McKinsey Global Institute

The future of work in Europe

Automation, workforce transitions, and the shifting geography of employment

Discussion paper
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Preface

This discussion paper focuses on longer-term trends affecting employment in more than 1,000 local and regional labor markets across Europe at a time when automation adoption is gathering pace. The research was mostly conducted before COVID-19 sparked a twin global health and economic crisis. It is too early to tell how the crisis will evolve, but decisions that government and business leaders make today in response to COVID-19 will need to factor in the longer-term trends that we identify here. The crisis could accelerate some of the trends that we identify and it could slow down others. The trends we identify include the differential speeds to automation adoption across Europe's regional labor markets; the growing divergence between the most dynamic cities and shrinking regions across the continent; a decline in labor supply that could create a shortage of workers, particularly in growing sectors and regions; and major shifts in the types of skills and specific occupations that will thrive or be put at risk.

This paper is the latest in our ongoing body of research into the potential effects of automation technologies. This work began with *A future that works: Automation, employment, and productivity*, in which we analyzed the automation potential of every occupation by looking at the extent to which its constituent activities can be handled by currently demonstrated technologies. In *Jobs lost, jobs gained: Workforce transitions in a time of automation*, we examined the potential for both job displacement and job growth to assess the potential net impact in multiple countries, as well as the implications for occupations, skills, and wages. In addition, we investigated the adaptation of workers and organizations to the rising demand for technological, social, emotional, and higher cognitive skills by 2030 in *Skill shift: Automation and the future of the workforce*. Last year, we published *The future of work in America: People and places, today and tomorrow*, exploring the impact on local economies and demographic groups in the United States. Now we are applying a similar lens and methodology to Europe and expect to publish further research on the impact of the COVID-19 pandemic in due course.

This independent MGI initiative is based on our own research and the insights and experience of our McKinsey colleagues around the world. We benefited from a collaboration with Google, whose input and expertise helped shape our analysis of local labor markets. We are also grateful to LinkedIn for collaborating on the analysis of career pathways. We thank Torsten Schuppe, Andrew Dunckelman, Katerina Havrlant, and Maria Lopes Saraiva from Google as well as Nate Williams and Paul Matsiras from LinkedIn. Our research was also enriched by insights from Hal Varian, Google's chief economist and emeritus professor at the School of Information, the Haas School of Business, and the Department of Economics at the University of California at Berkeley.

The research was led by the co-chairs of the McKinsey Global Institute, James Manyika and Sven Smit, based in San Francisco and Amsterdam, respectively, and Tilman Tacke and Susan Lund, MGI partners based in Munich and Washington, DC, respectively. The research team, led by Lea Thiel, included E. B. Armstrong, Vladana Boljanovic, Sebastian Flegr, Tomasz Mataczynski, Benjamin Meindl, Fábio Neves, Anastasia Shegay, Eva Spannagl, and Neha Verma.

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This paper was edited and produced by MGI editorial director Peter Gumbel and executive editor Lisa Renaud, together with production manager Julie Philpot and designers Elena Yaropolova, Cedric Walder, Marisa Carder, Patrick White, and Laura Brown. Nienke Beuwer, MGI director of external communications, helped disseminate and publicize it. Lauren Meling, MGI digital editor, ensured digital and social media diffusion. We are grateful to Amanda Covington, Deadra Henderson, Miriam Herrmann, Bettina Lanz, Susan Muhlbach, Sarah Portik, and Simone Smeets for personnel and administrative support.

This discussion paper contributes to MGI's mission to help business and policy leaders understand the forces transforming the global economy. As with all MGI research, this research is independent and has not been commissioned or sponsored in any way by any business, government, or other institution. We welcome your comments at MGI@mckinsey.com.

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In brief

The future of work in Europe

The COVID-19 crisis has strongly affected Europe's labor markets, and it may take years for employment to return to its pre-crisis levels. But the pandemic will not be the only trend shaping the future of work on the continent. This research takes an in-depth look at almost 1,100 local economies across the 27 EU countries plus the United Kingdom and Switzerland. We assess how automation and AI may reshape the mix of occupations, the skills required to work, and the transitions workers face. In the aftermath of the pandemic, emerging evidence from companies suggests that technology adoption and other workforce shifts could accelerate. Among our key findings:

Europe is a patchwork of highly varied local labor markets that have seen increasing geographic concentration of employment growth in the past. Forty-eight dynamic cities, including Amsterdam, Copenhagen, London, Madrid, Munich, and Paris, which are home to 20 percent of Europe's population, generated 43 percent of Europe's GDP growth, 35 percent of its net job growth, and 40 percent of its population growth between 2007 and 2018. By contrast, 438 shrinking regions with 30 percent of the population, mostly in Eastern and Southern Europe, have declining workforces, older populations, and lower educational attainment. The remaining half of the population lives in a wide range of economies that have been largely stable, with modest job growth prior to the pandemic.

The COVID-19 crisis ended years of strong employment growth marked by greater mobility. The crisis put up to 59 million European jobs, or 26 percent of the total, at risk in the short term, through reductions in hours or pay, furloughs, and permanent layoffs. This marks a sharp reversal in employment rates, which prior to the crisis had risen in 85 percent of the regions. Mobility had also been rising: while most migration took place within countries, the number of Europeans working in another European country doubled to 16 million from 2003 to 2018, as Eastern European countries joined the EU and Southern Europeans moved north.

Once the economy recovers, Europe may have a shortage of skilled workers, despite a growing wave of automation. A key reason is the declining supply of labor: Europe's working-age population will likely shrink by 13.5 million (or 4 percent) due to aging by 2030. The trend of shorter workweeks could reduce labor supply by an additional 2 percent. Scenarios we have developed for the pace of automation adoption show that 22 percent of current work activities (equivalent to 53 million jobs) could be automated by 2030, assuming a midpoint scenario. A large share of potential job losses (if not all) could be compensated by job growth from sources such as technology, rising incomes, and investments in healthcare. Even a 4 percent decline in the total number of jobs to 2030 would leave a shortage of workers to fill available positions. This is especially true in dynamic growth hubs. Unless the push to work from home that was a consequence of the COVID crisis fundamentally changes urbanization patterns, these 48 cities could capture more than 50 percent of Europe's potential job growth in the next decade, continuing and intensifying the geographic concentration we have seen over the past decade. In that case, they may need to attract workers from other areas to fill more than 2.5 million jobs.

More than half of Europe's workforce will face significant transitions. Automation will require all workers to acquire new skills. About 94 million workers may not need to change occupations but will especially need retraining, as technology handles 20 percent of their current activities. While some workers in declining occupations may be able to find similar types of work, 21 million may need to change occupations by 2030. Most of them lack tertiary education. Newly created jobs will require more sophisticated skills that are already scarce today. Our analysis of job profiles shows that Europeans frequently switch jobs, but they typically move from one growing occupation to another or from one declining occupation to another, with little crossover. However, we also identify promising transitions from declining into in-demand roles. Workers most likely to be displaced by automation are also those most at risk in the COVID-19 pandemic, and the crisis could accelerate some of the displacement. The overlap will be especially pronounced in a number of key sectors, such as wholesale and retail.

Overcoming labor market mismatches in a post-COVID world will be a key challenge, with potentially different solutions for each community. Four broad imperatives stand out: addressing skills shortages; improving access to jobs in dynamic growth hubs, potentially through an increase in remote working; revitalizing and supporting shrinking labor markets (since 40 percent of Europeans will live in regions where jobs are declining over the coming decade); and increasing labor participation. Employers will need to make adept decisions about strategy, skills, and social responsibility; their choices will need to reflect the skills, occupational mix, and geographic footprint of their workforces. Helping individuals connect with new opportunities and prepare for the jobs of tomorrow is a common task for every region across the EU.

The future of work in Europe: Automation, workforce transitions, and the shifting geography of employment

A longer-term perspective on European employment

Before the novel coronavirus pandemic struck in late 2019, more Europeans than ever were working. In 2018, in 27 of the 29 countries in this study (which spans the 27 nations of the European Union, plus the United Kingdom and Switzerland), employment rates reached their highest levels since 2000.[1] Given both the extreme economic disruption and the large-scale human suffering caused by the virus, it is not surprising that discussions of the labor outlook for now are mostly focused on the short to medium term. This discussion paper takes a longer-term view of the future of work in Europe, to 2030. It looks at profound trends that have been under way at a highly localized level; these trends will likely persist after the COVID-19 shock has worn off and may be accelerated by the pandemic. Automation adoption, for example, may be faster as a result and, as we discuss later, our research suggests that a substantial number of the occupations likely to be affected by automation are also at risk from the coronavirus crisis. We also find that automation may not have as significant an effect on the balance of jobs in Europe as is often believed.

For this research, which is similar to our work on local labor markets in the United States, we have combined a variety of data sources and employed economic modeling to create and analyze a unique data set on the present and future of work.[2] It covers economic indicators, demographics, and employment trends in 1,095 local labor markets across Europe, including 285 metropolitan areas.[3]

Our research shows that local labor markets have been on diverging trajectories in employment outcomes. Just 48 vibrant cities, home to only 20 percent of the continent's population, have generated more than one-third of the EU's job and population growth since 2007. These cities—including Amsterdam, Copenhagen, London, Madrid, Munich, and Paris—have become Europe's leading hubs of innovation and talent. Despite their high costs of living, they have been magnets that attract people from other regions that are experiencing low or no job growth. The rapid move to working from home during the crisis may affect this urbanization pattern over the longer term if it is sustained; we are continuing to research the medium- and longer-term effects of the COVID-19 pandemic on labor markets in Europe and globally.

Concurrent with this geographic concentration, we find a second key element that will affect Europe's labor markets in the future as automation is increasingly adopted in the workplace: shrinking labor supply. The working-age population has decreased by 1.4 percent across the EU since 2011. Some regions feel this more acutely as a result of aging and emigration, and these trends are accelerating. In addition, though there is some variation across the continent, the average European workweek has shortened by more than an hour since 2000. Depending

1 This discussion paper contains data and analysis based on research conducted before the United Kingdom's exit from the European Union and the onset of the COVID-19 pandemic. We use the terms "EU" and "Europe" interchangeably, and all references to EU averages, totals, or other statistical parameters throughout this discussion paper include the United Kingdom and Switzerland. The two exceptions to the rising employment trend are Greece, where the eurozone crisis had an exceptionally strong impact, and Denmark, where employment rates have been very high.

2 *The future of work in America: People and places, today and tomorrow*, McKinsey Global Institute, July 2019.

3 For 285 metropolitan regions in Europe, we combined all NUTS 3 regions belonging to the same commuting zone, defined by Eurostat.

on how quickly and robustly labor markets recover from the COVID-19 shock, Europe could find itself confronting the challenge of too few workers (especially highly skilled workers) to fill the jobs available, rather than a shortage of jobs. This is particularly true for dynamic growth hubs.

In any event, new jobs are likely to be distributed unequally across occupations and geographies, potentially exacerbating existing strains in the social contract linking individuals and institutions. Workers will need to add new skills and find their way to these opportunities. Business leaders and policy makers will need to find effective strategies and programs to smooth these transitions and solve the challenge of mismatches.

Local labor markets across Europe before the pandemic experienced a decade of divergence

Reducing regional disparities is one of the longtime core objectives of the European Union. Country-level indicators point to some progress on this front: over the past two decades, GDP per capita converged across countries. Less prosperous economies, especially in Eastern Europe, narrowed the gap with their richer counterparts in Western Europe.[4] The high-level employment story before the pandemic was also a positive one. Total employment rose by almost 10 percent between 2003 and 2018 for the EU as a whole despite little growth in the working-age population during this period and the shock of the 2008 financial crisis, which took several years to wear off.

The increase in employment was driven by rising participation among women and workers over age 55. About 14.6 million of the 21.2 million people who joined the workforce since 2002 were women, often in part-time jobs. In addition, employment rates among individuals ages 55 to 64 increased across almost all EU countries. Their labor force participation rate increased by more than 50 percent from 2002 to 2018. Yet youth employment was on the opposite trajectory. Employment for 15- to 24-year-olds decreased by about 4 percent. This was mainly driven by more time being devoted to education, though also by lack of opportunities and entitlements, as well as sharp declines in Southern Europe during the post-2008 financial crisis years.[5]

Our analysis of Europe's regional labor markets suggests that the future of work has already begun unfolding over the past decade and more. First, the occupational mix shifted.[6] In all regions, the most highly skilled individuals enjoyed the strongest job growth over the last decade, while middle-skill workers had fewer opportunities. Low-skill jobs grew only in dynamic and stable regions—not in the shrinking regions where the supply of low-skill labor is highest. Second, employment growth has been concentrated in a handful of regions. Third, labor mobility before the crisis rose as the geography of employment shifted, reflecting both push and pull factors. In contrast to the United States, labor mobility in the EU has been increasing as workers in the lower-income regions migrate to the dynamic cities to fill jobs. In a post-COVID and post-Brexit world, however, these flows may slow.

European labor markets fit into 13 clusters

To understand the nuanced local dynamics at work and the likely impact of automation in the coming decade, we used a mathematical clustering technique to group 1,095 local labor markets across Europe into 13 clusters (see Box 1, "Data and methodology"). The locations within each cluster share commonalities in the supply and demand of labor as well as other economic characteristics (Exhibits 2 and 3). These 13 clusters broadly fit into three sets, as described below: dynamic growth hubs, stable economies, and shrinking regions.

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4 After the 2008 financial crisis and the subsequent double-dip recession in Europe, convergence continued only in the Eastern European accession countries. In Europe's south, divergence reappeared. See *EU regular economic report: Including institutions: Boosting resilience in Europe*, World Bank, 2019.

5 All statistics from Eurostat annual data, "Employment and activity by sex and age."

6 Christian Odendahl et al., *The Big European sort? The diverging fortunes of Europe's regions*, Centre for European Reform, May 2019; and Sotiria Theodoropoulou, *Benchmarking working Europe 2019*, European Trade Union Institute, April 2019.

Box 1

Data and methodology

Most analyses of Europe's regional labor trends use Eurostat's *Nomenclature des unités territoriales statistiques* (NUTS) 2 classification, which focuses on 281 regions. To gain a more detailed and nuanced perspective, we go deeper and construct a database for NUTS 3 regions, which cover 1,095 local labor markets. Our data set includes more than 115 variables per region pulled from public and private data sources. For variables available only at the NUTS 2 level, we used modeling to disaggregate the data to the more granular NUTS 3 level. Our data set offers a unique, comprehensive view of employment by industry and occupation for each of the 1,095 regions, from 2011 to 2018.

We group these local economies into 13 clusters, using a statistical technique known as K-means clustering. It is based on 15 of the key variables reflecting each location's demographics, growth trends, skill levels, industry mix, business dynamism, innovation capabilities, and other characteristics (Exhibit 1).

To understand the impact of automation and estimate potential future job creation in each location, we adapted MGI's previous models for automation and job growth through 2030 and AI readiness.[1] The result is a localized view of jobs at risk of automation, potential job growth through 2030, and technology diffusion across Europe. While we ran multiple scenarios regarding the pace of automation in Europe, our results in this discussion paper reflect the midpoint adoption scenario—that is, midway between the most rapid and the slowest potential paths.[2] As noted, the COVID pandemic could potentially accelerate automation adoption in Europe, in which case our estimates may be too conservative. In any event, the shifts in occupations and skills that we expect are likely to remain largely similar in trend and direction.

We caution that the findings from our model are not forecasts; they are meant to illustrate how trends may play out over the next decade. We have not attempted to predict any long-term consequences of COVID-19, although we acknowledge that these could affect some of the regional clusters we identify, including those highly dependent on travel and tourism. Note that we considered only automation-related job losses, although other structural shifts, including but not limited to those from the pandemic, could have substantial impact on job growth estimates. Our modeling also does not account for Brexit and any related restrictions on trade and mobility.

To assess what kind of occupational and geographic moves Europeans typically make, we collaborated with LinkedIn's Economic Graph team to analyze aggregate (not personally identifiable) LinkedIn profile and jobs data.[3] We also conducted a survey of more than 7,000 workers spanning eight European countries to better understand the transitions for workers in roles with a limited online presence.[4]

1 See *Jobs lost, jobs gained: Workforce transitions in a time of automation*, McKinsey Global Institute, December 2017; and *Notes from the AI frontier: Modeling the impact of AI on the world economy*, McKinsey Global Institute, September 2018.

2 For a discussion of the assumptions, sensitivities, and limitations of these scenarios, see *A future that works: Automation, employment, and productivity*, McKinsey Global Institute, January 2017.

3 LinkedIn's Economic Graph team is an interdisciplinary group of policy and data science professionals who work with leading research organizations to understand critical economic and social policy issues.

4 We conducted the survey in collaboration with Dalia Research. The survey polled workers in France, Germany, Italy, Poland, Romania, Spain, Sweden, and the United Kingdom.

Exhibit 1

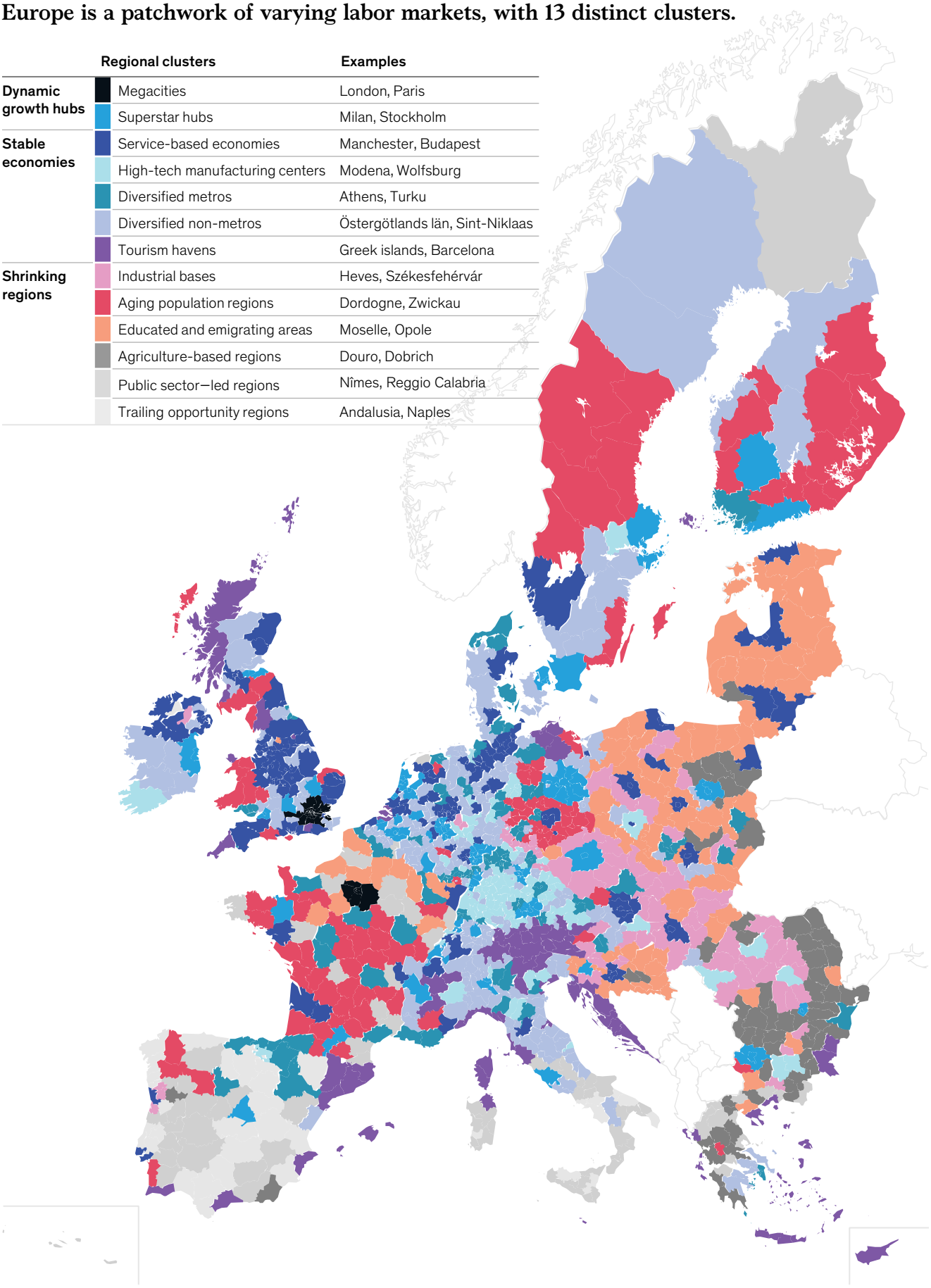
We segment local economies across Europe into clusters based on similarities in labor supply and demand.

1. GVA = gross value added.
Source: McKinsey Global Institute analysis

Exhibit 2

Europe is a patchwork of varying labor markets, with 13 distinct clusters.

	Regional clusters	Examples
Dynamic growth hubs	Megacities	London, Paris
	Superstar hubs	Milan, Stockholm
Stable economies	Service-based economies	Manchester, Budapest
	High-tech manufacturing centers	Modena, Wolfsburg
	Diversified metros	Athens, Turku
	Diversified non-metros	Östergötlands län, Sint-Niklaas
	Tourism havens	Greek islands, Barcelona
Shrinking regions	Industrial bases	Heves, Székesfehérvár
	Aging population regions	Dordogne, Zwickau
	Educated and emigrating areas	Moselle, Opole
	Agriculture-based regions	Douro, Dobrich
	Public sector–led regions	Nîmes, Reggio Calabria
	Trailing opportunity regions	Andalusia, Naples



The boundaries and names shown on maps do not imply official endorsement or acceptance by McKinsey & Company.
Note: Analysis focused on EU-27 countries plus United Kingdom and Switzerland. Analysis of long-term labor market trends and impact of automation was conducted before COVID-19 pandemic.
Source: Eurostat; Oxford Economics; McKinsey Global Institute analysis

Exhibit 3

Each cluster has a distinct economic and labor market profile.

Less economically favorable — More economically favorable

				Economic indicators[1]				Industry mix[1]	Labor market[1]	
		Regions, # (share of EU total, %)	**Population,** millions (share of EU total, %)	GDP per capita, € thousand	Real GDP CAGR, 2013–18	Unemployment rate, %	Net migration rate[2]	Share of employment in high-growth industries, %	Share of population with tertiary education, %	Old-age dependency ratio[3]
Dynamic growth hubs	Megacities	2 (<1)	26 (5)	47.4	2.1	6.2	-0.7	24.4	48.4	21.4
	Superstar hubs	46 (4)	76 (15)	41.4	2.7	5.5	7.0	17.8	40.6	27.2
Stable economies	Service-based economies	102 (9)	89 (17)	29.4	2.1	4.8	4.9	11.7	34.9	30.3
	High-tech manufacturing centers	78 (7)	26 (5)	35.6	3.1	3.8	6.2	7.6	24.7	30.9
	Diversified metros	64 (6)	49 (9)	30.4	1.3	7.4	3.9	9.7	30.1	31.2
	Diversified non-metros	267 (24)	63 (12)	28.1	1.6	5.4	5.4	9.1	27.7	32.1
	Tourism havens	98 (9)	33 (6)	25.2	1.7	10.2	4.1	8	28.2	32.3
Shrinking regions	Industrial bases	72 (7)	26 (5)	18.7	3.3	3.9	-1.1	5.2	20.4	27.9
	Educated and emigrating areas	85 (8)	34 (7)	15.1	1.5	7.5	-4.8	5.7	24.1	26.9
	Agriculture-based regions	58 (5)	17 (3)	10.9	1.9	7.8	-3.5	3	19.2	32.2
	Public sector–led regions	81 (7)	27 (5)	19.0	0.0	15.3	-0.2	6.6	22.1	34.3
	Trailing opportunity regions	35 (3)	36 (5)	20.1	1.4	17.3	-1.1	6.8	25.0	31.0
	Aging population regions	107 (10)	25 (5)	23.1	1.0	6.5	2.0	6.6	29.8	41.6

1. Average values, 2013–18. Some alternative years used as proxies in regions where data were not available.
2. Ratio of population change per year (difference between population sizes on January 1 of two consecutive years) to average population in that year. Value expressed per 1,000 persons. 2018 data.
3. Defined as ratio of population age 65 and older to working-age population (15–64) per 100 persons of working age.

Note: Figures may not sum to 100% because of rounding. Analysis focused on EU-27 countries plus United Kingdom and Switzerland.

Source: Eurostat; Oxford Economics; McKinsey Global Institute analysis

Dynamic growth hubs are home to 20 percent of Europeans

This category includes two clusters with the highest GDP per capita in Europe. They share many characteristics but differ in size and labor supply.

— Megacities. With more than ten million people apiece, London and Paris are Europe's largest metropolises. Each has a young workforce with high educational attainment. Workers are drawn by the concentration of high-growth industries (such as information and communications technology; financial services and insurance; and professional, scientific, and technical services). Both cities are known for strong innovation capabilities and business dynamism.

— Superstar hubs.[7] These 46 cities, which include Amsterdam, Copenhagen, Madrid, and Munich, have been among the fastest-growing regions in Europe. They have had a positive net migration of seven per 1,000 people, the highest among all clusters, and real GDP

7 Our designation of cities as superstar hubs is based on the gross value added and employment in so-called superstar industries. See *Superstars: The dynamics of firms, sectors, and cities leading the global economy*, McKinsey Global Institute, October 2018.

growth of almost 3 percent per year. They also have a large presence of high-growth industries, such as finance and tech.

Stable economies are home to 50 percent of Europeans

These five clusters encompass both urban and nonurban regions. Prior to the pandemic, they had above-average GDP per capita and attracted new residents.

— Service-based economies. These 102 local economies (including Budapest, Lyon, Manchester, and Riga) have a high share of employment in nontechnical services such as wholesale and retail trade. Their workforces have relatively high tertiary education levels. Real GDP growth has been stronger than that of most other clusters.

— High-tech manufacturing centers. More than 70 percent of these 78 regions are in Germany, including Stuttgart and Wolfsburg. Manufacturing is the dominant industry, and these regions produce a large number of high-tech patent applications. They have posted the second-highest real GDP growth of any cluster. Because of a heavy focus on vocational training, they have below-average levels of tertiary education.

— Diversified metros. These 64 cities have a mix of industry and service employment, and they are attracting new residents. They include Bologna in Italy, Freiburg in Germany, Plymouth in the United Kingdom, and Katowice in Poland. Their workforces tend to be well educated, although GDP growth has been modest.

— Diversified non-metros. These 267 non-metropolitan areas and small cities include East Kent in the United Kingdom, Korinthia in Greece, and Mittelburgenland in Austria. They do not have a particular industry focus, but they do attract a positive inflow of workers.

— Tourism havens. These 98 places—including Portugal's Algarve region, the island of Chios in Greece, Cornwall in the United Kingdom, the island of Mallorca in Spain, and the Tiroler Oberland in Austria—have been magnets for visitors. Many are around the Mediterranean and in the Alps. They have a high share of employment in food and accommodation, transportation, and nontechnical services. Barcelona stands out from this cluster with particularly fast job and real GDP growth, along with its workforce skills and innovation capabilities. All of these areas have been hard hit by the measures taken to stem the spread of COVID-19, including lockdowns, travel bans, and—in the initial stages of the virus—the shuttering of bars, restaurants, and hotels across the continent.

Shrinking regions are home to 30 percent of Europeans

In three types of clusters, the working-age population is shrinking because of outmigration, aging, or both. First, clusters mostly concentrated in Eastern Europe are still restructuring out of their formerly centrally planned economies, which continue to be dominated by low-growth sectors.[8] They typically have a mix of industry and agriculture, with relatively high educational attainment, but people are leaving. Second, clusters mostly concentrated in Southern Europe (public sector–led regions and trailing opportunity regions) have still not fully recovered from the recession and have low business dynamism. Third, aging population regions across Europe are shrinking because of demographic changes. Overall, employment in these regions has declined and not recovered since the financial crisis and recession.

— Industrial bases. These 72 manufacturing hubs, three-quarters of which are in Eastern Europe, have enjoyed high real GDP growth. But unlike high-tech manufacturing centers, they produce few high-tech patent applications and have shrinking populations with lower education levels.

[8] Jan Svejnar, "Labor markets in the transitional Central and East European economies," in *Handbook of Labor Economics*, Volume 3, Part B, Orley Ashenfelter and David Card, eds., Amsterdam, Netherlands: Elsevier, 1999, pp. 2809–57.

— Educated and emigrating areas. The working-age population is eroding in these 85 places. They include mostly Eastern European regions such as Gorj in Romania, Maribor in Slovenia, and Opole in Poland.

— Agriculture-based regions. These 58 farming regions are mostly in Eastern Europe. Their labor force has limited education and the second-highest negative net migration rate (after the educated and emigrating cluster).

— Public sector–led regions. The 81 local economies in this cluster have a high share of employment in the public sector, healthcare, and education. They include Nîmes in France and Reggio Calabria in Italy.

— Trailing opportunity regions. These 35 areas are facing high unemployment, negative net migration, and low business dynamism. Their workforce has low levels of secondary and tertiary education. They include Andalusia in Spain and Naples in Italy.

— Aging population regions. These 107 locations have highly educated workforces but also high old-age dependency ratios, as aging shrinks their labor supply. They include Dordogne in France, West Cumbria in the United Kingdom, and Zwickau in Germany.

Our 13 clusters are defined not by physical proximity but by similarities in labor supply and demand. Every European country has at least one dynamic or stable region.[9] Eighteen of the 29 countries have one superstar hub, 19 have at least one service-based economy, and 18 have at least one diversified metro or non-metro region.

Yet some regional patterns emerge. Shrinking regions are particularly concentrated in Eastern and Southern Europe. Eastern Europe accounts for 85 percent of the educated and emigrating areas and 45 of 58 agriculture-based regions. All but one of the trailing regions are in Southern Europe. In addition, some stable economies with a distinct industry focus are regionally concentrated. Germany is home to 72 percent of high-tech manufacturing centers, while more than half of tourism havens are in Southern Europe. This type of regional specialization enables firms to achieve economies of scale and benefit from cluster effects. But it also exposes local economies to specific types of demand shocks, which can contribute to regional disparities.[10]

Automation and other trends have already caused occupational and skill shifts across all local labor markets

Europe's local labor markets have been evolving in response to structural and technological shifts.[11] Employment in Europe, as in other advanced economies, has grown in knowledge-intensive sectors such as telecommunications, financial services, real estate, and education, while it has been declining in manufacturing and agriculture. Analytical work and activities involving personal interactions have superseded routine cognitive and manual tasks. Occupations with activities that are relatively susceptible to automation, such as office support, production work, and transportation services, have experienced slowing growth. Overall employment has grown, even though automation has reduced employment in factories and on farms.

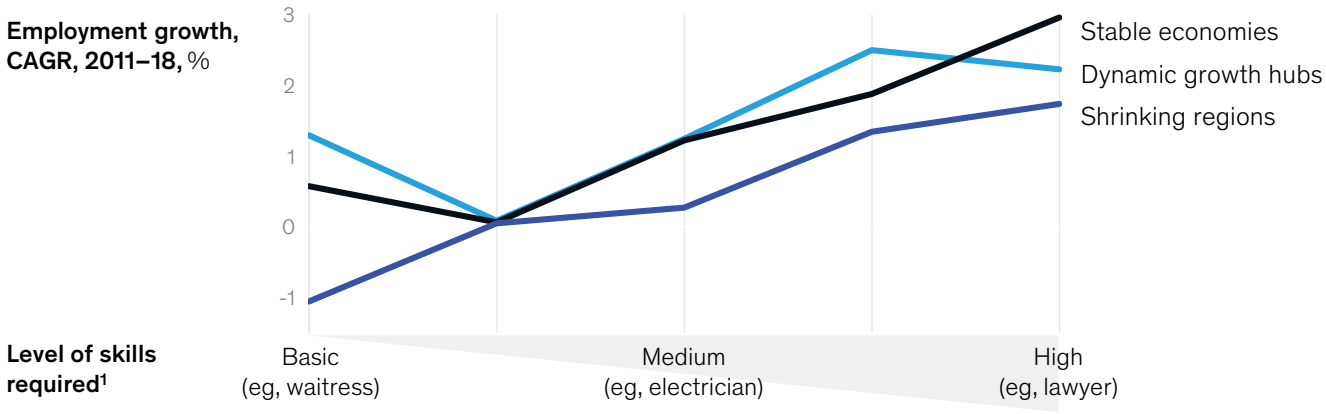
Job growth before the pandemic favored workers with the highest skill levels (such as legal and health professionals) across all three sets of local economy clusters—even in the shrinking regions (Exhibit 4).[12] Likewise, job growth was also relatively strong for

9 Excluding Cyprus, which has only tourism havens.
10 Paul Krugman, "Lessons of Massachusetts for EMU," in *Adjustment and Growth in the European Monetary Union*, Francisco Torres and Francesco Giavazzi, eds., Cambridge, UK: Cambridge University Press, 1993, pp. 241–66.
11 The trends discussed here emerge from our analysis of highly local economies and particular occupations across the EU. They may not be apparent in the aggregate (that is, at the national level) across all countries.
12 We use the categorization of skills employed by the US Bureau of Labor Statistics O*Net. High-skill workers are levels 4 and 5 in the O*Net range, and low-skill workers are level 1.

occupations at the low end of the skills continuum, such as cashiers and sanitation workers. This is particularly true in dynamic growth hubs, where growing populations with significant purchasing power drove demand for a range of services. However, low-skill jobs declined in the shrinking regions with little economic dynamism—the very places where skill levels are below the EU average.

Exhibit 4

Job growth in all regions has been stronger in occupations requiring a higher level of skills.



1. Based on US Department of Labor's O*Net classifications.
Note: Analysis focused on EU-27 countries plus Switzerland and United Kingdom.
Source: Eurostat; O*Net; McKinsey Global Institute analysis

Meanwhile, growth in lower middle-skill occupations (such as bank tellers) stagnated across all regional labor markets. A large body of academic research has identified this pattern of "hollowing out," as middle-skill, middle-wage employment erodes in advanced economies.[13]

While new jobs were added, real wage growth stagnated for many Europeans. Between 2000 and 2018, average real wages grew by only 0.9 percent per year across Europe (increasing in 19 of 21 countries for which comparable wage data are available). But in 18 of the 21 countries, the rate of growth slowed substantially when we compared periods not directly affected by the pre-financial crisis economic boom and the post-crisis slump. Average real wages grew by 1.6 percent annually between 1995 and 2000 but by just 1.1 percent per year between 2013 and 2018. Low wage growth has worsened relative poverty rates (even after taxes and transfers). Between 2000 and 2016, the share of the working-age population earning less than half of household median income increased in almost all countries; the EU average rose from 8 to 10 percent.

The nature of work has been changing, too. Part-time work rose substantially in 22 of the 29 European countries. Until the COVID crisis, independent work—including freelancers, workers for temporary staffing agencies, and gig economy workers—may have contributed 20 to 30 percent of all jobs.[14] Moreover, reduced employment protection in almost all countries means that working arrangements have eroded.

These trends have all contributed to significant shifts in the social contract—the implicit relationship between individuals and institutions—over the past two decades. While they have created considerable opportunity for some workers, especially those with advanced skills

[13] See Maarten Goos, Alan Manning, and Anna Salomons, "Job polarization in Europe," *American Economic Review*, 2009, Volume 99, Number 2; and David Autor and David Dorn, "The growth of low-skill service jobs and the polarization of the US labor market," *American Economic Review*, August 2013, Volume 103, Number 5. For a deeper discussion of labor market polarization, see *The social contract in the 21st century: Outcomes so far for workers, consumers, and savers in advanced economies*, McKinsey Global Institute, February 2020.

[14] *Independent work: Choice, necessity, and the gig economy*, McKinsey Global Institute, June 2016.

that are in high demand, and helped boost employment to record levels before the COVID-19 pandemic, a substantial proportion of Europe's workers have nonetheless been negatively affected by more fragile work situations and wage stagnation.[15]

Job growth since 2007 has been highly concentrated in 48 dynamic regions

As Europe's occupational and industry mix evolves, job growth has been highly concentrated in 48 cities. These dynamic growth hubs—the megacities of London and Paris and 46 superstar hubs—were home to 20 percent of the 2018 EU population and 21 percent of EU employment in 2018. Since 2007, they have generated a disproportionate 43 percent of the EU's GDP growth, 35 percent of net job growth, and 40 percent of population growth, mainly by attracting workers from other regional clusters (Exhibits 5 and 6).

By contrast, stable economies were home to roughly half of the EU population (just over 250 million people) and EU employment in 2018. Their 53 percent share of EU job growth between 2007 and 2018 was proportionate to their share of the population. Shrinking regions, home to 30 percent of Europe's population and 27 percent of EU employment in 2018, created only 12 percent of new jobs. In many of the regions, the absolute number of jobs declined. Overall, employment in shrinking regions has not returned to its level in 2007. Exhibit 7 highlights the concentration of job growth since the financial crisis.

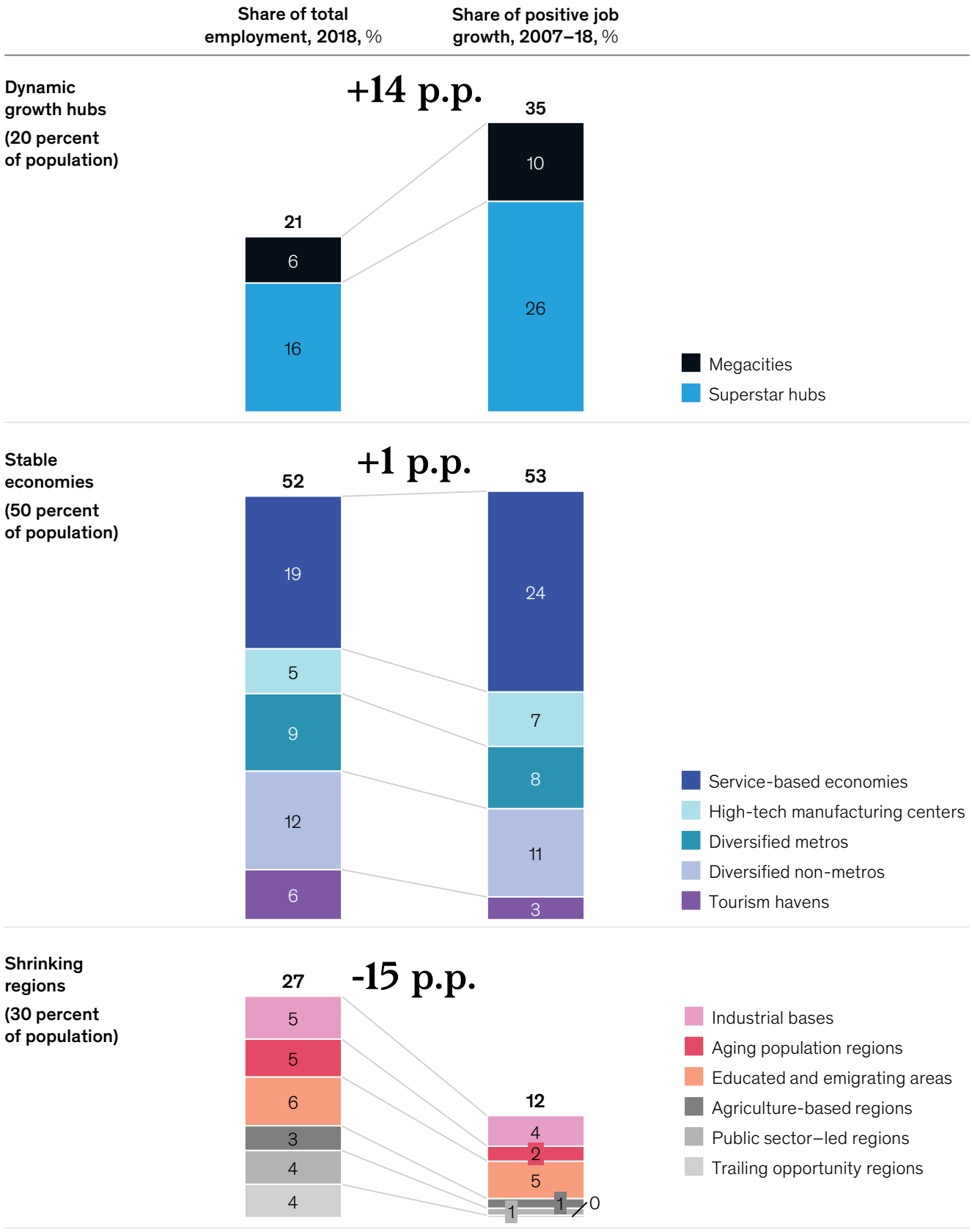
Behind the differences in employment outcomes are local differences in innovation capabilities, business dynamism, and available workforce skills. These factors are important drivers of economic growth and labor market outcomes and, like job growth, are becoming more regionally concentrated. Some groups of local economies stand out in these dimensions, while others are notably weak. In this research, we assess each cluster's innovative capabilities though proxies such as R&D expenditure and high-tech patent applications. For business dynamism, we look at the density of startups and Fortune Global 500 companies. For skills, we look at tertiary education levels and the number of science, technology, engineering, and mathematics (STEM) graduates per year.

The data show that the 48 megacities and superstar hubs punch far above their weight in all these areas. Together, these dynamic growth hubs produce a disproportionate share of high-tech patents (55 percent of the EU total versus 39 percent for stable economies and just 6 percent for shrinking regions). Their R&D expenditures are also above average. Dynamic growth hubs account for 73 percent of startups, compared with 25 percent for stable economies and 2 percent in shrinking regions. Twenty-nine of these cities are home to almost 80 percent of the European companies in the Fortune Global 500. London and Paris alone have 46 of the 126 total.

[15] See *The social contract in the 21st century: Outcomes so far for workers, consumers, and savers in advanced economies*, McKinsey Global Institute, February 2020.

Exhibit 5

Disparities between clusters are widening, with just 48 dynamic growth hubs generating more than one-third of Europe's job growth since 2007.

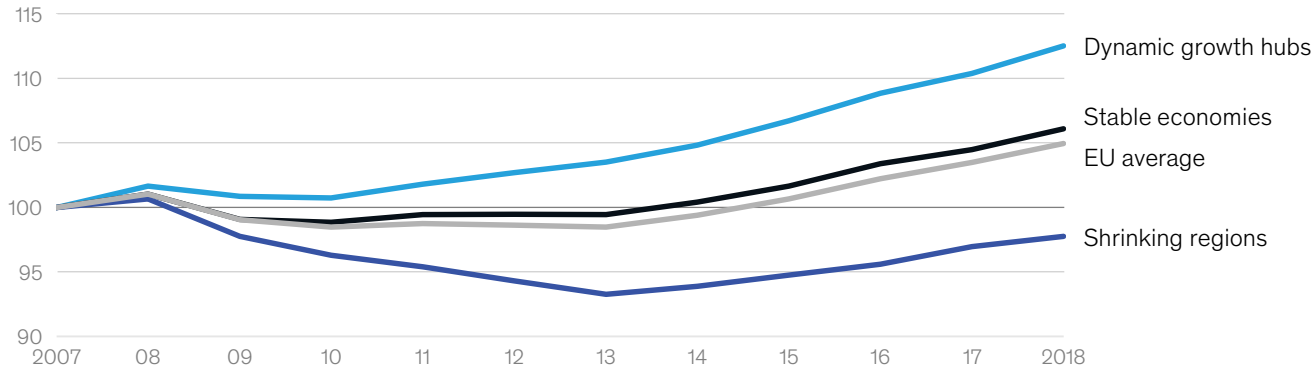


Note: Analysis focused on EU-27 countries plus United Kingdom and Switzerland. Figures may not sum to 100% because of rounding.
Source: Eurostat; Oxford Economics; McKinsey Global Institute analysis

Exhibit 6

Europe's job growth during the recovery from the 2008 recession was highly concentrated.

Annual employment by group of regional clusters, % of 2007 employment



Note: Analysis focused on EU-27 countries plus United Kingdom and Switzerland.
Source: Eurostat; McKinsey Global Institute analysis

The 48 growth hubs are home to about 83 percent of STEM graduates, and 40 percent of the resident population has tertiary education; this compares to less than 25 percent with tertiary education in some clusters within the shrinking regions category (including public sector–led regions, industrial bases, and agriculture-based regions). These differences are growing because educated workers are moving to these cities, helping to expand their working-age population. By contrast, people are leaving shrinking regions (in particular, the educated and emigrating regions and the industrial bases), adding to the effects of aging and low birth rates. Segments including metro and non-metro diversified economies, tourism havens, trailing opportunity regions, and public sector–led regions are attracting migrants, but not enough to counter low birth rates and aging. These factors are eroding their working-age population.

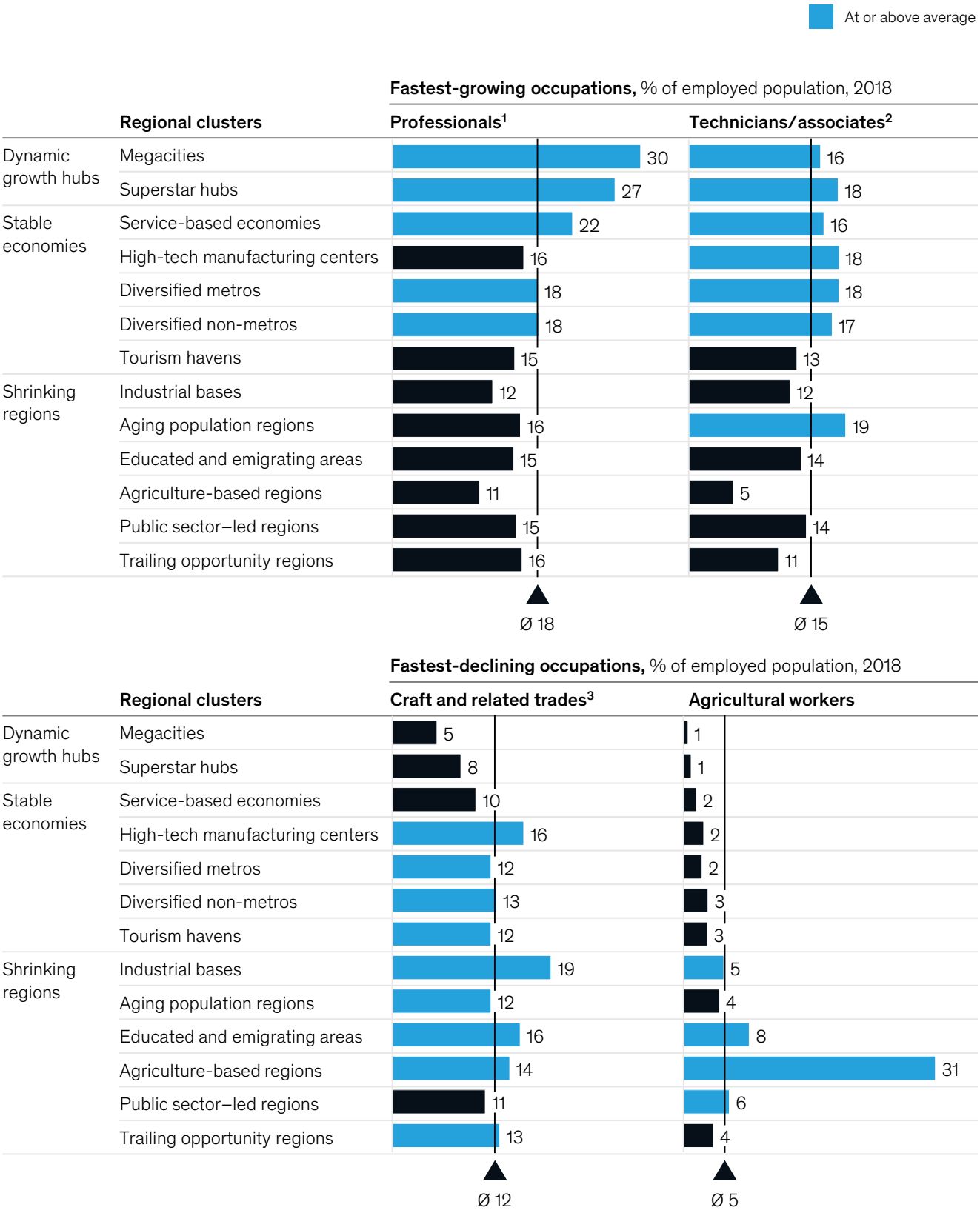
Regional clusters have distinct sector profiles. Megacities and superstar hubs, for instance, have high shares of employment and GDP in high-growth industries. As their names imply, manufacturing is the dominant industry in high-tech manufacturing centers and industrial bases, while farming dominates in agriculture-based regions.[16] Nontechnical services top the industry mix in tourism havens, service-based economies, and trailing opportunity regions, while the public sector and healthcare dominate in aging population regions and public sector–led regions.

The sector mix in each type of local economy determines its concentration of growing and declining occupations. Professionals and technicians are concentrated in megacities, superstar hubs, and service-based economies. Declining occupations, such as craftspeople and agricultural workers, are more concentrated in educated and emigrating areas, industrial bases, agriculture-based regions, trailing opportunity regions, and public sector–led regions (Exhibit 7).

[16] A "dominant" sector is defined as one in which employment and gross value added are significantly above the EU average.

Exhibit 7

The fastest-growing and -declining occupations in Europe are geographically concentrated.



1. Professionals include occupations such as analysts, architects, engineers, and doctors.
2. Technician and associate occupations include agriculture technicians, construction supervisors, information and communication technicians, pharmaceutical technicians and assistants, photographers, and secretaries.
3. Craft and related trade workers include bakers, electronics mechanics, motor vehicle repairers, roofers, printers, and toolmakers.

Note: Analysis focused on EU-27 countries plus United Kingdom and Switzerland.
Source: Cedefop; Eurostat; McKinsey Global Institute analysis

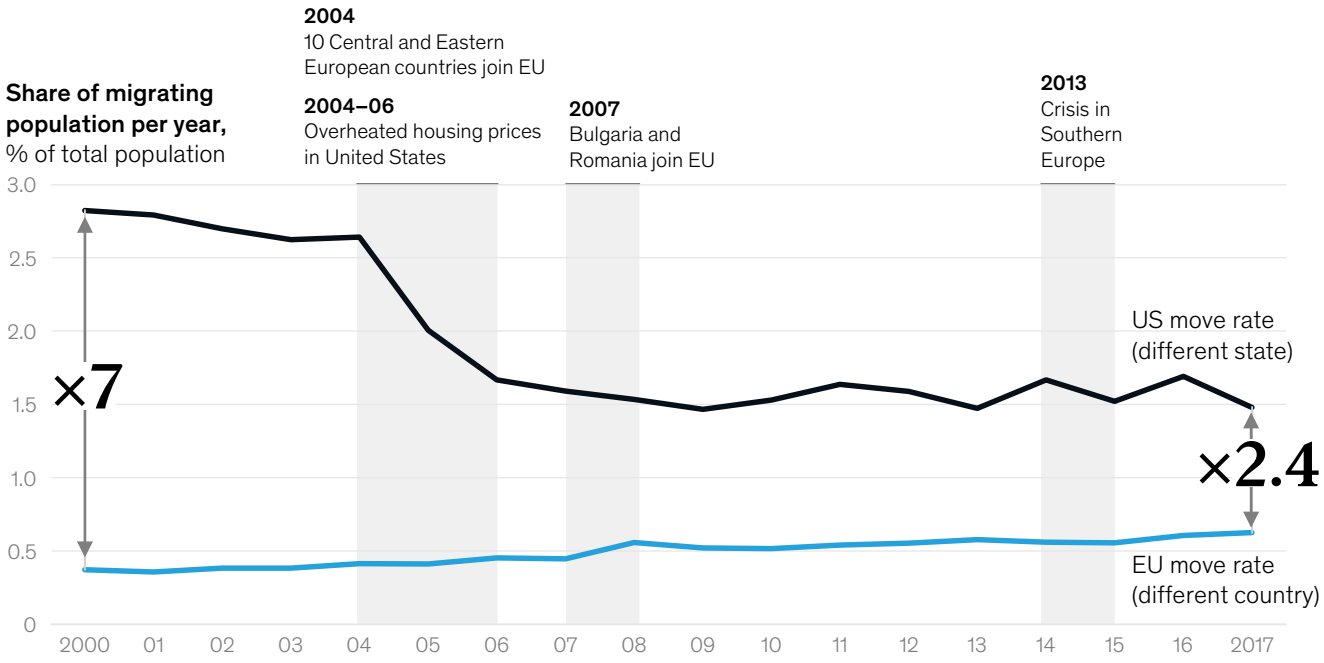
Labor mobility rose as talent moved to the jobs

As the geography of employment shifted across Europe, people looking for work—especially high-quality and well-paid work—moved. Most mobility has been domestic, but mobility across borders also increased, by more than 50 percent between 2003 and 2017, albeit from a low base. The number of people moving across borders every year rose from 0.4 percent of the total population in 2003 to 0.6 percent in 2017. The number of working-age Europeans who live and work in another European country doubled from 2003 to 2018, from fewer than eight million (2.3 percent of the total working-age population) to 16 million (4.8 percent).[17] Eastern and Southern Europeans in particular drove this trend. By contrast, labor mobility has traditionally been much higher in the United States, though it has been declining in recent decades (Exhibit 8).

Exhibit 8

Geographic mobility has declined in the United States, but has been rising in Europe.

Mobility across countries (Europe) and states (United States), 2000–17



Note: Defined as ratio of each year's movers to total population. In the United States, it includes moves from one state to another; in Europe, it includes moves from one country to another.

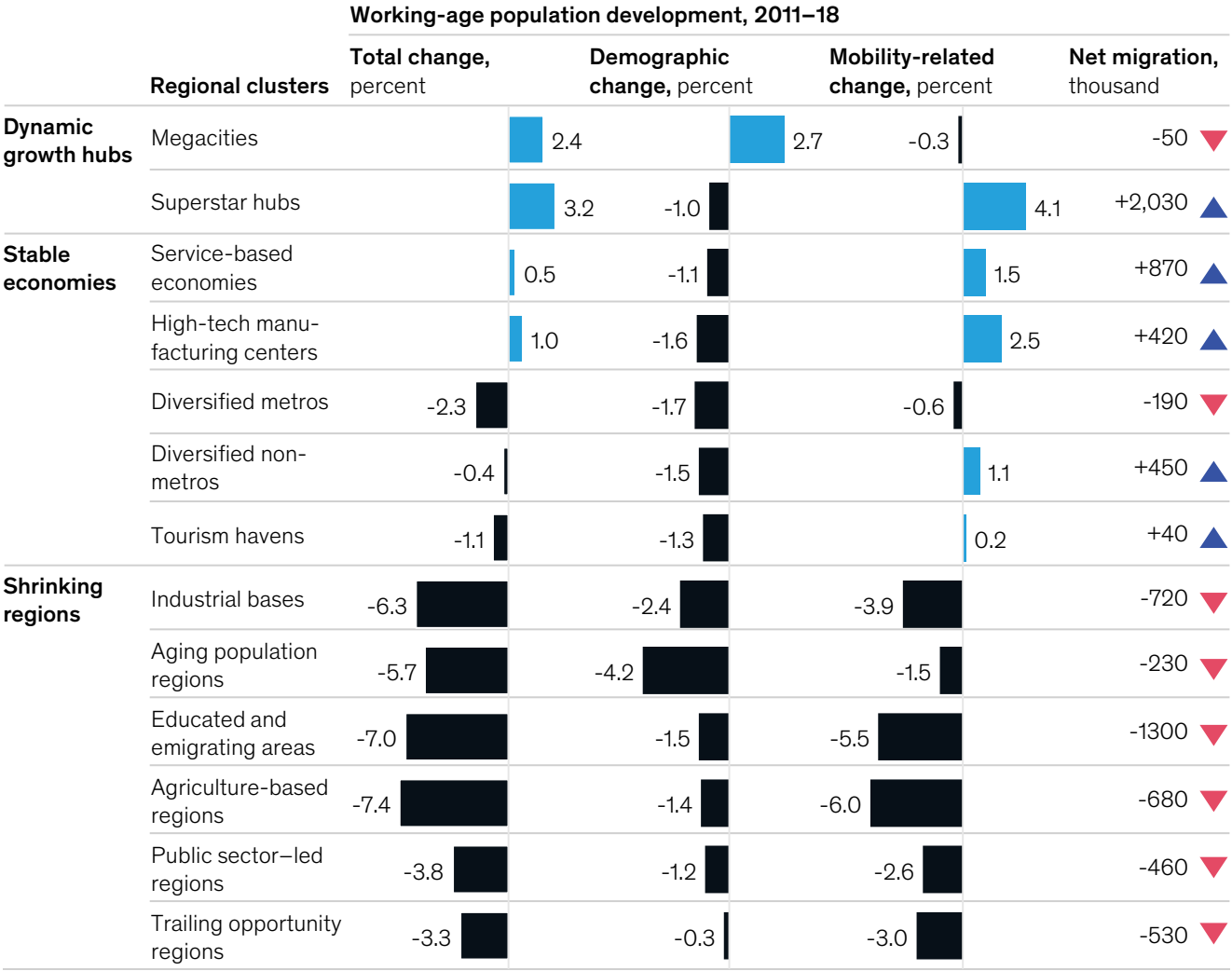
Source: Eurostat; US Census Bureau; McKinsey Global Institute analysis

While labor mobility increased across the EU, the outcomes vary significantly between clusters (Exhibit 9). Superstar hubs were the main magnets for new arrivals from 2011 to 2018, with positive net migration of 4 percent (averaging 0.5 percent annually). Overall, these cities added about two million people. Several of them (such as Berlin, Luxembourg, and Stockholm) actually experienced net migration of about 10 percent in this period. These inflows helped superstar hubs more than offset the impact of aging and demographic decline. Megacities, on the other hand, experienced slightly negative net migration between 2011 and 2018. Paris has lost residents, many of them families, because of high housing costs. However, birth rates in megacities are outpacing retirement rates, resulting in the lowest old-age dependency ratio of the clusters.

[17] Eurostat, "EU/EFTA born population of working age who usually resides in another EU/EFTA country, by country of birth and age," 2019.

Exhibit 9

As Europe ages, mobility has become the primary driver of growth in the working-age population in most clusters.



Note: Analysis focused on EU-27 countries plus United Kingdom and Switzerland.
Source: Oxford Economics; McKinsey Global Institute analysis

Prevailing language and cultural barriers continue to limit moves between countries, as do lingering practical difficulties such as transferring pensions and qualifications from one European country to another.[18] Growth in mobility slowed slightly following a surge between 2013 and 2016. One immediate consequence of the COVID-19 crisis has been an abrupt halt in migration, with countries across Europe essentially closing borders to contain the spread of the virus, with the exception of cross-border commuters and migrant farm workers. When these borders will reopen remains unclear. After COVID, it is also possible that the attraction of megacities and large urban hubs will fade as people choose to live in less densely populated areas, making greater use of digital technologies and the new encouragement to work from home (see Box 2, "European jobs at risk in the COVID-19 pandemic").[19] Cross-border migration may become less attractive if travel home can be interrupted with quarantines during disease outbreaks.

[18] Elena Fries-Tersch et al., *2018 annual report on intra-EU labour mobility*, European Commission, 2019.
[19] The potential of working from home may be limited. One study finds that only 37 percent of jobs in the United States can be performed entirely at home, with significant variation across cities and industries. Jonathan I. Dingel and Brent Neiman, *How Many Jobs Can be Done at Home?*, University of Chicago, Becker Friedman Institute, White Paper, April 16, 2020.

Box 2

European jobs at risk in the COVID-19 pandemic

The 2020 coronavirus pandemic prompted stringent lockdown measures across all EU countries, leading to a collapse of economic activity. Governments implemented measures aimed at reducing the short-term pain, including mass furlough plans under which companies received government subsidies to continue paying employees not working or working reduced hours. Even under an optimistic scenario that sees the virus contained within two to three months of economic shutdown, Europe's unemployment will rise sharply in 2020 and only return to pre-crisis levels by the fourth quarter of 2021. Under a more pessimistic scenario, which assumes Europe will need to implement ongoing physical distancing and quarantine measures for longer, unemployment is unlikely to recover to 2019 levels before 2024.

As the economy cautiously reopens after the shutdown, we estimate that nearly 59 million European jobs, or 26 percent of the total, are at risk in the short term through reductions in hours or pay, temporary furloughs, or permanent layoffs. The impact will be unevenly distributed, with significant differences among sectors and occupations and, as a consequence, among demographic groups and local labor markets.[1]

Occupations across all sectors of the economy are being affected, based on workers' required physical proximity to others, how much work can be done remotely, and potential changes in demand as the crisis evolves. Our analysis shows that just a few large sectors account for the bulk of vulnerable jobs. Wholesale and retail represent about 14.6 million jobs at risk, or 25 percent of total jobs at risk, while accommodation and food represent about 8.4 million jobs at risk, or 14 percent of the total. Manufacturing and construction also see substantial numbers of jobs at risk.

Three occupational groups account for about half of all jobs at risk in Europe: customer service and sales, food services, and building occupations. The jobs most at risk from pandemic short-term job losses overlap to some extent with those most vulnerable to displacement through automation (which we estimate based on an analysis of the proportion of the work activities for each occupation that have the potential to be automated).[2] For example, almost 70 percent of jobs that could be displaced due to automation in the wholesale and retail sector are also at risk due to COVID-19 (Exhibit 10). Thus, COVID-19 could accelerate some of the displacement once projected to take ten years. The crisis may also accelerate automation adoption, as robots are not susceptible to the virus, creating incentives to automate. Conversely, COVID-19 might delay or reduce job creation in jobs that involve human interaction and have been considered as shielded from digital technologies such as arts. As with occupations, we see that demographic groups most at risk from short-term job losses from the pandemic are also most at risk from displacement due to automation. This is especially the case for people with lower educational attainment. About 80 percent of jobs at risk (46 million) are held by people who do not have a tertiary degree, according to our estimates; overall, employees without a tertiary qualification are almost twice as likely as those with a university degree to have jobs at risk.

The employment impact of COVID-19 may hasten the workforce transitions to new jobs with different skills for many. The crisis could also accelerate existing inequalities within European countries, not just between better-educated and less well-educated workers, but also among young people, as we discuss in this paper. Forthcoming research from MGI will explore work in the post-COVID world.

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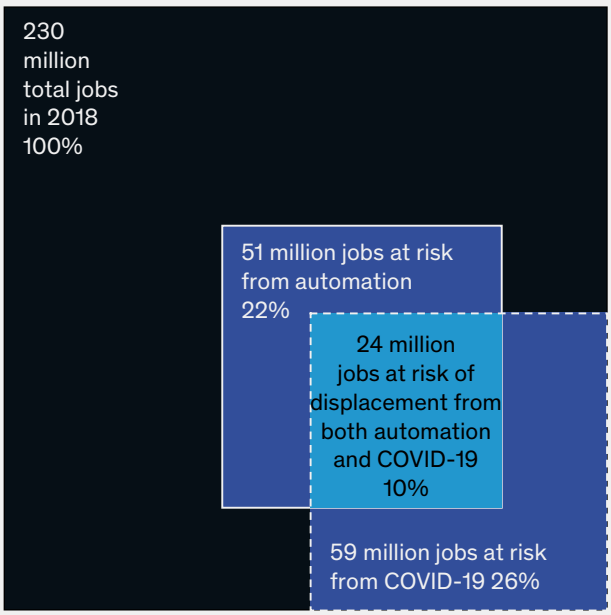
1 David Chinn, Julia Klier, Sebastian Stern, and Sahil Tesfu, *Safeguarding lives and livelihoods: Mitigating the employment impact of COVID-19,* McKinsey & Company, April 2020.

2 *Jobs lost, jobs gained: Workforce transitions in a time of automation*, McKinsey Global Institute, December 2017.

Exhibit 10

There is a large overlap between jobs at risk due to COVID-19 in the short term and jobs displaced by automation in the longer term.

EU-27 and the United Kingdom



Jobs at risk of displacement from both COVID-19 and automation vary largely by sector
Thousand

		% of jobs potentially displaced by automation	Correlation coefficient[1]
Wholesale and retail	5,411	68	0.96
Manufacturing	4,281	37	0.48
Accomodation and food services	2,970	94	0.95
Construction	2,365	58	0.73
Transportation and storage	1,470	50	0.67
Human health and social work	1,454	37	0.45
Public administration	977	33	0.61
Education	825	38	0.73
Administrative and support	805	44	0.58
Other services	774	64	0.85
Professional services	706	29	0.32
Financial and insurance	572	34	0.82
Arts	534	80	0.67
Agriculture	269	13	0.76
Information and communication	252	17	0.21
Real estate	93	28	0.30
Electricity	88	35	0.49
Water supply and sewerage	83	29	0.36
Mining and quarrying	11	9	0.06

1. Correlation between jobs at risk due to COVID-19 and jobs displaced due to automation at the aggregate level is highly significant ($r = 0.76$; $p = 0.00$).

Note: Includes EU-27 countries plus United Kingdom but excludes Switzerland; jobs displaced are based on midpoint automation scenario. Analysis of long-term labor market trends and impact of automation was conducted before COVID-19 pandemic; we define "jobs at risk due to COVID-19" as a reduction in hours or pay, temporary furloughs, or permanent layoffs; analysis determines jobs at risk as related to physical-distancing policies and their short-term knock-on economic consequences. Jobs at risk from automation refers to jobs whose constituent work activities are highly susceptible to being displaced by automation adoption.

Source: David Chinn, Julia Klier, Sebastian Stern, and Sahil Tesfu, *Safeguarding lives and livelihoods: Mitigating the employment impact of COVID-19*, McKinsey & Company, April 2020; Eurostat; Oxford Economics; US Bureau of Labor Statistics; McKinsey Global Institute analysis

In the decade ahead, as Europe's labor force shrinks, automation will affect occupational categories and demographic groups unevenly

In the aftermath of the 2008 financial crisis, unemployment rose sharply in Europe and only started to recover five years later, after a double-dip recession. Employment grew strongly in subsequent years until the 2020 health crisis. Assuming a similar long-term recovery after the pandemic, one key aspect of the employment story we find in our research relates to the supply of labor rather than demand for it among firms. While automation adoption will grow over the next decade, a shrinking labor force on the continent means that, by 2030, finding sufficient workers with the required skills to fill the jobs that exist and are being created in Europe may be challenging. While the analysis below is not a point forecast, it illustrates trends that we expect to continue and even accelerate in the future.

Europe's declining labor force poses a potential challenge to employers over the next decade

Prior research by MGI estimated that about half of all work activities globally have the technical potential to be automated by adapting currently demonstrated technologies, with considerable differences by country. However, this will not happen overnight even where the technology exists. The pace and extent of automation will depend on the business case for adoption, wage levels, regulatory and consumer acceptance, technical capabilities, and other factors.[20] Moreover, our research shows that jobs are rarely automated in their entirety. While machines take over routine and repetitive tasks, workers will reallocate their time to higher-productivity tasks that machines cannot do. This means that many roles will be reconfigured rather than eliminated, and most occupations will change.

We ran multiple scenarios regarding the pace of automation in Europe prior to the pandemic. The midpoint automation adoption scenario shows that about 22 percent of workforce activities across the EU (equivalent to 53 million jobs) could be automated by 2030. While there is little visibility at the time of writing as to when employment could recover from the pandemic and whether automation will accelerate as a result, we assume that, by 2030, the crisis will be behind us and new jobs created would fully or partially compensate for this automation-related job loss. Before the pandemic, our analysis suggested that job growth in Europe by 2030 could be as high as 2.7 percent, the equivalent of about six million jobs. While that growth seems less likely today, Europe could still experience labor supply shortages in the future. Even if there is a net decline in jobs, filling available positions would be challenging for European employers, especially in dynamic growth hubs. If the continent were able to recover only to pre-pandemic job numbers by 2030, employment rates would need to increase by three percentage points in order to fill the likely jobs available. Even with a decline of 9.4 million jobs (about 4 percent respectively at an annual compound growth rate of minus 0.3 percent) from the pre-pandemic levels, employment rates would stay stable.

The shrinking labor pool is a key reason. Europe's working-age population is expected to decrease by about 13.5 million, or 4 percent, by the decade's end (Exhibit 11). The decline will be especially large in Germany (almost 8 percent, or about 4.0 million people), Italy (almost 7 percent, about 2.5 million people), and Poland (9 percent, about 2.3 million people). A shrinking workweek might add further pressure. Since 2000, the average hours worked each week per capita have decreased by more than one (or almost 3 percent), to 37.1 hours.[21]

Europe's overall employment rate—that is, the employed population divided by the working-age population—rose to 70 percent before the pandemic, from 64 percent in 2002.[22] Employment rates varied sharply in 2018, ranging from 55 percent in Greece to 77 percent in Sweden. Nevertheless, they have risen in 27 of the 29 countries in our study and in almost 85 percent of all NUTS 3 regions. This increase was largely driven by increasing employment

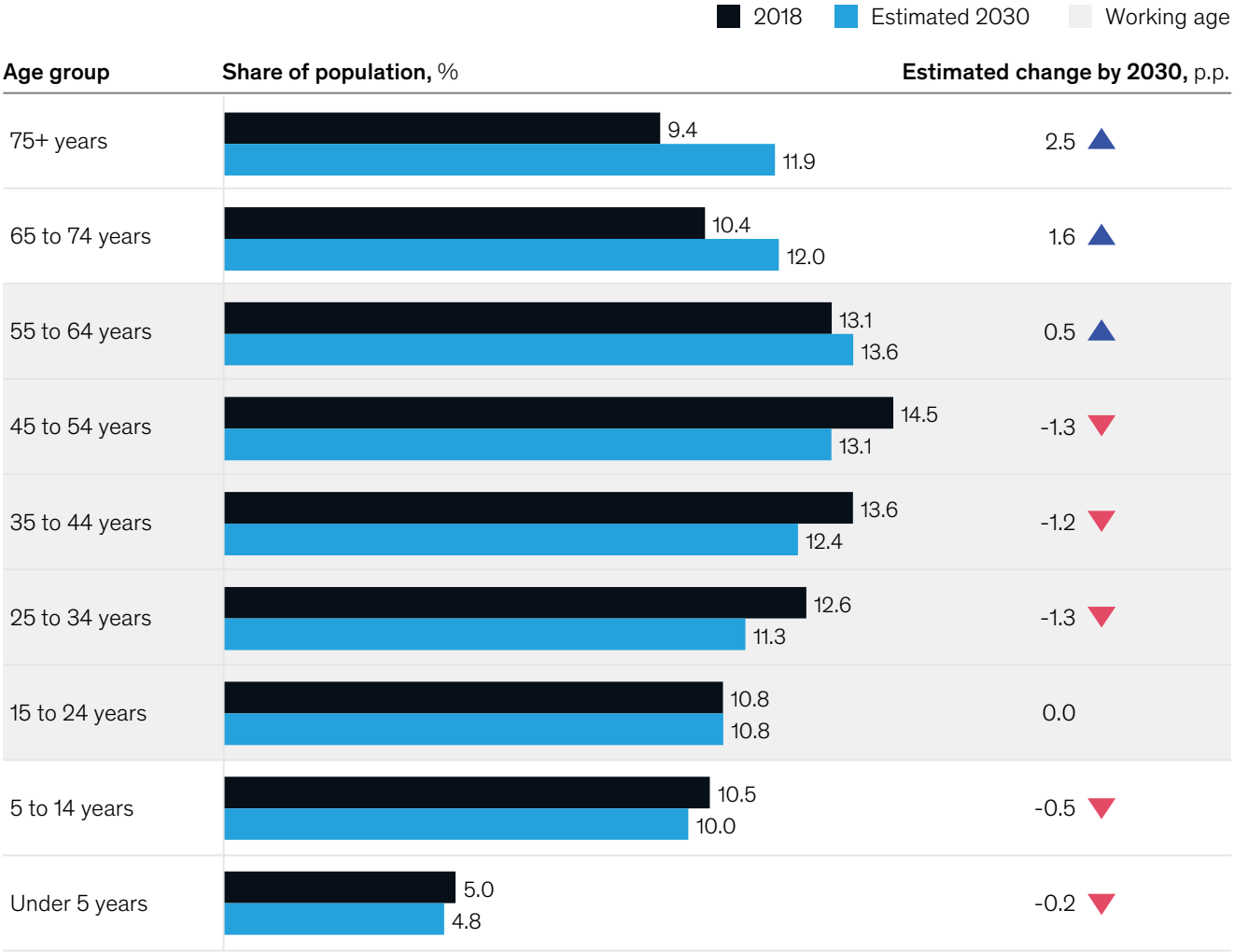
[20] *Jobs lost, jobs gained: Workforce transitions in a time of automation*, McKinsey Global Institute, December 2017.
[21] Data from 2000 do not include Croatia and Poland, which joined the EU later.
[22] We do not isolate employment of those aged 65 and above in our modeling.

among workers over age 55 and women. In the longer term, Europe may need to draw even more people into the labor force, raising the employment rate above the pre-pandemic high by 2030.

Exhibit 11

Aging is reducing the size of Europe's labor force.

Demographic change in the EU-27, the United Kingdom, and Switzerland



Note: Analysis of long-term labor market trends and impact of automation was conducted before COVID-19 pandemic. Figures may not sum to 100% because of rounding.

Source: Oxford Economics; McKinsey Global Institute analysis

The sector mix in Europe will continue to evolve

Automation is not the only force shaping the workplace. Europe's mix of sectors is rebalancing as manufacturing and agriculture continue to recede while services gain more relative weight. This is a long-term trend that has been playing out since the 1970s. Now automation is amplifying the shift toward more knowledge-intensive sectors, such as education, information and communications technology, and human health and social work.

Our analysis of potential automation displacement and potential job growth through 2030 indicates that this rebalancing will likely continue in the decade ahead. Some sectors are set to grow strongly, others may experience a shift of occupations within the sector but modest growth overall, and the number of jobs in still others may decline.

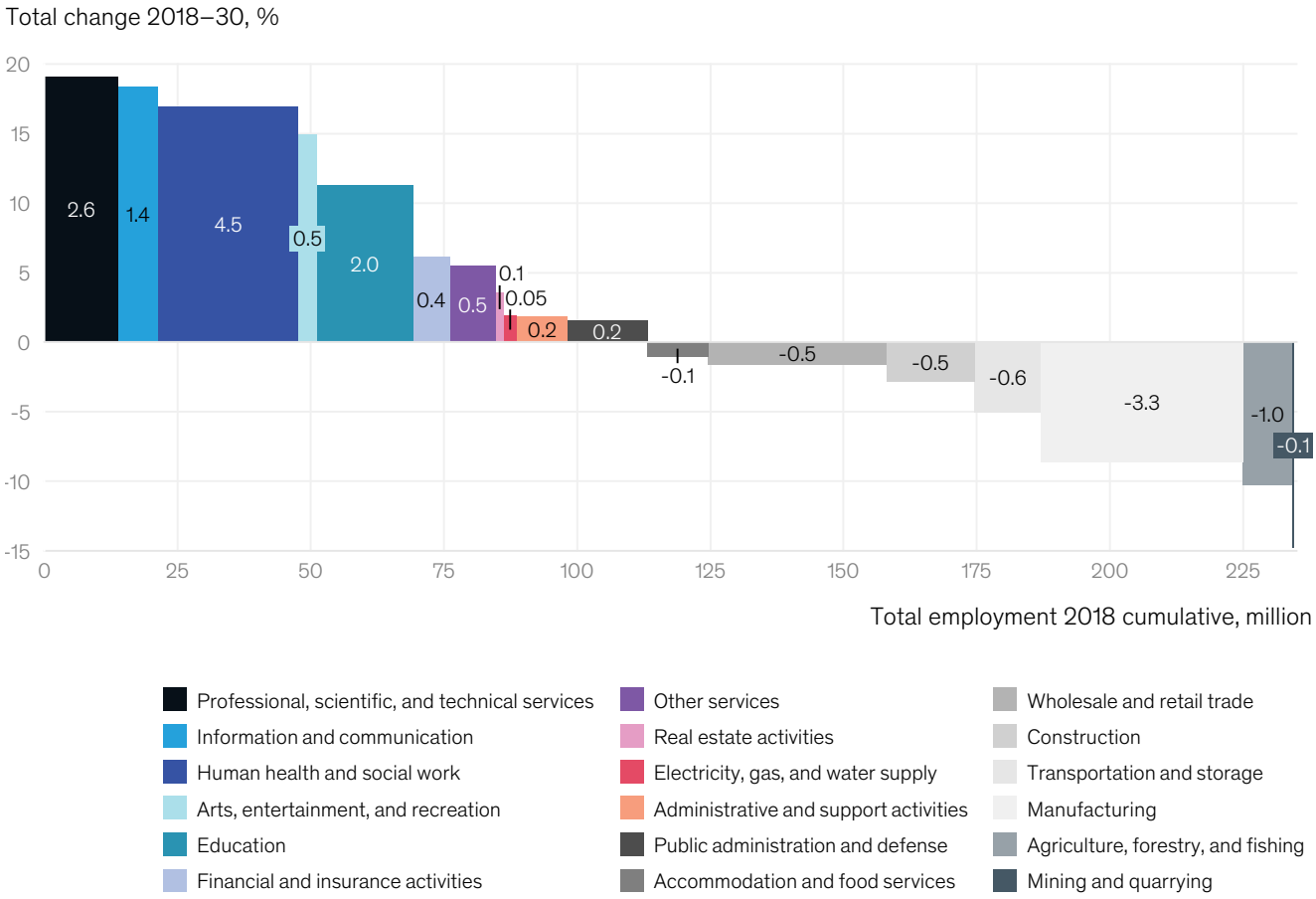
Based on our modeling, three sectors are likely to account for more than 70 percent of Europe's potential job growth through 2030. The strongest net gains through 2030 are

in human health and social work, where 4.5 million jobs could be added (Exhibit 12). This is followed by professional, scientific, and technical services, which could add 2.6 million jobs, and education, which could gain 2.0 million jobs. In addition, the information and communications technology sector and the arts, entertainment, and recreation sector could post some of the highest net growth rates, at 18 percent and 15 percent, respectively. But because they are starting from a smaller base, the number of jobs added would be lower in absolute terms.

Exhibit 12

The strongest job growth is projected in professional, scientific, and technical services as well as human health and social work, while the biggest decline could occur in manufacturing.

Potential net job growth in EU-27, United Kingdom, and Switzerland in midpoint automation scenario, million



Note: Analysis of long-term labor market trends and impact of automation was conducted before COVID-19 pandemic. For discussion of the assumptions, sensitivities, and limitations of our automation scenarios, see *A future that works: Automation, employment, and productivity*, McKinsey Global Institute, January 2017.

Source: Eurostat; Oxford Economics; McKinsey Global Institute analysis

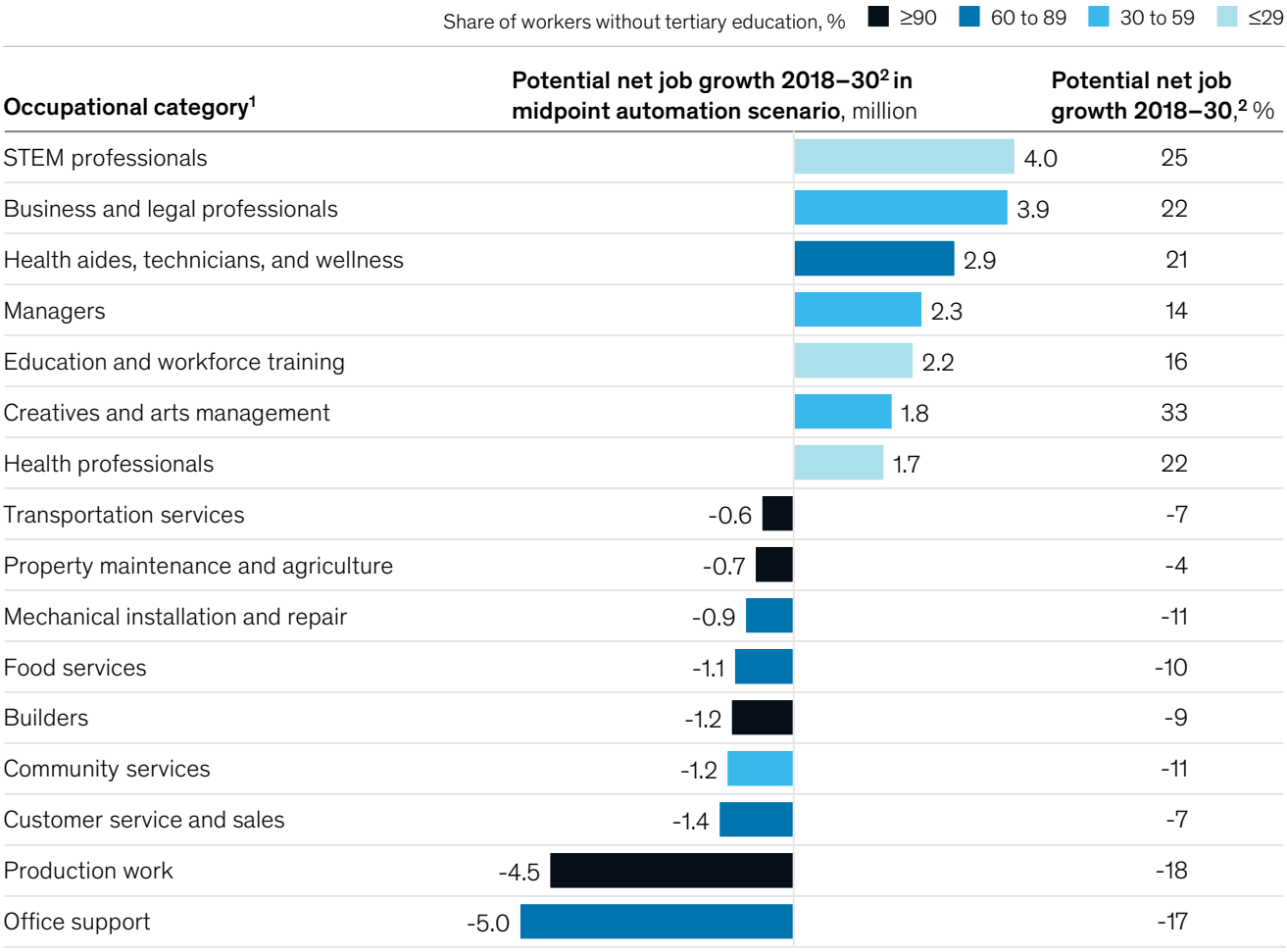
The occupational mix is changing, along with the demand for higher-level skills

Previous MGI research has found that less than 5 percent of occupations can be automated in their entirety. But within 60 percent of occupations, at least 30 percent of activities could be technically automated by adapting currently demonstrated technologies.[23] What lies ahead is not a sudden robot takeover but a period of ongoing, and perhaps accelerated, change in the mix of jobs and work activities in the economy.

Many of the largest occupational categories in Europe today have the highest potential for displacement. These include office support roles and production jobs, which employ about 30 million and 25 million workers, respectively. Low-wage customer service and sales roles, such as cashiers and clerks, are also likely to decline as many tasks are automated. Just ten of the more than 400 occupations we examined—including shop sales assistants, administrative secretaries, and stock clerks—account for nearly 20 percent of likely displacements (Exhibit 13). Most of these are low-wage jobs, primarily held by workers without tertiary education.

Exhibit 13

Across Europe, occupational categories such as STEM professionals and healthcare workers are expected to grow significantly, while office support and production jobs could decline.



1. Based on MGI's 16 occupational categories, also used in *The future of work in America* (2019).
2. Projections for EU-27 countries plus United Kingdom and Switzerland.

Note: This exhibit shows net job growth, factoring in both job losses due to automation and expected job creation. Jobs that do not yet exist, often created as a result of new technology (such as AI ethicists), are not included. Analysis was conducted before COVID-19 pandemic.

Source: McKinsey Global Institute analysis

[23] See two earlier McKinsey Global Institute reports: *A future that works: Automation, employment, and productivity* (January 2017), and *Jobs lost, jobs gained: Workforce transitions in a time of automation* (December 2017). We analyze the automation potential of every occupation by looking at the extent to which its constituent activities and associated capabilities can be handled by currently demonstrated automation technologies.

By contrast, many of the growing occupations in our model require a higher level of skills. We estimate that STEM-related occupations and business and legal professional roles could grow by more than 20 percent in the coming decade. This would add about four million jobs to categories that employed 16 million and 18 million workers, respectively, before the pandemic. Creative and arts management roles could increase by more than 30 percent, although this is a small category, with just over five million workers. Just 15 occupations account for almost 30 percent of potential future net job growth in our model. They include such diverse occupations as software developers, nursing professionals, and marketing professionals.

Although the list of growing jobs is dominated by those requiring a higher level of education and training, there are some exceptions that do not require tertiary education. These include several roles in healthcare (such as physiotherapy technicians and healthcare assistants) as well as equipment installers and repairers. Technological revolutions throughout history have created new types of work even as they made some occupations obsolete. The internet, for example, disrupted many industries and replaced many jobs. But it also gave rise to new roles such as web developers, app developers, social media marketers, search engine optimization consultants, and user experience designers—and even Uber drivers, Airbnb hosts, Instagram influencers, and YouTube stars. In the United States, MGI analysis found that the rise of personal computers directly and indirectly displaced 3.5 million jobs between 1970 and 2015, including jobs for typists, typewriter manufacturers, secretaries, and bookkeepers. But personal computers also created and enabled 19.3 million new jobs, including positions in the computer and software industries as well as jobs in industries that were enabled by the new technology, such as call center representatives and analysts.[24]

The next decade should be no different. The introduction of AI in particular could require some entirely new roles. AI systems have to be "taught" to recognize nuances in human communication and to model their performance after humans. Someone with judgment has to manage which algorithms to use based on the business results. In addition to the growth trends described above, we estimate that technology deployment itself could create an additional four million new jobs by 2030.[25] The expected occupational growth is in line with historical trends (Exhibit 14).

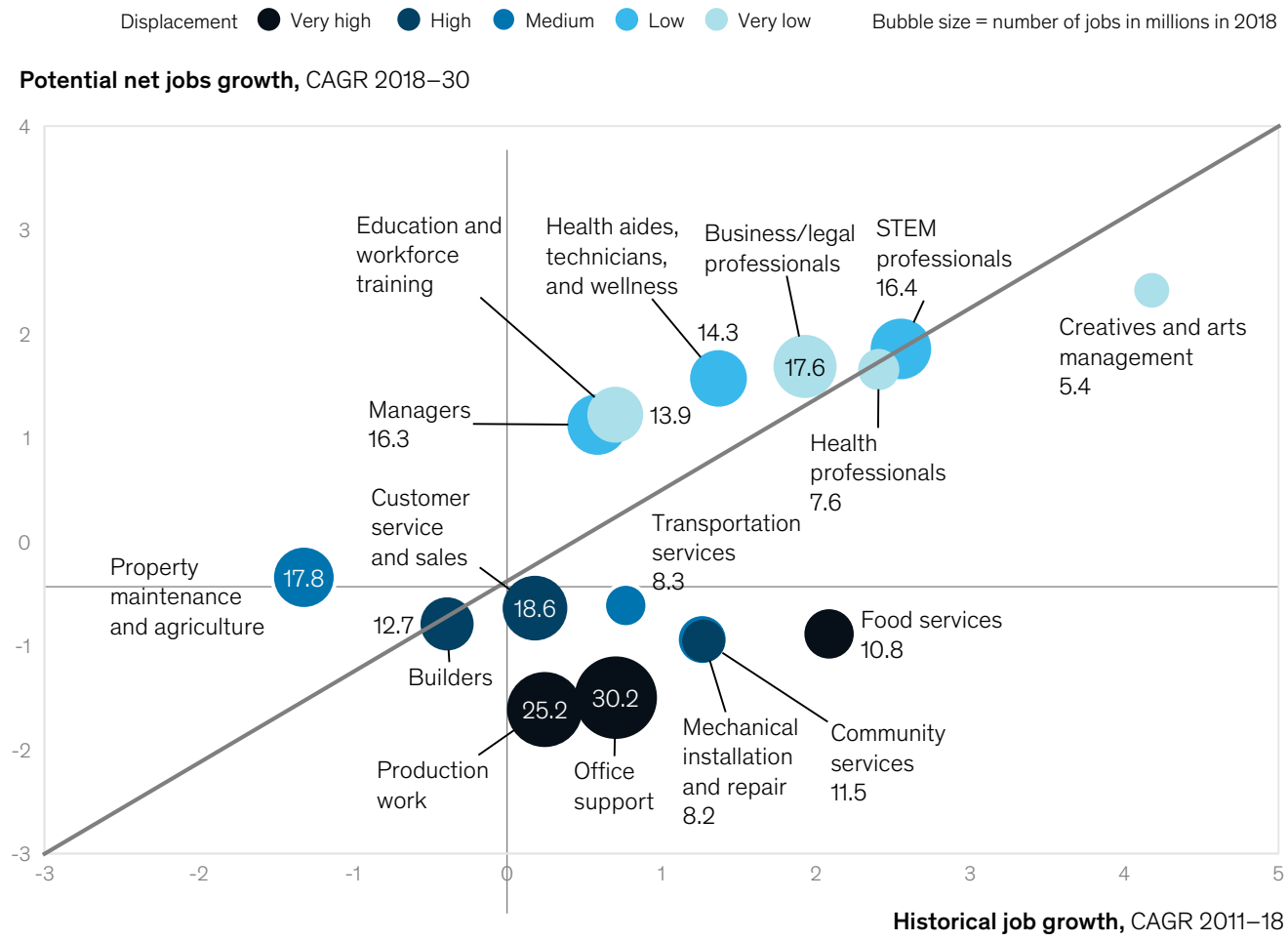
[24] *Jobs lost, jobs gained: Workforce transitions in a time of automation*, McKinsey Global Institute, December 2017.

[25] Some academic research suggests that around half of 1 percent of jobs created every year are entirely new; Jeffrey Lin, "Technological adaptation, cities, and new work," *Review of Economics and Statistics*, May 2011, Volume 93, Number 2. Our estimates are slightly lower.

Exhibit 14

Expected occupational growth in Europe is in line with historical trends, with the exception of highly automatable occupations that are likely to decline in the future.

Potential employment growth in EU-27, United Kingdom, and Switzerland in midpoint automation scenario



Note: Analysis of long-term labor market trends and impact of automation was conducted before COVID-19 pandemic. For discussion of the assumptions, sensitivities, and limitations of our automation scenarios, see *A future that works: Automation, employment, and productivity*, McKinsey Global Institute, January 2017.

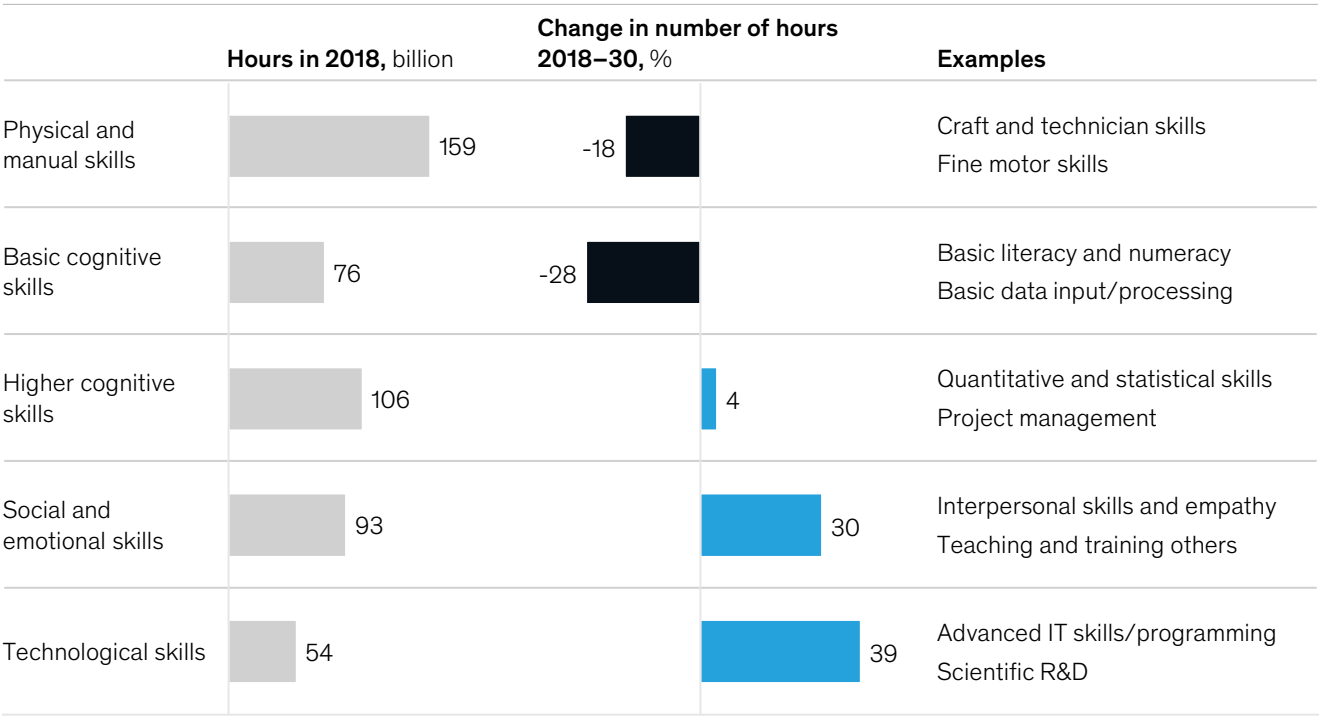
Source: McKinsey Global Institute analysis

Even within a given occupation, day-to-day work activities will change as machines take over some proportion of current tasks. Workers may need different skills as a result. Prior MGI research has defined 25 workforce skills in five categories: physical and manual skills; basic cognitive skills, such as literacy and numeracy; advanced cognitive skills, such as problem solving and project management; socioemotional skills, such as teaching and training others; and technological skills, such as programming.[26] Our model shows activities that require mainly physical and manual skills declining by 18 percent by 2030 across Europe, and those requiring basic cognitive skills declining by 28 percent (Exhibit 15). In contrast, activities that require technological skills will grow in all industries, creating even more demand for workers with STEM skills (increasing 39 percent), who are already in short supply. At the same time, we foresee 30 percent growth in demand for socioemotional skills. Human workers will increasingly concentrate in roles that require interaction, caregiving, teaching and training, and managing others—activities for which machines are not good substitutes.

[26] *Skill shift: Automation and the future of the workforce*, McKinsey Global Institute, May 2018.

Exhibit 15

Demand for technological, social, and emotional skills is expected to grow in Europe.



Note: Analysis focused on EU-27 countries plus United Kingdom and Switzerland. Analysis of long-term labor market trends and impact of automation was conducted before COVID-19 pandemic.
Source: *Skill shift: Automation and the future of the workforce,* McKinsey Global Institute (2018); McKinsey Global Institute analysis

Less-educated workers, young people, and men are most likely to be displaced by automation

In our analysis, education is significantly correlated with the likelihood of being displaced by automation. In the midpoint automation adoption scenario, people with only secondary education are three times as likely as people with more education to be in roles with high potential for automation. Potential net job growth is strongly positive for workers with higher education and negative for people with secondary education and below. This also holds true for the impact of the COVID-19 pandemic. Local economies with more educated populations are thus likely to sustain higher growth than those with lower educational attainment levels on average.

Other differences also emerge across demographic groups:[27]

— Young workers: Our model shows that workers aged 15 to 24 have the highest displacement rate of any age group, at almost 25 percent (versus 22 percent on average). In part, this is because many early-career jobs, such as cashiers and waiters, are highly automatable. The COVID-19 pandemic likewise puts jobs of young people at risk, according to our analysis.

— Women and men: Despite their concentration in roles with high automation potential (such as office support), women have on average a slightly lower displacement rate in our model than men (21 versus 23 percent). This is partly because more women work in healthcare and service roles, which have a lower displacement rate than other occupations. Women are also more heavily represented than men in some of the high-growth jobs of the future.[28]

Job growth could become even more geographically concentrated in the decade to come

Our findings suggest that automation and the occupational and skill shifts that accompany it would accelerate the concentration of potential net job growth, absent other changes (Exhibit 16). Unless COVID-19 causes changes in preferences of workers and companies for less dense communities, the same 48 megacities and superstar hubs that contributed 35 percent of the EU's job growth in the past decade could capture more than 50 percent through 2030. Academic research has found that this increasing regional disparity is a structural phenomenon reflecting economic specialization and economies of scale.[29] Automation and its varying impact on sectors and occupations (such as the growth of STEM-related roles and the decline of production work) add to this effect.

Our model suggests potential net growth rates of 15 percent in the two megacities and 9 percent for the superstar hubs in the midpoint automation scenario. However, note that our modeling of job growth does not account for Brexit and any related restrictions on trade and mobility that might result—all of which could affect job growth estimates, particularly for London. Their advantages include highly educated workforces with a strong representation of STEM skills, high business dynamism, plus a large presence of the tech and business services that are expected to continue growing. The growth in high-skill and high-wage jobs also spurs growth in lower-skill jobs, such as waiters, as high incomes increase consumption. Realizing this growth will require an influx of new workers and the right skills.

The clusters in the stable economies group, which is the most populous, could see modest job growth of less than 5 percent over the next decade. Our model shows them contributing about 40 percent of EU job growth through 2030—about ten percentage points below the share they produced between 2007 and 2018. Jobs in high-tech manufacturing centers may even decline by about 1 percent through 2030 as automation makes further inroads.

Within the shrinking regions category, few local labor markets are likely to see employment growth. Our analysis suggests that they will collectively account for less than 10 percent of expected EU job growth through 2030, an even smaller share than the 12 percent of employment growth they generated between 2007 and 2018. Their individual outcomes could range from net job losses of 6 percent to gains of 2 percent. A few places in Southern Europe could generate positive job growth as their economies recover from the prolonged crisis years. But many places in Eastern Europe are facing the double effects of aging and

[27] We find no significant difference between the displacement rates of native-born workers and immigrants.
[28] For a detailed analysis of the gender implications of automation, see *The future of women at work: Transitions in the age of automation*, McKinsey Global Institute, June 2019.
[29] See, for example, David A. Price, "Interview: Enrico Moretti," Federal Reserve Bank of Richmond, *Econ Focus*, first quarter 2019, Volume 24, Number 1; and Alfred Marshall, *Principles of economics*, London, England: Macmillan and Company, 1920.

emigration, creating a vicious cycle of shrinking labor supply and declining demand. At a time when automation could reduce employment in basic services and manufacturing, the relatively low share of knowledge-intensive and innovative sectors in these regions presents a challenge.

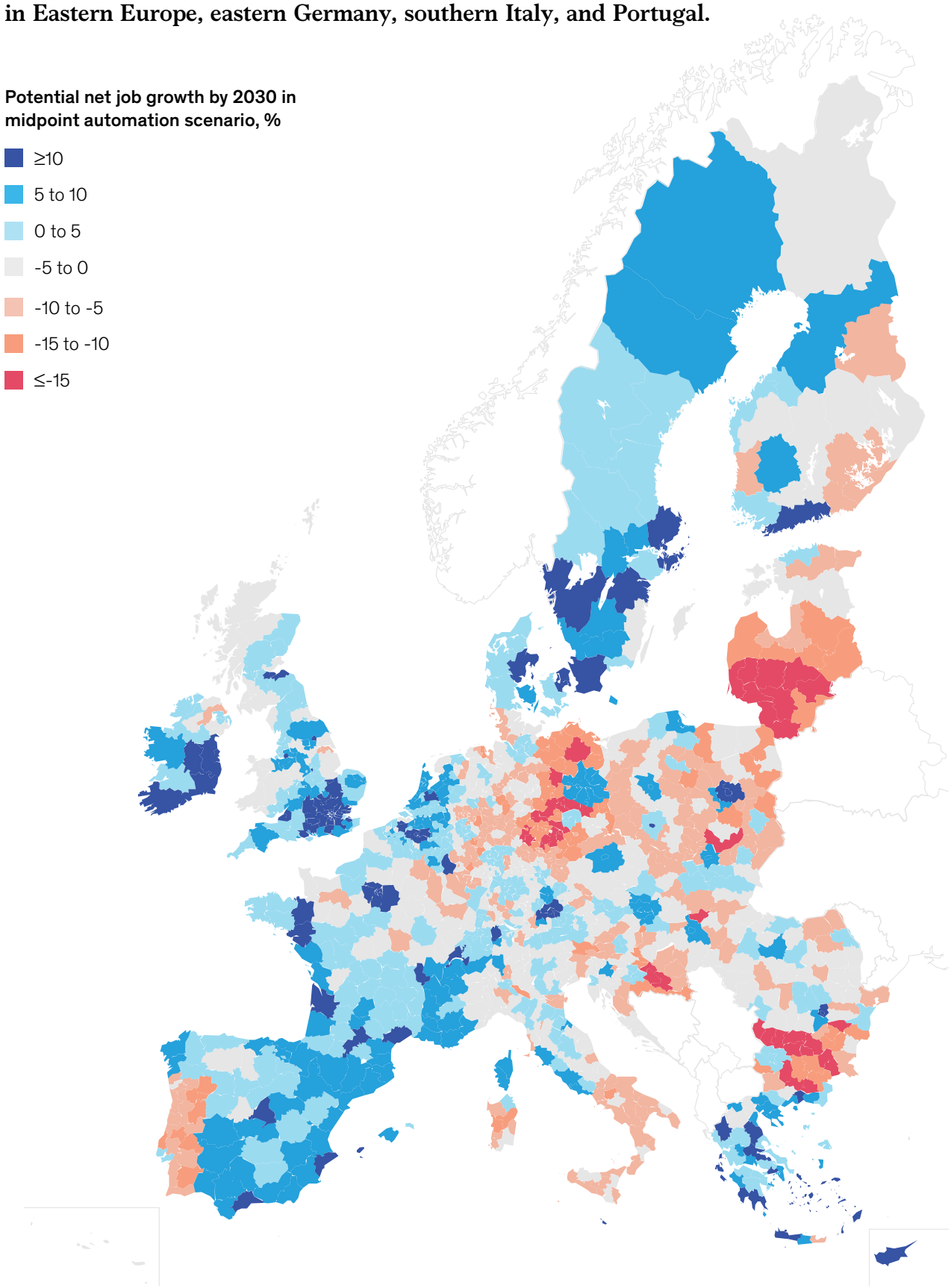
As a result of these trends, the share of Europeans living in regions where jobs are declining could double over the decade, to about 40 percent. One wild card in these estimates is the sudden shift to remote work that took place during the pandemic, as roughly one-third of the workforce began working from home. If this becomes a more permanent increase in the number of people working remotely, it could mean that some workers will not necessarily need to move to dynamic cities to take on the jobs being created there.

The distribution of Europe's working-age population is changing in parallel with the geographic concentration of job opportunities. Our analysis suggests that employment rates would need to increase in a broad-based way across Europe—including those regions with lower absolute numbers of jobs but an aging and emigrating workforce. Achieving the needed boost will be challenging in places such as Germany and Sweden, where labor participation was already high pre-pandemic (Exhibit 17).

Our study of the US labor market revealed similar trends of geographically concentrated job growth, but Europe differs in several key regards (see Box 3, "Similarities and differences in US and European local labor market trends").

Exhibit 16

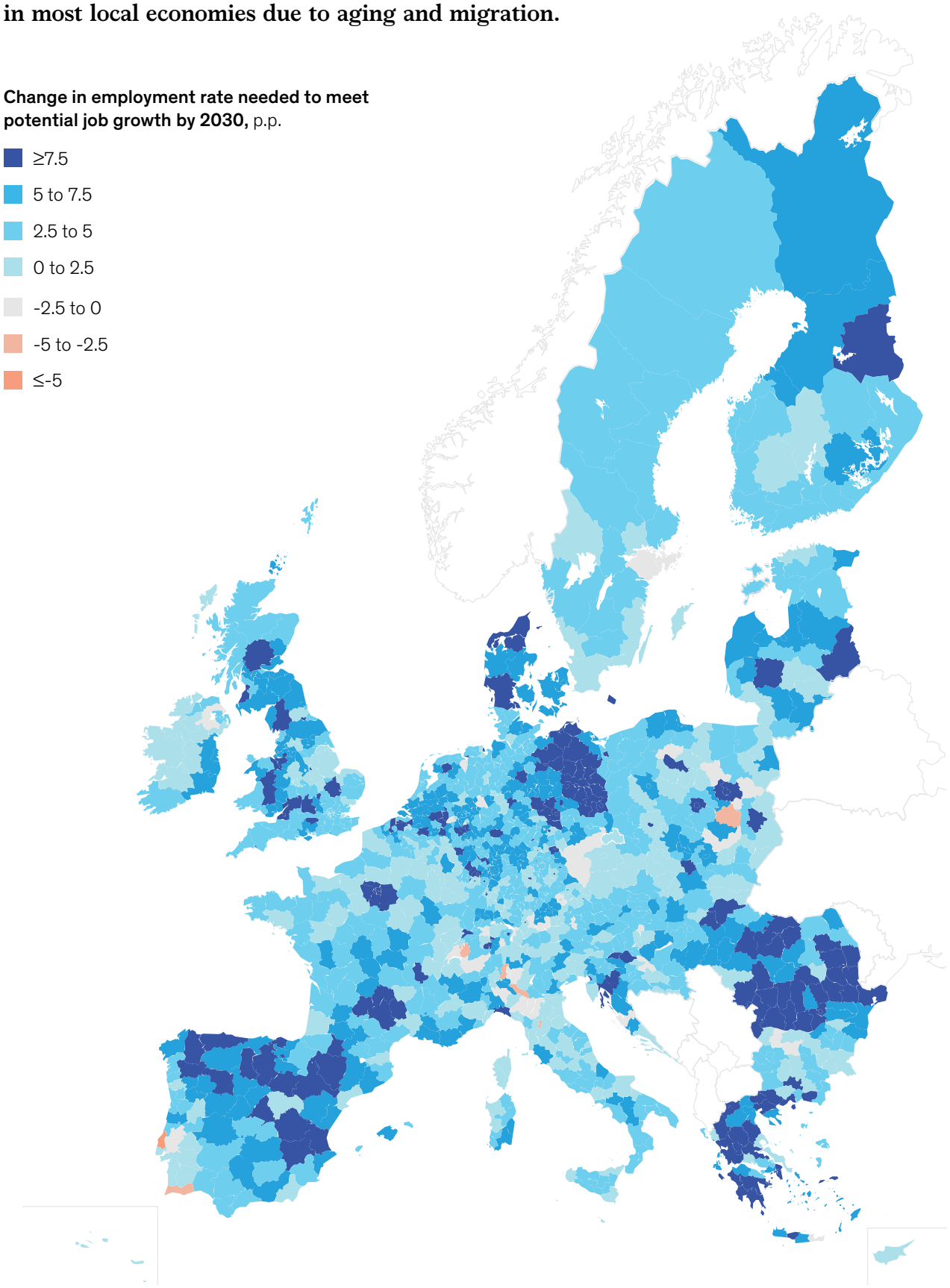
The coming decade could bring geographically concentrated net job growth, with declines in Eastern Europe, eastern Germany, southern Italy, and Portugal.



The boundaries and names shown on maps do not imply official endorsement or acceptance by McKinsey & Company.
Note: Analysis focused on EU-27 countries plus United Kingdom and Switzerland. Analysis of long-term labor market trends and impact of automation was conducted before COVID-19 pandemic. For discussion of the assumptions, sensitivities, and limitations of our automation scenarios, see *A future that works: Automation, employment, and productivity*, McKinsey Global Institute, January 2017.
Source: McKinsey Global Institute analysis

Exhibit 17

Once the COVID-19 crisis subsides, employment rates are likely to increase in most local economies due to aging and migration.



The boundaries and names shown on maps do not imply official endorsement or acceptance by McKinsey & Company.
Note: Analysis focused on EU-27 countries plus United Kingdom and Switzerland; employment rates were calculated by comparing our net job growth numbers with expected changes in working-age population. Analysis conducted before COVID-19 pandemic.
Source: Oxford Economics; McKinsey Global Institute analysis

Box 3

Similarities and differences in US and European local labor market trends

This examination of Europe's local labor markets uses methodology similar to that of our July 2019 analysis of US counties and cities. Several patterns are common in both places, including the increasing geographic concentration of expected job growth and the growing demand for higher skills. However, we also found some noteworthy differences. European workers were less vulnerable to losing their jobs or seeing reduced hours than US workers during the initial months of pandemic-related stay-at-home orders. Going forward, Europe may see lower net job growth through 2030, but its working-age population is declining while the US population continues to grow. New job creation is also more concentrated in Europe: the regions that may account for half of job growth are home to just 20 percent of the population, compared with 32 percent in the United States. More strikingly, nearly 40 percent of Europeans live in regions that may see declining employment over the next decade, compared with about 11 percent of Americans. However, labor mobility is rising in the EU, while it is higher but declining in the United States (Exhibit 18).

Exhibit 18

Europe differs from the United States in several key labor market trends.

	Europe	United States
Vulnerable jobs during COVID-19, share of total workforce	26%	35%
Change in working-age population by 2030	-4.0%	+2.4%
Share of population accounting for 50 percent of job growth through 2030	~20%	~32%
Share of population living in regions with declining jobs in 2030	~40%	~11%
Change in average length of workweek, 2002–18	-3%	+0%
Migrating population per year, share of total population[1]	0.6% ▲	1.5% ▼

1. Ratio of movers to total population. In the United States, this measures moves from one state to another; in Europe, this includes moves from one country to another.

Note: Analysis focused on EU-27 countries plus United Kingdom and Switzerland.

Source: Eurostat; US Census Bureau; McKinsey Global Institute analysis

Europe will need to address occupational and geographic mismatches

As automation adoption continues in the decade ahead, our scenarios suggest that almost all of today's 235 million European workers will face at least some degree of change as their occupations evolve. Occupational and geographic mismatches are likely to emerge as a major challenge over the next decade.

More than 90 million workers may need to develop significant new skills within their current roles, while up to 21 million may have to leave declining occupations. We estimate that 94 million workers (about 40 percent of the 2018 workforce) may not need to switch occupations but will nevertheless have to acquire new skills because more than 20 percent of what they do today can be handled by technology. This phenomenon is likely to happen across all geographic clusters. Automation's biggest effect could be altering jobs rather than diminishing them. In some roles, machines will free up time that can be directed to more productive or interpersonal tasks.

Some of the workers displaced by automation can find new jobs in the same line of work. For example, a cook who loses her or his job in one restaurant may be able to find a similar job in another one. But our analysis finds that 21 million people (9 percent of the workforce) might need to change occupations since their current roles are declining on net in the region where they live (Exhibit 19). Most of these workers are in lower-wage roles such as metal, machinery, and related trade workers; stationary plant and machine operators; sales workers; numerical and material recording clerks; and building and related trades. More than 60 percent of workers in these roles lack tertiary education.

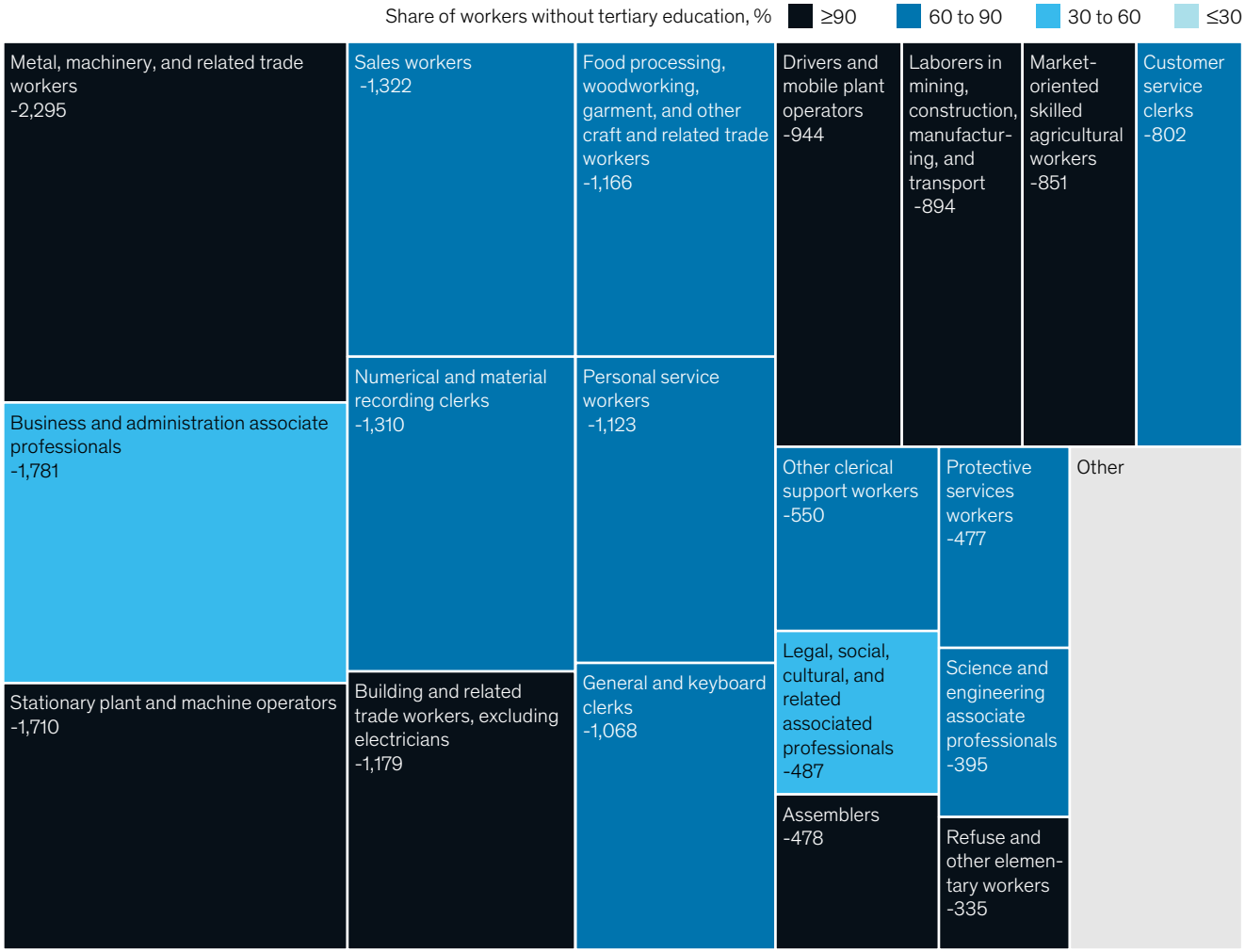
The challenge of redeploying workers will be particularly difficult in agriculture-based regions, educated and emigrating areas, and industrial bases, where more than 12 percent of the workforce may need to move from declining to growing occupations. In megacities and superstar hubs, only 5 percent of the workforce may need to make a similar switch.

Employers, too, may have challenges finding new workers with the skills needed. Many of the fastest-growing occupations, such as software and application developers and nursing professionals, require specialized skills. Today only about 40 percent of Europe's workforce has a tertiary education, but nearly 60 percent of growing occupations require it. Two exceptions are cleaners and helpers, as well as professional care workers—typically low-wage roles. Filling these jobs may be particularly challenging in megacities and superstar hubs, where potential job growth will be highest but housing is in short supply and infrastructure capacity is limited (Exhibit 20).

Exhibit 19

About 21 million workers may need to move from declining to growing occupations by 2030.

Total gross job decline by 2030, declining ISCO2 occupation groups only, thousand[1]



1. Total gross job decline as sum of regional gross job decline of 1,095 local labor markets.

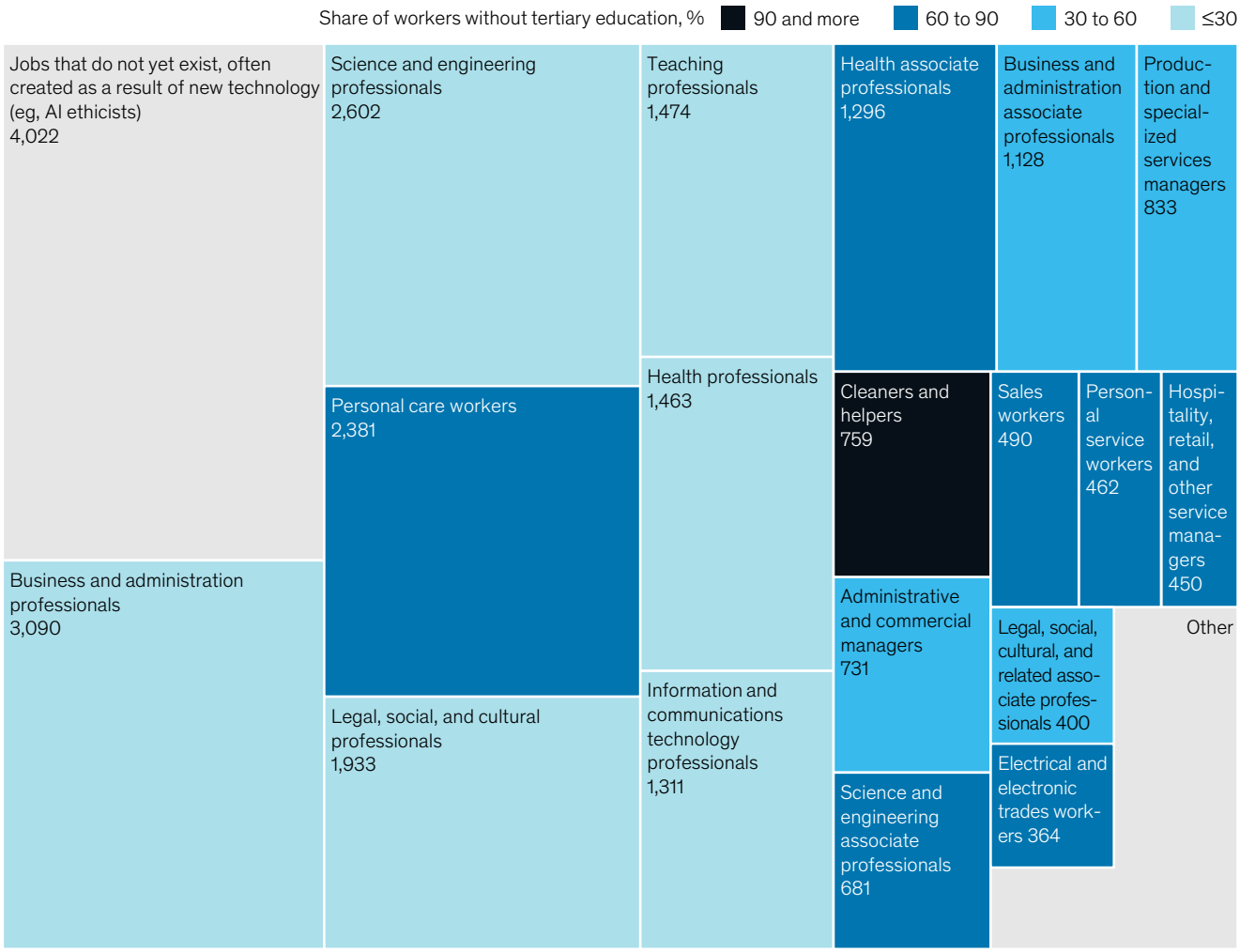
Note: Analysis focused on EU-27 countries plus United Kingdom and Switzerland; based on midpoint automation scenario. Analysis was conducted before COVID-19 pandemic. For discussion of the assumptions, sensitivities, and limitations of our automation scenarios, see *A future that works: Automation, employment, and productivity*, McKinsey Global Institute, January 2017.

Source: Oxford Economics; McKinsey Global Institute analysis

Exhibit 20

Many of the jobs that employers might need to fill by 2030 require a higher level of skills.

Total gross job growth by 2030, growing ISCO2 occupation groups only, thousand[1]



1. Total gross jobs growth as sum of regional gross jobs growth of 1,095 local labor markets.

Note: Analysis focused on EU-27 countries plus United Kingdom and Switzerland; based on midpoint automation scenario. For discussion of the assumptions, sensitivities, and limitations of our automation scenarios, see *A future that works: Automation, employment, and productivity*, McKinsey Global Institute, January 2017.

Source: Oxford Economics; McKinsey Global Institute analysis

Historical career pathways indicate a disconnect between growing and shrinking occupations

European workers have been switching occupations, but in the analysis we conducted together with LinkedIn, we observe that workers typically move into new roles that are "adjacent" to their current ones (that is, they require overlapping or complementary skills). Individuals who enter growing occupations tend to move there from other growing occupations with very high skill adjacencies, whereas those in occupations that are declining because of automation tend to switch to other declining roles.

We examined data from various public online job profiles, most of which belong to high-skill professionals. The data show that more than 70 percent of the workers on the platform changed occupations between 2014 and 2018, with most switching both occupation and employer. We also conducted a survey of more than 7,000 lower-skill workers in eight countries. This, too, showed significant movement between jobs.[30]

[30] France, Germany, Italy, Poland, Romania, Spain, Sweden, and the United Kingdom.

On average, 78 percent of people who moved into the four highly sought-after occupations we evaluated (software engineer, recruiter, talent acquisition specialist, and digital marketing specialist) came from other growing occupations. Of the four declining jobs we evaluated in detail (food server, administrative assistant, salesperson, and accountant), 57 percent of observed transitions ended with the individual taking another job that is declining. For food servers alone, the share topped 75 percent.[31]

People moving from one declining role to another or from one growing role to another often have extensively overlapping skills (as in the case of IT consultants becoming software engineers). This underscores the magnitude of the challenge ahead in helping people move from declining to growing roles.

However, our research also identified several examples of promising pathways. Demand for shop sales assistants is declining. But with additional training, some of the 9.7 million workers in these roles pre-pandemic could draw on their overlapping experience in interacting with people to meet the growing demand for nurses or personal care assistants (both of which are expected to grow by about 25 percent). Administrative assistants could become office managers, an occupation with high skill adjacencies, then use that as a springboard to a broader operations role. Alternatively, an administrative assistant could become a human resources manager (with lower skill adjacencies) and then a recruitment specialist. Despite low skill adjacencies of about 26 percent, food servers could transition into marketing specialist roles with positive growth rates. By using office assistant as a steppingstone, food servers can also become human resources assistants, an in-demand role (Exhibit 21).

However, retraining large numbers of workers will be challenging. The overlap in skills is larger between declining occupations than it is between a declining occupation and one on the rise. This highlights the fact that many people need to acquire new skills if they are going to move into the jobs of the future and have better prospects and stability. Workers in declining occupations cannot rely solely on their current skills in the job market. While we did not analyze occupational transitions by education or skill level, existing research shows that people with higher educational attainment are better able to move from declining to growing occupations.[32]

Several factors could ease potential mismatches. The most important is the generational shift in the labor market. More than 54 million Europeans will enter the workforce between today and 2030, and, for the most part, they are better educated than the almost 68 million who will reach pension age in the same period. Employers will need to collaborate with educational institutions to ensure that new graduates have the skills required for the occupations that need workers.[33]

[31] Note that we examined only moves from one occupation to another that appeared in the data more than 50 times. A long tail of occupational moves is not accounted for in this data.

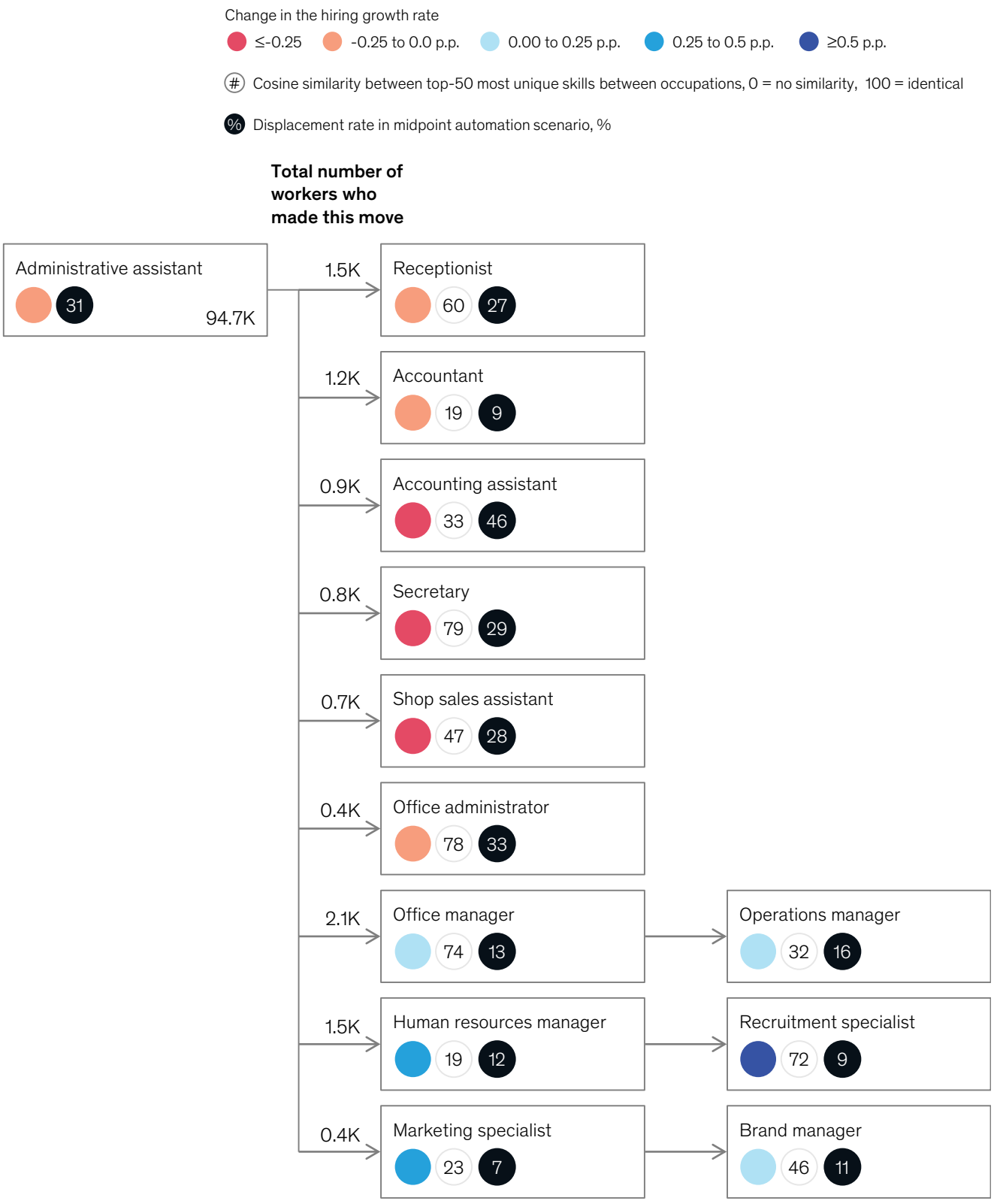
[32] David H. Autor, Frank Levy, and Richard J. Murnane, "The skill content of recent technological change: An empirical exploration," *Quarterly Journal of Economics*, November 2003, Volume 118, Number 4.

[33] *Education to employment: Getting Europe's youth into work*, McKinsey & Company, January 2014; and Katrin Oesingmann, "Youth unemployment in Europe," *ifo DICE Report*, March 2017, Volume 15, Number 1.

Exhibit 21

Generalist low-skill work: Historical analysis suggests that workers in declining/ automatable occupations often transition into other declining/automatable occupations.

Example: From administrative assistant to other declining roles,[1] n = 94,700



1. Occupations in the same ISCO category are consolidated.
Note: For comparison, average modeled displacement rate of all occupations is 21.8%. Analysis was conducted before COVID-19 pandemic.
Source: LinkedIn Economic Graph; LinkedIn analysis; McKinsey Global Institute analysis

Mobility could solve part of Europe's job-matching challenge

The concentration of job growth heightens the importance of labor mobility—within countries and across EU and non-EU countries. By 2030, some 40 percent of Europe's population could live in clusters where jobs are declining overall, and some of those workers may have to move to other regions with better opportunities. Another alternative would be for companies to expand in lower-cost regions or offer more remote and freelance opportunities.

In megacities and superstar hubs, our estimates suggest that less than 60 percent of expected job growth can be filled by existing residents. Filling the remaining 2.5 million openings in these dynamic growth hubs will require millions more migrants (equivalent to 4.4 percent of the current population). Remote work—widely adopted during the pandemic—could account for at least some of these positions, alongside commuting and physical moves.[34] Continuing to add this number of newcomers every year could also require increased investment in affordable housing and infrastructure.

Filling low- to middle-skill occupations will be especially difficult in cities where the cost of living is highest. In Paris, for example, nursing associates (one of the fastest-growing occupations) have an average wage that is less than two-thirds of the average cost of living for a three-person household. Average wages for teachers' aides (another of the fastest-growing occupations) are even lower, at less than half the average household living costs in Paris. Similar gaps between income and living costs—albeit of different sizes—are also found in cities such as Amsterdam, Madrid, Milan, and Munich. This is one area where COVID-19 could have a lasting impact, and slow down the closing of the gaps, as people become less willing to move to cities, where the pandemic spread more widely than in rural areas and was more deadly. Since dynamic high-growth regions are located across 17 European countries, mobility within countries will be important so that people seeking better opportunities can find them in places with the same language and culture. Mobility within countries remains a multiple larger than intercountry mobility. Germans are five times more likely to move from one part of Germany to another than they are to move to another country, for instance.

Employers will need to manage multiple complex issues

In reaction to the pandemic, some companies have started to redeploy idled workers to other activities with higher demand, including temporary reassignments between departments. In addition, they have adapted processes to expedite hiring of people in critical occupations and industries and encourage remote learning.

In the future, companies will be required to display similar adaptability as automation technologies transform work. Organizations need to address three sets of issues: strategy, skills, and social responsibility. First, leaders must establish a strategic vision and determine if they can use new technologies to gain a competitive advantage or defend their market positioning. In addition, the divergence of local economies across Europe will affect patterns of consumer purchasing power and labor costs. Companies may adjust their offerings and geographic footprint in response, affecting capital investment and real estate portfolios. Second, organizations have to assess current workforce skills, determine future needs, and create a road map to bridge the gaps. Third, companies might weigh the impact of their decisions on the communities in which they operate.

[34] This figure on the required inflow to fill jobs counts only workers; it does not include students, children, or retirees, for example.

When it comes to building the workforce of the future, every organization will have to forge its own path. But there are some common priorities, starting with the need to develop new skills. Retraining employees who have proven track records and potential can be about 1.5 to three times cheaper than hiring new talent.[35] Promoting a culture of continuous learning and growing can have the added benefit of boosting employee engagement.

Many firms across industries are competing for well-educated and digitally fluent professionals. While Europe has a number of well-known hotbeds of tech innovation, the higher associated costs and competition for hiring could lead some firms to opt for remote work or expand in less obvious regions. To acquire scarce talent, companies need to invest in recruiting and develop creative ways of identifying unconventional candidates. In some cases, firms may simply opt to make an acquisition to gain capabilities overnight. Others may engage freelancers and temporary contractors on a project basis.

One key challenge for employers will be deciding how current workers might fit into other roles and which individuals have the potential to make those moves. Cashiers are unlikely to become coders overnight, but they can become sales associates. The upfront evaluation of existing skills is an important first step in deciding what path each employee might take.

Not all employees affected by technological change will find new opportunities within their current company. Despite their best efforts, some may fall short of acquiring the skills needed to make the transition to new areas of work. Others may prefer to seek new employment instead of undergoing training and changing what they do. Companies that decide to release workers can offer outplacement assistance as a matter of good corporate citizenship. Firms can make arrangements and form partnerships with other local employers to support workers in acquiring skills likely to be useful elsewhere and encourage people to explore new roles—for example, at suppliers or vendors.

While all companies will need to grapple with these broad issues, the specifics vary substantially for employers with different types of workforces and products or services. Based on skill levels and geographic footprint, most European employers fit into nine types with different challenges and choices (Exhibit 22).

[35] Society for Human Resource Management, *Human capital benchmarking report*, November 2016.

Exhibit 22

Workforces can be segmented into nine archetypes based on skill level and geographic footprint, with varying challenges for employers.

Number of workers in 2018 | Automation displacement rate[1] | Share with tertiary education

Workforce archetypes based on skill level and geographic footprint		Challenges and priorities for employers
High-tech producers 10M–15M 15–20% 55–60%	Workers in advanced industries (such as automotive) with both technological and manufacturing skills. Often concentrated in rural areas or small towns.	• Attracting (STEM) talent with advanced technical and digital skills • Promoting culture of lifelong learning, continuous improvement, agility, and innovation, to enable retraining and redeployment of existing workforce toward more productive tasks
ICT professionals 5M–10M 15–20% 65–70%	High-wage workers with advanced digital skills that are in high demand in almost all sectors.	• Attracting and retaining tech talent • Creating platforms that support remote work to broaden the hiring pool to other markets and employ temporary workers and contractors for project work
High-skill white-collar workers 20M–25M 10–15% 55–60%	High-wage professional service roles requiring at least a tertiary education (eg, accounting). Often concentrated in urban areas.	• Offering training and coaching for social and emotional skills to facilitate growing focus on customer experience and client relationships • Upgrading skill set of workforce toward advanced data analytics to allow integration of digital tools into all functions
Specialized practitioners 35M–40M 10–15% 60–65%	Educated and mostly high-wage workers with industry-specific expertise (eg, law and medicine). Found in every community.	• Deciding which functions to keep in communities and which can be handled by independent contractors or remote workers, to ensure accessibility of service (eg, health care) in rural areas • Handling upward pressure on wages due to limited supply of many types of specialized practitioners
Mid- to low-skill white-collar workers 35M–40M 25–30% 35–40%	Workers in highly automatable administrative and office support occupations (eg, call centers).	• Implementing large-scale training programs and creating redeployment paths to retrain workers to fill new digital roles or shift some into more customer-facing roles
Makers and extractors 40M–45M 30–35% 10–15%	Geographically concentrated, low- to middle-skill workforces performing physically intensive or repetitive tasks (eg, manufacturing production), often with low turnover.	• Building technical and digital capabilities and creating redeployment paths for existing workforce • Workforce decisions can have major ripple effects in local communities
Local tradespeople 25M–30M 25–30% 15–20%	Workers who perform a high share of unpredictable work (such as repair). Often found in small and medium-size enterprises (SMEs).	• Building digital capabilities within existing workforce to be able to develop and implement new business models that increase innovation and productivity • Competing with larger enterprises to attract and retain talent
Builders and transporters 20M–25M 20–25% 10–15%	Workers with medium density of automatable activities, especially in physically intensive but unpredictable environments (eg, parcel delivery).	• Retraining or attracting talent needed to install, maintain, and use new technology systems • Deciding whether to retrain existing workers or whether natural attrition and retirement will allow workforce to evolve organically
Frontline labor 30M–35M 20–25% 10–15%	Customer-facing roles, often low skill and high turnover. Employers often have dispersed geographic footprint (eg, retail).	• Economics of retraining are challenging given high turnover and automatability of early-stage jobs • Understanding changing consumer demand on local level to prompt resizing of locations • Enabling workforce to focus on customer experience

1. Midpoint automation scenario.
Note: Analysis of long-term labor market trends and impact of automation was conducted before COVID-19 pandemic. Analysis focused on EU-27 countries plus United Kingdom and Switzerland.

Source: Eurostat; Oxford Economics; McKinsey Global Institute analysis

The choices European governments make today will determine how the future of work unfolds

During the COVID-19 crisis, governments across Europe put policies in place to cushion the economic downturn and reduce the risk of mass jobs losses. In designing measures to spur economic recovery after the pandemic, leaders will need to keep in mind issues relevant in the longer term. Each of the more than 1,000 local labor markets we analyzed has its own strengths, challenges, and unique starting point—and each will need to set its own priorities to address today's issues and tomorrow's eventualities (Exhibit 23). The strategies in a superstar hub may look very different from those in a shrinking agricultural region with lower educational attainment. Trailing opportunity and public sector–led regions may need to focus on creating jobs through sector-specific economic development strategies designed to attract investment and help new industries take root. In many of these places, tackling stubbornly high youth unemployment with career counseling and vocational training is a logical priority. All regions with shrinking workforces will need to focus on attracting and retaining high-skill workers as well as boosting participation among women and older workers.

Manufacturing production work is highly automatable, and many of the jobs that remain in smart factories will require a higher level of technical and digital skills. Helping some of today's factory workers gain technology skills so they can qualify for these new and better jobs will be a key challenge for industrial bases and high-tech manufacturing areas. Other workers will need training and support to change occupations altogether.

In Europe's most prosperous cities, many workers are struggling to keep up with the rising cost of living. Megacities and superstar hubs need to add more affordable housing in and near employment centers and improve transit connections with surrounding regions. These locations will have to accommodate an ongoing wave of new arrivals to fill the jobs they are projected to add at both the low and high ends of the wage scale. Here we highlight four issues that are common to many regions.

Exhibit 23

Local labor markets in Europe face a range of different challenges and priorities.

Share of population, 2018 | Predicted change in working-age population, 2018–30 | Share of potential employment growth, 2018–30

		Priorities
Dynamic growth hubs	**Megacities and superstar hubs** 20% 3% 52%	• Add affordable housing and improve transportation infrastructure for commuters • Invest in STEM and healthcare education, continue attracting STEM professionals to meet increased demand • Create job opportunities for middle- and low-skill workers through targeted training and placement • Companies may allow more remote work or consider expanding in lower-cost regions to be able to fill jobs
Stable economies	**Service-based economies** 17% -3% 18%	• Create sector-specific economic development strategies to attract investment in high-growth industries • Invest in STEM and healthcare education, attract STEM professionals to meet growing demand
	High-tech manufacturing centers 5% -6% 2%	• Diversify industry mix with more service-based sectors • Retrain employees in highly automatable jobs to meet demand for future skills • Increase educational attainment and STEM skills to continue developing and integrating innovative technologies
	Diversified metro and non-metro areas, tourism havens 28% -4% 21%	• Improve connectivity through public and digital infrastructure • Create sector-specific economic development strategies to attract investment and seed higher-value-added sectors • Promote entrepreneurship and innovation • Improve quality of jobs in low-wage regions
Shrinking regions	**Industrial bases, educated and emigrating areas, agriculture-based regions, and aging population regions** 20% -10% 3%	• Encourage remote work through incentives for companies and build-out of digital infrastructure • Attract and develop more future-oriented sectors to counter emigration of high-skill workers • Retrain low-skill workers in highly automatable jobs (in industrial bases and agriculture-based regions)
	Trailing opportunity and public sector–led regions 10% -7% 5%	• Spur job creation through targeted economic development strategies to attract investment • Promote entrepreneurship, fund innovation, and improve business environment • Increase educational attainment and STEM skills • Train long-term unemployed and help them reintegrate into an evolving labor market

Note: Analysis focused on EU-27 countries plus United Kingdom and Switzerland; employment projections based on midpoint automation scenario. This analysis of long-term labor market trends and impact of automation was conducted before COVID-19 pandemic. Figures may not sum to 100% because of rounding.

Source: Eurostat; Oxford Economics; McKinsey Global Institute analysis

Europe needs to create more training and career pathways

Effective training programs, better job matching, and transition support will all be critical to helping individuals chart new career pathways. Over the longer term, every country in Europe needs to ensure that its educational system is preparing students to succeed, with particular emphasis on the abilities required for in-demand jobs, such as STEM skills. Creating partnerships between educators and employers (potentially also involving the government and business associations) could help in the design of career-relevant curricula. Successful models such as Germany's vocational training and apprenticeship system can be replicated on a wider scale.

Because the need for particular skills keeps evolving rapidly, the old model of front-loading education early in life is no longer enough to serve people for their entire careers. Workers need easy access to effective programs through which they can acquire new and more relevant skills. Employers will be the natural providers of training opportunities for many, and policy makers can consider providing incentives to companies that invest in workforce development. But individuals who have to find new positions will need access to training programs outside their current workplace. Meeting the scale of this need will require mobilizing Europe's existing educational system (which is mostly governed on the national or subnational level), networks of labor agencies, training infrastructure, and new digital technologies. The most promising programs need to be replicated widely and perhaps scaled up with online training modules.

A labor market undergoing this degree of change also needs more efficient matching. Digital platforms can help to provide transparency about which jobs are in demand, assess individuals' skills and natural aptitude, and suggest appropriate career choices based on competencies rather than formal qualification.[36] Creating a consistent taxonomy of workforce skills and a standardized set of credentials could underpin more efficient digital marketplaces.

As became painfully apparent during the pandemic, policy makers will need to look at modernizing and strengthening the social safety net to support people transitioning between jobs.

Access to jobs in dynamic growth hubs needs to be expanded

Modern technology often favors the labor markets of bigger cities. Residents in many of Europe's dynamic growth hubs are already coping with congestion and high housing costs. In the years ahead, still more workers will be needed, since the current population is likely to fill only 60 percent of new jobs. To fulfill the rest of their growth potential, these cities will need to keep attracting an influx of new workers at roughly the same rate as in the past.

Investing in transit infrastructure around major metropolitan areas to expand what constitutes a viable commute is one way to increase mobility. Addressing the affordable housing shortage in these fast-growing urban areas would enable people who do want to move for better opportunities to do so.

Geographic mobility alone may not solve this issue. If workers cannot move to the jobs, the jobs may need to move to them. Employers in dynamic growth hubs may decide to expand their operations into other regions. With remote work on the rise, and heavily used during the pandemic, they can also hire remote workers or turn to freelancers and outsourcing to expand their talent pool beyond their immediate environs (see Box 4, "The workplace goes virtual"). All of these decisions could help to alleviate unbalanced growth.

Box 4

The workplace goes virtual

There is growing recognition that remote work can substitute for labor mobility.[1] From digital networks and file sharing to conference calls and video chats, technology makes it increasingly feasible for employees to be productive without being physically present in an office. Indeed, the COVID-19 pandemic was notable for the relative ease with which millions of workers switched to working from home, using both existing and relatively new tools, such as Zoom videoconferencing.

This development can enable companies in booming cities to tap into a broader talent pool while reducing the amount of office space they need in expensive real estate markets. It also reduces the pressure of local labor shortages and essentially enlarges the labor market. One study in the Netherlands found that the spread of remote work increases the size of the local labor market by about 25 percent.[2]

This type of shift can address unbalanced growth by simultaneously relieving some pressure on crowded dynamic growth hubs and opening up new opportunities for people in shrinking regions. Since remote work may be flexible and eliminates the need to commute, it can be an attractive proposition that boosts labor participation and helps companies fill jobs.[3] It may also foster employee satisfaction and retention.[4]

1 S. G. Absalyamova and T. B. Absalyamov, "Remote employment as a form of labor mobility of today's youth," *Mediterranean Journal of Social Sciences*, 2015, Volume 6, Number 1.
2 Duco de Vos, Evert Meijers, and Maarten van Ham, "Working from home and the willingness to accept a longer commute," *Annals of Regional Science*, July 2018, Volume 61.
3 Eurostat, "Working from home in the EU," June 2018.
4 Jon M. Jachimowicz et al., "Between home and work: Commuting as an opportunity for role transitions," *Harvard Business Review* working paper number 16-077, January 2016.

Shrinking labor markets need targeted economic development strategies

For policy makers, the prospect of even more polarized job, GDP, and population growth carries the risk of exacerbating social tensions and inequality. Many questions about industrial policy, skills development, urban development, and mobility will need to be debated, and some involve difficult trade-offs. We estimate that the number of Europeans living in regions with shrinking labor markets is likely to grow over the next decade (Exhibit 24).

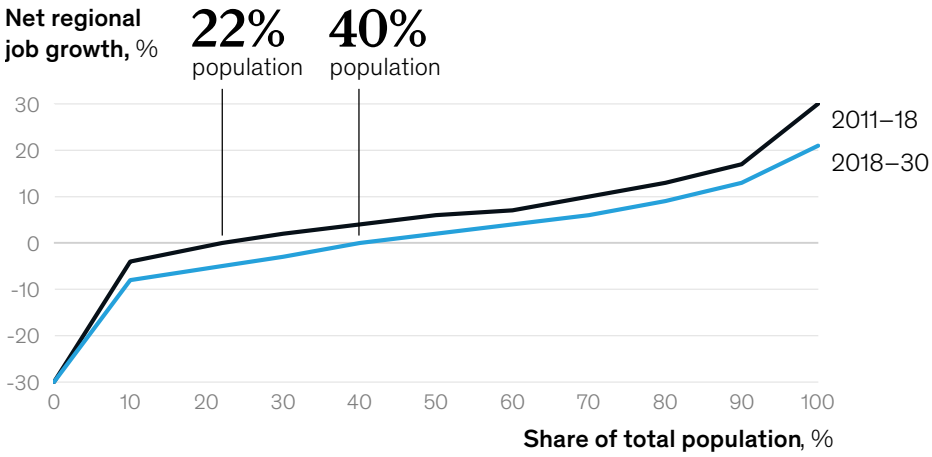
Policy makers will need to decide whether and how to invest public money or attract private funds into areas in relative decline to revitalize their economies. EU programs such as Horizon 2020 and the Cohesion Policy can be sources of funding and collaboration; the latter has the explicit goal of investing to reduce regional disparities.[37] A common strategy pursued by local governments is providing economic incentives to entice companies to relocate; the COVID-19 pandemic could in any case accelerate moves by companies out of large cities. Subsidies may be part of the tool kit, but they need to respect competition policy, be backed by a rigorous business case, and advance a more holistic economic development plan.

37 *Horizon 2020*, European Commission.

Regions that are losing workers or need to help their workforces develop the skills of the future may have to boost investment in local educational institutions or provide financial incentives to attract skilled outsiders. It may not be possible to turn around every shrinking region. But the residents who live in distressed places still need sufficient infrastructure and public services such as education and healthcare. Their own tax base may not cover these services, and when that is the case, regional, federal, and EU programs might be needed. Healthcare services in particular will be a critical concern as the population ages. Investment in mobile doctors or telemedicine can help to bridge these gaps.[38]

Exhibit 24

By 2030, as many as 40 percent of Europeans may live in regions with shrinking labor markets.



Main levers

- Encourage new investment in distressed areas
- Create incentives for companies to relocate
- Attract skilled and highly educated workers
- Guarantee provision of services in declining regions

Note: Analysis focused on EU-27 countries plus United Kingdom and Switzerland; analysis of long-term labor market trends and impact of automation was conducted before COVID-19 pandemic.
Source: Oxford Economics; McKinsey Global Institute analysis

Europe needs to keep raising labor market participation

In the short term, Europe's major challenge is to support incomes for workers affected by COVID-19, and for some to transition to new jobs. In the longer run, when the economy recovers, the challenge could be very different: it may be necessary to raise labor participation to deal with the decreasing working-age population. To boost employment rates, national governments may have to consider broad labor market and pension reforms. One logical place to start is getting more willing workers off the sidelines, focusing on demographic groups where there is room for growth.

Employment has been rising sharply among workers over age 55, but more can be done to keep this cohort actively engaged in the labor market. One option is reforming the pension system, for instance by changing the statutory retirement age to reflect rising life expectancies. Another is creating more flexible part-time roles so that people retire in stages.

Women accounted for most of the recent increase in employment across Europe, but their labor force participation remains significantly below that of men, in part because women in Western Europe still do two-thirds of all unpaid care work, including housework, childcare, and eldercare.[39] Employers can attract and retain women by offering more flexible schedules, part-time work, and remote work options that can help with this balancing act. Governments can also provide tax incentives for second earners in a family and ensure that public childcare and eldercare programs are affordable and widely available.

[38] Heike E. Krüger-Brand, "Mobile Versorgung: Praxis auf Rädern," *Aerzteblatt,* 2013.
[39] Sandra Sancier-Sultan and Julia Sperling, *Women and the future of work: A window of opportunity in Western Europe?*, McKinsey & Company, November 2018, McKinsey.com.

Employment for 15- to 24-year-olds decreased by about 4 percent from 2002 to 2018, mainly driven by longer periods spent in education and sharp declines in Southern Europe during the crisis years. This development relates to a protective environment for older workers with existing contracts, while younger workers struggle to enter the labor market, creating a so-called insider-outsider dynamic. To support youth employment, governments and businesses need to ensure that educational systems are equipping graduates with relevant skills and that vocational training, apprenticeships, and high-quality career counseling are available. Policy makers may want to consider tax incentives and subsidies for companies that hire and train young people as well as reforms that address the insider-outsider dynamic.[40]

Europe may take years to overcome the COVID-19 economic and employment crisis, but governments and companies still need to keep long-term trends in mind. With accelerated automation adoption, demographics could work in Europe's favor; based on the expected decline in labor supply, Europe may even find it challenging to fill the jobs available. Helping individuals connect with new opportunities and prepare for the jobs of tomorrow will challenge every community across the EU. Even as Europe focuses on the immediate aftermath of the pandemic, now is the time to think further ahead and reimagine the future of work.

[40] This link is debated in economic literature. See, for example, Clemens Noelke, *The consequences of employment protection legislation for the youth labor market*, MZES working paper number 144, 2011.

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