Lightcast

# Contents



**FAULT LINES**


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**Every chart in Fault Lines is fully interactive.** Click the links below each one, or scan this QR code to explore all the data.

# Executive Summary

The global labor market is facing widespread disruption, but underneath the countless competing challenges are three main factors, or "fault lines," permanently reshaping the balance between labor supply and demand: geopolitics, artificial intelligence, and labor shortages.

Existing talent strategies are not built to handle the change that these three fault lines are forcing upon the world economy. Without understanding how they intersect and reinforce one another, businesses, education institutions, and public sector leaders will find themselves building for a world that no longer exists, and unprepared for the one that does.

Beginning with geopolitics, countries are seeking to improve their own labor market conditions, through factors such as talent availability and educational infrastructure, in order to de-risk their dependency on others. As they play to their strengths in pursuit of these goals, they have fallen into two groups: "Advanced Knowledge Economies" in wealthier developed countries and "Industrial Scale Economies" in developing countries. Neither has a dominant advantage over the other.

China and India have more undergraduate students than the rest of the world combined. One might think this would prompt established university systems in North America and Europe to bring in more students from abroad, particularly as domestic birth rates slow down, but for political and national security reasons, the opposite has happened. International undergrad enrollment in the US peaked in 2017 and is down by over 100,000 (22%) since.

Immigration slowdowns are projected worldwide (a decline of 20% over 20 years in North America, Europe, and Oceania), both because origin countries have fewer people to send, and because destination countries are accepting fewer of them. A shrinking global talent pool is being squeezed by labor shortages on one side and geopolitics on the other.

Into this already-complex environment, AI accelerates disruption. The sectors most in need of workers (like hospitality and healthcare) are those with the lowest rates of AI adoption. On the other end of the spectrum, the industries that have embraced AI most (like IT and marketing) are those where skill requirements were already changing fastest. And as AI spreads across the labor market—56% of AI jobs are outside IT—more jobs have become vulnerable to automation. At the high end, over 70% of the skills needed for many kinds of editing and administrative roles are skills AI could replace.

AI also compounds geopolitical competition for talent. Within Lightcast data, 35% of AI workers live in the US, but only 24% were educated there. And data center employment has tripled: communities can attract huge investment if they can demonstrate they have the workforce and infrastructure to take advantage of it.

Also because of AI, the connection between credentials and careers has been scrambled. Only 6% of AI workers have AI degrees, suggesting majors are ineffective predictors of careers. Out of the top 10 skills requested in AI jobs, only two are AI-related—the rest are human skills like communication and leadership. Since technical skill requirements are changing so quickly, and traditional career pathways are broken, the role of education in an AI world will be to teach baseline skills that will endure for a lifetime, supplemented by short-term technical credentials.

This brings us back to labor shortages, because misaligned education requirements are a major factor: 66% of global job postings require a college degree, while only 31% of workers have them. Employers are putting up barriers to employment even though the world is running out of workers. The world population is aging: increased life expectancies have led to a larger elderly population, while fertility rates are declining worldwide. Add in the declining immigration rates discussed earlier, and now talent pipelines are being squeezed from three sides: fewer people being born, fewer people coming in, and obstacles to hiring the people already there.

Having identified the three fault lines that will reshape the global labor market in the years to come, organizations that invest in comprehensive labor market intelligence—organizational, skills, and workforce data working in concert—can anticipate change proactively, rather than catching up reactively. The immediate goal is for organizations and institutions to stop pretending like it's business as usual, and prepare to change based on the new reality ahead.

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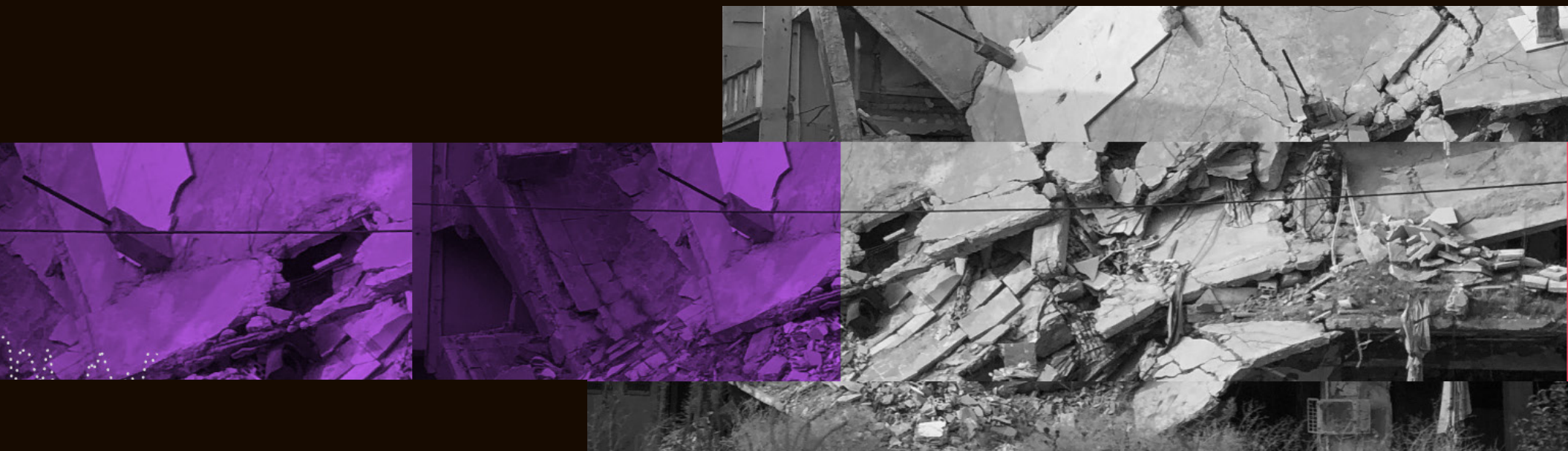
# Introduction

Where a fault line exists, it's only a matter of time before it ruptures. We're seeing fault lines in the global labor market.

Three cracks have formed, creating the conditions for monumental change ahead. The entire landscape of talent is being reshaped, and old ways of connecting people to jobs will fail, because they were designed for an environment that no longer exists. We're entering an era of permanent worker shortages.

Lightcast has been organizing and understanding the world's labor data for over 25 years, but the changes we've seen recently, and the challenges ahead in the years to come, are unlike any we've seen before. That's why we've written Fault Lines: we want to provide trusted guidance so leaders can make decisions with confidence, instead of guesswork. We want to show where the pressure is building so that businesses, educators, and the public sector can prepare, even when the ground is shaking under your feet.



# Our Three Fault Lines

Massive labor market disruption is underway, and none of the old rules apply.
Three factors are driving this change:

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**Geopolitics** has upended the movement and cost of talent worldwide. Countries are de-risking their exposure to the existing world order by developing their own capacity, but because of distrust and demographics, immigration has slowed, and workers are hard to find.


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**AI** has promised efficiency but delivered confusion. The sectors that need the most help are the ones AI is furthest from helping, while at the same time skills are changing faster and faster, making it harder and harder to plan ahead.

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**Labor shortages** compound the challenge, reducing the number of workers available and making every workforce decision more difficult.

# Key Takeaways

## Chapter 1: Geopolitics

**We're used to** an interconnected world, optimized for efficiency.

**Instead, we're going to see** competition, restriction, and reshuffling as countries de-risk their dependency on others.

- Every country is competing for geopolitical influence and security, but neither developed "Advanced Knowledge Economies" nor developing "Industrial Capacity Economies" have a dominant advantage. International trade and migration will decline as relationships become more cautious. Smaller countries will need to align with larger ones, carefully navigating rivalries between them.
- Immigration is slowing down. Feeder countries have fewer people to send, and destination countries are imposing new restrictions.
- The countries that have relied most on manufacturing now rely on it less—but some regions (including some US states) present bright spots where the sector is growing.

## Chapter 2: Artificial Intelligence

**We're used to** technology that developed at a manageable pace, and skills that lasted from graduation to retirement.

**Instead, we're going to see** disruption that moves faster than anyone can respond to it—and a gold rush of investment.

- AI is not solving labor shortages; supply and demand are misaligned. The sectors facing the most severe labor shortages are precisely those where AI adoption is lowest.
- AI's diverse impact requires specific adoption strategies—some jobs are highly vulnerable to AI (with over 70% of skills vulnerable), but every function must be considered individually.
- AI is spreading unevenly, amplifying geopolitical uncertainty as countries race to capture AI talent to establish themselves as technological leaders.
- The connection between education and business has fractured—only 6% of AI workers (and 11% of AI engineers) have AI degrees.

## Chapter 3: Labor Shortages

**We're used to** abundant talent and reliable economic growth.

**Instead, we're going to see** smaller populations, limited worker availability and new economic priorities.

- The world is running out of people. Over the next 20 years, working-age populations will slow down everywhere, and in some regions it will actually shrink.
- Worldwide, 66% of job postings require a degree, even though only 31% of workers have one. Richer countries like the US have the opposite problem: higher demand for workers without a degree than with one.
- Advanced economies in Europe, North America, and Oceania rely most heavily on foreign-born workers—but over the next 20 years, immigration into those regions will fall more than 20%.
- Production needs will shift as the world population ages, because older people require different goods and services than those who are younger. Demographics drive economics.

If your labor market strategy relies on doing things because that's the way you've always done them, you will find yourself losing customers, students, or residents to competitors who have recognized that their existing pipelines won't last forever, and are making active adjustments in response.

CHAPTER 1

# GEOPOLITICS

## The Displacement of Talent

### What We're Used To:

Talent pipelines and supply chains were fungible and flexible. The world economy was moving toward globalization, meaning the flow of goods and labor was determined by efficiency and business needs, not political priorities. Companies could move operations to wherever labor was cheapest, and skilled workers could move to wherever opportunities were greatest. The geopolitical landscape was stable enough to allow for long-term planning.

### What Happens Next:

Military conflicts are breaking out worldwide, threatening the stability we've relied on for decades. Even where there are no wars, there are still rivalries, and countries are seeking geopolitical advantages for themselves through policies like tariffs and migration restrictions, regardless of the economic tradeoffs. As immigration slows down worldwide and trade between rivals becomes less common, global supply chains and talent pipelines are breaking and need to be rebuilt.

KEY TAKEAWAYS

1

**As countries de-risk their dependence on the existing world order, they have fallen into two main groups.**

Neither developed “Advanced Knowledge Economies” nor developing “Industrial Scale Economies” have a dominant advantage over each other. As countries seek to maintain their own geopolitical advantages, they are moving away from the interconnected efficiency.

2

**The tradeoffs of immigration are being recalculated.**

Our existing systems are built on the assumption of a near-constant flow of millions of workers from country to country. This assumption will not hold true for long.

3

**Manufacturing is seeing a changing of the guard.**

Production capacity is a geopolitical advantage. For reasons both political and practical, the geography of manufacturing is expanding beyond a few powerhouse countries, opening the door for smaller regions (including some US states) to get a piece of the action. And while labor arbitrage is holding steady for now, companies are re-evaluating their global location strategies to adapt to geopolitical change.

## The ground is shifting under our feet. The 2020s have been defined by geopolitical disruption.

Geopolitics is a broad term, chosen intentionally because it encompasses many diverse trends that affect the global labor force. Here, we are looking at geopolitics to assess advantages and disadvantages, rather than the news.

A large, growing population is a geopolitical advantage. A large outflow of migrants is a disadvantage. A robust educational system is an advantage. High inflation is a disadvantage.

**Enterprises and regional leaders** alike both need to understand where talent is going to be, and what factors affect their movement, in order to make strategic future-oriented decisions about where and how to invest. **Educators** will need to make similar strategic choices about how to build their pipeline of prospective students and position them for success in the new global economy.

# Industrial Scale Economies and Advanced Knowledge Economies

The global labor market is a complex web of competition and collaboration that spans nations, regions, and even individual cities. To navigate this complexity, most of our analysis will focus on six regional clusters of countries.

## Defining our Trading Blocs

In order to make sense of a complex global economy, much of our analysis in Fault Lines focuses on six trading blocs. We chose these select countries for their significance to their region and close trading ties to each other, though their groupings are defined for analytical purposes and don't align exactly with formal trade agreements.

USMCA: US, Mexico, Canada

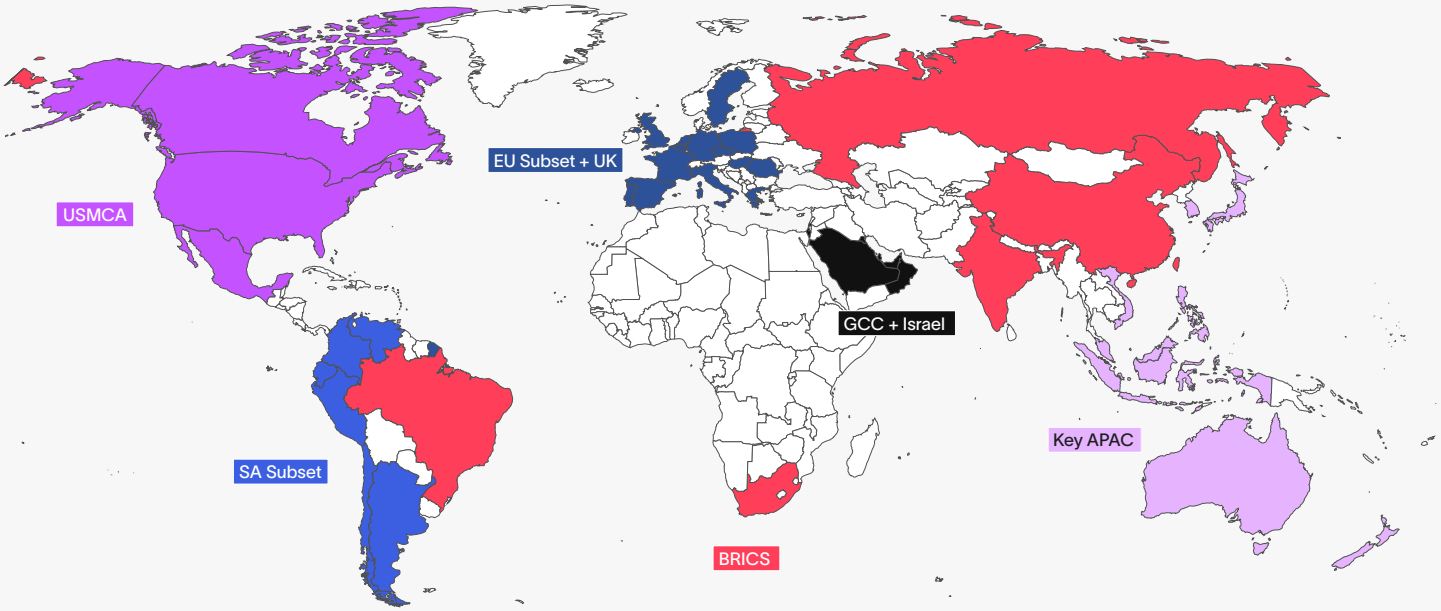
EU Subset + UK: Belgium, Czechia, France, Germany, Greece, Hungary, Italy, Netherlands, Poland, Portugal, Romania, Spain, Sweden, UK

BRICS: Brazil, Russia, India, China, South Africa

Key APAC: Australia, Indonesia, Japan, Malaysia, New Zealand, Philippines, Singapore, South Korea, Vietnam

GCC (Gulf Cooperation Council) + Israel: Bahrain, Israel, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates (UAE)

South America Subset: Argentina, Chile, Colombia, Ecuador, Peru, Venezuela




**Every trading bloc has advantages or disadvantages compared to the others.**

These groupings provide a useful shorthand to look at global trends—but what global trends matter most to the labor market? At a high level, we broke them into four categories: macroeconomic factors, worker availability, education, and infrastructure.

## Immediately, a few distinct patterns emerge.

BRICS countries tend to excel in macroeconomic factors and worker availability. USMCA, the EU, and the GCC + Israel, by contrast, score higher on education, talent, and infrastructure.

None of these blocs are dominant across the board. Everyone with strengths also has weaknesses, and blocs with similar strong points tend to have similar challenges.

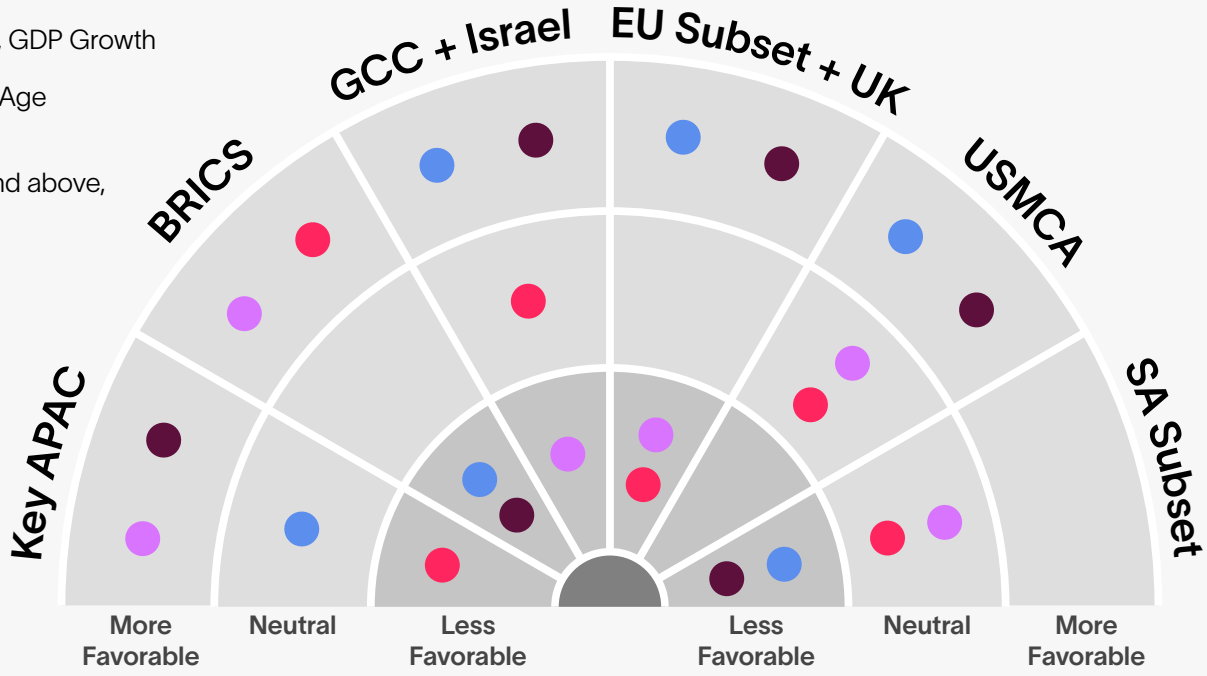
Because these geopolitical trends happen on such a large scale, it's difficult for any one entity to change them. But in specific situations, they offer opportunities for organizations that can defy the larger patterns.

For instance, if you operate in the EU and can secure a reliable talent pipeline, you can enjoy the bloc's existing infrastructure and education systems without sacrificing worker availability. Likewise, if you can achieve educational success in BRICS countries, you can tap into a large pool of underutilized talent and benefit from favorable macroeconomic conditions.

## Different blocs lead on different economic dimensions, but none lead on all of them.

Trading Blocs Indexed Across Key Economic Metrics

- **Macro-Economic Factors:** Inflation, Real Interest Rates, GDP Growth
- **Worker Availability:** Working-Age Population, Working-Age Population Predicted Change, Unemployment Rates
- **Education/Talent:** % Workers with Bachelor's Degree and above, Participation Rate of Workers with Tertiary Education
- **Infrastructure:** % Internet Users, Logistics Performance Index (LPI), Government Effectiveness Score




Source: International Labor Organization (ILO), UN World Population Prospects, World Bank, and Lightcast Analysis

Variables were normalized and weighted by importance. Trading bloc scores are averages of individual country scores, calculated using the most recent data available for each country.

## Countries Grow in One of Two Ways. The Two Resulting Groups are Diverging.

Countries that have high GDP either have very large populations and industrial capacity (BRICS countries on the top left of the chart), or have high educational attainment (Western and Gulf countries on the top right), but not both. We've identified three broad clusters to help analyze this dynamic at a glance.

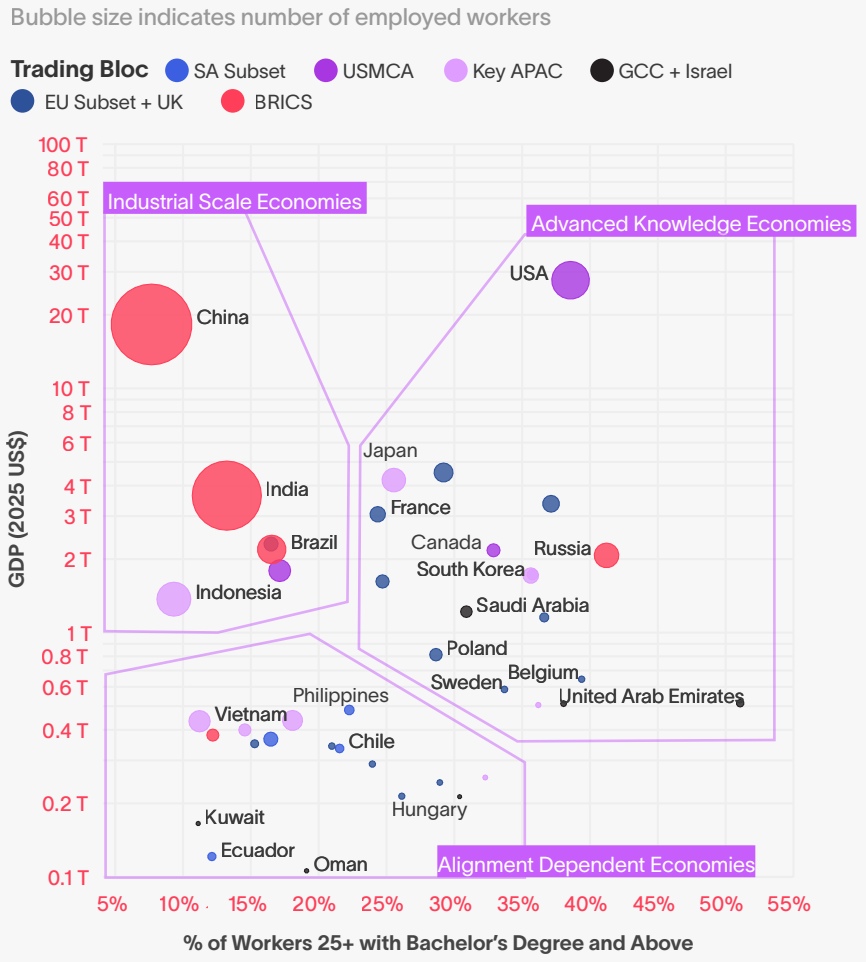
**Advanced Knowledge Economie**s align closely because their workforces are similarly educated and their infrastructures are mature. Those similarities have made trade historically smooth, but they also mean these economies face the same demographic and talent pressures.

**Industrial Scale Economies** share a similar structural profile. Their labor markets are characterized by large, growing workforces, but their infrastructure and institutional depth lag behind more developed economies.

The remaining countries fall into a third group, and include smaller developed economies as well as many developing economies. Some (like South Africa or the Philippines) have enough people that they could develop along the same path as Industrial Scale Economies. However, most of this third group is small enough that their most reliable path to geopolitical success will be close economic, cultural, and military ties to either Advanced Knowledge Economies or Industrial Scale Economies.

## Education, not just income level, is a key divider across three global economic clusters.

GDP and Educational Attainment Separate Industrial Scale Economies, Advanced Knowledge Economies, and Alignment Dependent Economies




Source: World Bank, UN World Population Prospects, and Lightcast Analysis

Explore the interactive chart

# Application: Invest Locally Based on Global Trajectories

Understanding a region's strengths and weaknesses will help your organization anticipate where talent will be abundant, where it may be scarce, and how to position your organization to take advantage of shifting geopolitical realities.

**Advanced Knowledge Economies** (USMCA, EU, GCC + Israel) need to compete on innovation and specialization. These regions have educated workforces but shrinking talent pools, so their focus should be on retention, productivity tools, and attracting global talent.

**Industrial Scale Economies** like BRICS have an advantage in their large workforces, but their risk comes from the "brain drain" that happens when their population is educated abroad. They'll find workers, but may need to invest heavily in training. Partner with local institutions to build skills rather than assuming they will come or assuming students can be trained elsewhere.

The third group—**Alignment-Dependent Economies**—will succeed by strategically aligning themselves to larger countries in one of the other groups, and possibly following one of their paths in the future.

Your 10-year plan should account for workforce trajectories, not just current conditions—within your own organization and across the world at large. Talent intelligence tools like strategic staffing forecasts and competitive benchmarking help you see where regions are heading before it becomes obvious to everyone else.

In Chapter 3, we'll explore these workforce opportunities and demographic risks in more detail, and outline the talent strategies and intelligence tools that can help you navigate what comes next.

# Mapping Out Migration

Immigration plays an outsized role in shaping the movement, cost, and development of talent. A large working-age population leads to larger consumer markets and GDP growth, creating economic and political power for the country where those people live and work.

Immigration declines are projected almost everywhere, and the talent strategies that relied on it will suffer dramatically as a result. But looking through a geopolitical lens, it becomes clear that specific immigration policy choices can meaningfully reshape talent availability and strategy.

**Labor shortages create geopolitical pressure.**

The working-age population is decreasing in many of the world's largest economies, and growth is slowing in many more.

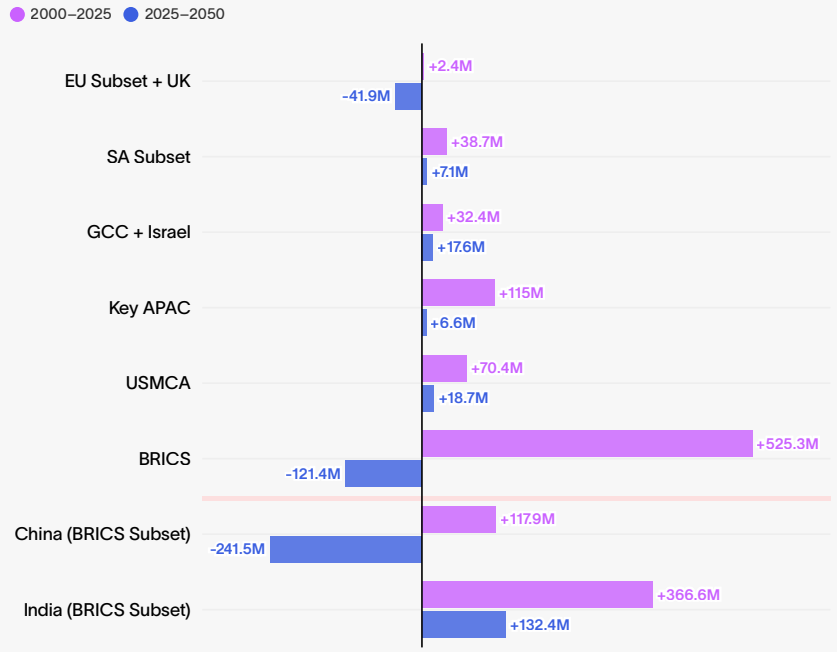
Generally speaking, working-age populations in our trading blocs will see less growth or even decline over the next 25 years.

Two countries are worth calling out here: India has already overtaken China in population, and will soon surpass its working-age population by tens of millions. The Chinese labor force is already shrinking—due in no small part to its one-child policy, in effect from 1979–2015.

When a country has fewer native-born workers available, it becomes a geopolitical advantage to find them from elsewhere—immigrants can become the workers and consumers they need to keep their societies and economies healthy and functioning. The problem is that many other countries will be in the same position, competing for a shrinking pool of potential immigrants.

## Demographics are restraining future workforce growth. In some regions, that population will shrink.

Net Working-Age Population Change by Trading Blocs and Select Countries




Source: UN World Population Prospects, and Lightcast analysis

Explore the interactive chart

# Assumptions About Skilled and Student Immigration no Longer Hold True

**The global education landscape does not match the global population landscape.**

The highest-ranked universities in the world are overwhelmingly in the US and Europe, but almost all of the countries with the top universities are expected to see their working-age population shrink in the next 25 years. (The US is the only exception: growth will slow down but not actually shrink, according to UN population projections.)

This regional distribution is almost exactly opposite from the projections of overall distribution of higher education students, which shows the vast majority of learners in the BRICS bloc, especially China and India.

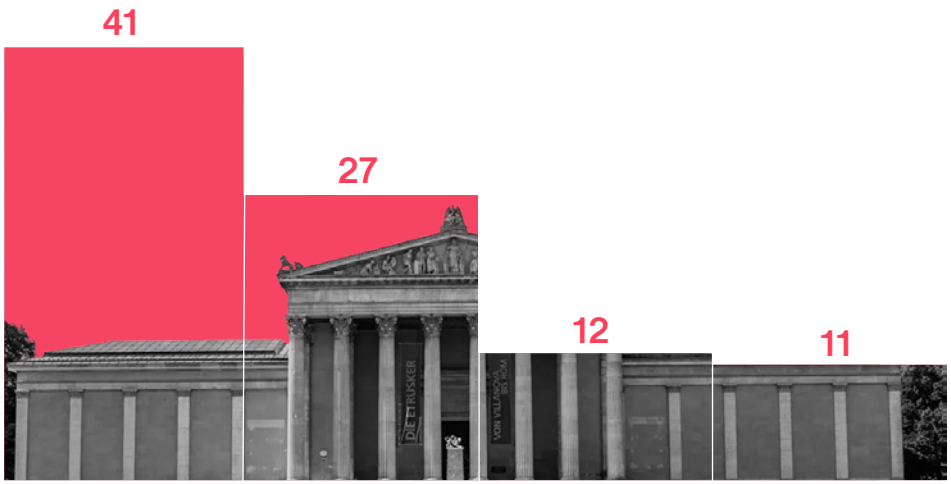
For centuries, students have traveled to the West for education, which creates an advantage for Western countries: they gain many of the best and brightest students from around the world. But now, the majority of the world's students come from China and India, and existing student pipelines are bound to break.

Anticipate disruption coming from multiple directions. Educational infrastructure in Industrial Scale Economies will need to ramp up dramatically to accommodate their millions of students. It is not a geopolitical advantage to send your most ambitious young people away to a foreign country and risk the chance they stay there.

Meanwhile, many countries in Europe and North America are placing more restrictions on immigration—which means lower international student enrollment.

## Top-ranked universities are concentrated in North America, primarily the US.

Number of Universities Ranked in the Top Global 100 by Trading Bloc

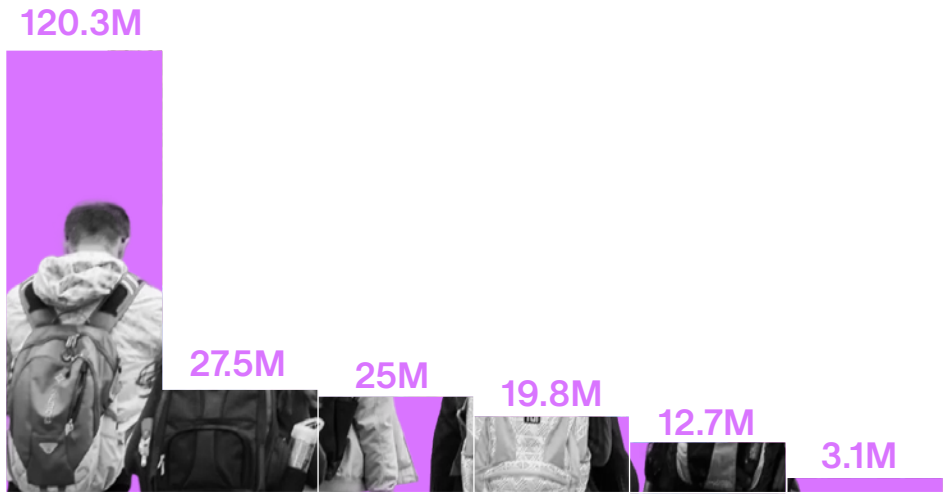



Source: US News Best Global Universities Rankings and Lightcast Analysis

Note: No GCC + Israel or SA Subset Universities appear in the Top Global 100.

## Future global talent will be concentrated in regions lacking top-ranked universities.

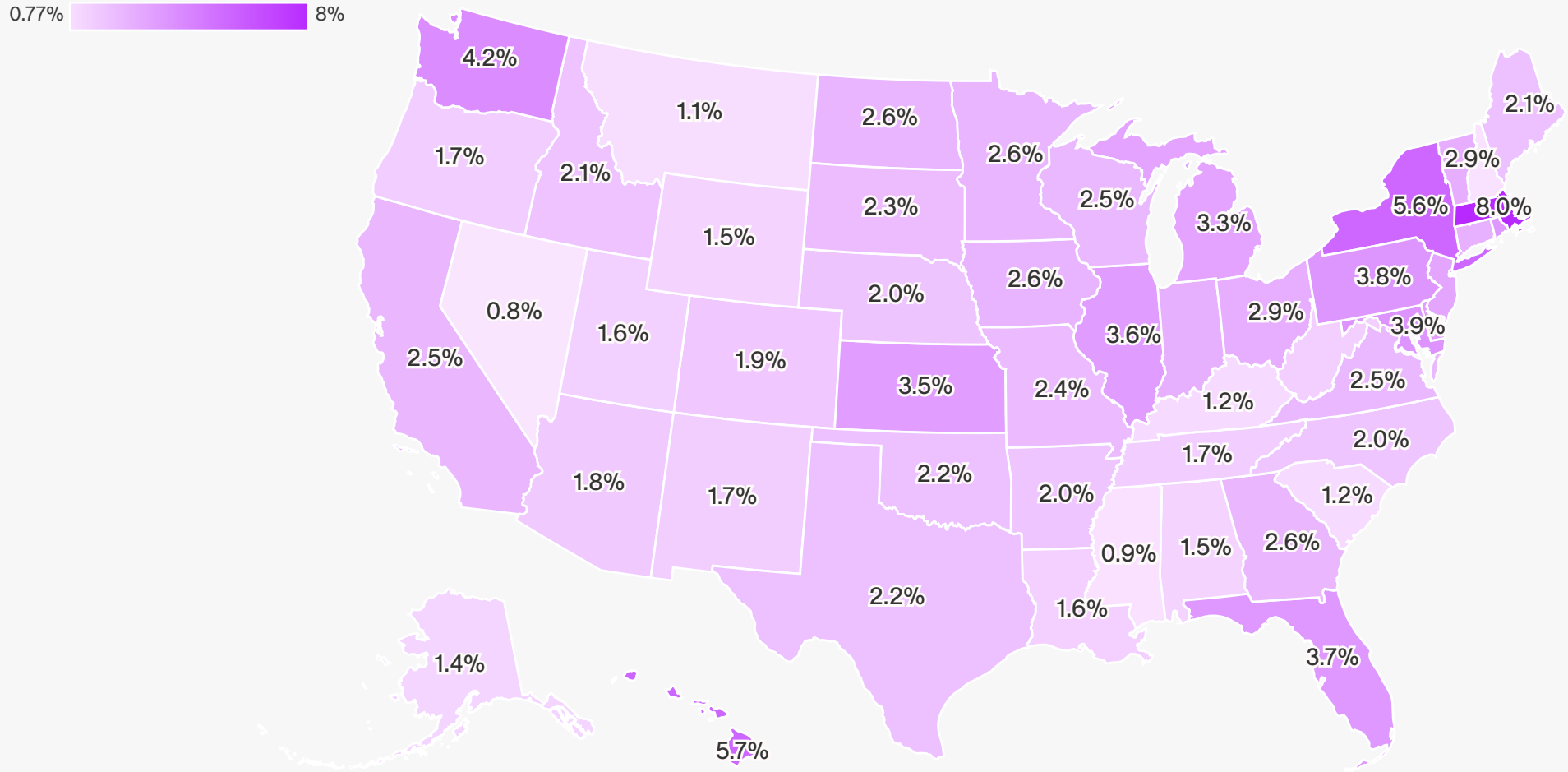
Total Enrollments in Higher Education by Country




Source: UNESCO Institute for Statistics and Lightcast Analysis

## The states with the highest concentrations of international students are in the Northeast, especially Massachusetts and New York.

International Share of Enrollments by State, 2023




Source: Lightcast Core Labor Market Information

Explore the interactive chart

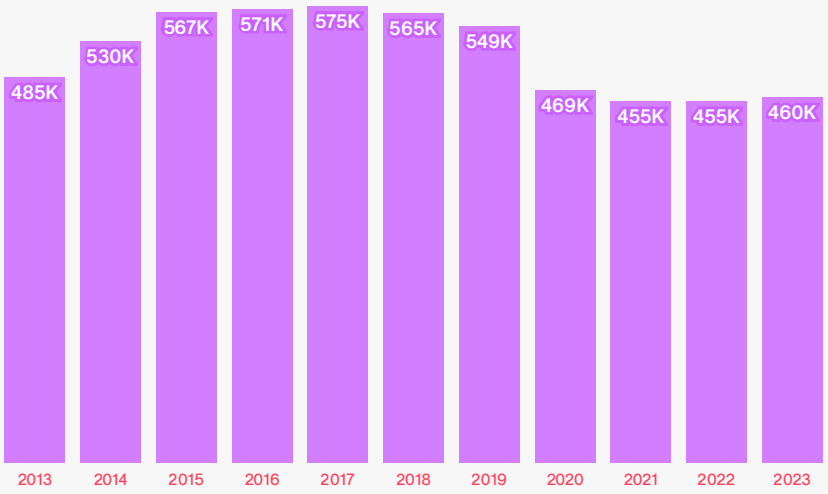
The US is scaling down international enrollment and revoking student visas for its own political and national security reasons. **Since 2017, international undergrad enrollment in the US is down by over 100,000**. Universities will have to find new sources of students.

Skilled immigration for professionals faces similar pressure. The US H-1B program is a useful proxy for this: in fiscal year 2024, nearly 400,000 H-1B visas were approved (new or renewed). But now each visa costs $100,000, a policy change designed to incentivize hiring US-born IT workers over those born elsewhere. The Professional, Scientific, and Technical Services industry is by far the most reliant on foreign expertise and thus most vulnerable to this kind of policy shift.

Immigration can be restricted at either the origin or the destination. Both sender and receiver need to be in agreement for the system to work. The longstanding assumption that the US and Europe can draw talent from geopolitical rivals (present or future) may no longer hold true. Education institutions and businesses in the West will need to find new sources of people, either domestically or from abroad, while former feeder countries will need to invest in their own educational systems.

## International undergrad enrollments peaked in 2017.

US International Undergraduate Enrollment by Year

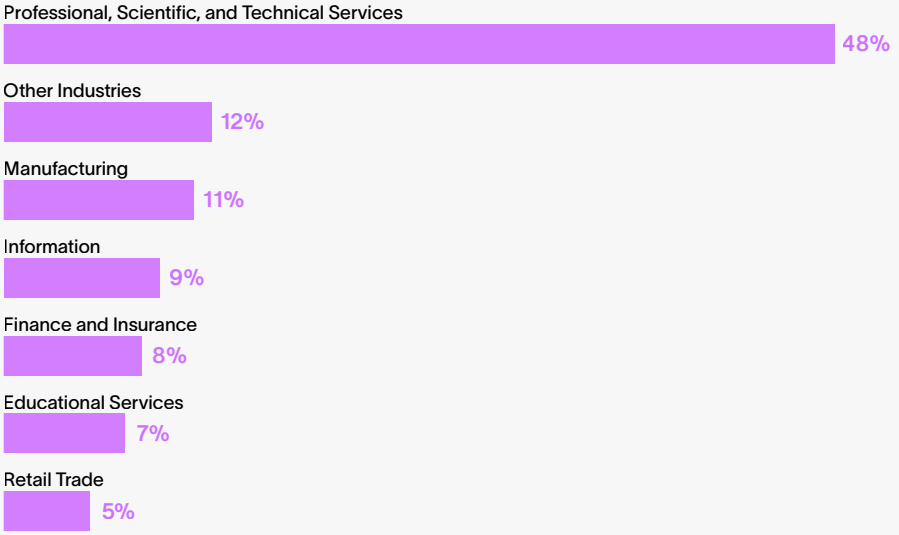



Source: Lightcast Core Labor Market Information

Explore the interactive chart

## In the US, the Professional, Scientific, and Technical Services Industry is the most reliant on H-1B visas.

Percentage of H-1B Visa Approvals by Industry, Fiscal Year 2024




Source: H-1B Employer Data Hub, US Citizenship and Immigration Services, and Lightcast Analysis

Explore the Interactive Chart

# Application: Planning for Volatility

In ways both positive and negative, immigration patterns and policies can transform the talent landscape very, very quickly. Organizations relying on H-1B workers or international student pipelines need contingency plans built into their strategic staffing forecasts, as many companies learned after the increase in H-1B visa costs in the US.

**Businesses** can adapt to a slowdown in immigration by developing alternative sourcing strategies:

- Remote work arrangements that allow talent to stay in their home countries,
- Partnerships with offshore teams, or
- Accelerated training programs to develop domestic workers into specialized roles.

Market expansion and site selection decisions should factor in immigration policy stability as much as current talent availability. Chapter 3 details additional talent strategies for adapting to slower immigration.

**For universities and training providers,** declining domestic student populations combined with restricted international access is a major challenge. When new enrollments are uncertain, you might expand offerings, perhaps by building partnerships with employers to create work-integrated learning (the ongoing AI credentialing discussed in Chapter 2 would be a great example). Data on enrollment trends can provide early warning when policy shifts begin affecting international student flows.

Economic development organizations should track how immigration policies affect regional competitiveness—tech hubs, research clusters, and innovation districts depend on global talent flows. Competitive benchmarking against peer regions should include which areas maintain favorable immigration policies.

# Manufacturing in the Mid-21st Century

Manufacturing drives economic power. Any trade relationship offers both sides a potential bargaining chip, and anything not produced domestically is subject to potential embargo or sanction. Countries are trying to de-risk their dependence on existing trade relationships, with the knowledge that they may not last.

Supply chain shocks, followed by the imposition of new tariffs, have made domestic production capacity a strategic and national security advantage once again—but even as automation accelerates, manufacturing still depends on workers and the human capital that supports them.

## Manufacturing is seeing a changing of the guard.

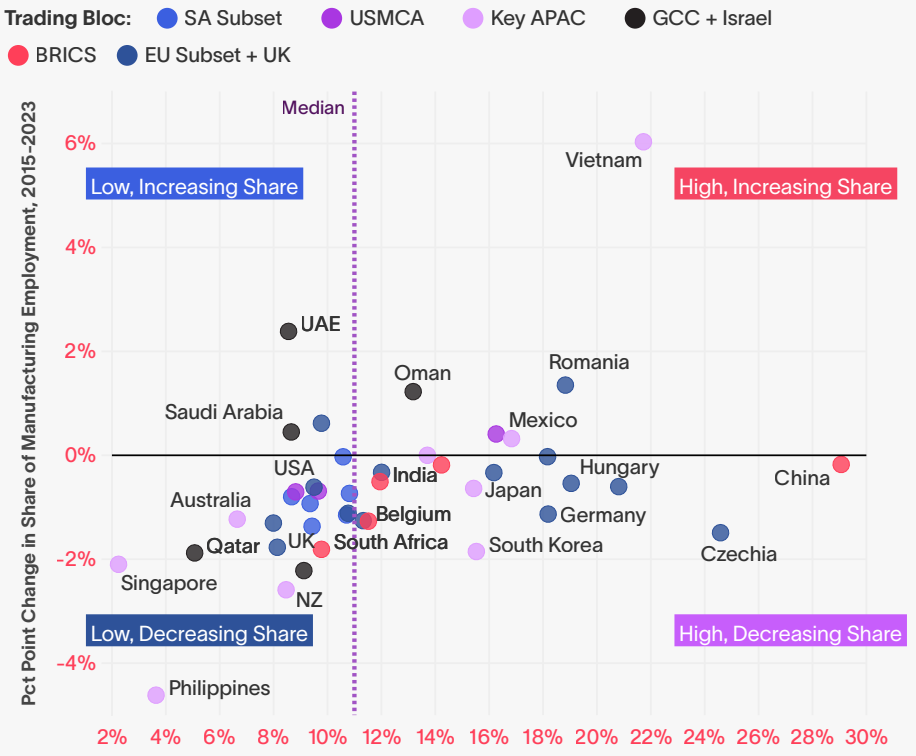
For decades, a few powerhouse countries have dominated global manufacturing. That dominance is not disappearing, but it is becoming more constrained as populations age, workforces shrink, and labor-intensive production becomes harder to scale. At the same time, many governments are pursuing policies, like tariffs, that seek political and national security goals, even if they result in higher costs and the destruction of existing trade relationships. Manufacturing is undergoing a tectonic shift.

The next generation of manufacturing hubs may rise not where capital is cheapest, but where education systems, business investment, demographics, and politics align to support long-term industrial growth.

This chart compares each country in our trading blocs by its share of manufacturing employment, and also the change in that share since 2015.

**Legacy manufacturing powerhouses are becoming constrained by aging populations and geopolitical friction; manufacturing growth and capacity are shifting elsewhere.**

Manufacturing's employment share and its recent growth indicate, respectively, the sector's relative importance within a country and whether that role is expanding or contracting.




Source: International Labour Organization (ILOSTAT database), SDG Indicator 9.2.2, and Lightcast Analysis

Note: X-axis employment shares reflect the most recent data available per country.

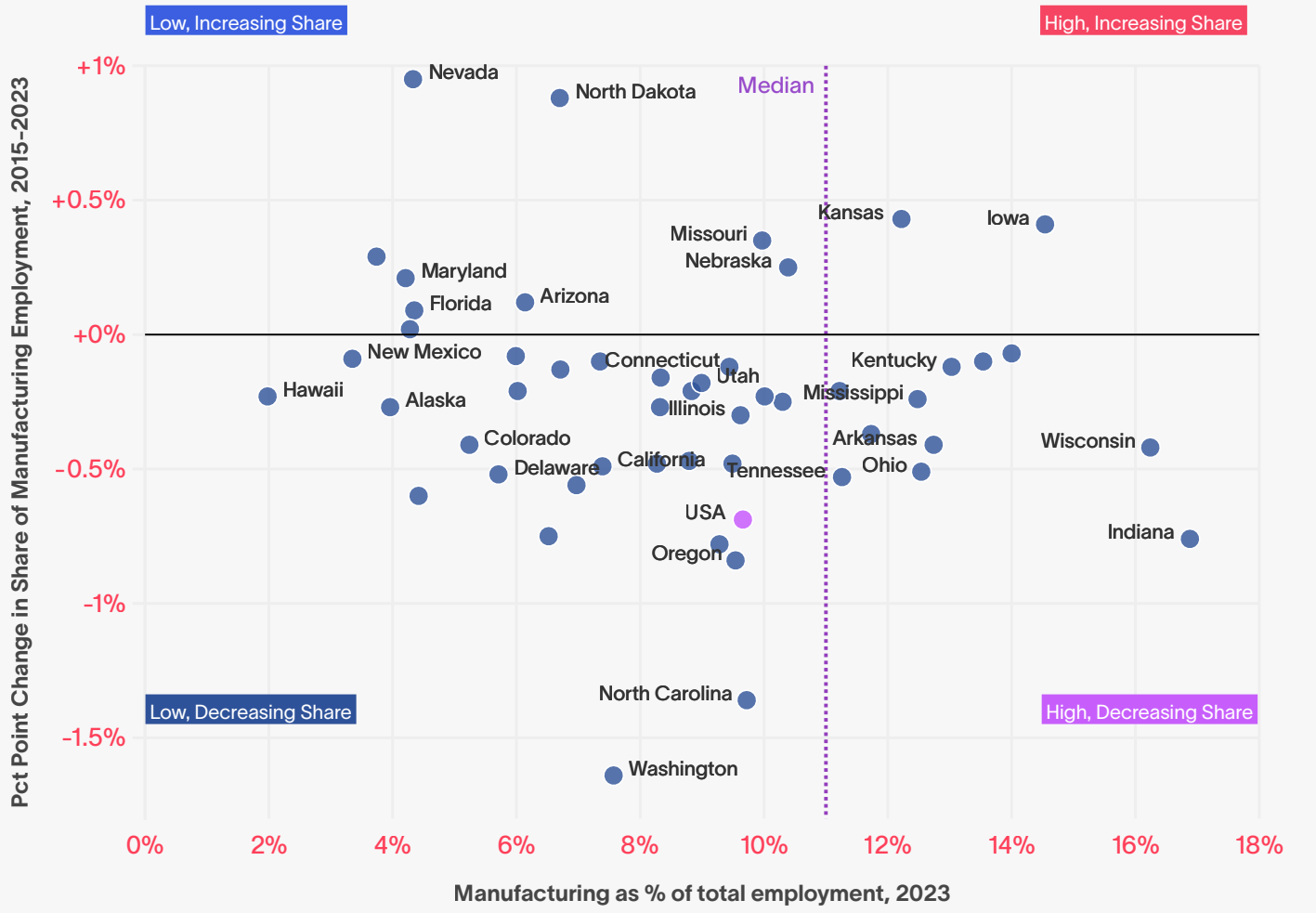
Explore the interactive chart

**Vietnam** is a standout with a high share of manufacturing employment and rapid growth, and countries, such as Greece and UAE, in the "low, increasing share" quadrant have high potential. China, while still heavily industrial, is beginning to show relative employment contraction. The United States appears in the "low, decreasing share" quadrant—but beneath that headline we find a more nuanced story.

In 11 US states, manufacturing is on the rise, as a growing share of overall employment. In Iowa and Kansas, that share is already high and still increasing. So even though the US overall has a lower share of manufacturing workers compared to other countries, it has bright spots where opportunities are still available.

## Despite a downward trend nationwide, several US states have a growing share of manufacturing employment.

Manufacturing as a Share of Total Employment and Its Percentage Point Change, 2015-2023




Sources: Lightcast Labor Market Information

Explore the interactive chart

# Is Labor Arbitrage Over?

**The short answer is no.**

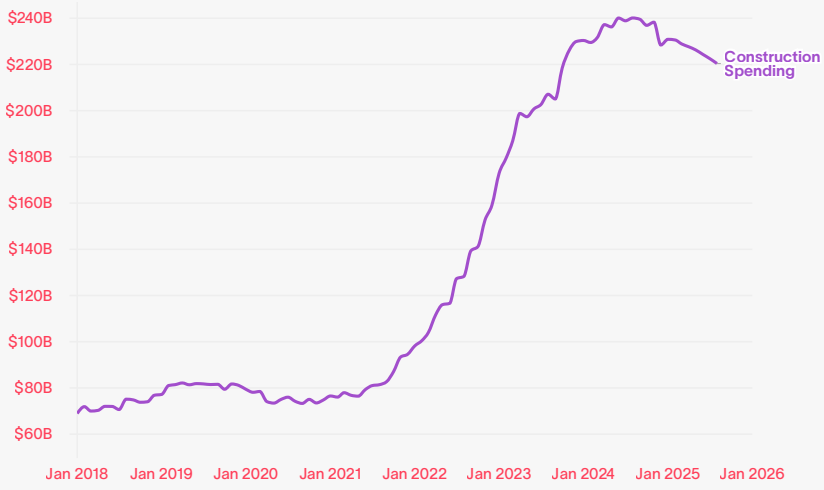
Labor arbitrage—the relocation of work to lower-cost regions to achieve the same output at reduced expense—has long been a defining feature of globalization. Policy shifts, tariffs, reshoring incentives, H-1B visa restrictions, and calls to "bring jobs home" all suggest a global reduction of cross-border labor arbitrage. Yet when we look at the data, that shift hasn't materialized.

In the US, anticipation of reshoring is often in the news, backed by more than $1 trillion in announced manufacturing investments through policies like the CHIPS Act. But in the labor market, the results are still pending. These two charts use construction spending and manufacturing employment as proxies for reshoring, with the assumption that businesses "bringing jobs home" would be building new factories and hiring new workers to do so.

But neither show a major spike; both construction spending and manufacturing employment rose up through 2022, but they have leveled off since then, even showing a slight decrease. If the boom is going to come, it hasn't shown up in data yet.

## Construction spending on manufacturing shows no evidence of mass reshoring.

Total Construction Spending on Manufacturing in the US

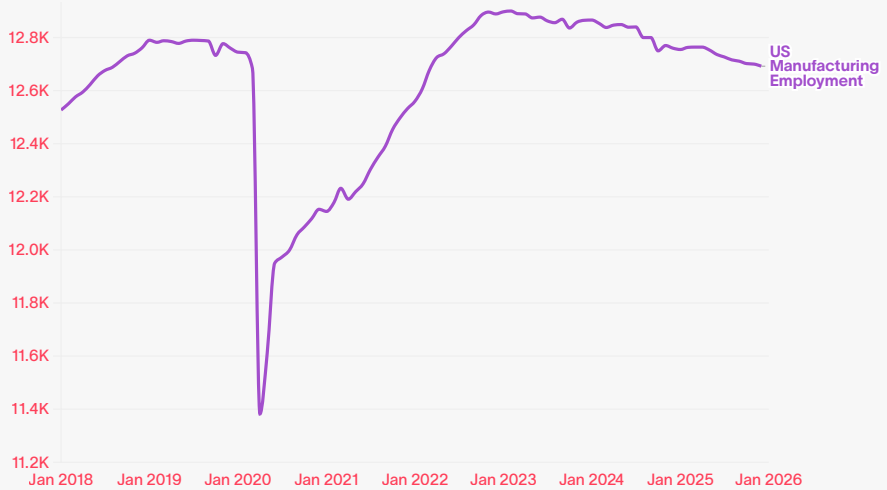



Source: US Census Bureau and Lightcast Analysis

Explore the interactive chart

## US manufacturing employment does not indicate a push toward reshoring.

Employment Count in US Manufacturing




Source: US Bureau of Labor Statistics and Lightcast Analysis

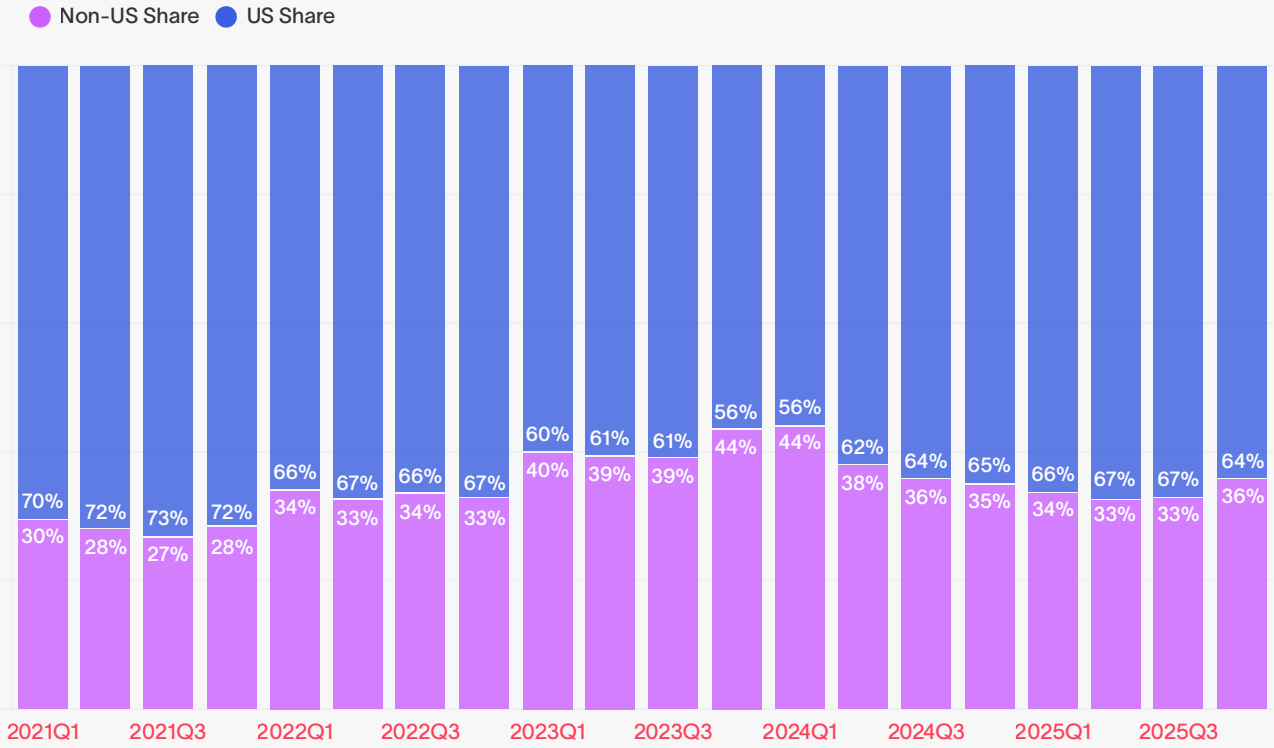
Explore the interactive chart

The same holds true for Fortune 500 companies. The share of non-US job postings at Fortune 500 companies peaked in early 2024 and has declined since. The balance between onshore and offshore hiring has not fundamentally changed.

But the persistence of labor arbitrage does not contradict our other observations about deglobalization. Countries may intend to de-risk by bringing their production capacity closer to home, but the labor market reality is that cost pressures and capacity constraints keep arbitrage alive. Offshoring has been a reliable practice for decades, and an effective solution: it's economically optimal to employ workers where labor is least expensive. That's not the problem. The problem is relying on old habits even when every other signal indicates that a seismic change is coming.

## The share of non-US job postings at Fortune 500 companies peaked in early 2024 and has declined since.

Fortune 500 Job Postings by Location




Source: Lightcast Job Postings Data

Explore the interactive chart

# Application: Increasingly Precise Strategies

This level of complexity in the global manufacturing landscape should not be overwhelming or paralyzing; instead, it enables greater precision. In an increasingly specialized manufacturing landscape, every region should use the shared language of data to make its case on the international stage, attracting investment and shaping strategy with data that proves their community's potential.

Even if your organization has gotten far enough to know you want to operate in the agricultural American Midwest, you need to know why (or why not) to choose Iowa over Illinois. What skills do local workforces possess? What training programs are in place to develop them? Or, if the technological sophistication of your industry continues to increase and you need more workers with college degrees in your manufacturing process, you might consider two options: moving operations to a smaller, more developed region with higher educational attainment, or investing in education and development local to the region where you already operate. They aren't easy choices, but better organizational intelligence based on labor market data will help you understand the potential outcomes better.

Lightcast BUSINESS ATTRACTION AND RETENTION → Explore

Lightcast can identify the skills and capabilities that make any region unique and provide the data on business growth and job postings to demonstrate how your community can meet employers' needs best.

# Chapter 1 Conclusion

As the tectonic plates of the global economy shift, they are tearing apart the old landscape and leaving a different one in its place. It's a new world.

Just as one example, most of us grew up knowing China was the biggest country in the world by population and its manufacturing capacity was always growing. Now its manufacturing growth is slowing down and evolving, and India's population is larger. Most modern trade relationships were designed under the assumption of relatively free trade, especially in developed economies like the US. High tariffs have changed that reality.

Geopolitical tensions have created two powerful trends: first, countries want to decouple themselves from the existing balance of power, because it has proven less reliable than expected. That means bringing manufacturing capacity home—but, because of the very same insulation, many have cut themselves off from the immigration flows needed to sustain their labor forces.

When circumstances change, workforce strategies must change in response. If demographics and immigration restrictions lead to broken talent pipelines, organizations must get creative to find new sources of workers (and students). If Advanced Knowledge Economies and Industrial Scale Economies continue on their diverging paths, it will be harder for location planning teams to find a region with the skills and people their organization needs—it's possible, but it's difficult. Granular, precise data makes it easier.

Looking ahead to our other fault lines, geopolitics intersects very clearly and significantly with both AI and labor shortages. AI creates another arena for geopolitical rivalry, becuse competition for talent and technology is intense and intensifying. And labor shortages we've already addressed through one specific lens—immigration. In Chapter 3, we'll go into more detail about others.

**Organizational Intelligence** is how you navigate geopolitical change. When trade deals shift or immigration rules change, gut instinct and conventional wisdom are out of date.

**Data provides a clear view of the landscape, even when it's shaking.**

CHAPTER 2

# ARTIFICIAL INTELLIGENCE

## The Disruption of Talent

## What We're Used To:

Technological progress moved slowly enough that education and training could keep up. A degree earned at the start of a career provided a foundation that remained relevant for decades. Automation focused on physical, repetitive tasks, leaving knowledge work stable and secure.

## What Happens Next:

Technology changes faster than the labor market can adapt. Supply and demand are ballooning in unexpected ways, accentuating shortages and saturating markets rather than restoring balance. Instead of teaching practical skills with long shelf lives, educators have a harder challenge ahead: teaching a posture and approach toward technology that is flexible enough to adapt to lifelong disruption. All the while, public sector leaders are competing to capture AI talent and investment for their regions in an ongoing gold rush that shows no signs of slowing down soon.

1

## AI is not solving labor shortages; supply and demand are misaligned.

**The sectors facing the most severe labor shortages are precisely those where AI adoption is lowest.** Hospitality and healthcare, two of the most talent-starved industries in the labor market, have AI adoption rates of 0.4% and 0.7%, respectively.

2

## AI's diverse impact requires specific adoption strategies.

**Every function and occupation demands to be considered individually.** The highest share of AI job postings are found in IT roles (20% of the total), but the jobs most vulnerable to AI are elsewhere—including executive assistants, editors, and interpreters/translators (where over 70% of their skills are exposed to AI).

3

## As countries race for AI talent, it's not clear who will win.

**AI is spreading unevenly, amplifying geopolitical uncertainty as countries race to capture AI talent to establish themselves as technological leaders.** Within Lightcast profiles data, only 24% of AI workers studied in the US, but 35% work there.

4

## The connection between education and business has fractured.

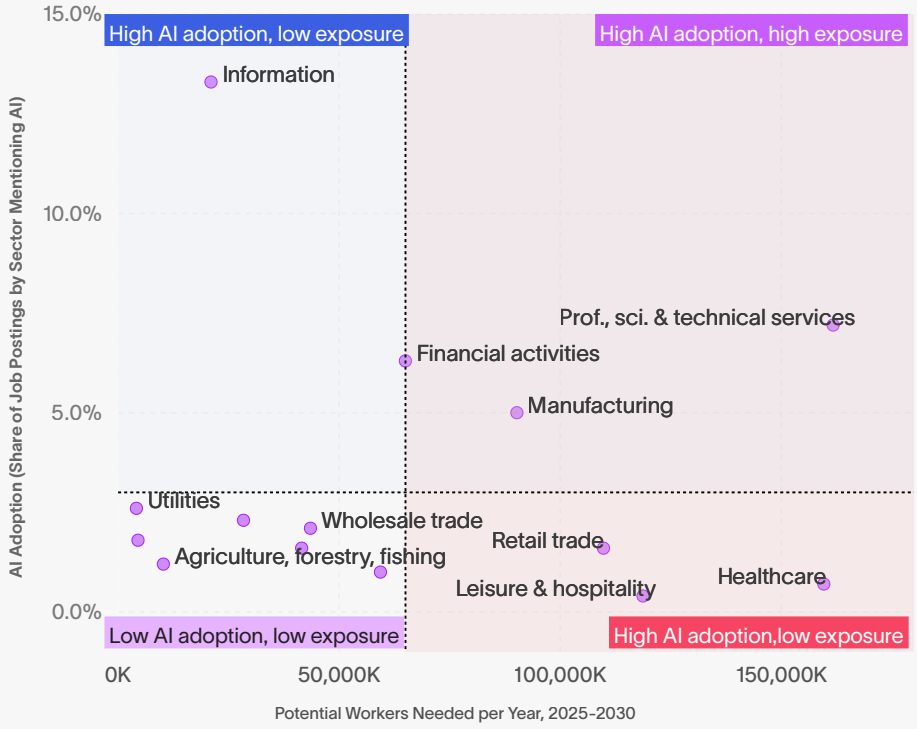
**While in the past, education institutions could develop programs in response to business needs, now both are rushing to adapt to AI as fast as they can.** AI engineers tend to be highly educated—more than five times more likely to have a PhD than the average worker—but only 11% have AI-related qualifications.

# AI is Filling Gaps that Don't Exist

If AI were intended to solve workforce problems, we would expect to see it deployed most heavily in places with the greatest challenges. Instead, the opposite is happening. The supply of workers is high in professional, white-collar roles, but this is where AI's impact is greatest.

## AI adoption is lowest where workers are needed most.

Relationship between Labor Shortages and AI Adoption in the US Labor Market




Source: Lightcast Job Postings Data, and BLS Data

Explore the interactive chart

**AI is creating new pressure points rather than solving existing problems.** Many sectors with the largest labor shortages in advanced economies show minimal AI adoption—hospitality and healthcare provide the clearest example of this, at 0.4% and 0.7% adoption, respectively.

AI development might be focused on white-collar roles for any number of potential reasons, including that it's the field the tech industry knows best, but perhaps most relevant is market pressure: AI investment is being directed to the places where the return is highest, not where it's most needed. The result is lower demand in sectors where the supply of talent is already high, and little relief where the need is most acute.

Lightcast has identified nine skill clusters within the broader umbrella of AI. These categories were created to support our research alongside the Stanford Institute for Human-Centered AI and its annual AI Index Report. Those clusters are: AI Agents; AI Ethics, Governance, and Regulation; Artificial Intelligence; Autonomous Driving; Generative AI; Machine Learning, Natural Language Processing; Neural Networks; Robotics; and Visual Image Recognition. Across those nine clusters, Lightcast experts have identified a total of over 300 skills, and a job posting is considered an AI job if it includes one of those skills within the text of the job listing. Similarly, a worker professional profile is considered AI talent if it mentions one of the AI skills on their profile.

# AI is Linked to Rapid Job Change

While the sectors needing the most help still lack it, AI is accelerating skill changes in the fields that were already evolving fastest (like IT and Marketing), compounding the challenge for workers struggling to keep up.

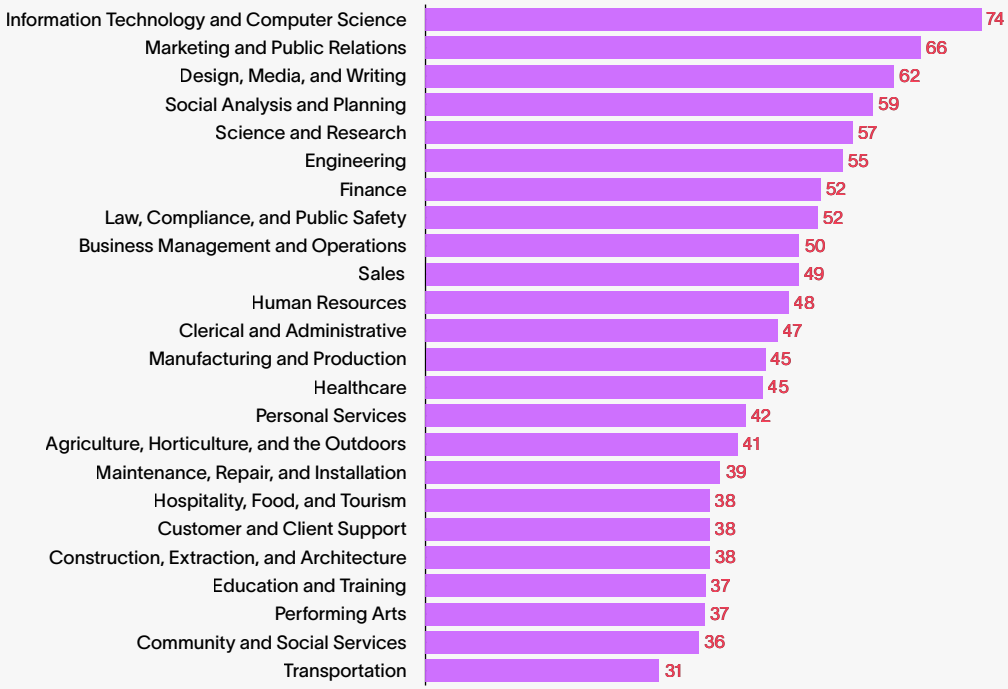
The sectors that are highly exposed to AI face accelerating skills obsolescence that outpaces traditional training cycles. And unlike previous waves of automation that mainly affected manual tasks, AI's impact on cognitive work means that even highly educated workers in knowledge-intensive fields must continuously adapt to remain relevant.

Skills requirements across all job functions are shifting faster than at any point in modern history—between 2021 and 2024, a third of the skills in the average job changed, and the rate of change is accelerating. Information technology, marketing, and design rank among the functions experiencing the most dramatic transformation, with skills' shelf lives shrinking year over year.



## AI is a primary driver of rapid skill change in white-collar occupations.

Skill Change Index by Career Area, 2021-2024 (UK)




Source: Lightcast UK Skills Revolution

Explore the interactive chart

# Application: Quantifying Skill Change

First and foremost, it would be helpful if AI could relieve the pressure in worker-starved industries like healthcare and retail. That is where the greatest efficiency gains are possible, and it should be a priority.

But for those responding to AI disruption rather than shaping it, collaboration is the first step. Employers and educators must be aligned to help train and develop workers throughout their careers as the pace of change accelerates.

Neither workforce development systems nor higher education institutions were built to respond at this velocity, but they have no choice. It might be tempting for employers, educators, and workforce development professionals to blame each other, but nobody dropped the ball here. Change came fast, and now everyone must respond as quickly as they can.

## Solutions might include:

- Design an organization-specific skills strategy to reliably evaluate change within your region, company, or target employers
- Hire for learning ability and adaptability over current skill matches—which will also require clearly-defined career pathways and internal development programs for new and existing employees
- Creating modular, stackable credentials jointly designed by employers and educators that allow workers to develop skills over time without leaving the workforce for a full degree

# Organizational Strategies are Breaking Apart

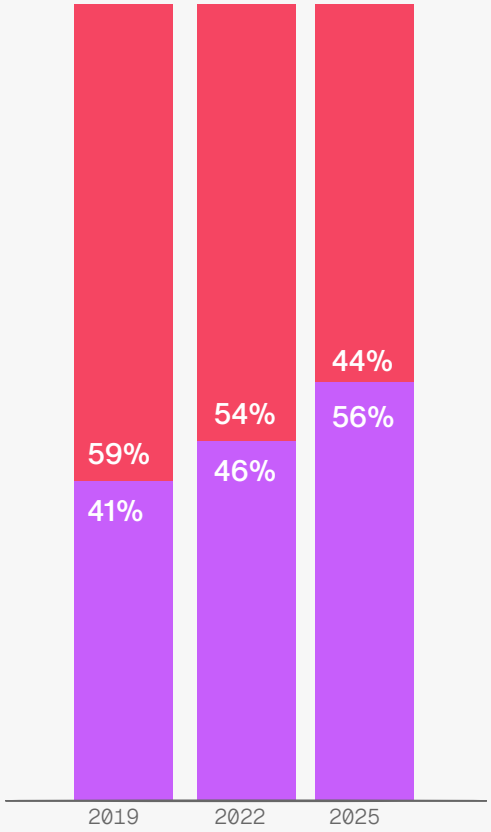
AI workforce transformation has become a key priority for organizations across the labor market, but any two professionals might experience it very differently. AI requires unique strategies for every role. Because the technology is disruptive on a task level, not an occupation level, every function needs its own approach because it is being reshaped differently. **The impact that individuals within a given role will feel from AI will be primarily determined by the skillsets they use to complete their daily tasks.**

## Tracking AI Across Roles

While only a few years ago "artificial intelligence" was siloed to the cutting edge of the tech sector, we've crossed a threshold where over half of AI jobs are outside tech—marketing, HR, sales, and finance are the other functions with the highest adoption.

### AI skills are no longer just in tech jobs, but spreading across functions

Share of Job Postings Mentioning AI Skills, Split by IT and Non-IT (US Labor Market)




Source: Lightcast Job Postings Data

Explore the interactive chart

## AI skill requirements vary by job function.

Share of AI Postings Requiring a Given Set of AI Skills

| | AI Ethics, Governance and Regulations | Artificial Intelligence | Autonomous Driving | Generative AI | Machine Learning | Natural Language Processing | Neural Networks | Robotics | Virtual Image Recognition |
|---|---|---|---|---|---|---|---|---|---|
| Agriculture, Horticulture, and the Outdoors | 0% | 49% | 16% | 6% | 19% | 4% | 2% | 2% | 4% |
| Business Management and Operations | 1% | 60% | 3% | 10% | 20% | 3% | 1% | 1% | 1% |
| Clerical and Administrative | 0% | 64% | 3% | 10% | 10% | 10% | 1% | 1% | 1% |
| Community and Social Services | 0% | 78% | 1% | 3% | 8% | 10% | 0% | 0% | 0% |
| Construction, Extraction, and Architecture | 0% | 52% | 16% | 1% | 8% | 5% | 4% | 12% | 2% |
| Customer and Client Support | 0% | 67% | 1% | 10% | 12% | 7% | 1% | 1% | 1% |
| Design, Media, and Writing | 0% | 57% | 3% | 16% | 13% | 8% | 0% | 1% | 1% |
| Education and Training | 1% | 52% | 3% | 6% | 24% | 7% | 3% | 3% | 2% |
| Engineering | 1% | 33% | 14% | 6% | 24% | 2% | 3% | 12% | 6% |
| Finance | 2% | 58% | 1% | 8% | 26% | 4% | 1% | 0% | 1% |
| Healthcare | 0% | 63% | 2% | 3% | 10% | 11% | 1% | 7% | 3% |
| Hospitality, Food, and Tourism | 0% | 47% | 1% | 4% | 41% | 5% | 0% | 1% | 0% |
| Human Resources | 1% | 66% | 1% | 9% | 16% | 6% | 0% | 1% | 1% |
| Information Technology and Computer Science | 2% | 34% | 2% | 12% | 33% | 6% | 8% | 1% | 3% |
| Law, Compliance, and Public Safety | 1% | 60% | 6% | 8% | 16% | 6% | 1% | 0% | 1% |
| Maintenance, Repair, and Installation | 0% | 24% | 42% | 4% | 7% | 2% | 0% | 18% | 3% |
| Manufacturing and Production | 1% | 51% | 6% | 4% | 17% | 3% | 1% | 14% | 3% |
| Marketing and Public Relations | 1% | 54% | 1% | 13% | 22% | 7% | 1% | 0% | 1% |
| Military | 0% | 28% | 45% | 1% | 20% | 1% | 0% | 3% | 2% |
| Performing Arts | 1% | 75% | 0% | 4% | 13% | 4% | 1% | 1% | 1% |
| Personal Services | 0% | 67% | 1% | 6% | 16% | 6% | 2% | 0% | 2% |
| Sales | 1% | 64% | 2% | 11% | 17% | 3% | 1% | 1% | 1% |
| Science and Research | 1% | 30% | 4% | 8% | 30% | 7% | 12% | 1% | 7% |
| Social Analysis and Planning | 2% | 41% | 8% | 7% | 33% | 5% | 1% | 0% | 2% |
| Transportation | 0% | 32% | 55% | 2% | 7% | 1% | 0% | 1% | 1% |

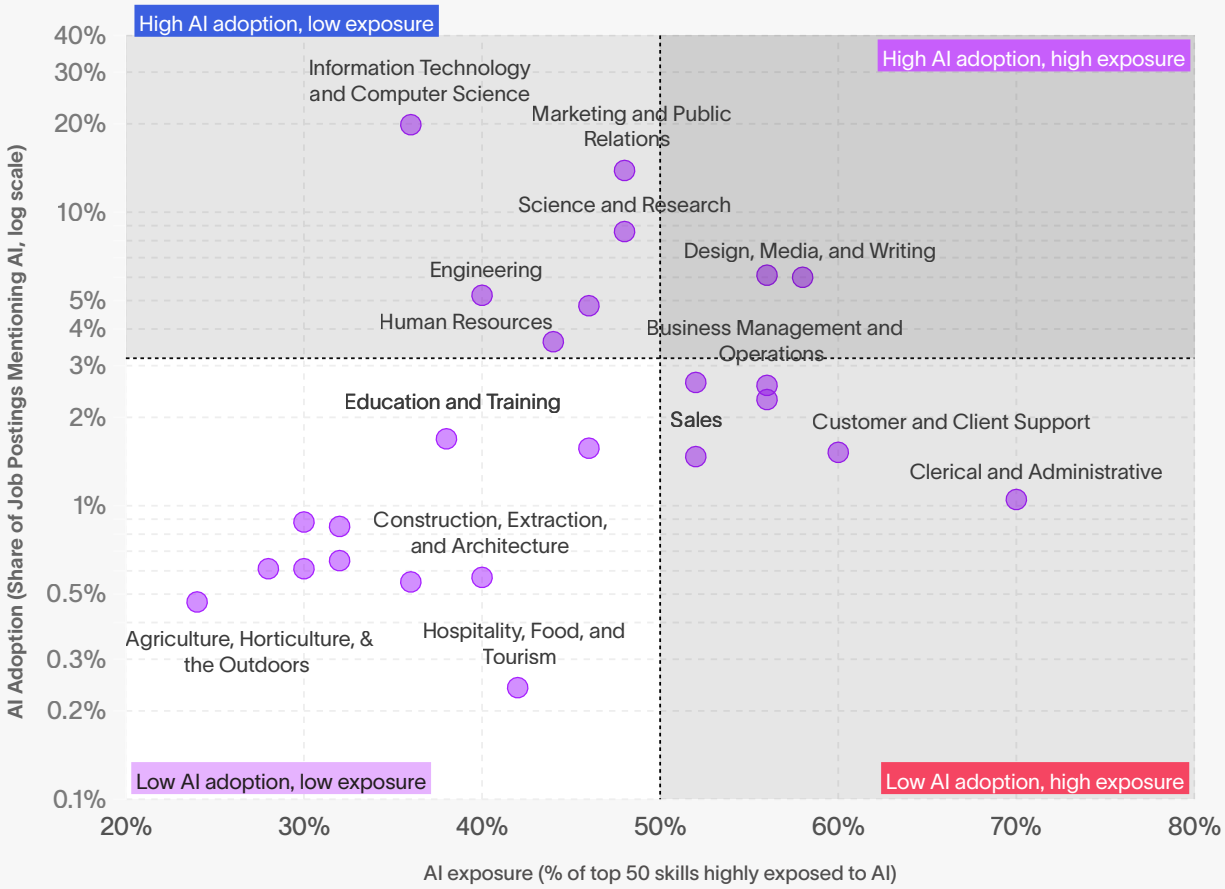
Source: Lightcast Job Postings Data

But even as adoption is on the rise overall, each individual job function has different priorities for how it implements AI. The Lightcast definition of AI skills and AI jobs uses ten different skill clusters to break down nuances within the overall field of AI, and Lightcast data shows us that every job function uses a different mix. It's inaccurate to think of AI as one singular bucket of skills. While "Artificial Intelligence" and "Machine Learning" are clearly the clusters most in use across the board, even they show remarkable diversity between career areas.

# The Adoption-Exposure Gap

## AI transformation is happening at the skills and task level, affecting jobs differently.

AI Exposure and AI Adoption by Job Function




Source: Lightcast Job Postings Data

Explore the interactive chart

We can look at job postings to tell us which occupations are being changed by AI today. We can look at exposure, at a skill level, to anticipate what occupations will be changed by AI tomorrow. Exposure, in this context, refers to the degree to which an occupation's core skills are susceptible to being augmented or automated by AI technologies (and our exposure rankings come from a 2025 Harvard Business School paper). Job functions like design and media, sales, customer service, and finance show high exposure even where adoption remains moderate.

## Jobs with a large share of their skillset exposed to AI are at higher risk of displacement.

Share of Top 50 Skills that Are Highly Exposed to AI, by Occupation

| Occupation (Lightcast Occupation Taxonomy) | AI Exposure |
|---|---|
| MOST AI-EXPOSED | |
| Executive Assistant | 78% |
| Editor | 74% |
| Interpreter | 74% |
| Office/Admin | 74% |
| Proofreader | 72% |
| Data Entry Clerk | 72% |
| Court Reporter | 70% |
| Legal Secretary | 70% |
| Underwriter | 70% |
| Receptionist | 70% |
| LEAST AI-EXPOSED | |
| Nurse Anesthetist | 14% |
| Physician | 12% |
| Driller / Drill Operator | 12% |
| Emergency Medical Technician | 10% |
| Firefighter | 8% |
| Paramedic | 8% |
| Art Therapist | 8% |
| Cardiovascular Technician / Technologist | 8% |
| Respiratory Therapist | 8% |
| Dialysis Technician | 6% |

Source: Lightcast Job Postings Data

Explore the interactive chart

We can zoom in to look at specific occupations, rather than job functions. Many kinds of writing and editing jobs are among those most exposed, with over 70% of their core skills potentially affected. On the other end of the spectrum, healthcare and first responder jobs dominate the low end of the rankings.

Throughout the labor market, but especially in these highly-exposed roles, tasks that are routine, rules-based, or language-driven have become increasingly automated or augmented. As a result, these workers will need to set themselves apart through higher-order capabilities—critical thinking, domain expertise, and the ability to guide, critique, and refine AI-generated content.

Even as AI augmentation spreads, helping many professionals complete their current tasks more efficiently, they will require new work to be done elsewhere in the organization. Technical teams will need to take on new tasks to aid in the development, integration and security of the AI tools utilized by their colleagues.

# Application: Rapid Reskilling, Individually Optimized

The solution should not be a widespread push (from corporate L&D, education, or workforce development) toward literacy in specific tools like ChatGPT or Google's image-editing tool Nano Banana, for two reasons. Not only do different workers need to use it differently, but specific tools are changing too quickly for anyone to be certain about their long-term relevance. Instead, employers should prioritize helping workers develop the adaptability to thrive in an environment where job requirements shift continuously. If augmenting work with LLMs is "micro AI," leaders and stakeholders should be thinking about macro AI, where entire processes and workflows are redesigned with AI at their core.

Because every function requires a different AI strategy, attempting to transform everything simultaneously will fail. Instead, organizations must identify where AI poses the greatest risk of disruption, where it offers the highest return on investment, and where the workforce is most prepared to adapt. This requires granular labor market intelligence—understanding not just broad trends, but specific skills, occupations, and regional labor patterns.

The organizations that stay standing after the tremors of AI disruption pass are those that build internal systems for rapid reskilling, create pathways for workers to transition between roles, and foster a culture where continuous learning becomes embedded in daily work rather than an occasional intervention. And this is all the more important as AI disruption expands across the global talent landscape.

# The Geography of AI

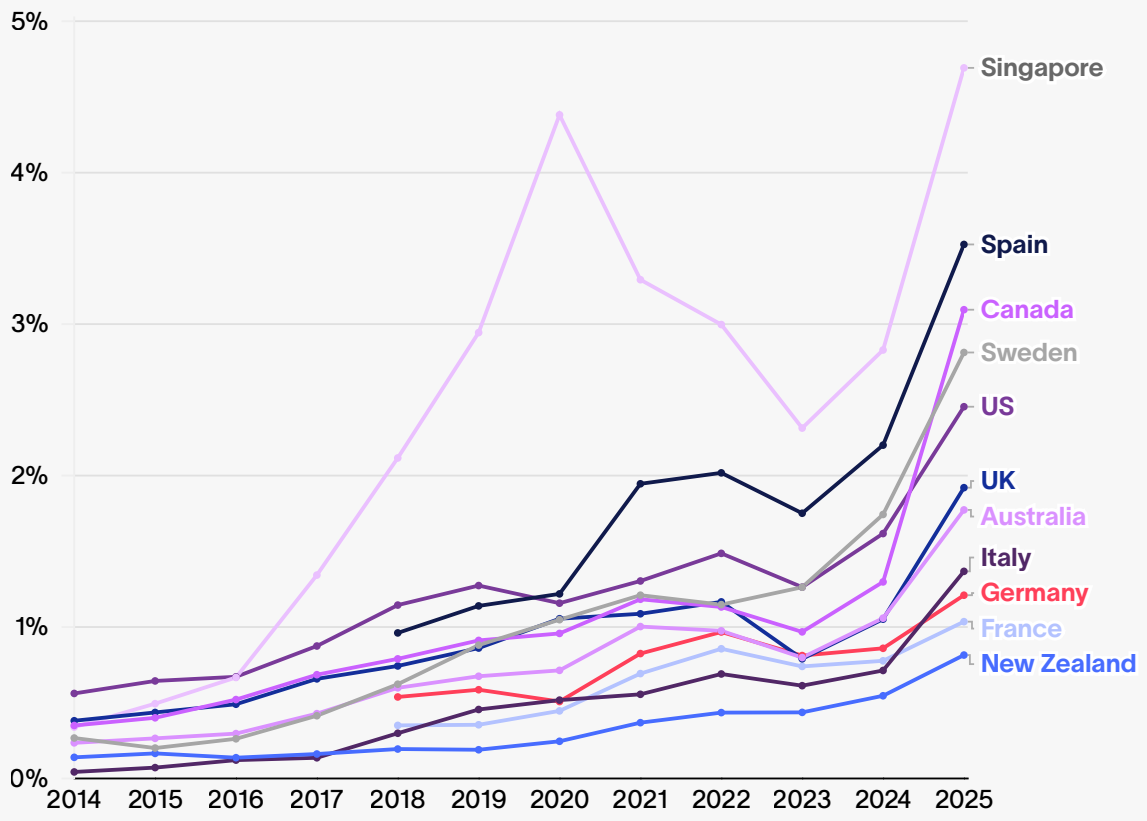
**Long-term global implications remain uncertain.**

AI is spreading unevenly, and we don't yet know whether it will concentrate power or democratize it. The US employs an outsized share of AI talent, but many other countries, especially in Asia, have competitive advantages. (India and Indonesia have large AI talent pools that could accelerate their development if retained domestically, and Singapore boasts the highest concentration of AI workers.) The uncertainty increases pressure on an already unstable landscape.

Demand for AI skills is rising everywhere, but adoption in urban areas is particularly high. Globally, Singapore leads with 4.7% of all job postings mentioning AI skills, and Washington, DC, has higher adoption than the rest of the US.

## Demand for AI varies significantly by country, with Singapore leading the way.

Share of Job Postings Mentioning AI Skills in Selected Countries (2014–2025)

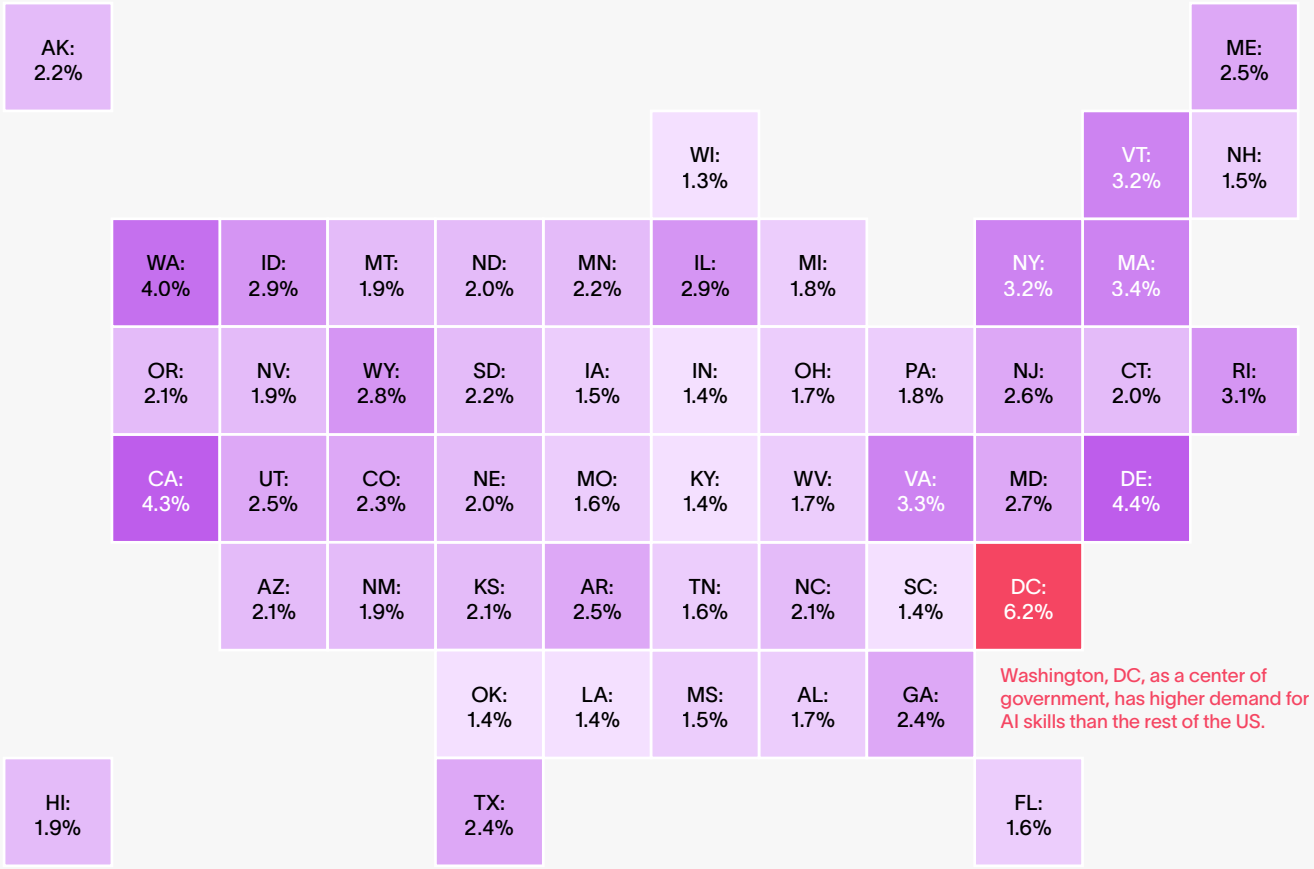



Source: Lightcast Job Posting Data

Explore the interactive chart

## Demand for AI also varies significantly across states.

Share of Job Postings Mentioning AI Skills by US State




Source: Lightcast Job Postings Data

Explore the interactive chart

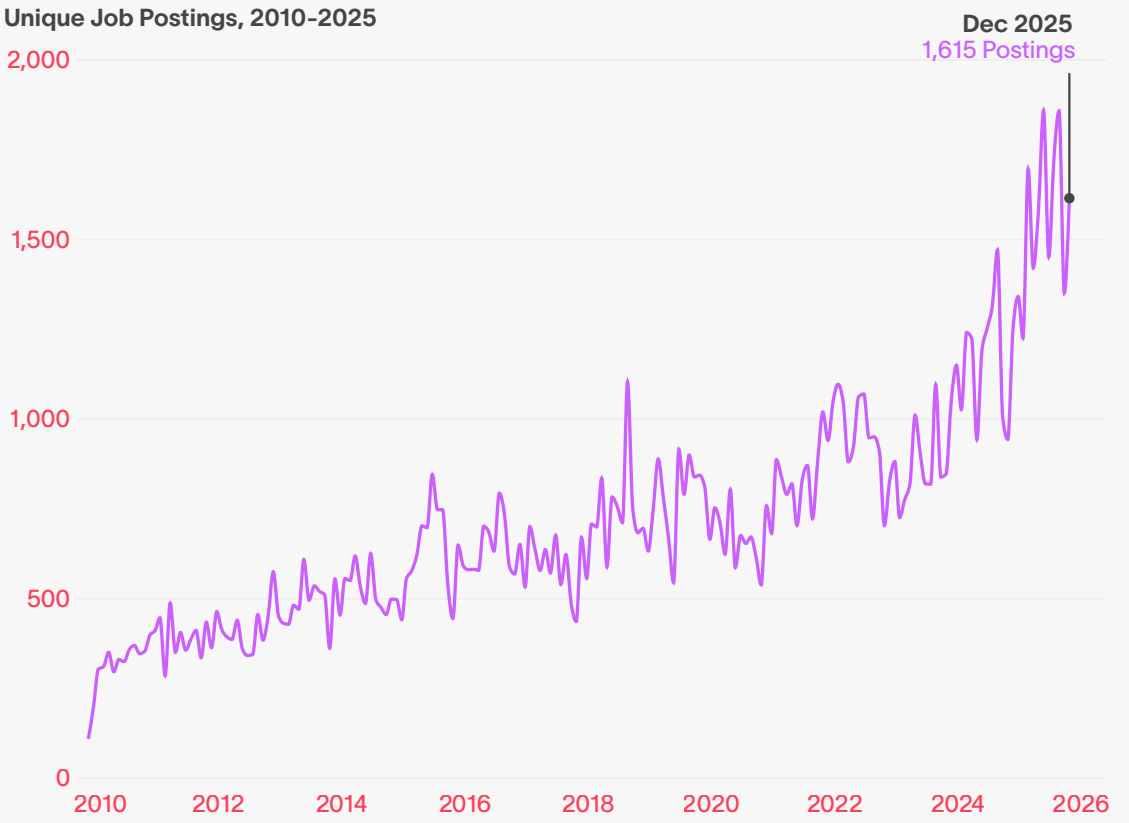
The United States has seen 50% growth in AI-related postings over the past year, with AI now appearing in 2.5% of all job postings. These numbers may seem small in absolute terms, but they represent millions of jobs at the leading edge of technological transformation.

AI talent and infrastructure are geopolitical advantages, amplifying the pressures and rivalries reshaping the world economy, as discussed in Chapter 1. Even regional variation within countries matters, because they determine which markets will capture the benefits of AI-driven growth—and which risk falling further behind.

# Data Centers in the US

## AI growth is pushing demand for data center jobs.

Number of Job Postings For Data Center Technicians / Engineers in the US Labor Market




Source: Lightcast Job Postings Data

Explore the interactive chart

Discussions about AI often focus on jobs for AI engineers and transformation in white-collar roles, but a boom in data center construction represents another means by which AI is transforming local economies.

Hiring activity for data center technicians/engineers in the US has tripled in recent years. These technicians and engineers help keep data centers operating, but they're just one part of an interconnected workforce needed for the broader infrastructure buildout.

Data centers rely on four overlapping industries: construction and skilled trades, telecommunications, data center operations, and power and energy. They may not be major long-term job creators, but there's a big need for construction and skilled trades workers—including blue-collar workers with technical skills—throughout multiple phases of data center construction and operations, not just the early stages.

Decisions about data centers are complex, especially because the jobs created by a boom in construction are often temporary. Each community will have to decide for itself whether this kind of investment is worth it, but they can't do that without reliable data about the economic impact.

The Lightcast I/O (input-output) model can quantify the exact extent of that impact. Here's what it might look like if a new AI data center were built in Laredo, TX, as an example. (Note that this does not count economic impacts during the construction phase.)

## Creating data centers has a multiplier effect on job opportunities in a region.

Effects from Adding 100 Jobs at an AI Data Center in Laredo, TX

| $9.9M | 188 | $767K |
|---|---|---|
| **Change in Earnings** | **Change in Jobs** | **Change in TPI** |
| MULTIPLIER: 1.56 | MULTIPLIER: 1.88 | (Taxes on Production and Imports) |
| Total change in regional earnings (initial, direct, indirect, and induced) from the addition of these jobs. This total is calculated from the initial, user-made change times the multiplier determined by Lightcast's input/output model. | Total change in regional jobs (initial, direct, indirect, and induced) from the addition of the initial jobs. This total is calculated from the initial, user-made job change times the multiplier determined by Lightcast's input/output model. | Effect on taxes on production and imports (TPI) from adding these 100 jobs in Laredo.<br>TPI Earnings: Local \| $258K<br>TPI Earnings: State \| $253K<br>TPI Earnings: Federal \| $256K |

Source: Lightcast Input-Output Model

Note: Projections based on adding jobs to the "Computing Infrastructure Providers, Data Processing, Web Hosting, and Related Services" industry in Laredo, TX

The "Taxes on Production and Imports" data in the I/O model measures the change in local, state, and federal tax revenue through the increased or decreased industry sales, specifically general sales and property taxes. It's important to note that this change in tax revenue corresponds to the ripple effects and cannot be tied to a particular timeframe.

# If local leaders do want to attract this kind of investment, what levers can they pull to do so? Here are five.

| | FACTOR | EXPLANATION |
|---|---|---|
|  | Energy | Companies prioritize regions with reliable, low-cost electricity, often from multiple sources like natural gas, nuclear, hydro, or renewables. Proximity to energy generation reduces transmission losses and improves operational efficiency. |
|  | Connectivity | Strong fiber optic networks and robust transportation infrastructure are essential for high-speed data transfer and logistics. Locations near major highways, rail, and internet backbone nodes are highly attractive. |
|  | Talent | Access to a skilled workforce is critical. Companies look for areas with universities, technical colleges, and training programs that can supply engineers, IT specialists, and data center operators—and sufficient construction and skilled trades workers. |
|  | Regulation & Incentives | Tax incentives, grants, and regulatory clarity influence site selection. Predictable, business-friendly policies reduce operational risk and improve ROI for large-scale infrastructure investments. |
|  | Industrial Sites | Redevelopment of dormant industrial or manufacturing sites with existing power infrastructure can lower construction costs and accelerate timelines. Pre-built facilities often have high-capacity electrical connections already in place. |

# The Concentration Tradeoff

## Availability of AI talent is not enough; we need to look at competition for this talent.

Hiring Difficulty Score: Easiest (0) to Hardest (5) to find

| | Natural Language Processing | Robotics | Machine Learning | Deep Learning |
|---|---|---|---|---|
| India | 1.1 | 0.5 | 0.6 | 1.1 |
| Canada | 1.4 | 3.1 | 1.1 | 0.6 |
| Germany | 1.4 | 1.3 | 1.1 | 1 |
| United States | 1.6 | 2 | 1.6 | 1.8 |
| United Kingdom | 1.9 | 2.5 | 1.9 | 2.5 |
| Ireland | 3.5 | 0.9 | 3.9 | 1.9 |
| Singapore | 4.6 | 2.8 | 4.6 | 4.8 |

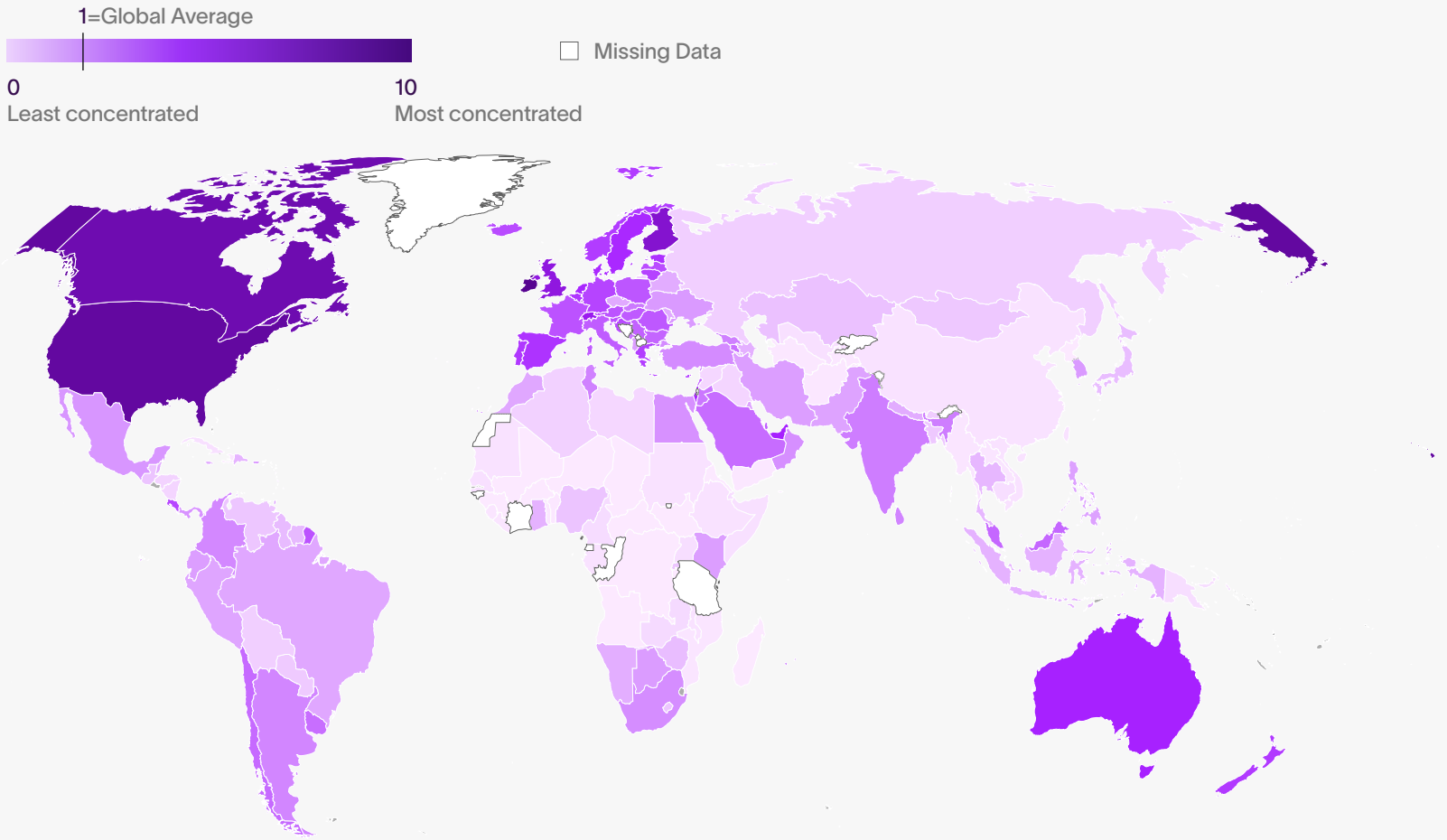
Source: Lightcast Profiles and Job Postings Data

As with any mismatch between supply and demand, the uneven concentration of AI workers and employers creates advantages and disadvantages across regions—if and when demand exceeds supply, wages can rise suddenly. So while AI talent is more abundant in the US, the overwhelming majority of those workers already have jobs, so they would likely need to be paid more to leave them. Competition for AI workers is lower in Germany or India, which could offer potential employers an arbitrage advantage. You can't shape global location strategy without understanding local workforce dynamics.

## AI talent is unevenly distributed globally.

Relative Concentration of World's AI Talent

As AI adoption has increased, so has competition for AI talent. The United States in particular has drawn talent away from other countries: within Lightcast profiles data, 24% of global AI talent was educated there, but 35% work there now.




Source: Lightcast Professional Profiles Data

Note: Compared with most other countries, Lightcast data on China is relatively sparse. This means our analysis of global AI talent distribution underrepresents China's actual position in the AI race, which we know from other sources is substantial. However, the core patterns we observe—the concentration of AI talent in certain regions, the mobility of AI workers across borders, and the competitive dynamics between nations—remain visible and significant despite this limitation.

Data on Hong Kong, which is more readily accessible, might be used as a proxy to give some sense of AI adoption in Chinese cities.

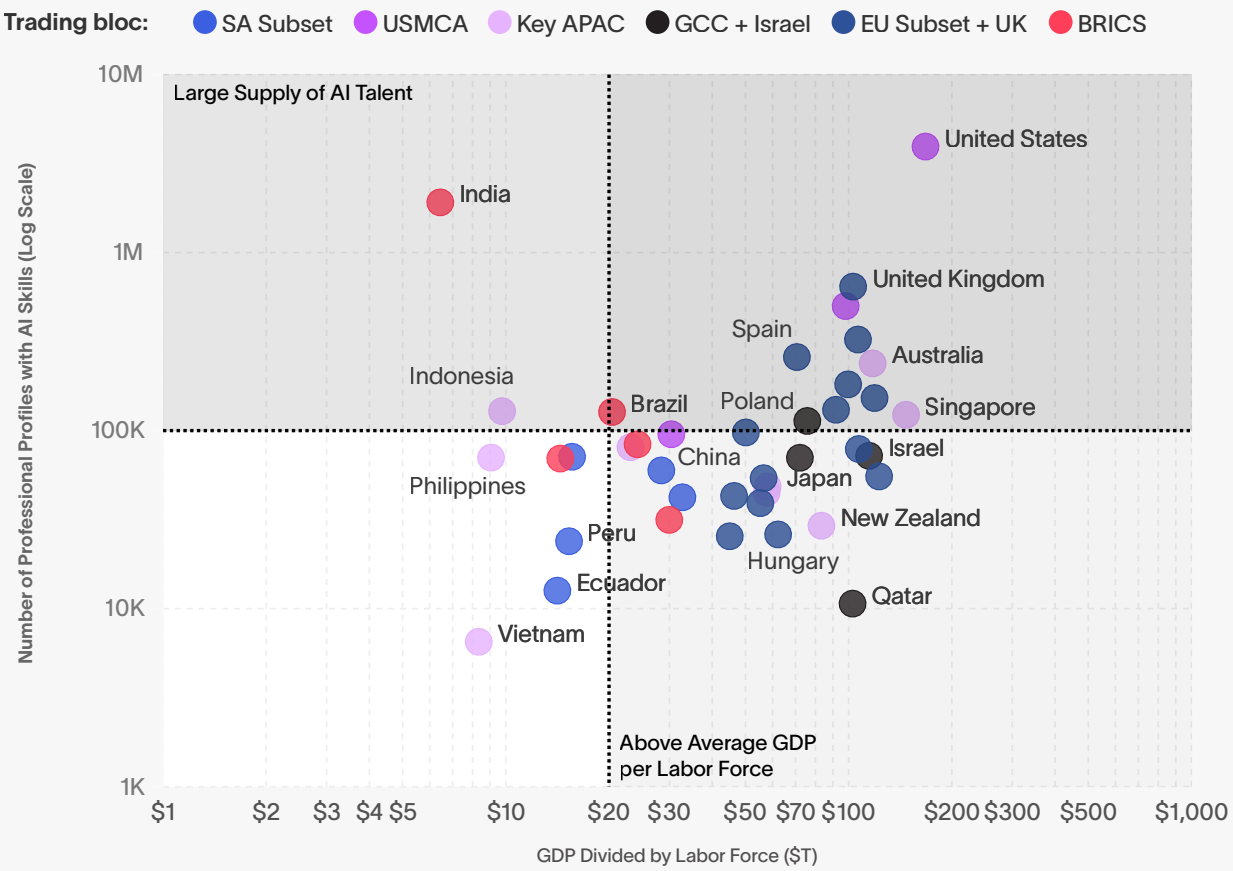
Explore the interactive chart

When we plot countries by GDP, labor force, and AI talent concentration, most advanced economies in the USMCA and EU trading blocs cluster in the upper right—high income, high AI capability. This suggests that initial advantages are compounding rather than converging.

India and Indonesia, alone in the upper left quadrant, emerge with unique advantages: both have large pools of AI talent relative to their current economic positions. If they can retain and develop that talent domestically, they could accelerate their trajectory toward advanced economic status.

## AI could serve as a great leveler or deepen inequality—but we don't know yet what will prevail.

Relationship Between GDP per Labor Force and AI Talent Availability




Source: World Bank and Lightcast Profiles Data

Explore the interactive chart

# Application: Building For The Future

For businesses, AI talent concentration creates a classic build-vs.-buy decision with huge stakes—the biggest technological change in a generation. You can choose whether to locate where AI talent concentrates (US, Singapore, Ireland) and compete fiercely for expensive workers, or you can go where AI competition is lighter (Germany, India, Indonesia) and build competitive advantage through better retention and development.

As data centers reshape which regions can support AI-intensive operations, they offer a similar challenge. Organizations planning major facilities should map not just current data center locations, but where new capacity is coming online. A region adding significant data infrastructure today will be more likely to have reliable AI talent pipelines in 3-5 years. (This will require similar calculations to the demographic projections discussed in Chapter 3.)

Public sector institutions can capitalize on this if they have the data to demonstrate that their community offers the advantages that new investments are looking for. The data center playbook is clear: energy costs, tax incentives, infrastructure investment, workforce development, and regulatory environment all matter—but the future matters too. Community leaders will need to demonstrate not just the skills and workers that their region has now, but those they will have in the future.

# AI has Fractured the Educator-Employer Connection

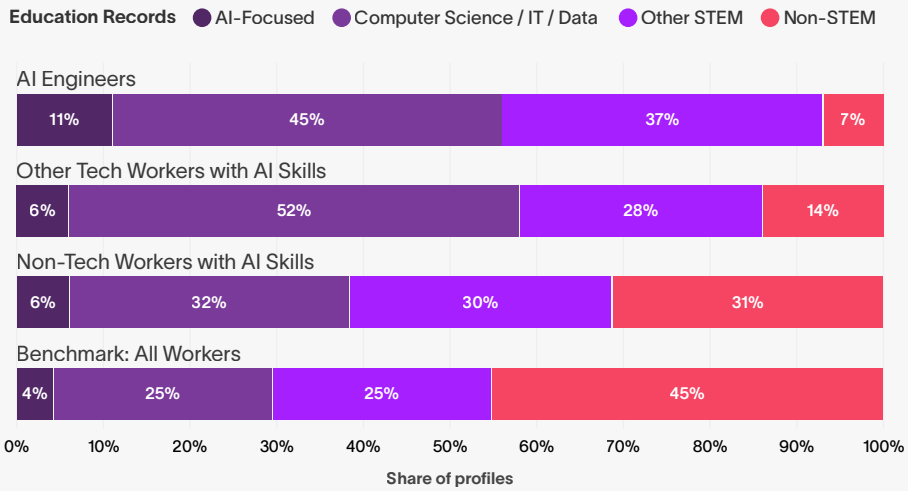
Only 11% of AI engineers' degrees are AI-related, suggesting majors cannot effectively predict AI careers. Very few AI-specific education programs exist at all, and those that do are so new they have produced very few graduates.

At the same time, these professionals are five times more likely to hold PhDs than average workers—suggesting it's a field where education is highly valued.

# Who Are AI Workers?

## Only a small share of AI workers' credentials are AI-related.

AI Talent by Field of Study




Source: Lightcast Professional Profiles Data

Note: Individuals may hold multiple education records, and the data does not identify a primary degree; therefore, we report the distribution of education records associated with AI talent.

Explore the interactive chart

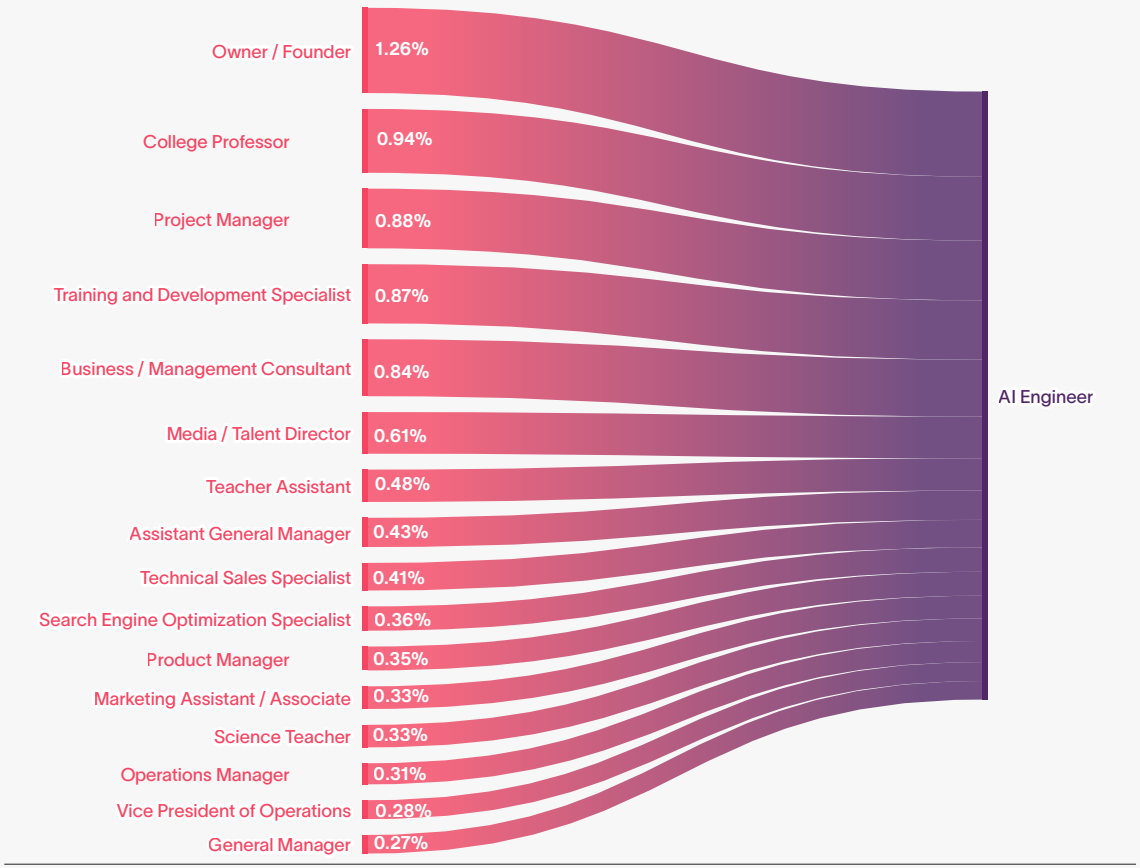
As AI degree programs proliferate, one might expect that more and more workers will have credentials that are directly connected to their work—but that's far from a sure thing. The risk for university AI programs is that the technology will continue changing while the students are sequestered away studying last year's tools.

AI is a high-achieving field where most professionals do not have degrees specific to their line of work, suggesting that more occupations could be available to professionals outside of the traditional career pathways, if employers were willing to consider them. The educational diversity currently present in the field shows that such diversity is possible more broadly.

The link between credentials and careers has been scrambled. Workers did not study AI and then enter AI careers; they entered AI careers despite studying something else.

## First jobs for AI engineers are remarkably diverse.

Most Common Non-Tech First Jobs After Graduation for AI Engineers




Source: Lightcast Professional Profiles Data

Explore the interactive chart to get a full picture of all feeder jobs for AI Engineers

First jobs prove to be better predictors of AI careers than education credentials, but not by much. While 31% of current AI engineers began their careers in AI-related roles, that still means nearly 70% entered from other fields.

The pathway into AI work is neither linear nor clearly marked, and traditional educational planning—which assumes students declare a major, complete a program, and enter a related field—struggles to accommodate this reality. Education institutions are poorly suited to teach emerging disciplines. The frontier of AI research is happening inside OpenAI, Anthropic, Google, and Meta, not the academy.

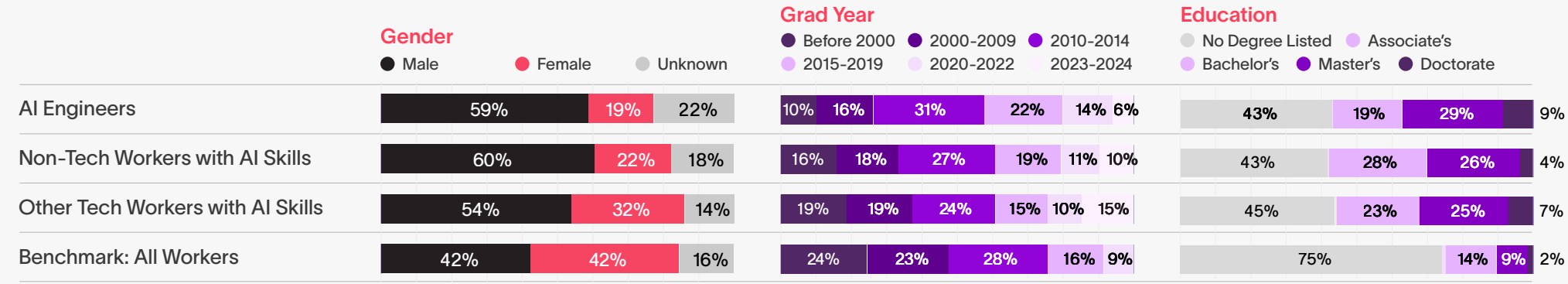
**Lightcast** PROGRAM GAP ANALYSIS → Explore

The disconnect between education and AI jobs highlights how coursework can be misaligned to careers. Are your students graduating into jobs that your local workforce needs? A Program Demand Gap Analysis can provide the answers, so you can validate successful programs, discover new opportunities, and see where to improve.

# Who Could Be AI Workers?

## AI talent is overwhelmingly young, male, and highly-educated.

Share of Professional Profiles with AI Skills, by Age, and Gender, Education




Source: Lightcast, Professional Profiles Data

Individuals may hold multiple education records, and the data does not identify a primary degree; therefore, we report the distribution of education records associated with AI talent.

Explore the interactive chart

Workers with AI skills are overwhelmingly young: 25% graduated within the past five years, (compared to 20% of all workers with online professional profiles). Among AI engineers specifically, that figure rises to 36%.

Since AI workers are disproportionately young, most of the people needing to learn AI skills will be older professionals. That means their training will need to come from corporate Learning and Development or ongoing education programs, not bachelor's degrees.

# What Skills Will AI Workers Need?

The most in-demand skills in AI jobs are not technical. Eight of the ten most sought-after skills are deeply human capabilities, like management, leadership, critical thinking, and problem-solving (the Lightcast report Beyond the Buzz goes into further detail on this). These human skills (also referred to as durable skills) appear across the labor market, not just in AI roles—Lightcast research shows that 76% of all job postings in the US mention at least one durable skill, and demand for these capabilities is rising faster than demand for technical skills. This pattern holds across regions and sectors, suggesting a fundamental shift in the skills that employees must possess.

Universities may not be able to predict which technical skills students will need in five years, but they can cultivate the analytical reasoning, communication ability, and collaborative capacity that will matter regardless of technological change.

If educators try to teach specific AI capabilities, those skills will be out of date by the end of the week, let alone graduation. Instead, they must teach a posture toward AI that can incorporate new technology quickly while building on a base of foundational critical-thinking skills.

**The skills most in demand in AI jobs are still overwhelmingly human.**

The Top 10 Skills Most Frequently Mentioned in AI Jobs

1. Communication
2. Artificial Intelligence (AI Skill)
3. Management
4. Operations
5. Leadership
6. Research
7. Machine Learning (AI Skill)
8. Customer Service
9. Writing
10. Problem Solving

Source: Lightcast, *Beyond the Buzz*

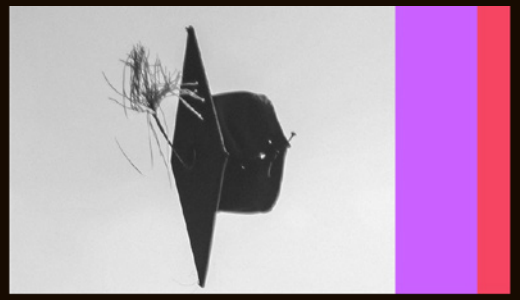
# Application: Continuous Learning

Since we've established that current AI workers are overwhelmingly young and male, then it stands to reason that women and older workers are untapped sources of talent, and those who are already in the workforce will need upskilling and reskilling opportunities in order to take advantage of AI's rise. The population of potential learners is huge.

Educational institutions have not yet shown they can create degree programs in AI fast enough to meet demand, and even if they could, the rapid evolution of AI technology would render specific technical training obsolete within years.

Traditional higher education—designed around full-time, multi-year programs—is not the answer. Instead, institutions must develop new models: shorter skills-based credentials that stack toward degrees, competency-based assessments that recognize skills regardless of where they were acquired, and partnerships with employers that align learning with immediate labor market needs.

Future-ready institutions should embed AI literacy across disciplines while strengthening their traditional role as providers of foundational skills. This distributed approach prepares students for an economy where AI touches everything, rather than segregating AI into a technical specialty.



Lightcast SKILLABI → Explore

Today's learners need their educational investment to equip them for career success. So whether you're launching a new program, updating an existing one, or exploring microcredentials, you need to understand how the skills you teach—including durable human skills—will prepare learners for a workplace that's constantly changing.

# Chapter 2 Conclusion

The help AI provides is real, and so are the economic advantages it enables for businesses, education institutions, and communities who can take advantage of it.

But the gaps where it provides no help are also real. So if we aren't looking at wholesale job replacement nor a passing trend we can entirely discount, then how should we proceed?

Thankfully, there's a wide range in between those two extremes. Granular Skills Intelligence provides the data to navigate a fault line as complex and fast-moving as AI, even when the ground is already shaking under our feet. Underneath the broad umbrella of "Artificial Intelligence," it's possible to identify and track specific skills that, taken together, unlock broader trends from across the talent landscape.

Where it intersects with our other fault lines, AI disruption accelerates the skills transformation already underway in advanced economies, intensifies competition for talent across geopolitical boundaries, and interacts with demographic trends that determine which nations can sustain AI-driven growth. We need AI to solve the productivity gaps caused by labor shortages, but implementation is stalled because the greatest investment is far away from the sectors that need it most.

Leaders must plan for a future shock that has not yet come (like building shock-absorbing dampers under a building before the earthquake hits)—no longer just hiring workers with the right skills, or training the local workforce or undergraduate class and being done, but building an infrastructure that allows for constant, rapid reskilling.

> "One of the clearest patterns to emerge from rapid AI-driven disruption is the uneven distribution of its gains across sectors, regions, and countries. This report captures those emerging fault lines, showing how AI may either narrow or deepen global disparities. Understanding this uneven disruption is why we have tracked AI's development and impact through the Stanford AI Index, including through partnerships such as Lightcast, since 2017."

**Loredana Fattorini**
AI Index Research Manager

Stanford University
Human-Centered
Artificial Intelligence

CHAPTER 3

# LABOR SHORTAGES

## The Deficit of Talent

### What We're Used To:

Talent as a renewable resource. In the past, a steady stream of young workers entered the market each year, outpacing the number of retirees. Because demographic trends provided a natural surplus of labor, recruitment focused on selecting the best candidate from a deep pool of applicants, and organizations operated with the assurance that if they posted a position, the market would provide the people to fill it, either domestically or internationally.

### What Happens Next:

Talent becomes a scarce commodity—as it already has in many regions. As fertility rates decline and the global population ages, the natural surplus has evaporated, creating a structural deficit where the number of open roles permanently exceeds the number of available people. (And in developing nations where population growth is still strong, opportunities are limited.) Economic expansion is no longer contingent on business needs, but by the availability of people who can do the work, in both the present and the future.

KEY TAKEAWAYS

1

## The global population is getting older.

Lower fertility rates and surging retirements are decreasing the size of the labor force, increasing pressure on the labor supply. Every region will see slower growth in its workforce between 2025-2045, and some will see an actual decrease.

2

## Immigration is falling in developed economies.

The inflow of new workers is drying up. Nearly every trading bloc will see immigration slow over the next two decades. Countries that once exported talent will start keeping workers home.

3

## Job Requirements are mismatched to available talent.

Regions without high educational attainment are requesting degrees anyway, while more educated societies face a surplus of workers with degrees. Both situations limit opportunities for workers and also constrict talent pipelines. Within key trading blocs, 66% of job postings request advanced credentials, but only 31% of workers have them.

4

## Demographics are driving new consumption habits.

Older populations consume a different mix of goods and services than younger ones, so growth will increasingly shift toward healthcare, caregiving, and age-related services, and away from categories like childcare and education. Market dominance means far less when your target demographic is disappearing.

### Defining our Trading Blocs

These definitions are the same as those used in Chapter 1 (see page 13). Note that where data is available, many charts and statistics still draw on all countries, rather than just these blocs.

USMCA: Canada, Mexico, US

EU Subset + UK: Belgium, Czechia, France, Germany, Greece, Hungary, Italy, Netherlands, Poland, Portugal, Romania, Spain, Sweden, UK

BRICS: Brazil, Russia, India, China, South Africa

Key APAC: Australia, Indonesia, Japan, Malaysia, New Zealand, Philippines, Singapore, South Korea, Vietnam

GCC (Gulf Cooperation Council) + Israel: Bahrain, Israel, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates (UAE)

South America Subset : Argentina, Chile, Colombia, Ecuador, Peru, Venezuela

Everyone involved in workforce strategy—including educators training future workers, business professionals attracting and retaining talent, and public sector leaders responsible for their region's sustained growth—face a difficult double mandate. They must build strategies to work within today's constraints and also in the years of transformation ahead. That's easier said than done, but it must be done anyway.

Investing in workforce intelligence—which can include data on workforce planning and forecasting, career pathways and mobility, and labor market benchmarking to inform location strategy—is how your organization positions itself to stay standing despite shaky ground.

With fewer workers available worldwide, most organizations will not meet their talent goals in the decades to come, because they're looking for people in the same old places—and failing to find them. Meanwhile, the minority that withstand this disruption will have adapted their strategies to find new sources of talent. These are global-scale trends, but they must be addressed at the national, local, institutional, and organizational levels.

## An Aging Population

The world is running out of workers because the global population is getting older. Life expectancies are higher, leading to more older, nonworking adults in the population, while at the same time, fertility rates are remaining flat or going down. This constricts the number of workers available, but also changes the type of work that must be done.

The overall demographic pattern of the global workforce is found in the balance between those 15-64 (working age), 65+ (older dependents), and child dependents under 15.

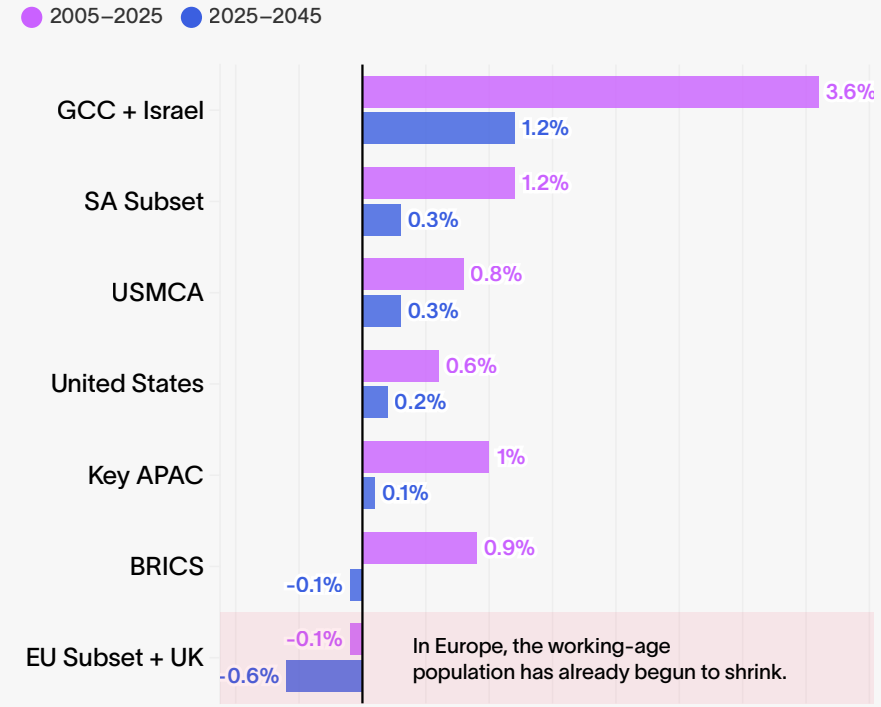
# Working-Age Population Growth is Declining

The global labor market relies most heavily on working-age adults. Unfortunately, we will have fewer of them in the future than we have had in the past.

The working-age population (15-64) will grow more slowly in almost every major region through 2045. In Europe and the BRICS countries, it will actually shrink. Other regions show dramatic slowdowns: the GCC and Israel, which experienced robust working-age population growth in recent decades, will see that growth rate collapse by more than half.


## Growth in the working-age population will slow down everywhere. In some regions, that population will shrink.

Average Annual Growth Rate of the Working-Age Population (15-64)




Source: UN World Population Prospects and Lightcast Analysis

Explore the interactive chart

# Older Age Groups Are Making up More of the Population

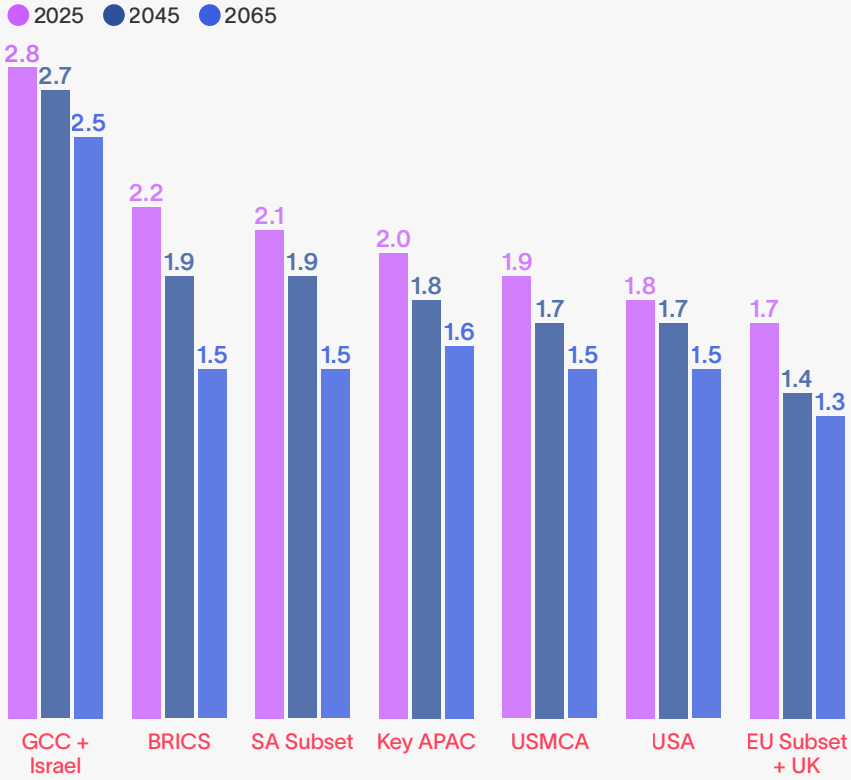
Older adults are living longer—which is good news! But it does raise challenges from an economic perspective.

People who don't work (mainly children and retirees) depend on the production of working-age adults. In the past, when populations were younger, children made up a larger share of these dependents. This meant that working-age adults were mostly providing for people who would someday enter the labor force. But now, and into the future, the majority of dependents are retirees, and they make up an increasing share of the population relative to working-age adults.

More people relying on fewer workers slowly increases strain on the global labor market...like tectonic plates increasing pressure on a fault line.

## Fewer workers supporting populations slowly increases strain on the global labor market.

Number of Working-Age Persons (15-64) Per Dependent Children and Seniors*




Source: UN World Population Prospects and Lightcast Analysis

*Note: Dependent children and seniors refer to persons aged 0-14 and 65+, respectively.

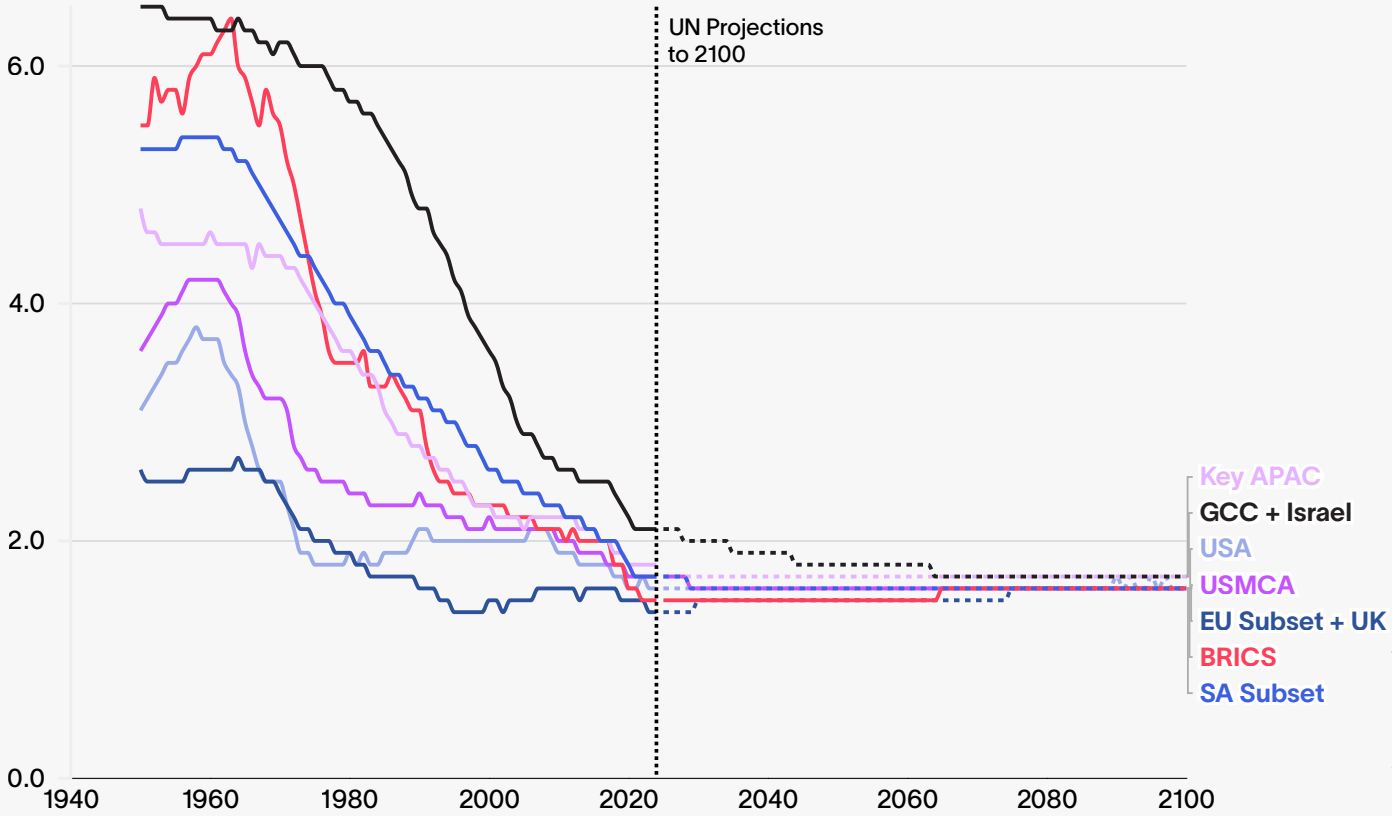
Explore the interactive chart

# Fertility rates offer no indication help is coming

While aging populations reflect past demographic patterns and previous birth rates, more recent declining fertility rates shape future labor supply. And fertility rates are projected to continue declining globally, including in African countries that have traditionally experienced the highest birth rates. Even if fertility rates were to rebound immediately—which shows no sign of happening—it would take two decades before those births translated into new workers.

## Declining fertility rates in all global regions will constrain future labor supply.

Total Fertility Rates (Live Births Per Woman)




Source: UN World Population Prospects and Lightcast Analysis

Explore the interactive chart

# Demographics Drive Economics

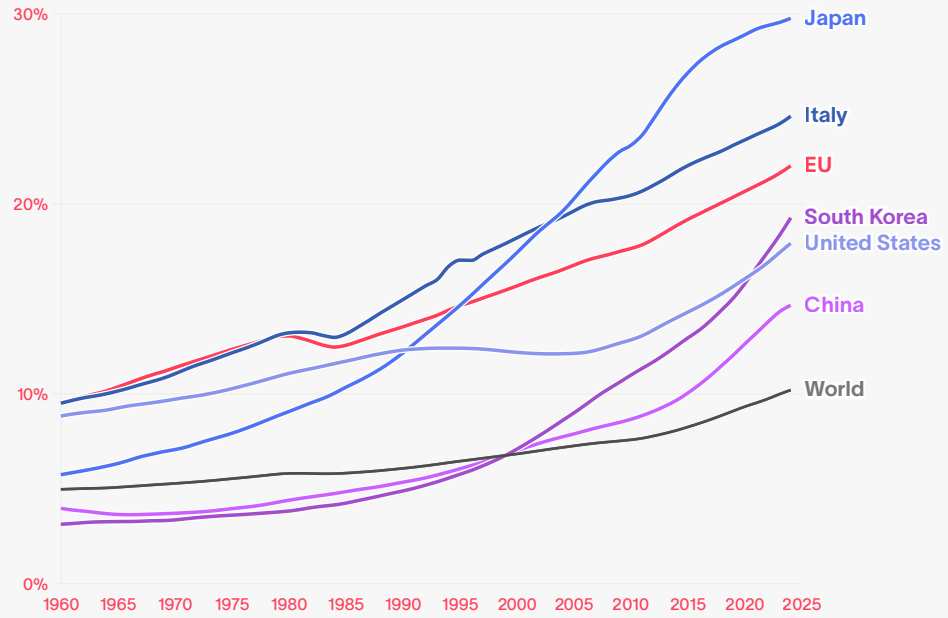
An aging workforce does not just limit the number of workers available; it also changes the kind of work that must be done.

In Japan, the native population has decreased by 6.3 million since 2009, and one in three are over 65. Official statistics report 14.6% of China's population is over 65, and that rate is accelerating quickly. South Korea has seen its number of childcare centers decline by nearly 40% from 2013 to 2024.

More than a fifth of Western Europe is over 65, a share that is also rising steadily (Italy is the oldest in the group, with 24.6% of its population 65 and older). Eastern Europe is experiencing negative population growth. In the United States, the native-born population is projected to start shrinking around 2031, with deaths exceeding births, and all subsequent growth dependent on immigration. Africa is the only continent expected to see growth over the coming decades, and it represents only 3% of global GDP.

## The 65+ share of the population is rising throughout the world, but especially in developed countries.

Persons 65+ as a Percent of the Total Population, by Selected Countries and Regions



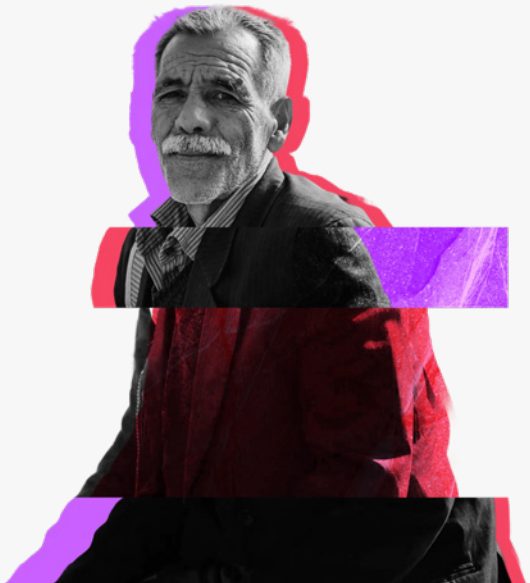

Source: World Bank and Lightcast Analysis

Explore the interactive chart

Aging populations will have dramatic economic consequences—we see this illustrated in South Korea. This chart shows South Korea's age distribution in 1990 compared to 2032. In the 1990s, South Korea took advantage of its young, growing population by using state-led industrial policy to create a "demographic dividend," seeing 7–11% GDP growth. Through 2029, that is projected to drop to about 2% yearly.

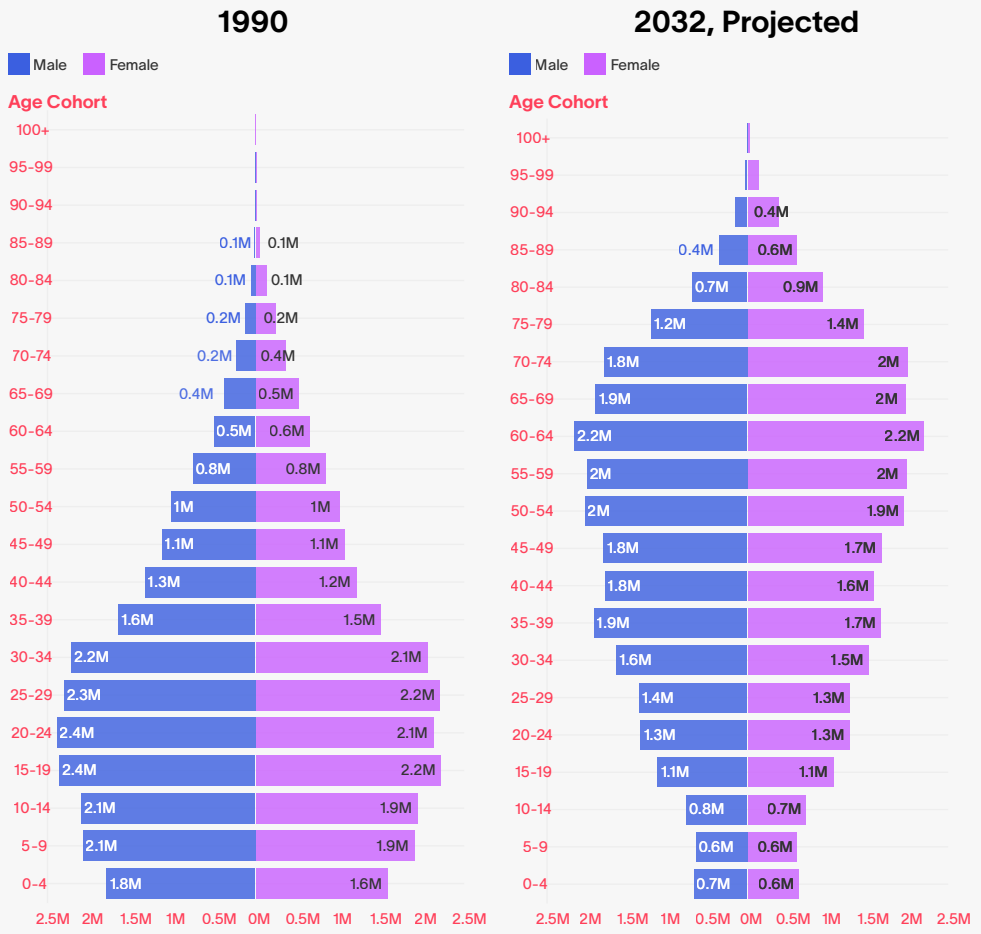
Younger populations drive GDP growth, but aging populations create a "demographic drag" instead, especially because spending drops after age 65 among all income levels.

In other words, population growth is strongly correlated to GDP growth in developed countries. When fewer new workers enter the economy in the decade to come, we will see a fraction of the economic growth that we've grown accustomed to.



## South Korea's record-low birth rates are radically shifting its demographics.

South Korea Population by Age




Source: UN World Population Prospects and Lightcast Analysis

Explore the interactive chart

In Chapter 2, we discussed how AI talent and adoption are skewed toward younger workers, at the very moment in history when older people are the fastest growing share of major economies around the world. Where those conflicting dynamics meet, tectonic pressure starts building.

Aging populations require care workers, service providers, and food suppliers. They need less cutting-edge technology, software, wearables, automobiles, and consumer gadgets—which are exactly what has driven GDP growth over the past five decades.

---

## Market dominance means far less when your target demographic is disappearing.

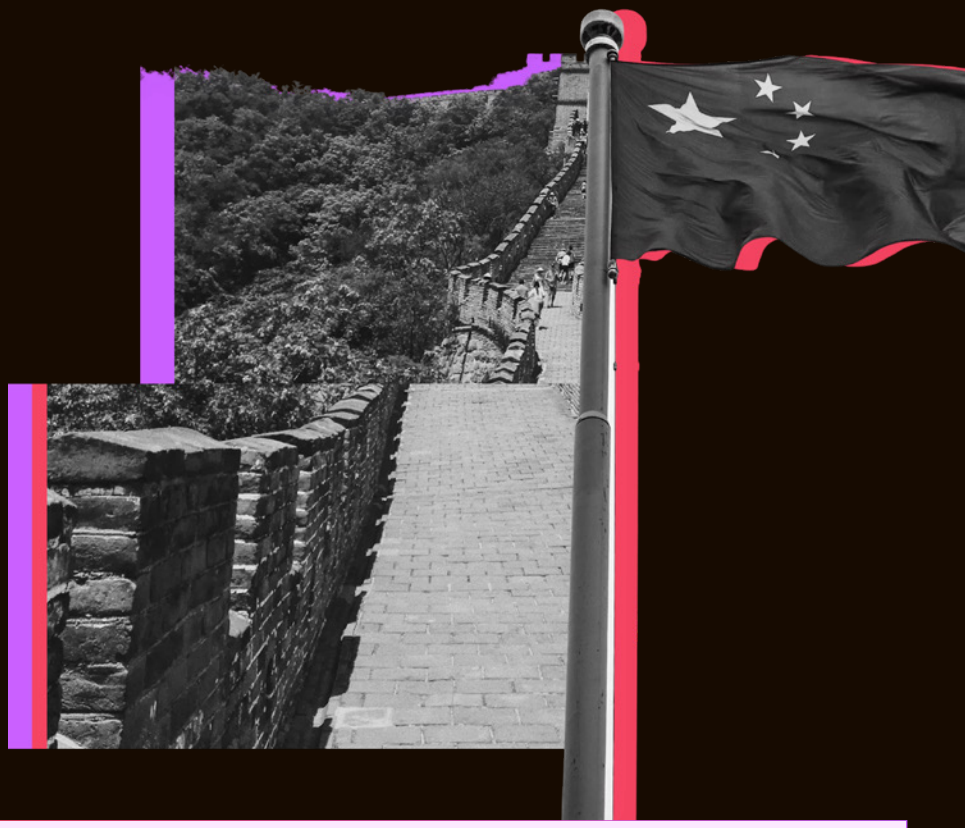
# Application: Long-Term Thinking

You need to know not just how many workers you need today, but whether those workers will exist ten or 20 years from now in the markets where you operate.

China, for instance, has long been a reliable source for low-cost labor, but the impact of its one-child policy has begun rippling through its economy, reducing its labor supply in the years ahead. In fact, that tradeoff is exactly what made the past 30 years so productive; parents were free to work because they spent less time and money on childcare. China optimized for short-term success over long-term stability instead of balancing the two.

Labor market benchmarking that compares current wage rates or availability without accounting for demographic trajectories will lead to flawed location decisions. The regions with the most favorable labor costs today may face the tightest constraints tomorrow.

As the global population ages, global consumer demand will also shift to accommodate their needs. We might expect more growth in senior housing, healthcare services, food supply chains, and the skilled trades, but less growth in motor vehicles, fashion and other trend-focused consumer goods, and childcare.



# Immigration Dries Up

Immigration is one of the most powerful tools countries have to influence the size and composition of their workforce. While population growth takes decades to affect the labor force, an inflow of immigration has an immediate effect—and so does losing people to other regions. Understanding the present and future of immigration is fundamental to understanding the overall shape of the global labor market.

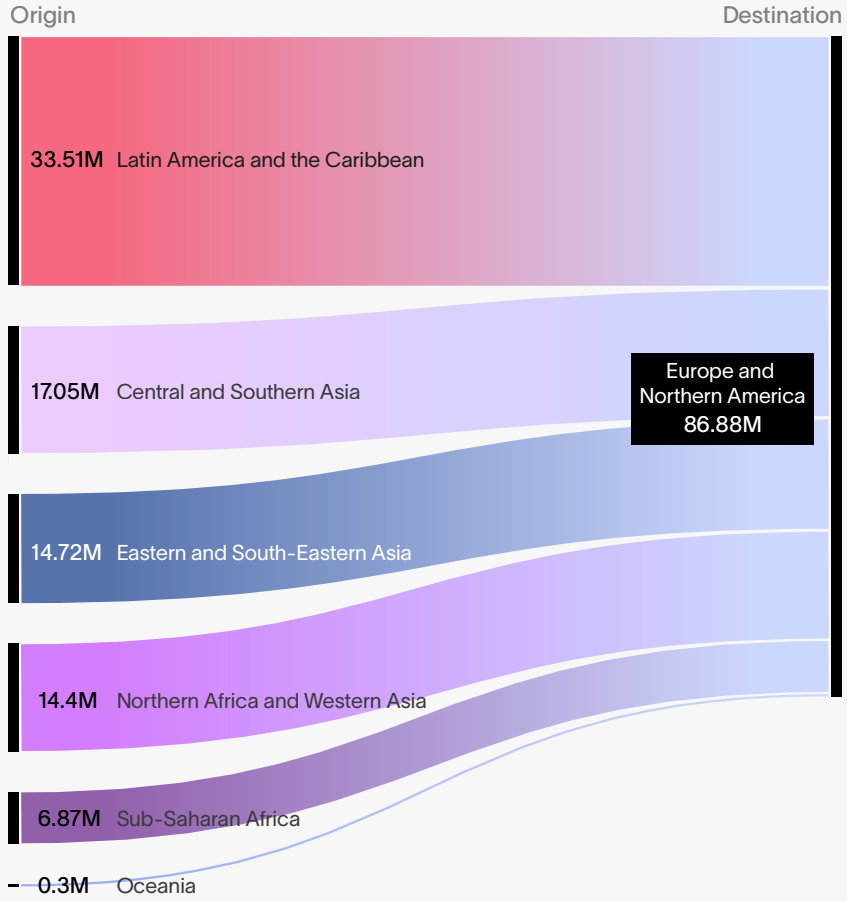
In Chapter 1, we discussed immigration flows as a function of policy choices (like visa restrictions). Here, we're looking more at demographic pressure—a smaller population has fewer people available to send out.

The overwhelming majority of immigration historically has flowed from developing to developed nations.

Among the 10 countries with the highest net immigration over the past five years, the United States stands out, maintaining high immigration levels even through the pandemic. The UK, Canada, and UAE also attract large inflows, while Ukraine shows a surprising surge driven by wartime repatriation (see inset on next page).

## Europe and North America host the largest international migrant populations.

Movement of International Migrant Populations*




Source: United Nations and Lightcast Analysis

*Note: These origin groups are different than other country groups used in this report; if we were to focus only on our trading blocs here we would miss many of the countries sending the most immigrants out.

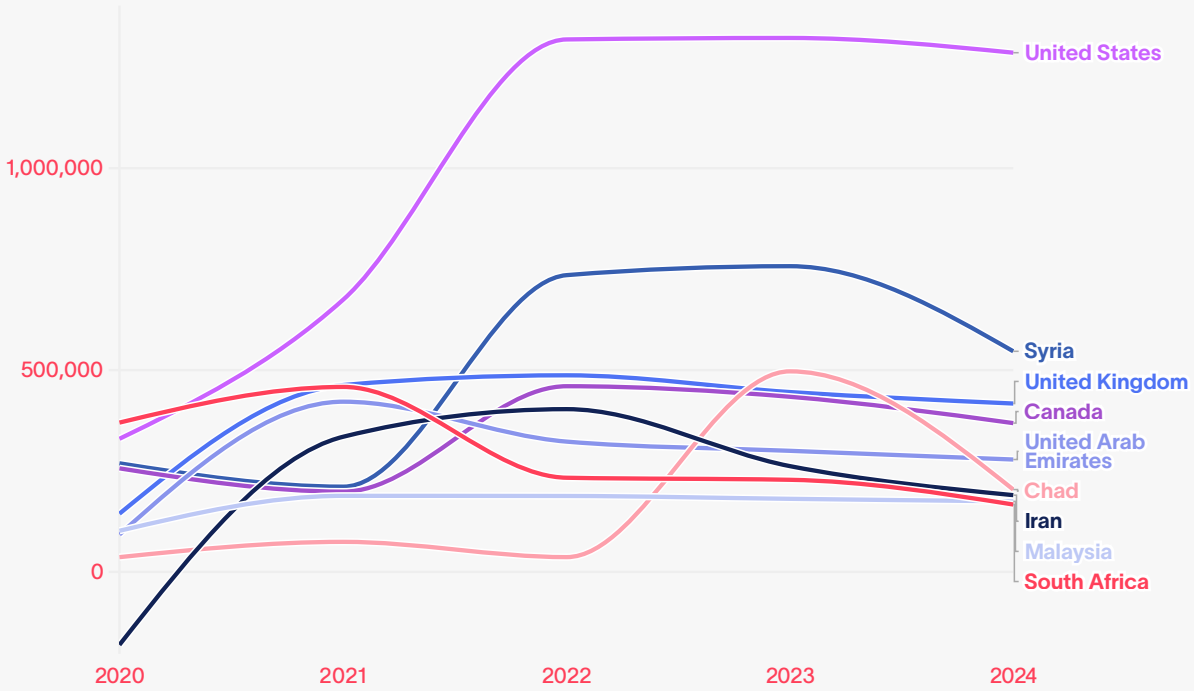
Explore the interactive chart, including migrant flows into other destinations

Conversely, many of the largest net outflows come from BRICS countries that have strong labor availability—but as those countries' populations decline, they will have fewer workers to send out.

Historically, migration has been a reliable method of filling talent gaps in developed economies, helping offset aging native-born populations. But now, net migration rates are set to decline across most regions, slowing a key source of labor force growth. This is happening for reasons as diverse as political backlash, improved economic conditions in the countries of origin, and changing demographic conditions (lower fertility rates) in feeder countries that push fewer working-age people toward migration.

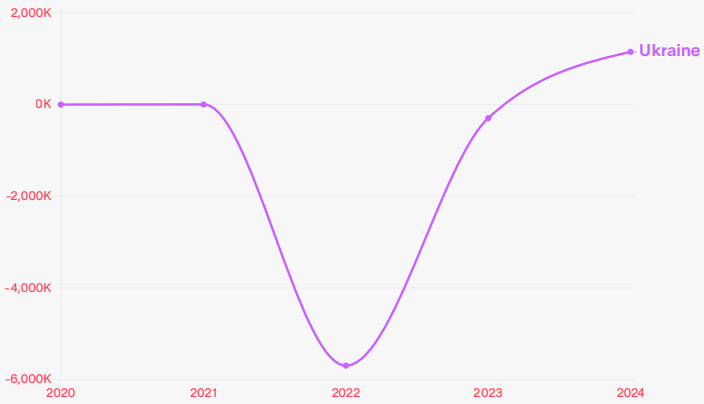
## The US attracts far more migrants than any other country—regularly bringing in more than a million a year.

Top Countries by Net Migration in 2024




## Ukraine has seen a surge in repatriation after a mass exodus of 5.7 million people in 2022.

Net Migration, 2020–2024

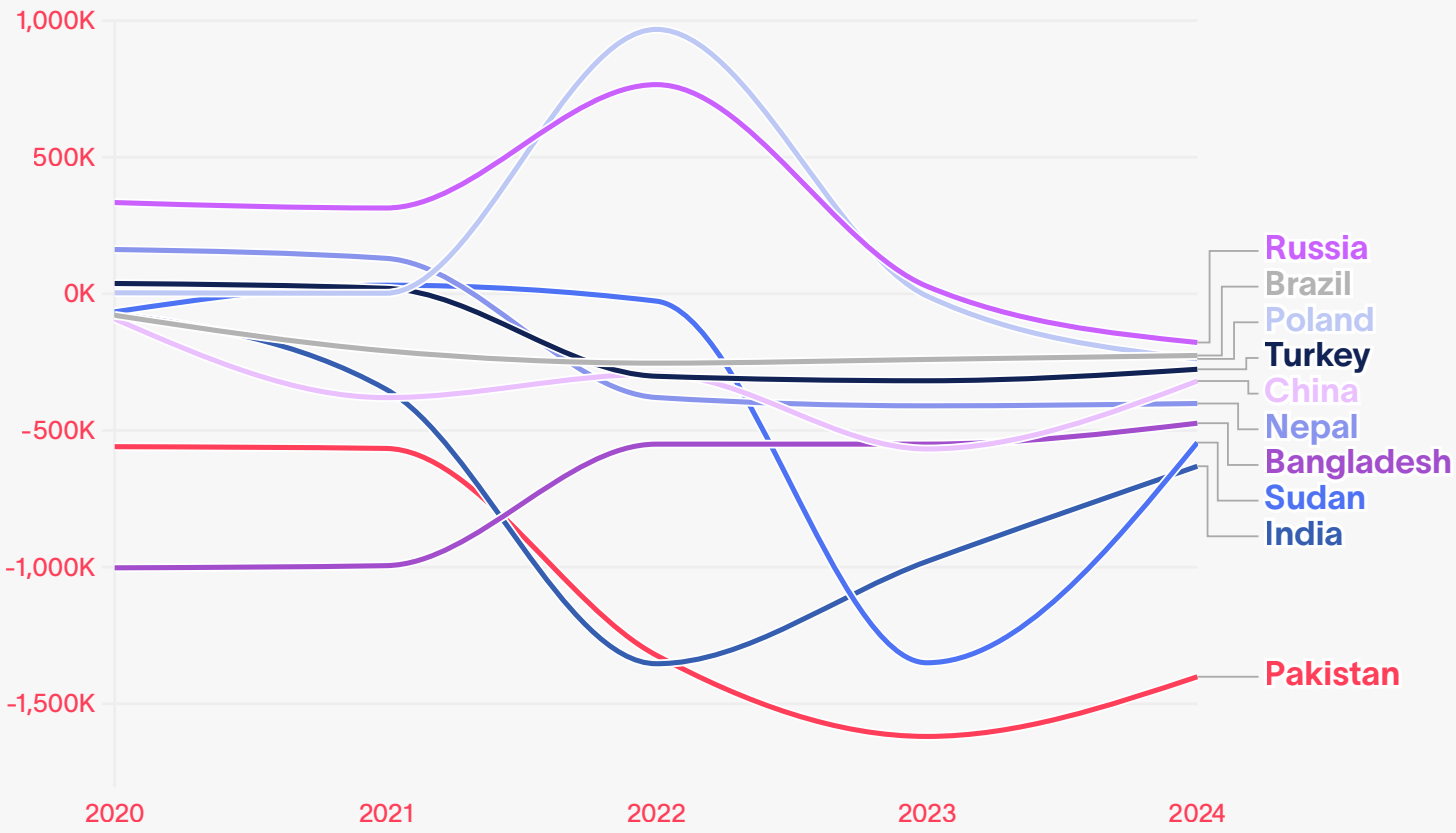



Source: World Bank and Lightcast Analysis

Explore the interactive chart

## Net migration is a loss of labor for the countries with the highest outflows.

Bottom Countries by Net Migration in 2024



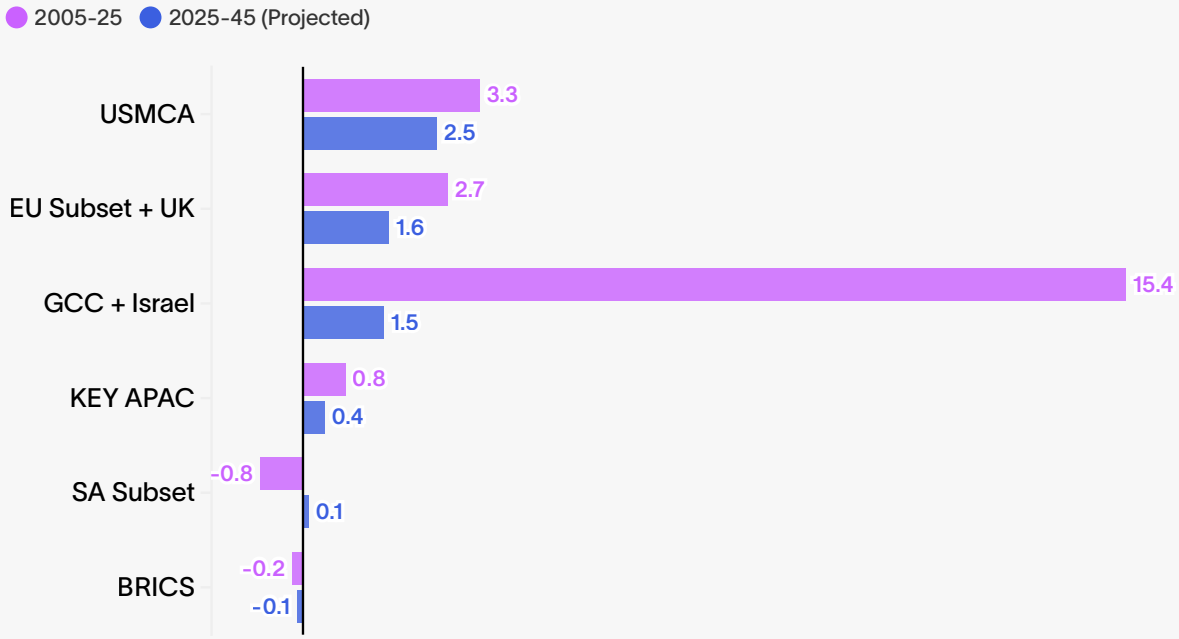

Source: World Bank and Lightcast Analysis

Explore the interactive chart

# Net Immigration Rates Are Projected to Decline Across Most Regions Through 2045

**Migration is slowing across nearly all regions, weakening a key buffer against aging populations. Some regions will see their population shrink.**

Average Net Migration Rate*




Source: UN World Population Prospects and Lightcast analysis

*Note: Net migration rate reflects the net balance of people entering and leaving a region each year, expressed per 1,000 residents.

Explore the interactive chart

In almost every region analyzed, net migration is projected to be significantly lower over the next 20 years than over the past 20. South America is the only true exception; the BRICS countries will see fewer outflows through 2045 but remain a net exporter of people. (The abnormally high growth rate for our GCC + Israel group in the earlier period reflects, in part, regional instability and conflict in neighboring countries.)

# Application: Be Where The People Are

When immigration slows, economies lose not just additional workers but specifically prime-age workers most likely to contribute immediately to innovation and economic growth. For multinational employers, this creates both challenge and opportunity in location strategy—sites in regions that keep more open borders may enjoy steady labor supply gains over those in regions with tighter limits. Or, to take it a step further, some might consider investing in emerging markets to take advantage of growing working-age populations. (See page 21 in Chapter 1 for additional ways to respond to slowing immigration.)

> Amid many changes and challenges, a better future of work will demand adaptability for workers, employers, regions, and countries. Forward-thinking employers are rethinking how they hire and develop talent, shifting away from outdated screen-outs. They're investing to build a more adaptable and augmented workforce to meet the future needs of their companies, customers, and constituents. In adaptive labor markets, skills are emerging as the currency of upward mobility for talent.

**Byron Auguste**
CEO and Cofounder

Opportunity @Work

**Lightcast** TEARING THE PAPER CEILING → Explore

Even if a job posting requires a college degree, a worker might not actually need one to perform it. Alongside Opportunity@Work, Lightcast is working to unlock new possibilities for "STARs" —workers without a bachelor's degree ("Skilled Through Alternate Routes.") A new filter in the Analyst platform identifies STARs-friendly postings, making it easier to switch to skills-based hiring.

# Nonexistent and Unnecessary Degrees

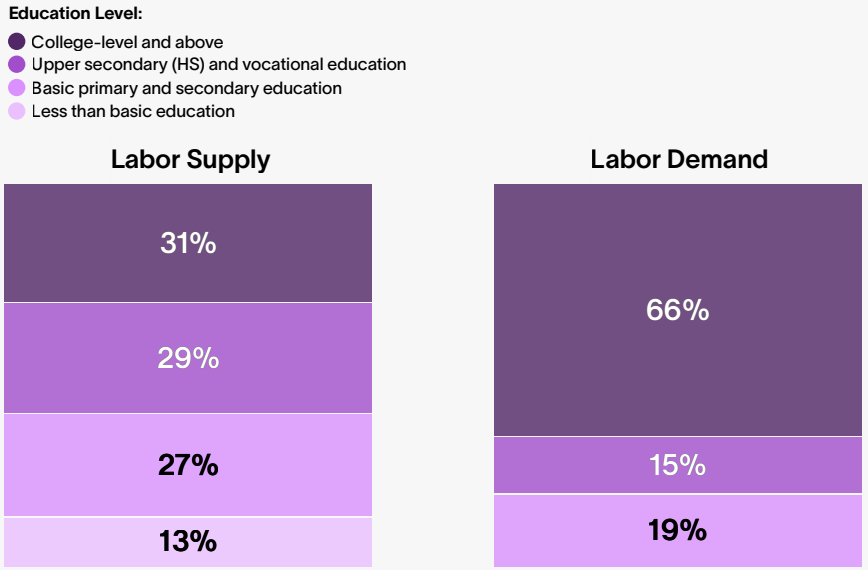
Many regions are also imposing education requirements misaligned with their population's actual education. So not only are there fewer people being born and fewer people migrating in (reducing the number of workers available,) regions are also making inefficient use of the workers they do have.

With fewer potential workers available, one might expect employers to lower barriers to entry, so that they can find as many people as possible. That hasn't happened. Employers are requiring degrees where not enough workers have them.

The share of job postings that require a college degree is over double the share of workers that have them. In fact, Lightcast global data shows the share of postings looking for degrees has increased over the past decade, while postings with lower education requirements have declined.

## Across key trading blocs, there is an educational deficit that limits the number of workers available to take on open roles.

Labor Supply and Demand by Education Level for Countries in Key Trading Blocs




Note: Data refer to countries in the six key trading blocs defined in this report: USMCA, EU Subset+ UK, BRICS, Key APAC, GCC + Israel, and South America Subset. Labor supply refers to persons in the labor force ages 25+. Labor demand refers to Lightcast online job postings. College-level and above includes short-cycle tertiary (e.g., Associate's or advanced technical or technician degrees), Bachelor's, Master's, and Doctoral programs.

Source: International Labor Organization (ILO) and Lightcast Job Postings Data

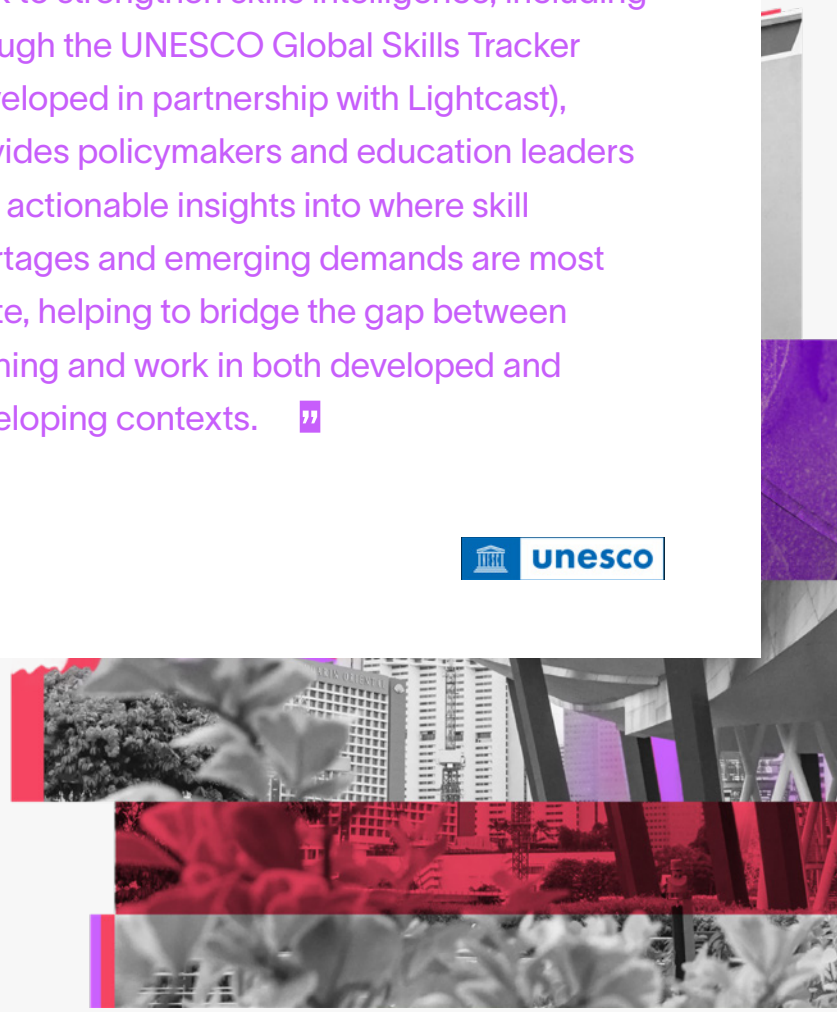
Explore the interactive chart

Someone living in a region desperately needing workers might still struggle to get a job because they don't have the credentials that employers are asking for. And unlike previous eras, when one might expect to do a similar job their whole career, now skill needs change so quickly that a college degree might not even be useful a few decades later. (See page 52 in Chapter 2 for more on how skill change is changing educational goals.)

Educated societies are the exception. The data above covered trading blocs from across the world, but certain geographies have the opposite problem. In the US, for example, Lightcast data has shown that the majority of the top 10 jobs with the most job postings do not need a college degree, but the share of the workforce who have one is increasing. Labor force growth is misaligned to what the job market actually demands.

This is a key tenet of our research report "The Rising Storm," which covers these findings in greater detail. But the takeaway here is that different geographies face different alignment challenges, and educational surplus or deficit both limit the number of workers available for a certain role. Location plans need to take these challenges into account by understanding the educational makeup of any target market.

> "The structural labour market shifts highlighted in Fault Lines, from demographic pressures to rapid technological change, make clear that education systems must be better aligned with real-time labour market needs. UNESCO's work to strengthen skills intelligence, including through the UNESCO Global Skills Tracker (developed in partnership with Lightcast), provides policymakers and education leaders with actionable insights into where skill shortages and emerging demands are most acute, helping to bridge the gap between learning and work in both developed and developing contexts."
>
> unesco



# Application: Maintaining Flexibility

On the surface, the solutions to this are simple. In many cases, employers should require fewer degrees, perhaps by turning to alternatives like skills-first hiring instead. Educators also have a perfect opportunity to offer credentials, ranging from full degrees down to microcredentials, that provide the training that local employers are looking for.

In situations where credentials are necessary (such as in highly technical roles), then talent strategies must identify locations and recruitment strategies that ensure a robust pipeline of qualified candidates. But upskilling and internal mobility must be incorporated as well. Organizations that can identify good feeder roles, transferable skills, and effective training have a major competitive edge when labor is scarce.

## Risk vs. Opportunity

We know that all over the globe, populations are aging and growth is slowing, immigration is declining, and job requirements are misaligned to the local supply of workers. But we also know that no two places are exactly alike, meaning that these converging trends are affecting every region differently. See page 34 in Chapter 2 for more on how accelerating skill change affects workforce strategy.

Comparing the overall Risk (projected population slowdown) to the overall Opportunity (workforce skills and technology in place) facing each region, we can place them all into four quadrants that offer more specific insights and practical solutions for each. In the US, for example, Lightcast data has shown that many of the occupations with the most job openings do not require a college degree, but the share of the workforce that has one is increasing.

As we covered in Chapter 1, every region has advantages and disadvantages compared to the others. And because different regions face different combinations of demographic risks and workforce opportunities, no single solution applies universally. What works in Western Europe won't work in Eastern Europe. What works in North America won't work in Southeast Asia.



## "B" Ready

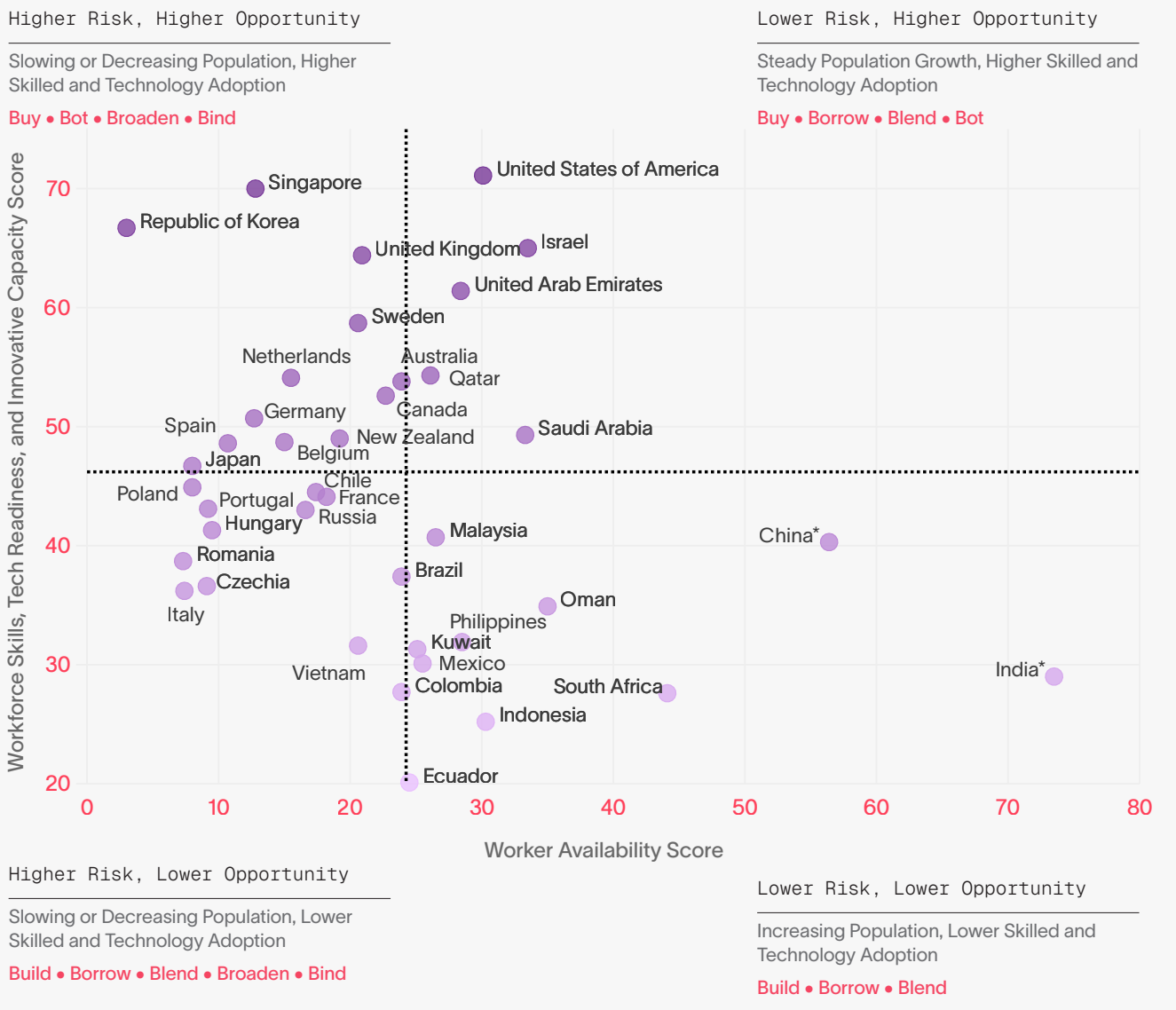
In addition to big-picture discussions of these regions, we also provide each with suggested "Lightcast B" strategies—our data-driven application of the Build-Buy-Borrow framework for attracting, retaining, and developing talent. Most solutions are oriented toward employers, but many intersect with educational and public sector priorities for those same regions.

### "Lightcast B" Workforce Strategies

| | |
|---|---|
| Buy: | Acquire talent |
| Build: | Upskill talent |
| Borrow: | Engage gig talent |
| Bot: | Augment roles with technology |
| Bind: | Retain talent |
| Blend: | Extend talent with contractors |
| Broaden: | Expand talent pools or roles |

## When labor supply falls short, skills and technology shape the viable talent strategies.

Workforce Availability (X Axis) and Skills, Tech Readiness, and Innovative Capacity (Y Axis)




Workforce Skills, Tech Readiness, and Innovative Capacity Score 20.1 71.1

**Methodology:**

This chart positions countries based on projected demographic risk and workforce opportunity. Scores on both axes range from 0 to 100. The x-axis reflects Worker Availability (or Risk), combining unemployment rates with current and projected working-age population to capture demographic pressure. This is the same "Worker Availability" indicator used on page 12 in Chapter 1. The y-axis represents Workforce Opportunity, calculated as the average of three normalized and weighted indicators: education, technological readiness, and innovative capacity. Education reflects the share of the population with a bachelor's degree and that group's labor force participation (the "Education/Talent" indicator in Chapter 1, page 12); technological readiness captures the share of internet users and the share of AI-related job postings; and innovative capacity reflects performance on the WIPO Global Innovation Index and foreign direct investment inflows. Together, these measures group countries into four quadrants that highlight varying combinations of demographic risk and workforce opportunity.

Sources: International Labor Organization (ILO), UN World Intellectual Property Organization (WIPO), UN World Population Prospects, World Bank, and Lightcast Job Postings Data

Note: Country indicators are normalized and weighted by importance to create comparable scores on a 0-100 scale. Quadrants compare projected demographic risk (population slowdown) on the x-axis with workforce opportunity on the y-axis, defined by the skills and technology available in each country.

*Lightcast data on China is sparse compared to other country coverage, which may skew its opportunity score here. India's low opportunity score is likely due to the wide economic disparity in the country—some regions have high tech readiness and innovative capacity, while others rank much lower.

Explore the interactive chart

Higher (Demographic) Risk, Higher (Workforce) Opportunity regions face demographic decline, but their workers are skilled, tech-savvy, and innovative. Western Europe and parts of Asia are here. The shrinking workforce is real, but these regions have tools to manage it in the near term.

WHAT TO DO:

- Audit every role. Which have skills that are becoming obsolete? Which can be redesigned for part-time workers or remote talent? Which absolutely need full-time, on-site staff? Could foreign-born talent fill those gaps?
- Create "returnship" programs for parents or older adults re-entering work (a collaboration opportunity for businesses and the public sector). Build bridge programs that help workers transition from declining industries into growing ones.
- Companies can build location strategy around universities or underemployed populations to ensure access to talent, providing educators with the opportunity to offer career-aligned credentials for both full and part-time students.
- Harness technology. In these regions, automation and AI are not just productivity levers but essential tools for sustaining output as the workforce shrinks.

Workforce Strategies: Buy · Bot · Broaden · Bind

Lower (Demographic) Risk, Higher (Workforce) Opportunity regions have more time than others: growing working-age populations plus strong skills, technology, and innovation. Countries in the USMCA and GCC + Israel trade bloc are in this group. But even here, competition for the best workers is fierce.

WHAT TO DO:

- Use skills and tasks to clarify which roles will face the most competition—looking at titles alone lacks sufficient precision— and create a plan for filling them. If you can't offer something competitors can't (flexibility, growth, purpose), you may need to pay 20-30% above market.
- Build clear, fast routes to leadership. Top talent won't wait five years to see if they might get promoted.
- Where possible, streamline and expand access to visa and work permit processes for high-skilled specialists, especially in STEM fields, to maintain competitive advantage in attracting global talent.
- Lean into technology. These regions are better positioned to augment talent with AI and other technologies, translating adoption more quickly into productivity gains than lower-skill labor markets.

Workforce Strategies: Buy · Borrow · Blend · Bot

Higher (Demographic) Risk, Lower (Workforce) Opportunity regions are in trouble. Working-age populations are shrinking, and the workers who remain often lack the skills to offset those losses. Parts of Southern and Eastern Europe fit this profile.

WHAT TO DO:

- Grow the potential labor force by bringing in temporary workers from abroad and/or removing barriers that keep people out of the workforce (like lack of childcare or inflexible schedules).
- Internal development is the most reliable talent pipeline for businesses. Develop flagship learning programs aligned with business strategy and mapped to in-demand critical skills development.
- Be honest about whether your current sites can survive with half the available workers. Model scenarios where you have 20-30% fewer applicants in five years.
- Educators can partner with employers to create accelerated training programs and apprenticeships that move workers from entry-level to skilled positions in 3-5 years, focusing on declining industries with transferable skills.

Workforce Strategies: Build · Borrow · Blend · Broaden · Bind

Lower (Demographic) Risk, Lower (Workforce) Opportunity regions have young, growing populations—but workers often lack the skills, technology access, or innovative environment to compete globally. Africa, Latin America, and parts of Asia fall here.

WHAT TO DO:

- Look beyond wage rates. Factor in training costs, time to productivity, and turnover risk. That "cheap" labor might not be cheap once you account for development costs.
- Invest in digital infrastructure and technology access in schools and vocational programs to ensure workers can develop skills to be globally competitive.
- Partner with local schools and universities to create pipelines. Design roles that allow people to learn on the job while contributing immediately.

Workforce Strategies: Build · Borrow · Blend

# What About The Rising Storm?

A few years ago, Lightcast released a report called The Rising Storm, focusing on the “demographic drought” facing the US in the coming years. Instead of an earthquake, the main metaphor was a hurricane, the idea being that there are major workforce challenges ahead and the first storm clouds were on the horizon. So why is the US in the “Lower (Demographic) Risk, Higher (Workforce) Opportunity” quadrant here?

The US has high opportunity relative to other countries. So if the US is doing better than its peers and still facing challenges, then whatever challenges its peers face are worse.

Compared to most of the developed world, the US still has advantages: a slightly healthier fertility rate than Europe or East Asia, continued (though slowing) immigration, and strong technological and innovative capacity. “Lower Risk, Higher Opportunity” doesn’t mean “no problems,” but rather “better positioned than most.” Countries in this quadrant have time and tools that others don’t.

But being in a better position than Southern Europe or East Asia doesn’t mean the US can coast. In fact, the struggles facing Higher workforce Risk and Lower Workforce Opportunity regions are a preview of what’s coming for countries like the US if they don’t act now.

# Chapter 3 Conclusion

This shift from talent abundance to talent scarcity fundamentally alters the landscape of the global economy. For the last half-century (especially in the West), business models were built on the assumption that labor was available and flexible. When that assumption fails, it immediately increases pressure to get everything else right.

Without a surplus of workers, efficiency becomes a survival mechanism rather than a cost-saving measure, forcing organizations to look toward technology, such as AI, to close the gap. This scarcity also heightens the stakes of location strategy—if you cannot find workers in your current market, you are forced to look across borders, effectively pushing you into the realm of geopolitical maneuvering.

We've never seen a steadily shrinking labor force in any major economy before now. But in the aftermath of this earth-shaking disruption, the organizations that see the most success will be the ones that stop waiting for the labor market to return to the old normal, and instead recognize that we're facing unprecedented demographic change.

> Fault Lines points out the complex and highly dynamic nature of the job market. Organizations that want to scale and adapt really need labor intelligence to understand these trends, almost as important as global weather data for airlines and transport companies.

**Josh Bersin**

Founder and CEO

the josh bersin company

EPILOGUE

# 2050

## It's career day at elementary school, 24 years from now. Every student invites one parent to explain their job, and in our hypothetical example, they arrange themselves in order of highest to lowest salary.

Four out of the 20 are in the skilled trades: two plumbers, one electrician, and one HVAC installer. They are our highest earners. They don't own the company, to be clear, they're everyday, run-of-the-mill workers, but high demand has led to a significant and durable increase in their rates over time.

One doctor is in this same tier of earnings. Right below her are two nurses and two medical techs. Also near the top of the salary range are a farmer, and the owner of the dealership that sells self-driving tractors to the farmer, and the assistant manager of the assisted living facility, which is one of the largest employers in town.

One dad is in construction. He began his career undocumented, but about 15 years ago, the need for his skills became so acute that a special visa for homebuilders was created. He now runs his own team.

One mom runs the entire marketing operation for a midsize retail company; she started her career as part of a team of 20. Now running a team of AI agents, her output is higher than ever, and almost as good.

We also have a personal trainer, a teacher, and a mom who works as an administrator for the city. All of these are their second careers; they began as a consultant, office manager, and salesperson, respectively. The teacher has begun worrying about his job; this year's kindergarten class is the smallest in a century.

Earning less, but only barely, are four foodservice workers. A lack of young people has shrunk the traditional base of workers for those jobs, so many restaurants increased their wages. As a result, it has become more common, and more respectable, to work in foodservice full-time, even at fast and casual spots. Efforts toward automation have been made, but a few years ago, a deep-frying machine broke down and the owner couldn't get a repair tech out for a week. Since then, most restaurants have trusted human workers more.

Overwhelmingly, the work being represented in this classroom is local and hands-on. Only a minority work in an office on a computer, because there simply isn't a need. Some of those jobs have been sent overseas to countries with large, English-speaking populations like Nigeria, India, and the Philippines, but the vast majority are now filled by AI.

Ten of the older parents are in Gen Z; the other 10 are Generation Alpha and younger, making the children's grandparents Millennials—but these grandparents are still in the workforce. Millennials—even those older than 65—will not be ready to retire, because their parents, Gen X in their 80s, still need financial support. Because of increasing life expectancies, it is not uncommon for the fifth-graders in the class to spend an afternoon with their great-grandparents when the whole family gathers together. Out of the four generations in a modern 2050s family, only one is part of the cohort we today consider working-age.

Around the table, the kids are singing the latest I-pop song (out of Indonesia) as the adults talk about how times have changed. The older generations recall how in the 2030s, China faded away as a manufacturing powerhouse and became a cultural and technological leader for a time—similar to how Japan's international role shifted as its population aged.

All three of the older generations went to the same four-year university, not far away, and the grandparents ask the fifth-grader if he thinks he'll go to the same one. He wrinkles up his face. "I'm not sure," he says. "Everyone says that it's too expensive."

His great-grandparents frown at that. "You know, I've always thought that a four-year degree was the best thing you can do for your future," his great-grandfather says. "You ought to invest in yourself, that's certainly what I did. My education set me apart."

His daughter, the boy's grandma, says "Well, dad, that's not necessarily true anymore. College was a popular choice when I went—it seemed like the norm for people my age. And it was great for me because it taught me the communication and critical thinking I needed to work alongside AI, but maybe a two-year certification makes more sense."

Her son, the boy's father, cuts in: "I appreciate your input, everyone, but we're not putting any pressure on him. We'd be happy with any of those options, or none of the above. A lot's changed since you all started working."

The conversation ends in a polite truce. The grandparents try to break the silence by asking if anyone has gone out to the movies recently, but of course none of them have.

This is a picture of the world that will emerge after our fault lines rupture.

Very few of us can significantly alter the paths that geopolitics, labor shortages, and AI are on, but each of us can plan ahead to be in a stronger position as the world reshapes itself around us.

## The Path Over Shaky Ground

The world beneath our feet is shaking in ways we have no precedent for. As geopolitical disruption, AI transformation, and labor shortages converge, they are creating challenges no single generation has ever faced.

And yet most organizations do business like it's the 20th century, using past performance as a predictor of future results, assuming perpetual GDP expansion despite mounting evidence otherwise. One thing is certain. The future will be different than the present, and organizations should act accordingly.

We need a new playbook. While challenges emerge from every direction, organizations that invest in the right intelligence can navigate with confidence. The three fault lines reshaping the global labor market—geopolitics, AI, and labor shortages—each require distinct strategic responses built on distinct data foundations:

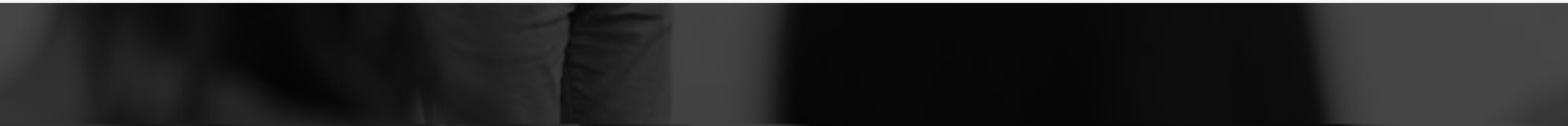
**Geopolitics demands Organizational Intelligence.** As policy shifts, trade relationships, and immigration patterns affect where talent flows and what it costs, organizations need visibility into economic and policy impacts, market expansion opportunities, site selection criteria, competitive benchmarking, strategic staffing forecasts, and sales intelligence. Without this foundation, location decisions become scattershot and long-term planning becomes guesswork.

**AI demands Skills Intelligence.** The most disruptive technology since the internet is reshaping roles faster than traditional credentials can keep pace. Organizations need clarity on talent strategy, skill transformation pathways, curriculum design and alignment, recruitment precision, and future skills forecasting. Otherwise, companies risk training for yesterday's skills while tomorrow's critical needs go unmet.

**Labor shortages demand Workforce Intelligence.** Because aging populations, credential mismatches, and declining immigration are squeezing labor supply from multiple directions simultaneously, organizations must adapt with a comprehensive talent strategy. This means integrating robust workforce planning and forecasting, clear career pathways and mobility strategies, labor market benchmarking, and location strategy insights. Without these insights, talent gaps will widen while qualified workers remain on the sidelines.

Having identified the fault lines that will reshape the global labor market in the years to come, organizations that invest in comprehensive labor market intelligence—organizational, skills, and workforce data working in concert—can anticipate change proactively, rather than catching up reactively. The immediate goal is for organizations and institutions to stop pretending like it's business as usual, and prepare to change based on the new reality ahead.

Seismologists understand that actual, literal fault lines are where pressure builds as segments of the earth's crust move, almost imperceptibly beneath us—until the pressure gives way, shaking the ground, cracking the foundations, and creating impassable fissures across our old familiar roads. We may not feel anything now, and we may not know when we will, but we know the pressure is building, with the power to rip everything apart. The impact will reshape the entire environment when it ultimately hits. And the time to prepare is now.




FAULT LINES

EXPLORE MORE