

Future of Jobs Report 2023 INSIGHT REPORT MAY 2023 Terms of use and disclaimer World Economic Forum 91-93 route de la Capite CH-1223 Cologny/Geneva Switzerland Tel.: +41 (0)22 869 1212 Fax: +41 (0)22 786 2744 E-mail: [contact@weforum.org](mailto:contact@weforum.org) [www.weforum.org](http://www.weforum.org) Copyright © 2020 by the World Economic Forum All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, or otherwise without the prior permission of the World Economic Forum. ISBN-13: 978-2-940631-96-4 <https://www.weforum.org/reports/the-future-of-jobs-report-2023/> Future of Jobs Report 2023 May 2023 The findings, interpretations and conclusions expressed in this work do not necessarily reflect the views of the World Economic Forum. The report presents information and data that were compiled and/or collected by the World Economic Forum (all information and data referred herein as “Data”). Data in this report is subject to change without notice. The terms country and nation as used in this report do not in all cases refer to a territorial entity that is a state as understood by international law and practice. The terms cover well-defined, geographically self-contained economic areas that may not be states but for which statistical data are maintained on a separate and independent basis. Although the World Economic Forum takes every reasonable step to ensure that the data thus compiled and/or collected is accurately reflected in this report, the World Economic Forum, its agents, officers and employees: (i) provide the data “as is, as available” and without warranty of any kind, either express or implied, including, without limitation, warranties of merchantability, fitness for a particular purpose and non-infringement; (ii) make no representations, express or implied, as to the accuracy of the data contained in this report or its suitability for any particular purpose; (iii) accept no liability for any use of the said data or reliance placed on it, in particular, for any interpretation, decisions, or actions based on the data in this report. Other parties may have ownership interests in some of the data contained in this report. The World Economic Forum in no way represents or warrants that it owns or controls all rights in all data, and the World Economic Forum will not be liable to users for any claims brought against users by third parties in connection with their use of any data. The World Economic Forum, its agents, officers and employees do not endorse or in any respect warrant any third-party products or services by virtue of any data, material or content referred to or included in this report. Users shall not infringe upon the integrity of the data and in particular shall refrain from any act of alteration of the data that intentionally affects its nature or accuracy. If the data is materially transformed by the user, this must be stated explicitly along with the required source citation. For data compiled by parties other than the World Economic Forum, users must refer to these parties’ terms of use, in particular concerning the attribution, distribution, and reproduction of the data. When data for which the World Economic Forum is the source (herein “World Economic Forum”), is distributed or reproduced, it must appear accurately and be attributed to the World Economic Forum. This source attribution requirement is attached to any use of data, whether obtained directly from the World Economic Forum or from a user. Users who make World Economic Forum data available to other users through any type of distribution or download environment agree to make reasonable efforts to communicate and promote compliance by their end users with these terms. Users who intend to sell World Economic Forum data as part of a database or as a stand-alone product must first obtain the permission from the World Economic Forum ( [CNES@weforum.org](mailto:CNES@weforum.org) ). Future of Jobs Report 2023 2 Contents © 2023 World Economic Forum. All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, including photocopying and recording, or by any information storage and retrieval system. Disclaimer This document is published by the World Economic Forum as a contribution to a project, insight area or interaction. The findings, interpretations and conclusions expressed herein are a result of a collaborative process facilitated and endorsed by the World Economic Forum but whose results do not necessarily represent the views of the World Economic Forum, nor the entirety of its

Members, Partners or other stakeholders. Preface Key findings 1 Introduction: the global labour market landscape in 2023 2 Drivers of labour market transformation 2.1 Expected impact of macrotrends on industry transformation and employment 2.2 Expected impact of technology adoption on industry transformation and employment 3 Jobs outlook 4 Skills outlook 4.1 Expected disruptions to skills 4.2 Reskilling and upskilling priorities in the next 5 years 5 Workforce strategies 5.1 Barriers to transformation and workforce strategies 5.2 Talent availability and retention 5.3 Talent development Conclusion Appendix A: Analysis methodology Appendix B: Sectoral lens on macrotrends and technology Appendix C: Sectoral lens on skills User guide Economy Profiles Industry Profiles Region Profiles Skill Profiles Contributors Endnotes 4 5 8 20 20 24 28 37 37 42 49 49 53 57 61 62 75 79 82 93 183 237 256 287 294 Future of Jobs Report 2023 May 2023 Future of Jobs Report 2023

3 Preface Since its first edition in 2016, the World Economic Forum's bi-annual Future of Jobs Report has tracked the labour-market impact of the Fourth Industrial Revolution, identifying the potential scale of occupational disruption and growth alongside strategies for empowering job transitions from declining to emerging roles. In 2023, labour-market transformations driven by technological breakthroughs, such as the coming of age of generative artificial intelligence (AI), are being compounded by economic and geopolitical disruptions and growing social and environmental pressures. This fourth edition of the Future of Jobs Report therefore broadens its scope beyond technological change to also consider and address the labour-market impact of a multitude of concurrent trends, including the green and energy transitions, macroeconomic factors, and geo- economic and supply-chain shifts. Similar to previous editions, the core of the 2023 Future of Jobs Report is based on a unique survey- based data set covering the expectations of a wide cross-section of the world's largest employers related to job trends and directions for the 2023– 2027 period. This year's report brings together the perspectives of 803 companies – collectively employing more than 11.3 million workers – across 27 industry clusters and 45 economies from all world regions. This report would not be possible without their openness to contributing their views and insights, and we sincerely thank them all. We greatly appreciate, too, the support of our network of Partner Institutes, which have enhanced the report's geographical coverage, and our ongoing data collaborations with Coursera, Indeed and LinkedIn, which complemented the survey findings with a range of unique and innovative data-driven insights. Our thanks also to the project team: Till Leopold, Elselot Hasselaar, Mark Rayner, Sam Grayling, Ricky Li and Attilio Di Battista, as well as the wider team at the Centre for the New Economy and Society for their input. After widespread instability in the last three years across the world of work, we hope the outlook provided in this report will contribute to an ambitious multistakeholder agenda to better prepare workers, businesses, governments, educators and civil society for the disruptions and opportunities to come, and empower them to navigate these social, environmental and technological transitions. The time is ripe for business leaders and policy-makers to decisively shape these transformations and ensure that future investments translate into better jobs and opportunities for all. Saadia Zahidi Managing Director, World Economic Forum Future of Jobs Report 2023 May 2023 Future of Jobs Report 2023

4 Economic, health and geopolitical trends have created divergent outcomes for labour markets globally in 2023. While tight labour markets are prevalent in high-income countries, low- and lower-middle-income countries continue to see higher unemployment than before the COVID-19 pandemic. On an individual level, labour-market outcomes are also diverging, as workers with only basic education and women face lower employment levels. At the same time, real wages are declining as a result of an ongoing cost-of-living crisis, and changing worker expectations and concerns about the quality of work are becoming more prominent issues globally. The fourth edition of the Survey has the widest coverage thus far by topic, geography and sector. The Future of Jobs Survey brings together the perspective of 803 companies – collectively employing more than 11.3 million workers – across 27 industry clusters and 45 economies from

all world regions. The Survey covers questions of macrotrends and technology trends, their impact on jobs, their impact on skills, and the workforce transformation strategies businesses plan to use, across the 2023-2027 timeframe. Technology adoption will remain a key driver of business transformation in the next five years. Over 85% of organizations surveyed identify increased adoption of new and frontier technologies and broadening digital access as the trends most likely to drive transformation in their organization. Broader application of Environmental, Social and Governance (ESG) standards within their organizations will also have a significant impact. The next most-impactful trends are macroeconomic: the rising cost of living and slow economic growth. The impact of investments to drive the green transition was judged to be the sixth-most impactful macrotrend, followed by supply shortages and consumer expectations around social and environmental issues. Though still expected to drive the transformation of almost half of companies in the next five years, the ongoing impact of the COVID-19 pandemic, increased geopolitical divisions and demographic dividends in developing and emerging economies were ranked lower as drivers of business evolution by respondents. The largest job creation and destruction effects come from environmental, technology and economic trends. Among the macrotrends listed, businesses predict the strongest net job-creation effect to be driven by investments that facilitate the green transition of businesses, the broader application of ESG standards and supply chains becoming more localized, albeit with job growth offset by partial job displacement in each case. Climate change adaptation and the demographic dividend in developing and emerging economies also rate high as net job creators. Technological advancement through increased adoption of new and frontier technologies and increased digital access are expected to drive job growth in more than half of surveyed companies, offset by expected job displacement in one-fifth of companies. The net job creation effect places these two trends in 6th and 8th place respectively. The three key drivers of expected net job destruction are slower economic growth, supply shortages and the rising cost of inputs, and the rising cost of living for consumers. Employers also recognize that increased geopolitical divisions and the ongoing impact of the COVID-19 pandemic will drive labour- market disruption – with an even split between employers who expect these trends to have a positive impact and employers who expect them to have a negative impact on jobs. Within technology adoption, big data, cloud computing and AI feature highly on likelihood of adoption. More than 75% of companies are looking to adopt these technologies in the next five years. The data also shows the impact of the digitalization of commerce and trade. Digital platforms and apps are the technologies most likely to be adopted by the organizations surveyed, with 86% of companies expecting to incorporate them into their operations in the next five years. E-commerce and digital trade are expected to be adopted by 75% of businesses. The second-ranked technology encompasses education and workforce technologies, with 81% of companies looking to adopt these technologies by 2027. The adoption of robots, power storage technology and distributed ledger technologies rank lower on the list. The impact of most technologies on jobs is expected to be a net positive over the next five years. Big data analytics, climate change Key findings Future of Jobs Report 2023 May 2023 Future of Jobs Report 2023 5 and environmental management technologies, and encryption and cybersecurity are expected to be the biggest drivers of job growth. Agriculture technologies, digital platforms and apps, e-commerce and digital trade, and AI are all expected to result in significant labour- market disruption, with substantial proportions of companies forecasting job displacement in their organizations, offset by job growth elsewhere to result in a net positive. All but two technologies are expected to be net job creators in the next five years: humanoid robots and non-humanoid robots. Employers anticipate a structural labour market churn of 23% of jobs in the next five years. This can be interpreted as an aggregate measure of disruption, constituting a mixture of emerging jobs added and declining jobs eliminated. Respondents to this year's Future of Jobs Survey expect a higher-than-average churn in the Supply Chain and

Transportation and Media, Entertainment and Sports industries, and lower-than-average churn in Manufacturing as well as Retail and Wholesale of Consumer Goods. Of the 673 million jobs reflected in the dataset in this report, respondents expect structural job growth of 69 million jobs and a decline of 83 million jobs. This corresponds to a net decrease of 14 million jobs, or 2% of current employment. The human-machine frontier has shifted, with businesses introducing automation into their operations at a slower pace than previously anticipated. Organizations today estimate that 34% of all business-related tasks are performed by machines, with the remaining 66% performed by humans. This represents a negligible 1% increase in the level of automation that was estimated by respondents to the 2020 edition of the Future of Jobs Survey. This pace of automation contradicts expectations from 2020 survey respondents that almost half (47%) of business tasks would be automated in the following five years. Today, respondents have revised down their expectations for future automation to predict that 42% of business tasks will be automated by 2027. Task automation in 2027 is expected to vary from 35% of reasoning and decision-making to 65% of information and data processing. But while expectations of the displacement of physical and manual work by machines has decreased, reasoning, communicating and coordinating – all traits with a comparative advantage for humans – are expected to be more automatable in the future. Artificial intelligence, a key driver of potential algorithmic displacement, is expected to be adopted by nearly 75% of surveyed companies and is expected to lead to high churn – with 50% of organizations expecting it to create job growth and 25% expecting it to create job losses. The combination of macrotrends and technology adoption will drive specific areas of job growth and decline: –The fastest-growing roles relative to their size today are driven by technology, digitalization and sustainability. The majority of the fastest growing roles are technology- related roles. AI and Machine Learning Specialists top the list of fast-growing jobs, followed by Sustainability Specialists, Business Intelligence Analysts and Information Security Analysts. Renewable Energy Engineers, and Solar Energy Installation and System Engineers are relatively fast-growing roles, as economies shift towards renewable energy. –The fastest-declining roles relative to their size today are driven by technology and digitalization. The majority of fastest declining roles are clerical or secretarial roles, with Bank Tellers and Related Clerks, Postal Service Clerks, Cashiers and Ticket Clerks, and Data Entry Clerks expected to decline fastest. –Large-scale job growth is expected in education, agriculture and digital commerce and trade. Jobs in the Education industry are expected to grow by about 10%, leading to 3 million additional jobs for Vocational Education Teachers and University and Higher education Teachers. Jobs for agricultural professionals, especially Agricultural Equipment Operators, are expected to see an increase of around 30%, leading to an additional 3 million jobs. Growth is forecast in approximately 4 million digitally- enabled roles, such as E-Commerce Specialists, Digital Transformation Specialists, and Digital Marketing and Strategy Specialists. –The largest losses are expected in administrative roles and in traditional security, factory and commerce roles. Surveyed organizations predict 26 million fewer jobs by 2027 in Record-Keeping and Administrative roles, including Cashiers and Ticket Clerks; Data Entry, Accounting, Bookkeeping and Payroll Clerks; and Administrative and Executive Secretaries, driven mainly by digitalization and automation. –Analytical thinking and creative thinking remain the most important skills for workers in 2023. Analytical thinking is considered a core skill by more companies than any other skill and constitutes, on average, 9% of the core skills reported by companies. Creative thinking, another cognitive skill, 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. Dependability and attention to detail, ranks sixth, 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 – as well as quality control. Future of Jobs Report 2023 6Employers

estimate that 44% of workers' skills will be disrupted 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 thinking to be growing in importance slightly more rapidly than analytical thinking. Technology literacy is the third-fastest growing core skill. 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. Systems thinking, AI and big data, talent management, and service orientation and customer service complete the top 10 growing skills. 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. Six in 10 workers will require training before 2027, but only half of workers are seen to have access to adequate training opportunities today. The highest priority for skills training from 2023-2027 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. Training workers to utilize AI and big data ranks third among company skills-training priorities in the next five years and will be prioritized by 42% of surveyed companies. Employers also plan to focus on developing worker's skills in leadership and social influence (40% of companies); resilience, flexibility and agility (32%); and curiosity and lifelong learning (30%). Two-thirds of companies expect to see a return on investment on skills training within a year of the investment, whether in the form of enhanced cross-role mobility, increased worker satisfaction or enhanced worker productivity. The skills that companies report to be increasing in importance the fastest are not always reflected in corporate upskilling strategies. Beyond the 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 proportion than the more highly-ranked creative thinking, indicating that though AI and big data is part of fewer strategies, it tends to be a more important element when it is included. 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). Respondents express confidence in developing their existing workforce, however, they are less optimistic regarding the outlook for talent availability in the next five years. Accordingly, organizations identify skills gaps and an inability to attract talent as the key barriers preventing industry transformation. In response 48% of companies identify improving talent progression and promotion processes as a key business practice that can increase the availability of talent to their organization, ahead of offering higher wages (36%) and offering effective reskilling and upskilling (34%). Surveyed companies report that investing in learning and on-the-job training and automating processes are the most common workforce strategies which will be adopted to deliver their organizations' business goals. Four in five respondents expect to implement these strategies in the next five years. Workforce development is most commonly considered to be the responsibility of workers and managers, with 27% of training expected to be furnished by on-the-job training and coaching, ahead of the 23% by internal training departments and the 16% by employer-sponsored apprenticeships. To close skills gaps, respondents expect to reject external training solutions in favour of company-led initiatives. A majority of companies will prioritize women (79%), youth

under 25 (68%) and those with disabilities (51%) as part of their DEI programmes. A minority will prioritize those from a disadvantaged religious, ethnic or racial background (39%), workers over age 55 (36%), those who identify as LGBTQI+ (35%) and those from a low-income background (33%). Forty-five percent of businesses see funding for skills training as an effective intervention available to governments seeking to connect talent to employment. Funding for skills training ranks ahead of flexibility on hiring and firing practices (33%), tax and other incentives for companies to improve wages (33%), improvements to school systems (31%) and changes to immigration laws on foreign talent (28%).

**Future of Jobs Report 2023**

**Introduction: the global labour market landscape in 2023**

The past three years have been shaped by a challenging combination of health, economic and geopolitical volatility combined with growing social and environmental pressures. These accelerating transformations have and continue to reconfigure the world's labour markets and shape the demand for jobs and skills of tomorrow, driving divergent economic trajectories within and across countries, in developing and developed economies alike. The Fourth Industrial Revolution, changing worker and consumer expectations, and the urgent need for a green and energy transition are also reconfiguring the sectoral composition of the workforce and stimulating demand for new occupations and skills. Global supply chains must also quickly adapt to the challenges of increasing geopolitical volatility, economic uncertainty, rising inflation and increasing commodity prices. Like previous editions, The Future of Jobs Report 2023 offers insights into these transformations and unpacks how businesses are expecting to navigate these labour-market changes from 2023 to 2027, leveraging a unique cross-sectoral and global survey of Chief Human Resources, Chief Learning Officers and Chief Executive Officers of leading global employers and their peers. This report is structured as follows: Chapter 1 reviews the global labour-market landscape at the beginning of 2023. Chapter 2 explores how key macrorends are expected to transform this landscape over the 2023–2027 period. Chapters 3 and 4 then discuss the resulting global outlooks for jobs and skills over the 2023–2027 period. Chapter 5 reviews emerging workforce and talent strategies in response to these trends. The report's appendices provide an overview of the report's survey methodology and detailed sectoral breakdowns of the five-year outlook for macrorends, technology adoption and skills. In addition, The Future of Jobs Report 2023 features a comprehensive set of Economy, Industry, and – for the first time – Skill Profiles. User Guides are provided for each of these profiles, to support their use as practical, standalone tools.

As a foundation for analysing respondents' expectations of the future of jobs and skills in the next five years, this chapter now assesses the current state of the global labour-market at the beginning of 2023.

**Diverging labour-market outcomes between low-, middle- and high-income countries**

The intertwined economic and geopolitical crises of the past three years created an uncertain and divergent outlook for labour markets, widening disparities between developed and emerging economies and among workers. Even as a growing number of economies have begun to recover from the COVID-19 pandemic and its associated lockdowns, low- and lower-middle-income countries continue to face elevated unemployment, while high-income countries are generally experiencing tight labour markets. At the time of publication, the latest unemployment rates stand below pre-pandemic rates in three quarters of OECD countries,<sup>1</sup> and across a majority of G20 economies (Figure 1.1). At 4.9%, the 2022 unemployment rate across the OECD area is at its lowest level since 2001.<sup>2</sup> By contrast, many developing economies have experienced a comparatively slow labour-market recovery from the disruptions induced by the COVID-19 pandemic. In South Africa, for example, the formal unemployment rate has climbed to 30%, five percentage points higher than it was pre-pandemic (Figure 1.1). Developing economies, especially those reliant on the sectors hardest hit by recurring lockdowns, such as hospitality and tourism, still exhibit slow labour-market recoveries. The asymmetry of the recovery is exacerbated by countries' varying capacities to maintain policy measures to protect the most vulnerable and maintain employment

levels. While advanced economies were able to adopt far-reaching Future of Jobs Report 2023 May 2023 Future of Jobs Report 2023

8Unemployment rate (%)South Africa 0 20 30 10 Q1 Q1 Q1 Q1 Q1 2022 2020 2019 2018 2021 Italy Q1 Q1 Q1 Q1 Q1 2022 2020 2019 2018 2021 Brazil Q1 Q1 Q1 Q1 Q1 2022 2020 2019 2018 2021 France 0 20 30 10 Q1 Q1 Q1 Q1 Q1 2022 2020 2019 2018 2021 Argentina Q1 Q1 Q1 Q1 Q1 2022 2020 2019 2018 2021 Türkiye Q1 Q1 Q1 Q1 Q1 2022 2020 2019 2018 2021 Canada 0 20 30 10 Q1 Q1 Q1 Q1 Q1 2022 2020 2019 2018 2021 Saudi Arabia Q1 Q1 Q1 Q1 Q1 2022 2020 2019 2018 2021 United States of America Q1 Q1 Q1 Q1 Q1 2022 2020 2019 2018 2021 India 0 20 30 10 Q1 Q1 Q1 Q1 Q1 2022 2020 2019 2018 2021 Australia Q1 Q1 Q1 Q1 Q1 2022 2020 2019 2018 2021 Republic of Korea Q1 Q1 Q1 Q1 Q1 2022 2020 2019 2018 2021 Sub-Saharan AfricaEast Asia and the Pacific Central Asia Middle East and North AfricaEurope South Asia North AmericaLatin America and the CaribbeanUnemployment rate across G20 countries FIGURE 1.1 Quarterly unemployment rate, 2018Q1–2022Q4 Future of Jobs Report 2023 9Unemployment rate (%)Mexico 0 20 30 10 Q1 Q1 Q1 Q1 Q1 2022 2020 2019 2018 2021 Japan Q1 Q1 Q1 Q1 Q1 2022 2020 2019 2018 2021 Germany Q1 Q1 Q1 Q1 Q1 2022 2020 2019 2018 2021 United Kingdom 0 20 30 10 Q1 Q1 Q1 Q1 Q1 2022 2020 2019 2018 2021 Indonesia Q1 Q1 Q1 Q1 Q1 2022 2020 2019 2018 2021 Sub-Saharan AfricaEast Asia and the Pacific Central Asia Middle East and North AfricaEurope South Asia North AmericaLatin America and the Caribbean Source International Labour Organisation, ILOSTAT .Unemployment rate across G20 countries FIGURE 1.1 Quarterly unemployment rate, 2018Q1–2022Q4 measures, emerging economies have provided less support to the most vulnerable firms and workers due to their limited fiscal space.<sup>3,4</sup> In 2022, various employment indicators pointed towards a strong labour-market recovery for high- income countries, with many sectors experiencing labour shortages. In Europe, for example, almost three in 10 manufacturing and service firms reported production constraints in the second quarter of 2022 due to a lack of workers.<sup>5</sup> Nursing professionals, plumbers and pipefitters, software developers, systems analysts, welders and flame cutters, bricklayers and related workers, and heavy truck and lorry drivers were among the most needed professions (Figure 1.2). In the United States, businesses in Retail and Wholesale of Consumer Goods reported close to 70% of job openings remaining unfilled, with close to 55% of roles unfilled in manufacturing and 45% in leisure and hospitality.<sup>6</sup> Businesses also reported difficulties in retaining workers. According to a global survey conducted in late 2022 across 44 countries, one in five employees reported they intend to switch employers in the coming year.<sup>7</sup> Future of Jobs Report 2023 10Number of economies0 75 100 125 150 175 50 25Most common labour shortages by occupations in 2022 in Europe FIGURE 1.2 Source Labour shortages report 2022, European Labour Authority.Note Job grouping is based on the Level-2, Sub-Major job category in the International Standard Classification of Occupations (ISCO) Taxonomy.Health ProfessionalsMetal, Machinery and Related Trades WorkersBuilding and Related Trades Workers (excluding Electricians) Drivers and Mobile Plant Operators Teaching ProfessionalsInformation and Communications Technology Professionals Science and Engineering Associate Professionals Personal Services WorkersFood Processing, Woodworking, Garment and Other Craft and Related Trades Workers Labourers in Mining, Construction, Manufacturing and Transport Science and Engineering Professionals Personal Care Workers Cleaners and Helpers Stationary Plant and Machine OperatorsLegal, Social and Cultural Professionals Sales Workers Legal, Social, Cultural and Related Associate Professionals Food Preparation AssistantsBricklayers and Related Workers Metal Working Machine Tool Setters and OperatorsSheet Metal WorkersMotor Vehicle Mechanics and Repairers Nursing ProfessionalsSpecialist Medical Practitioners Physiotherapists Software DevelopersApplications ProgrammersSystems Analysts Heavy Truck and Lorry DriversEarthmoving and Related Plant Operators Butchers, Fishmongers and Related Food Preparers Early Childhood EducatorsPrimary School Teachers Building and Related Electricians Electrical Engineering Technicians Cooks

Writers Building Construction Labourers Civil Engineers Mechanical Engineers Health Care Assistants Cleaners and Helpers in Offices, Hotels and Other Establishments Psychologists Food and Related Products Machine Operators Contact Centre Salespersons Chefs Kitchen Helpers Carpenters and Joiners Plumbers and Pipe Fitters Concrete Placers, Concrete Finishers and Related Workers Electrical and Electronics Trades Workers

Number of economies in Europe reporting labour shortages for top occupations, grouped by job families

Future of Jobs Report 2023

11 Diverging employment levels by gender, age and education level

Women experienced greater employment loss than men during the pandemic<sup>8</sup>, and according to the World Economic Forum's Global Gender Gap Report 2022<sup>9</sup>, gender parity in the labour force stands at 62.9% – the lowest level registered since the index was first compiled. The global pandemic also disproportionately impacted young workers, with less than half of the global youth employment deficit projected to have recovered by the end of 2022.<sup>10</sup> As highlighted in Figure 1.3, the youth employment deficit relative to 2019 is largest in Southern Asia, Latin America, Northern Africa and Eastern Europe, with only Europe and North America likely to have fully recovered at the time of publication. Workers with a basic education were also hardest hit in 2020, and slower to recover their prior

Change (%) Positive Change Negative

	2020	2021	2022
Eastern Asia	-20	-15	-10
South-Eastern Asia and the Pacific	20	20	21
Southern Asia	20	20	21
Central and Western Asia	20	20	21
Arab States	20	20	21
Eastern Europe	20	20	21
Northern, Southern and Western Europe	20	20	21
Northern Africa	20	20	21
Sub-Saharan Africa	20	20	21
Northern America	20	20	21
Latin America and the Caribbean	-20	-15	-10

0 5 -5 -20 -15 -10 0 5 -5 -20 -15 -10 0 5 -5 -20 -15 -10 0 5 -5

Youth employment deficit relative to 2019, by sub-region

FIGURE 1.3 Source Global Employment Trends for Youth 2022: Investing in transforming futures for young people, ILO calculations based on ILOSTAT, ILO modelled estimates, November 2021.

Note The employment deficit shows the difference in employment in each year due to the EPR being below the 2019 level. Data are estimates up to 2021, and projections for 2022. "Youth" refers to ages 15-24.

Future of Jobs Report 2023

12 Change in unemployment (%) -4 +2 +4 +6 +8 0 -2

Change in unemployment, by economy and education level, 2019-2021

FIGURE 1.4 Source International Labour Organization, ILOSTAT

Change in unemployment rate among workers with basic education

Change in unemployment rate among workers with advanced education

Change of unemployment rate is higher among workers with basic education

Change of unemployment rate is higher among workers with advanced education

United States of America Austria Sweden South Africa Saudi Arabia Colombia Canada Finland Brazil Czech Republic Belgium Romania Hong Kong SAR, China Israel Switzerland Pakistan Spain Viet Nam Mexico India Thailand Republic of Korea Netherlands Indonesia Latvia Serbia Italy Australia Germany Poland Argentina France Türkiye Lithuania

participation in the labour market. In many countries the increase in unemployment from 2019 to 2021 of workers with a basic education level was more than twice as large as the impact on workers with advanced education (Figure 1.4).

Access to social protection

From January 2020 to January 2022, almost 3,900 social-protection measures were implemented across 223 economies to support the labour force impacted by COVID-19.<sup>11</sup> These measures are estimated to have reached close to 1.2 billion people globally. Wage subsidies, cash transfers, training measures and extending unemployment- benefit coverage have all been crucial tools to protect the most vulnerable during the pandemic. Most such short-term support measures are now being phased out,<sup>12</sup> and targeted medium to long- term investments will be needed to alleviate the long-term effects of recurring economic shocks on firms and workers. Yet, there remains an urgent need to provide adequate social protection to those not covered by full-time employment contracts (Figure 1.5).

Future of Jobs Report 2023

13 Nearly 2 billion workers globally are in informal employment, representing close to 70% of workers in developing and low-income countries, as well as 18% in high income ones.<sup>13</sup> Given their susceptibility to economic shocks and working poverty, informal workers



represent a crucial labour- market cohort and need better representation in data, broad-based income support in the short term and a longer term shift towards formalization. Real wages and cost of living According to the International Labour Organization (ILO), labour income in many developing countries remains below pre-pandemic levels.<sup>14</sup> In 2020, the global economy started experiencing inflation levels not seen in almost 40 years.<sup>15</sup> With high inflation, the global cost-of-living crisis has hit the most vulnerable hardest.<sup>16</sup> According to the ILO, for the first time over the last 15 years, workers' real wages have declined – by 0.9% in the first half of 2022.<sup>17</sup> Across regions, real wage growth was most affected in Northern, Southern and Western Europe; Latin America; Asia Pacific; and North America.<sup>18</sup> In Africa, real wages saw a 10.5% drop in 2020 due to the global pandemic.<sup>19</sup> However, real wages have continued to increase in 2022 across Asia Pacific, Central and Western Asia and Arab states.<sup>20</sup> In line with rising inflation, purchasing power has declined for the most vulnerable, given the higher weight of energy and food in expenditures of the lowest-income households.<sup>21</sup> According to recent research by the United Nations Development Programme (UNDP), rising food and energy prices could push up to 71 million people into poverty, with hot spots in Sub-Saharan Africa, the Balkans and the Caspian Basin.<sup>22</sup> This cost-of-living crisis highlights the importance of designing permanent models of social protection for non-standard employment and the informal economy that provide security and support resilience.<sup>23</sup>

Share of informal employment as a % of total employment (2019-2021 average)% share of population covered by social protection (2018 or latest data available)

Country	Share of informal employment as a % of total employment (2019-2021 average)	% share of population covered by social protection (2018 or latest data available)
Angola	40	60
Albania	60	100
Argentina	0	0
Armenia	20	40
Bulgaria	60	100
Bosnia and Herzegovina	80	100
Bolivia (Plurinational State of)	100	100
Brazil	0	0
Botswana	0	0
Colombia	0	0
Costa Rica	0	0
Dominican Republic	0	0
Ecuador	0	0
Egypt	0	0
Georgia	0	0
Guatemala	0	0
Guyana	0	0
Indonesia	0	0
India	0	0
Iraq	0	0
Jamaica	0	0
Jordan	0	0
Kyrgyzstan	0	0
Kiribati	0	0
Lebanon	0	0
Saint Lucia	0	0
Sri Lanka	0	0
Republic of Moldova	0	0
Maldives	0	0
Mexico	0	0
Marshall Islands	0	0
North Macedonia	0	0
Mali	0	0
Myanmar	0	0
Mongolia	0	0
Pakistan	0	0
Peru	0	0
Paraguay	0	0
Palestinian Territories	0	0
Senegal	0	0
El Salvador	0	0
Serbia	0	0
Timor-Leste	0	0
Türkiye	0	0
Uganda	0	0
Viet Nam	0	0
Vanuatu	0	0
South Africa	0	0
Zambia	0	0

Informal employment and social protection coverage in developing countries

FIGURE 1.5 Source International Labour Organization, ILOSTAT .Note Developing countries are countries classified as Upper Middle Income, Lower Middle Income or Low Income Countries by World Bank. For more information about the country classification, please refer to <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups>.

Sub-Saharan Africa East Asia and the Pacific Central Asia Middle East and North Africa Europe South Asia North America Latin America and the Caribbean

Future of Jobs Report 2023

14 Worker preferences In this context of diverging labour-market outcomes, issues around the quality of work have come to the fore. This section reviews some of the latest worker preference research to analyse which job attributes are of most importance to workers currently. As a starting point, data shows workers, openness to changing employer. Data on worker preferences from CultureAmp<sup>24</sup> and Adecco<sup>25</sup> find that more than a quarter (33% and 27% of workers, respectively) do not see themselves at their current company of employment in two years' time. In line with this, a little under half of workers (42% and 45%, according to CultureAmp and Adecco, respectively) actively explore opportunities at different companies. Worker surveys at both CultureAmp<sup>26</sup> and Randstad<sup>27</sup> suggest that salary levels are the main reason workers decide to change their job. 52% of Randstad respondents say they worry about the impact of economic uncertainty on their employment and 61% of respondents to Adecco's worker-preference survey worry that their salary is not high enough to keep pace with the cost of living given rising rates of inflation.<sup>28</sup> Additional data explores the protection and flexibility of employment: 92% of respondents to Randstad's employee survey<sup>29</sup> say job security is important and more than half of these respondents wouldn't accept a job that didn't give assurances regarding job security. 83% prioritize flexible hours and 71% prioritize flexible locations. A fourth theme identified by workers is work- life balance and burnout: 35% of CultureAmp respondents indicate that work-life balance and burnout would be the primary reason to

leave their employer. Workers responding to Randstad's employee survey<sup>30</sup> value salary and work-life balance equally, with a 94% share identifying both aspects of employment as important to choosing to work in a particular role. Data also suggests that diversity, equity and inclusion (DEI) at work is particularly important to young workers. According to Manpower,<sup>31</sup> 68% of Gen Z workers are not satisfied with their organization's progress in creating a diverse and inclusive work environment, and 56% of Gen Z workers would not accept a role without diverse leadership. Meanwhile, data suggests that fewer women than men are trained. Lastly, workers across age ranges indicate dissatisfaction about training opportunities. Manpower data<sup>32</sup> show that 57% of surveyed employees are pursuing training outside of work, because company training programmes do not teach them relevant skills, advance their career development or help them stay competitive in the labour market. Respondents to Adecco's survey criticize companies for focusing their efforts too much on managers' development, skills and rewards. Only 36% of non-managers who responded to Adecco's survey said that their company is investing effectively in developing their skills, compared to 64% of managers.

**Employment shifts across sectors** The past two years have witnessed a volatility in the demand and supply of goods and services resulting from lockdowns and supply-chain disruptions. The global economic rebound has reconfigured the sectoral distribution of employment across industries. Figure 6 presents OECD data demonstrating that, while Information Technology and Digital Communications experienced a strong rebound in most countries, the Accommodation, Food and Leisure; Manufacturing and Consumer; and Wholesale and Consumer Goods sectors are experiencing a slower rate of recovery. Since the first quarter of 2019, a majority of countries have experienced employment growth in Professional Services, Education and Training, Health and Healthcare, and Government and Public Sector, but employment in the Supply Chain and Transportation and Media, Entertainment and Sports sectors lags behind 2019 levels. In addition to the pandemic-induced employment shifts we have seen across sectors during the last few years, generative AI models are likely to continue shaping sectoral shifts in employment. While AI applications are shown to be effective general-purpose technologies,<sup>33</sup> the development of general-purpose technologies have previously been hard to predict, which is why regulation needs to be both prompt and adaptable as institutions learn how these technologies can be used. Through research conducted for the Future of Jobs Report, LinkedIn has identified the fastest growing roles globally over the past four years, shedding further light on the types of jobs employers have been seeking (Box 1.1). The transformations that labour markets are experiencing have also increased the need for swifter and more efficient job reallocation mechanisms within and across different firms and sectors. The coming years represent a generational opportunity for businesses and policy-makers to embrace a future of work which fosters economic inclusion and opportunity, sets in place policies which will influence not only the rate of growth but its direction, and contribute to shaping more inclusive, sustainable and resilient economies and societies.

**Future of Jobs Report 2023**

**15Change in employment (Thousands of jobs)**

	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q
Germany	-1,800	+600															
Greece	-80																
Ireland	-60	0	+60														
Colombia	-1,300	0	+100														
Czech Republic	-240	0	+60														
France	-250	0	+350														
Austria	-110	0	+30														
Belgium	-160	0	+60														
Brazil	-6,000	0	+500	0	+51	-53	+20	-5,407	-1,201	-1,020	+209	-90					

**Change in employment by sector in selected countries (2019-2021)**

**FIGURE 1.6** Negative Positive

a. Accommodation, Food and Leisure  
b. Manufacturing  
c. Retail and Wholesale of Consumer Goods  
d. Media, Entertainment and Sports  
e. Care, Personal Services and Wellbeing  
f. Agriculture and Natural Resources  
g. Supply Chain and Transportation  
h. Infrastructure  
i. Non-governmental and Membership Organisations  
j. Energy and Materials  
k. Real Estate  
l. Financial Services  
m. Professional Services  
n. Education and training  
o. Health and Healthcare  
p. Government and

Public Sector q. Information Technology and Digital Communications Future of Jobs Report 2023 16a b c d e f g h i j k l m n o p q Portugal -300 +50 a b c d e f g h i j k l m n o p q Spain -600 0 +200 a b c d e f g h i j k l m n o p q Sweden -160 0 +60 a b c d e f g h i j k l m n o p q Republic of Korea -700 0 +400 a b c d e f g h i j k l m n o p q Mexico -700 0 +300 a b c d e f g h i j k l m n o p q Poland -250 0 +200 a b c d e f g h i j k l m n o p q Israel -100 0 +30 a b c d e f g h i j k l m n o p q Italy -900 0 +100 a b c d e f g h i j k l m n o p q Japan -1,400 0 +600 0 Change in employment (Thousands of jobs) -10 -805 -90 +150 +142 +187 -99 -6 -55 Change in employment by sector in selected countries (2019-2021) FIGURE 1.6 a. Accommodation, Food and Leisure b. Manufacturing c. Retail and Wholesale of Consumer Goods d. Media, Entertainment and Sports e. Care, Personal Services and Wellbeing f. Agriculture and Natural Resources g. Supply Chain and Transportation h. Infrastructure i. Non-governmental and Membership Organisations j. Energy and Materials k. Real Estate l. Financial Services m. Professional Services n. Education and training o. Health and Healthcare p. Government and Public Sector q. Information Technology and Digital Communications Negative Positive Future of Jobs Report 2023 17 The fastest-growing jobs support sales growth and customer engagement, the search for talent, and technology/IT BOX 1.1 Research conducted by LinkedIn for the Future of Jobs Report 2023 describes the 100 roles that have grown fastest, consistently and globally, over the last four years – known as the “Jobs on the Rise”. While ILO and OECD data show which sectors are employing more people, Jobs on the Rise data identifies the specific job types that have experienced significant growth. Figure B.1 organizes the 100 Jobs on the Rise into broad types. In line with ILO and OECD data on the growth of roles in the Information Technology and Digital Communication sector, Technology and IT related roles make up 16 of the top 100 Jobs on the Rise, the third-highest of all job groupings. Jobs related to Sales Growth and Customer Engagement top the list, with 22 of the 100 roles. With roles such as Sales Development Representatives, Director of Growth, and Customer Success Engineer featuring in this group, this may suggest an increasing focus on broadening customer groups and growth models in a world with increasing digital access and rapid technological advancement (more detail on how increasing digital access and adoption of frontier technologies could transform demand for specific job types is available in Chapter 3). Human Resources and Talent Acquisition roles are the second-most popular roles, and most of these relate to Talent Acquisition and Recruitment, including a specific role for Information Technology Recruitment – perhaps illustrating the increasing difficulty and importance of accessing talent in a generally strong labour market. Of the groups further down the list, Sustainability and Environment related roles are notable for all being in the top 40, including three of the top 10 roles (Figure B.2). This might suggest the green transition is both a significant and developing labour-market trend, where roles have titles such as “Sustainability Analyst”. Chapter 3 further examines the outlook for roles related to a green transition. Sales Growth and Customer Engagement Human Resources and Talent Acquisitions Technology and IT Marketing and Communications Partnerships and Alliances Cyber Security Sustainability and Environment Security Insights and Analytics Other Legal and Finance Top 20 20 - 40 40 - 60 60 - 80 80 - 100 5 0 Number of jobs in the top 100 fastest growing 10 15 20 25 LinkedIn jobs on the rise, 2018-2022 FIGURE B1.1 Source LinkedIn. Growing roles by job type In collaboration with LinkedIn Future of Jobs Report 2023 18 Annual average % growth 0 +50 +60 +20 +30 +40 +10 Source LinkedIn. Fastest growing job postings on LinkedIn 2018-2022 FIGURE B1.2 Talent Acquisition Associate Sustainability Analyst Sales Development Representative Customer Success Analyst Sustainability Specialist Customer Success Associate Growth Marketing Manager Talent Acquisition Partner Sustainability Manager Workplace Coordinator 1. 2. 3. 4. 5. 6. 7. 8. 9. 10. +53% +45% +45% +43% +42% +42% +42% +41% +40% +39% Future of Jobs Report 2023 19 Drivers of labour market transformation 2 The green transition, technological change, supply-chain transformations and changing consumer expectations are all generating demand for new jobs across industries and regions. However,

these positive drivers are offset by growing geoeconomic tensions and a cost-of-living crisis.<sup>34</sup> The Future of Jobs Survey was conducted in late 2022 and early 2023 bringing together the perspective of 803 companies – collectively employing more than 11.3 million workers – across 27 industry clusters and 45 economies from all world regions. The Survey covers questions of macrotrends and technology trends, their impact on jobs, their impact on skills, and the workforce transformation strategies businesses plan to use. This chapter analyses findings from the World Economic Forum's Future of Jobs Survey to explore how businesses expect macrotrends and technology adoption to drive industry transformation and employment. Results from the survey provide a picture of how businesses expect several macrotrends to impact their operations. Trends ranging from technology adoption to macroeconomic and geopolitical outlook, the green transition, demographics and consumer preferences are expected to drive industry transformation in the next five years. As illustrated in Figure 2.1, businesses identify increased adoption of new and frontier technologies and broadening digital access as the trends which are most likely to drive transformation in their organization, these are expected to drive trends in over 85% of the organizations surveyed. Broader application of Environmental, Social and Governance (ESG) standards within their organizations will also have a significant impact. The next most-impactful trends are macroeconomic: the rising cost of living and slow economic growth. The impact of investments to drive the green transition was judged to be the sixth-most impactful macrotrend. Supply shortages and consumer expectations around social and environmental issues follow next. Though still expected to drive the transformation of almost half of companies in the next five years, the ongoing impact of the COVID-19 pandemic, increased geopolitical divisions and demographic dividends in developing and emerging economies were placed lower as drivers of business evolution by respondents. Employers also forecast the expected impact of these macrotrends on employment within their organizations. Figure 2.2 suggests that employers expect most of the disruptions to have a net positive effect on employment, with most macrotrends expected to drive net job growth. Among the macrotrends listed, businesses predict the strongest net job-creation effect to be driven by investments that facilitate the green transition of businesses, the broader application of ESG standards and supply chains becoming more localized, albeit with job growth offset by partial job displacement in each case. Climate change adaptation and the demographic dividend in developing and emerging economies also rate high as net job creators. Technological advancement through increased adoption of new and frontier technologies and increased digital access – the two macrotrends judged by businesses to be most impactful on their organization in the next five years – are also expected to drive job growth in more than half of surveyed companies. However, this is offset by expected job displacement in one-fifth of companies, with the remaining respondents expecting the impact on employment to be roughly neutral. The net job creation effect places these Expected impact of macrotrends on business transformation and employment

2.1 Future of Jobs Report 2023 May 2023 Future of Jobs Report 2023 20