



FUTURE OF WORK

THE GLOBAL TALENT CRUNCH

A global talent crisis could cost nations trillions of dollars in unrealized annual revenues, new Korn Ferry study finds.

The talent crunch—an imminent skilled labor shortage affecting both developed and developing economies—could ultimately shift the global balance of economic power by 2030 if left unaddressed.

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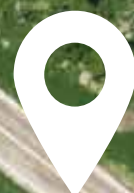
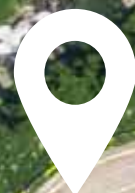
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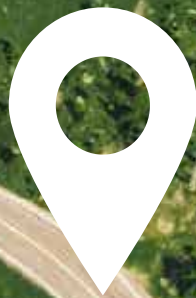
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(EMEA).

Asia Pacific.

The last word.





About this study.

This study estimates the impending talent crunch by modeling the gap between future labor supply and demand. We uncover the extent of the talent shortfall in 20 major economies at three milestones: 2020, 2025, and 2030. The model focuses on three knowledge-intensive sectors within each market that act as critical drivers of global economic growth: financial and business services; technology, media, and telecommunications (TMT); and manufacturing, and also examines the remainder of each economy. Using level of education as a commonly accepted proxy for skills, and taking into account forecast productivity gains, the study uses available data to forecast shortages for highly skilled, mid-skilled, and low-skilled workers to reveal an imminent talent crunch.

Introduction.

A major crisis is looming over organizations and economies throughout the world. By 2030, demand for skilled workers will outstrip supply, resulting in a global talent shortage of more than 85.2 million people. Signs are already emerging that within two years there won't be enough talent to go around. In countries with low unemployment and booming manufacturing production, including the Czech Republic, Poland, Hungary and Slovakia, a labor shortage has already accelerated automation and increased use of robotics—not to replace people, but because there aren't enough of them to fill the factories.

Left unchecked, the financial impact of this talent shortage could reach \$8.452 trillion in unrealized annual revenue by 2030, equivalent to the combined GDP of Germany and Japan. The United States alone could miss out on \$1.748 trillion in revenue due to labor shortages, or roughly 6% of its entire economy. While leaders are betting heavily on technology for future growth—a 2016 Korn Ferry survey found that 67% of CEOs believe technology will be their chief value generator in the future of work—they cannot discount the value of human capital. Even companies that are using more robotics foresee a growing need for human talent with advanced skills; for example, redeploying people from the factory floor, where robots can perform repetitive work, to the research laboratory. The problem, however, is the mismatch between technological advances, including automation, artificial intelligence (AI), and machine learning, and the skills and experience workers need to leverage these advanced tools. Technology cannot deliver the promised productivity gains if there are not enough human workers with the right skills. This has set the scene for a global talent crunch.

The talent crunch, as modeled in this study, refers to the gap between talent supply and demand at

three critical milestones: 2020, 2025, and 2030. This report seeks to help leaders successfully plan and execute on their strategies, despite the risk, by examining the scale, impact, and timing of the talent crunch and what it means for organizations over the long term. For this study, we assessed the talent-supply gap in 20 developed and developing economies across the Americas (Brazil, Mexico, the United States), Europe, the Middle East, and Africa (EMEA; France, Germany, the Netherlands, Russia, Saudi Arabia, South Africa, the United Arab Emirates, and the United Kingdom), and Asia Pacific (Australia, China, Hong Kong, India, Indonesia, Japan, Malaysia, Singapore, and Thailand). What we found is that global growth, demographic trends, underskilled workforces, and tightening immigration mean that even significant productivity leaps enabled by technological advances will be insufficient to prevent the talent crunch.

More granularly, we examined talent supply and demand in each of the 20 economies as a whole and within three major knowledge-intensive industries—financial and business services (including insurance and real estate), technology, media, and telecommunications (TMT), and manufacturing—and at three distinct skill levels, referenced throughout as:

1. **Highly skilled workers (Level A):** These individuals have completed post-secondary education, such as college or university, or a high-level trade college qualification.
2. **Mid-skilled workers (Level B):** These individuals have attained upper secondary education, such as high school, or a low-level trade college qualification.
3. **Low-skilled workers (Level C):** These individuals have less than upper secondary education.



Our findings forecast the scale and impact of the talent crisis at each milestone in terms of skilled employee shortages and what they imply in terms of lost opportunity for value creation. For instance, the United States' financial services sector will suffer the most from stunted growth due to lack of talent, with \$435.69 billion in projected unrealized economic output, equal to about 1.5% of the country's entire economy. For the all-important technology sector, we found that a labor-skills shortage will reach 4.3 million workers by 2030, or 59 times the number of employees of Alphabet, Google's parent company. On the positive side, India is projected to have a skilled-labor surplus of around 245.3 million workers by 2030, the only country in our study expected to have a surplus, owing mainly to its vast supply of working-age citizens and government programs to boost workers' skills.

Fortunately, there is time to mitigate the risk. Governments and organizations must make talent strategy a key priority and take steps now to educate, train, and upskill their existing workforces.

This report will help leaders understand how talent shortages are impacting their sectors and the regions where they operate so they can immediately begin to address the talent crunch—before they fall behind and suffer the economic consequences. Time is running out.



85.2
million workers

\$8.5
trillion
unrealized
revenue



Overview: The global perspective.

By 2030, we can expect a talent deficit of 85.2 million workers across the economies analyzed—greater than the current population of Germany. The shortfall of Level A workers could equal 21% of the highly skilled workforce of the 20 countries in our study. India is the only country analyzed that can expect a talent surplus, driven by a burgeoning working-age population.

This global skills shortage could result in \$8.452 trillion in unrealized annual revenue by 2030—equivalent to the combined GDP of Germany and Japan.

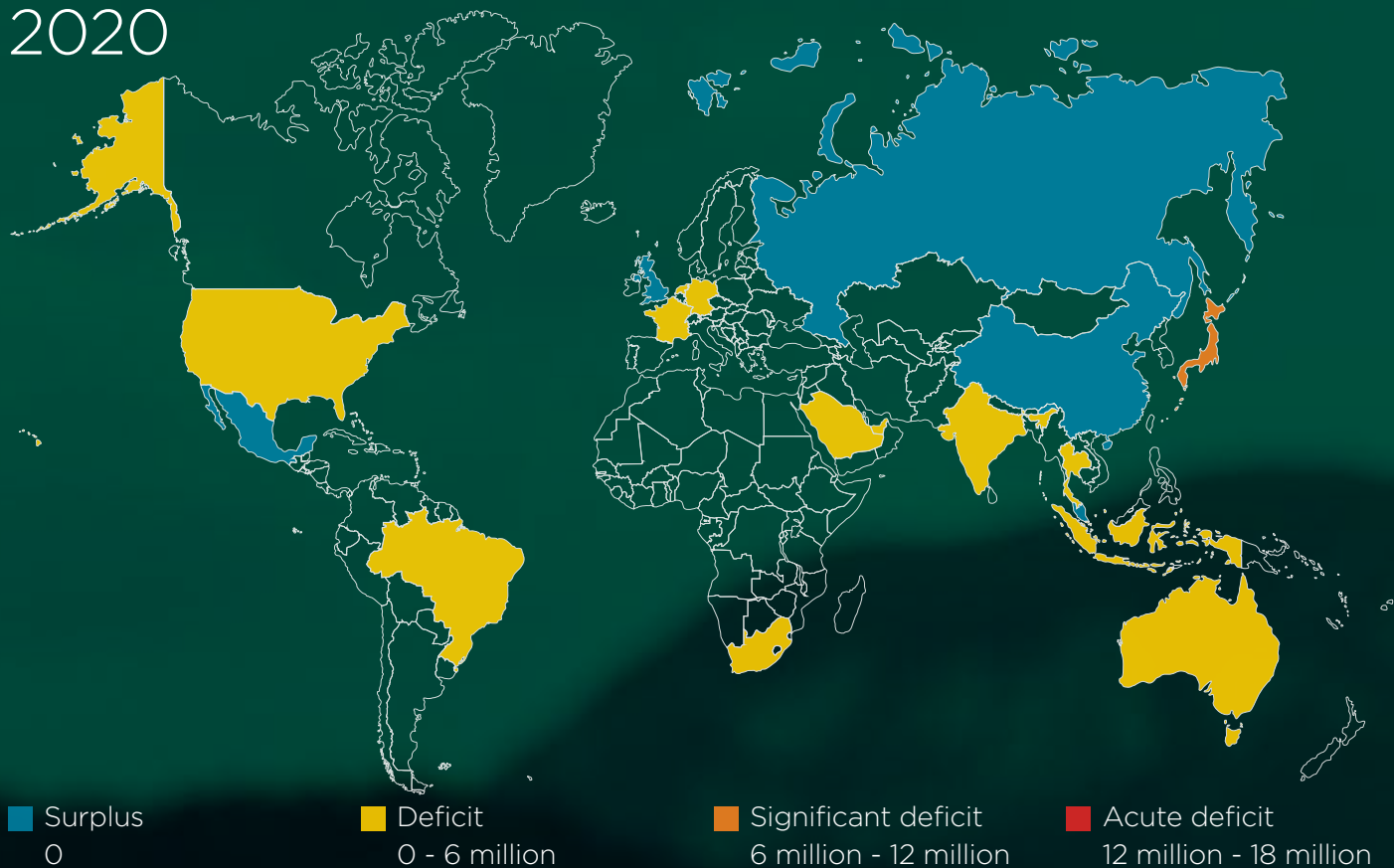
The impact of the talent crunch is so significant that the continued predominance of sector powerhouses is in question, from London as a global financial services center to the United States as a technology leader to China as a key manufacturing base.

As a result, organizations may be prompted to relocate their headquarters and operational centers to places where the talent supply is more plentiful. Governments will be forced to invest in improving their people's skills to avert corporate flight and to defend their nations' income and status.

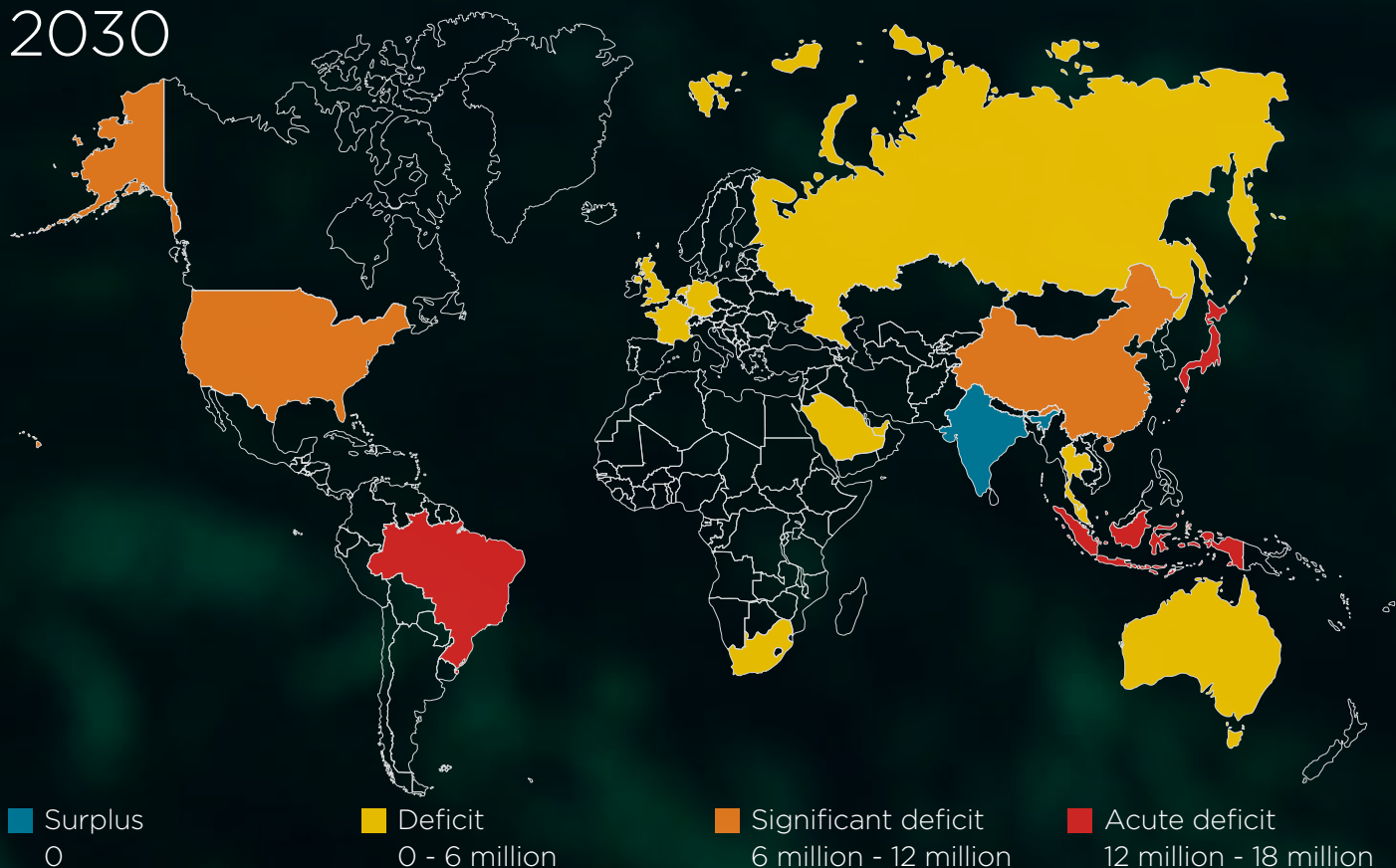
Total global talent deficit by economy

These heat maps show the intensity of labor shortages across the economies analyzed, and demonstrate how shortages will worsen between 2020 and 2030. The acuteness of an economy's deficit is based on its overall shortage of workers, not accounting for the size of its total workforce.

2020

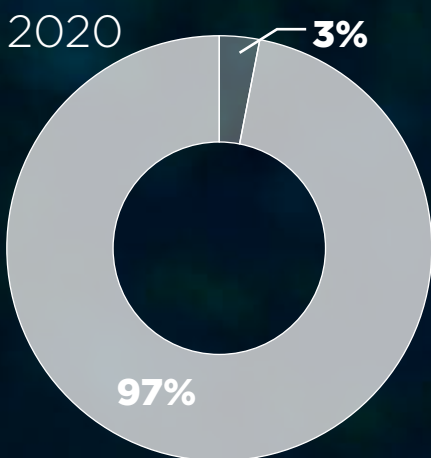


2030

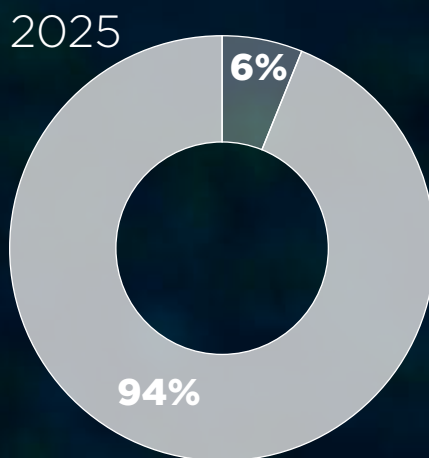




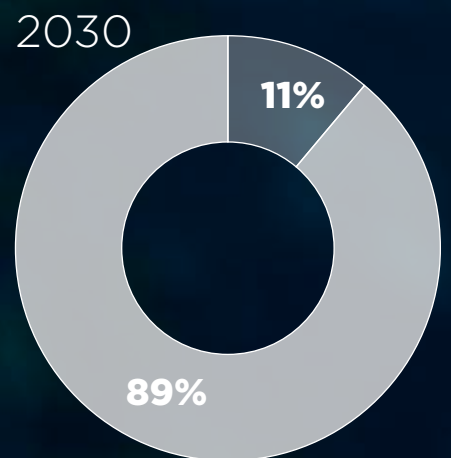
Total global labor deficit as a percentage of workforce



Unrealized output due to labor deficit
\$2.1 trillion



Unrealized output due to labor deficit
\$3.8 trillion



Unrealized output due to labor deficit
\$8.5 trillion

Workforce Labor Deficit

The sector perspective.

Financial and business services.

Could talent shortages threaten financial services?

2030: Labor skills shortage of 10.7 million workers and unrealized output of \$1.313 trillion.

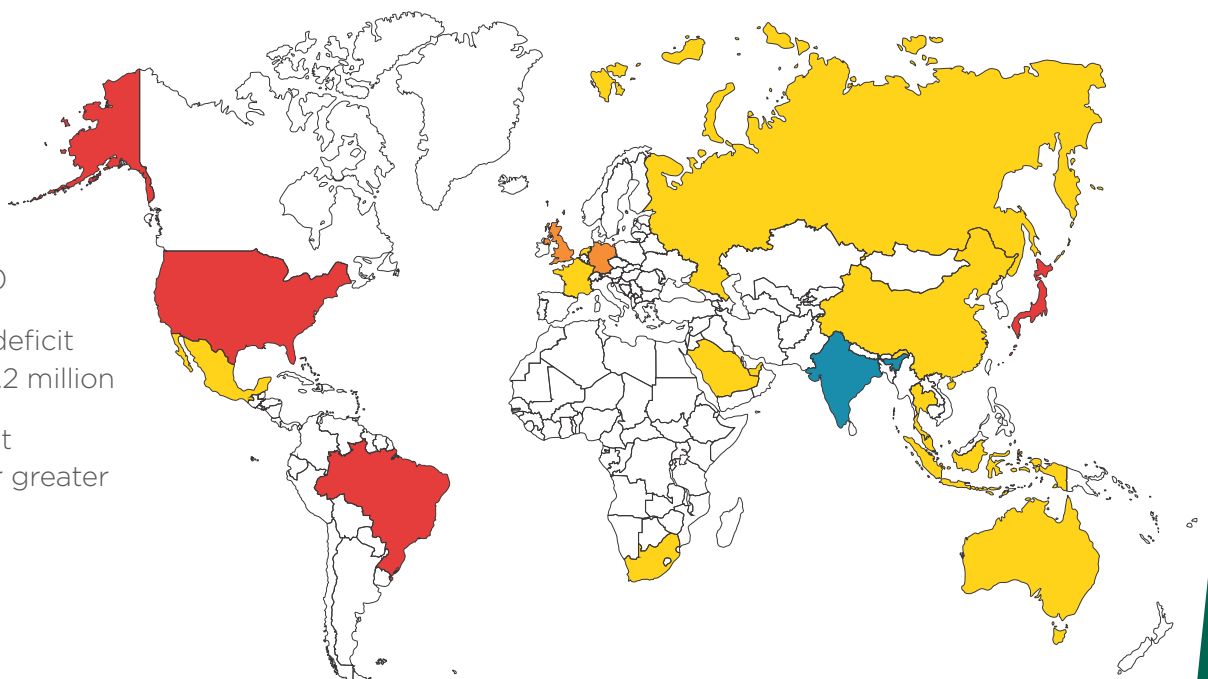
Financial and business services is one of the world's most important sectors in terms of contribution to GDP and it's the sector most threatened by severe talent shortages. Our study forecasts a deficit of 10.7 million workers by 2030, equivalent to more than 45 times the global workforce of HSBC Bank.

- Markets in our study could miss out on generating \$1.313 trillion of revenue by 2030 due to skills shortages in the financial and business services sector.
- The top five financial centers in our study—the United States, China, the United Kingdom, Germany, and France—could fail to generate \$870.47 billion by 2030, with the United States accounting for half of this (equivalent to 1.5% of the projected 2030 US economy).
- European financial centers like the UK and Germany could struggle to retain their global positions due to looming skilled-talent shortages, with the UK facing a skills shortage equivalent to a fifth of its sector workforce by 2030.
- Japan, the world's sixth biggest financial center, could fail to generate \$113.62 billion in 2030, equivalent to more than 18% of the sector's potential value in 2030.
- India is the only country expected to have a surplus of highly skilled financial and business services labor by 2030.

Global financial and business services talent deficit by economy

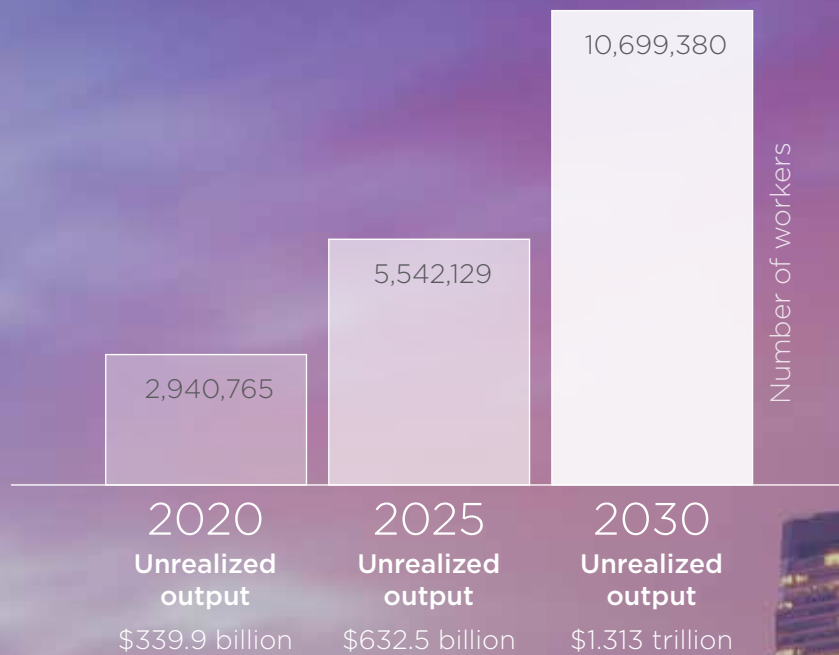
2030

- Surplus
0
- Deficit
0 - 600,000
- Significant deficit
600,000 - 1.2 million
- Acute deficit
1.2 million or greater



The acuteness of an economy's deficit is based on its overall shortage of workers, not accounting for the size of its total workforce.

Financial and business services labor deficit.



A significant sector with significant shortages.

The knowledge economy—dominated by financial and business services—is a key economic driver for both developed and developing markets. In the United States and the United Kingdom, the sector now comprises roughly a third of the economy, and in Germany it represents almost a quarter. In the United Arab Emirates, it now makes up 23% of the nation's economy, and in China it could contribute 17% to the country's economy by 2030.

But talent is already tight in financial and business services, with rapid changes creating a mismatch between available workers and vacant positions. Labor shortages in this sector are the most acute and could potentially inflict the greatest damage on growth, accounting for more than 16% of the total unrealized revenue that our research projects by 2030.

Financial centers feel the pinch.

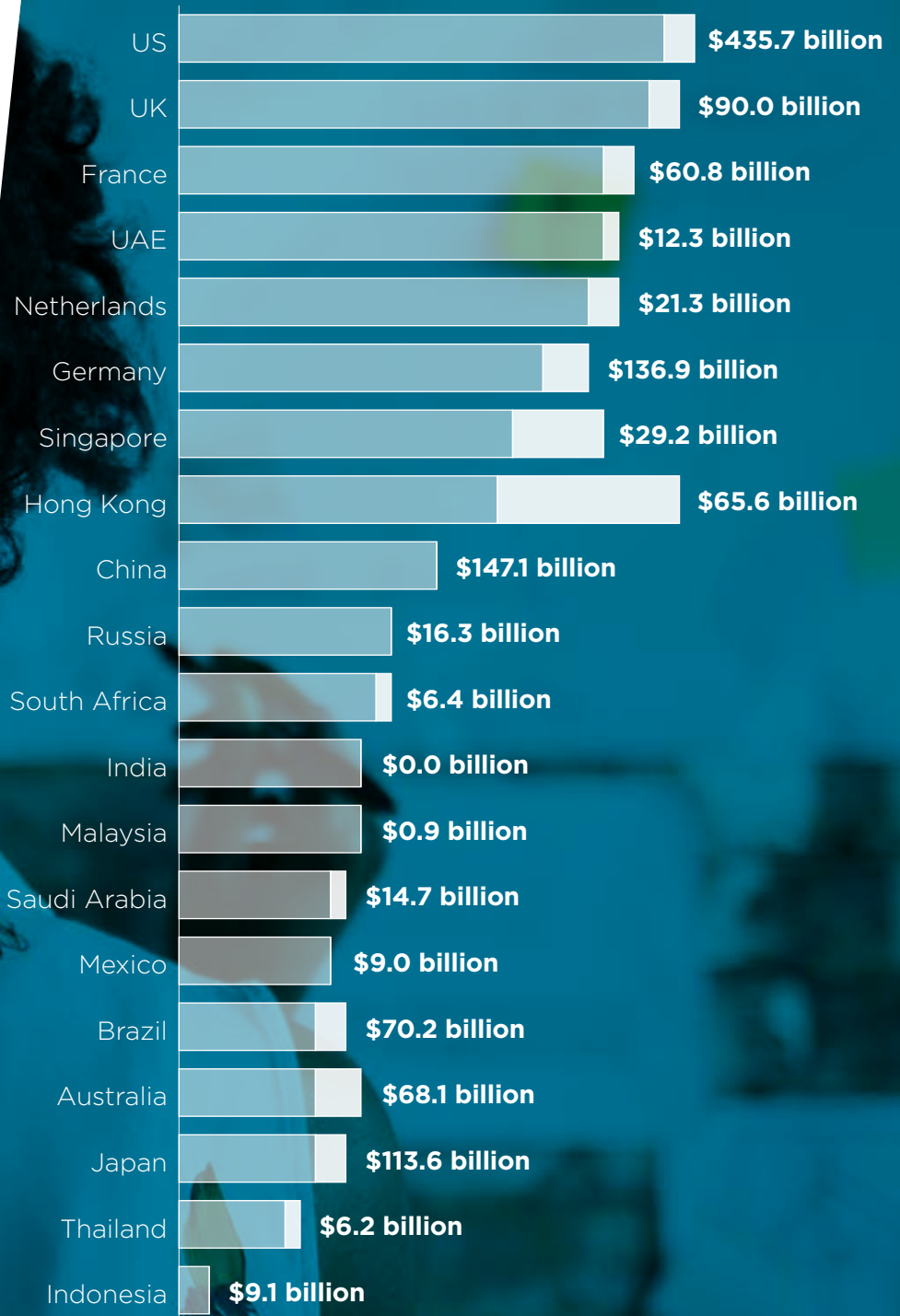
While in the near term (2020), a handful of countries including China, Russia, and the UK are expected to have small surpluses at Level A (highly skilled talent), the picture shifts in the years ahead. The UK, United States, Singapore, and Hong Kong—home to some of the world's leading financial centers—will experience a combined deficit of 2.6 million Level A workers by 2030, according to Korn Ferry research. Talent shortages in this sector across the 20 economies analyzed could result in \$1.313 trillion in unrealized revenue.

The United States' financial services sector is projected to suffer the most. The \$435.69 billion shortfall forecast not only accounts for a third of the global sector total in the research's findings, but also is equal to 1.5% of the whole US

economy. At the global level it's easy to see why skilled-worker deficits in places like the US can have such a huge impact on total sector revenues. Just three economies among the 20 studied—the United States, China, and Germany—will make up almost 40% of the total financial and business services worker deficit at Level A by 2030.

In fact, the only place where a supply of Level A workers will grow faster than demand between 2020 and 2030 is India, which is expected to have a 1.1 million surplus by 2030. India is currently the eighth biggest financial and business services market in the firm's study, but this pool of highly skilled labor could boost it above other markets where talent supply is drying up.

Impact of labor shortage on financial and business services sector at 2030



0% 5% 10% 15% 20% 25% 30% 35%

■ Unrealized output as a percentage of economy at 2030
 ■ Economy at 2030

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Global financial services players are already experiencing skilled-talent shortages and are set to face the greatest talent gap of any industry sector in the next decade. Financial services leaders need to act now or they will forfeit substantial growth opportunity.

Michael Franzino,
President, Global
Financial Services,
Korn Ferry

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Small economies struggle.

The talent crunch will be even more damaging for small but currently mighty spots Hong Kong and Singapore. By 2030, Hong Kong's financial services skills shortages will result in lost revenue equal to a staggering 12% of its total economy, while Singapore's could be equivalent to 6% of its economy.

Michael Franzino, president, Global Financial Services, Korn Ferry: "For a small economy, the most important resource is its people, and opportunities for growth are closely aligned to the skills of the population. Small economies like Hong Kong and Singapore have limited opportunities for expansion, so upskilling the existing workforce is critical. Human resource development holds the key both to economic development and reducing inequality by enabling local populations to achieve their potential."

Technology, media, and telecommunications (TMT).

Could talent shortages slow the digital revolution?

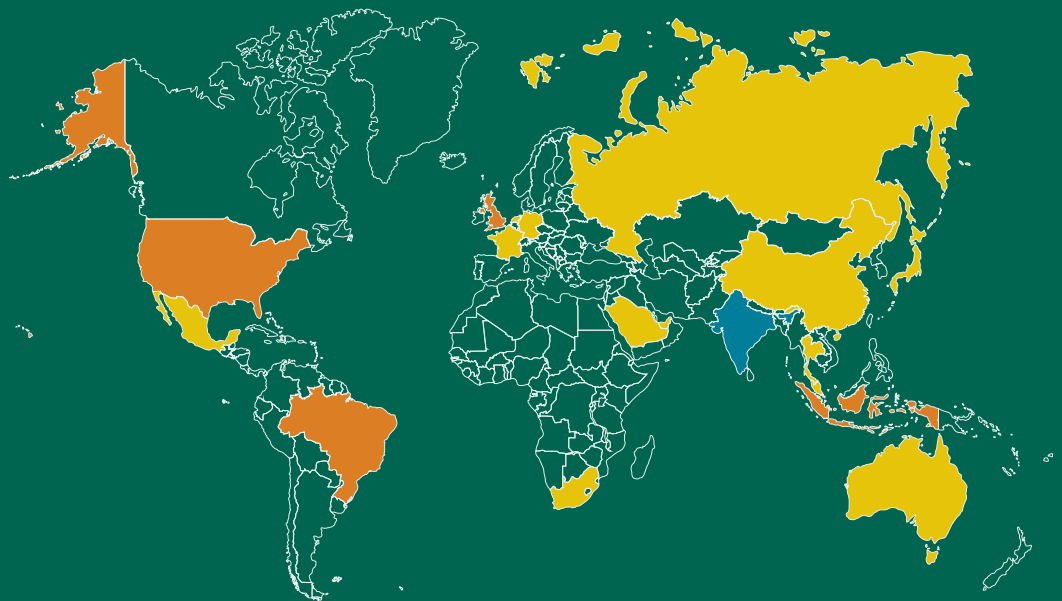
2030: Labor skills shortage of 4.3 million workers and unrealized output of \$449.70 billion.

Technology underpins all other sectors of the global economy, but its advancement could be stalled by serious talent problems. Such deficits are already evident and Korn Ferry research forecasts that by 2030 the labor-skills shortage will reach 4.3 million workers. This is equivalent to 59 times the number of employees of Alphabet, Google's parent company. While the digital revolution often seems unstoppable, it could be about to hit a wall.

Global technology, media, and telecommunications talent deficit by economy

2030

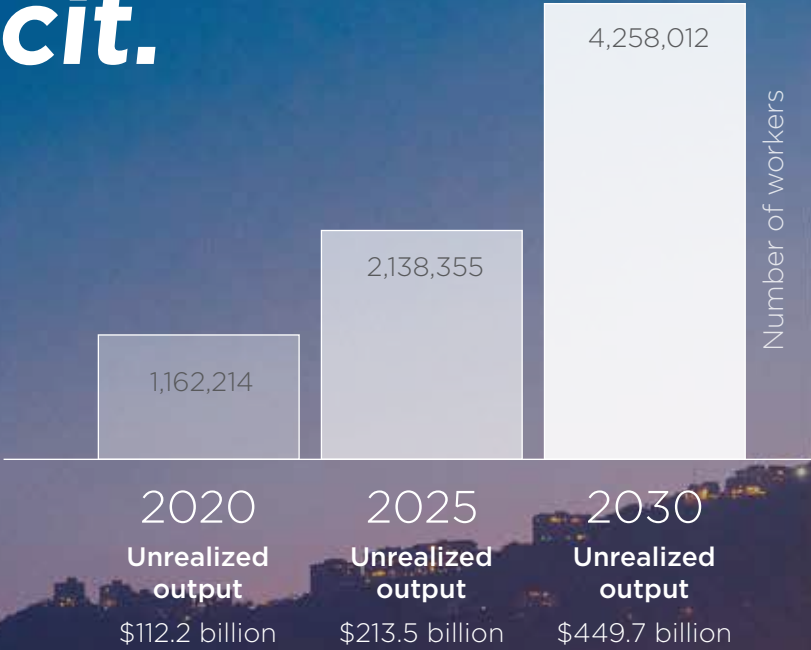
- Surplus
0
- Deficit
0 - 600,000
- Significant deficit
600,000 - 1.2 million
- Acute deficit
1.2 million or greater



The acuteness of an economy's deficit is based on its overall shortage of workers, not accounting for the size of its total workforce.

- The United States, currently the world's leading technology market, can expect to lose out on \$162.25 billion by 2030 due to sector skills shortages. These talent deficits may imperil America's status as the global tech center.
- China, which has labored to transform itself into a world-leading tech center, could fail to generate \$44.45 billion of revenue by 2030 due to skills shortages.
- Japan's demographics work against it, with sector skills deficits marked already and projected to reach 280,000 workers by 2020. The shortfall will rise to more than 500,000 Level A workers by 2030, threatening Japan's position as a global top-5 tech market.
- By 2030, the UK will fail to realize almost 9% of TMT sector potential revenue due to skills shortages.
- India is again the only country expected to have a skilled-labor surplus, expected to reach 1.3 million workers by 2030, creating opportunities for India to further develop its importance as a technology center.

Technology, media, and telecommunications labor deficit.



Worker gap grows as tech industry expands.

The booming technology, media, and telecommunications (TMT) sector already plays a critical role in the global economy, with Amazon, Google, and Apple usurping industrial titans atop stock market indices. By 2030, the TMT sector is expected to account for almost 10% of the US economy, and massive growth is forecast across all the world's markets.

This isn't the full story, of course, because tech already impacts every other sector of the economy. Innovations in artificial intelligence and machine learning are driving automation, and the people-tech partnership promises enhanced productivity across every industry. But in a separate 2016 study, Korn Ferry found traditional firms already struggle to find the digital talent they need to keep up with customer demand and transform to more digital operating models.

By 2020, most countries in the firm's study will experience a deficit of Level A workers, with only China, Malaysia, Mexico, Russia, and the UK expected to see surpluses of this talent sufficient to feed their TMT sector. But by 2030, all countries except India will be gripped by TMT talent deficits.

Organizations will face a double challenge when looking for tech talent in both the immediate and longer term; the skills are critical for both the TMT sector and beyond its boundaries, resulting in explosive global demand. Unless governments and organizations can develop enough highly skilled workers, a talent crunch threatens the rosy forecasts for technological progress and its accompanying economic growth.



Tech giants face talent squeeze.

The United States is currently the world's tech leader, but if its TMT talent deficit is left unaddressed, the country is due to experience the greatest unrealized output of any market in the study. This sum will reach \$162.25 billion by 2030, more than a third of total unrealized output across all countries analyzed.

"The United States is so far failing to equip the next generation with the new skills that are needed to fill large numbers of high-tech roles," says **Werner Penk, president, Global Technology Market, Korn Ferry**. "As with many economies, the onus falls on companies to train workers, and also to encourage governments to rethink education programs to generate the talent pipelines the industry will require."

Japan's TMT skills shortage will dramatically worsen over the next decade, further eroding its status as a leading tech nation, and it may see its sway in other industries falter too. Japan is using technology to try to tackle the labor shortages resulting from its huge demographic challenges, with increasing mechanization of agriculture and growing use of robotics in manufacturing. However, its TMT labor shortage of more than half a million workers by 2030 could make this increasingly challenging.

“The Silicon Valley of India”

India, meanwhile, will see a Level A TMT surplus of 1.3 million workers by 2030, offering yet more opportunities for the nation. Bangalore and environs—the Silicon Valley of India—ranked No. 15 in the most recent Global Startup Ecosystem Ranking, in which American cities dominated the top 10. When Korn Ferry ranked countries in this study by value added to the TMT sector, India pulled in at No. 7 (America was No. 1). But with the United States facing a Level A labor shortage as soon as 2020—a shortfall that could exceed 625,000 TMT workers by 2030—Bangalore, with its skilled worker surplus, may storm up the rankings, surpassing US tech hubs. India could challenge America’s position well before 2030.

Impact of labor shortage on technology, media, and telecommunication sector at 2030



0% 2% 4% 6% 8% 10%

■ Unrealized output as a percentage of economy at 2030
 ■ Economy at 2030



The lack of elite tech talent gets significant attention from policy makers, politicians, business leaders, and the media. However, a very different global picture emerges when we consider less-skilled TMT workers. While most countries will struggle to find the Level A workers they desperately need, we expect a global surplus of Level B (mid-skilled) workers up until 2025, and Level C (low-skilled) workers are in surplus throughout the period. Surpluses are not found in all countries, but oversupply in some economies may be due to organizations finding their most significant cost-cutting and automation opportunities in reductions in lower-skilled, more labor-intensive functions. Meanwhile, tech is more likely to complement rather than replace more highly skilled roles.

The business implications are clear: Governments and organizations need to seriously consider how to educate, train, and upskill their existing workforce. Labor will be available globally, but it may not match sector needs at the time. And while governments and officials may have more time to grapple with difficult issues like education funding and access, and immigration, businesses must urgently answer market and shareholder demands for results. They must act now to mitigate the talent crunch, making people—and their development, recruitment, and compensation—a top priority to support sustained growth.

Manufacturing.

Could talent shortages limit the growth of emerging markets?

2030: Labor skills shortage of 7.9 million and unrealized output of \$607.14 billion.

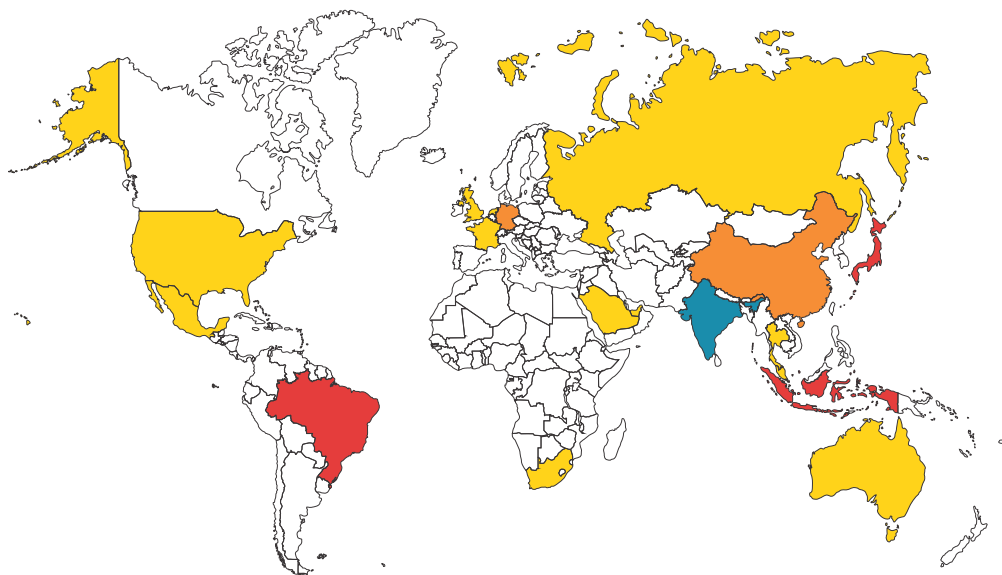
A solid manufacturing industry is needed to meet domestic product demand, generate export revenue, and provide the equipment and instruments that other sectors need to flourish. Manufacturing is especially critical for developing markets, with this sector accounting for 35% or so of China's economy. But manufacturing is headed toward a crisis. By 2030, the sector faces a global labor shortage of 7.9 million workers, the equivalent of 39 times the number of Ford employees worldwide.

- The abundance of manufacturing talent in China and Russia will drive a global surplus of highly skilled manufacturing workers until 2020. But, by 2030, all countries except India face deficits in highly skilled labor in the sector.
- Developing countries with strong manufacturing centers may begin to struggle due to severe talent shortages: By 2030, Brazil could suffer manufacturing worker deficits of 1.7 million, while Indonesia could see worker shortages reach 1.6 million.
- The United States, the world's most important manufacturing economy, already struggles with shortfalls in highly skilled manufacturing talent. This deficit is expected to increase over the next decade, reaching a 2030 shortfall of 383,000 such workers, equivalent to more than 10% of the highly skilled workforce.
- Japan, the No. 3 manufacturing economy in the firm's study, could fail to realize \$194.61 billion by 2030 due to severe labor shortages in this sector, the highest amount of any country analyzed, representing 3% of the country's entire economy.

Global manufacturing talent deficit by economy

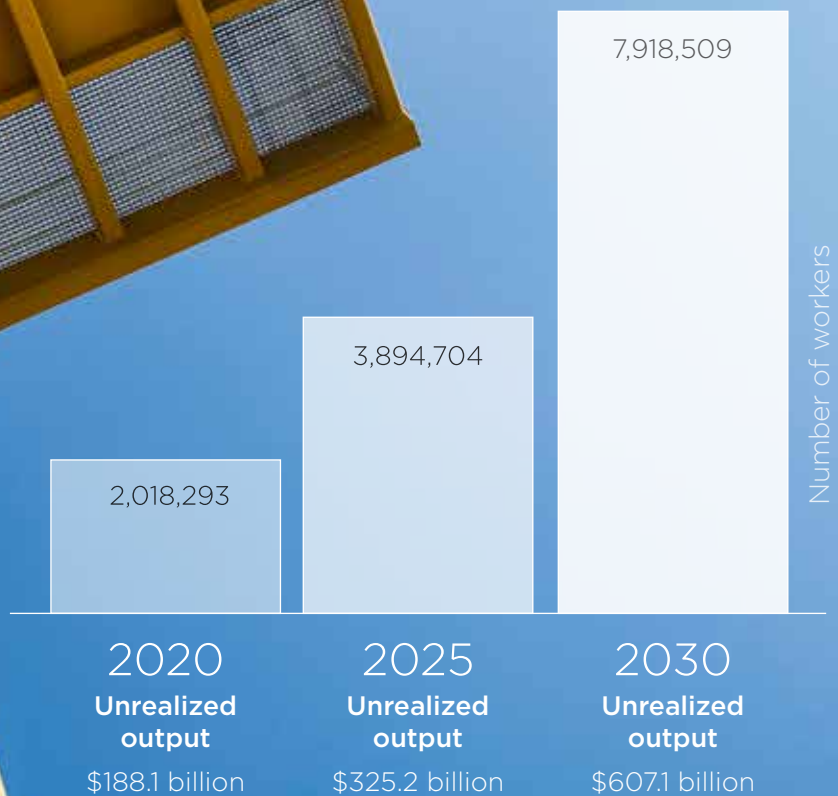
2030

- Surplus
0
- Deficit
0 - 600,000
- Significant deficit
600,000 - 1.2 million
- Acute deficit
1.2 million or greater



The acuteness of an economy's deficit is based on its overall shortage of workers, not accounting for the size of its total workforce.

Manufacturing labor deficit.



Number of workers

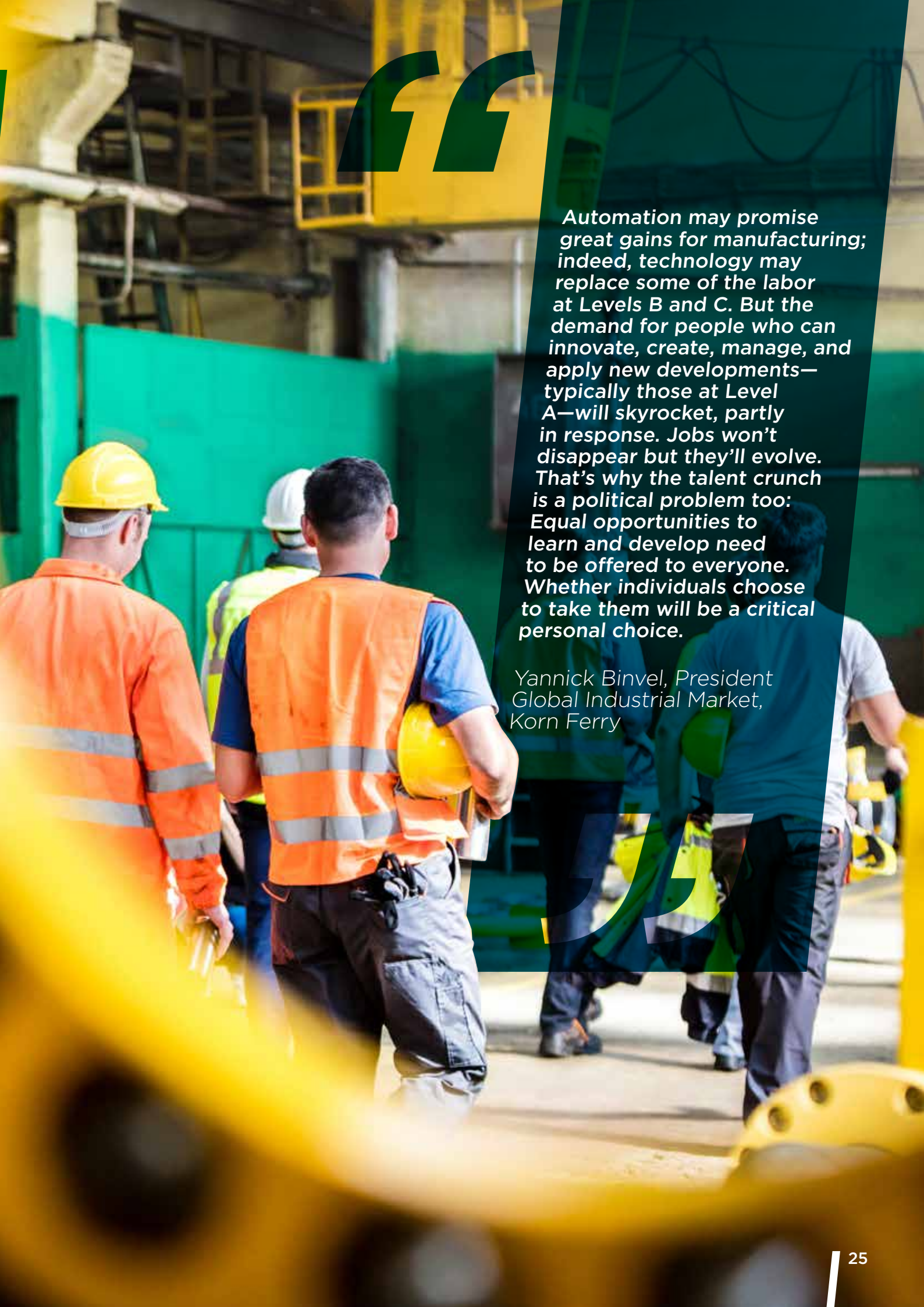
Manufacturing sustained by short-term surpluses.

Although the global economy is undergoing rapid transformations, manufacturing remains a critical driver. Manufacturing represents just over a third of China's economy and a fifth of Germany's, underscoring the sector's importance as an engine for growth in both developing and developed nations. A robust manufacturing sector is crucial to economies' long-term health, experts insist, providing important export income and a source of innovation, enabling technological developments like automation.

Many companies, especially in developed countries, already struggle to fill certain manufacturing roles.

Still, manufacturing is the only sector in our study with a projected global surplus of Level A (highly skilled) workers by 2020. This is driven by China, with a 1.3 million Level A worker surplus, and Russia with a surplus of more than 500,000 Level A workers. These talent abundances offset substantial sector deficits in the United States, Japan, and Germany.

In the short-term, this could bolster China's position as a leading manufacturing nation. However, in the medium term it could stunt the country's technological development, as China won't be under the same pressure as other nations to find productivity improvements.



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Automation may promise great gains for manufacturing; indeed, technology may replace some of the labor at Levels B and C. But the demand for people who can innovate, create, manage, and apply new developments—typically those at Level A—will skyrocket, partly in response. Jobs won't disappear but they'll evolve. That's why the talent crunch is a political problem too: Equal opportunities to learn and develop need to be offered to everyone. Whether individuals choose to take them will be a critical personal choice.

Yannick Binvel, President
Global Industrial Market,
Korn Ferry

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Labor shortages loom for manufacturing centers.

Labor surpluses in China and Russia will not persist, however. By 2030, both countries will face Level A labor deficits.

Japan—the No. 3 manufacturing nation in the firm’s study and a country that sees this sector make up a quarter of its current economy—should brace for a particularly acute skills shortage. It may struggle to maintain its spot in the world’s top manufacturing ranks as it faces immediate labor deficits at both Level A and Level B. By 2030, Japan will fail to generate \$194.61 billion of revenue due to labor shortages, equivalent to 3% of the country’s entire economy. Japan’s low birth rate and tightly restricted immigration are contributing to its shrinking talent pool. Both its population and labor force participation level will likely fall in the next decade.

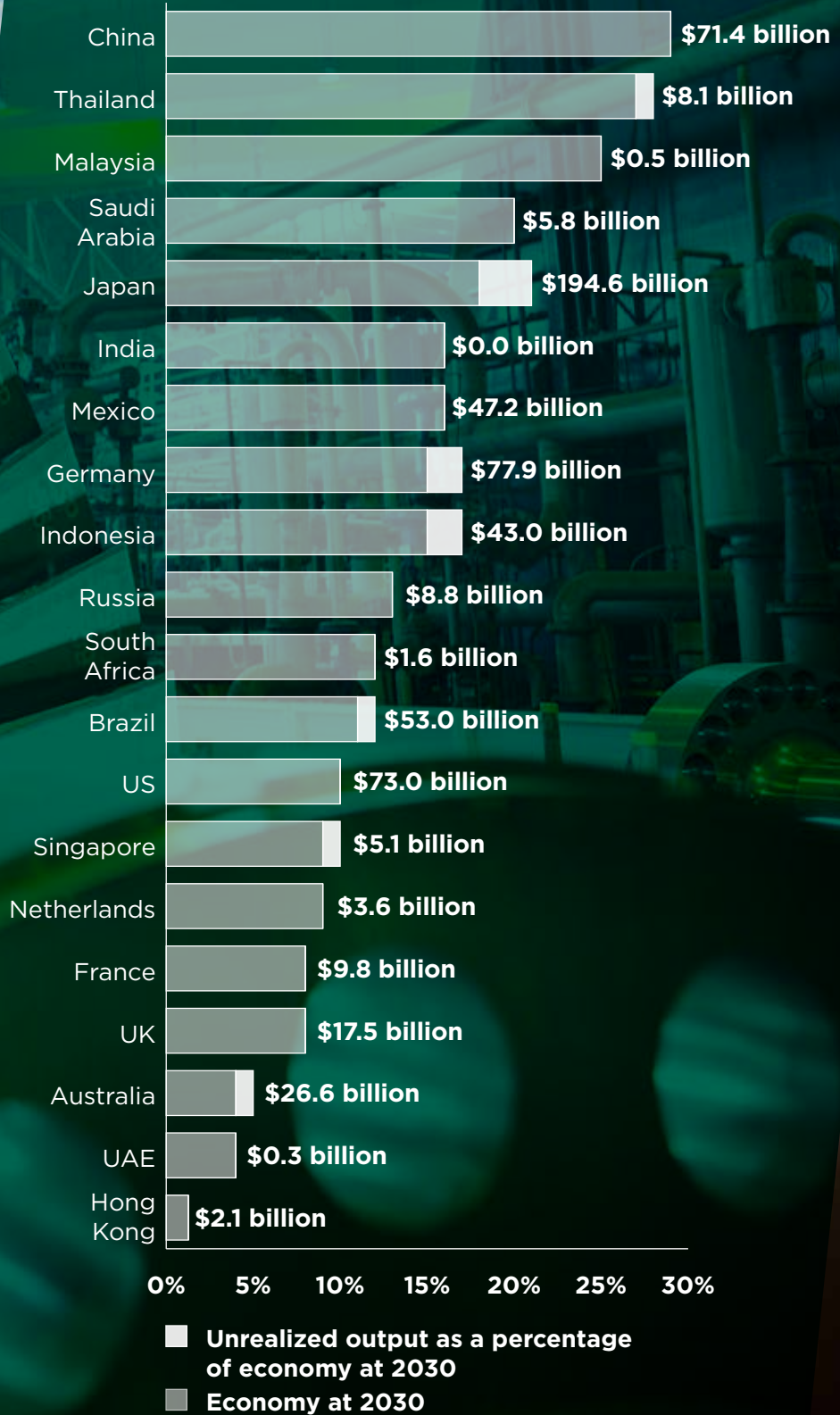
Germany will see the next biggest impact after Japan in its unrealized output due to manufacturing labor shortages, with the deficits it is already experiencing at Levels A and B intensifying. Although Germany is a leading manufacturing hub today, by 2030 ungenerated revenue due to sector labor shortages could reach \$77.93 billion.

However, across the manufacturing sectors in the 20 economies we analyzed, Hong Kong and Singapore will be hardest hit. By 2030, Hong Kong’s Level A deficit will be equivalent to 80% of its sector’s workforce. Singapore may face Level A labor shortages equaling more than 61%.

India, yet again, is the only country where the supply of highly skilled labor is growing faster than demand, with a projected Level A labor surplus by 2030 of more than 2.4 million workers.



Impact of labor shortage on manufacturing sector at 2030



The regional perspective.

The Americas.

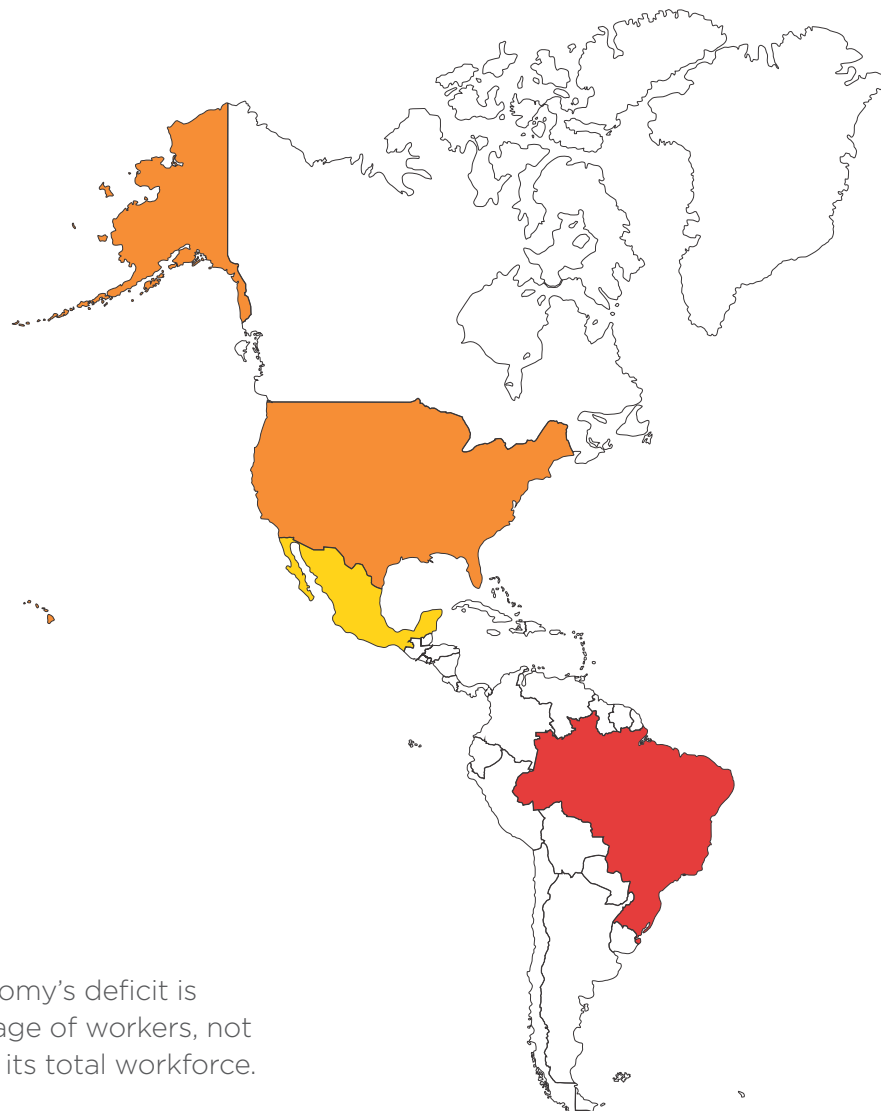
2030: Labor skills shortage of 23.9 million and unrealized output of \$2.307 trillion.

The United States faces a huge shortage of skilled workers, which is set to worsen with an aging population. But this is not a problem limited to developed countries. Brazil's worker deficit across all skill levels is expected to reach 15.8 million by 2030. Mexico is also heading toward skills shortages that could hinder its development, particularly in its promising financial and business services sector.

Total talent deficit in the Americas

2030

- Surplus
0
- Deficit
0 - 4 million
- Significant deficit
4 million - 8 million
- Acute deficit
8 million or greater



The acuteness of an economy's deficit is based on its overall shortage of workers, not accounting for the size of its total workforce.

A nation with an aging population.

The United States faces one of the most alarming talent crunches of any country in our study. This is partly because America's population is graying rapidly, with 10,000 baby boomers reaching retirement age each day for the next 19 years.

By 2030, the United States could experience unrealized revenue of \$1.748 trillion due to labor shortages, equivalent to 6% of its entire economy. This is the highest figure of all the markets examined, and almost a fifth of the total revenue shortage across all 20 economies. The United States has an overall surplus of Level B (mid-skilled) and Level C (low-skilled) workers at each of our three milestones. But the Level A (highly skilled)

worker deficit is expected to reach more than 6.5 million people by 2030. The sizable demand for that talent will be driven by the financial and business services sector, which accounts for a quarter of the total unrealized output (\$435.69 billion).

US job vacancies hit a record high last year, exceeding six million openings per month. Analysts attributed the nation's hiring crunch to a tight labor market and paucity of workers with the right skills and experience. And as demand rises, supply will decline: The labor force participation rate is expected to fall over the next decade, dipping from 62% in 2020 to 60% in 2030.

Developing economies already feeling the pinch.

Brazil, the world's fifth most populous country and South America's largest economy, also faces huge talent shortages by 2030, when it will hit a 15.8 million employee deficit across all skill levels. Its Level A talent shortage will be equivalent to 36% of the country's entire Level A workforce at 2030. Of all the countries in the study, only Indonesia faces a bigger talent crunch in terms of number of workers. Brazil is also one of the few countries that will encounter shortages across all skill levels (A, B, and C) by 2030, which will result in unrealized output equal to 13% of its economy.

Mexico may experience talent challenges as soon as 2025. Its overall deficit of Level A workers may cause it to miss out on \$65.16 billion, equivalent to 3% of its total economy, by 2030, with its promising financial and business services sector hit hardest. Still, Mexico is in a better position than the other countries we've studied in this region.





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Brazil is already in the throes of a severe skills shortage. A number of initiatives have been launched in an effort to fill the skills gap and keep pace with ambitious infrastructure programs, but a lot more will need to be done for the country to fulfill its growth potential.

Jean-Marc Laouchez,
President, The Korn
Ferry Institute

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Europe, Middle East, and Africa (EMEA).

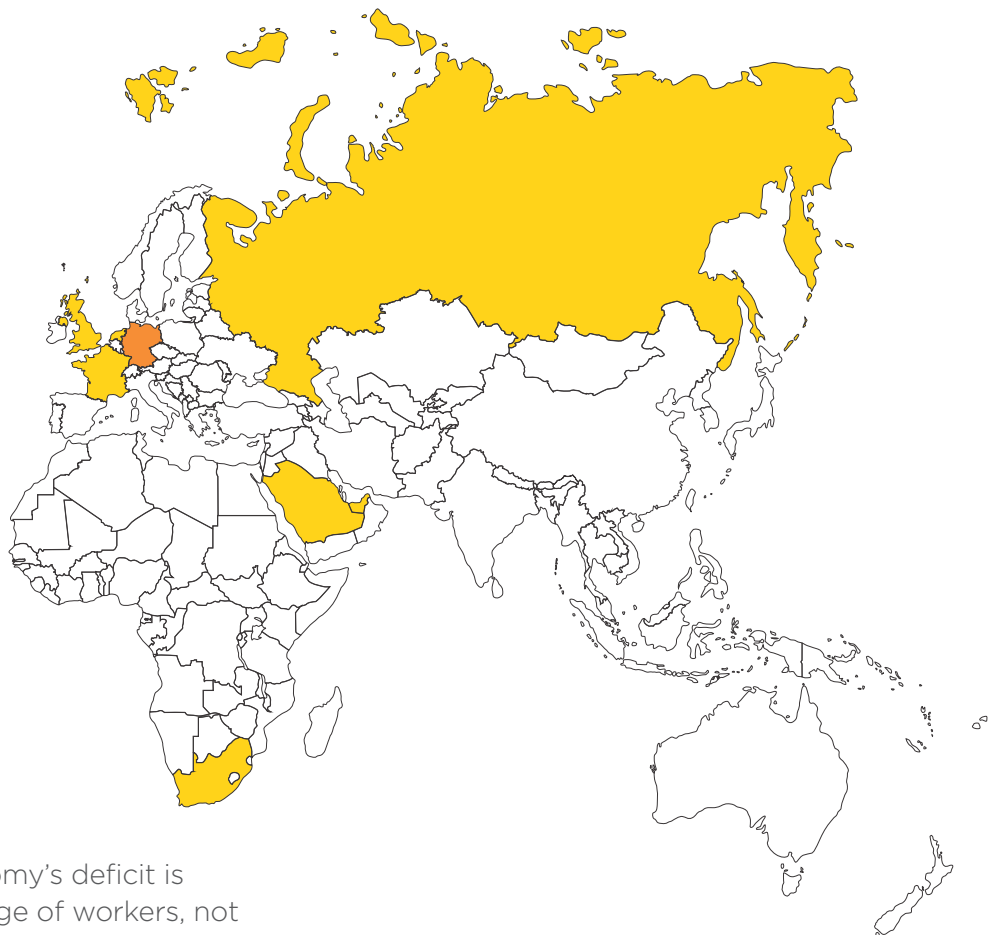
2030: Labor skills shortage of 14.3 million and unrealized output of \$1.906 trillion.

Europe is set to suffer severe skills shortages, with unrealized output of the EU countries in our study totaling \$1.323 trillion by 2030 due to talent deficits particularly in the financial and business services sector. This EU-wide problem indicates that the free labor movement benefits of European Union membership are unlikely to provide a solution to the skills shortages. The developing countries in the EMEA region also face similar problems, with the financial and business services sector becoming increasingly important, but labor markets becoming increasingly tight.

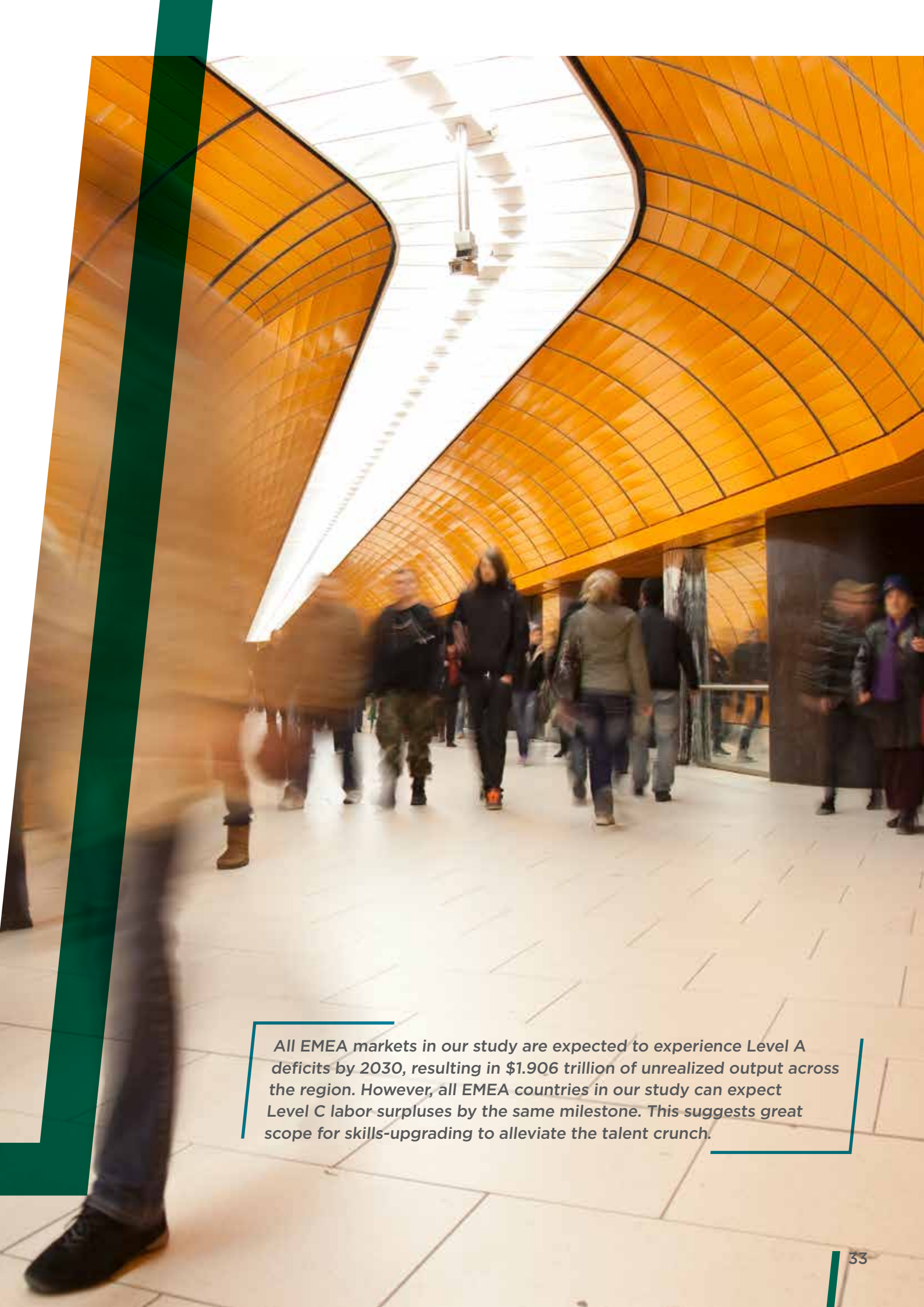
Total talent deficit in EMEA

2030

- Surplus
0
- Deficit
0 - 4 million
- Significant deficit
4 million - 8 million
- Acute deficit
8 million or greater



The acuteness of an economy's deficit is based on its overall shortage of workers, not accounting for the size of its total workforce.



All EMEA markets in our study are expected to experience Level A deficits by 2030, resulting in \$1.906 trillion of unrealized output across the region. However, all EMEA countries in our study can expect Level C labor surpluses by the same milestone. This suggests great scope for skills-upgrading to alleviate the talent crunch.

Wealthy European nations struggle with sector shortages.

The UK and Germany will feel their talent shortages most acutely. With a projected deficit of almost 4.9 million workers by 2030, Germany may fail to generate \$629.89 billion of revenue, equivalent to almost 15% of its economy. This shortage will be driven by the powerful financial and business services sector, which accounts for almost a quarter of the German economy. Frankfurt now ranks No. 11 in the Global Financial Centres Index, and is one of the European cities—along with Paris—expected to benefit from the possible Brexit fallout as banks, insurers, and investment management companies look to shift operations from London.

However, Germany's looming financial sector talent shortage—occurring at both Level A and Level B and as soon as 2020—could hinder these ambitions. Germany is

likely to remain dependent on immigration to plug its growing talent gap.

Disregarding the potential Brexit fallout, London's dominance of the financial markets may still be challenged by the talent crunch. That's because the UK will confront severe skilled-worker deficits across the sector by 2030 if no action is taken, resulting in nearly \$90 billion of unrealized output. The financial and business services sector, which is expected to represent a third of the UK economy by 2030, will be hit by its talent shortage later than most other EMEA economies. While it will enjoy a surplus across all skill levels until 2020, by 2030 our research predicts a significant shortage at both Level A and Level B. The good news is that the UK's organizations and policy makers have a little time to prepare; indeed, the British government has committed to

invest in workforce skills in its most recent budget.

France and the Netherlands, the other EU countries in our study, can also expect Level A (highly skilled) talent shortages, with the financial and business services sector again hit hardest. This European talent woe indicates that the free movement of labor, a key EU membership benefit, is unlikely to solve skills shortages in prominent European financial centers. And while Paris may hope to benefit from Brexit by attracting companies looking to move headquarters from London, France's highly skilled labor shortage could stymie these plans. France, due to talent deficits, may fail to generate \$214.56 billion by 2030, with \$60.77 billion of this accounted for by the financial and business services sector.



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To deal with this skills mismatch, we're seeing some companies building their own talent pipeline by hiring straight from school or college. These younger workers can be recruited at a lower cost and trained in the company's specific culture and ways of working. Constant learning—driven by both workers and organizations—will be central to the future of work, extending far beyond the traditional definition of learning and development.

Jean-Marc Laouchez,
President, The Korn
Ferry Institute

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Governments take different approaches to talent gaps.

Like other EMEA nations, Russia will be most affected by Level A worker deficits in the growing knowledge-intensive financial and business services sector. However, Russia has the biggest surplus of Level B workers of all the countries in the EMEA region, and also has a surplus of Level C workers. This oversupply is forecast to reach 6.0 million workers by 2030, presenting Russia with a huge education and training opportunity. The Russian government has been rolling out such programs in an effort to close the gap.

The major Middle Eastern markets in our study—the United Arab Emirates and Saudi Arabia—both face imminent shortages of highly skilled talent. This means that by 2020 they may miss out, respectively, on \$14.46 billion and \$25.80 billion of unrealized output. Those figures will have surged, respectively, to \$50.55 billion and \$206.77 billion a decade later. Recent UAE government initiatives, including a new visa entry system, aim to attract more highly qualified professionals to the nation as the country continues to diversify its economy.

In Africa, a talent crunch will hit South Africa, but the impact will be less dramatic than the other countries examined in the EMEA region. South Africa can expect Level B and Level C worker surpluses, with deficits found only at Level A. Officials in Johannesburg may wrestle most with talent shortfalls in financial and business services, which is a sector growing in importance to South Africa; the sector could represent 14% of the country's whole economy by 2030. The looming skills shortage threatens this sector, with unrealized output in this area alone expected to equal 1% of the country's entire economy by 2030.





Asia Pacific.

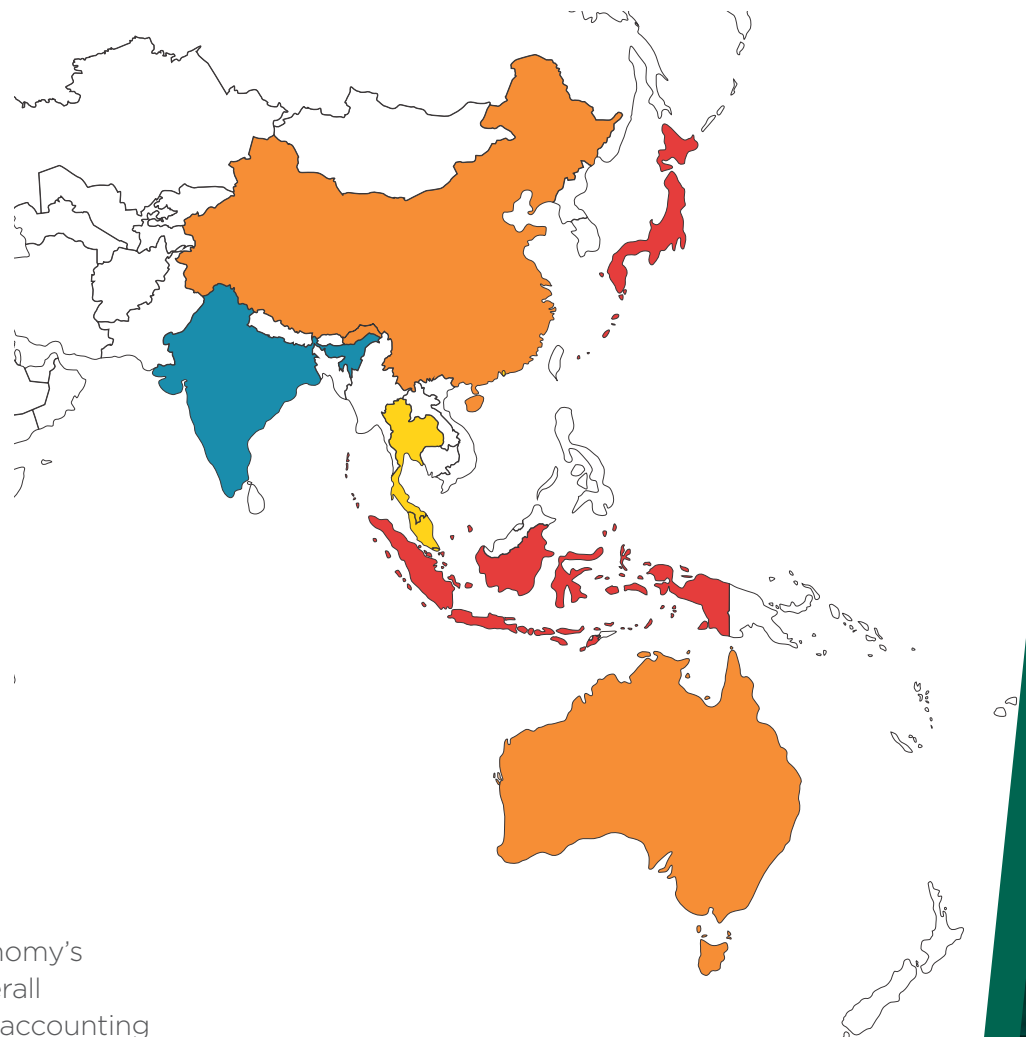
2030: Labor skills shortage of 47.0 million and unrealized output of \$4.238 trillion.

The talent crunch as a percentage of the economy is most pronounced in the Asia-Pacific region. While some economies in this region are dealing with rapidly aging populations, others have a rising number of working-age citizens. Hong Kong and Japan face particularly stark deficits, for instance; in contrast, India stands out as the only country in our study that can expect a talent surplus, expected to reach 245.3 million workers by 2030.

Total talent deficit in Asia Pacific

2030

- Surplus
0
- Deficit
0 - 4 million
- Significant deficit
4 million - 8 million
- Acute deficit
8 million or greater



The acuteness of an economy's deficit is based on its overall shortage of workers, not accounting for the size of its total workforce.

A woman in a winter coat and scarf is looking at her phone. The background is a city skyline at night with lights from buildings.

Demographic changes cause regional shifts.

Growth momentum in the Asia-Pacific region remains strong, projected to reach 5% in 2018, according to the International Monetary Fund (IMF). India, the only country in our study to have a projected skilled-labor surplus by 2030, is expected to overtake China to become the world's most populous country in the next six years. India's median age is predicted to be just over 31 by 2030, meaning it has a vast supply of working-age citizens. The government has also been announcing programs to boost workers' skills and capacities.

For the rest of the region, the story is very different: the Asia-Pacific region could fail to generate \$4.238 trillion of revenue by 2030 as a result of its talent shortage. A large proportion of that sum is attributable to high unrealized output figures of China (\$1.434 trillion) and Japan (\$1.387 trillion). China will be most affected by talent shortages in the financial services sector, while Japan's worker deficits will mainly occur in manufacturing.

Although China has ambitious growth plans, talent shortages could curb this huge nation's efforts to fulfill its potential. During the timescale of our study (2015 to 2030), its workforce is expected to shrink by 20.5 million, as vast numbers of people reach retirement age and the impact of the one-child policy further squeezes demographics. Although the country has a high number of migrant workers, many of them are low-skilled. While our study shows a wide Level A talent gap in China, it also predicts a surplus of Level B and Level C workers that could total almost 50 million by 2030.

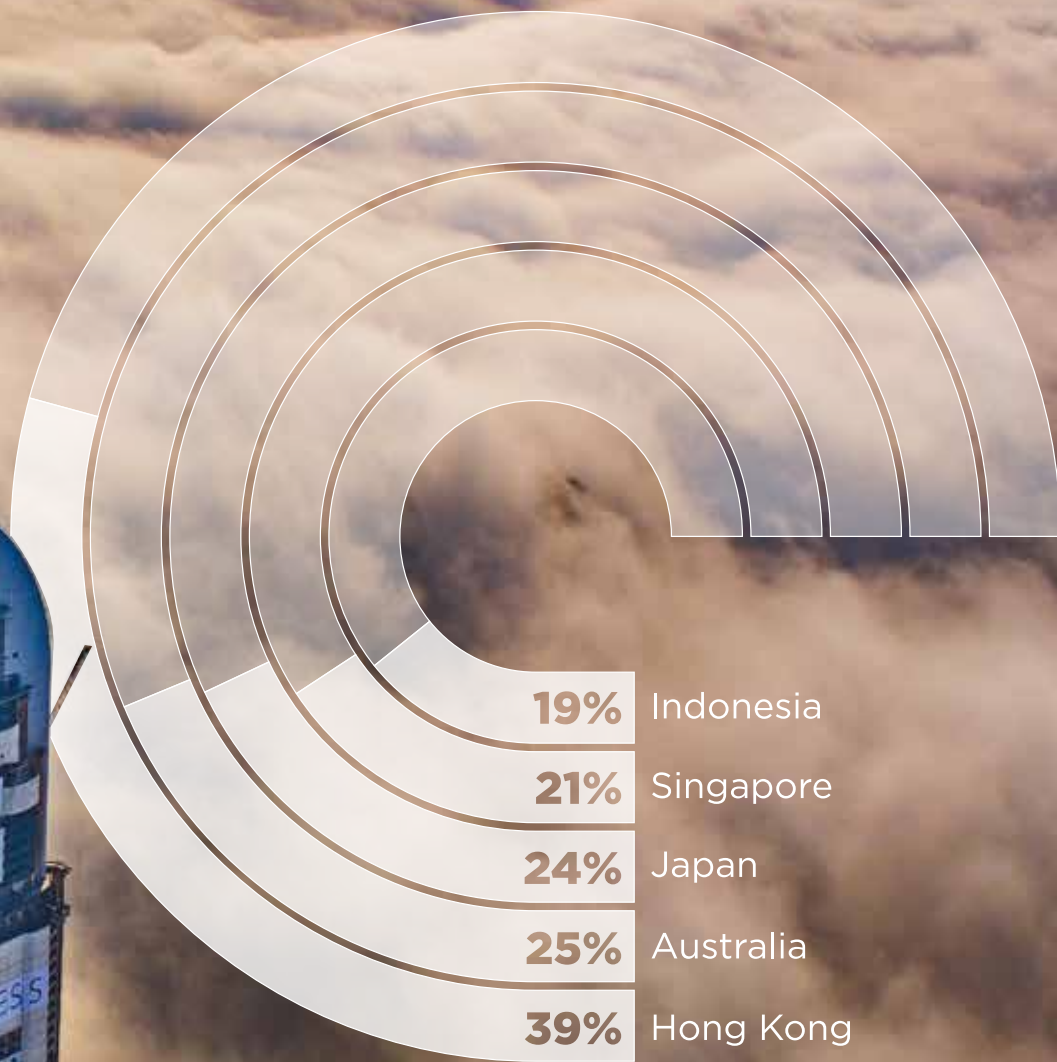
Indonesia may also find its growth prospects hampered by talent shortages, with manufacturing suffering most. Of all economies in our study, Indonesia, the world's fourth most populous country, can expect the largest deficit in the number of workers across all sectors—a total shortage of almost 18 million by 2030. A deficit of Level A workers is imminent, while shortages of Level B and Level C workers could take hold by 2025. Indonesia also has persistently high youth unemployment, a 19% rate in 2016, as the country struggles with a mismatch between young people's skills and industry needs. The government has announced a "national internship roadmap" to try to bridge the gap between schools and workplaces. These efforts may need to be stepped up drastically.

Financial hubs hard hit.

Key financial centers in the Asia-Pacific region also will be rocked by talent shortages. Hong Kong and Singapore, two of the world's most important financial hubs, are headed to Level A worker deficits equivalent to 80% and 61% respectively of their sector workforces. Hong Kong's talent crunch will be the most pronounced when its effects are measured as a proportion of its economy, with the resulting unrealized output equivalent to 39% of its entire economy.

In fact, of the markets in our study, the five with the most significant talent crunch as a percentage of their economies—Hong Kong, Australia, Japan, Singapore, and Indonesia—are all found in the Asia-Pacific region. Australia could see \$587.56 billion in unrealized output due to skills shortages, equivalent to more than a quarter of its entire economy. Skills shortages will occur at both Level A and Level B, with only a tiny worker surplus at Level C, suggesting that talent is particularly limited in Australia. The country has recently tightened its already strict immigration rules, which could worsen an already challenging labor market.





Highest unrealized output as a percentage of economy at 2030.

The last word.

Acute global talent shortages are clearly a looming threat, and they're driven by a shortage of skills rather than a shortage of people.

Mitigating the talent crunch requires a fundamental redefinition of the social contract between individuals, organizations, and governments. The future of work doesn't just require different skill sets, but entirely new ways of working.

We will see successful organizations moving from a paternalistic approach to a more mature, flexible relationship with their people, built on mutual respect. We can also expect a more fluid labor market, with staff brought in on a per-project basis. For individuals to remain credible, it will be critical for them to stay constantly up to date, with the emphasis on individual responsibility for maintaining relevant skills.

Governments must be mindful of their citizens' employability in the context of a global talent market. It's essential that governments and companies focus on building and maintaining skilled talent pipelines and provide continuous access to both formal and on-the-job learning opportunities.

In the new networked economy, organizations will increasingly rely on an extended ecosystem of workers rather than a large permanent workforce, using people, technology, and partners to execute their strategies in different ways. Managing turnover effectively will become as important as managing loyalty.

This fluidity will only be possible if it is enabled by organizations and governments. Governments must embrace more flexible labor rules, reducing the

complexity and friction of entering and leaving employment.

In this fast-changing environment, workforce planning and a comprehensive understanding of the talent supply chain are critical. Leaders need a deep understanding of talent marketplace economics to put the right planning and core proposition in place to ensure they have the skills their workplace needs.

While technology will reshape the future of work, organizations will be unable to leverage it without the right talent. It is only through the partnership of people and technology that the full potential of both can be realized. To secure their future, companies must look to address the talent crunch now.



Detailed methodology.

The Korn Ferry Global Talent Crunch report is based on economic modeling designed by Korn Ferry, Man Bites Dog, and Oxford Analytica and executed by Oxford Analytica.

The gap between talent supply and demand.

The talent crunch is the gap between the likely demand for staff and projections of skill availability at three key future milestones: 2020, 2025, and 2030. To calculate this, we forecast the talent needs of the following three knowledge-intensive sectors:

Financial and business services, including financial services, insurance, and real estate.

Technology, media, and telecommunications, including information and communication technology, publishing, broadcasting, and telecommunications.

Manufacturing, including industrial and consumer packaged goods and life sciences.

We model each industry's share of the economy, taking into account factors such as per-capita income, export position, and natural resource endowments. We use OECD long-term forecasts for some of these correlations, allowing us to derive the sector's share of the economy at our key future milestones. To establish the size of the economy itself, we forecast the compound annual growth rate (CAGR) for the 2018 to 20 period based on the 2000 to 2015 CAGR's relationship with world trade growth, starting level of GDP per capita, growth in government expenditure, and oil rents per GDP. We forecast the educational level of the demanded workforce using known data that we project into the future.

To establish labor supply, we use International Labour Organization (ILO) projections of the available labor force to 2030. These take into account demographic forecasts and projections for migration (both into and out of the country), as well as the likely labor-force participation rate. We then estimate the proportion of the population that's educated to our three education levels (described on the next page) and we overlay the labor-force participation rate for each of these education levels. Estimates are informed by known proportions for a wide variety of countries over several decades, which we project into the future.

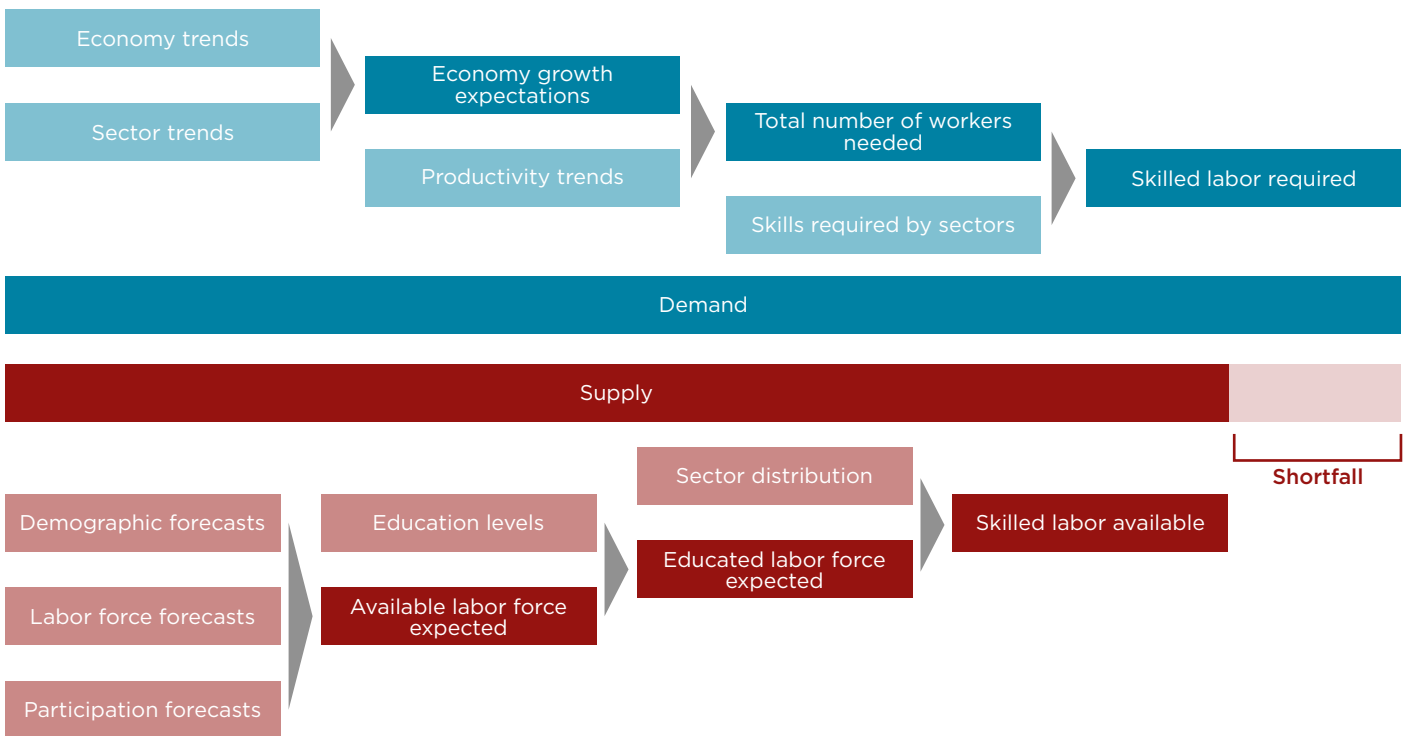
Skill level	Description	International Standard Classification of Education (ISCED) 2011 categories
Level A	Highly skilled workers	Post-secondary education, such as college or university, or a high-level trade college qualification
Level B	Mid-skilled workers	Upper secondary education, such as high school, or a low-level trade college qualification
Level C	Low-skilled workers	Lower secondary education (middle school) or less

We derive the number of required workers by dividing the sector's value-added output by the productivity rate (the value added per worker). There are various factors and variables to take into account here, including the fact that developing economies tend to experience faster rates of productivity growth than developed economies. Our productivity growth assumption is therefore based on sector averages from 2000-2015 (CAGR), with different rates for developing and developed economies, and broken into high-performing and low-performing groups (see Appendix).

Quantifying the gap between supply and demand.

In order to distribute the available labor force to the three sectors, we need to assert a productivity growth rate for the rest of the economy. The rest of the economy exhibits lower productivity than the sectors we're focusing on, because the three sectors are internationally tradable, whereas the rest of the economy will be characterized by a mixture of traded and non-traded activities.

On the assumption of labor mobility between sectors, we allocate available labor at each skill level to the proportionate need by sector. The labor-demand share of each sector is the share of available labor force allocated to each sector, and the talent gap arises from shortfalls.





Sector data.

Two major data collections have been used in our model: EU-KLEMS and the 10-sector database of the Groningen Growth and Development Centre (GGDC). The KLEMS data includes richer detail, but is not available for all of the countries in our study. We've made appropriate adjustments to account for any material discrepancies between the two data sets.

Appendix

Productivity growth for 2016-2030.

Productivity growth in 2016 to 2030 is assigned according to the sectoral average CAGR in productivity (in constant US dollars per worker) in 2000 to 2015, differentiating between (a) advanced versus non-advanced economies, and (b) a high-performing group and a low-performing group. These averages are reported in table below “Productivity performance 2000-2015”, the historical performance by country. The table is sorted by sector, advanced/non-advanced and growth (CAGR). Data for Saudi Arabia and UAE are based on national statistics (i.e., published data from the relevant government ministries), not KLEMS or GGDC; hence their productivity growth (CAGR) figures are not included in the averages derived in the table below.

Productivity performance 2000-2015.

advanced	country	sector	group	growth (CAGR)	first year	latest year
0	China	FIR	Fast	14.3%	2000	2011
0	Russia	FIR	Fast	13.6%	2000	2015
0	Thailand	FIR	Fast	7.5%	2000	2011
0	India	FIR	Fast	6.8%	2000	2011
0	Indonesia	FIR	Slow	3.9%	2000	2010
0	South Africa	FIR	Slow	2.7%	2000	2015
0	Malaysia	FIR	Slow	2.3%	2000	2011
0	Brazil	FIR	Slow	1.8%	2000	2015
0	Mexico	FIR	Slow	-0.5%	2000	2011
0	UAE	FIR	Fast		2010	2015
0	Saudi Arabia	FIR	Slow		2005	2014
1	Australia	FIR	Fast	2.4%	2006	2015
1	Netherlands	FIR	Fast	1.4%	2000	2011
1	US	FIR	Fast	1.2%	2000	2011
1	Hong Kong	FIR	Fast	1.1%	2000	2015
1	France	FIR	Fast	1.0%	2000	2011
1	UK	FIR	Slow	0.2%	2000	2011
1	Singapore	FIR	Slow	-0.2%	2000	2014
1	Germany	FIR	Slow	-0.3%	2000	2015
1	Japan	FIR	Slow	-2.8%	2000	2012
0	China	MAN	Fast	11.1%	2000	2011
0	Russia	MAN	Fast	10.5%	2000	2015
0	India	MAN	Fast	6.9%	2000	2011
0	Thailand	MAN	Fast	4.9%	2000	2011
0	Malaysia	MAN	Fast	4.6%	2000	2011
0	Indonesia	MAN	Slow	3.8%	2000	2010

advanced	country	sector	group	growth (CAGR)	first year	latest year
0	Brazil	MAN	Slow	2.5%	2000	2015
0	South Africa	MAN	Slow	1.4%	2000	2015
0	Mexico	MAN	Slow	0.1%	2000	2011
0	Saudi Arabia	MAN	Slow		2005	2014
0	UAE	MAN	Slow		2010	2015
1	Singapore	MAN	Fast	2.9%	2000	2014
1	US	MAN	Fast	1.8%	2000	2011
1	Germany	MAN	Fast	1.7%	2000	2015
1	UK	MAN	Fast	1.6%	2000	2011
1	Netherlands	MAN	Fast	1.5%	2000	2011
1	France	MAN	Slow	1.1%	2000	2011
1	Japan	MAN	Slow	0.5%	2000	2012
1	Australia	MAN	Slow	0.0%	2006	2015
1	Hong Kong	MAN	Slow	-0.5%	2000	2015
0	China	TMT	Fast	12.9%	2000	2011
0	Russia	TMT	Fast	12.4%	2000	2015
0	Indonesia	TMT	Fast	7.6%	2000	2010
0	India	TMT	Fast	5.9%	2000	2011
0	Thailand	TMT	Slow	4.4%	2000	2011
0	Malaysia	TMT	Slow	2.4%	2000	2011
0	Brazil	TMT	Slow	1.4%	2000	2015
0	South Africa	TMT	Slow	0.6%	2000	2015
0	Mexico	TMT	Slow	-1.6%	2000	2011
0	UAE	TMT	Fast		2010	2015
0	Saudi Arabia	TMT	Slow		2005	2014
1	US	TMT	Fast	2.4%	2000	2011
1	Netherlands	TMT	Fast	1.7%	2000	2011
1	Germany	TMT	Fast	1.1%	2000	2015
1	Hong Kong	TMT	Slow	0.6%	2000	2015
1	France	TMT	Slow	0.6%	2000	2011
1	UK	TMT	Slow	0.5%	2000	2011
1	Australia	TMT	Slow	0.2%	2006	2015
1	Japan	TMT	Slow	-2.8%	2000	2012
1	Singapore	TMT	Slow	-2.9%	2000	2014

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About Korn Ferry

Korn Ferry is a global organizational consulting firm. We help companies design their organization—the structure, the roles, and responsibilities, as well as how they compensate, develop, and motivate their people. As importantly, we help organizations select and hire the talent they need to execute their strategy. Our approximately 7,000 colleagues serve clients in more than 50 countries.