience rapid population decline are Japan and South Korea¹⁵—two of the most dynamic economic and innovative engines of past decades. In Japan, the proportion of older people (aged 65 and over) is one of the highest globally, with predictions indicating that by 2050, 40.1% of its population will be in this age group. The number of Japanese nationals dropped by the largest amount in a year since comparable records began in 1950—a fall of 837,000 in the 12 months to October 2023. This decline represents a daily drop of 2,293 people or just under 96 per hour.¹⁶

Significant demographic shifts are also anticipated in Europe and North America within the next ten years, which will affect the size of the working-age population. For instance, in the US alone, 10,000 people per day currently reach the 65-year-old retirement threshold and the number of older adults will more than double over the next several decades to represent over 20% of the population by 2050.

One of the immediate effects of an ageing population is the deceleration of labor force growth—resulting in potential labor shortages. With fewer young people entering the workforce and a larger proportion of older individuals, the ratio of retirees to active workers is set to increase, placing additional strain on the workforce. To address ageing populations, countries have adopted various strategies to compensate for a limited workforce.

One strategy has been to rely more on technological advancements, particularly automation and robotics. As a consequence, countries experiencing rapid population ageing have been at the forefront of technological adoption as it can help compensate for their shrinking labor force by boosting productivity.

¹⁴ Cited in: Peng, X. (2022).

¹⁵ South Korea is experiencing a similar trend, with its elderly population expected to reach 37% by 2050.

¹⁶ Financial Times (2024).

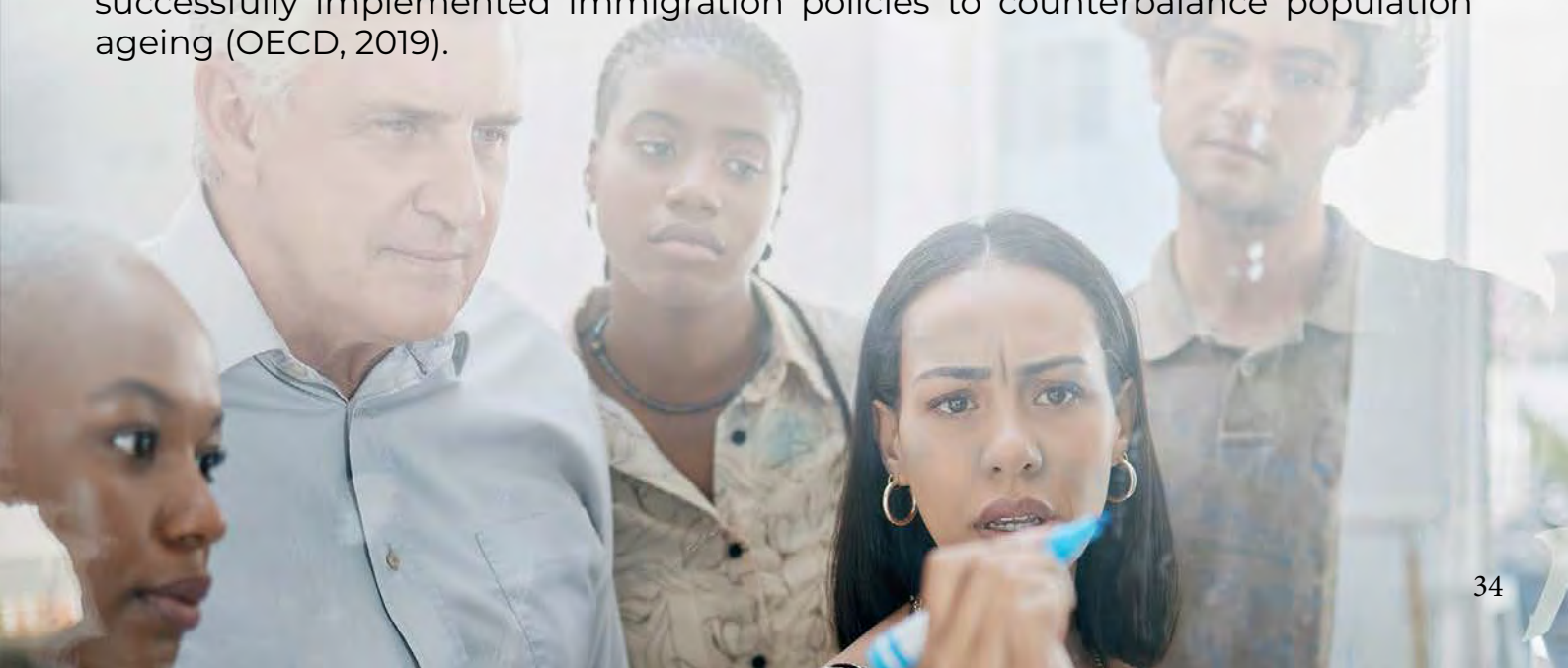
2.2 DEMOGRAPHIC SHIFTS

Robot adoption in factories around the world has continued at high speed with the global average robot density reaching a record 162 units per 10,000 employees in 2023 - more than double the number measured only seven years ago (IFP, 2024).

The Republic of Korea is the world's number one adopter of industrial robots with 1,012 robots per 10,000 employees, where robot density has increased by 5% on average each year since 2018. It is followed by Singapore (770) and China (470), the latter surpassing Germany (429) and Japan (419). By contrast, the United States reached 295 units in 2023.

A complementary approach has been to increase productivity by upskilling and reskilling existing employees. This strategy involves investing in the development of current employees' skill sets, enabling them to perform a wider range of tasks and take on new responsibilities. By making workers more productive, it helps compensate for the shrinking labor force.

Several countries have successfully implemented this strategy with notable results. For example, Germany's dual education system combines company apprenticeships with vocational school education. This system ensures that students gain practical skills and experience relevant to their industries while receiving theoretical education. As a result, Germany has one of the lowest youth unemployment rates in Europe and a highly skilled workforce that contributes to its robust industrial sector. Moreover, Sweden has focused on lifelong learning to continuously upskill its workforce. The country provides extensive adult education programs and encourages workers to return to education throughout their careers. This focus on continuous learning has allowed Sweden to maintain high levels of innovation and productivity, even in the face of demographic challenges. Alleviating labor shortages through immigration is another strategy that has been attempted. Strategic immigration policies can effectively address the challenges of an ageing population, ensuring a steady supply of labor and building economic resilience. Germany, Canada and Australia along with several other countries have successfully implemented immigration policies to counterbalance population ageing (OECD, 2019).



2.2 DEMOGRAPHIC SHIFTS

Canada's immigration policy

Canada has long been recognized for its proactive immigration policy. The country has consistently welcomed many immigrants annually, focusing on skilled labor to fill gaps in its workforce. Canada's Express Entry system, introduced in 2015, prioritizes candidates with desirable skills and work experience, ensuring a steady influx of young, qualified professionals. This approach has helped Canada maintain a dynamic labor market and support economic growth despite its ageing population.

Germany's immigration strategy

Germany, another notable example, has also relied on immigration to mitigate the effects of population ageing. In recent years, Germany has implemented a series of measures to attract skilled workers from abroad, including the Blue Card program, which facilitates the immigration of highly skilled workers from non-EU countries. These efforts have been crucial in addressing labor shortages in healthcare, engineering, and information technology sectors.

Australia's immigration system

Australia has similarly embraced immigration to bolster its workforce and counteract demographic challenges. The country's points-based immigration system favors young, skilled applicants who can contribute to the economy. By targeting professionals in high-demand fields, Australia has managed to sustain its labor force and drive economic development even as its population ages.

Countries with young populations

However, not all countries face population ageing. Regions such as the Middle East and Africa have a relatively young population and rapid workforce growth. This development is expected to accelerate in the near future. The median age in Saudi Arabia (31.5), Jordan (24.6), South Africa (28.1), and Nigeria (17.6) is low compared to their European counterparts. Of these four countries, Saudi Arabia is the only one that will see its median age increase by 2050, which is the result of a declining fertility rate over the past decade¹⁷.

¹⁷ The fertility rate in Saudi Arabia was, as reported by the UN, above 7 in the early 1970s. The latest figure is 2.8 according to the 2022 Saudi Census.

2.2 DEMOGRAPHIC SHIFTS

A young population is often associated with the concept of demographic dividend. The concept, first introduced by economists David Bloom and David Canning (2003)¹⁸, suggests that it may result in a boost to economic growth, provided that there are available and adequate jobs, along with the presence of quality and accessibility of education and training systems for this larger segment of the labor force (Lee & Mason, 2006). This window of opportunity can last for several decades, depending on the speed and magnitude of the demographic transition.

It is important to note that a demographic dividend is not automatic. It requires a comprehensive set of policies that can effectively capitalize on the changing age structure. These policies include investments in healthcare, education, and job creation. For example, improving healthcare systems ensures the young population remains healthy and productive. Investing in education, particularly in science, technology, engineering, and mathematics (STEM), can equip the younger generation with the necessary skills to thrive in a rapidly evolving job market. Creating an enabling environment for entrepreneurship and innovation can also foster job creation and economic growth.

Countries currently experiencing a demographic dividend must also consider the long-term implications of their policies. As the young population ages, there will eventually be a shift towards an older demographic. Therefore, it is crucial to plan for the future by establishing robust social security systems and pension schemes that can support the ageing population. Additionally, promoting a culture of lifelong learning can help ensure that the workforce remains adaptable and skilled throughout their careers.

¹⁸ They emphasized the importance of demography to economic growth. They attributed a large portion of the economic growth of East Asia in 1965 to 1990 to the region's working-age population, which led to increase in productivity.



2.3 TECHNOLOGICAL CHANGE

Technological change has long sparked complex debates about jobs and skill demand. It has especially been noteworthy for the fear and anxiety it has generated over the years. The McKinsey Global Institute (2018) projected that around 15% of the global workforce, or about 400 million workers, could be displaced by automation in the period 2016–30, necessitating a transition to new forms of employment. That figure could rise to 30% or 800 million workers. Up to 30% of hours worked could be automated by 2030, boosted by gen AI (McKinsey Global Institute, 2024). By 2030, Europe and the United States could respectively require up to 13 million occupational transitions. The World Economic Forum (2023) anticipates similar developments.

These scenarios may appear extreme to many observers. Although most analysts agree that technologies are altering the types of jobs available and reshaping the skills required to perform them, there is less agreement about the magnitude and pace of change. Also lost in the narrative is that the impact of technology on employment and skills is more nuanced and context-specific than is often suggested. What is still much debated is whether technology is a substitute or a complement to labor.

What is technological change, automation and AI?

Although the terms technological change, automation, and artificial intelligence (AI) are often discussed in the context of employment, they are not always clearly defined. Even though technological change is typically thought of as automation, it also comprises changes in the efficiency of productive processes (e.g. communication), which can accelerate other large-scale processes affecting employment (e.g. outsourcing, offshoring, globalization). Automation, for the most part, can be described as advanced capabilities such as artificial intelligence, machine learning, cloud computing, IoT, and cybersecurity, replacing physical, mental or cognitive tasks done by humans. Artificial Intelligence (AI) refers to the simulation of human intelligence processes by machines, especially computer systems. These processes include learning, reasoning, and self-correction. Specifically, AI can be used to perform tasks such as problem-solving, data analysis, and even complex decision-making that traditionally required human intelligence. Generative AI, a subset of artificial intelligence (i.e. ChatGPT), is particularly noteworthy for its ability to create new content, whether it be text, images, or ideas, based on its training data.

2.3 TECHNOLOGICAL CHANGE

The impact of changing technology on workers

To better understand how the use of technology affects the demand for workers' skills, Autor et al. (2003) proposed a classification of job tasks across occupations into four categories: routine, nonroutine, analytic and interactive, and manual tasks (Table 2.2).¹⁹

Table 2.2. Classification of tasks by degree of risk of automation

	Routine tasks	Non-routine tasks
Analytic and Interactive Tasks	Substantial substitution (Example: record-keeping, repetitive customer service)	Strong complementarity (Example: forming and testing hypotheses, legal writing, persuading/selling, and managing others)
Manual Tasks	Substantial substitution (Example: picking or sorting, repetitive assembly)	Limited opportunities for substitution or complementarity (Example: janitorial services, truck driving)

Source: Autor, Levy, and Murnane, 2003.

Predictions that technology will make humans redundant have long been a source of apprehension (Lawlor & Tovey, 2011; Boreham et al., 2008). One of the earliest examples of technology anxiety and jobs can be traced back to the Luddite movement in England in the early 19th century²⁰. The Luddites were a group of textile workers who protested the introduction of mechanized looms and believed they were destroying their traditional way of life. Much of the process of industrialization in the late nineteenth and early twentieth centuries replaced highly skilled artisans with capital equipment operated by less-skilled workers (Goldin & Katz, 1998). The economist John Maynard Keynes (1930) later coined the term “technological unemployment”, predicting that technological progress would lead to a drastic reduction in working hours and a rise in leisure time for workers. Concerns over automation and joblessness during the 1950s and early 1960s were strong enough that in 1964, President Lyndon B. Johnson empanelled a “Blue-Ribbon National Commission on Technology, Automation, and Economic Progress” to confront the problem (Autor, 2015).

¹⁹ The authors claim that, depending on their type, tasks are vulnerable to automation. For tasks that can be accomplished by following explicit rules, computers can substitute for workers. When workers perform nonroutine problem-solving and complex communications tasks, computers will instead complement worker activities instead.

²⁰ In response, they smashed machines, burned factories and clashed with authorities in a violent rebellion from 1811 to 1816. Despite their actions, the Luddites failed to stop the march of technology, eventually leading to increased productivity, lower prices and higher demand for textiles. The technology also created new jobs for engineers, mechanics, managers and other professionals who were needed to operate and maintain the machines.

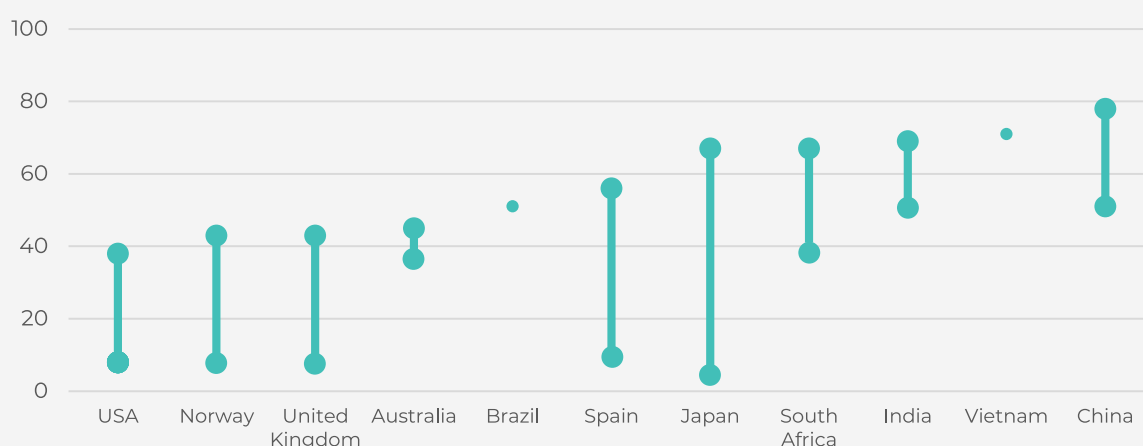
2.3 TECHNOLOGICAL CHANGE

These fears have been renewed more recently, with many studies painting a particularly gloomy picture of the consequences of technological change on employment. In many of these scenarios, automated processes and machines substitute workers, leading to massive job losses, increased inequality, and social disruption (Schwab, 2016; Rifkin, 1995)²¹. For instance, Brynjolfsson & McAfee (2012) noted that rapid technological change was destroying jobs faster than it was creating them, contributing to the stagnation of median income and the growth of inequality.

In a well-known study, Frey & Osborne (2013) estimated that almost half of US jobs were vulnerable to automation, with lower-wage occupations and those requiring lower educational levels being more likely to be automated. The latter study has been particularly influential, having been replicated across many countries to construct predictions of job losses.²² Acemoglu & Restrepo (2017) considered that increased usage of robots in the US economy between 1990 and 2007 reduced the employment-to-population ratio by 0.18 to 0.34 percentage points. McAfee & Brynjolfsson (2014) later emphasized that computerization was advancing further by progressively challenging human performance in cognitive tasks.

More recently, Lassébie & Quintini (2022) estimated that occupations at the highest risk of automation accounted for about 28% of employment. This is higher than previous figures published by the OECD, which put the share of workers at high risk of automation at about 14% (Nedelkoska & Quintini, 2018). The effects of automation can in fact vary widely among countries at different levels of income, and regions. While technological progress may account for these differences, different methodologies adopted have affected the range of estimates (Fig. 2.4).

Figure 2.4. Range of estimates of the share of jobs at risk of being lost to technology (%)



Source: Arntz et al. (2016), McKinsey (2017), Frey & Osborne (2017)

²¹ Also see Bresnahan, 1999; Charles et al., 2013; Jaimovich & Siu, 2012.

²² Australia (Durrant-Whyte et al., 2015; Edmonds & Bradley, 2015); Finland and Norway (Pajarinen et al., 2015); Singapore (Lee, 2016); United Kingdom (Deloitte, 2013; Lawrence et al., 2017); Germany (Brzeski & Burk, 2015); Japan (David, 2017); South Africa (le Roux, 2018); and 40 developing countries covered by the World Development Report (World Bank, 2016).

2.3 TECHNOLOGICAL CHANGE

Demographics most at risk of automation

Amid these changes, youth and women, in particular, are found to be at a higher risk of being affected by automation (e.g. UK Office of National Statistics, 2019; Council of Europe, 2019; Nedelkoska & Quintini, 2018). Entry-level positions, typically filled by the youth, are among the most susceptible to automation. These roles often involve repetitive tasks that can be easily automated, reducing the need for human labor and limiting the opportunities for young people to enter the workforce. Those without higher education or specialized training may find themselves at a disadvantage, struggling to compete for the fewer high-paying jobs. This economic divide can affect their career development and financial stability in the long-term. Furthermore, the rapid pace of technological change requires continuous upskilling, which can be a barrier for young individuals who may lack access to education and training resources.

Research by the International Monetary Fund has reported that female workers are at a significantly higher risk for displacement by automation than male workers, with 11% of the female workforce at a high risk of being automated (Brussevich et al., 2019). However, differences in proportions of women at high risk of automation vary substantially across countries. In Japan, women are three times more likely than men to fall into a high-risk group. Less well-educated and older female workers (aged 40 and older) and those in clerical, service, and sales positions are disproportionately exposed to automation. For females in particular, their disadvantage can be attributed to a variety of factors, such as women's higher employment in part-time jobs, particularly in the service industry, and their underrepresentation in higher-paying jobs that are expected to expand in the future, such as occupations in programming and software development (Frenette & Frank, 2020; Dellot, 2018; Roberts et al., 2019).

Countries most affected by automation

Although much focus has been given to the United States and Europe, concerns over technological change also extend to emerging economies, with China and India accounting for the largest technically automatable employment potential in the G20. The latter has been estimated at more than 700 million full-time equivalents between them (McKinsey Global Institute, 2017,²³ World Bank, 2016; Maloney & Molina, 2016). Other Asian countries were also found to be highly impacted, with an estimated 137 million workers across Cambodia, Indonesia, the Philippines, Thailand and Vietnam—approximately 56% of the total workforce of those countries—at risk of displacement by technology (Chang & Huynh, 2016).

²³ McKinsey also suggested that automation will create new demand for labor, especially in areas such as technology, health care, education, and the green economy. MGI estimated that 8% to 9% of labor demand in 2030 will be in new occupations that have not existed before.

2.3 TECHNOLOGICAL CHANGE

Automation and society division

Most recently, discussions about technology have centred on the impact of Artificial Intelligence (AI) and its subset Generative AI. Like other technologies, AI is expected to disrupt employment levels and skill requirements but at a scale not seen before (Brynjolfsson et al., 2017). While previous technological changes were limited to non-cognitive and routine tasks, the disruptive nature of this technology is likely to have implications for all occupations, including those with cognitive tasks (McAfee & Brynjolfsson, 2014). The negative impact is estimated at up to 40% (OECD, 2024; IMF, 2024; Lee, 2018). But not all agree on the magnitude of its potential impact.

Economic studies consistently find that technological change often favors certain skills, known as skill-biased technological change (SBTC).²⁴ This theory suggests that technology boosts skilled labor, increasing the wage gap between skilled and unskilled workers (Acemoglu & Restrepo, 2020). This rising skill premium has raised concerns about growing inequality, as noted in numerous studies (Autor & Dorn, 2013; Goos et al., 2009; Dustmann et al., 2009).²⁵

Earlier on, Gorz (1985, 1989) was worried that increased automation could lead to a polarization of society with two distinct groups of workers: On the one side, a core of well-paid professionals in stable full-time work and, on the other, a growing number of people who are either in peripheral, insecure, part-time jobs, or who are unemployed. Many of these jobs—often referred to as being part of the gig economy—are often characterized by job insecurity, lower wages, and less attractive work conditions for many of these workers.²⁶ Acemoglu (2002) later remarked that “an acceleration in skill-biased technical change during the past few decades appears to be the main cause of the increase in wage inequality,” a development also observed empirically by Autor (2013; 2019) who noted that workers were increasingly shunted into low-wage occupations that require only generic skills, with workers with middle skills losing out (Fig. 2.5).

²⁴ One set of early studies considered the growing education wage gap in the context of a standard labor supply and demand model. Studies by Bound & Johnson (1992), Katz & Murphy (1992), and Murphy & Welch (1992) concluded that skill-biased technical change was the only factor capable of explaining the large increase in the college-education wage premium during the 1980s. Others found a positive association between new technologies and a higher level of required skills: Machin & Van Reenen (1998), Card & DiNardo (2002), Bessen (2016), Goldin & Katz (2008).

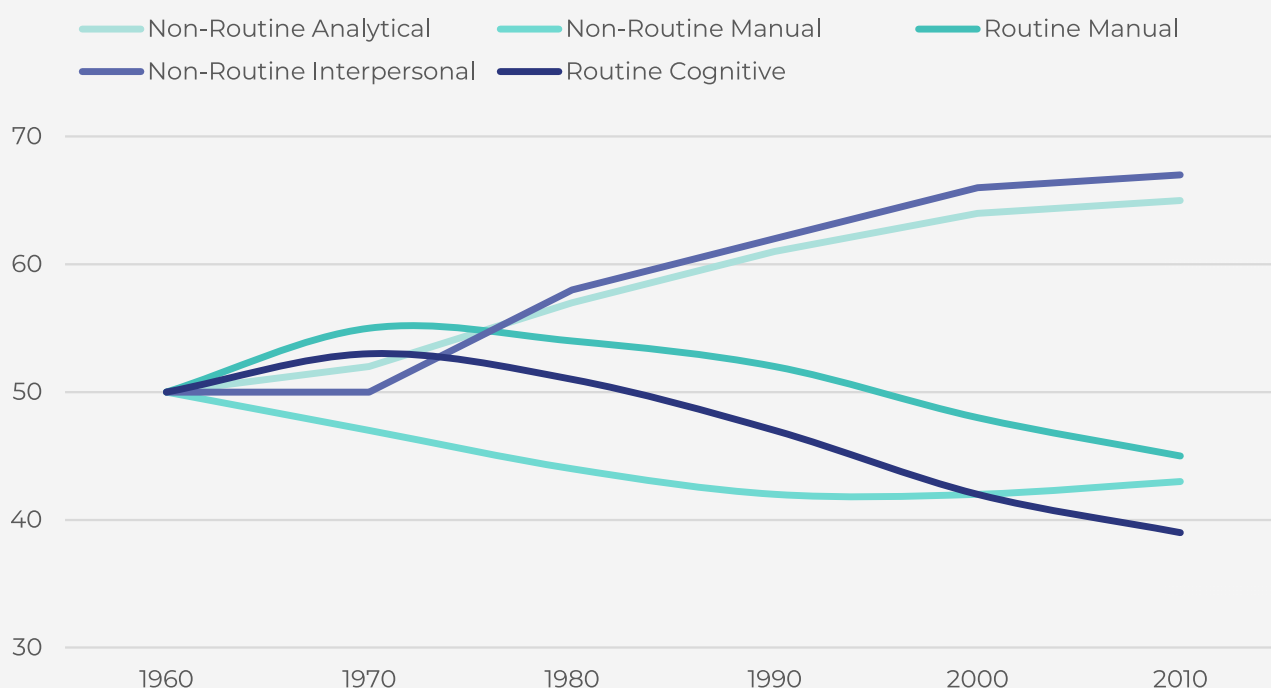
²⁵ Beaudry et al. (2016) also remarked that the demand for skills has resulted in high-skilled workers pushing low-skilled workers even further down the occupational ladder and, to some degree, out of the labor force altogether.

²⁶ The gig economy refers to a labor market characterized by the prevalence of short-term contracts or freelance work, as opposed to permanent jobs. In the gig economy, workers take on various short-term jobs or ‘gigs’ rather than working for a single employer in a traditional, long-term employment arrangement. These gigs include anything from driving for a ride-sharing service to performing one-off tasks for businesses or individuals. The gig economy is often associated with the rise of digital platforms that connect workers with customers, allowing for more flexible and on-demand work arrangements.

2.3 TECHNOLOGICAL CHANGE

Increasing demand for well-paid jobs, in which non-routine cognitive tasks are performed, as well as non-routine manual work at the lower end of the income distribution, in combination with the automation of repetitive cognitive skills, has forced employment away from the middle of the income distribution (see also Autor et al., 2003; Autor, 2013; Michaels et al., 2014; Katz and Kearney, 2006). This decline in middle-skill jobs has been attributed to the combined effects of automation and international trade, which have led to the elimination of many productions, administrative support, and clerical jobs.

Figure 2.5. Changes in worker tasks in the US economy, 1960-2009 (%)



Source: Autor & Price, 2013.

2.3 TECHNOLOGICAL CHANGE

Substitution or complementarity?

Like other technologies before it, the analysis of its impact is still under debate. However, one of the fundamental questions is whether technology is a relative substitute or a complement to human labor (Decanio, 2016). In other words, does technology replace workers, or does it augment their work? Although a large segment of the literature has focused on job displacement and polarisation as the most likely outcomes, other studies claim instead that automation is more likely to replace only a relatively small share of jobs in their entirety as most occupations will be restructured. However, many studies have shown that skills are relative complements (Bresnahan et al., 2000; Acemoglu, 2002; Autor, Levy, & Murnane, 2003). In this case, technology is assumed to take a factor-augmenting form, thus complementing either high or low-skill workers (Acemoglu & Autor, 2011).

This suggests that it is highly unlikely that entire occupations will be automated given that, in practice, even occupations labelled as high-risk are likely to contain a substantial share of tasks that are hard to automate and, also, that there is a lot of heterogeneity in the tasks performed within each occupation. According to this view, technologies may complement humans, requiring workers to learn to work effectively with new technologies as some tasks, but not all, will be affected by automation (Georgieff & Hye, 2021; Arntz et al., 2016; Bessen, 2016). Arntz et al. (2016) estimated that, on average, only 9% of total employment in the OECD countries are at high risk of being fully automated, while for another 25% of jobs, between 50% and 70% of the tasks could change significantly because of automation (see also Kim et al., 2017). The notion of complementarity between technology and labor is important, as it is also very much about how technology is used.



2.3 TECHNOLOGICAL CHANGE

While more jobs may be exposed to AI, very few risk disappearing entirely (Lassébie & Quintini, 2022). In fact, some economists think AI will transform the global economy without booting people out of jobs. (Gmyrek et al. 2023a). Collaboration with a virtual assistant may, in fact, improve performance. The average respondent estimates that ChatGPT can halve the time spent on about a third of work tasks which, in theory, boosts efficiency (Humlum & Vestergaard, 2024). Frey, 2023, argued that artificial intelligence platforms like ChatGPT can augment the capabilities and productivity of low and medium-skill workers by handling routine tasks and allowing them to focus on more complex aspects of their work. Like other technologies that preceded it, AI can create new tasks and jobs, particularly for workers with complementary skills (Green, 2023).

Others have argued that the technology has had almost no economic impact so far (The Economist, 2024). Acemoglu (2024), for instance, finds most of the recent claims about AI to be overly optimistic due to the complexity of future tasks that AI will undertake. He estimates a modest increase in total factor productivity (TFP) of no more than 0.55% over a decade as the result of AI usage.²⁷ Borgonovi et al. (2023) found that AI-related online vacancies comprised less than 1% of all job postings and were predominantly found in sectors such as ICT and professional services. In a similar study, Green & Lamby (2023) found that jobs with skills related to machine learning were the most sought-after.

The finding that there is yet little evidence of a surge in productivity is not usual. The development of steam, electricity and computers faced similar issues. A similar observation was made in the 1980s with the advent of computers. The information age did not immediately increase economic output or productivity, a phenomenon Nobel laureate Robert Solow noted by saying, “You can see the computer age everywhere but in the productivity statistics” (Solow, 1987). So far, it seems to be true also for Artificial Intelligence and Generative AI (Brynjolfsson & Unger, 2023).

Nonetheless, advanced economies are expected to experience AI’s benefits and pitfalls sooner than emerging markets and developing economies, mainly due to their employment structure focused on cognitive-intensive roles (Georgieva, 2024). There are some consistent patterns concerning AI exposure, with women and college-educated individuals being more exposed but also better poised to reap AI benefits and older workers potentially less able to adapt to the new technology.

²⁷ Acemoglu (2024) suggests that GDP and aggregate productivity gains are proportional to the fraction of tasks affected by AI and the average savings in task-level costs. Additionally, the paper discusses the potential for AI to impact wage and inequality, suggesting that improvements in low-skill worker productivity may not necessarily lead to reduced inequality and could, in fact, exacerbate it.

2.3 TECHNOLOGICAL CHANGE

The impact of technology on labor markets is, therefore, complex and depends on various factors, such as the nature, scope and speed of innovation, the adaptability of workers and firms, the institutional and regulatory environment, and the policies and institutions that support the transition. This caution is due to the early evidence being based on tasks that are easier to automate. In contrast, future effects could stem from more complex tasks with context-dependent decision-making factors.



2.4 CLIMATE CHANGE

Skills and employment are two of many factors impacted by climate change. The transition to a low-carbon economy promises a surge in green jobs, offering opportunities for innovation and sustainable growth.²⁸

Green jobs can be defined as those that contribute to preserving or restoring the environment (OECD, 2024; ILO, 2016). This includes jobs in traditional sectors such as manufacturing and construction, as well as in new, emerging green sectors like renewable energy and energy efficiency. Green skills can be referred to as the knowledge, abilities, values, and attitudes needed to live in, develop, and support a sustainable and resource-efficient society (OECD, 2023; 2014; ILO, 2019).

What is climate change and how will it impact the economy?

Climate change refers to long-term shifts in temperatures and weather patterns, which is often attributed to the increase in the concentration of greenhouse gases in the atmosphere.²⁹ The effects of climate change can be widespread, impacting natural ecosystems, human societies, and economies, and include more frequent and severe weather events, rising sea levels, and changing wildlife habitats and migration patterns. The net effect of climate change on the overall economy depends on the magnitude and frequency of climate shocks, the adaptive capacity of economic agents, and the policy responses and investments undertaken to mitigate and adapt to climate change.

Work by the Intergovernmental Panel on Climate Change (IPCC) anticipates that, under a business-as-usual scenario, the global average temperature will increase by 4.4°C by 2100³⁰. Among the countries covered in the study, Brazil, Saudi Arabia, and Spain would face the greatest mean change in temperature (Fig. 2.6).

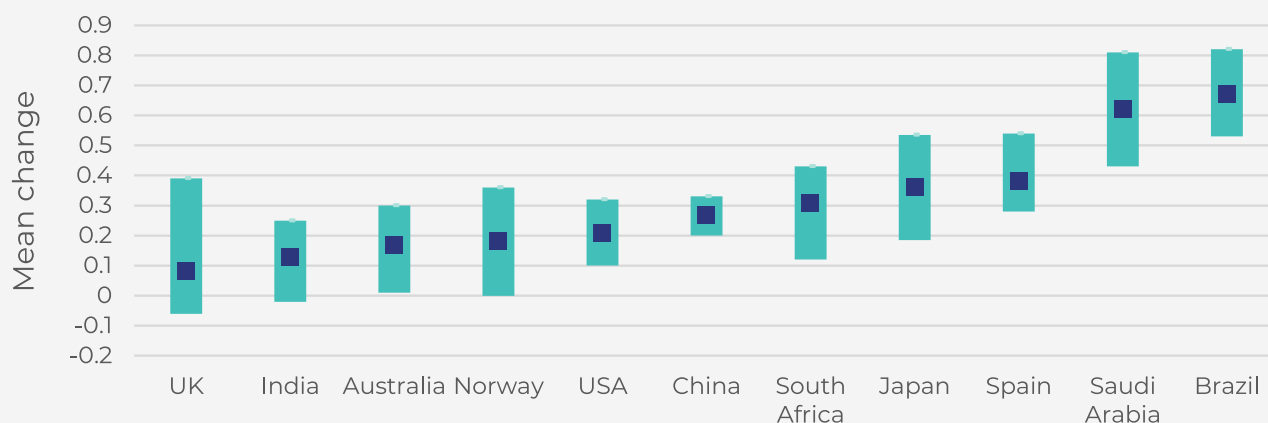
²⁸ See Dell et al., 2014 for a comprehensive review; and Dell et al., 2012; Burke et al., 2015; Newell et al., 2021, among many others.

²⁹ The United Nations Framework Convention on Climate Change (UNFCCC) defines it as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods." UN Framework Convention on Climate Change, Article 1.

³⁰ See Lee et al., 2023.

2.4 CLIMATE CHANGE

Figure 2.6. Mean change in the number of unusually warm days over the 1979-2021 period, selected countries



Maes et al. 2022

While most scenarios estimate that the medium-term effects would range between 1% to 3% of GDP, some studies expect the impact to be more substantial. For instance, Bilal & Känzig (2024) estimate that a 1°C increase in global temperature could lead to a 12% decline in world GDP. Another report by the Swiss Re Institute (2021) suggests that a rise in global temperatures of 3.2°C would potentially result in the world economy losing up to 18% of its total economic value by 2050. Burke et al. (2018) project a 15%–25% reduction in per capita output by 2100 for a 2.5–3°C of global warming scenario and a reduction of more than 30% for 4°C warming.³¹

Climate change and its affect on different sectors

Greater economic losses have been observed for sectors with high direct climate exposure, including regional losses to agriculture³², forestry, fisheries, energy and tourism.³³ The agricultural sector, often the backbone of many economies, is expected to face significant challenges with crop yields potentially decreasing by up to 10% per degree of global warming, which could lead to job losses and increased poverty, particularly in vulnerable communities. In contrast, the construction sector may see a surge in demand as the need for resilient infrastructure becomes more urgent.

³¹ Estimates vary widely across studies and countries. See: Burke, Davis & Diffenbaugh (2018). Burke et al. (2015) shows that under current climate policies, global temperature could rise by 2.9°C by the end of the century, while the world's most vulnerable countries could face an average GDP hit of -19.6% by 2050. Acevedo (2017) projects a 9% average loss in GDP by 2100, whereas Baarsch et al. (2020) anticipates GDP losses of 10–15% by 2050.

³² Byers et al. (2018).

³³ Intergovernmental Panel on Climate Change (2022).

2.4 CLIMATE CHANGE

The economic repercussions of climate change are expected to unfold over time or abruptly, affecting various sectors individually and collectively. Workers in outdoor roles, emergency services, and hot indoor environments are particularly vulnerable. The International Labor Organization (2024) expects that 2.4 billion workers worldwide could be affected by climate change. The excessive heat, a direct consequence of climate change, could affect a staggering 70% of the global workforce of 3.4 billion people, along with productivity losses, which could reach \$2,400 billion by 2030. The WEF (2023) anticipates that, as global temperatures rise, up to 3.8% of total working hours could be lost by 2030 due to heat-induced stress, equating to the loss of 136 million full-time jobs and an economic downturn of \$2,400 billion. In some regions, such as the Arab Region,³⁴ most employment losses would be found in the construction sector, accounting for 40% of the total loss of working hours due to heat stress by 2030. Productivity losses could also be significant in the agricultural sector.

Measuring technology's impact on job creation is a source of debate, as a wide range of estimates exists on the level of job creation.³⁵ While many studies and reports predict strong job creation potential in the future in environmental fields, others downplay its significance.

The adaptation to climate change is seen as creating new employment opportunities. For example, the construction industry may experience a boom as buildings are retrofitted to be more energy-efficient or as new, more resilient infrastructure is developed to withstand extreme weather events. Moreover, because of the externalities they create, actions on climate change have become intertwined with globalization as countries engage in environmental agreements that aim to balance economic growth with ecological preservation. These agreements often take the form of international accords, where countries commit to reducing greenhouse gas emissions and transitioning to sustainable energy sources. The ripple effect of these commitments influences not only national policies but also the operational strategies of multinational corporations as they also adopt greener strategies.

³⁴ The Arab Region refers to the 12 countries covered by the ILO Regional Office for Arab States, Bahrain, Iraq, Jordan, Kuwait, Lebanon, Occupied Palestinian Territory, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, United Arab Emirates, and Yemen.

³⁵ The U.S. Bureau of Labor Statistics uses two approaches to measuring green jobs: (1) the output approach, which identifies establishments that produce green goods and services and counts the associated jobs, and (2) the process approach, which identifies establishments that use environmentally friendly production processes and practices and counts the associated jobs. The output approach alone, however, would not cover some activities and associated jobs that favorably impact the environment although the product or service produced is itself not "green." The process approach is intended to address this aspect of green jobs.

2.4 CLIMATE CHANGE

The transition to greener jobs

In a recent report, the WEF (2023) reported that hiring for green jobs has consistently outpaced overall hiring rates. Demand for these jobs has risen by 40% since 2015, with a robust demand for professionals skilled in sustainability practices, renewable energy technologies, and environmental management. The ILO (2023) also estimates that 24 million new jobs could be created globally by 2030 if the right policies are implemented to promote a greener economy. This transition will require a diverse range of skills, particularly in solar photovoltaic, wind power, and hydropower, which are among the fastest-growing sectors. According to IRENA (2023), the shift towards low-carbon economies is anticipated to create a surge in employment within the renewable energy sector, which saw a global increase to 13.7 million jobs in 2022.

The long-term effects of climate policy on job creation are also contingent upon the speed and scale of the transition. A rapid shift to sustainable practices could result in a swift and significant impact on employment. In contrast, a gradual transition might allow for a smoother absorption of changes in the job market. However, the transition will have its challenges. The process of creative destruction implies that while new jobs may be created, others may be lost.

Efforts to mitigate pollution and reduce reliance on energy and resource-heavy processes may downsize or cease operations in certain industries. A common scenario in long-term climate policy is the “phasing out” of polluting industries and the expansion of environmentally sustainable or “green” sectors. In China, for instance, the strategic closure of numerous coal mines aimed at curtailing excess capacity and combating climate change is projected to result in approximately 1.3 million job losses in the coal sector and an additional 500,000 in the steel sector. These figures represent a substantial portion of the workforce, roughly 20% and 11% in these sectors, respectively (ILO, 2017). Similar transitions are observed in the transportation and manufacturing sectors, which are moving towards more sustainable options such as rail transport over trucking, the production of electric vehicles over traditional internal combustion engines, and the adoption of recycling and refurbishing practices in place of landfill usage.

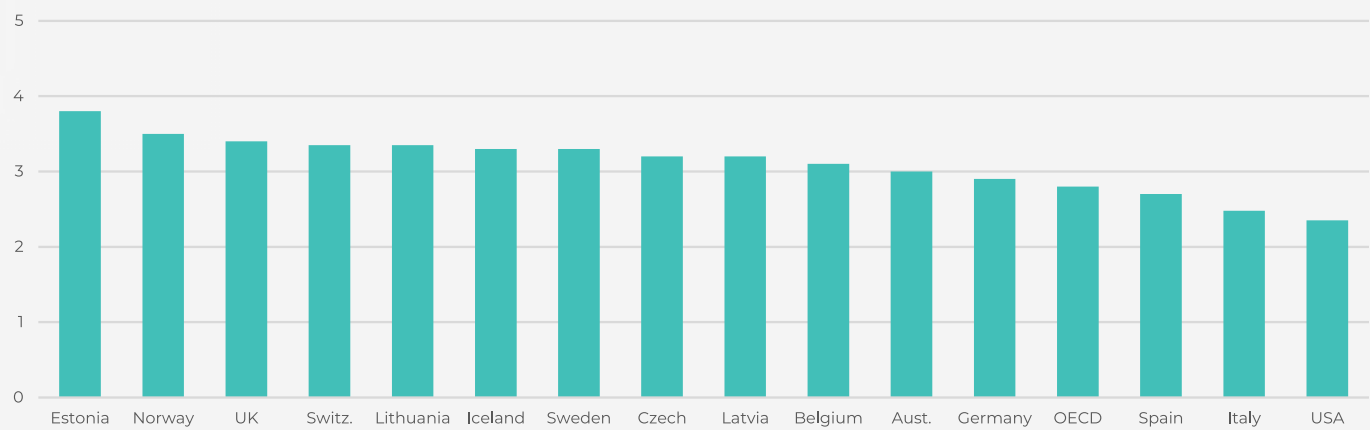
Despite the increasing prevalence of climate change in the public discourse, labor markets have not, on average, become much greener over the last decade. The current evidence indicates that green jobs still account for a small proportion of total employment. Across European countries, the share of green employment is about 3%, and roughly 2.3% in the United States (Fig. 2.7).



2.4 CLIMATE CHANGE

Based on individual government reports, the figure for China has been estimated to be about 7.3% and approximately 2.9% for India.³⁶ These estimates have been relatively stagnant for the past decade (OECD, 2023b).

Figure 2.7. Green employment share, %



Source: Tyros et al. (2023); World Bank (2022).

³⁶ Out of 740 million Chinese workers, about 54 million of are estimated to work in green jobs according to the World Bank (2022). Green jobs account for about 18.5 million in India out of about 643 million workers.



2.4 CLIMATE CHANGE

The pool of qualified individuals has not been expanding significantly either. Indeed, only a fraction of the workforce is reported to possess the necessary competencies that organizations need and want, which amounts to about 13% of the workforce (WEF, 2023). The LinkedIn Global Green Skills Report (2022) also showed an 8% growth in green jobs between 2015 and 2022 but only a 6% increase in the talent pool with the necessary skills. Partly to blame for this skill shortage is the relative gender gap across the industry. This suggests that, while investment in eco-friendly initiatives is on the rise, translating this into job opportunities has remained a challenge.

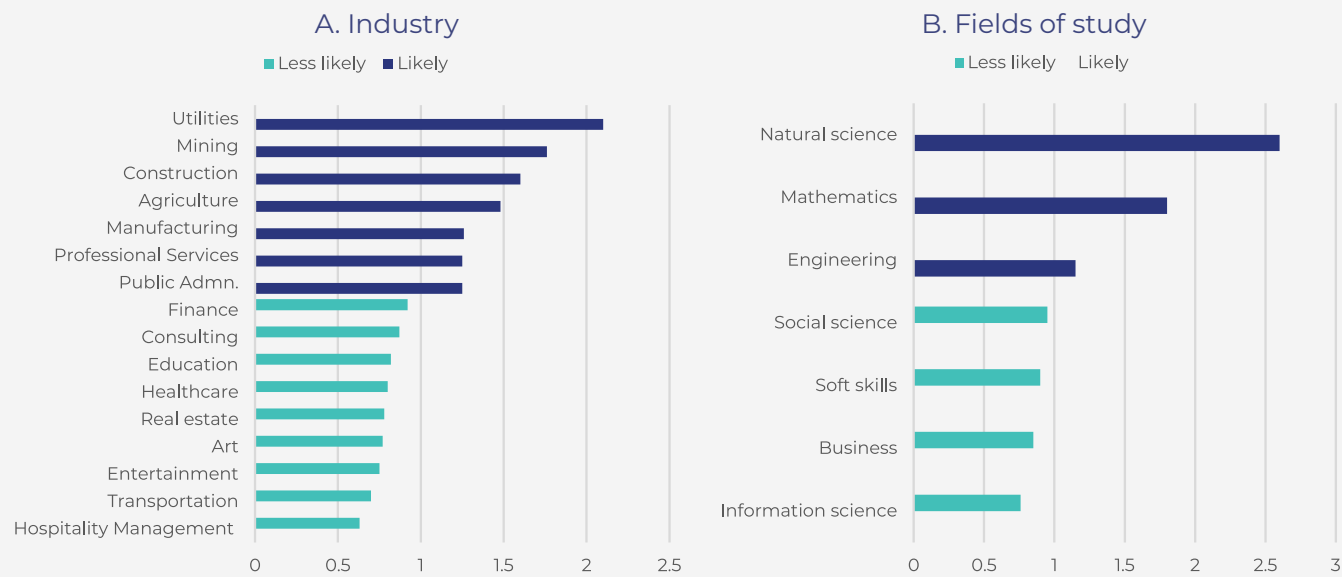
A significant gender disparity continues to exist in the green energy sector, with women's representation falling short of their presence in the broader global workforce. Despite making up 48% of the global labor force, women only account for about 32% of held roles in renewables (Johnstone & Silva, 2020). Moreover, women are concentrated in administrative roles (58%), with a low presence in STEM-related jobs (32%) (IRENA, 2022).

As illustrated in Fig. 2.8.B, the development and availability of green skills will be essential to ensure the transition across sectors. Green skills encompass the knowledge, abilities, values, and attitudes essential for fostering a sustainable and resource-efficient society, as outlined by the OECD (2021). These skills are not only technical and specific to certain jobs or industries, like installing solar panels or waste management, but also universal skills transferable across various scenarios, including problem-solving, creativity, and teamwork. The range of skills necessary for these tasks is broad, covering both specialized knowledge and general soft skills that facilitate environmentally friendly practices (ILO, 2011). At the same time, many green job opportunities typically require highly skilled and tertiary-educated workers (Marin & Vona, 2019).



2.4 CLIMATE CHANGE

Figure 2.8. Likelihood of workers moving into green and sustainability-related jobs (%)



Source: LinkedIn Global Green Skills Report 2023

A transition to a net zero economy will require a workforce that is agile and expert at adopting eco-friendly practices. Countries with a higher capacity to redeploy workers from ‘brown’ to ‘green’ jobs can facilitate this transition, using the underlying supply of green skills within their labor markets. While the extent of this reallocation varies across countries, these outcomes are influenced by national policies, investment in training and education, and the adaptability of the workforce (Barbier, 2016).

It particularly underscores the importance of reskilling and upskilling the workforce to meet the demands of a changing climate and the evolving labor market, particularly in sectors like transportation, energy, and manufacturing, which are expected to undergo significant early shifts. Proficiency in STEM disciplines is particularly crucial, given that many environmentally focused jobs are based on scientific and mathematical principles. Additionally, digital competencies are becoming indispensable as organizations implement technology-driven strategies to meet environmental goals. Knowledge in sectors such as utilities, mining, and agriculture is also gaining prominence as these fields experience a swift transition towards more sustainable practices. Furthermore, expertise in public administration is in high demand due to the growing complexity of regulatory and policy measures in response to climate change.

CONCLUSION

These global forces are changing the skill demand landscape in different ways, requiring strategic action to prepare the workforce for the future. At the same time, it is crucial to evaluate carefully how these trends affect job roles and skill requirements. These issues matter to current and future workers who want to anticipate future trends and how they might respond by investing in their human capital and making other decisions throughout their working lives. The next section will provide insights into the views and experiences of labor market participants across 14 countries and set the stage for further discussion about their degree of readiness.



A photograph of a busy city street at night, likely Times Square in New York City. The street is filled with people walking, and the buildings are covered in numerous bright, colorful billboards and advertisements. The scene is illuminated by the city lights and the glow of the billboards. The text "ATTITUDES AND EXPECTATIONS: A REVIEW OF SURVEY RESULTS" is overlaid in white, bold, sans-serif capital letters in the center of the image.

ATTITUDES AND EXPECTATIONS: A REVIEW OF SURVEY RESULTS

3. ATTITUDES AND EXPECTATIONS: A REVIEW OF SURVEY RESULTS

This section reports on the aspirations and expectations of labor market participants (employed, searching for employment, or self-employed) using a survey that spans 14 countries across seven global regions. It examines how global forces—economic globalization, shifting demographic patterns, the pace of technological change, and the emergence of climate change—are shaping labor markets, skill demand and the essence of work across Asia, Africa, Europe and the Americas. The study reveals global and demographic differences in skill and training perceptions, which are shaped by education, income, country, and age. It particularly found that:



Technological advancements are outpacing globalization as the main driver of skill disruption.



Job automation fears persist, affecting about a quarter of the workforce in major economies, with a higher rate of concern in China.



In regions undergoing rapid technological industrialization, notably Vietnam and China, there is a strong intent to upskill or reskill.



Population aging in Europe and Japan are not seen as a key factor for skills development and acquisition, even though they have some of the world's oldest demographics. In contrast, Chinese respondents place more importance on this issue.



Climate change impacts upskilling differently across regions, with countries like Vietnam and China seeing it as a more pressing reason for skill enhancement.



Respondents expressed confidence in meeting these challenges and viewed upskilling or reskilling as their primary responsibility.



There is a positive correlation between higher education levels and proactive skill acquisition, as well as confidence in adapting to new skill requirements.



Respondents see cognitive, management, socio-emotional, and STEM skills as vital for adapting to new labor market demands. The acquisition of these skills are believed to help bolstering their adaptability in a dynamic labour market.

3. ATTITUDES AND EXPECTATIONS: A REVIEW OF SURVEY RESULTS



While male respondents tend to favour management and STEM skills, female respondents are more focused on socio-emotional skills.



Preference trends towards self-directed learning methods, such as online courses and on-the-job training, for personal development.



Upskilling efforts are hindered by inadequate collaboration between public and private sectors, along with constraints in time and financial resources.



Confidence in support for upskilling is higher for businesses than for governments, NGOs, or community organizations.

By identifying commonalities and disparities in workforce attitudes and responses towards strategic choices and priorities, the analysis provides insights into the mindset of labour market participants across various regions during times of change. The following is a detailed account of the survey results.



3.1. THE IMPACT OF THE GLOBAL FORCES ON SKILL DEMAND

As discussed earlier, globalization continues to create a vast, interconnected market where competition and collaboration often span continents. This development necessitates a continuous update of skills to remain competitive. Demographics, whether through the ageing of the workforce or influx of young entrants, exerts significant strain on the job market, intensifying the need for specific competencies.

Technology is increasingly automating or enhancing various tasks, rendering some skills less valuable or even redundant. The subtle yet profound impact of climate change is catalyzing the rise of emerging sectors dedicated to eco-friendly solutions, necessitating the acquisition of new skills while phasing out others.

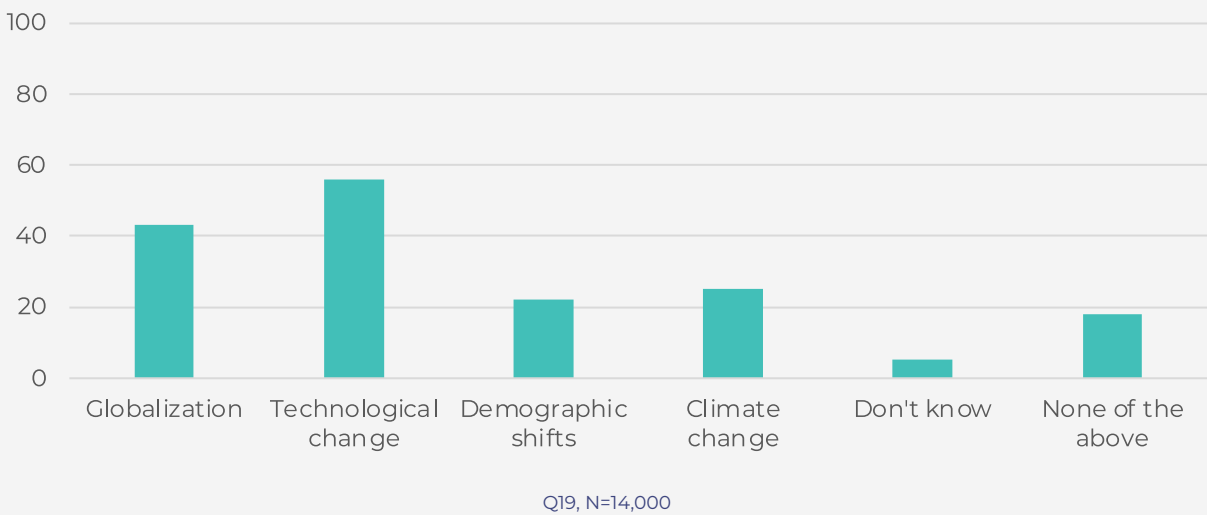


3.1.1 THE GENERAL IMPACT OF GLOBAL FORCES

When individuals across countries were questioned about which global trends influenced their decision to seek additional training or education in the past five years, an overwhelming number leaned towards one specific answer. While globalization was acknowledged as a noteworthy influence, it is the rapid pace of technological change that is seen as the formidable disruptor by over 50% of respondents, highlighting the need for continuous investment in upskilling and reskilling (Fig. 3.1.A). This view was attained when respondents were asked about the next five years, which shows the transformative effect of technological advancements on the nature of work and the skills required.

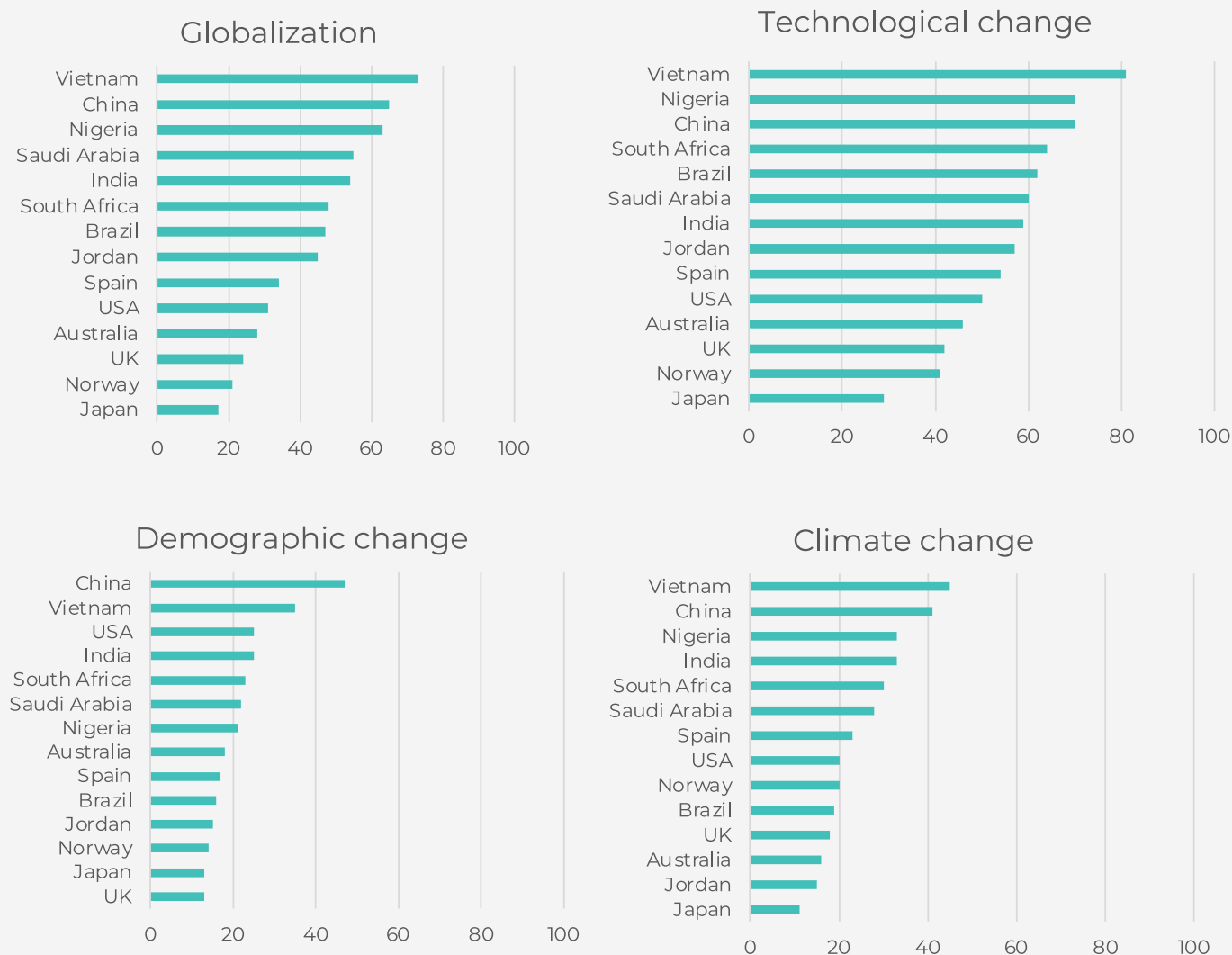
The uneven spread of technological advancements across countries and the varying capacity of labor markets to absorb these changes have also had an impact on the urgency, or not, to upgrade skills (Fig. 3.1.B). In countries where technology is newer, such as Vietnam (81%), Nigeria (70%), and China (70%), labor market participants were more inclined to acquire new skills to bridge the gap between current capabilities and the demands of a technologically evolving job market.

Figure 3.1. Thinking of the past five years...Did any of the following global forces prompt you to upskill or reskill in your work? (%)
A. Total



3.1.1 THE GENERAL IMPACT OF GLOBAL FORCES

B. By country



Q19. N=13,930

The parallel developments in both Vietnam and China underscore a broader regional trend towards high-tech industrialization, which is reshaping the economic landscape of Asia. In Vietnam, for instance, the manufacturing sector has seen a surge in foreign direct investment and a pivot towards high-tech industries. Strategic government initiatives, such as tax incentives for high-tech firms and establishing specialized industrial zones, have created an environment conducive to this transformation. China's state-owned enterprises have significantly invested in strategic emerging high-tech industries, reinforcing its commitment to advancing its technological capabilities.

3.1.1 THE GENERAL IMPACT OF GLOBAL FORCES

Conversely, in countries where technology has been integrated into the labor market for a longer period, such as the United States (50%), Australia (44%), and the United Kingdom (42%), there appears to be less urgency to upskill because of it. Nonetheless, the continuous progression of technology means that, even in these established markets, there is a steady demand for skill enhancement to keep pace with ongoing advancements.

Globalization was also seen as having a strong impact on respondents' decision to upskilling and reskilling. As discussed earlier, increased international competition can push individuals to continuously update their skills to meet global standards. The changing job market, with new roles emerging and others becoming obsolete, necessitates upskilling or reskilling to adapt to these shifts.

Interestingly, demographics were generally not deemed impactful among European and Japanese respondents despite pressures from population ageing. Its significance was however considered more important among Asian respondents, particularly those in China, India and Vietnam. Those are countries with large, ageing populations where a decline would be more impactful. China, where nearly 50% of respondents are concerned about its effects, has already begun to experience a decline in its population as discussed in the previous section.

Despite climate change being a high-profile issue, it was not considered to have a determining impact on the decision to upskill or reskill. This result may appear surprising, particularly among respondents from European countries, which are generally more aligned with climate-friendly discourses. Instead, it is in countries like Vietnam, China, Nigeria, and India where respondents felt the greatest need to upskill. Many of these countries face acute challenges related to pollution levels.



3.1.1 THE GENERAL IMPACT OF GLOBAL FORCES

Generally, the lesser emphasis on demographic and climate change could be attributed to the more immediate and tangible effects of technological advancements that labor market participants have been experiencing on day-to-day work activities, as opposed to the often gradual and indirect impact of demographic and environmental shifts. It does not imply that these forces are not considered important. It rather indicates that the perceived impact of technology is overshadowing other megatrends in the minds of respondents.

Gender

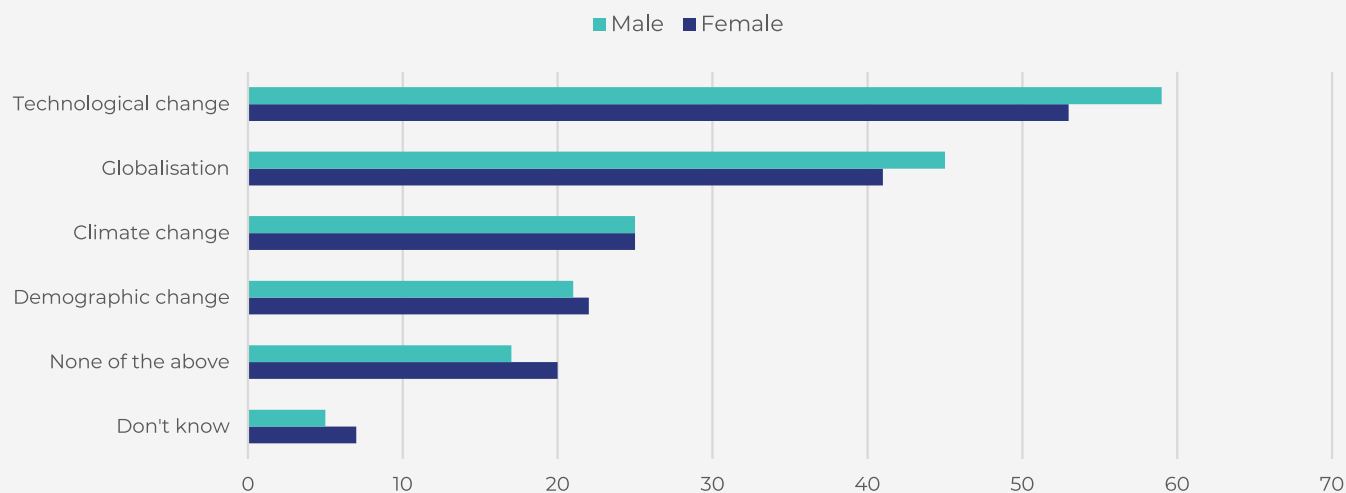
There is a notable difference in the degree to which men and women reported being influenced by global forces. The data suggests that, while both genders recognized the impact of globalization and technology on their skill development, they report being affected differently (Fig. 3.2). Specifically, a higher percentage of men reported that technology had a significant impact on their decision to acquire new skills or improve existing ones, with 58% of men acknowledging this influence compared to 52% of women. Similarly, 45% of men felt a strong influence to enhance their skills because of globalization, whereas this was the case for 41% of women.

These differences could be attributed to various factors, including differences in how men and women perceive and interact with technological advancements and global market trends. Studies have indicated that men may have more positive attitudes towards technology and utilize it more for learning (Qazi et al., 2022; Tam et al., 2020; Lee et al., 2019). Additionally, cultural and societal expectations could play a part in shaping these perceptions (Carvajal & Isaksson, 2024). Understanding these nuances sheds light on the appropriate strategies to encourage skill acquisition across genders.



3.1.1 THE GENERAL IMPACT OF GLOBAL FORCES

Figure 3.2. Which of the following global trends prompted you to upskill or re-skill in your work? By gender (%)



Q19. N=14,000

Age groups

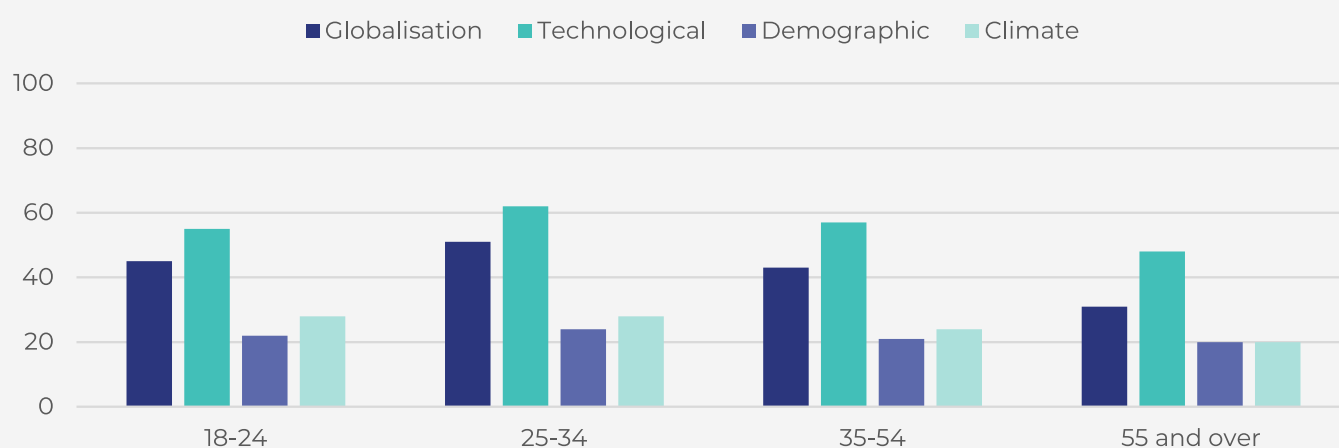
Significant disparities were observed among age cohorts, with younger populations feeling more strongly about the need to upskill or reskill. Over the past five years, individuals aged 18 to 34 indicated a heightened need for skill enhancement, particularly in technological proficiency and climate change adaptation.. This trend is expected to continue, as this age group anticipates a continued need for upskilling to navigate the future effectively (Fig. 3.3).

The investment in learning is also seen as more advantageous for this demographic due to the extended period over which they can apply the acquired skills, thus potentially yielding a higher return on their human capital investment. Survey responses indicated a stark contrast in attitudes towards learning across the age of labor market participants. Older workers (55+ years) take a more moderate view on learning new skills. Only 28% of those aged 55 and above felt compelled to update their skills in response to the megatrends. This disparity can be attributed to several factors.

3.1.1 THE GENERAL IMPACT OF GLOBAL FORCES

As individuals approach the latter stages of their careers, they may perceive a diminished return to skill enhancement, given the relatively limited timeframe for professional application. In other words, there is a prevalent belief that the benefits of learning new skills decrease with age, particularly as retirement looms. Furthermore, age-related biases in the workplace can deter older employees from pursuing further education or training. The fear of being sidelined or eventually replaced can lead to a reluctance in investing time and resources into learning new skills.

Figure 3.3. Which of the following global trends prompted you to upskill or re-skill in your work? Age groups (%)



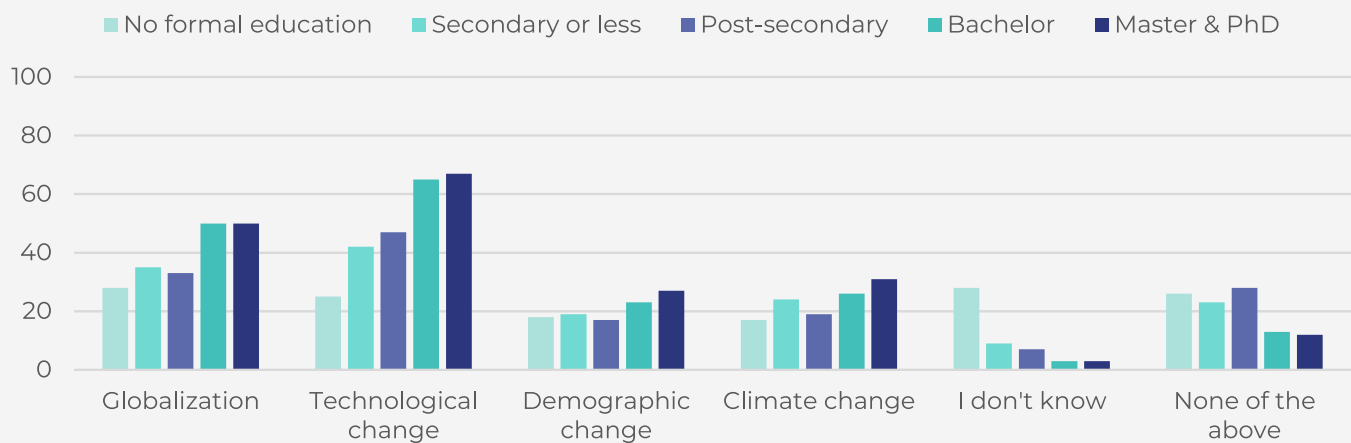
Q19. N=14,000

Educational levels

Educational levels greatly affect how people perceive skill requirements and training needs. The results showed that younger and more educated groups were more likely to emphasize the importance of skills and express greater engagement in training than lower-educated respondents. Survey results indicated that 65% of those with higher education (Bachelor's, Master's, and PhD degrees) have actively pursued new skills in the past five years due to technological changes (Fig. 3.4). This awareness also extended to globalization with 50% adapting their skills accordingly. Although responses were lower for demographics and climate change, they still increased with education.

3.1.1 THE GENERAL IMPACT OF GLOBAL FORCES

Figure 3.4. Which of the following global trends prompted you to upskill or re-skill in your work? Educational groups (%)



Q19. N=14,000.

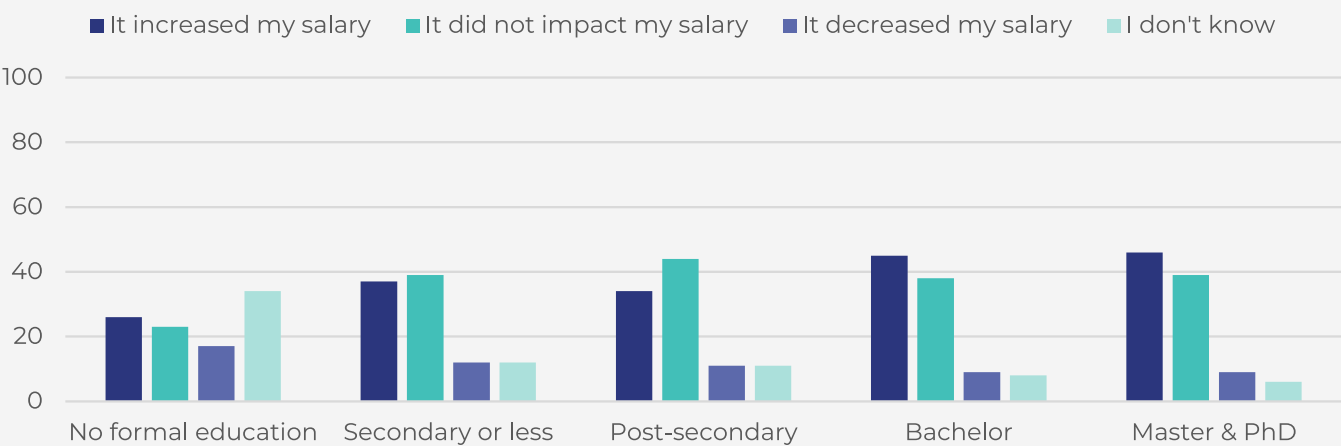
This seemingly proactive approach to career development is indicative of a broader understanding that the labor market rewards those who are prepared, adaptable, and skilled. They also recognize that these changes can be leveraged, which, in turn, could lead to better job opportunities and higher wages. By enhancing their skill sets, workers aim to position themselves advantageously within the labor market. This was evident across higher educated groups, where over 45% reported a positive impact on their earnings by upskilling (Fig. 3.5). The beneficiaries of higher wages were also younger (18-34 age group), about 63% for those with a Master/PhD degree compared to 44% and 36% respectively for the 35-54 and 55+ age groups.



3.1.1 THE GENERAL IMPACT OF GLOBAL FORCES

On the other hand, individuals with lower educational attainment did not share the same urge for upskilling or reskilling. This discrepancy was evident when examining responses to technological change and globalization. Those with secondary education were 25 percentage points less likely to improve their skills in response to technological changes and 15 percentage points less likely to do so in the context of globalization than university-educated individuals. The gap widened further when considering those with no formal education. They exhibited a 40 percentage point difference in the likelihood of reskilling due to technological changes and a 32 percentage point difference in response to globalization compared to their university-educated counterparts. It was clear that the higher the education level, the higher the propensity to upskill or reskill.

Figure 3.5. How have these global trends impacted your salary level? (%)



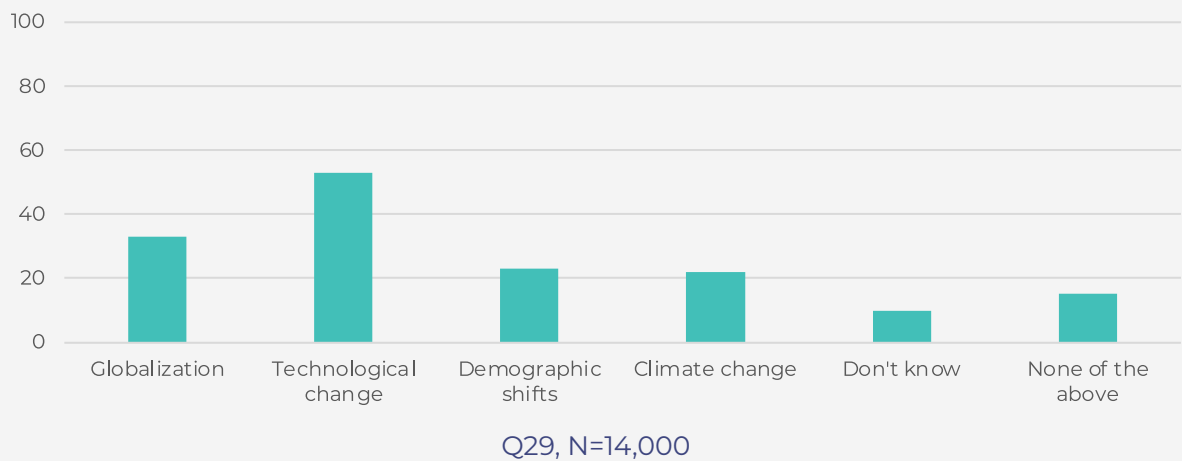
Q20 N=14,000.

Over the next five years, the survey data indicated a consistent view regarding global forces. Similar to the past, where upskilling and reskilling sentiments were driven by globalization and technological change, the latter has become the primary concern with more than half of the respondents being worried their current skills could become obsolete because of it (Fig. 3.6 A).

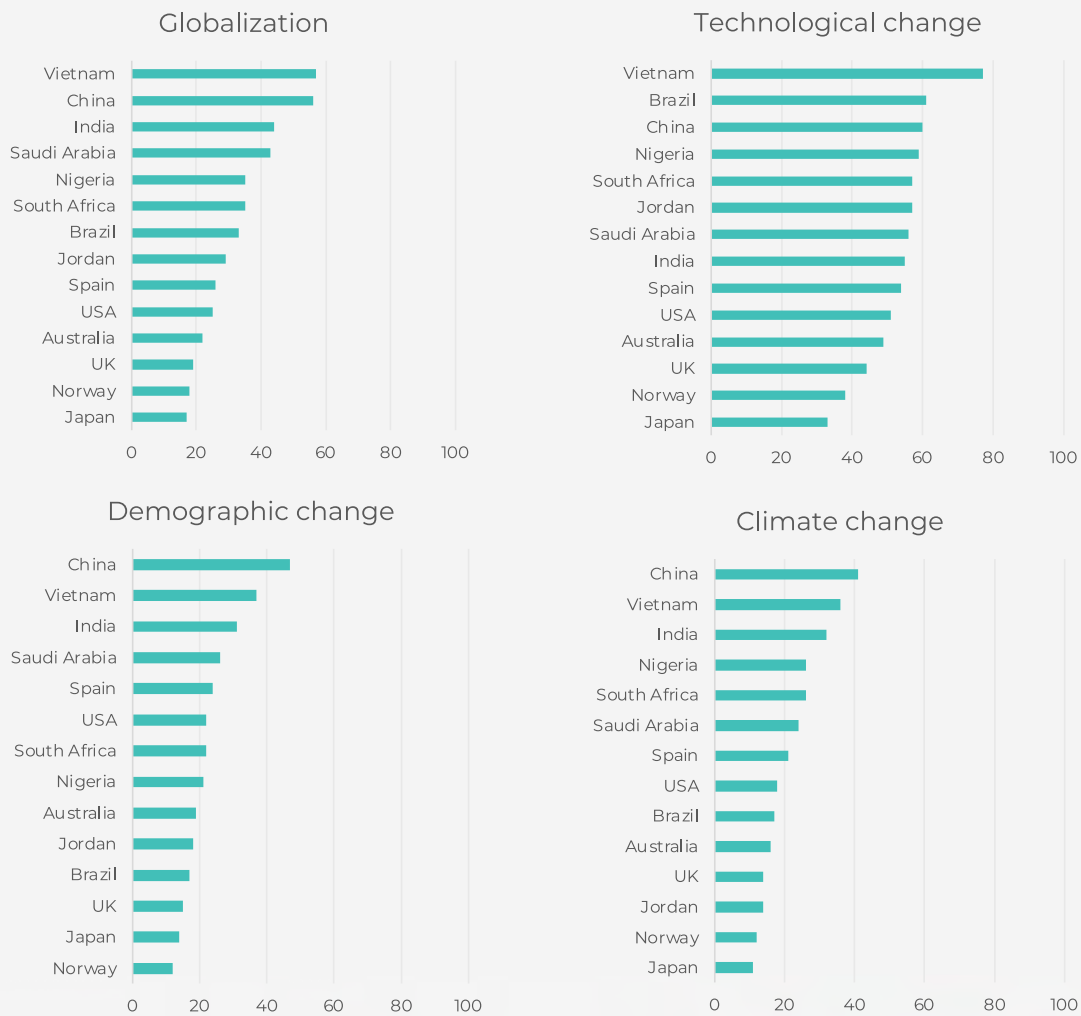
This condition was particularly prevalent in Asian countries, with 77% of respondents in Vietnam and 60% in China expressing apprehension about technological change (Fig. 3.6 B). Respondents from these two countries were also generally more concerned about the effects population ageing and climate change could have on their skills.

3.1.1 THE GENERAL IMPACT OF GLOBAL FORCES

Figure 3.6. Thinking of the next five years...Which of these global trends do you fear could make your skills partially or fully obsolete?
A. Total %



B. By country



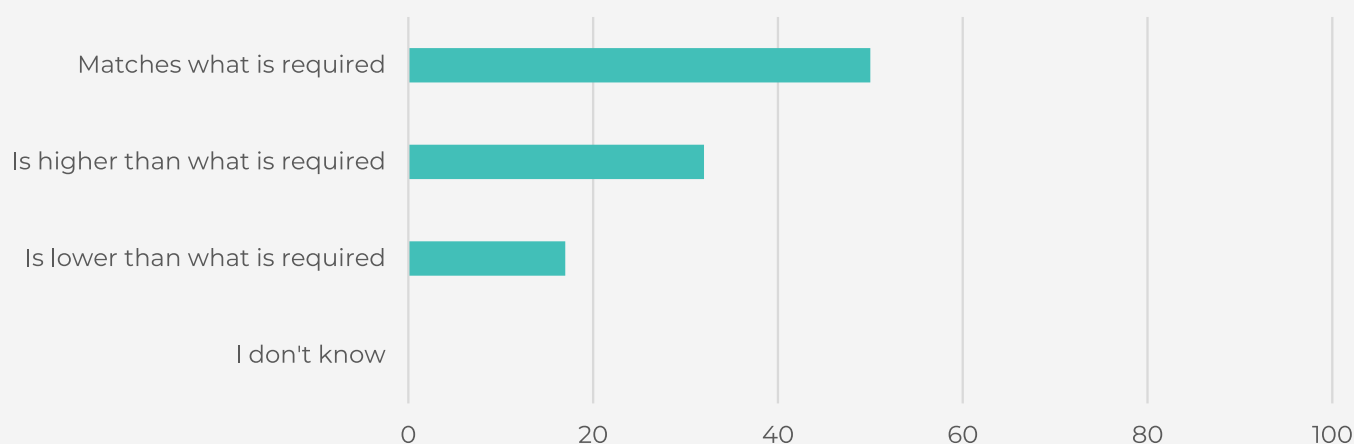
Q29, N=13,930

3.1.1 THE GENERAL IMPACT OF GLOBAL FORCES

While most respondents (50%) felt that their skills appropriately matched their current job, a significant number (32%) perceived themselves as overqualified (Fig. 3.7). These results were consistent across gender and all age groups, suggesting a mismatch between their capabilities and the skill requirements of their job.

This evidence of over-skilling was more noteworthy in the Middle East, the United States, and Europe. In the Middle East, particularly in Jordan (45%), nearly half of the workforce reported having higher skills than their job required. This situation was also prevalent in the United States (39%) and the United Kingdom (37%), though to a slightly lesser extent. The proportion was much lower in some Asian countries, with only 18% and 19% of respondents reporting being overqualified in Japan and Vietnam.

Figure 3.7. Overall, how would you best describe your skills in relation to what is required to do? (%)



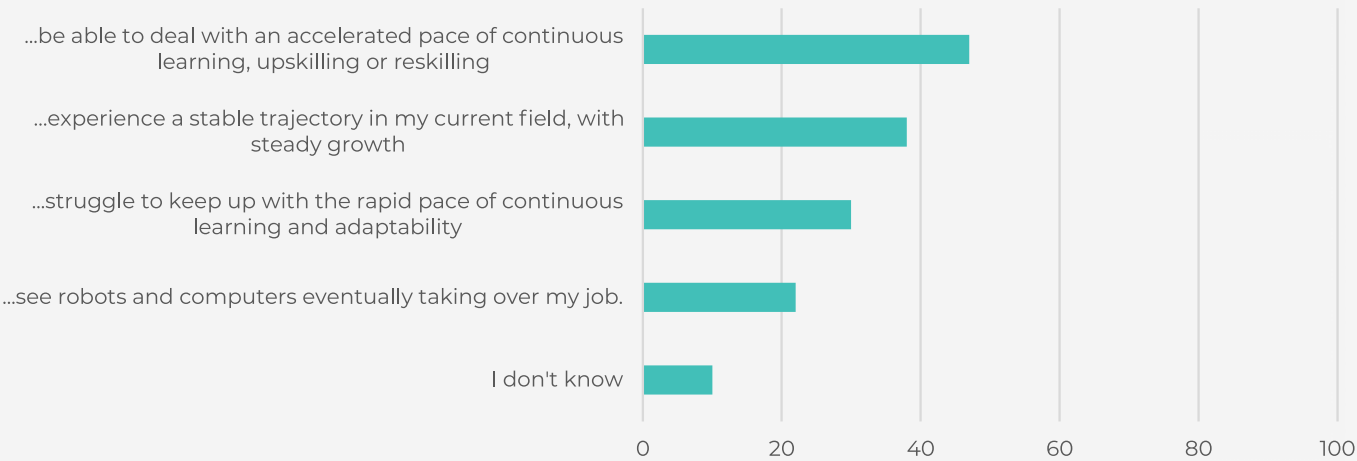
Q25. N=12,611.

For individuals, overskilling can result in underutilizing their abilities, leading to job dissatisfaction and a potential wage reduction. From an economic perspective, overskilling represents an inefficient allocation of human resources, which can stifle productivity and innovation. Moreover, it may signal deeper structural issues within the labor market, such as an oversupply of certain qualifications or a lack of appropriate job opportunities.

3.2. RESPONDING AND ADAPTING TO GLOBAL FORCES

An interesting finding from the survey was the relative confidence of respondents regarding the skill requirement brought by the global forces. Nearly half of the respondents felt confident in being able to deal with an accelerated pace of skill development. Nearly 40% expected to experience a stable trajectory and growth in their current job (Fig. 3.8). This confidence was incidentally higher in Nigeria (70%), Vietnam (62%) and South Africa (56%). At the same time, 30% of labor market participants reported struggling to keep up with the rapid pace of continuous learning and adaptability. The latter group of respondents were more likely to be from Asian and Middle Eastern countries (41% and 42%, respectively).

Figure 3.8. What do you think your professional future will look like? I expect to... (%)



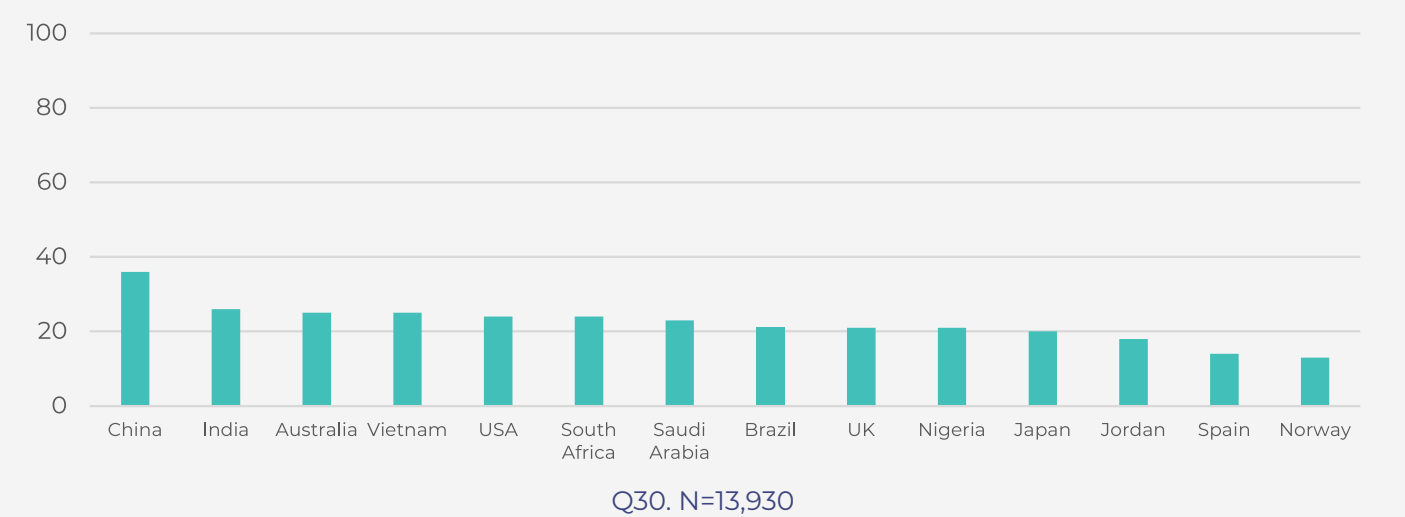
Q30. N=13,930



3.2. RESPONDING AND ADAPTING TO GLOBAL FORCES

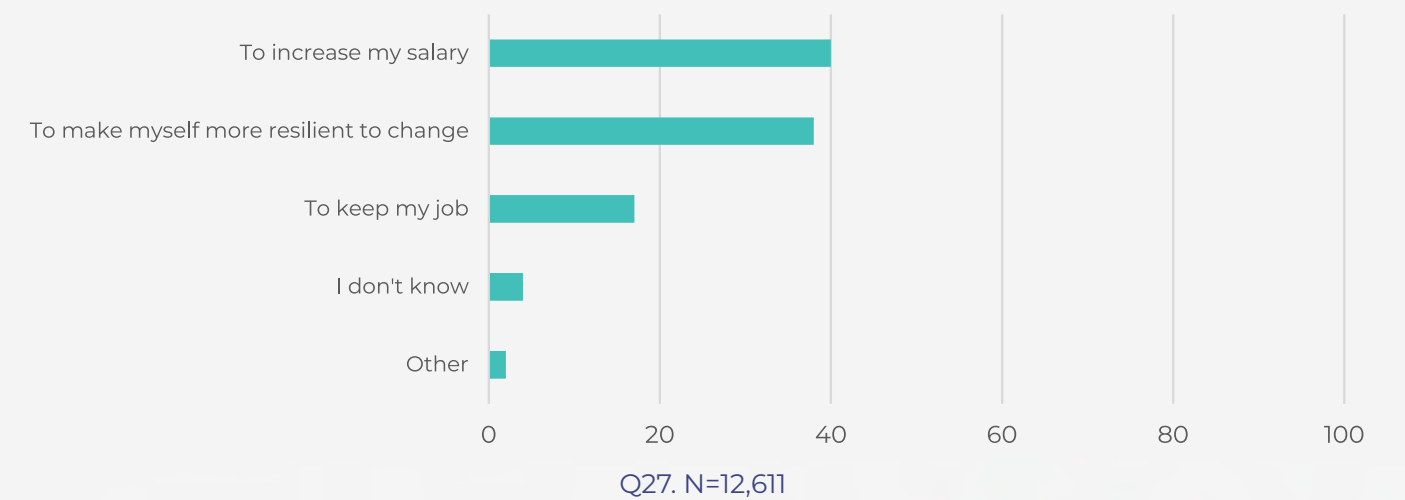
When asked whether they feared that robots or computers could eventually take over their jobs, only 22% believed that scenario was likely. However, there was a noticeably higher proportion of technologically anxious respondents in China (Fig. 3.9).

Figure 3.9. I expect to see robots and computers eventually taking over my job (%)



For survey participants, the pursuit of upskilling and reskilling served two main objectives. To first enhance their earning potential and, second, to bolster their competitiveness and adaptability in the job market (Fig. 3.10). Salary was deemed more critical by 45% of younger individuals (ages 18-34), with the perceived importance diminishing as age increased. However, for university-educated individuals, being resilient was deemed more critical.

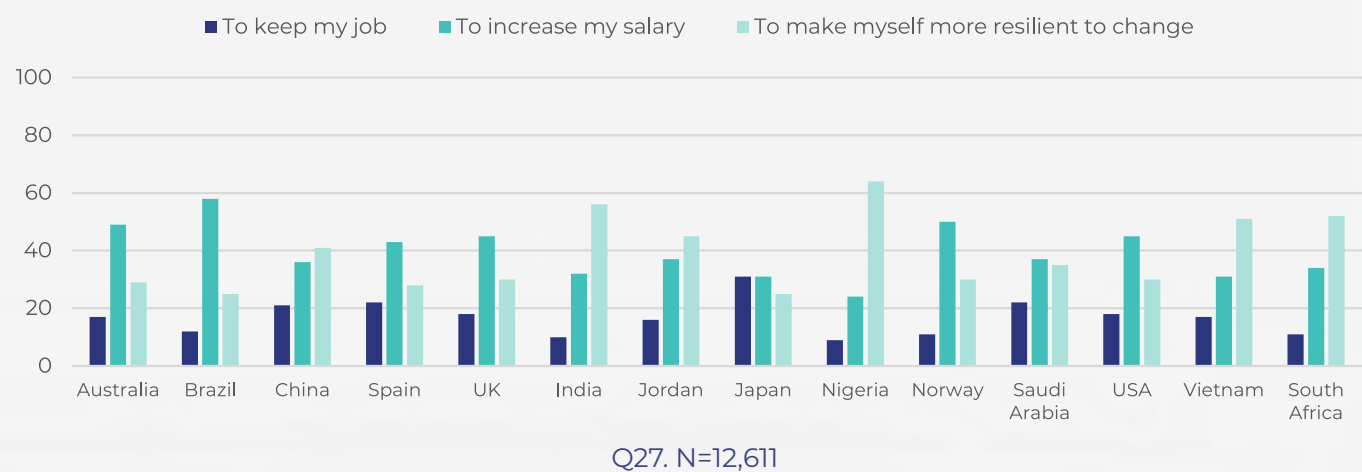
Figure 3.10. What is the main reason that would motivate you to undertake upskilling or reskilling? (%)



3.2. RESPONDING AND ADAPTING TO GLOBAL FORCES

The emphasis on salary versus resilience varied by country (Fig. 3.11). For example, survey participants from Brazil, the European Union, the United States, and Australia primarily expressed a desire to enhance their skills or retrain to boost their income. Conversely, in Asian, African, and, to some degree, Middle Eastern countries, the focus was on mitigating the negative effects of global trends on their professional lives and being more resilient to change.

Fig. 3.11. What is the main reason that would motivate you to undertake upskilling or reskilling? By country (%)

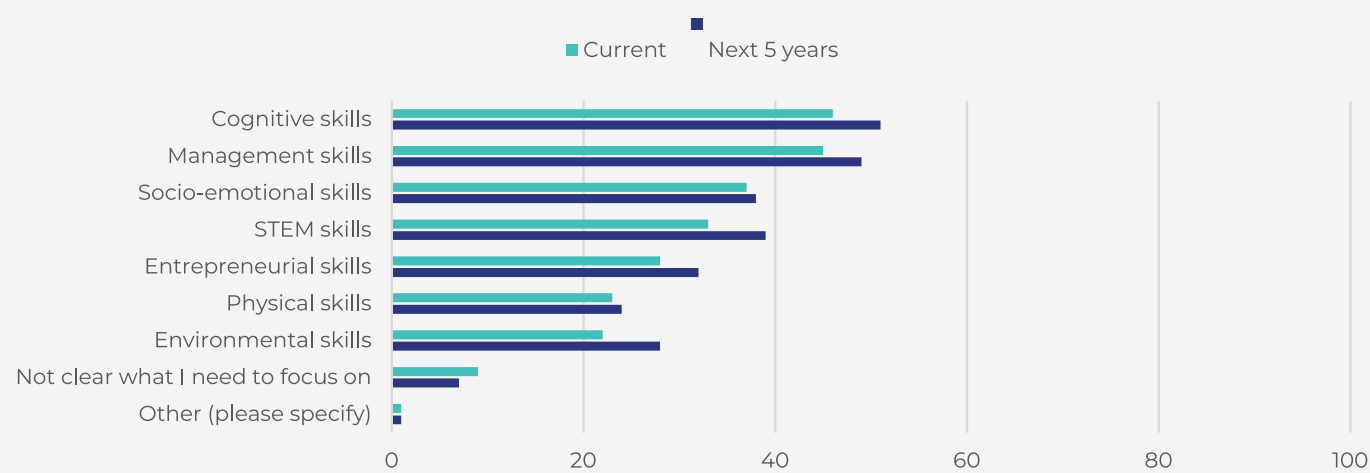


3.2.1 SKILLS DEEMED MOST IMPORTANT

As the workplace continues to evolve, the ability to identify the right skills to face changes in the labor market appeared to be of higher value to most respondents. Skill enhancement was not just seen as a way to learn new technologies but also as a way of adapting to new ways of working, thinking critically, solving complex problems, and operating in social contexts.

It was widely acknowledged that certain skills held more importance due to their resilience against automation and technological disruption. Respondents, in fact, identified cognitive skills, management skills, as well as socio-emotional skills as the three most critical competencies to succeed in the current labor market. These skills were all considered to be even more relevant in the future (Fig. 3.12).

Figure 3.12. Which, if any, of the following skills do you feel you need to improve to maintain your current and future work activity? (%)



Q28. Which, if any, of the following skills do you feel you need to improve to maintain your current work activity?
Current: N=12,611.
Q34. Please select the types of skill on which you believe you will need to focus your upskilling and reskilling efforts.
Next 5 years: N=13,930.

3.2.1 SKILLS DEEMED MOST IMPORTANT

Cognitive skills, encompassing critical analysis, problem-solving, and innovative ideation, were considered essential for the future by over 50% of respondents. Labor market participants in countries like Brazil, India, and Nigeria felt more strongly about these skills, while it was less so in Australia and the United Kingdom. As discussed in the preceding section, cognitive skills have been deemed less susceptible to automation as they involve complex judgment and decision-making processes, which require a nuanced understanding of context—a realm where human intuition still has an advantage. Despite recent advances in artificial intelligence and early encroachment in jobs requiring these skills, this development did not appear to weigh on the minds of respondents.

Management skills were also recognized as relevant by nearly half of the respondents. The complex nature of the modern business environment, which implies strategic planning, leadership, and cultural awareness, was essential for navigating the intricacies of global forces. In African, Asian, and Middle Eastern countries, these skills were particularly valued as they are often at the forefront of rapid economic development and social change.

Respondents also thought social and emotional skills will be critical in the future. Resistant to technological disruption, as they are deeply rooted in human interaction and the social fabric of the workplace, these soft skills were the third highest selection by respondents. These skills, which include empathy, teamwork, and communication, are increasingly valued in service-oriented economies as they contribute to a collaborative and flexible work environment. Although environmental skills were less considered, there was still a recognition that they might be more relevant in the future. This view was consistent across all regions and may show a growing awareness in the importance of the issue.

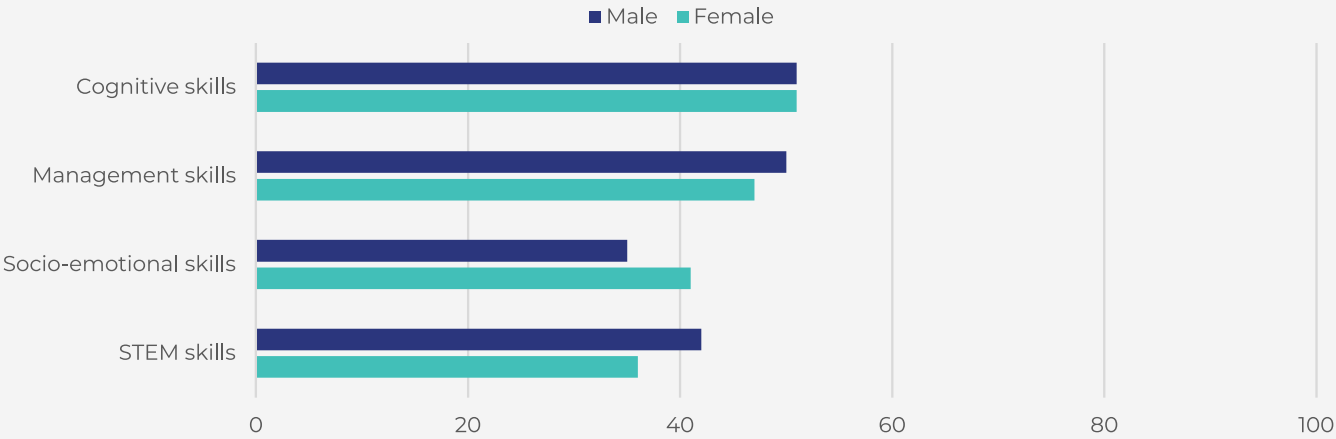
The differences across gender were minimal, except in management, socio-emotional, and STEM skills. Male respondents tended to favor management and STEM skills for the future, while female respondents were more focused on socio-emotional skills (Fig 3.13.A).



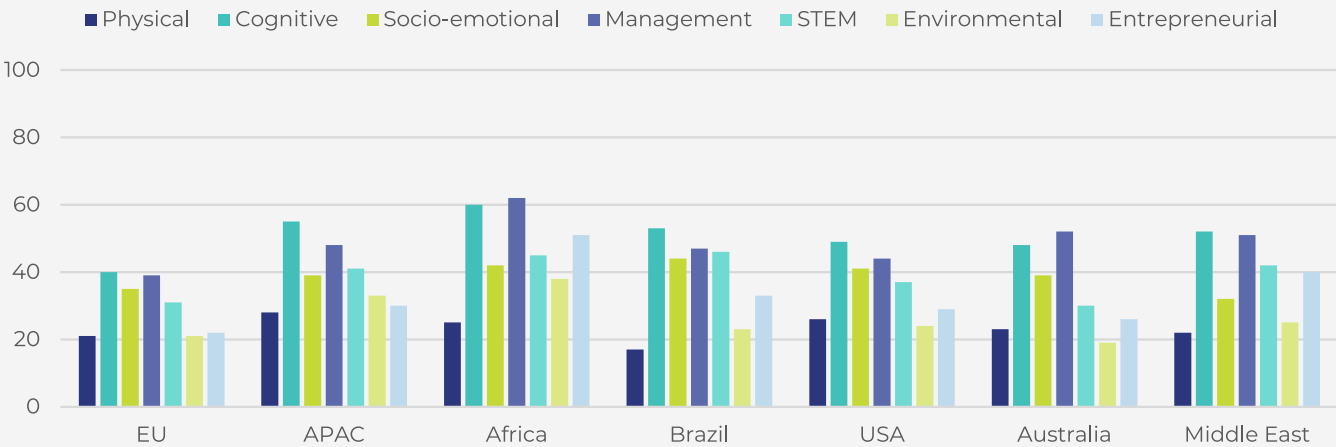
3.2.1 SKILLS DEEMED MOST IMPORTANT

Figure 3.13. Please select the types of skill on which you believe you will need to focus your upskilling and reskilling efforts in the next five years (%)

A.By gender



B.By region



Q34. N=13,930.

3.2.1 SKILLS DEEMED MOST IMPORTANT

Although most countries seemed to value STEM skills even more in the future, with an average of 7 percentage points, respondents from Brazil showed the highest increase between perceived current and future needs, with a rise of 12 percentage points. Asia was the only region where it did not increase (1 percentage point). Many respondents thus appeared to acknowledge that these four leading competencies are more resilient for the future, offering a competitive advantage to those who acquire them.

At the same time, while automation and artificial intelligence have revolutionized numerous sectors, it is believed they have also generated a need for uniquely human skills that machines cannot duplicate. The focus on cognitive, management and socio-emotional skills might, therefore, indicate a wider trend where technology is perceived as enhancing rather than substituting human abilities.

There were little differences across gender and age for entrepreneurship skills. However, the latter mattered more in developing countries like Nigeria (55%), South Africa (47%) and India (44%), where it is often, for a great number of people, the only conduit to employment and income (Fig. 3.13.B).

It was lower in countries like Norway (14%) and Japan (11%). In Norway, notably, there is a robust social safety net and a high standard of living, which may reduce the incentive to engage in entrepreneurial activities that are perceived as risky. Additionally, Norway's education system emphasizes employment in established industries over entrepreneurial skills. Japan faces similar challenges, with cultural norms that often prioritize employment stability over the uncertainties of entrepreneurship. Physical and environmental skills were identified as less critical in the current labor market. Countries such as China, India, and Nigeria showed a higher requirement for physical skills compared to countries like Australia, the United States and the United Kingdom. This difference does not diminish the importance of physical labor in some contexts. Instead, it highlights a shift towards a knowledge-based economy where cognitive abilities are more sought after and used.

3.2.1 SKILLS DEEMED MOST IMPORTANT

Despite much hype, green skills were seen as less relevant in Europe and other Western countries. Instead, they were more valued by respondents from countries like India, Vietnam and Nigeria. It is true, as we illustrated earlier, that green skills only constitute approximately 6% of employment in most countries. While this statistic does not diminish the importance of these skills in the labor market, current labor market trends may also suggest that this is likely a transient phase. As economies strive to become more sustainable, the demand for green skills is likely to increase, reflecting the need for workers who can contribute to environmental solutions. Respondents generally saw climate change as a more important driver of upskilling or reskilling in the future than they did in the past five years.

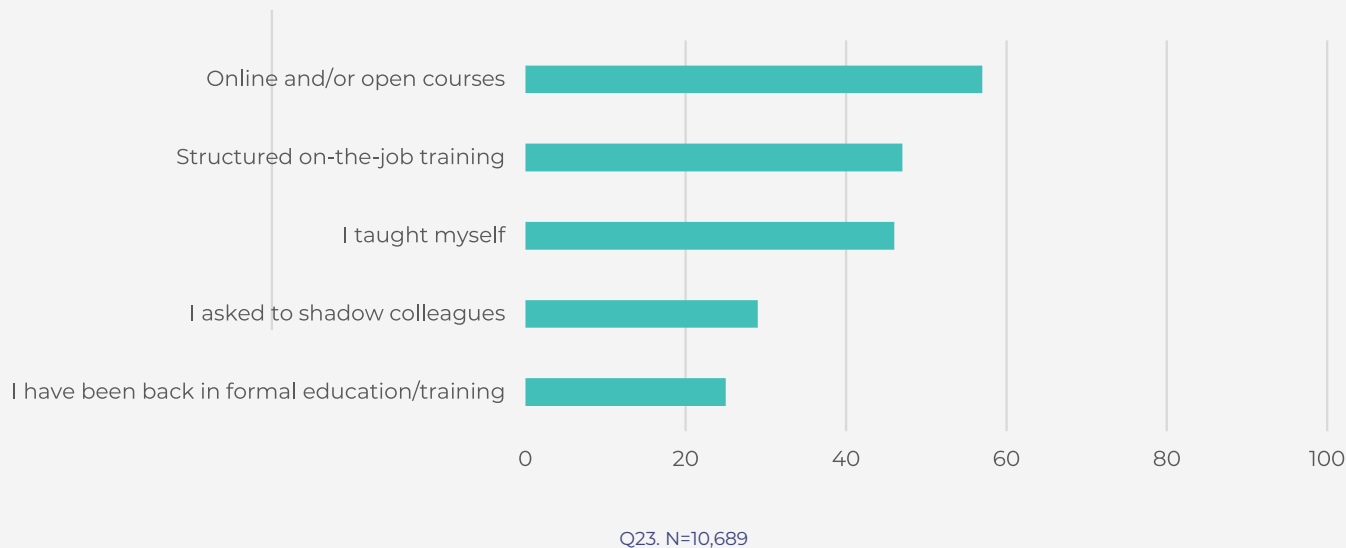


3.2.2 TRAINING PREFERENCES

Respondents shared several approaches regarding the acquisition of skills. Continuous learning and development opportunities, such as online courses, were the most popular methods for individuals to pursue further training (Fig. 3.14). On-the-job training was also highly considered. This latter choice was more common in countries like China, India, and Nigeria and favored by full-time employees.

On-the-job training programs were highly valued by older participants, particularly those over 55, and were especially appreciated in Norway (63%) and Spain (59%). Such programs represent a proactive measure by employers to cultivate a competent, adaptable workforce suited to the changing needs of today's workplace. These programs often combine theoretical instruction with practical, hands-on experience, potentially leading to industry-recognized certifications or qualifications.

Figure 3.14. Which forms of training have you sought to improve your skills? (%)



Self-learning was also popular, especially for older, high-income and high-skilled workers. These individuals often have greater access to resources, such as high-quality educational materials and advanced technology, facilitating independent study. Moreover, they tend to have a higher level of baseline education that enables them to effectively engage with complex material and self-directed learning methods. The motivation for self-learning in this group may have been driven by the desire to maintain a competitive edge in the job market, where advanced skills and continuous professional development are highly valued. Additionally, the rapid pace of technological change, particularly in IT and finance, necessitates ongoing learning to stay abreast of new tools and methodologies.

3.2.3 WORKPLACE CHANGE

Survey responses from labor market participants suggested they believe employers have taken proactive steps in the past five years to adapt and thrive in the face of change, particularly as it relates to technology. Approximately 45% of respondents indicated that global trends have led to the introduction of new technologies in the workplace (Fig. 3.15). In this instance, 42% reported a need to adopt new work practices in response to technological change. In comparison, 35% of workers reported having experienced an increase in the speed and complexity of their roles—suggesting that jobs have become more demanding and complex. This shift may indicate that technology may have also changed the nature of the work.

Interestingly, the survey revealed subtle differences in how demographics perceived these developments. For example, male workers reported feeling that global forces were impacting their work more with the expectation that it would continue. It was similar for those in the prime of their working lives, aged 25-to-54.

The trend was expected to continue during the next five years. A majority of respondents (53%) anticipated that technological advancements would drive further adoption of new technologies. Similarly, 47% foresaw the implementation of new work practices, although they expected the pace and complexity of their jobs would remain consistent with current levels.

Figure 3.15. Would you say these global trends changed the tasks in your work by...(%)

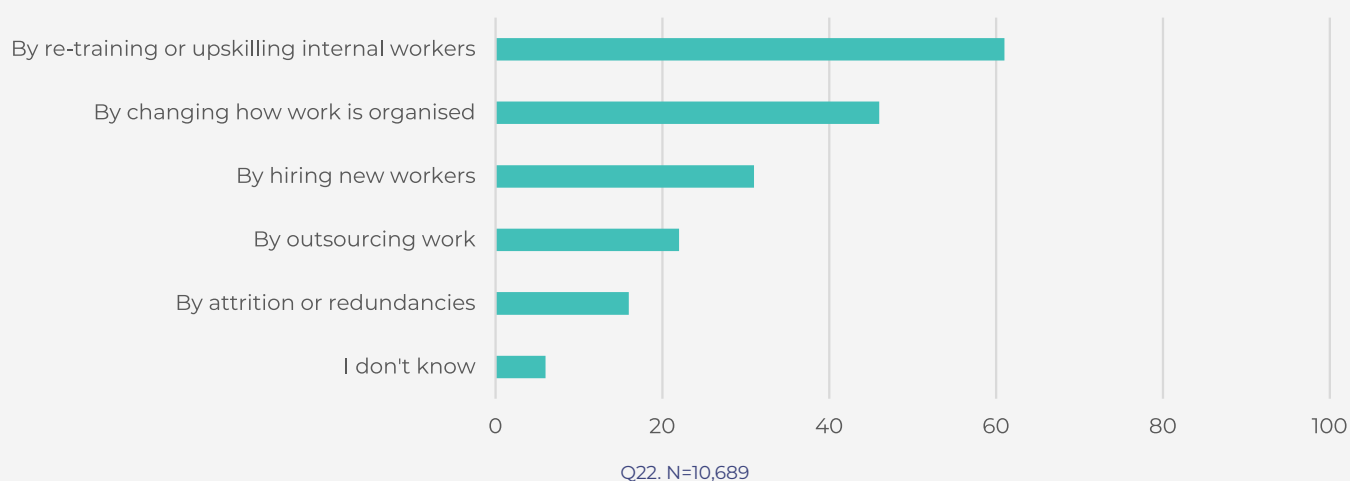


3.2.3 WORKPLACE CHANGE

When asked how their employers have responded to changes brought by the megatrends, just over 60% of respondents reported that they opted to re-train or upskill their workers, underscoring the importance of human capital strategies (Fig. 3.16). This view was shared mainly by prime-age (25-54) and university-educated individuals. There was no difference across genders.

A substantial number (45%) also reported that their employers changed how the work was organized. Reorganizing work may involve restructuring tasks, workflows, and sometimes even the physical workspace to optimize efficiency and collaboration. This may include adopting new technologies, shifting to agile methodologies, or implementing flexible work arrangements. Such changes are often aimed at creating a more dynamic and responsive work environment that can quickly adapt to new challenges.

Figure 3.16. How has your organization addressed these changing skill needs? (%)



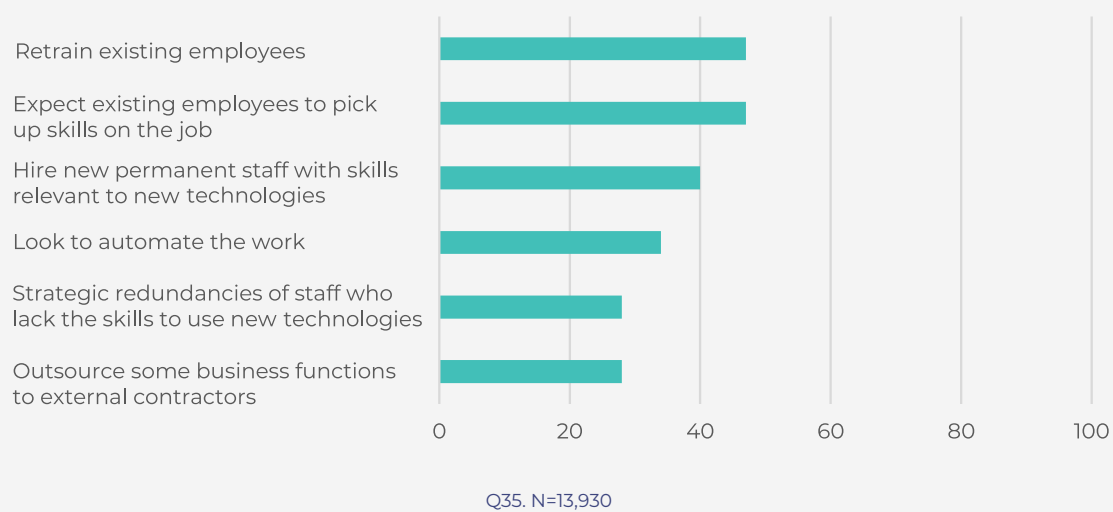
Even though, in the survey, businesses are seen as the most reliable supporters, a smaller proportion of respondents (22%) felt somewhat insecure about the support they would receive, with concerns about hiring new talent and outsourcing. The lower proportion may show outsourcing to be a less popular strategy among employers. There are good reasons for this. While outsourcing can allow companies to focus on core competencies, using external expertise can potentially lead to cost inefficiencies. It can also result in challenges such as communication barriers, misaligned objectives, and a dependency on the outsourced vendor's stability and performance.

3.2.3 WORKPLACE CHANGE

Instead, 47% of respondents anticipated that their employers would follow a similar strategy in the future, which is to encourage employee upskilling (Fig. 3.17). However, the proportion of people who believe so is lower than in the past. A similar proportion of respondents also assumed that their employers would expect employees to continue learning on the job in the future.

By investing in training and reorganization, companies are preparing their employees to handle the market's evolving demands better and positioning themselves to adapt to future changes quickly. Such an approach may bring other benefits, like higher employee morale and loyalty, as individuals see tangible opportunities for growth and development within the organization. Eventually, this strategy can create a virtuous cycle where a skilled and motivated workforce drives the company's success, further fuelling investment in its people.

Figure 3.17. In your opinion, which of these strategies are employers likely to adopt in response to shifting skills demand? (%)



The expectation that businesses should support skill needs through training or on-the-job skill development is rooted in recognizing that employers also benefit from a skilled workforce. This expectation is consistent with the concept of ‘firm-specific human capital,’ where the skills acquired are particularly valuable to the current employer. Businesses, therefore, have an incentive to invest in the training of their employees to improve performance and retain talent, which in turn can lead to a more competitive position in the market.

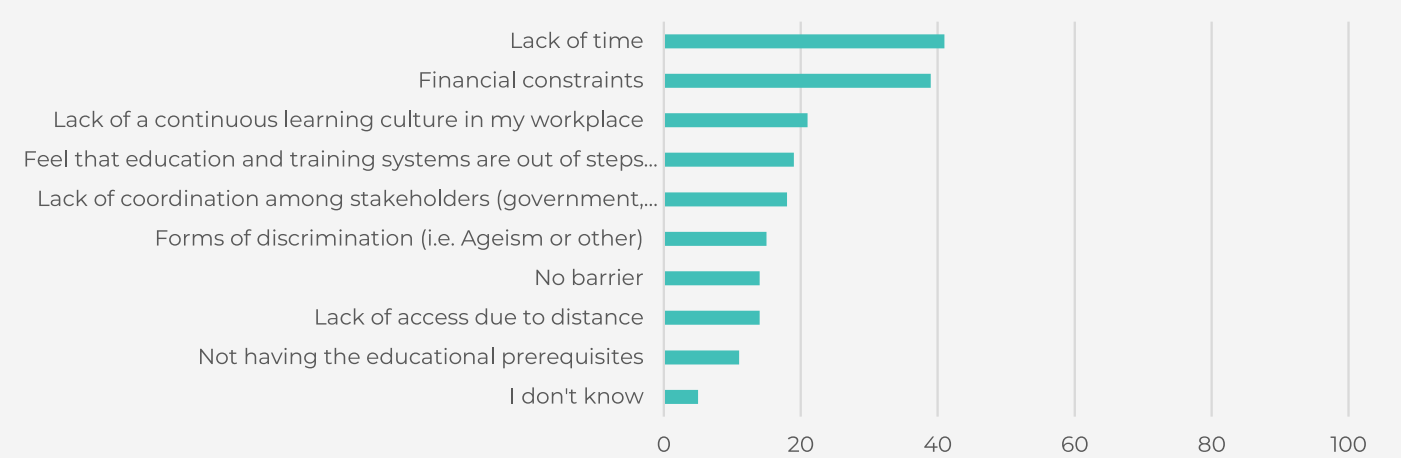
3.3. BARRIERS TO TRAINING

In the pursuit of professional development through upskilling or reskilling, individuals frequently encounter a range of obstacles. For an important proportion of respondents, time and financial constraints emerged as the most significant barriers (Fig. 3.18). Misaligned education systems and poor coordination between government, businesses, and unions were deemed relevant but of secondary importance.

Over 40% of respondents identified lack of time as a barrier to further developing their skills. Indeed, many reported finding it challenging to allocate hours for learning amidst their existing work and personal commitments. Economic pressures often necessitated longer working hours for those less educated, leaving little room for educational growth. Time was particularly salient in regions such as Africa, Brazil, and the Middle East.

Financial limitations appear to have further exacerbated this situation. Indeed, the costs associated with training programs or courses can be prohibitive, especially in countries with limited disposable income. Regardless of age, financial constraints were of greater concern in Brazil, Jordan, Nigeria, South Africa, and Vietnam. It was also the case for respondents in China, Norway, and the United Kingdom. In contrast, fewer respondents from the United States, European Union countries, and Australia reported financing as a challenge. This disparity may be attributed, in the latter countries, to more robust social safety nets, greater access to financial resources, and potentially more flexible work arrangements that allow time for continued education.

Figure 3.18. What barriers, if any, have you faced in attempting to upskill or reskill? (%)



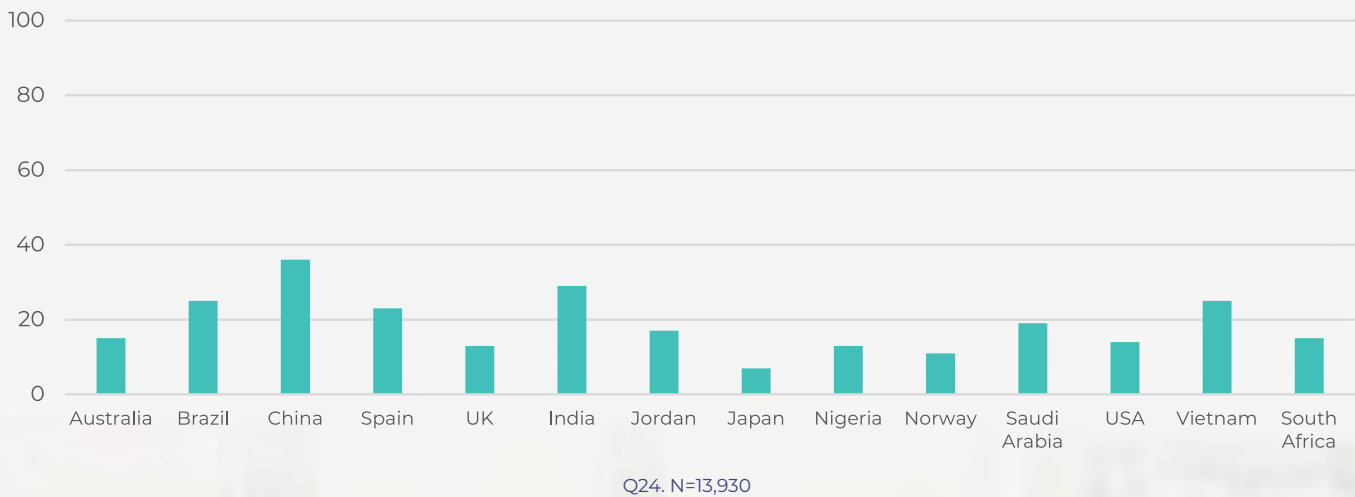
Q24. N=13,930

3.3. BARRIERS TO TRAINING

Importantly, survey respondents categorically identified that education and training systems need to catch up in their capacity to adapt to the evolving skill requirements. The seeming disconnect between the skills taught in educational institutions and those demanded by the marketplace has led to a perception of a misalignment that may hinder effective upskilling. Indeed, 19% of respondents felt the current educational system was out of step with the new skills context, a view that was particularly shared among 21% of those in younger age groups (18-34) and among a higher proportion of the most educated—20% with Bachelor and 24% for those with Master/PhD.

Among countries, the dissatisfaction was highest among respondents from China (36%) and India (28%). The lowest level of dissatisfaction was in the United Kingdom (13%) and Australia (15%), countries with performant education systems, although disparities exist between urban and regional areas (Fig. 3.19).

Figure 3.19. Feel that education and training systems are out of steps with new skill contexts (%)



3.3. BARRIERS TO TRAINING

The sentiment that education and training systems in China and India need to be fully aligned with the evolving context of new skills may be rooted in several factors. In China, there is a pressing need for a transformation in the education and skills-development system to cater to a modern, digital, and post-industrial economy. The challenge lies in transitioning from an education system that has historically served an industrial economy well to one that can support continuous rises in living standards through improved skills and innovation (Woetzel et al., 2021; Zhu, Y., 2019). Similarly, the education system in India faces adapting to new economic realities and technological advancements. The need for reskilling and upskilling is deemed paramount as the country moves towards a more digital and knowledge-based economy (Min. of Human Resources Development, 2020).

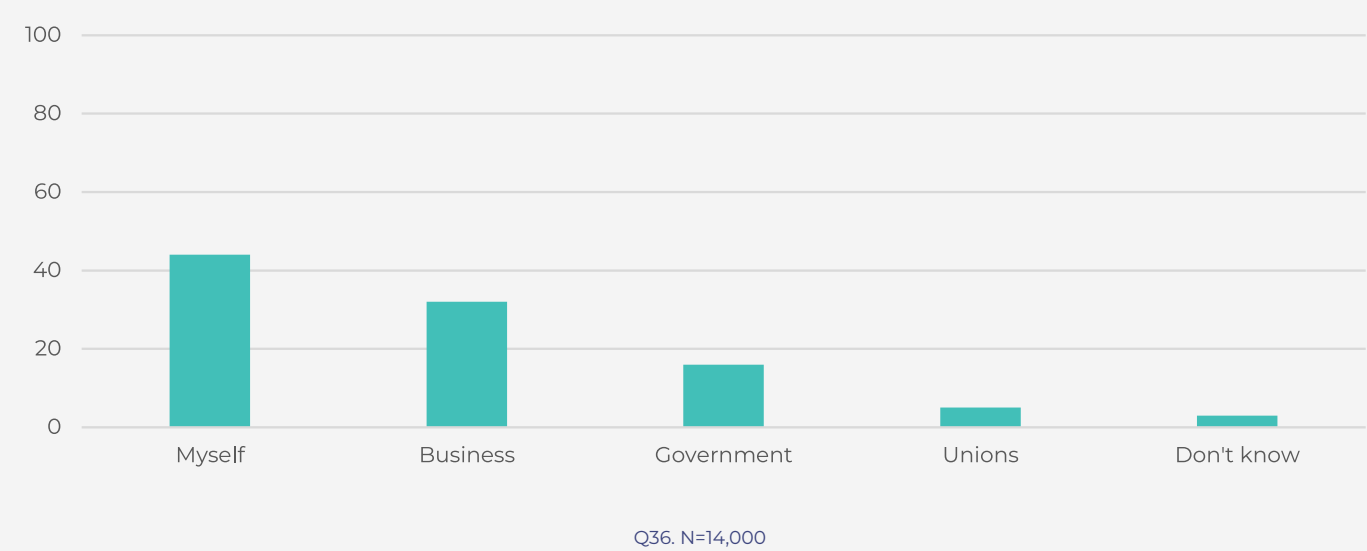
The lack of cohesive strategies and collaboration among governments, businesses, and labor unions has also been identified as another significant constraint. The complex interplay of diverse interests and priorities among these entities can result in a fragmented approach to workforce development. While governments may prioritize macroeconomic stability and public welfare, businesses might focus on profitability and competitiveness, and labor unions may typically seek to protect workers' rights and benefits. Differing objectives can lead to a disjointed approach to workforce development, where policies and programs are not aligned, resulting in inefficiencies and missed opportunities for synergy.



3.4 RESPONSIBILITY AND TRUST

A large proportion of respondents (44%) felt that they were responsible for upskilling or retraining themselves, reflecting a labor market where self-improvement and adaptability are highly valued (Fig. 3.20). At the same time, 32% felt that business held an important responsibility for providing training.

Figure 3.20. In terms of your upskilling and reskilling efforts, who do you feel should have the biggest responsibility for it? (%)



Many respondents chose business as the most reliable entity for supporting upskilling or reskilling efforts (Fig. 3.21.A). This was the case across most countries. As discussed previously, survey responses have shown that employers have been prioritizing human capital development, perhaps recognizing that a well-trained workforce is integral to maintaining competitiveness and encouraging innovation.

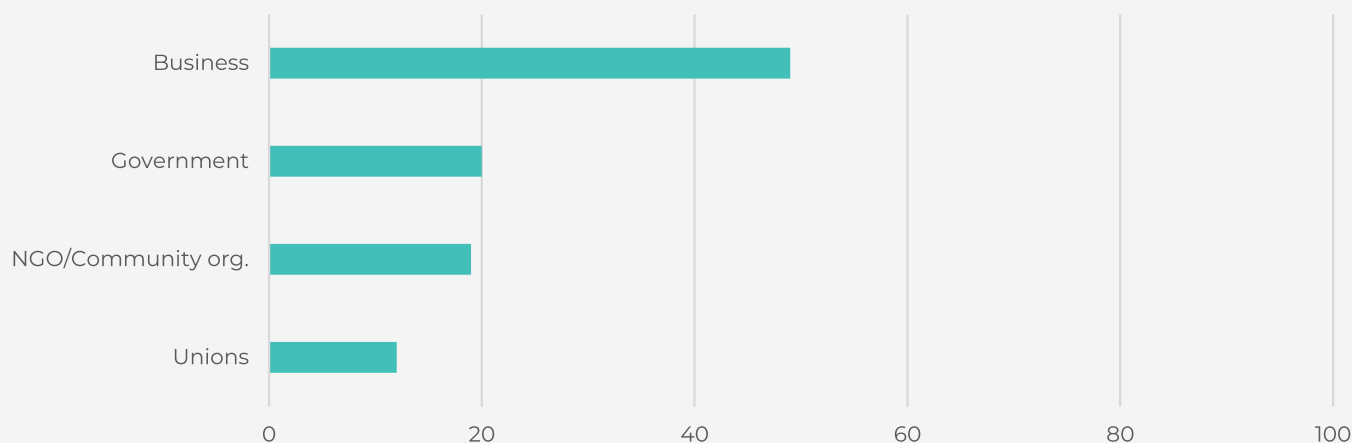
This trust in businesses is indicative of a broader trend where companies are increasingly expected to play a proactive role in employee development, providing either in-house training programs or facilitating access to external educational resources. The emphasis on continuous professional development within the workplace underscores the dynamic nature of modern labor markets, where adaptability and lifelong learning are vital to career advancement and organizational success. Incidentally, government, community organizations, and unions were perceived as the less trusted partners in support of their training strategies.



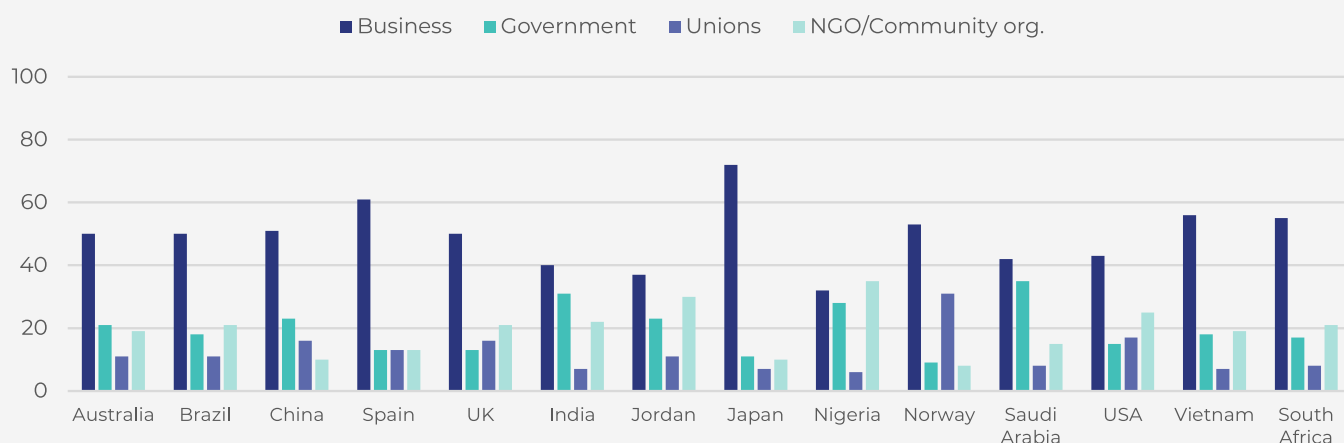
3.4 RESPONSIBILITY AND TRUST

Figure 3.21. Among the following stakeholders, which one do you have the most confidence in to support you in your upskilling and reskilling efforts? (%)

A. Total



B. Across countries, %



Q37. N=13,930

While trust in government may seem low in countries like the United States (15%), where there is long-standing scepticism regarding the government's role in public affairs, it was more surprising for a country like Norway (9%) (Fig. 3.21.B). Only in Saudi Arabia (35%) and India (31%) did the government enjoy a substantial share of trust. In the case of Saudi Arabia, it could stem from the country's long-standing reliance on state-led economic planning and the pivotal role successive governments have historically played in ensuring economic stability and workforce development.

3.4 RESPONSIBILITY AND TRUST

Nonetheless, the broader global sentiment towards governmental involvement in direct skill training reflects a cautious approach. This scepticism might be attributed to perceived bureaucratic inefficiencies, a disconnect between policy frameworks, and the rapid pace of market demands. Despite the reservations about the government's role in skill training and the waning of trust in its capacity, its function in providing financial support was still seen as most relevant. The latter is often viewed as essential in offering financial aid and subsidies that enable individuals to pursue educational and training opportunities that might otherwise be inaccessible due to high costs or the unavailability of financing through other sources. In these cases, financial support is critical in mitigating disparities and fostering inclusive growth, particularly in regions with limited private sector engagement in workforce development.

Just over 10% of respondents deemed unions trustworthy and it was among European respondents where they had the highest level of support. In this case, it may reflect Europe's long-standing tradition of advocating for workers' rights and benefits. In fact, in the EU, unions have historically been instrumental in negotiating better working conditions, fair wages, and comprehensive training programs. Their involvement is seen as contributing to a more stable and supportive environment for workers to develop the necessary skills to adapt to changing job markets.



3.5. MEASURES TO BE PRIORITIZED

The call for relevancy in education resonated strongly among respondents, highlighting the necessity for curricula that prepare students for current employment opportunities and future roles that may emerge as technology and industries evolve. The top priority identified by respondents was a call to make education and training systems more relevant (Fig. 3.22), a view shared by 20% of respondents, or nearly 60%, when considered as part of their top three priority measures. University-educated individuals mostly shared this sentiment. There were no significant differences across gender and age.

Figure 3.22. Which measures should be prioritized? Top 1 and top 3 responses

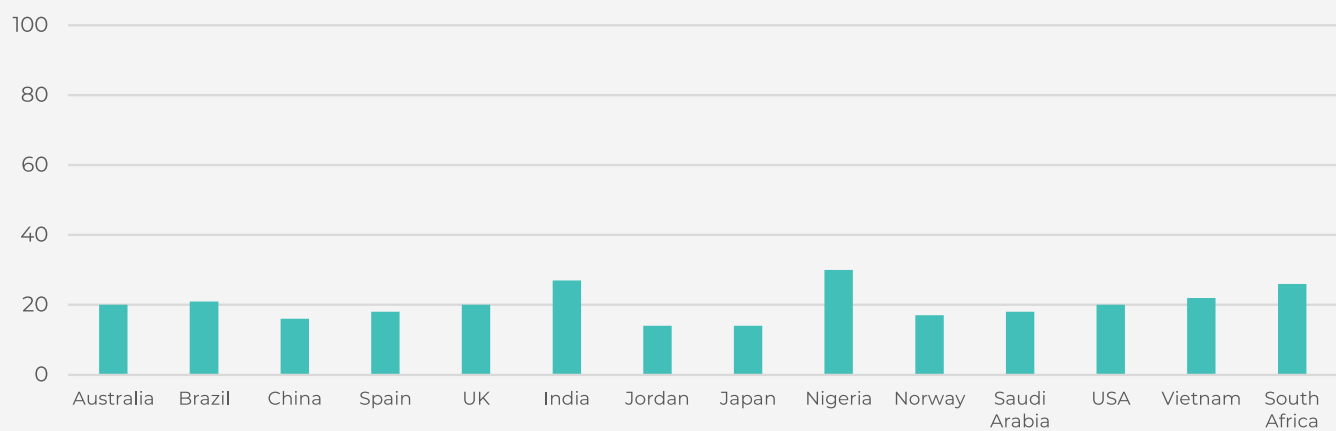


Q.38. N=12,961

Across countries, it was also a top priority among respondents from Nigeria, South Africa and India (Fig. 3.23). In Nigeria, for instance, the emphasis on education and training relevancy may have been driven by the need to address the skills gap that hinders many young people from securing employment. The country faces significant challenges in terms of quality and access to education. Making training systems more pertinent to current and future job requirements is seen as crucial for fostering economic growth and reducing unemployment.

3.5. MEASURES TO BE PRIORITIZED

Figure 3.23. Make education and training systems more relevant (%)



Q.38. N=12,961

Similarly, in South Africa, there is a pressing need to overhaul the education system to better equip students with the skills required in the modern workforce. The country’s labor market, characterized by high youth unemployment rates, requires an education system that can adapt to these challenges and provide meaningful pathways to employment. In India, the priority of making education and training more relevant is driven by the young population entering the job market each year. The Indian economy is diversifying rapidly, and there is a growing demand for skills in information technology, healthcare, and green energy. By ensuring that educational programs are closely aligned with these sectors, India can better prepare its workforce to meet the demands of a dynamic and competitive global economy.

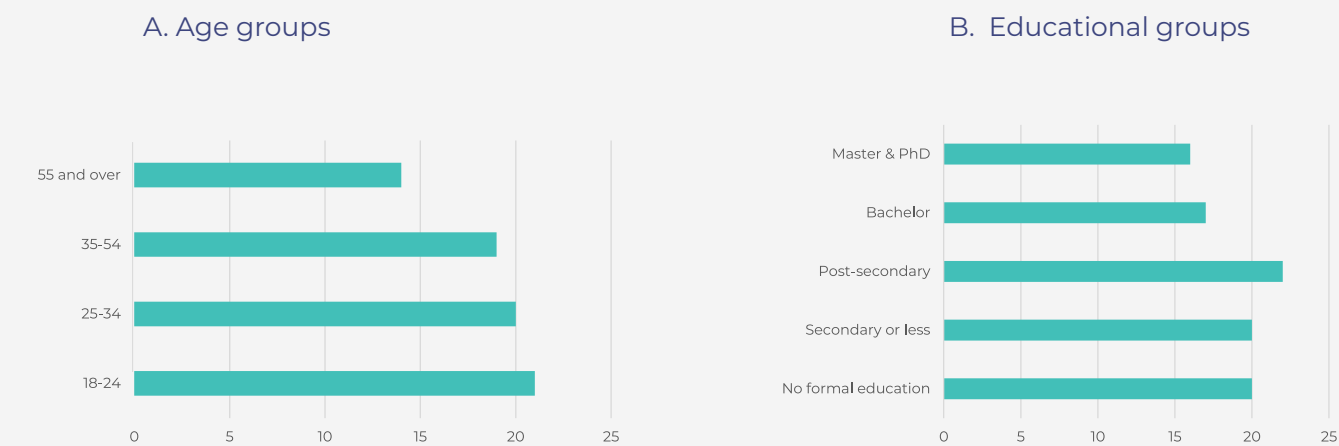
The emphasis on enhancing the accessibility of education and training systems is especially pronounced in certain countries. The urgency of this task is underscored by the socioeconomic inequalities prevalent in these regions. Efforts to make education more relevant are also tied to broader socioeconomic goals, including reducing poverty, fostering economic growth, and promoting social inclusion. By prioritizing better access to educational and training systems, these countries aim to create a more equitable society where everyone has the opportunity to succeed. For instance, in Brazil, 17% of the population viewed this as their top priority, closely followed by India at 16%. It was less significant in Norway (11%), reflecting the country’s strong emphasis on accessibility and equity. These principles are deeply embedded in the Norwegian social fabric, ensuring that all services and opportunities are available, making it a less important issue among its respondents.



3.5. MEASURES TO BE PRIORITIZED

Financial assistance to support their training options was reported as the second most important priority among respondents. This issue was considered a top priority for younger labor market participants, particularly for non-university educated individuals (Fig. 3.24). Jordan and Japan were the countries where this issue was considered most important.

Figure 3.24. Providing financial assistance (%)



Q38, N= 12,961

Improving job flexibility and customizing on-the-job training programs were also seen as vital priorities to help them face the changing needs of today’s workplace. Customized on-the-job training programs combining theoretical instruction with practical, hands-on experience, can lead to industry-recognized certifications or qualifications, enhancing the workforce’s overall competency. In the survey, 15% of participants identified it as their primary concern. This sentiment was notably prevalent among the older demographic, with 17% of those aged 55 and above emphasizing its importance. The issue was prioritized by a significant portion of respondents in Spain (22%) and Norway (20%), contrasting with lower percentages in India (13%), Japan (9%), and Nigeria (8%).

In the swiftly changing job market, policymakers and educators need to deliver precise and reliable information about future skill demands. Such data is crucial for aligning educational programs with the skills that will be in demand, thus ensuring that individuals are adequately prepared for future jobs. In the surveyed group, 15% ranked this initiative as their utmost concern.

3.5. MEASURES TO BE PRIORITIZED

This sentiment was particularly prevalent among those with a university education (16%) and individuals aged 55 and above (17%), who deemed this issue of utmost significance. In European countries, along Australia and the United States, where labor market information is more developed and responsive to a wide range of users, other regions are different. For instance, Japan (19%), China (18%), and Nigeria (18%) had the highest proportion of respondents identifying the issue as a top priority, with those in Saudi Arabia (17%) sharing similar sentiments. The prioritization of this concern underscores its significance in bridging the gap between current educational outputs and future occupational demands.

For 15% of survey participants, eliminating skill development and training barriers was another critical priority. These impediments can create significant difficulties, especially for females and younger individuals (aged 18-24). As previously demonstrated, a substantial portion of this group recognized the negative effects of these obstacles on their professional advancement and opportunities. Younger workers often need help with unique challenges, such as a lack of experience and financial constraints. For these individuals, the availability and relevance of skill development programs are crucial factors that can shape their career paths. Across regions, this was notably the case in Brazil (20%) and India (17%). It was less so in Norway (11%) and Vietnam (12%).

Building on the insights

The results from the survey have provided a general view of the labor market's pulse across various global regions. A notable trend from the findings is the heightened consciousness regarding the necessity for skill enhancement, particularly in cognitive, managerial, socio-emotional, and technological skills. This awareness is not confined to any single demographic. Still, it is a resonant theme across the surveyed population, signalling a shift towards embracing the skills that will be complementary in a technology-dominated era.

Building on the insights discussed so far, we proceed to the report's next phase, which offers a forward-looking perspective on challenges and opportunities regarding learning and skill development. In doing so, the following section aims to provide a framework for future policy discussions and debates.



An aerial night view of a city skyline, likely Chicago, with a strong blue color cast. The image shows numerous skyscrapers and buildings, with some lights visible. The text is overlaid in the center.

PREPARING FOR THE FUTURE AND THE APPROACHES TO SKILL DEVELOPMENT

4. PREPARING FOR THE FUTURE AND THE APPROACHES TO SKILL DEVELOPMENT

Although globalization, demographics, technology, and climate change were recognised as factors influencing the future of work, respondents identified technology as the main driver for upskilling and reskilling. Skills like cognitive, management, socio-emotional, and STEM were viewed as increasingly beneficial in adapting to the new labor market realities. Interestingly, these skills act as complements to technology, thereby decreasing the likelihood of substitution. Many labor market participants have chosen these skills to enhance their resilience in this changing environment.

At the same time, respondents strongly felt that current skills systems needed to be improved to keep pace with these changes. They also expressed little trust in governments and unions, preferring to rely on themselves or businesses for their upskilling or retraining needs. This demand for training has led to several innovative programs and initiatives being introduced in recent years. However, while these new training approaches bring short completion times and flexibility, they also bring their challenges like quality assurance and accreditation.

As we move forward, the need for practical skill development strategies has never been more critical. As global forces reshape the landscape of work and skills, individuals and organizations must continuously adapt to remain competitive. More innovative approaches are expected to be introduced due to the strong demand for responsive, personalized training. At the same time, a more collaborative effort between governments, educational institutions, and industry leaders could better coordinate and revitalize the skills ecosystem. This section explores various skill development options, while emphasizing the importance of a proactive and multifaceted approach.



4.1 DYSFUNCTION, DISCONNECTION AND FRAGMENTATION?

Skill development has been a critical issue for decades, driven by the necessity to equip individuals for an ever-changing job market. Businesses, governments, international organizations, and think tanks have long championed its cause. Despite these efforts, the survey responses have shown a high degree of dissatisfaction exists regarding most countries' skills ecosystem.

The issue appears to be complex and examining the causes in more depth would be outside the scope of this report. However, one reason behind this apparent breakdown appears to be a decline in trust in government and educational institutions, which have long been essential pillars in skill development. These institutional actors have been perceived as slow to adapt to the changing landscape. Deficient labor market information from governments has also been identified as exacerbating skill mismatch. Notably, educational institutions have particularly been criticized for providing skills not aligned with the recent evolution in the job market, widening the gap between the skills taught and those in demand. These developments have contributed to an erosion of trust in key institutions, which, in turn, seem to have hindered the effectiveness of these frameworks. Let us briefly highlight the importance of some of these key functions.

Inadequate labor market information

Insufficient information can lead to subpar decision-making. Indeed, a well-functioning labor market requires that participants have the information necessary to make informed choices. A lack of access and mis-interpretability of information about future labor demand can contribute to inefficient allocation of human capital and amplify the consequent skill mismatches. Therefore, it raises transaction costs and limits the information flow in a market-demand-driven economy (Chateau et al., 2011).

Its effects can be felt across the different labor market agents. For instance, individuals can lack job and skill information, often relying on ad hoc data and insights from peers or the internet to guide them. Companies face challenges in candidate discovery, credential verification, and making informed recruitment choices. Finally, governments encounter information gaps when forecasting skills demand.

The speed at which new skills are being demanded and the complexity of the evolving labor market makes it challenging to predict skills demand accurately. The latter is exacerbated by the fact that traditional data collection and analysis methods have not kept pace with these rapid changes, leading to information gaps.

4.1 DYSFUNCTION, DISCONNECTION AND FRAGMENTATION?

Financial and budgetary constraints, in some cases, may have contributed to limiting statistical agencies' capacity to provide accurate and detailed information on labor market trends.

Lack of institutional trust

The decline in trust towards government and educational institutions has been observed over several decades and have been persistent features of policy analysis. Factors contributing to this decline are diverse and complex, encompassing economic, social, political, and technological changes. As people have become more isolated or disconnected from traditional networks, their reliance on trust in larger institutions appears to have waned.³⁷ At the same time, democratized access to information has empowered individuals to question established authorities and seek out alternative perspectives, which can both positively and negatively affect trust levels.

Educational institutions have not been immune to this trend. The public's trust in these institutions has been impacted by a range of issues, including debates over the value of higher education, concerns about the rising cost of tuition, and questions about the relevance of traditional educational models in a rapidly changing world.

The implications of this decline in trust are profound. A lack of trust in government can lead to decreased civic engagement, lower voter turnout, and a cynicism that undermines the legitimacy of democratic processes. In the realm of education, diminished trust can result in reduced support for public institutions, skepticism about the expertise of educators, and a potential devaluation of academic credentials.

With current education and training systems seen as inadequate in meeting current and future skill needs, labor market participants have increasingly turned to businesses for their skills development. Restoring trust in educational institutions and government bodies also requires integrating real-world studies into curricula, encouraging industry partnerships, and updating training materials.

³⁷ The World Value Survey, PEW Research Center and Eurobarometers, have all tracked and documented this trend. Incidentally, Dalton (2005) found that the greatest declines in trust were among the better-educated and upper social status. He suggested that changing citizen expectations, rather than the failure of governments, were prompting the erosion of political support in advanced industrial democracies. A result, which seems to find echoes today.

4.1 DYSFUNCTION, DISCONNECTION AND FRAGMENTATION?

Lack of coordination among stakeholders

The misalignment between skills learned and an industry's actual requirements is often exacerbated by a lack of coordination between government bodies, educational institutions, and private sector stakeholders. Partnerships among these entities could help to overcome these challenges.

International organizations, notably the OECD, the ILO and the World Bank, have long advocated for a comprehensive approach to skills policies, emphasizing coordination, cooperation, and collaboration across all levels of government, engaging stakeholders throughout the policy cycle, building integrated information systems, and aligning financing arrangements.

Increasing cost of education and training

The rapid pace of technological change necessitates continuous investment in training programs to keep skills relevant, yet this can be cost-prohibitive for individuals and organizations. The fact that the return on investment for training is not always immediately apparent compounds this challenge, making it a less attractive expenditure for some individuals and cost-conscious entities.

An unequal educational and training landscape

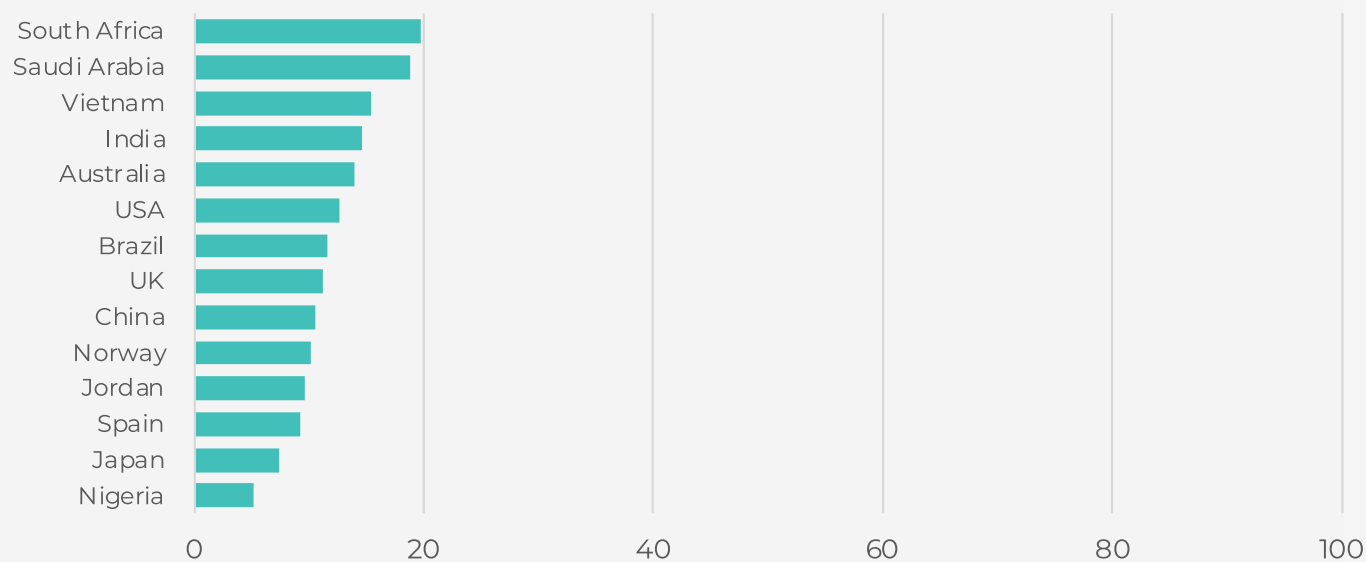
Governments worldwide recognize that increased government spending on education can improve educational outcomes, such as higher enrolment rates, better school completion rates, and improved cognitive performance among students. It is, therefore, consequent that they allocate a significant portion of their total expenditure to education, which is close to 13% on average according to UNESCO (Fig. 4.1). The total expenditure spent on education varies greatly from country to country, reflecting differing national priorities, economic capabilities, and educational strategies. There are also wide disparities within countries but, given the report's scope, we will focus on cross-country differences.

While funding levels may be a significant factor in shaping the landscape of learning opportunities, they do not necessarily reflect the effectiveness or quality of the educational systems. In fact, investments in teacher training, educational materials, and school infrastructure can significantly impact the quality of education. The age of schooling is also a determinant of educational outcomes.



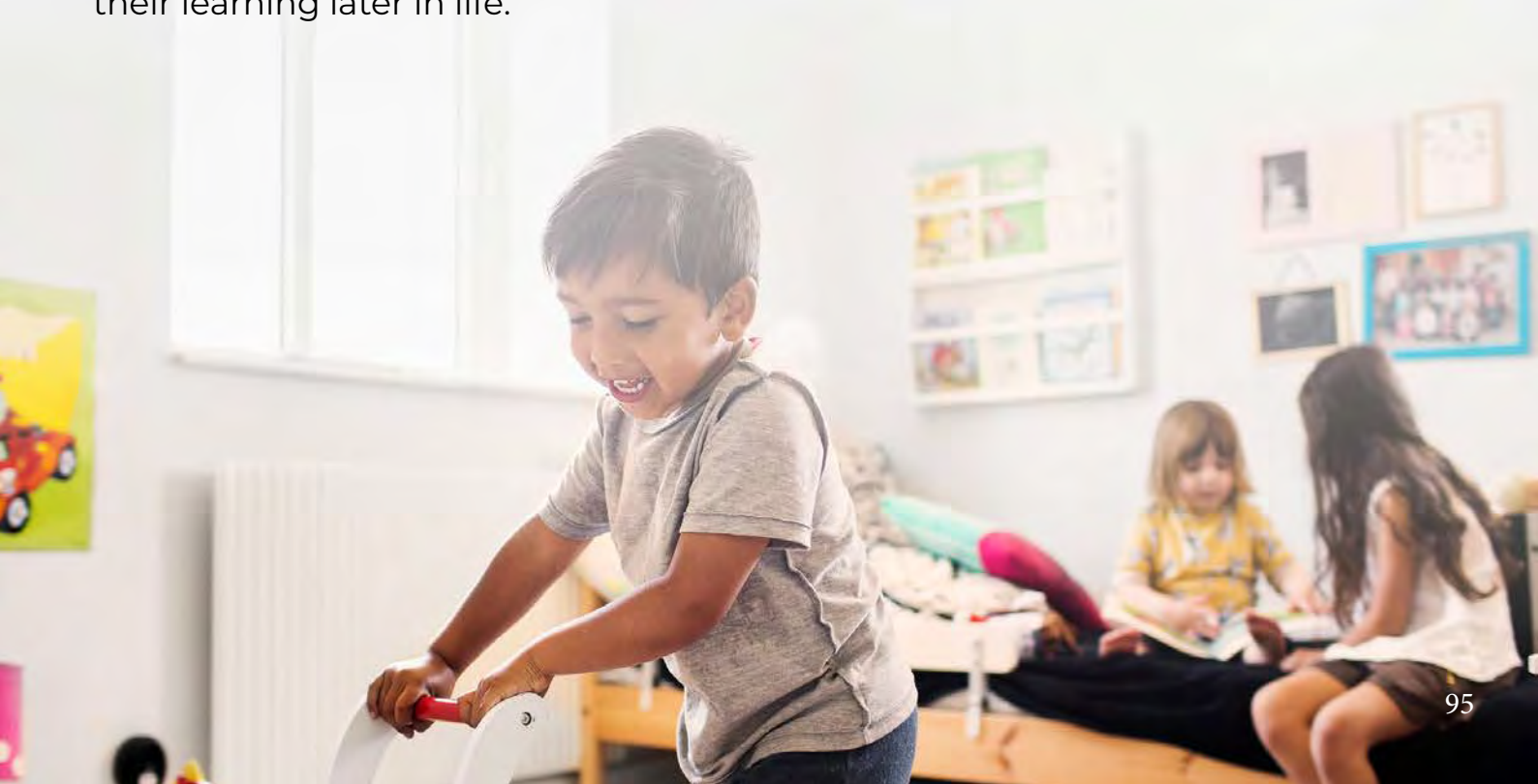
4.1 DYSFUNCTION, DISCONNECTION AND FRAGMENTATION?

Figure 4.1. General government expenditure on education (%)



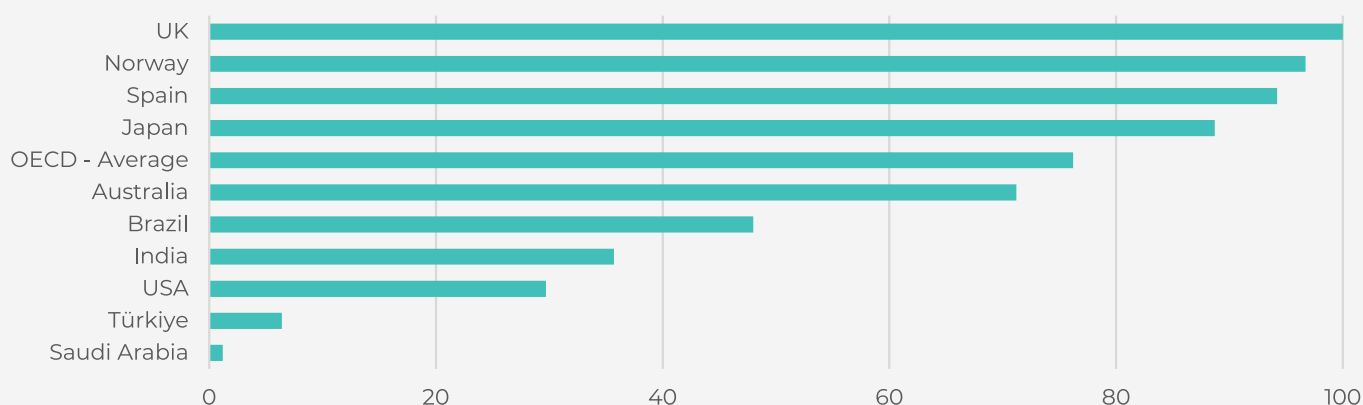
Source: UNESCO, 2021

Many studies have shown that the cornerstone of lifelong learning lies in early child development (ECD), which establishes the foundational cognitive and social skills necessary for future academic and professional success. However, the availability and quality of ECD vary widely, with disparities evident across countries (Fig. 4.2). For instance, while some countries have made strides in making pre-primary education accessible and even compulsory, others fall behind, with low enrolment rates. For lower-performing countries, it reflects either choice or broader socio-economic challenges. Most importantly, it indicates that a portion of their young population may not get an early educational start, which may negatively impact their learning later in life.



4.1 DYSFUNCTION, DISCONNECTION AND FRAGMENTATION?

Figure 4.2 Enrolment rate in early childhood education, 3-year-olds³⁸ (%)



Source: OECD, Education at a Glance 2023. Figures refer to 2021. Data on China not available.

Primary and secondary education also provide the learning foundation necessary in later life. Although governments have managed to increase the numbers of children enrolled in primary and secondary schools, many are not meeting the basic learning level and have learning deficits (Steer, 2014). The situation has worsened recently.

Score gaps in 4th-grade mathematics from the Trends in International Mathematics and Science Study (TIMSS)³⁹ generally widened from 2011 to 2019 because the scores of low-performing students decreased (Stephens et al., 2022). In the United States, the scores of low-performing students decreased by 20 points, while there was no change in the score of high-performing students, matching the prevailing international pattern.

³⁸Enrolment rates in early childhood education and care (ECEC) are expressed as net enrolment rates, which are calculated by dividing the number of students of a particular age group enrolled in ECEC by the size of the population of that age group. Generally, figures are based on head counts and do not distinguish between full-time and part-time enrolment.

³⁹TIMSS provides data on the performance of fourth and eighth graders. At the same time, PISA is a worldwide study conducted by the OECD to evaluate education systems by testing the skills and knowledge of 15-year-old students. The OECD has also introduced a Creative Thinking Test as an additional component of PISA. It comprehensively evaluates students' abilities to produce original and diverse ideas. The test assesses creative thinking by examining students' capacity to generate, evaluate, and improve ideas across various contexts. The test also includes written and visual expression and scientific and social problem-solving. It is only available for a few countries, most of them outside the covered list in this report.

4.1 DYSFUNCTION, DISCONNECTION AND FRAGMENTATION?

In the eighth grade, in addition to decreases in low-performing students' scores, high-performing students' scores increased, resulting in a pattern of divergence. A similar pattern was observed in general science where score gaps widened from 2011 to 2019. In countries where the score gap was narrowed such as in Jordan and South Africa, it was because low-performing students' scores increased. In others, such as Saudi Arabia, it was because the performance of both low and higher performing students declined during the period.

Despite being the most populous country in Africa and having the largest economy, Nigeria has one of the lowest literacy rates in the world, with only 59% of the adult population able to read and write. Even though primary education is officially free and compulsory, about 10.5 million of the country's children aged 5-14 years are not in school. Only 61% of 6-11-year-olds regularly attend primary school, and only 35.6% of children aged 36-59 months receive early childhood education (UNICEF, 2023).

As discussed earlier, the OECD's Programme for International Student Assessment (PISA), which measures abilities across these disciplines, has shown that 15-year-old student scores in mathematics, science and reading are on a downward trend, a development which has affected more developed countries. This decline began in 2010 but accelerated after 2018.

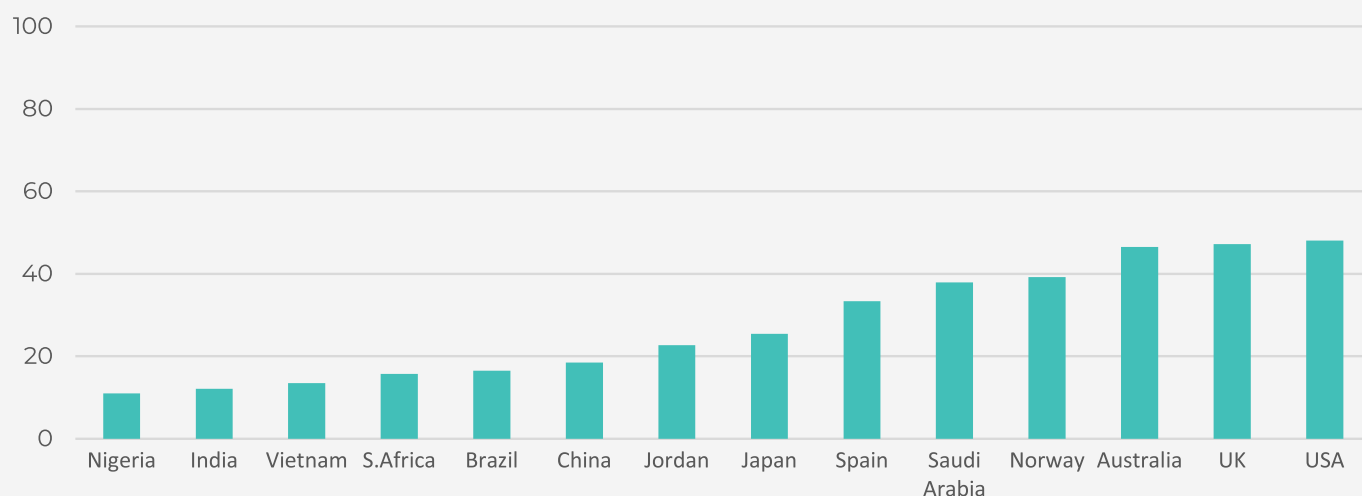
Wide disparity in higher education

Learning disparity across countries also extends to higher education. The United States, which is often cited as a leading nation in terms of tertiary-level education, leads the list of countries, with Australia and the United Kingdom not far behind (Fig. 4.3). Saudi Arabia has made significant strides in increasing access to education, improving quality, and promoting inclusive learning opportunities. Nigeria, India, Vietnam, South Africa, and China, however, are lagging with much lower levels of educational attainment.



4.1 DYSFUNCTION, DISCONNECTION AND FRAGMENTATION?

Figure 4.3. Educational attainment among 25–64-year-olds, 2022 (%)



Source: World Bank, except China; OECD, Education at a Glance 2022.

Despite these performances, the survey nonetheless showed general dissatisfaction with the current education and training systems. Respondents strongly perceived that higher education institutions were not adequately preparing students for the workforce, with graduates often lacking the essential skills required by employers.

Despite this, higher education still appears to be a valued choice. Over the past decades, the pursuit of higher educational attainment has been accelerating.

OECD countries, among others, have seen a substantial increase in the percentage of the population with tertiary education in the past two decades. As of 2022, the share of 25–64-year-olds with a tertiary degree has risen from 22% in 2000 to 41%. Also notable is the higher level of educational attainment of females (54%), comparatively to males (41%).

This significant increase in individuals achieving higher education levels is a testament to the growing value placed on advanced learning in today's economy.

4.1 DYSFUNCTION, DISCONNECTION AND FRAGMENTATION?

Economic literature has long shown a premium attached to human capital development, with each additional year of schooling associated with an 8-13% rise in hourly earnings (Card, 1999). Moreover, educational attainment is frequently used as a hiring criterion because employers assume it reflects a person's skill level or productivity (Spence, 1973).⁴⁰ Technological change may have strengthened the case for higher education.

STEM skills, encompassing science, technology, engineering, and mathematics, are increasingly recognized as critical competencies in the modern world. Rapid technological advances and workplace digitization are key factors exacerbating this issue. Workers are struggling to match their skill sets with the evolving demands of employers. The growing gap between the supply and demand for skilled professionals in these fields further underscores the significance of STEM. Employment in STEM occupations has surged by 79% over the past three decades, and projections indicate an additional 11% growth from 2020 to 2030.

Box 4.1. Australia: Supporting women in STEM

With only 17% of the STEM workforce in 2016 consisting of women, the Government of Australia developed the Advancing Women in STEM Strategy to help address the issue. Central to the strategy is the government's role as a participant, supporter, and enabler. The government first sought to understand the challenges girls and women experience along the STEM pathway from early education to established careers to guide the strategy's development. The strategy focuses on several interventions in three key areas: education, careers, and visibility.

- Enabling STEM potential through education
- Supporting women in STEM careers
- Making women in STEM visible

The government publishes the annual STEM Equity Monitor report to track the impact of gender interventions in STEM fields

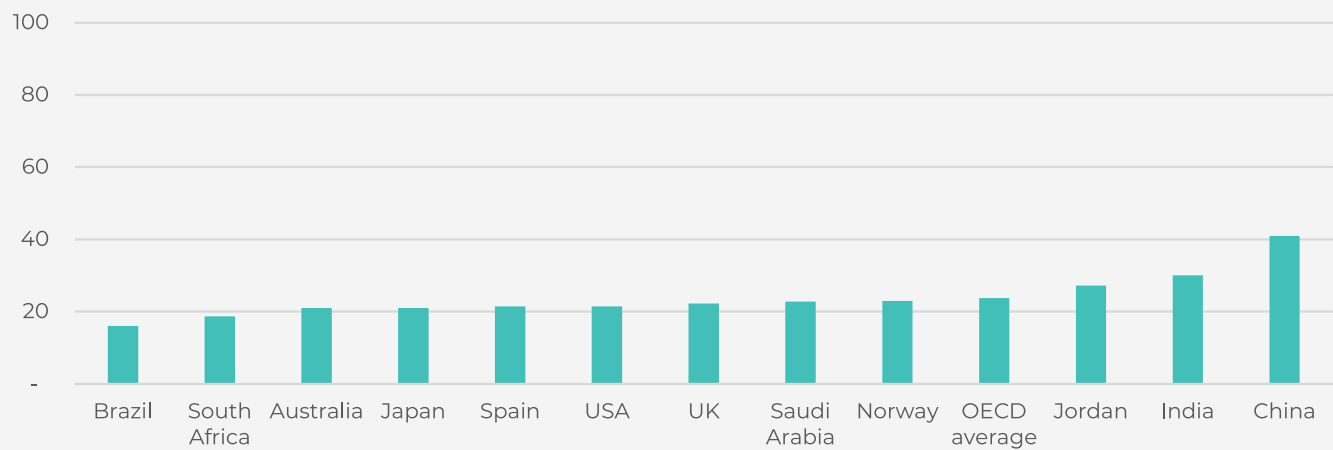
Source: Department of Industry, Science and Resources, 2023.

⁴⁰ The Signaling Theory was first proposed by Michael Spence (1973). The latter experimented and found a positive correlation between an agent's (educational) credentials and a principal's belief/judgment towards the agent's capabilities. While higher education levels are associated with positive career outcomes such as higher salaries, job mobility, and better health, the direct correlation between educational attainment and job performance is more complex as it may overlook the nuances of job-specific competencies not captured by formal education.

4.1 DYSFUNCTION, DISCONNECTION AND FRAGMENTATION?

Specialization can depend on individual choices but also national priorities. While India and China have a lower proportion of students in tertiary education, they have focused their efforts on STEM fields. China, for instance, has over 40% of its college graduates holding a degree in one of these disciplines (Fig. 4.4). Following closely are countries like India, contributing to its position as a major player in the global STEM education arena. Other countries, such as Brazil and Vietnam, have also shown remarkable progress. The United States, while having a lower percentage than some Asian countries, remains a significant contributor to the global pool of STEM talent, particularly in advanced research and innovation sectors.

Figure 4.4. Total graduates in STEM fields (%)



Source: UNESCO, OECD, and statistical yearbooks of India, and China. Data for Nigeria was unavailable.

However, only 15% of young women end up being STEM graduates, compared to 35% of young men, according to UNESCO statistics for 2022. Although men still dominate STEM-related fields, some countries have performed better in bridging this gender gap. For instance, India has a female graduation rate of 26%, followed by Saudi Arabia at 21%. These countries are well ahead of European countries and the United States, which are ranging between 10 to 13%. However, the percentage of STEM degrees obtained by women has stagnated, except in Saudi Arabia. This state of stagnation was confirmed in the 2024 GEM Gender Report, which showed women had made no progress over the past ten years (Montoya, 2024).



4.1 DYSFUNCTION, DISCONNECTION AND FRAGMENTATION?

So why the dissatisfaction with the education system?

The evolving landscape of education and training reflects a broader shift in the global economy and the nature of work. Historically, education systems were designed to provide a broad knowledge base, while training was often more specialized, focusing on the skills needed for specific jobs or industries. As technological change accelerates and the job market becomes more dynamic, the line between education and training has blurred. Rapid technological advancements mean that the lifespan of skills is shorter than ever before, requiring constant learning and adaptation from workers. However, the current system is seen as not always efficient at informing, supporting or incentivizing continuous professional development, hence the general dissatisfaction among respondents.

Global forces are contributing to this unprecedented complexity, creating new jobs requiring advanced skills and competencies. In this revolutionary period of time, employers demand that workers are skilled, flexible and trainable. Amid these changes, the concept of education, as a one-time event that precedes a career, is increasingly deemed insufficient. Instead, a model of continuous learning and development, extending well beyond the initial job entry, is emerging as a critical component of workforce resilience. This paradigm shift necessitates re-evaluating educational strategies at all levels, emphasizing the importance of foundational learning in primary and secondary education as a platform for lifelong learning.

The need for proactive and constant skill renewal emphasizes the necessity for education and training systems to become more flexible, personalized, and accessible. Online platforms and workplace training initiatives must overcome barriers by offering affordable, accessible, and time-efficient learning opportunities. The increasing demand for soft skills, such as communication, team collaboration, and creativity, highlights survey respondents' awareness of automation and the complementary nature of these skills to technology.

4.1 DYSFUNCTION, DISCONNECTION AND FRAGMENTATION?

In addition, there is a growing emphasis on the return on investment (ROI) for students, who are increasingly concerned with how their online education will translate into job opportunities and career advancement. This has led to a call for online education providers to innovate and develop partnerships with employers, offering degree and training programs directly linked to employment opportunities and addressing labor shortages in specific sectors.

To solve this, some advocate for a more integrated approach to education and training, one that breaks down the silos between disciplines and promotes a more holistic development of skills. This includes the need for education and workforce development systems to become more responsive, personalized, accessible, and continuous throughout workers' careers. A comprehensive skill set, including cognitive, socio-emotional, and technical skills, is also expected to be part of the skill acquisition strategy. The next section explores potential emerging approaches that address the need for more personalized and customized approaches to skill development.



4.2 EMERGING EDUCATIONAL AND TRAINING MODELS

A notable finding from respondents was that they felt strongly about having primary responsibility for their training strategies. The positive news is that alternative learning solutions have already begun to reshape the landscape of professional development making it easier for the workforce to have autonomy over their development. By integrating innovative approaches such as online platforms, micro-learning, and gamification, more recent educational and training models have aimed to make learning more engaging, efficient, and accessible. While these approaches have attracted attention, they are not completely new. Many, of these online courses, have been developed from previous distance education practices, lifelong learning, and open educational resources. Here are some training approach highlights:



Massive Open Online Courses (MOOCs). Online platforms, such as Massive Open Online Courses (MOOCs), provide wide-ranging access to high-quality education. These platforms offer courses from top universities and experts worldwide, allowing individuals to learn at their own pace and convenience. MOOCs have been instrumental in democratizing education, breaking down geographical and financial barriers, and supporting lifelong learning.



These platforms provide a range of materials, including video lectures and interactive forums, to create a dynamic educational community. Renowned platforms like edX, Coursera, and FutureLearn collaborate with top universities to offer diverse courses and comprehensive programs, facilitating career and personal growth. While MOOCs are adaptable and cost-effective, their success hinges on course quality and post-course support.



Microlearning offers a solution to the time constraints faced by many professionals. Microlearning allows individuals to integrate education into their daily routines without significant disruption by breaking down learning content into short, focused units. These bite-sized chunks of content can be consumed quickly and easily integrated into the daily workflow, allowing for continuous learning without significant disruption to one's duties.

4.2 EMERGING EDUCATIONAL AND TRAINING MODELS



Competency-Based Education (CBE) is an innovative approach that prioritizes skill and knowledge mastery over the traditional time-based educational model. Tailored to individual learning trajectories, CBE is ideal for adult education and professional development, valuing prior learning and experiences. This method enhances educational efficiency, potentially shortening the path to graduation by acknowledging existing competencies gained through work or life experiences.

Benefits of CBE are the ongoing assessments and feedback, which ensure knowledge retention and practical application. As job markets evolve, demanding specific skills, CBE's adaptable framework promotes consistent competency standards, which are crucial for educational quality and accountability. With its emphasis on practical outcomes, CBE is gaining traction in educational institutions, offering a relevant alternative to conventional methods in today's skill-focused economy.



Flexible and Modular Learning Pathways (FMLPs) focus on the structure and delivery of education, offering a flexible framework for learning. They are designed to provide learners with a variety of educational experiences that can be tailored to their individual needs, interests, and schedules. FMLPs emphasize the importance of flexibility in learning, allowing for the integration of different types of learning, such as formal, non-formal, and informal, across various levels of education. This approach supports the idea that learning can occur in multiple settings, not just within the traditional classroom environment.



Personal Learning Accounts (PLAs) are typically financial instruments allowing individuals to fund their education and training. They serve as a personal budget for learning, which can be used to access a range of educational services and resources over a person's lifetime. The concept behind PLAs is to empower individuals to take charge of their learning journey, making decisions about what, where, and how they learn, with the financial means to support those choices. For instance, the French Compte Personnel de Formation allows individuals to accumulate training entitlements that can be used throughout their careers. Similarly, the Singapore SkillsFuture Credit empowers citizens with credits to pursue lifelong learning (Box 4.2).

4.2 EMERGING EDUCATIONAL AND TRAINING MODELS

Box 4.2. SkillsFuture Singapore

SkillsFuture Singapore (SSG) is a comprehensive initiative that encourages individuals to take charge of their personal development at every stage of life, from schooling to mid-career and beyond. The main features of SkillsFuture include:

- Providing resources for education and career guidance
- Fostering an integrated system of quality education and training
- Promoting employer recognition of skills and mastery
- Nurturing a culture of lifelong learning.

This initiative supports the nation's vision of a future-ready society where every individual's skill and contribution drive the country's advancement towards an advanced economy and inclusive society. SSG provides resources such as SkillsFuture Credit, Jobs-Skills Insights, Skills Advisory services, and the MySkillsFuture online portal to empower Singaporeans to chart their career and lifelong learning pathways.

The SkillsFuture Credit program was introduced in 2015 and allocates an initial credit of \$500 to all Singaporean citizens aged 25 and above. The credit does not expire and can be used for a wide array of approved courses. In 2020, an additional one-off top-up of \$500 was given, which must be used by the end of 2025. For mid-career individuals, particularly those aged 40 and above, the program offers a substantial top-up of \$4,000 to support more significant upskilling, reflecting the government's commitment to lifelong learning and career development. As a result, the participation rate for training has increased from 35% in 2015 to 50% in 2022.

Source: World Economic Forum, 2023.



Gamification. The application of game-design elements has emerged as a compelling method to increase engagement and motivation in learning. Gamification introduces game-design elements like point scoring, leaderboards, and rewards into the learning process. The interactive nature of gamification strives to make learning more enjoyable, enhancing motivation and engagement on the part of participants.

4.2 EMERGING EDUCATIONAL AND TRAINING MODELS



Mobile Training Units (MTUs). Despite the strong demand for training, it is not always accessible to all. MTUs attempt to bridge this gap. They can be particularly effective in reaching remote or underserved areas, providing on-the-spot training that is both accessible and relevant to the local context. MTUs have moreover been recognized for their cost-effectiveness and efficiency, as they save resources by bringing the training to the participants rather than vice versa.

By delivering training directly to the community and overcoming geographical and logistical barriers, MTUs can positively impact marginalized groups by enhancing their skills, knowledge, and participation in society. They can also help break cycles of poverty and foster economic self-sufficiency within these communities.

Online education and personalized learning represent transformative approaches to training that have gained significant traction in the educational landscape. Artificial intelligence, machine learning, and data analytics are also anticipated to become integral in creating personalized learning experiences that predict skill shortages and recommend tailored learning paths. AI also has the potential to personalize education, providing immediate feedback that helps students learn better, teachers teach better, and schools become more effective.



4.2 EMERGING EDUCATIONAL AND TRAINING MODELS

Box 4.3. Virtual Reality (VR) and Augmented Reality (AR) Training

Virtual and Augmented Reality technologies are at the forefront of educational innovation, offering immersive experiences that are particularly advantageous for technical and vocational education. Virtual Reality training creates a fully simulated environment where learners can engage with a three-dimensional space through headsets and controllers, practicing skills and procedures in a safe, controlled setting. This is especially useful for high-risk or expensive scenarios, such as surgical operations or handling dangerous substances.

In healthcare, VR training is transforming medical education with tools like surgery simulators that offer students a realistic, risk-free setting to hone their surgical skills. The military uses VR for simulations and tactical games, equipping personnel with enhanced realism and skill development for combat scenarios. Elite athletes from the NCAA, NFL, NBA, and Olympic teams use VR to refine their performance and strategic acumen.

Augmented Reality (AR) training integrates digital data with the physical world, enhancing perception and interaction via devices like tablets and AR glasses. This method is ideal for tasks requiring physical and digital input, such as equipment repair or intricate assembly. AR and Virtual Reality (VR) training enhances learning retention and engagement by providing immersive experiences in a risk-free setting. These technologies are versatile, benefiting sectors like healthcare and manufacturing, and are transforming organizational training methods. They enable realistic simulations for hands-on practice without real-life risks, creating a compelling learning journey. As AR and VR evolve, they are set to significantly influence professional training and development's future.

Source: Kaplan et al. 2020; <https://www.princetonreview.com/ai-education/vr-and-ar>.

These above approaches to learning can offer a plethora of advantages, such as:

- Enhanced accessibility to education through online platforms
- The customization of learning experiences to meet individual student needs
- The promotion of practical, hands-on skills through project-based initiatives.

Although these new approaches have democratized access to training, they are however not without their challenges.



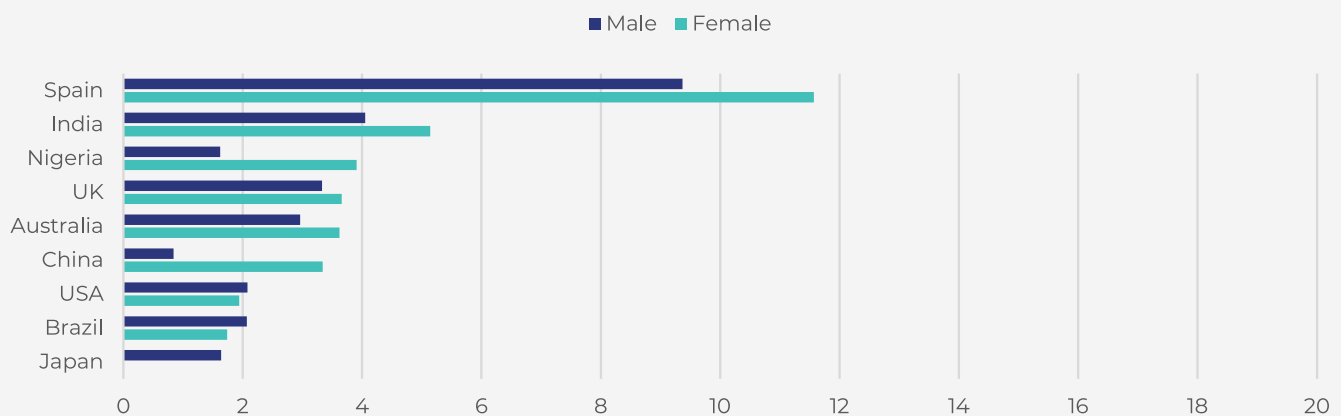
4.3 TRAINING APPROACH CHALLENGES

Online educational innovations have become more common in recent years, with the pandemic increasing their popularity even further. Many higher education institutions now offer short and flexible MOOCs in non-degree programmes to extend their traditional mission. It was initially hoped that the proliferation of these online courses (MOOCs) would democratize access to education, allowing learners worldwide to acquire new skills and knowledge while decreasing inequalities (Acemoglu, Laibson, & List, 2014; Hoxby, 2017). At the same time, democratizing access and expanding the enrolment pool, may also dilute the value of this form of learning.

Despite their popularity, the growth in MOOC participation has been concentrated almost entirely in the world's most affluent countries (Reich & Ruiperez-Valiente, 2019). Early evidence also showed that few students completed courses relative to more formal modes of learning (Jordan, 2014).⁴¹ Unlike formal education, it is relatively easy to withdraw from these types of courses without significant penalties (McClure, 2019).

Completion rates were moreover found to be even lower in fields of study such as STEM. Interestingly, while females were less likely than males to enrol in STEM MOOCs, they were equally likely to complete them (Jiang et al., 2018).

Figure 4.5 STEM MOOC enrollees in each country who completed one or more STEM MOOC, by gender (%)



Source: Jiang et al. 2018.

⁴¹ Counter to this point, others have argued that completion rates were potentially misleading because the emancipatory effect of free online access to education allows students to take what they need from MOOCs to meet their own learning goals without formally completing courses (LeBar, 2014).

4.3 TRAINING APPROACH CHALLENGES

While MOOCs can potentially extend educational opportunities, they may inadvertently perpetuate existing disparities in educational attainment. Research has consistently shown that the most successful participants in MOOCs tend to be those who already possess significant educational advantages (Castaño-Muñoz & Rodrigues, 2021; Emanuel, 2013; Koller & Ng, 2013). Indeed, individuals with prior higher education experience, access to robust learning resources, and a conducive learning environment are more likely to excel in MOOC settings. This phenomenon may be attributed to several factors, including the self-directed nature of MOOCs, which favors learners with strong self-regulation skills and academic backgrounds that foster independent study habits.

The digital divide poses a significant barrier for more disadvantaged communities. Students from rural or underprivileged backgrounds frequently encounter obstacles in securing essential technology and internet access, which are crucial for participating in modern educational experiences. In some emerging countries, this divide becomes even more pronounced, as not all students have the means to obtain the necessary technological tools or stable internet connections. Consequently, this lack of access to technology can hinder the ability of many learners to engage effectively with online education platforms, creating disparities in educational opportunities and labor market outcomes.

As the demand for online education grows, so does the need for robust quality assurance and accreditation processes to ensure that the qualifications obtained online are recognized and valued by employers. This is particularly important as the labor market evolves, with employers seeking specific competencies and credentials. MOOC participants expect their efforts to be recognized and rewarded appropriately in the labor market.

The rapid expansion of online learning offerings, ranging from massive open online courses (MOOCs) to comprehensive online degree programs, has created a fiercely competitive environment with various providers. However, as the domain of MOOCs grows, the importance of solid consumer safeguards is becoming increasingly more pronounced. Such a competitive atmosphere calls for a transparent and consistent framework for accreditation to maintain high educational standards and labor market relevance.

Digital badges were designed to help address this issue. The metadata within these badges ensures a transparent record of achievement, supporting the credentials' integrity. As the job sector evolves, the need for such precise and verifiable qualifications will likely rise, positioning micro-credentials and badges as key components of career growth. They aid in personal advancement and help employers pinpoint the exact skills of candidates. Notably, digital badges from recognized platforms like Credly's Acclaim, which comply with the Open Badge Standard, are becoming popular.



4.3 TRAINING APPROACH CHALLENGES

These badges, displayed on platforms like LinkedIn, verify the holder's skills and educational accomplishments, signifying a move towards a more dynamic, individualized, and skill-focused professional development model.

MOOCs are recognized for their potential to further education and enhance skills, yet they have not reached the status of an equivalent to conventional degrees from employers' perspective. Employers might acknowledge the current knowledge and abilities that these courses impart and the dedication they reflect from the learners (Radford et al., 2014). However, research suggests that MOOCs often act as complementary 'soft credentials' that augment formal qualifications rather than replace them (Egloffstein & Ifenthaler, 2017; Hamori, 2019; Rivas, Baker, & Evans, 2020; Rosendale, 2017). Short-term credentials like MOOCs can be considered suitable stand-alone qualifications in certain sectors like technology (McClure, 2016). Nonetheless, the value attributed to MOOCs in the job market is intricate and region-specific, warranting ongoing assessment.

Individual learning accounts have received renewed attention from policymakers due to their ability to make training rights portable from one job or employment status to another. Dividing learning programmes into self-contained and certified modules could also allow individuals to increase their qualification levels in several steps when the amount of support provided by ILS and/or time constraints do not allow them to do it in one go. While offering flexibility and personalization in education, individual learning schemes face several constraints that can impact their effectiveness (OECD, 2023d; 2019b).

One significant challenge is the economic barrier, as not all individuals have equal access to financial resources to support their learning endeavors, which can lead to disparities in educational outcomes. Moreover, the quality and relevance of training provided are crucial. There must be an effective system in place to ensure that training providers are financially stable and well-qualified to promote successful learning outcomes. Another constraint is the participation bias against low-skilled individuals. Targeted learning schemes are necessary to reduce this bias and ensure those needing an upgrade in skills receive adequate support. Lastly, there is the challenge of maintaining motivation and engagement without the structure of traditional learning environments, which necessitates innovative approaches to keep learners on track towards their educational goals.

Microlearning, characterized by its content delivery in small, specific bursts, faces similar challenges. One significant challenge is limiting only a few concepts per learning session, which can lead to fragmented learning experiences.



4.3 TRAINING APPROACH CHALLENGES

This fragmentation can make it difficult for learners to integrate and apply knowledge comprehensively. Additionally, microlearning requires high levels of dedication from learners, who must engage with the content regularly to benefit fully. Preparing microlearning materials can also be time-consuming for educators, as it involves distilling complex information into concise, impactful segments.

Online education can lead to student isolation and demands high self-motivation and discipline. Without the physical presence of teachers and peers, students may feel disconnected and lack the social support that traditional classroom environments provide. The flexibility of online learning also puts the onus on students to manage their time and stay motivated, which can be challenging for many. Effective online education requires robust support systems and strategies to keep learners engaged and on track.

Data privacy concerns also exist when using technology to track performance. Using digital tools to monitor and assess student progress raises important questions about the security and confidentiality of personal information. Schools and educational institutions must implement stringent measures to protect student data from unauthorized access and breaches. Ensuring privacy is critical to maintaining trust and safeguarding the rights of learners.

Developing customized learning paths for each student involves a considerable investment in time and professional development. Educators must be equipped with the skills and tools to analyze student data, identify individual needs, and adapt their teaching strategies accordingly. This process is resource-intensive, often necessitating additional funding and support to ensure its implementation. Successfully applying project-based learning hinges on providing teachers with the necessary resources and support to create meaningful and engaging projects for students.

Despite these challenges, integrating online, personalized, and project-based learning into educational curricula continues to evolve, driven by technological advancements and a growing recognition of the need for more adaptive and relevant educational experiences. MOOCs, particularly, are complementing traditional lifelong learning options, such as public programmes, on-the-job training or formal accredited courses.



4.4 IS THERE A ROLE FOR GOVERNMENTS?

While the increase in continuous learning methods caters to the need for personalized and responsive training, issues remain related to labor market information, accreditation, and inclusive and accessible education. Additionally, market failures could be addressed by incentivising training in strategically important areas, such as emerging technologies where skill shortages are most evident. Despite diminished trust in its ability to play a broader role in the education and training sectors, governments could still contribute in these areas.

Governments have the unique capacity to mobilize resources on a large scale and can implement policies that encourage or mandate skill development. They can also provide funding for education and training programs, ensuring that individuals can access the necessary resources to develop their skills. Furthermore, governments can play a key role in identifying and forecasting future skill needs, essential for preparing the workforce for the evolving job market. By collaborating with industry leaders, educational institutions, and other stakeholders, governments can help create a dynamic and responsive skill development ecosystem that supports economic growth and individual advancement.

Here is how they could do it:

Labor market information

Governments could create robust mechanisms for collecting and disseminating labor market information to effectively guide educational and training initiatives. Australia is a benchmark for countries aiming to improve their labor market information systems. Managed by the Australian Government's National Skills Commission, the Labor Market Insights website offers an extensive range of current data including job activity statistics, employment figures by industry and occupation, unemployment rates, monthly job vacancies, and employment forecasts.

Furthermore, integrating labor market information into educational curricula can help institutions better prepare students for the evolving job landscape. This includes incorporating real-world case studies, industry partnerships, and continuous updates to training materials to reflect the latest trends and demands. By doing so, educators can provide students with a more relevant and practical learning experience, enhancing their employability upon graduation.

4.4 IS THERE A ROLE FOR GOVERNMENTS?

Credential verification and validation

The rise of personalized learning experiences, while beneficial for catering to individual student needs, also presents a challenge for standardization and comparability of educational outcomes. The alignment of online courses with labor market needs is crucial. Educational institutions must focus not only on knowledge delivery but also on the employability of their graduates. This requires a shift towards developing skills and competencies that are in demand and ensuring that online learning platforms can provide verifiable and industry-recognized credentials.

Companies face challenges in candidate discovery, credential verification, and making informed recruitment choices. One of the primary hurdles is the discovery of suitable candidates, which involves identifying individuals with the requisite skills and those who align with the company's culture and values. This task is further complicated by the need for thorough credential verification to ensure the authenticity and accuracy of candidates' qualifications and work history. This decision-making process is often hindered by the need for more comprehensive data and the rapid pace of change in job requirements due to technological advancements and shifting market dynamics.

Inclusive and accessible education

Targeted training programs for marginalized groups are specialized initiatives designed to provide equitable access to education and skill development for communities that have historically been underrepresented or disadvantaged. These programs often focus on participatory decision-making and aim to empower individuals by offering tailored courses that address specific barriers and needs.

For instance, such programs may offer courses on engaging women, youth, and displaced people in participatory and deliberative processes, thereby deepening democracy and promoting inclusivity. Initiatives like South Africa's YES (Youth Employment Service) and India's Skill India Mission focus on providing training and employment opportunities to women, rural populations, and other marginalized groups (Box 4.4).

4.4 IS THERE A ROLE FOR GOVERNMENTS?

Providing financing support

A government's role in financing training remains pivotal. Public funding can alleviate the financial burden on organizations and individuals, making training more accessible and equitable. Government initiatives can also ensure that the workforce is prepared for the challenges of tomorrow, fostering a culture of lifelong learning and adaptability.

Governments can encourage investment in human capital by providing subsidies, tax incentives, or direct funding, which is crucial for long-term economic growth and social prosperity. Organizations, especially small and medium-sized enterprises, find themselves grappling with the financial strain of keeping their workforce adept and knowledgeable. Similarly, individuals seeking to enhance their skill sets are faced with the daunting prospect of self-funding their professional development. This financial strain can act as a barrier to career advancement and innovation, potentially stifling growth and competitiveness.



4.4 IS THERE A ROLE FOR GOVERNMENTS?

Box 4.4. Supporting marginalized groups

South Africa's YES

South Africa's Youth Employment Service (YES) is a pioneering initiative aimed at confronting the country's youth unemployment crisis by creating pathways to economic participation for previously disadvantaged youth. YES seeks to provide a critical mass of young people with high-quality work experiences, increasing their employability and earning potential.

The program has made significant strides, creating over 155,358 work opportunities and deploying more than R8.3 billion into the economy without state funding. It operates collaboratively, partnering with businesses across various sectors to offer 12-month quality work experiences.

YES's commitment to inclusivity is evident in its focus on empowering women, rural populations, and other marginalized groups. This ensures that the benefits of economic growth and employment are equitably shared. By integrating these groups into the workforce, YES addresses immediate employment needs and fosters a more diverse and resilient economic landscape for South Africa's future.

Skill India Digital

Skill India Digital is a comprehensive initiative aimed at empowering the Indian population with essential skills for the digital age. It offers a wide range of features designed to facilitate upskilling, reskilling, and career growth. The platform provides access to over 7,100 skill courses and connects individuals to job exchanges and skill centres. It is a multilingual hub, making it accessible to a broader audience.

The Skill India Digital Hub (SIDH) integrates services such as discovery, recommendation, skilling, lifelong learning opportunities, apprenticeships, and assessments. It employs machine learning algorithms to recommend the most relevant courses and centres to learners based on their profiles and preferences. Additionally, the platform features a Trust Layer for verifiable digital credentials, a Finance Layer for payment services like direct beneficiary transfers, and a Discovery Layer to facilitate commerce and innovation within the ecosystem.

Source: yes4youth.co.za; skillindiadigital.gov.in

4.4 IS THERE A ROLE FOR GOVERNMENTS?

Coordination and facilitation

Governments can create a more cohesive and supportive ecosystem for skill development by fostering partnerships with educational institutions and businesses. For instance, engaging employers in designing and delivering training programs ensures the skills being taught are relevant and in demand. In the case of skills development, various training providers must work together to achieve process stability and permanence, detect shortages, learn from successful experiences, and mobilize resources. This ensures training programs align with industry needs and there is a clear pathway from education to employment.

As discussed earlier, industry partners in Singapore are integral to the Adult Learning Collaboratory's mission of co-creating innovative solutions for adult learning. By collaborating with the Institute for Adult Learning (IAL) and SkillsFuture Singapore (SSG), industry stakeholders bring valuable insights and practical experience, ensuring that the solutions developed are relevant and effective in real-world settings. Industry partners participate in a dynamic testing, experimentation, and iteration processes to refine adult learning solutions. Collaborative approaches enable the development of evidence-based strategies that address specific challenges faced by various sectors. By using their networks and influence, they can facilitate the implementation of effective learning strategies on a broader scale, benefiting more Singaporeans. The WAAD skill program in Saudi Arabia is another good example of collaboration with the private sector (Box. 4.5).



4.4 IS THERE A ROLE FOR GOVERNMENTS?

Box 4.5. Collaborative training initiatives with the private sector

WAAD Saudi Arabia

Launched in 2023, the WAAD initiative by the Saudi Ministry of Human Resources and Social Development aims to advance the national workforce in line with Saudi Vision 2030. The program encourages private sector training, targeting 1,155,000 training opportunities by the end of 2025 through 14 national companies.

WAAD focuses on training and qualifying national cadres through partnerships with private sector giants like SABIC and Saudi Telecom Company. The strategy includes seven criteria for national enterprise participation, including the annual training of 12% of Saudis. The program also emphasizes regional development, with forums in various provinces to allocate specific training opportunities, enhancing the labor market and developing future skills.

The campaign achieved its target in half the original time. In November 2024, the Ministry announced a new target of 3 million training opportunities with around 60 partners, highlighting the success of the initiative and the crucial role of private sector collaboration.

Source: <https://www.hrsd.gov.sa/media-center/news/251120241>

International bilateral agreements

Collaboration can also extend across countries. An example is Global Skills Partnerships (GSPs), which are increasingly used in cases of skill shortages, especially in countries facing population aging (Dempster et al., 2024). GSPs are bilateral agreements established across various regions to tackle demographic imbalances, manage migration pressures, and address skill shortages. These partnerships, such as those between Belgium and Morocco, Germany and Kosovo, and Australia with the Pacific Islands, aim to prevent brain drain by fostering a skilled workforce.

4.4 IS THERE A ROLE FOR GOVERNMENTS?

This approach benefits all parties involved:



Origin countries see workforce skill enhancements aligning with their development goals



Destination countries receive skilled workers ready to integrate and contribute



Individuals gain access to new opportunities and safer migration options.

The flexibility of the GSP model allows it to be tailored to specific sector needs, making it a proactive solution for global employment challenges. GSPs provide equitable and sustainable labor mobility solutions, contributing to the development and offering a model for international cooperation. They represent a progressive approach to labor migration, promoting mutual benefits and potentially reshaping global development dynamics.

Incentivizing training in strategic areas

Governmental intervention in the form of incentives for training in emerging technologies is a strategic approach to mitigating market failures. Governments can tailor programs and policies to encourage acquiring necessary skills by identifying sectors with skill gaps.. This technique will help reduce the mismatch between supply and demand of labor and promote innovation and competitiveness in industries critical for economic growth. Such initiatives could include:



Tax breaks for companies investing in employee training



Grants for individuals pursuing education in high-demand fields



Partnerships between industry and educational institutions to align curricula with market needs.

These measures can help ensure a workforce that is adaptable and equipped to meet the challenges of rapidly evolving technological landscapes.

4.5 WHERE NOW? FURTHER POINTS FOR DISCUSSION

The trend towards continuous learning and skill development is indicative of the broader societal shifts taking place. Where once a single set of skills could last a career, now lifelong learning and adaptability are expected. Employers are looking for workers who can perform their current roles and possess the potential to grow and evolve with the company. With the advent of new technologies, traditional educational pathways are being augmented and complemented by approaches such as online learning, micro-credentials, and immersive virtual reality experiences.

There is now a greater emphasis on professional development opportunities, both from the perspective of the employee seeking to enhance their career prospects and the employer aiming to retain a competitive and skilled workforce. Personalized learning is gaining traction, tailoring education to individual needs and helping bridge existing skill gaps by providing targeted training that aligns with each learner's unique career trajectory. These advancements offer flexibility and access to cutting-edge knowledge, enabling them to stay relevant in an ever-evolving job market. The impact of these changes is far-reaching, demanding a more dynamic and resilient workforce capable of navigating the challenges of a more interconnected and technologically advanced world.

While most would agree on the importance of having the right skills, there is often disagreement over which skills are essential and how they should be developed. Technical skills continue to be important. However, critical thinking, problem-solving, and self-management skills—including active learning, resilience, stress tolerance, and flexibility—are being recognized as vital for success in the future job market. These skills can contribute to empowering individuals to navigate the complexities of modern work environments. Businesses, governments and educational institutions have understood the importance of these skills and are incorporating them into curricula and training programs. So are individuals. As we have seen, survey respondents identified those skills as the most important.

As we look ahead, it appears that cementing our the future in the workplace requires us to develop new skills. Continuous learning and adaptability should be the foundations of this upskilling and reskilling process. Building partnerships between educational institutions, businesses, and governments can encourage the wider adoption of successful approaches, benefiting a larger number of people and enhancing the overall skill level of the workforce.



4.5 WHERE NOW? FURTHER POINTS FOR DISCUSSION

This report has sought to provide an overview of how global forces have and will affect skill demand. At the same time, it has created more questions which need attention and discussion, including:



Performance in early education has shown a constant decline in the past decades. What are the likely implications of these developments for the future? Could personalized and customized training be the answer to fill this gap?



With the rapid expansion of online learning offerings, this new landscape necessitates a clear and consistent framework for accreditation to maintain high educational standards and labor market relevance. Are digital badges sufficient? Will the labor market assign a similar value to this new type of learning as it did to formal education?



Survey responses have shown a high degree of dissatisfaction with the current skills ecosystem in most countries. Why this level of dissatisfaction when so much effort and resource have been put into education and skill development?



Respondents clearly demonstrated their dissatisfaction with formal learning institutions. Yet, enrolment in university education continues to rise, confirming it is still considered a valued choice. What explains this apparent contradiction?



The past decades have seen trust erode in educational and governmental institutions, particularly in Western countries. Can these institutions regain their place as pivotal players in the skill development ecosystem in the future?

These issues are interconnected and contribute to a comprehensive understanding of the future of work and skill demand. Continuous exploration remains vital to better navigate the challenges and opportunities and to ensure that individuals are equipped with the skills they need to succeed in an ever-changing global labor market.

An aerial night photograph of a city, featuring a prominent highway interchange with multiple overpasses. The surrounding area is filled with various buildings, including a large, modern structure with a curved facade and a glass facade, and several smaller, more traditional buildings. The scene is illuminated by city lights, creating a vibrant and dynamic atmosphere. The word "REFERENCES" is overlaid in white, bold, sans-serif capital letters in the center of the image.

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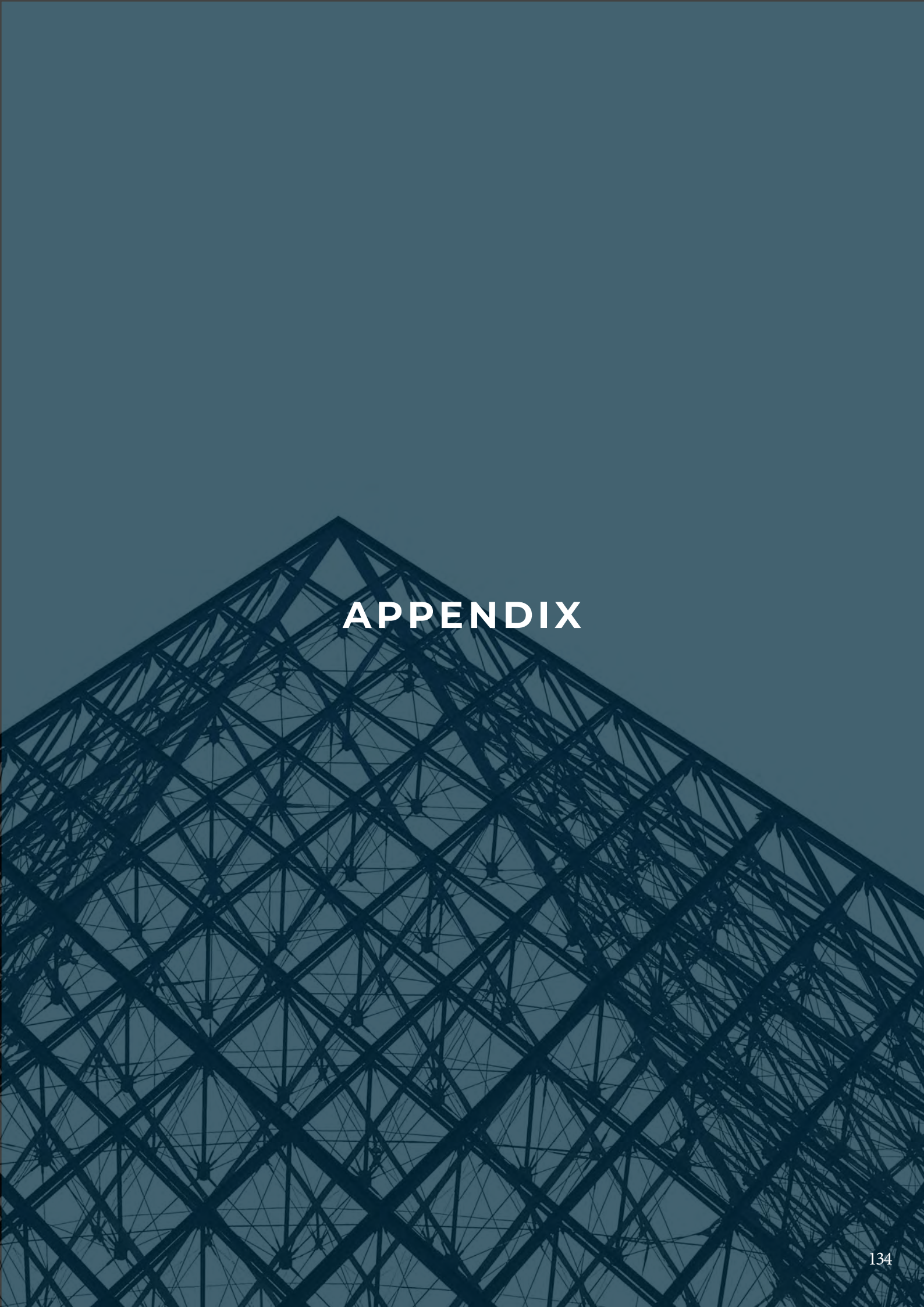
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APPENDIX

6. APPENDIX

Survey questionnaire

Block 1: General information

In the next three sections, we will ask you a set of questions about your background, education, and work experiences

A: Demographics

In this section, we would now like to ask you some personal questions

1 What is your gender?

- 1 Male
- 2 Female
- 9 No answer

2 What is your age?

- 1 18 - 24
- 2 25 – 34
- 3 35 – 54
- 4 55+

3 In which country were you born?

Code for country or region



6. APPENDIX

B: Education and training

In this section, we would now like to ask you some questions about your formal education and training. By “formal education” we mean that it is provided in schools, colleges, universities or other educational institutions and leads to a certification that is officially recognized by governmental authorities or accredited professional bodies. This would also apply to technical and vocational education.

A: Demographics

4 What is the highest level of education you have completed?

- 1 Primary education
- 2 Lower secondary education
- 3 Upper secondary education
- 4 Post-secondary non-tertiary education
- 5 Short-cycle tertiary education
- 6 Bachelor's or equivalent level
- 7 Master's or equivalent level
- 8 Doctor or equivalent level

5 If post-secondary, what was the main area of study?

- 1 General programmes
- 2 Education
- 3 Art and humanities
- 4 Social sciences, journalism and information
- 5 Business, administration and law
- 6 Natural sciences, mathematics and statistics
- 7 Information and Communication Technologies (ICTs)
- 8 Engineering, manufacturing and construction
- 9 Agriculture, forestry, fisheries and veterinary
- 10 Health and welfare
- 11 Services (Personal, hospitality, security and transport)
- 12 Others

6 Do you have a formal certification related to technical, vocational or apprenticeship training that included a practical work-based element?

- 1 Yes
- 2 No

7 In which country did you receive your education? Code for country

6. APPENDIX

C: Labour force information

In this section, we would now like to ask some questions about your work activities “Work activities mean any work for pay or profit during the reference week, even for as little as one hour. Pay includes cash payments or “payment in kind” (payment in goods or services rather than money), whether payment was received the work was done or not. Also counted as working for pay is anyone who receives wages for on-the-job training that involves the production of goods or services.

Self-employed: a person who works directly for himself/herself. A self-employed person may or may not have personnel.”

8 What is your current situation?

- 1 Employed, full time (30 hours+)
- 2 Employed, part-time (29 hours or less)
- 3 Unemployed and looking for a job
- 4 Self-employed

9 What kind of employment contract, if any, do you have in your current job?

- 1 An indefinite/permanent contract
- 2 A fixed term/temporary contract
- 3 A temporary employment agency contract
- 4 I do not have a formal contract
- 5 Other
- 8 Don't know

10 Do you currently work ...

- 1 Entirely at home?
- 2 Hybrid?
- 3 Entirely on company premises?
- 9 No answer

6. APPENDIX

11 What is the size of the organisation where you work?

- 1 1 – 4
- 2 5 – 9
- 3 10 – 49
- 4 50 – 99
- 5 100 – 249
- 6 250 – 499
- 7 500 – 999
- 8 1,000 – 4,999
- 9 5,000 – 9,999
- 10 10,000+

12 Which sector do you work in?

- 1 Agriculture, Forestry and Fishing
- 2 Mining
- 3 Manufacturing
- 4 Electricity, Gas, Water and Waste Services
- 5 Construction
- 6 Wholesale Trade
- 7 Retail Trade
- 8 Accommodation and Food Services
- 9 Transport, Postal and Warehousing
- 10 Information Media and Telecommunications
- 11 Financial and Insurance Services
- 12 Rental, Hiring and Real Estate Services
- 13 Professional, Scientific and Technical Services
- 14 Administrative and Support Services
- 15 Public Administration and Safety
- 16 Education and Training
- 17 Health Care and Social Assistance
- 18 Arts and Recreation Services
- 19 Activities of extraterritorial organizations and bodies
- 20 Other Services



6. APPENDIX

13 Which of the following categories best describe your current work in your organisation?

- 1 Manager
- 2 Professional services
- 3 Technicians and Associate Professionals
- 4 Clerical support
- 5 Service and sales
- 6 Craft and related trades
- 7 Plant and machine operator and assembler
- 8 Elementary occupations
- 9 Other

14 What is your monthly salary? Salary bands
By monthly salary, we mean before deductions for tax, social security contributions, and the like (i.e. regular overtime pay, regular bonuses, tips and commissions).

15 How long have you been with your employer?

- 1 Less than one year
- 2 1-5 years
- 3 5-10 years
- 4 10 years+

16 Are you represented by a trade union, a works council or any other form of worker representation in your company?

- 1 Yes
- 2 No
- 8 Don't know

6. APPENDIX

D: Current skills

In this section, we will ask you questions about your skills

17 To what extent are the following skills required for your current work?

- 1 Physical skills
- 2 Cognitive skills
- 3 Social and emotional skills
- 4 Management skills
- 5 STEM skills
- 6 Environmental skills
- 7 Entrepreneurial skills
- 8 Other

18 How were the majority of these skills acquired?

- 1 Through formal education
- 2 Through on-the-job training
- 3 Through off-the-job training
- 4 A combination of these
- 5 I taught myself

6. APPENDIX

Block 2: General attitudes and experience about skills context

In the next two sections, we will ask you questions about general attitudes and experience regarding four global forces that are impacting skill demand: Globalisation demographic, technological, and environmental domains. You will be asked how you feel they have affected you and how you feel they might affect you in the future

- (1) Globalisation of goods and labor is the process of integrating world economies, which has made it easier for companies to outsource production and for workers to move to other countries. As this process can increase the competition among companies, workers may need to learn new skills or update their existing skills regularly.
- (2) Demographic change refers to the impact of a young or an aging population on labour markets. For example, population aging may lead to shortages of workers or skills deficits as many workers retire. In countries with very young population, it can lead to a strong increase in the number of workers, which can either lead to more opportunities if the economy expands or more competition with other workers if it does not.
- (3) Technological advancement can affect employment by creating new jobs, displacing existing jobs, or changing skill requirements as people need to learn how to use new tools or adapt to new technologies (i.e. automation or the adoption of AI technologies in the workplace)
- (4) Policies around climate change can affect skill demand by creating new jobs to help mitigate its effects (i.e. green skills)



6. APPENDIX

A: Past and present

Thinking of the past 5 years...

19 Did any of the following global forces prompt you to upskill or reskill in your work?

- 1 Globalisation of markets and migration
- 2 Demographic change
- 3 Technological advancements
- 4 Climate change
- 8 Don't know

20 How have these global forces impacted your salary level?

- 1 Increased my salary
- 2 Decreased my salary
- 3 Did not impact my salary
- 4 Don't know

21 Did these global forces change the tasks in your work?

- 1 By introducing new working practices?
- 2 By introducing new technology?
- 3 By increasing the pace or complexity of your job?
- 4 By increasing the competition from other workers?
- 8 Don't know

22 How has your organisation addressed these changing skill needs? If so, how? Check all that apply.

- 1 By re-training or upskilling internal workers
- 2 By hiring new workers
- 3 By outsourcing work
- 4 By changing how work is organised
- 5 By attrition or redundancies
- 8 Don't know

6. APPENDIX

23 Which forms of training have you sought to improve your skills? Check all that apply.

- 1 Structured on-the-job training
- 2 Online and/or open courses
- 3 I asked to shadow colleagues who master the skills(s) I want to learn
- 4 I have been back in formal education/training
- 5 I taught myself
- 8 Don't know

24 What barriers, if any, have you faced in attempting to upskill or reskill? Check all that apply.

- 1 Not having the educational prerequisites
- 2 Financial constraints
- 3 Lack of a continuous learning culture in my workplace
- 4 Lack of coordination among government, business, unions or community-based organisations
- 5 Lack of time
- 6 Training facility is too far
- 7 Discrimination (i.e. ageism or other)
- 8 No barrier
- 9 Don't know

Moving to your current situation...

25 Overall, how would you best describe your skills in relation to what is required to do your job?

- 1 Is a lot lower to what is required
- 2 Matches what is required
- 3 A lot lower than what is required
- 8 Don't know

6. APPENDIX

26 If someone was applying for your job today, what qualifications, if any, would they need to get the job?

- 1 Primary education
- 2 Lower secondary education
- 3 Upper secondary education
- 4 Post-secondary non-tertiary education
- 5 Short-cycle tertiary education
- 6 Bachelor's or equivalent level
- 7 Master's or equivalent level
- 8 Doctor or equivalent level

27 What is the main reason that motivates you to undertake upskilling or reskilling?

- 1 To keep my job
- 2 To increase my wage
- 3 To make myself more resilient to change
- 8 Don't know

28 Which, if any, of the following skills do you feel you need to improve to maintain your current work activity? Check all that apply.

- 1 Physical skills
- 2 Cognitive skills
- 3 Social and emotional skills
- 4 Management skills
- 5 STEM skills (science, technology, engineering and maths)
- 6 Environmental skills
- 7 Entrepreneurial skills
- 8 Other
- 9 Not clear what I need to focus on



6. APPENDIX

B: Future

In this section, we will ask you about how you feel towards the future and how it might affect your future work and skills situation.

Thinking of the next five years...

29 Which of these global trends do you fear could make your skills partially or fully obsolete? Check all that apply.

- 1 Globalisation of markets and migration
- 2 Demographic change
- 3 Technological advancements
- 4 Climate change
- 8 Don't know

30 What do you think your professional future will look like? Check all that apply. I expect to...

- 1 ...experience a stable trajectory in my current field, with steady growth
- 2 ...be able to deal with an accelerated pace of continuous learning, upskilling or reskilling
- 3 ...struggle to keep up with the rapid pace of continuous learning and adaptability
- 4 ...see robots and computers eventually taking over my job.
- 5 I don't know

31 What do you think will be the main impact of these global changes on your salary?

- 1 Yes, will increase my salary
- 2 Yes, will decrease my salary
- 3 No, will not impact my salary
- 4 Don't know



6. APPENDIX

32 How do you expect these global forces will change the tasks in your work?

- 1 By introducing new working practices?
- 2 By introducing new technology?
- 3 By increasing the pace or complexity of your job?
- 4 By increasing the competition from other workers?
- 8 Don't know

33 What do you think will be the future requirements to get a job?

- 1 Primary education
- 2 Lower secondary education
- 3 Upper secondary education
- 4 Post-secondary non-tertiary education
- 5 Short-cycle tertiary education
- 6 Bachelor's or equivalent level
- 7 Master's or equivalent level
- 8 Doctor or equivalent level

34 Please select the skill clusters on which you believe you will need to focus your upskilling and reskilling efforts. Check all that apply.

- 1 Physical skills
- 2 Cognitive skills
- 3 Social and emotional skills
- 4 Management skills
- 5 STEM skills (science, technology, engineering and maths)
- 6 Environmental skills
- 7 Entrepreneurial skills
- 8 Other



6. APPENDIX

Block 3: General attitudes about policies and interventions

In this section, we will ask you how you feel about who should bear the primary responsibility for training, the support you feel you need to adapt to future skill demand, and policies more generally.

35 Which of these strategies are employers likely to adopt in response to shifting skills demand? Check all that apply.

- 1 Hire new staff with relevant skills
- 2 Retrain existing employees
- 3 Expect existing employees to adjust and learn on the job
- 4 Look to automate the work
- 5 Outsource some business functions to external contractors
- 6 Layoff staff who lack the relevant skills

36 In terms of your upskilling and reskilling efforts, who do you feel should have the biggest responsibility for it?

- 1 Myself
- 2 Government
- 3 Business
- 4 Unions
- 8 Don't know

37 Among the following stakeholders, which one do you have the most confidence in to support you in your upskilling and reskilling efforts? Check all that apply.

- 1 Business
- 2 Government
- 3 Unions
- 4 NGO/Community organisations

6. APPENDIX

38 What do you think is the most effective approach to support workers in terms of their upskilling and reskilling?

- 1 Individuals should solely be responsible for upgrading their skills
- 2 The government should play a more active and supportive role
- 3 Business should actively provide on-the-job-training
- 4 Unions should be able to negotiate which training is most appropriate for workers
- 5 Government, business, and union should work together in the delivery training
- 8 Don't know

39 Which measures should be prioritized? Check all that apply by order of importance.

- 1 Improve the accessibility of education and training
- 2 Make education and training systems more relevant
- 3 Customized on-the-job training programs
- 4 Providing financial assistance
- 5 Provide better information on which skills will be in demand in the future
- 6 Employers to do more to improve job flexibility, job quality, or skills matching
- 8 Don't know

End of survey



II. STATISTICAL NOTES

Sampling Frame

The sampling frame used by Potloc consists of social media users who are active on platforms such as Facebook, LinkedIn, Instagram, and Twitter. This allowed Potloc to reach a diverse and broad audience, including niche and hard-to-reach populations.

Representativeness

- The usual biases of internet-based methodologies apply: respondents must have internet access, be on social media, or belong to a panel.
- While Potloc's method allows for precise targeting and broad reach, there are some concerns regarding representativeness:
 - Digital Divide: Not all segments of the population are equally active on social media, which may lead to under-representation of certain groups, such as older adults or those with limited internet access.
 - Self-Selection Bias: Individuals who choose to participate in social media surveys may differ systematically from those who do not, potentially introducing bias.

Stratification Strategy

- Potloc employed a mix of social media and online partners. Given the broad eligibility criteria, our strategy was to target the general population using localized visuals and texts for each country.
- Potloc used a stratification strategy to ensure that the sample is representative of the population. This involves dividing the population into different strata based on key characteristics such as age, gender, location, and occupation. Each stratum is then sampled independently to ensure that all segments of the population are adequately represented.



II. STATISTICAL NOTES

Use of Weights

Potloc did not use weights. Instead, it applied the following minimum quotas:

- Minimum of 40% per gender break (male, female)
- Minimum of 20% per age break (18-24, 25-34, 35-54, 55+)
- Level of Education: minimum of 15% among 4 levels (Elementary School+ Secondary (high) school, University degree, Post-graduate, Vocational qualification, Other)
- Follow-up quotas: household income, (sector+field of study).
- The remaining respondents were distributed randomly, on a first-come, first-kept basis.



III. TABLES

Country of Residence														
	Australia	Brazil	China	India	Japan	Jordan	Nigeria	Norway	Saudi Arabia	South Africa	Spain	UK	USA	Vietnam
All respondents	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Gender (Q1; N=14,000)														
	Australia	Brazil	China	India	Japan	Jordan	Nigeria	Norway	Saudi Arabia	South Africa	Spain	UK	USA	Vietnam
Male	45%	56%	52%	59%	56%	61%	60%	44%	58%	40%	50%	48%	46%	59%
Female	55%	43%	48%	40%	43%	39%	40%	57%	42%	60%	50%	52%	53%	40%
Prefer not to say	0%	1%	0%	1%	1%	0%	0%	0%	0%	0%	1%	0%	0%	1%
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Age (Q2; N=14,000)														
	Australia	Brazil	China	India	Japan	Jordan	Nigeria	Norway	Saudi Arabia	South Africa	Spain	UK	USA	Vietnam
18-24	20%	20%	20%	17%	10%	15%	20%	17%	20%	21%	16%	22%	20%	21%
25-34	30%	20%	30%	24%	21%	27%	28%	25%	35%	28%	26%	23%	21%	35%
35-54	30%	39%	27%	40%	35%	47%	40%	38%	34%	31%	35%	28%	39%	28%
55+	20%	22%	23%	19%	33%	11%	12%	20%	11%	20%	24%	27%	20%	17%
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Employment status (Q8; N=14,000)														
	Australia	Brazil	China	India	Japan	Jordan	Nigeria	Norway	Saudi Arabia	South Africa	Spain	UK	USA	Vietnam
Employed, full time (30 hours+)	57%	57%	91%	45%	61%	47%	47%	75%	61%	57%	68%	65%	59%	64%
Employed, part-time (29 hours or less)	29%	7%	6%	9%	27%	10%	13%	19%	12%	11%	16%	22%	19%	13%
Unemployed	7%	7%	1%	24%	6%	19%	11%	2%	17%	14%	8%	5%	11%	7%
Self-employed	8%	28%	3%	22%	7%	23%	28%	4%	11%	18%	8%	8%	11%	15%
Base total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

III. TABLES

Employment tenure (Q15; N=10,667)														
	Australia	Brazil	China	India	Japan	Jordan	Nigeria	Norway	Saudi Arabia	South Africa	Spain	UK	USA	Vietnam
Less than one year	17%	20%	7%	14%	10%	16%	16%	14%	14%	12%	14%	15%	14%	12%
1-4 years	43%	34%	36%	36%	24%	29%	43%	38%	43%	45%	35%	41%	43%	38%
5-10 years	22%	15%	39%	24%	25%	22%	21%	20%	21%	27%	22%	21%	24%	30%
Over 10 years	17%	30%	18%	26%	41%	33%	20%	28%	22%	16%	29%	23%	19%	20%
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Skill levels (Q13; N=12,611)														
	Australia	Brazil	China	India	Japan	Jordan	Nigeria	Norway	Saudi Arabia	South Africa	Spain	UK	USA	Vietnam
High-skill	50%	53%	59%	66%	42%	59%	58%	42%	57%	59%	44%	47%	51%	62%
Medium-skill	35%	29%	33%	23%	28%	25%	29%	29%	31%	29%	36%	38%	32%	23%
Low-skill	10%	9%	8%	4%	24%	7%	6%	19%	8%	6%	16%	13%	12%	12%
Other	5%	9%	0%	7%	6%	9%	7%	10%	4%	6%	4%	3%	5%	2%
Base total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Education (Q4; N=14,000)														
	Australia	Brazil	China	India	Japan	Jordan	Nigeria	Norway	Saudi Arabia	South Africa	Spain	UK	USA	Vietnam
Secondary or less	25%	38%	24%	20%	16%	23%	23%	30%	26%	25%	27%	29%	31%	21%
Post-second-ary	26%	8%	6%	6%	45%	14%	13%	18%	12%	28%	22%	24%	16%	17%
Bachelor	35%	36%	51%	38%	22%	48%	47%	30%	47%	31%	29%	26%	35%	47%
Master & PhD	15%	18%	19%	36%	16%	15%	17%	22%	15%	16%	21%	20%	17%	15%
No formal education	0%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%	2%	1%
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

III. TABLES

Educational fields (Q5; N=10,379)														
	Australia	Brazil	China	India	Japan	Jordan	Nigeria	Norway	Saudi Arabia	South Africa	Spain	UK	USA	Vietnam
Agriculture, forestry, fisheries and veterinary	2%	3%	3%	2%	2%	1%	5%	1%	3%	1%	1%	3%	1%	2%
Business, administration and law	25%	20%	9%	19%	7%	22%	14%	10%	15%	24%	23%	14%	22%	20%
Education	10%	10%	6%	13%	5%	11%	11%	16%	16%	11%	13%	11%	8%	8%
Health and welfare	17%	12%	4%	6%	6%	11%	9%	22%	13%	8%	12%	14%	15%	8%
Services (Personal, hospitality, security and transport)	6%	1%	4%	2%	10%	2%	1%	3%	2%	4%	4%	4%	5%	4%
Social science & humanities	11%	19%	12%	14%	8%	11%	22%	12%	8%	12%	13%	16%	16%	7%
STEM	22%	29%	51%	32%	31%	32%	28%	23%	33%	26%	26%	27%	23%	41%
General programmes	2%	0%	8%	3%	20%	1%	1%	2%	1%	2%	1%	2%	4%	3%
Other	6%	5%	2%	9%	10%	11%	9%	13%	9%	11%	7%	9%	6%	7%
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Industry (Q12; N=12,611)														
	Australia	Brazil	China	India	Japan	Jordan	Nigeria	Norway	Saudi Arabia	South Africa	Spain	UK	USA	Vietnam
Agriculture	2%	2%	2%	2%	1%	1%	4%	1%	1%	2%	3%	1%	1%	3%
Industry	14%	11%	27%	13%	26%	13%	14%	14%	20%	14%	12%	12%	11%	22%
Market services	46%	42%	53%	47%	42%	32%	41%	31%	35%	47%	42%	42%	45%	46%
Non-market services	29%	23%	15%	25%	16%	34%	29%	43%	29%	22%	28%	32%	30%	21%
Other sector	10%	22%	3%	13%	15%	20%	12%	11%	14%	15%	15%	13%	14%	9%
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Income levels (Q14; N=11,910)														
	Australia	Brazil	China	India	Japan	Jordan	Nigeria	Norway	Saudi Arabia	South Africa	Spain	UK	USA	Vietnam
Low income	50%	68%	17%	33%	48%	33%	71%	44%	41%	53%	61%	50%	51%	26%
Mid income	34%	18%	32%	25%	33%	33%	17%	45%	24%	21%	30%	32%	30%	28%
High income	16%	14%	51%	43%	18%	34%	12%	11%	35%	27%	9%	18%	19%	46%
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%



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