

## 4

# Skills outlook

This chapter reports Future of Jobs Survey results regarding skills, as classified by the World Economic Forum's Global Skills Taxonomy.<sup>53</sup> The chapter begins by analysing the skills currently needed for work, and whether businesses expect them to increase or decrease in importance in the next five years. It then presents data provided by surveyed

companies on the prioritized composition of their reskilling and upskilling strategies for the period 2023–2027. Sectoral decompositions of skill trends are available in Appendix C (p79), and detailed profiles for the range of cross-functional skills are included as 26 Skill Profiles at the end of the report (see p255).

## 4.1 Expected disruptions to skills

When the Future of Jobs Report was first published in 2016, surveyed companies predicted that 35% of workers' skills would be disrupted in the following five years. In 2023, that share has risen to 44% (Figure 4.1). This expected rate of disruption to skills nevertheless represents a stabilization since

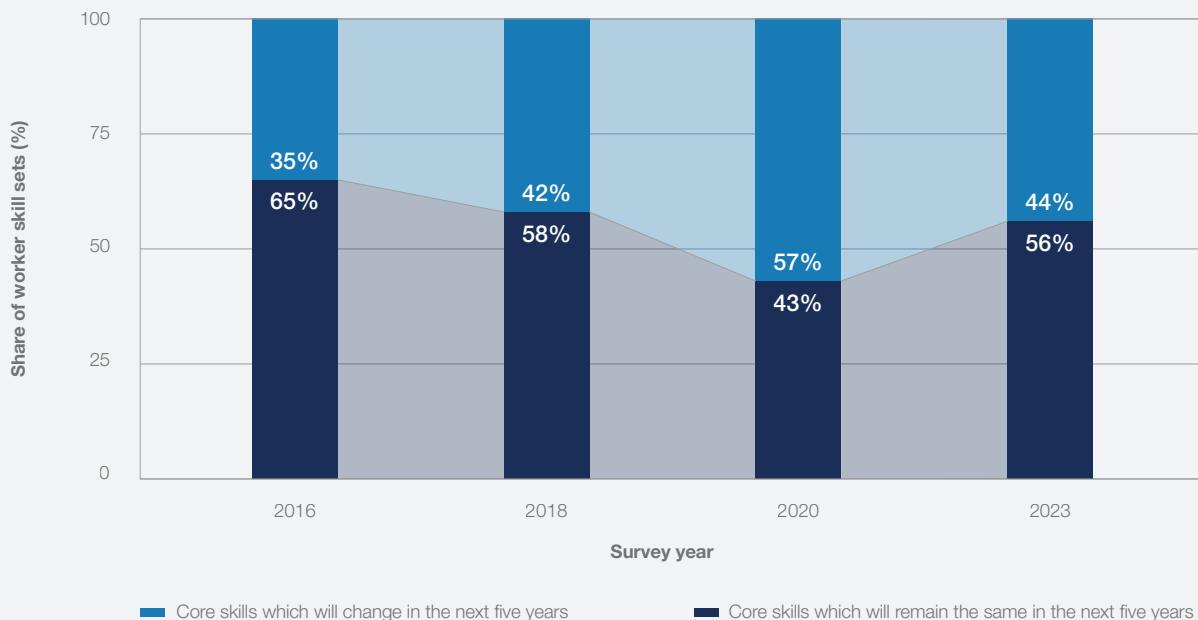
the previous edition of the Future of Jobs Survey in 2020, when COVID-19-induced disruptions to working life caused respondents to forecast a skills instability of 57% in the following five years.

With only 43% of respondents now reporting that

FIGURE 4.1

### Disruptions to skills

Evolution in the shares of workers' core skills which will change and which will remain the same in the next five years



Source

World Economic Forum, Future of Jobs Surveys 2016, 2018, 2020 and 2023.

Note

Values reported are the mean skill stability percentages estimated by organizations surveyed in each edition of the survey.

COVID-19 is driving industry transformation (see Chapter 2), the adoption of frontier technologies (driving transformation in 86% of companies) may be expected to drive the evolution of workplace skills across the full spectrum of skills, knowledge, abilities and attitudes, as workers adapt to automation and AI.

## Core skills in 2023

Figure 4.2 shows the core skills required by workers today. As in 2020, Analytical Thinking is considered to be a core skill by more companies than any other skill, and constitutes on average 9% of the core skills reported by companies. Another cognitive skill, creative thinking, ranks second, ahead of three self-efficacy skills – resilience, flexibility and agility; motivation and self-awareness; and curiosity and lifelong learning – in recognition of the importance

of workers ability to adapt to disrupted workplaces. The fourth self-efficacy skill in the Global Skills Taxonomy, dependability and attention to detail, ranks seventh, behind technological literacy.

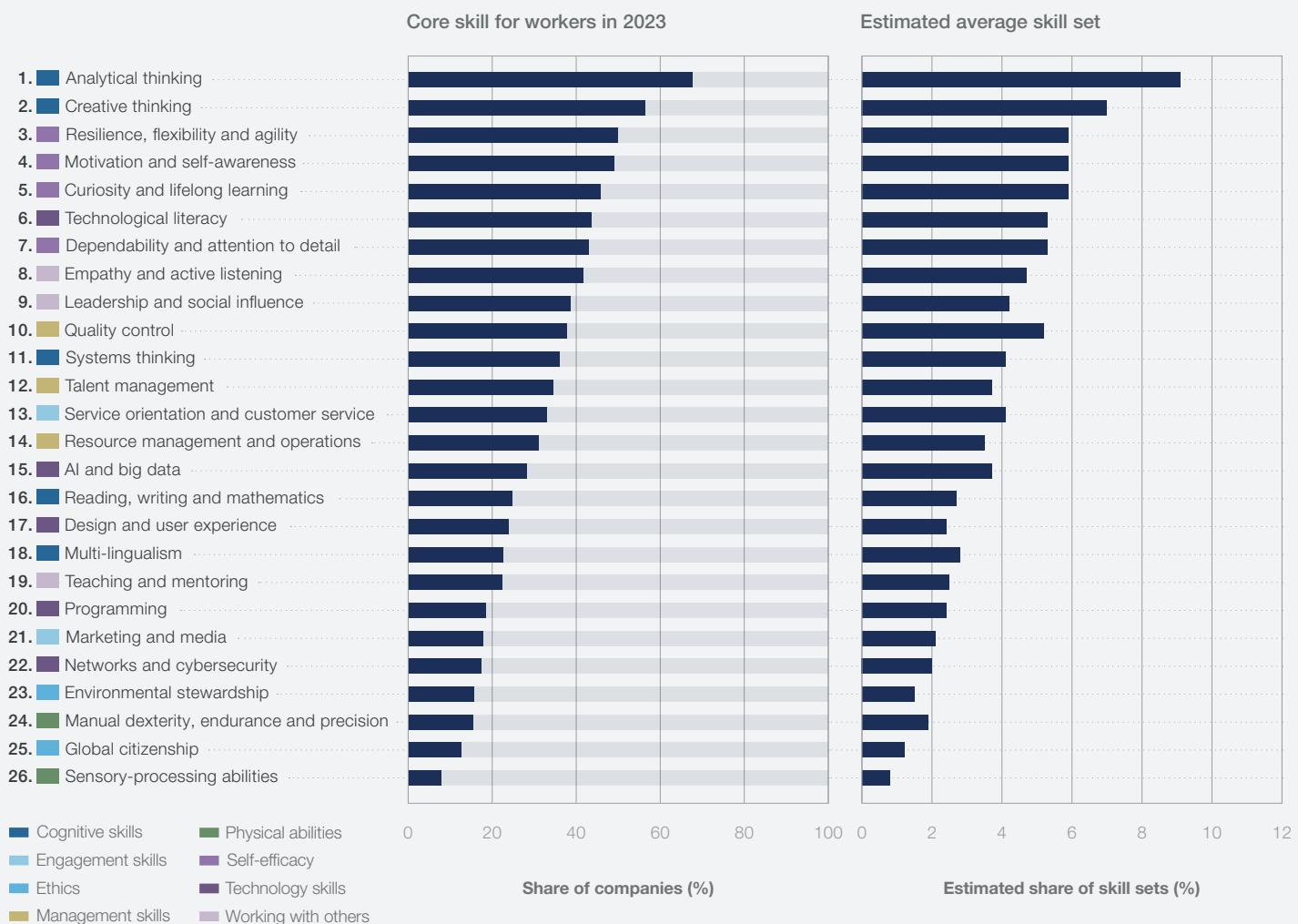
The core skills top 10 is completed by two attitudes relating to working with others – empathy and active listening and leadership and social influence – and quality control. Constituting 5% of worker skill sets despite ranking tenth, quality control is an example of a skill particularly important to a limited cohort of businesses. Management skills, engagement skills, technology skills, ethics and physical abilities are generally considered to be less important than cognition, self-efficacy, and working with others.

While core skill sets are relatively uniform across sectors, several distinguishing features can be identified. The Media Entertainment and Sports industry values empathy and active listening and dependability and attention to detail at half the

FIGURE 4.2

## Core skills in 2023

Share of organizations surveyed which consider skills to be core skills for their workforce. Estimated average composition of the skill sets of workers in organizations surveyed. Skills are ranked and ordered by the share of organizations surveyed which consider the skill as core to their workforce.



Source

World Economic Forum, Future of Jobs Survey 2023.

Note

The Future of Jobs Survey uses the World Economic Forum's Global Skills Taxonomy.

global rate – trends which are reversed in non-governmental and membership organizations. Agriculture, Forestry and Fishing ranks as an outlier due to the sector's focus on environmental stewardship and its growing outlook for the importance of manual dexterity, endurance and precision and resource management skills. Environmental stewardship skills are also notably important in the Chemical and Advanced Materials industry, alongside leadership and social influence. The Electronics and Education and Training industries are united by an emphasis on the importance of systems thinking to their workers. These trends may be viewed in detail in Appendix C.

Comparisons to previous surveys suggest that creative thinking is increasing in importance relative to analytical thinking as workplace tasks become increasingly automated. In 2018 and 2020, the

number of surveyed companies that considered analytical thinking to be a core skill outnumbered those considering creative thinking to be a core skill by a margin of 35% and 38%, respectively. That gap has now decreased to 21% and may continue to close. As reported in Chapter 2, companies expect the automation of reasoning and decision-making to increase by 9% by 2027.

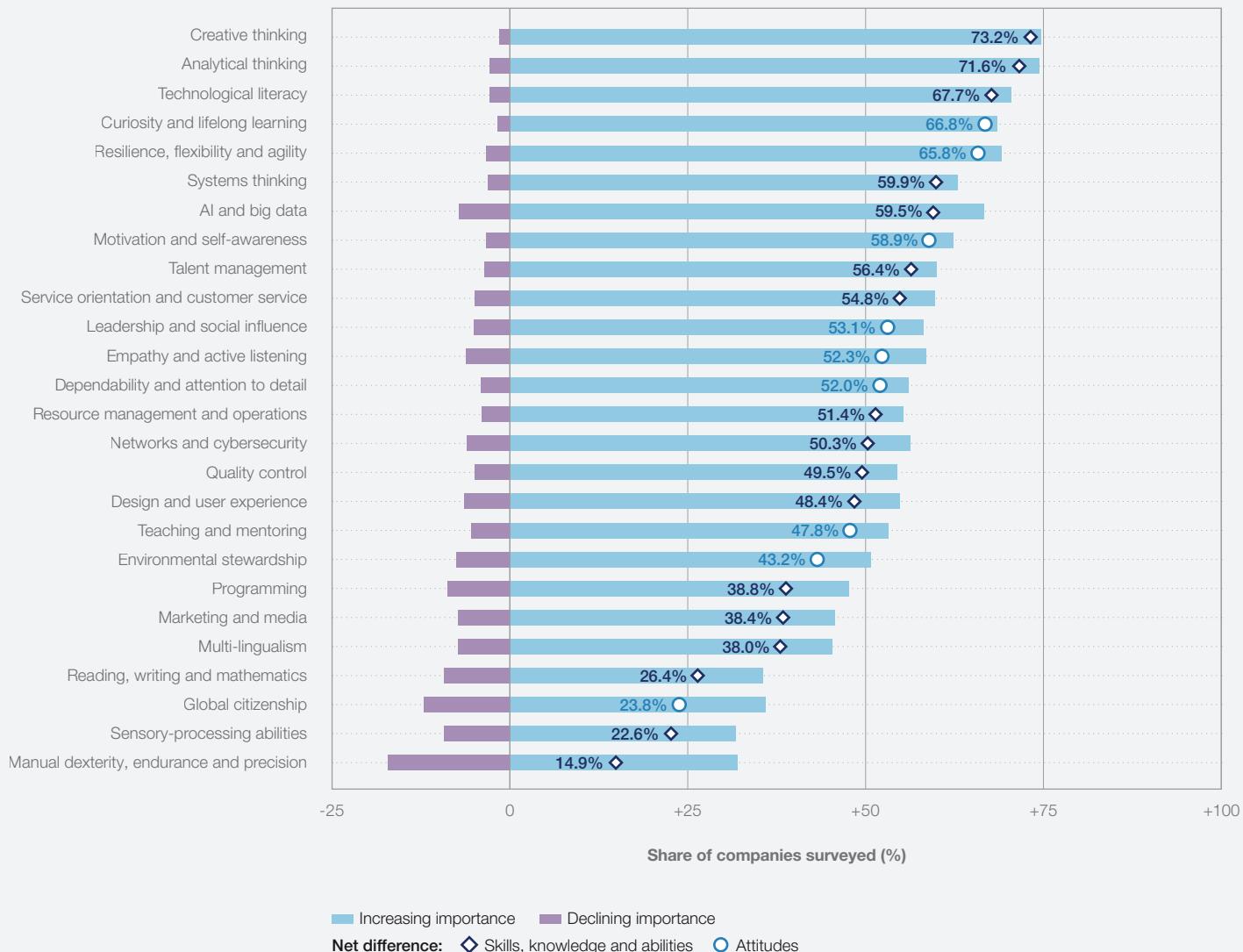
## Skill evolution 2023–2027

Figure 4.3 reports business expectations for the evolution of the importance of skills to their workers in the next five years. Cognitive skills are reported to be growing in importance most quickly, reflecting the increasing importance of complex problem-solving in the workplace. Surveyed businesses report creative

FIGURE 4.3

### Skills on the rise

Share of organizations surveyed which consider skills to be increasing or decreasing in importance, ordered by the net difference.



#### Source

World Economic Forum, Future of Jobs Survey 2023.

#### Note

The Future of Jobs Survey uses the World Economic Forum's Global Skills Taxonomy. The share of companies which consider skills to be of stable importance to their workers is not plotted.

thinking to be growing in importance slightly more rapidly than analytical thinking. Technology literacy is the third-fastest growing core skill.

Among the 2023 core skills identified in Figure 4.2, self-efficacy skills rank above working with others in the rate of increase in importance of skills reported by businesses. The socio-emotional attitudes which businesses consider to be growing in importance most quickly are curiosity and lifelong learning; resilience, flexibility and agility; and motivation and self-awareness – evidence that businesses emphasize the importance of resilient and reflective workers embracing a culture of lifelong learning as the lifecycle of their skills decreases. Systems thinking, AI and big data, talent management, and service orientation and customer service complete the top 10.

While respondents judged no skills to be in net decline, sizable minorities of companies judge reading, writing and mathematics; global citizenship; sensory-processing abilities; and manual dexterity, endurance and precision to be of declining importance for their workers. These four skills are judged to be increasing in importance least quickly by survey respondents.

The declining importance of physical abilities has been a feature of previous Future of Jobs Reports. Ethical skills have been introduced to the report's skills taxonomy for the first time in this edition, with 68% of companies believing that consumers becoming more vocal on social and environmental issues is likely or highly likely to drive transformation within their organization in the next five years (see Chapter 2). Workers will require skills training if companies are to meet the increasing ethical demands placed on them as a result of adopting frontier technologies and adapting to the green transition. Yet, such an emphasis is currently not evident in Future of Jobs Survey data except in a

minority of industries.

Figure 4.4 illustrates industry-specific variations in the evolving importance of skills. Physical abilities, which comprise manual dexterity and precision and sensory processing abilities, are growing in demand most quickly in the Care, Personal Service and Wellbeing; Agriculture, Forestry and Fishing; Mining and Metals; and Advanced Manufacturing industries. The Care and Agriculture sectors also forecast the fastest growth in importance for management skills, which include talent management, resource management and operations, and quality control.

Engagement skills – which comprise marketing and media and service orientation and customer service – are growing in importance most quickly in the Care, Personal Services and Well-being; Accommodation, Food and Leisure; and Media, Entertainment and Sports sectors. Technology skills are increasing in importance in Care, Personal Services and Wellbeing and in two sub-industries within Financial Services: Insurance and Pensions Management and Financial Services and Capital Markets. Increased demand for cognitive skills such as analytical thinking and creative thinking is most evident in the Electronics and Chemical and Advanced Materials industries and in Nongovernmental and Membership Organizations. Socio-emotional attitudes related to self-efficacy, working with others and ethics are increasing in importance most quickly in the Oil and Gas; Care, Personal Services and Wellbeing; and Electronics industries.

Taking into account all industries in the survey, increasing skill demands are particularly evident in Care, Personal Services and Wellbeing, which ranks in the top five of 27 industries across all skill clusters of the Global Skills Taxonomy.

FIGURE 4.4

**Top industries for increasing skill requirements, 2023–2027**

Shares of organizations which consider skills within the corresponding skill category to be growing in importance for their workers from 2023 to 2027, as opposed to having stable or declining importance. The top seven industries out of the 27 studied in this report are selected in each case, and ranked.

**Cognitive skills****Engagement skills****Technology skills****Physical abilities****Management skills****Self-efficacy, working with others and ethics**

## Source

World Economic Forum, Future of Jobs Survey 2023.

## Note

The Future of Jobs Survey uses the World Economic Forum's Global Skills Taxonomy. Industries are categorised according to an optimised 27 sectors based on respondent statistics.

## 4.2 Reskilling and upskilling priorities in the next 5 years

As skills are being disrupted, businesses are designing and scaling up their training programmes. In the 2020 Future of Jobs Report, companies estimated that 42% of workers had completed training that bridged skills gaps. That share receded slightly to 41% in 2023. Given that businesses see skills gaps in the local labour market as the foremost barrier towards achieving industry transformation and investing in learning and training on the job as the most promising workforce strategy for achieving their business goals (see Chapter 5), formulating effective reskilling and upskilling strategies for the next five years is essential for maximizing business performance.

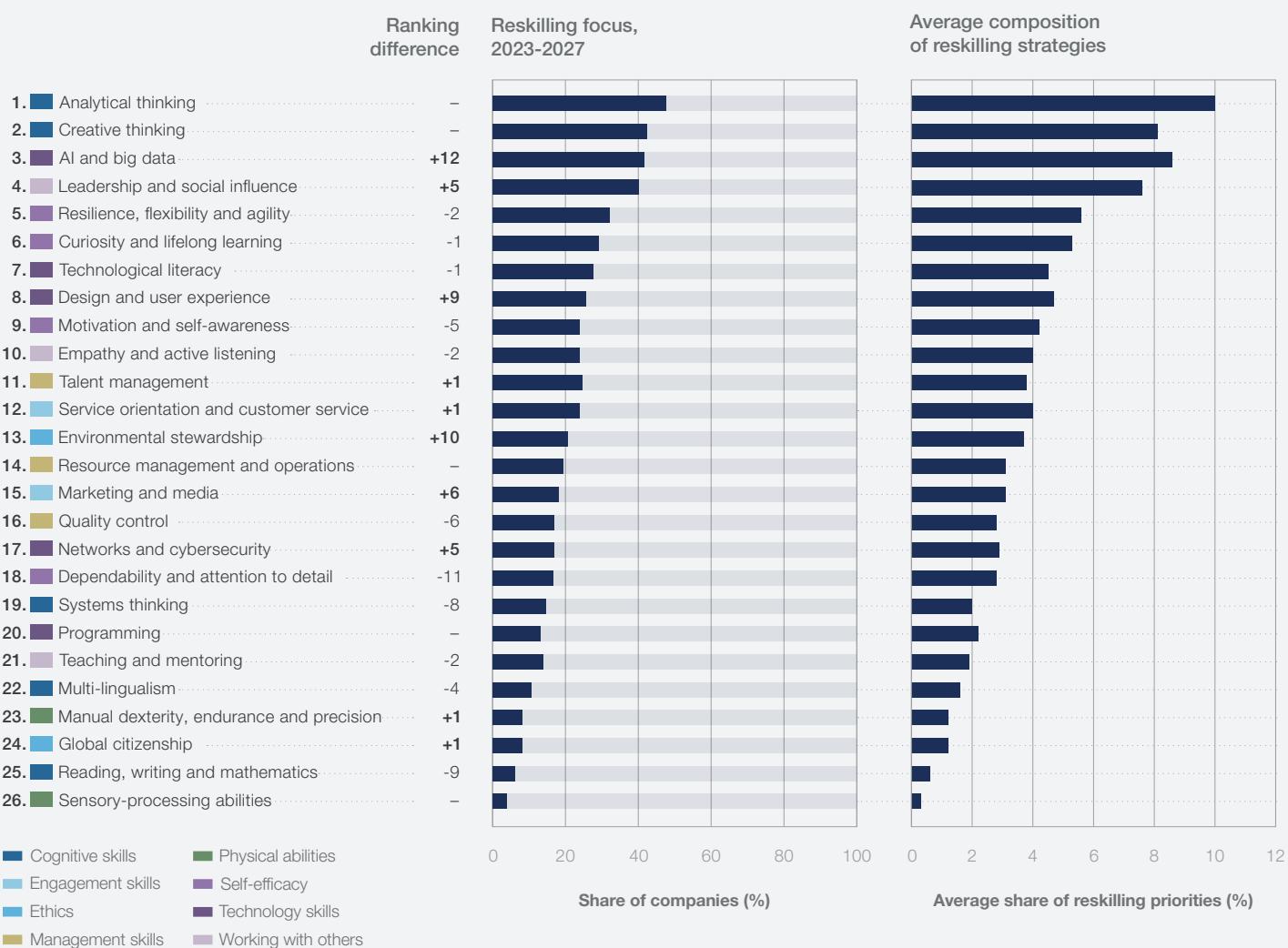
### Upskilling priorities and strategies

Figure 4.5 summarizes the training strategies of companies responding to the Future of Jobs survey. The highest priority for skills training from 2023 to 2027 is analytical thinking, which is set to account for 10% of training initiatives, on average. The second priority for workforce development is to promote creative thinking, which will be the subject of 8% of upskilling initiatives.

FIGURE 4.5

#### Reskilling and upskilling, 2023-2027

Aggregated rankings of reskilling and upskilling priorities reported by surveyed organizations. Ranking differences relative to the ranking of skill importance in 2023, as denoted in Figure 4.2. (Positive ranking differences indicate strategic priorities.) Share of companies which include each skill in their reskilling and upskilling strategies for 2023 to 2027. Average composition of reskilling and upskilling initiatives of surveyed organizations.



Source

World Economic Forum, Future of Jobs Survey 2023.

Note

The Future of Jobs Survey uses the World Economic Forum's Global Skills Taxonomy.

Figure 4.5 presents cross-functional skills ranked by the priority assigned by companies to them within their reskilling and upskilling strategies scheduled for 2023 to 2027, and an estimate of the composition of the average corporate skills strategy. The difference between this reskilling rank and the ranking of skills according to their current importance in Figure 4.4 is also noted. Source: Future of Jobs Survey.

The skills that companies report to be increasing in importance the fastest are not always reflected in corporate upskilling strategies. Beyond these top-ranked cognitive skills are two skills which companies prioritize much more highly than would appear according to their current importance to their workforce: AI and big data as well as leadership and social influence.

Companies rank AI and big data 12 places higher in their skills strategies than in their evaluation of core skills, and report that they will invest an estimated 9% of their reskilling efforts in it – a greater fraction than the more highly-ranked creative thinking, indicating that though it appears in fewer strategies, it tends to be a more important element when it

appears. Leadership and social influence ranks five places higher than suggested by its current importance and is the highest ranked attitude. Other skills which are strategically emphasized by business are design and user experience (nine places higher), environmental stewardship (10 places higher), marketing and media (six places higher) and networks and cybersecurity (five places higher).

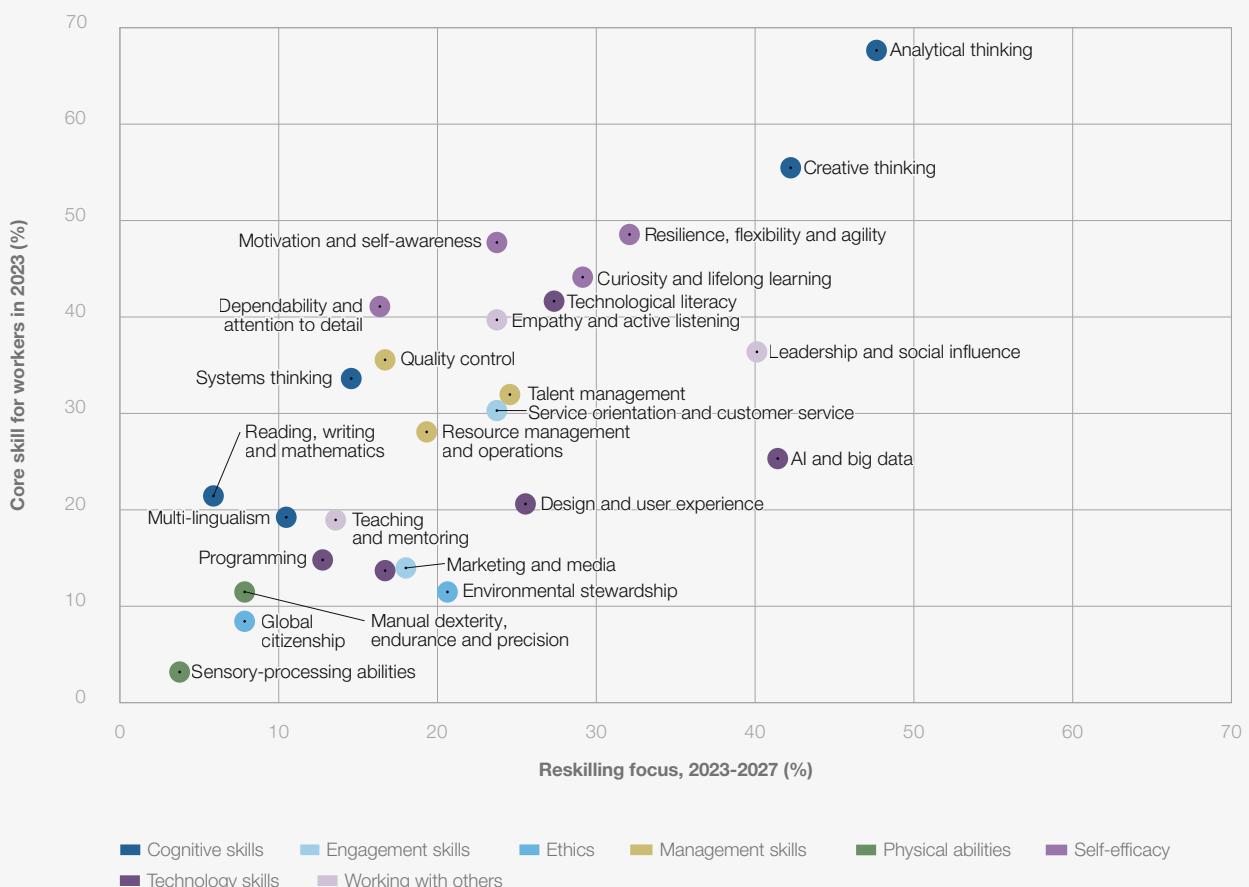
Figure 4.6 illustrates broader trends which will reshape the future of cross-functional workplace skills in the coming five years. Though companies assess self-efficacy skills to have a high importance at present, following recent disruptions, they will be relatively deemphasized in skills strategies from 2023 to 2027. Technology skills will receive greater emphasis in skills strategies relative to their current importance, with particular emphasis on AI and big data.

Box 4.1 presents an analysis, in collaboration with Coursera, of how companies' skills strategies compare to the skills-training choices made by individual workers.

FIGURE 4.6

### The evolving skills landscape, 2023-2027

The probability of an organization surveyed evaluating a skill to be a core skill for its workers in 2023 versus the probability of the skill appearing in its reskilling and upskilling initiative in the next five years



Source

World Economic Forum, Future of Jobs Survey 2023.

Note

The Future of Jobs Survey uses the World Economic Forum's Global Skills Taxonomy.

**BOX 4.1****Training supply-demand mismatch**

In collaboration with Coursera

The third dimension of the reskilling and upskilling landscape – besides the skills needed for work and the training strategies identified by employers – is the range of upskilling and reskilling choices made by individual learners. Research conducted by Coursera for this report suggests that these choices often differ from business priorities.

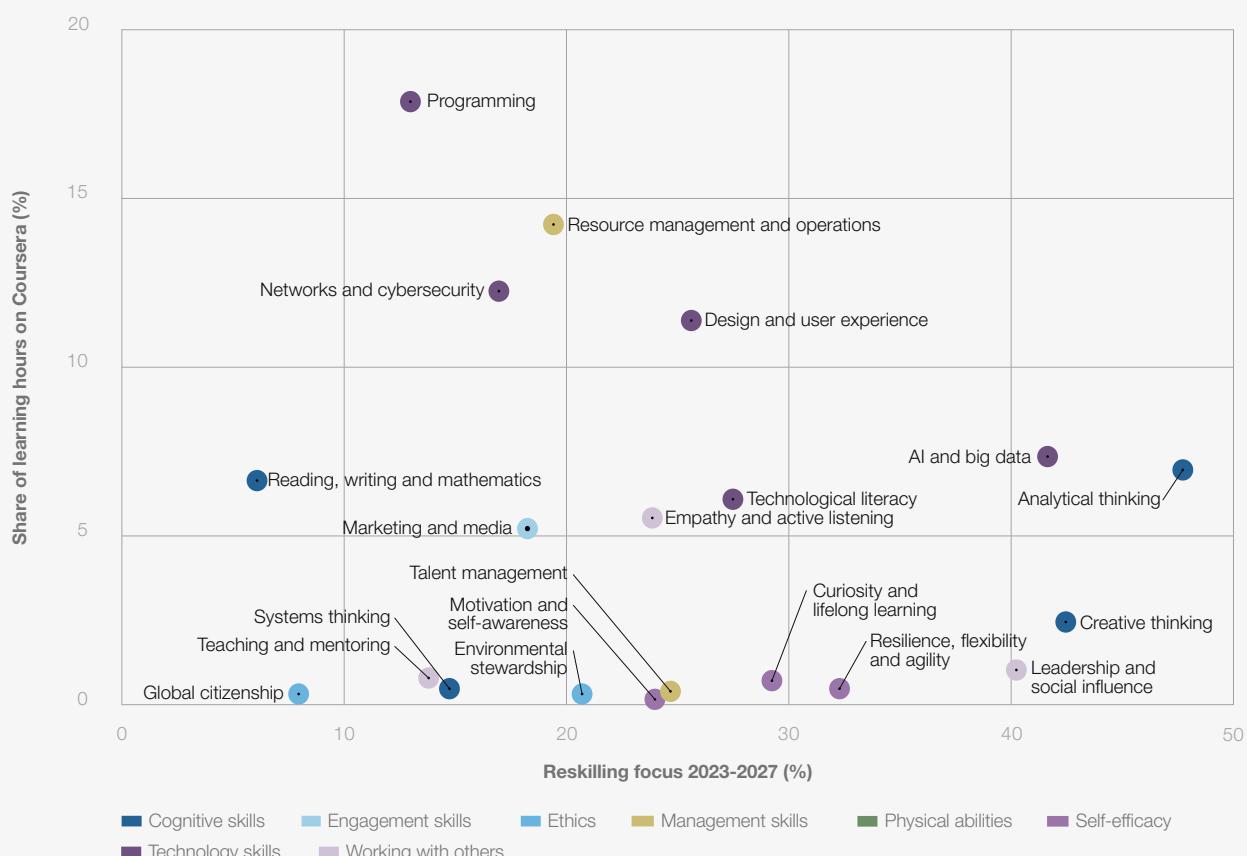
Individual learners on Coursera have mainly focused on building technical skills such as programming, resource management and operations, networks and cybersecurity, and design and user experience (see Figure B4.1). These choices sometimes align with the skills businesses seek, as reported in responses to the Future of Jobs survey – and many of these skills are foundational to achieving higher proficiencies in sought-after skills such as AI and big data and leadership and social influence. Similarly, individual learners are prioritising reading, writing, and mathematics, which, while rarely an explicit corporate focus, are critical foundational skills

for any career. Even so, discrepancies persist, and job-seekers can more effectively use online learning platforms to close skill gaps and meet employer requirements, especially as traditional qualifications become less important.

Historically, individuals on the Coursera platform have prioritised developing technical or “hard” skills associated with lucrative careers in programming and data analytics. Increasingly, however, emerging technologies such as generative AI are reshaping workforce demands, and employers are placing greater emphasis on “soft” skills (see Figure 4.8). These skills allow companies to respond to change and are resistant to automation. Early evidence suggests that the supply side of the market is equalising itself: socio-emotional skills have steadily increased their share of learning hours from 2017 to 2023, except during a brief uptick toward technical skills during global lockdowns in 2020 (see skills profiles p255-284).

**FIGURE B4.1****Supply and demand for skills**

The share of learning hours spent by users on a skill on Coursera's learning platform in 2022 versus the probability of it appearing in its skills strategy for 2023-2027

**Source**

Coursera, Inc.; World Economic Forum, Future of Jobs Survey 2023.

**Note**

Coursera data were mapped to the same subset of the World Economic Forum's Global Skills Taxonomy as was used by the Future of Jobs Survey.

FIGURE B4.2

**Formal education does not affect the time taken to acquire online skill credentials**

Median number of learning hours taken by users to successfully complete credentials on the Coursera online learning platform, as a function of the skill proficiency taught by the course and the learner's level of formal education



## Source

Coursera, Inc.

## Note

Coursera data were mapped to the World Economic Forum's Global Skills Taxonomy.

The public and private sectors must join forces to create the flexible and affordable reskilling pathways displaced workers need to successfully transition at scale into the jobs of the future (see Chapter 3). With a skills-based talent approach, employers can diversify and expand their hiring pipelines for incoming talent while also creating pathways for employee reskilling necessary to adapt to fast-changing workforce requirements and encourage lifelong learning at work.

Encouragingly, Coursera data show no evidence that learners without a degree take longer to achieve beginner, intermediate or advanced

proficiency in any skill in the Global Skills Taxonomy (see Figure B4.2). These findings demonstrate the potential for a skills-based approach to workforce development and talent management to close skills gaps and address labour shortages, especially in light of the disproportionate impact of recent disruptions on the labour-market participation of workers with basic education (see Chapter 1).

This edition of the *Future of Jobs Report* aims to offer granularity on technology skills, particularly the priorities companies assign to training workers to work with AI and big data, as well as attitudes and other socio-emotional factors. The next section addresses AI and big data skills and the final section of this chapter addresses attitudes, such as self-efficacy, working with others and ethics.

## AI and big data

While AI and big data ranks only 15th as a core skill for mass employment today, it is the number three priority in company training strategies from now until 2027, and number one priority for companies with more than 50,000 employees. AI and big data is also the most strongly prioritized skill in the Insurance and Pensions; Management, Media, Entertainment and Sports; Information and Technology Services; Telecommunications; Business Support and Premises Maintenance Services; and Electronics industries.

Among technology skills, the ability to efficiently use AI tools now exceeds computer programming by humans, networks and cybersecurity skills, general

technological literacy skills, and design and user experience by some margin. In the next five years, AI and big data will comprise more than 40% of the technology training programmes undertaken in surveyed companies operating in the United States, China, Brazil and Indonesia. The next most emphasized technology skill is design and user experience, though this receives less than half the strategic prioritization of AI and big data in most countries and industries, and only exceeds it in Spain and Latvia, among the countries covered by this year's survey.

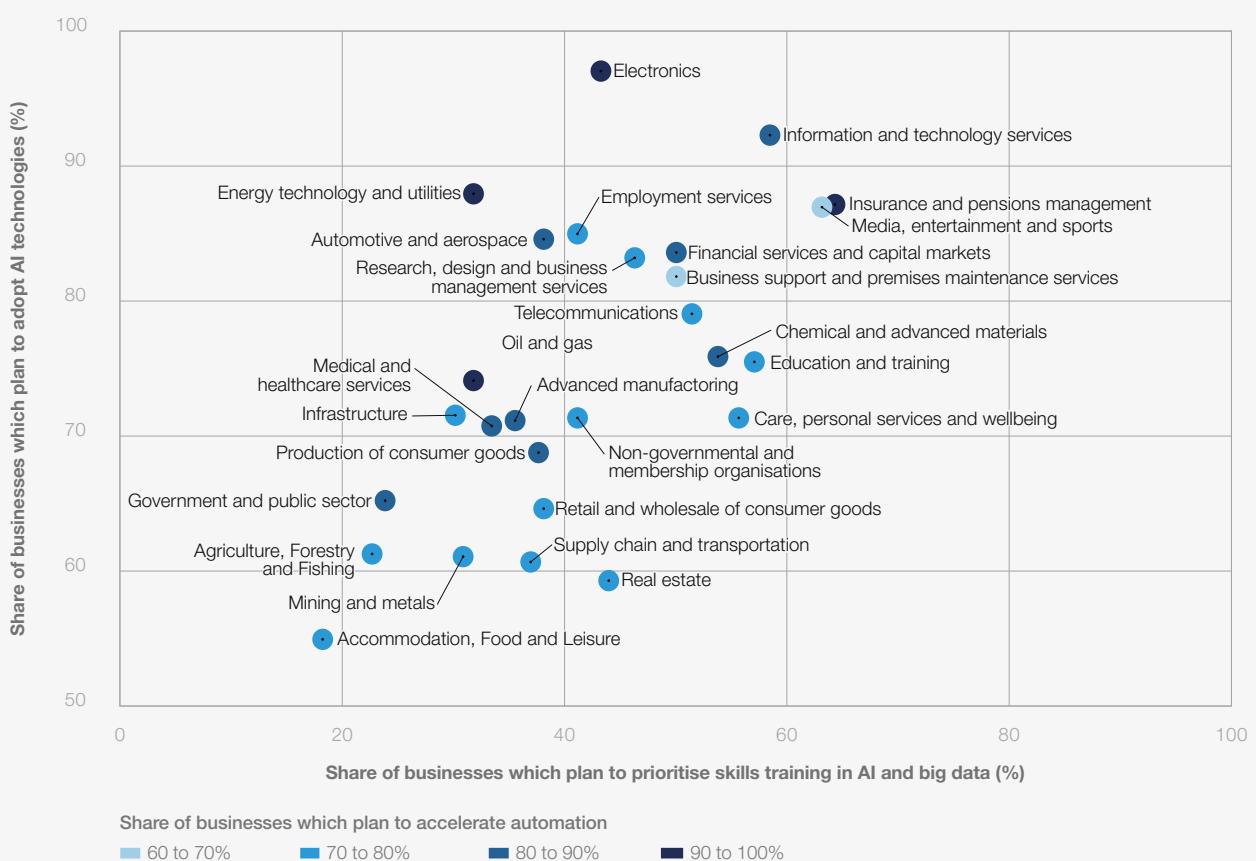
Although a minority of companies believe that AI and big data has been overemphasized as a core skill and will decline in importance to workers, a net 59% of companies predict it will grow in importance, and many companies see it as a strategic priority. Though generative AI has the potential to displace jobs, the focus placed on training workforces to exploit AI and big data indicates the opportunities for new roles which harness its potential to help achieve business goals.

These findings are also reflected elsewhere in the Future of Jobs Survey. Big-data analytics also ranks top by some margin among technologies which are seen as likely to create jobs if they are adopted,

**FIGURE 4.7**

### Artificial intelligence strategies, 2023 to 2027

The probability that organizations surveyed will prioritise skills training in AI and big data versus the probability that they will adopt artificial-intelligence technologies and the likelihood of them pursuing automation as a business strategy



Source

World Economic Forum, Future of Jobs Survey 2023.

with 65% in agreement that they will stimulate labour-market growth and just 7% predicting contraction (see Chapter 2). Specialized roles in AI and big data are estimated to grow by 30-35% (see Chapter 3). Big-data analytics is the third-most likely technology for companies to adopt by 2027, with 80% of companies planning to integrate it more deeply into their operations, and 75% of companies planning to integrate AI techniques such as machine learning and neural networks.

As Figure 4.7 demonstrates, there is widespread increase in prioritizing AI strategies across sectors. However, the need for employees to be trained to exploit and interpret AI and big data is correlated neither with the amount of direct investment in AI foreseen in the next five years, nor with the likelihood that a company will pursue automation as a business strategy.

## Attitudes

Across industries, roughly two-thirds of the skills that companies identify as priorities for workforce development fall within the Skills, Knowledge and Abilities cluster of the Forum's Global Skills Taxonomy, with the remaining third being Attitudes. Socio-emotional skills within the Attitudes cluster are most strongly emphasized by training programmes in the Medical and Healthcare Services; Infrastructure; Production of Consumer Goods; Mining and Metals; and Advanced Manufacturing industries, where they are approaching parity with technical skills and abilities. Skills, knowledge and abilities – so called "hard" skills – are most strongly prioritized in Insurance and Pensions Management as well as digital industries such as Information and Technology Services and Telecommunications, where they are expected to feature in almost three-quarters of training initiatives.

As noted earlier in the chapter, a key strategic priority for businesses from 2023 to 2027 will be leadership and social influence, which ranks far higher in company skills strategies than as a core skill for workers in 2023. Forty percent of surveyed companies report that their strategies will focus on leadership, corresponding to an 8% share of skills strategies on average. Upskilling workers in leadership is reported to be a particular priority in the Automotive and Aerospace as well as Infrastructure industries, where it appears in more than 60% of five-year strategies, and is also the top priority across all skills in both the Supply Chain

and Transportation and Advanced Manufacturing industries.

Figure 4.8 shows broader trends in skills strategies across the full spectrum of Attitudes covered by the Global Skills Taxonomy. Across industries, only Care, Personal Service and Wellbeing; Education and Training; and Medical and Healthcare Services prioritize working with others over the Self-Efficacy skills emphasized elsewhere. These industries are among many to report placing a pronounced emphasis on empathy and active listening as well as leadership and social influence. Respondents report that the remaining skill in the working with others sector of the taxonomy – teaching and mentoring – will receive little focus in training programmes, except in the Education and Training and Production of Consumer Goods industries.

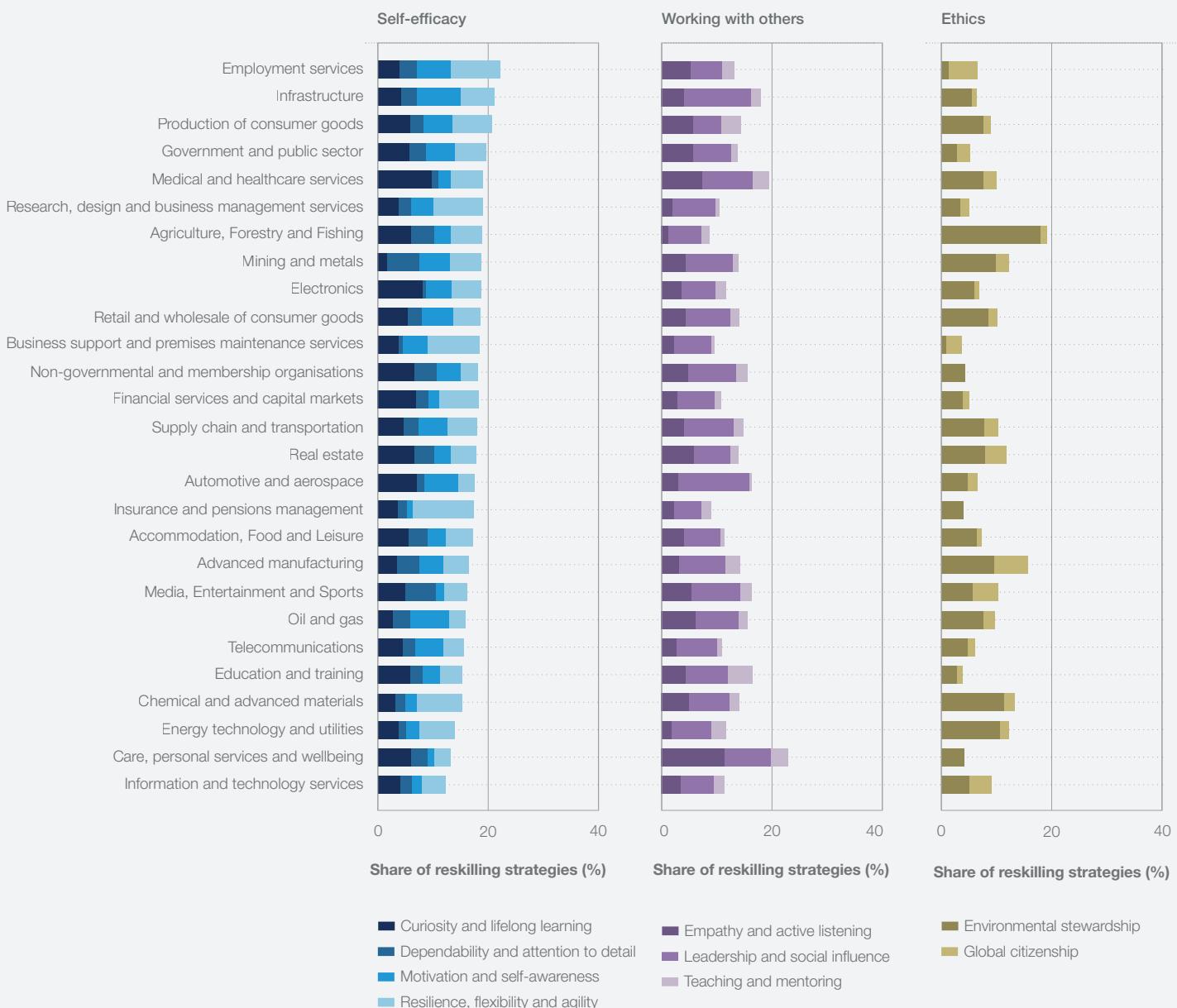
The picture regarding Self-Efficacy skills is more complex. A subset of industries – including Insurance and Pensions Management; Business Support and Premises Maintenance Services; Research, Design and Business Management Services; Employment Services; and Chemical and Advanced Materials will place a marked emphasis on developing their employees' resilience, flexibility and agility. The Medical and Health Services and Electronics industry will emphasize skills development in curiosity and lifelong learning. The Infrastructure industry will focus its self-efficacy skills strategy on motivation and self-awareness. Most industries will place less emphasis on dependability and attention to detail; although Mining and Metals and Media and Entertainment and Sports lead all industries on emphasizing this skill.

Industries vary widely in their commitment to upskilling and reskilling their employees in the cross-functional Ethics skills included in the Global Skills Taxonomy. Upskilling in Attitudes relating to global citizenship is not emphasized, with the strongest commitments in the Advanced Manufacturing and Employment Services industries. Companies operating in Agriculture, Forestry and Fishing; Chemical and Advanced Materials; and Energy Technology and Utilities demonstrate the greatest commitment to upskilling their workers in environmental stewardship. Across industries, environmental stewardship features more strongly in skills strategies than in companies' estimation of its current importance as a core skill, in line with the increasing intensity of green skills of workers and the above-average hiring rate for green jobs, as reported in Chapter 3.

FIGURE 4.8

**Sectoral priorities for "soft" skills**

Stacked percentages showing the mean shares of organizations, reskilling and upskilling skill priorities for 2023 to 2027 which pertain to attitudes. Organizations surveyed assigned the remaining fractions of 100% to skills in the skills, knowledge and abilities branch of the Global Skills Taxonomy.



## Source

World Economic Forum, Future of Jobs Survey 2023.

## Note

The Future of Jobs Survey uses the World Economic Forum's Global Skills Taxonomy.