

A New Migration Strategy for Growth and Innovation

March 2023

By Johann Harnoss, Janina Kugel, Marley Finley,
Dany Bahar, Hillel Rapoport, and Rebekah Smith



BCG

**BCG
HENDERSON
INSTITUTE**



Boston Consulting Group partners with leaders in business and society to tackle their most important challenges and capture their greatest opportunities. BCG was the pioneer in business strategy when it was founded in 1963. Today, we work closely with clients to embrace a transformational approach aimed at benefiting all stakeholders—empowering organizations to grow, build sustainable competitive advantage, and drive positive societal impact.

Our diverse, global teams bring deep industry and functional expertise and a range of perspectives that question the status quo and spark change. BCG delivers solutions through leading-edge management consulting, technology and design, and corporate and digital ventures. We work in a uniquely collaborative model across the firm and throughout all levels of the client organization, fueled by the goal of helping our clients thrive and enabling them to make the world a better place.

The BCG Henderson Institute is Boston Consulting Group's strategy think tank, dedicated to exploring and developing valuable new insights from business, technology, and science by embracing the powerful technology of ideas. The Institute engages leaders in provocative discussion and experimentation to expand the boundaries of business theory and practice and to translate innovative ideas from within and beyond business. For more ideas and inspiration from the Institute, please visit <https://www.bcg.com/featured-insights/thought-leadership-ideas.aspx>

A New Migration Strategy for Growth and Innovation

A goal without a plan is just a wish.

— Antoine de Saint-Exupéry, French writer and pilot

Few of us would imagine it: innovation, perhaps the most pondered, probed, and pursued of business and societal imperatives today, is on the decline.¹ Solutions to the critical challenges we face depend not only on a handful of exceptional individuals with breakthrough ideas, but on the broad array of people who help realize those ideas by keeping the engines running and greasing the wheels of progress. An essential ingredient in this mix is migration: a country's blend of talent offered by populations drawn from beyond its borders—their brain power and brawn, their genius and common sense, and their creativity and fresh perspectives. Countries and cities that optimize their migration mix for economic potential can reap significant competitive advantage, now and in the decades ahead.

Yet most policymakers have failed to recognize this opportunity. In this report, we present a three-factor framework that can help public leaders stimulate economic growth through migration policy. BCG's Global Talent Migration Index (GTMix) describes the elements of a winning migration mix—one that correlates squarely with greater productivity and innovation, as well as with public acceptance of immigrant workers. This novel, research-backed framework can help policymakers understand the current state of their migration strategy, benchmark it against the corresponding strategies of other countries, and ultimately design policies that will make their economy more vibrant, more innovative, and more resilient.

Migration Policy Typically Focuses on the Wrong Elements

Much of the public discourse on migration in advanced economies focuses on managing immigration rather than on proactively shaping it. Most countries that employ active attraction strategies aim to draw in only a small number of “highly skilled” individuals. (We put quotation marks around “highly skilled” to underscore the conventional, relatively narrow application of this term to individuals with advanced degrees, extensive business or technology

experience, or other prestigious credentials.) We call this traditional view the *small-scale skilled immigrant* (SSI) approach. Meanwhile, programs to broaden the mix or to expand, reattract, or otherwise engage with a nation's own network of emigrants are seldom part of the conversation.

In the US, for example, 93% of employment-based immigrant visas in 2022 were awarded to foreign nationals with university degrees, demonstrated “high-skill” abilities, or qualified US investments. Only 3% were allocated to so-called “unskilled” labor.² Likewise, in the work permit system that China introduced in 2017, some 78% of work permits are reserved exclusively for “skilled” talent, with much of the remaining 22% allocated to similarly qualified workers on a short-term basis.³ Few countries try to achieve origin diversity within their immigrant population or to strategically cultivate a broad emigrant diaspora.

Although SSI-based policies ostensibly intend to fill specific talent gaps, they miss the broader economic opportunity that migration represents. For one thing, such policies ignore the sheer volume of workers needed to reverse widespread labor shortages, today and in the future. As of mid-2022, the world's 30 largest economies faced an all-time-high employment gap of some 30 million unfilled jobs, representing an aggregate \$1 trillion to \$3 trillion in lost productivity annually. Moreover, aging populations in high-income countries signal greater shortages ahead. Specifically, trade and service sector jobs are projected to be among the fastest-growing occupations in the next decade, but SSI policies largely exclude foreign workers who are willing and able to fill these essential roles.⁴ In addition, these policies fail to meaningfully connect countries to the breadth of perspectives, skills, and knowledge available worldwide. As a result, countries miss out on an opportunity to foster innovation.

1. Bloom, Jones, Van Reenen & Webb (2020), “Are Ideas Getting Harder to Find?” *American Economic Review* 110(4): 1104–44.

2. US Department of State (2022), “Report of the Visa Office 2022,” table V, parts 2 and 3.

3. <https://www.china-briefing.com/news/china-work-permits-are-you-a-b-c-tier-talent/>.

4. <https://www.bls.gov/ooh/fastest-growing.htm>.

Despite recent breakthroughs such as generative AI, CRISPR, and 3D-printed organ transplants, the overall rate of technological and scientific progress is actually in decline. Over the past several decades, despite greater investment, innovation efforts in fields as diverse as agriculture, manufacturing, cancer research, and computing have yielded diminishing returns. (See Exhibit 1.) For example, breakthroughs in treatments for breast cancer—a life-threatening disease that affects one in eight women worldwide—are becoming harder to achieve. Or consider Moore’s law: it takes 18 times as many researchers today to double computer chip transistor density as it took in 1970.⁵ In view of the breadth and magnitude of solutions needed to protect and advance society, countries desperately need a labor force with greater potential to innovate. They need people who bring a broader set of problem-solving heuristics, who are more connected to global networks of knowledge, and who provide a steady inflow of new skill sets and expertise.

Contrary to SSI logic, pursuing STEM and other so-called “highly skilled” professionals alone is not a sound immigration strategy. Beyond scientists, researchers, technologists, and others who discover, invent, and innovate, new ideas require a deep well of workers to help advance, execute, and commercialize them. More fundamentally, this deep well is crucial for maintaining a functioning economy that can adequately meet demand for essential services and products.

Any country’s migration strategy must address two points: it must define an ideal migration mix for its needs, and it must create a plan to integrate and engage migrants. Although ample practical guidance is available on the latter point—through, for example, the [Migrant Integration Policy Index \(MIPEX\)](#)—comparable guidance on the former is lacking in popular discourse. A considerable body of academic research exists to inform the development of an economically stimulating migration mix, but most policymakers have not yet incorporated these insights into their planning. This publication aims to fill the gap between research and policy practice, not only identifying what “good” looks like, but also offering tactical advice on how to bring “good” to life.

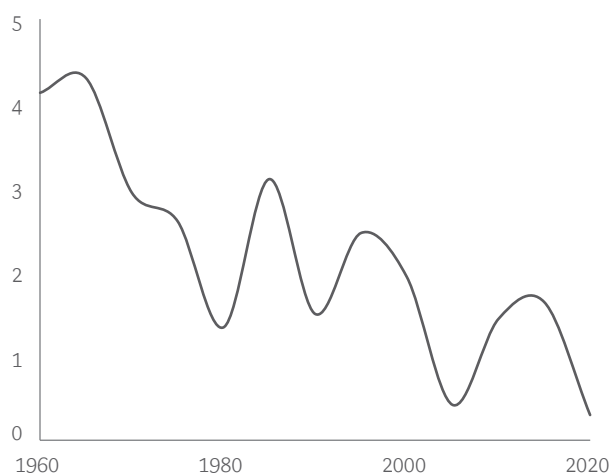
A Shift in Thinking

To realize the promise of migration, policymakers must rethink three long-held assumptions about the quantity of migrants needed, the quality of a country’s migration mix, and the definition of migration as a one-way activity. (See Exhibit 2.) We propose the following three-step approach:

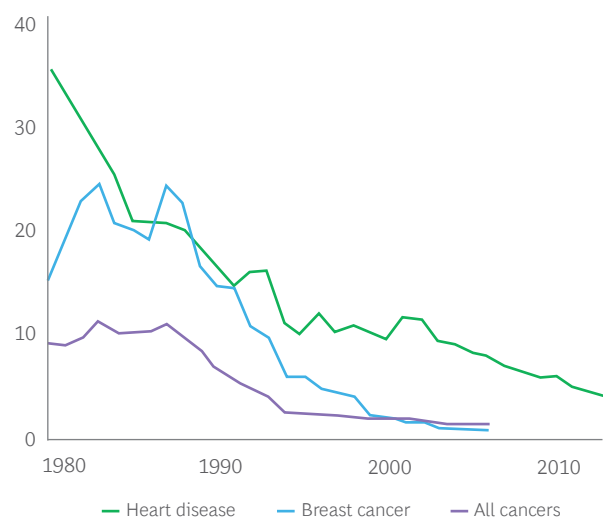
Exhibit 1 - Human Progress Is Slowing

GDP per capita growth in high-income countries

Annual percentage growth, five-year average (%)



Years of life saved per 100,000 people, per clinical trial



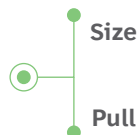
Sources: GDP per capita growth in high-income countries graph: World Bank national accounts data and OECD national accounts data. Years of life saved per 100,000 people, per clinical trial graph: adapted from Bloom, Jones, Van Reenen & Webb (2020), “Are Ideas Getting Harder to Find?” *American Economic Review*, 110(4): 1104–44. (Copyright American Economic Association; reproduced with permission of the *American Economic Review*.)

5. Bloom, Jones, Van Reenen & Webb (2020), “Are Ideas Getting Harder to Find?” *American Economic Review* 110(4): 1104–44.

Exhibit 2 - The GTMix Encompasses Six Questions of Economic Impact



Quantity



How prevalent are immigrants in your country?

How many of the world's highly educated immigrants have you attracted?



Quality

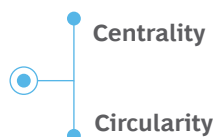


How nationally diverse is your immigrant population?

How economically complex are the countries your immigrants come from?



Connectivity



How central is your country in the global migrant network?

How many global mobile inventors are you attracting (or re-attracting)?

Source: BCG analysis.

Note: GTMix = Global Talent Migration Index.

- Seek additive value (quantity).** Small-scale immigration policies often stem from a view of immigrants as competition (displacing natives from jobs) or as a financial burden (charity cases that deplete government resources)—or both. But rather than protecting domestic populations from an economic threat, strict and scarce visas deprive them of an economic advantage. Empirical research shows that large immigrant populations sustain, expand, and boost economic productivity in receiving countries. To unlock these benefits, a migration strategy must recognize the additive value of immigrants as complements rather than competitors, and as resource gains rather than resource drains.
- Expand the notion of “skilled” (redefine quality).** Migration strategies today revolve around attracting “skilled” talent—people who typically have an advanced education or experience in the sciences or business. But all work requires skill of some sort, and skills that require prestigious degrees and earn higher incomes are not the only skills of value. In many countries, traditional labor skills (for example, in construction and transportation) are in short supply, as are service skills in such fast-growing sectors as health care. An innovation-boosting migration strategy redefines *quality* to encompass the diverse perspectives and complex productive knowledge that immigrants contribute across all skill types and levels.

- Count connectivity as a benefit.** Immigration is only half of the story. A winning migration strategy also considers domestic workers who move abroad (emigrants). Just as migrants bring knowledge from their places of origin to their destinations, they also send knowledge and resources home through their personal connections or upon their return. Both immigrants and emigrants strengthen a country’s position as an international hub of productivity and innovation.

Introducing the Global Talent Migration Index

We developed the Global Talent Migration Index (GTMix) to help countries assess and shape their migration mix. This framework, drawn from extensive theoretical and empirical research, provides a lens for pinpointing economic considerations that a country’s current policies may overlook.

The GTMix measures countries on the three core factors—quantity, quality, and connectivity—using data on migrant populations, economic complexity, and patents. These factors are not exhaustive, nor do they necessarily translate into impact, especially if not implemented alongside effective integration strategies. Because the GTMix assesses actual migration patterns, it does not offer a qualitative or causal assessment of policies. Nevertheless, it can help public leaders measure the impact of past policies and design future policies to spur desired migration patterns

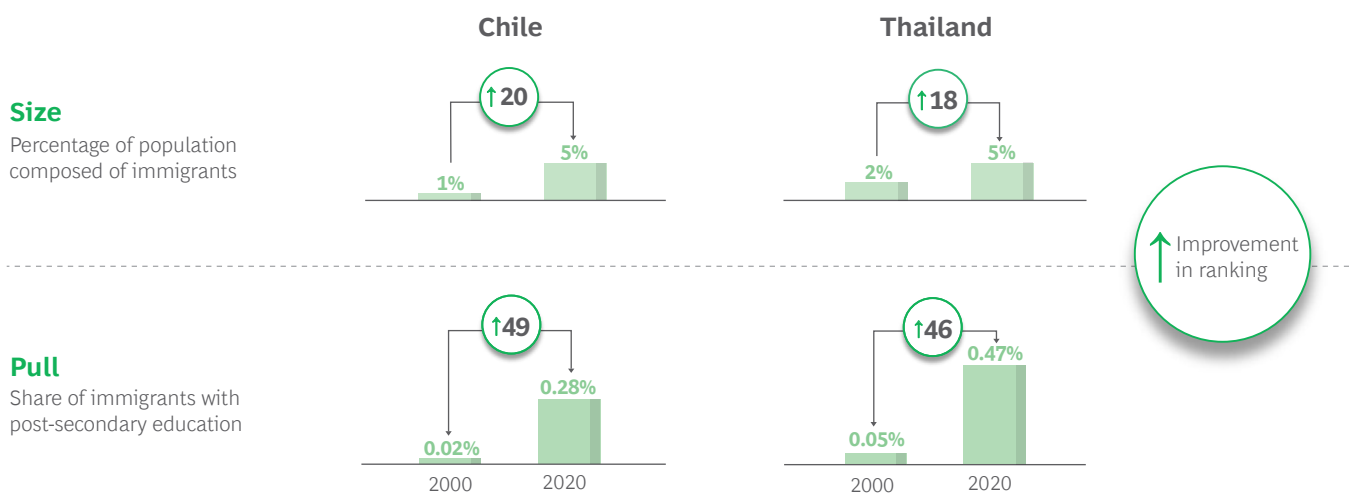
Quantity. This factor has two components: the total number of international workers that a country brings in (which we term *size*) and the global share of highly educated immigrants that it attracts (which we call *pull*). Although migration strategies today recognize the value of the latter, they often ignore the relevance of workers whose skill sets lie outside those acquired through a university education. Over-emphasis on attracting the highly educated ignores the need for workers in trade and service sectors—generally categorized as “low-skilled”—whose competencies are in demand and essential for a well-oiled economy. These include nurses, technicians, auto mechanics, construction workers, farmworkers, and a host of other vocational tradespeople. Thus, high scores in both pull and size are positive.

Research shows that beyond filling job vacancies, migrants of varying educational levels fuel innovation and start businesses of their own at rates that exceed those of native workers.⁶ Immigrants make up roughly 15% of workers in the US but account for 25% of entrepreneurs and 25% of inventors.⁷ US-based retail and tech giants eBay, Kohl’s, and Instagram, started by immigrants from France, Poland, and Brazil, generate billions of dollars in annual income and tax revenue and employ tens of thousands of people.⁸

Moreover, rather than displacing or undercutting native workers, blue-collar immigrants often propel domestic talent into higher-paying jobs.⁹ Event studies consistently show that short-term labor market crowding from an influx of new immigrants had no negative impact on native worker employment after ten years.¹⁰ In fact, there is evidence that increasing the size of the immigrant population leads to greater workforce participation of native women.¹¹ So while continuing to attract in-demand, “highly skilled” workers remains valuable, attracting migrants who can perform essential manual and vocational labor and expand the economy through their entrepreneurial efforts, is important, too.

Countries that earn high GTMix scores on quantity include Middle Eastern countries with majority-immigrant populations, such as the United Arab Emirates and Saudi Arabia, as well as Australia, Canada, and Switzerland. Chile and Thailand have raised their GTMix quantity ranking dramatically since 2000, more than doubling their total immigrant populations and enjoying even greater growth in their share of the world’s highly educated migrants. (See Exhibit 3.)

Exhibit 3 - Two Outstanding Quantity Climbers: Chile and Thailand



Sources: UN Population Division data; BCG analysis.

- <https://behavioralscientist.org/how-immigrants-drive-entrepreneurship-invention-innovation/>.
- <https://hbr.org/2016/10/immigrants-play-a-disproportionate-role-in-american-entrepreneurship>.
- <https://www.fastcompany.com/90202816/some-of-the-u-s-s-biggest-companies-are-founded-by-immigrants>; <https://www.ft.com/content/dfe4f0d8-8d25-11e5-a549-b89a1dfede9b>.
- Peri & Sparber (2009), “Task Specialization, Immigration, and Wages.” *American Economic Journal: Applied Economics* 1(3): 135–69.
- Card (1990), “The Impact of the Mariel Boatlift on the Miami Labor Market,” *ILR Review* 43(2): 245–57; <https://www.oecd-ilibrary.org/sites/99ac61a3-en/index.html?itemId=/content/component/99ac61a3-en>.
- Cortés & Tessada (2011), “Low-Skilled Immigration and the Labor Supply of Highly Skilled Women,” *American Economic Journal: Applied Economics* 3(3): 88–123.

It is important to note that strategies to increase immigrant population size without providing measures to support migrants, such as protections for health, welfare, and human rights, will fail on a humanitarian level and are unlikely to unlock the economic potential of a vibrant migration mix.

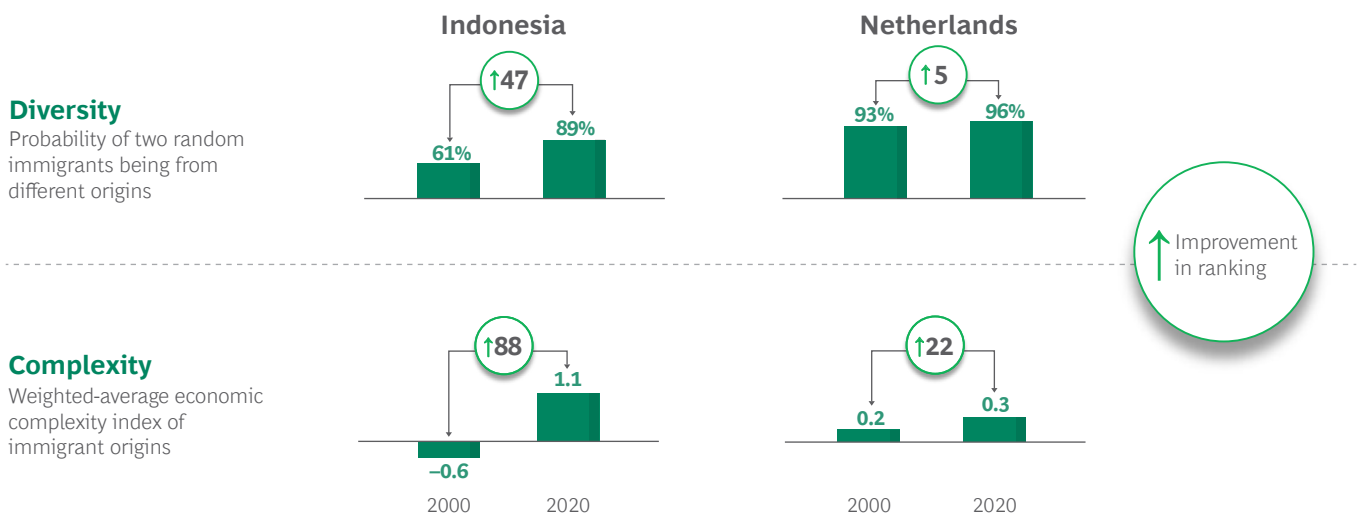
Quality. This factor consists of two subfactors, which we term *diversity* and *complexity*. Diversity reflects the heterogeneity of national origins, which in turn reflects different ways of thinking. Geographic diversity is itself a source of innovation, offering a broad array of perspectives that fuel novelty and creativity. Researchers have found a statistically significant correlation between greater variety of origins in a country’s immigrant population and increased long-term income levels and productivity; in more economically advanced countries, that correlation extends to innovativeness as well.¹²

Complexity involves the extent to which immigrants import advanced expertise in productive work, such as agriculture, recycling, or new product or service development. Migrants transmit specific knowledge of best practices from their homelands around the world—whether it comes from direct expertise or simply familiarity with their home economy’s industries. In fact, research shows that immigrants

from countries that are advanced in certain industries boost the productivity of those same industries in their receiving countries. For example, migration between Tanzania and Kenya helped grow the former’s soap industry. Similarly, Chilean emigrants in Sweden have helped advance Chile’s paper products industry.¹³ This phenomenon can also be observed at the individual level. Danone, the major yogurt brand (Dannon in the US), was founded in Barcelona by a Greek immigrant who imported, along with his knowledge, bacterial cultures from Eastern Europe to introduce the probiotic digestive aid to the West.¹⁴

To understand how diversity and complexity play out, consider Indonesia, whose migration mix quality has skyrocketed since 2000. (See Exhibit 4.) In diversity, Indonesia increased the probability that two random immigrants would be from different home countries from 60% in 2000 to 90% in 2020. And whereas Indonesia ranked in the bottom ten in complexity among the 100 countries studied in 2000, it ranked fourth highest in 2020. This dramatic rise is a function of changes in countries of origin (notably, greater representation of immigrants from South Korea, Singapore, the US, and the UK) and of the heightened economic complexity of the leading places of origin, such as China, India, and Japan.

Exhibit 4 - Two Quality Standouts: Indonesia and the Netherlands



Sources: UN Population Division data; Harvard Growth Lab’s Economic Complexity Index; BCG analysis.

12. Alesina, Harnoss & Rapoport (2016), “Birthplace diversity and economic prosperity,” *Journal of Economic Growth* 21(2), 101–38.

13. Bahar & Rapoport (2018), “Migration, Knowledge Diffusion, and the Comparative Advantage of Nations,” *Economic Journal* 128(612): F273–F305.

14. Bailey (1997), *Marketing and Pricing of Milk and Dairy Products in the United States*, Iowa State University Press.

The Netherlands, which has historically depended on immigration for population growth, saw marked improvement in diversity since the turn of the millennium. It rose five places in diversity to rank sixth overall in 2020. Its advance in complexity was even more impressive, as it rose 22 places.

Connectivity. Connectivity gauges the extent to which a country recognizes the value of both immigration and emigration as ways to access global knowledge. It is composed of two factors: *centrality*, which we define as the degree to which a country is a hub in the global migrant network; and *circularity*, our term for the extent to which international inventors—immigrants and return emigrants—pass through the country.

Many people associate the intuitive concept of migrants as conduits for transferring information across borders with fear of “brain drain.” Although “brain drain” (as in the loss of doctors or other essential workers) can be a real concern, the notion that countries generally lose knowledge when educated workers emigrate is misleading. Research shows that emigration actually produces a “brain gain” by connecting sending countries to the aggregate “global brain” and the global economy.¹⁵ So countries should not overlook the value of a two-way approach. Both immigration and

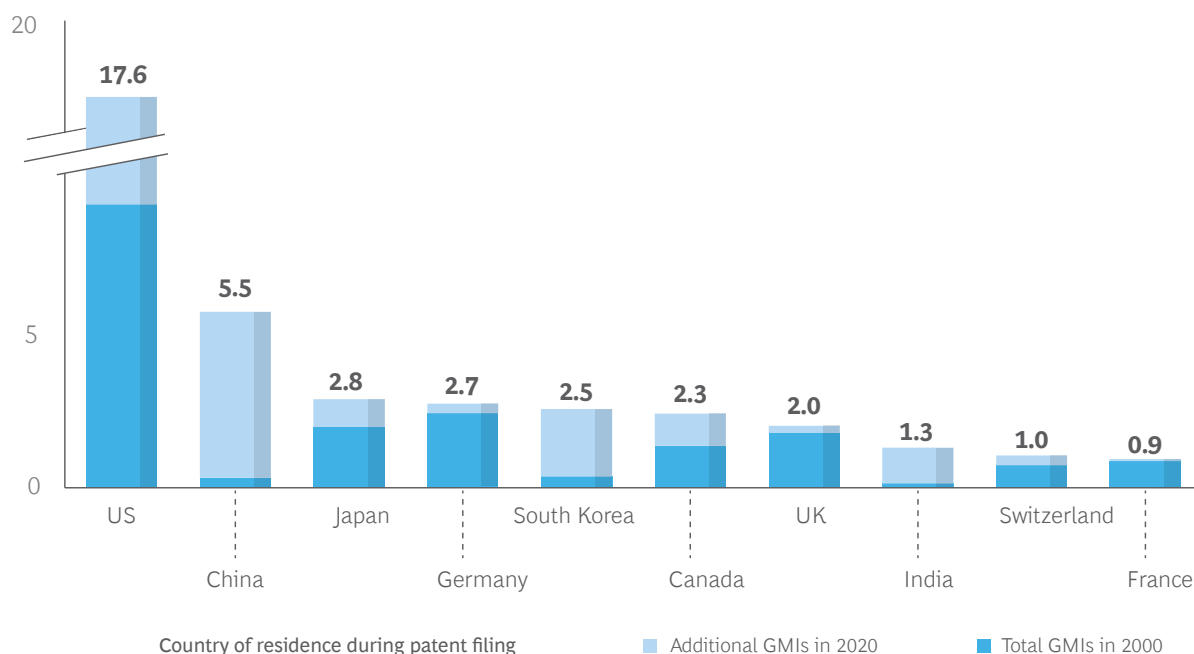
emigration bring in valuable knowledge, financial opportunities, and business connections. The flows between and among countries represent strategic opportunities for accessing and sharing information, forging collaborations, and ultimately bolstering innovation.

Emigrant workers, like immigrants, transmit industrial know-how home from their receiving countries.¹⁶ This is true of both white- and blue-collar workers. For example, after the 2011 Greek financial crisis, entrepreneurial migrants returning home to Albania drove the agricultural sector’s transition from subsistence to commercial, boosting wages and expanding job opportunities for non-emigrant Albanian workers.¹⁷ In the same vein, inventors see major quantitative and qualitative (as measured by frequency of citation) boosts in patenting after working in different countries and when teaming with other global mobile inventors.¹⁸ (See Exhibit 5.) The most recent patent from Impossible Foods, the Silicon Valley unicorn, credits 11 inventors who have worked in or hail from such countries as Canada, China, Iran, Russia, Singapore, Spain, and the UK.¹⁹ Iranian-born ophthalmologist Dr. Gholam Peyman, who received his medical doctorate in Germany, developed Lasik surgery after moving to the US and joining the faculty at the University of Illinois.

Exhibit 5 - US and China Are Top Global Mobile Inventor Hot Spots

Number of global mobile inventors

(in thousands)



Source: Bahar, Choudhury, Miguelez & Signorelli, “Global Mobile Inventors” (mimeo), working paper.

Note: GMI = global mobile inventor.

15. <https://www.cgdev.org/article/myth-brain-drain-how-emigration-can-help-poor-countries-harvard-political-review>.

16. Bahar & Rapoport (2018), “Migration, Knowledge Diffusion, and the Comparative Advantage of Nations,” *Economic Journal* 128(612): F273–F305.

17. https://econpapers.repec.org/article/eeeeecrev/v_3a101_3ay_3a2018_3ai_3ac_3ap_3a101-132.htm.

18. Bahar, Choudhury, Miguelez & Signorelli, “Global Mobile Inventors” (mimeo), working paper; PatentsView (US Patent and Trademark Office); BCG analysis.

19. <https://patents.justia.com/patent/20220330575> and online biographical information.

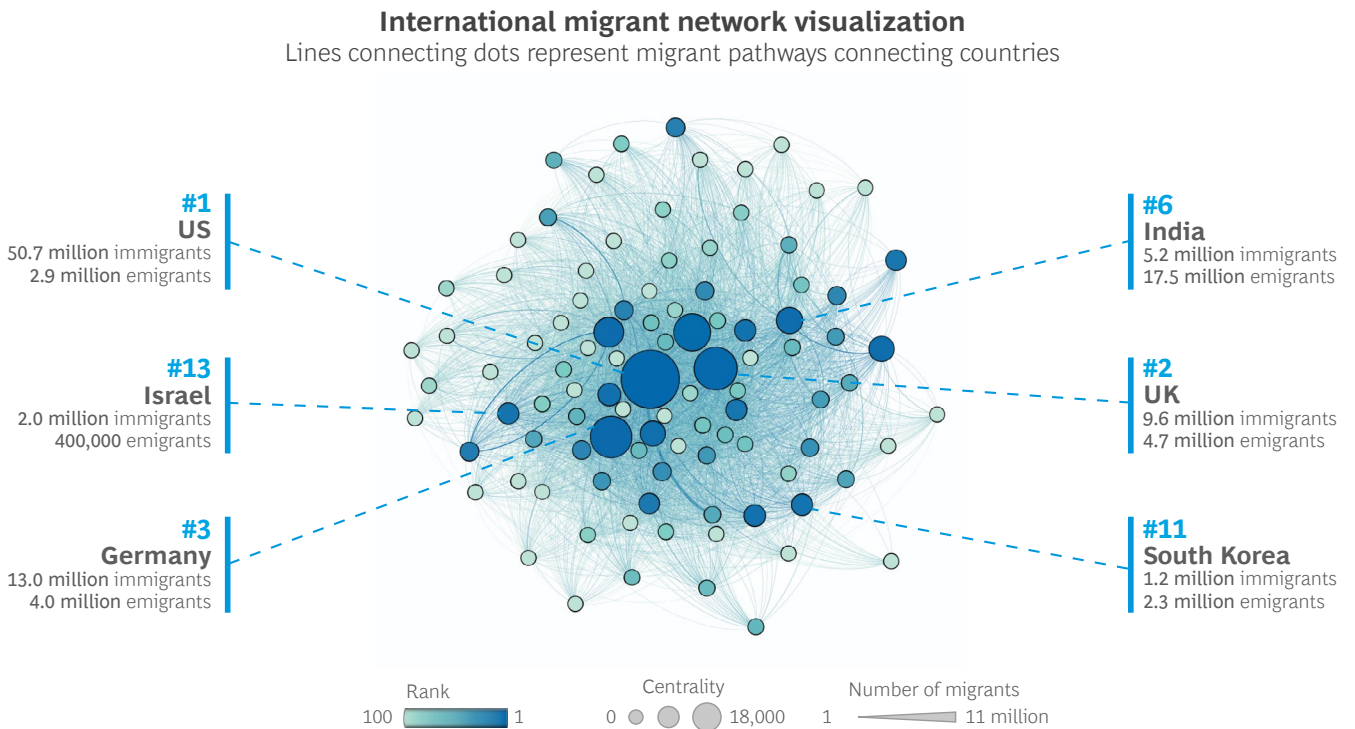
Besides contributing to gains in productivity and innovation, both inward migration and outward migration expand the sending and receiving countries' access to markets and increase their trade.²⁰ This is especially true in the case of migration pathways involving countries with less established institutions or less cultural commonality. For example, migrant networks between Spain and countries in Africa have had a greater impact on increasing trade than migrant networks between Spain and Latin American countries.²¹

The US earns a very high score for connectivity. With its extensive migrant network and the world's largest population of global mobile inventors, it ranks first in both centrality and circularity. This is primarily due to its large immigrant populations, as is also the case with Germany, the UK, and France. Conversely, China and India solidify

their places in the global network chiefly because of their widespread emigrant diasporas. (See Exhibit 6.)

The three core factors of quantity, quality, and connectivity, together with their components, independently drive economic value. Furthermore, a country's aggregated GTMix score correlates significantly with productivity and innovation. (See Exhibit 7.) Specifically, a ten-point improvement in index score translates into 21% higher GDP per capita and a 40% increase in the number of patents that the country produces (after controlling for income, size, and other country-level differences). There is also a strong correlation between GTMix performance and societal acceptance of immigrant workers. (See the sidebar "Migration Mix and Social Acceptance.")

Exhibit 6 - Centrality Leaders Are Hubs of Migration and Knowledge



Source: UN Population Division data.

20. <https://www.oecd-ilibrary.org/sites/99ac61a3-en/index.html?itemId=/content/component/99ac61a3-en>; <https://wol.iza.org/articles/impact-of-migration-on-trade/long#:~:text=It%20is%20now%20widely%20accepted,effects%20and%20immigrant%20preference%20effects>.

21. Peri & Requena (2009), "The Trade Creation Effect of Immigrants: Testing the Theory on the Remarkable Case of Spain," NBER Working Paper No. 15625.

Migration Mix and Social Acceptance

Countries that rank high on the Global Talent Migration Index (GTMix) also tend to be more accepting of immigrant workers. Responses to the World Values Survey—a noncommercial survey, conducted every five years, of the social, political, economic, religious, and cultural values of nearly 100 nations, representing around 90% of the world’s population—reveal the extent to which residents of various countries believe that native workers should have hiring priority over immigrants when jobs are scarce. When we compared these responses to countries’ GTMix rankings, we found that people in countries with higher GTMix scores agree less with such favoritism. The correlation is apparent over four time periods: 1990, 2000, 2010, and 2020. (See the exhibit.) When we control for year, GDP per capita, population, “highly skilled” population, region, and economic complexity, the correlation is statistically robust at a 1% level.

The correlation between the GTMix and social acceptance highlights that a country’s migration mix can affect its integration outcomes. A closer look at the data reveals that diversity, in particular, is the driving factor. External research has also found that age and social networks are key determinants of immigrant employment and wages: younger immigrants and those who have access to a diaspora or ethnic community in their destination city tend to have better labor market outcomes.¹ The GTMix doesn’t reward countries for targeting younger immigrants (older, experienced workers fill labor needs, too, and may have more productive knowledge to import), and diversity is an important goal (which may mean bringing immigrants into a country despite a lack of existing social connections there). Even so, public leaders may want to consider age and networks alongside the GTMix framework to facilitate integration.

GTMix Ranking Correlates with Societal Acceptance of Nonnative Workers

Average responses, by country, to the World Values Survey poll question, “If jobs are scarce, should native workers have hiring priority?”



Sources: World Value Survey Wave 7 (latest available data); BCG analysis.

Note: The graph tracks results for the 43 countries for which World Values Survey data is available. GTMix = Global Talent Migration Index.

1. <https://www.migrationpolicy.org/article/migrant-social-networks-vehicles-migration-integration-and-development>; Gustafsson, Mac Innes & Österberg (2017), “Age at immigration matters for labor market integration—the Swedish example,” *IZA J Develop Migration* 7(1); <https://doi.org/10.1186/s40176-017-0087-1>; Brell, Dustmann & Preston (2020), “The Labor Market Integration of Refugee Migrants in High-Income Countries,” *Journal of Economic Perspectives* 34(1): 94–121.

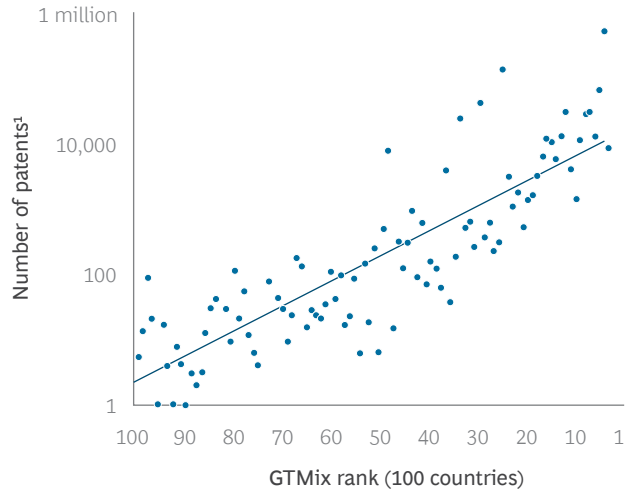
Exhibit 7 - Top GTMix Performers Are More Productive and Innovative



How productive are you?



How innovative are you?



Sources: UN GDP and population estimates; PatentsView (US Patent and Trademark Office); BCG analysis.

Note: GTMix = Global Talent Migration Index.

¹Three-year sum (to smooth annual variance) of patents filed with the US Patent and Trademark Office and later granted; shown on the Y axis and used as a dependent variable over three time periods in the regression.

How the Nations Rank

The GTMix uses bilateral migration data to assess countries' performance in each of the three factors and their subfactors. (See the sidebar "How We Calculated Countries' GTMix Scores.") No country can maximize its scores in all six dimensions, nor should it necessarily try to do so. Inevitably, national priorities, resources, assets, and opportunities will require tradeoffs across dimensions. Nevertheless, the framework gives policymakers a way to step back and view their migration mix through an economic lens, examining metrics that they previously either didn't study or didn't see in aggregate, to identify gaps and opportunities.

Notable Performers, Overall and Over Time. Countries that rank the highest across all dimensions—size, pull, diversity, complexity, centrality, and circularity—have migration mixes that deliver the most positive economic potential. In an analysis of 100 countries in 2020, the US earned the top spot, followed by Germany, Australia, and the UK. Japan, China, and India, ranked 21st, 32nd, and 51st, respectively. (See Exhibit 8.)

One especially valuable aspect of the GTMix is that it allows policymakers to assess countries' performance over time. Although the top ten spots have seen no new entries over the past 20 years, Germany and France (for example) have followed noticeably different trajectories. (See Exhibit 9.) Meanwhile, outside the group of countries in the top ten, five East Asian countries—Japan, South Korea, Singapore, China, and Malaysia—have gained substantial ground (moving up 6.4 places, on average, since 2000), as has Saudi Arabia (up 6 places). Despite ranking lower, a number of emerging players have advanced markedly since 2000, including Indonesia (up 51), Sri Lanka (up 34), Thailand (up 28), and Qatar (up 27).

How We Calculated Countries' GTMix Scores

We determined the overall GTMix ranking of each country by computing the sum of its subrankings in each of the six underlying factors: size and pull for quantity; diversity and complexity for quality; and centrality and circularity for connectivity. (See the exhibit.) A lower sum indicated strong performance across subrankings and resulted in a higher overall rank. We used UN Population Division data on bilateral migration stocks for all subfactors except pull and circularity.


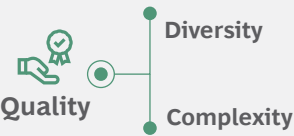
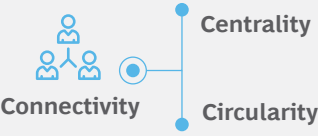
For the quantity factor, we measured size as the ratio of immigrant stock to the total population of the destination country. Pull represents the market share of “highly skilled” immigrants, estimated from Barro-Lee data, using the percentage of people in the national population age 25 and over with tertiary schooling, with the native population deducted from the total. We looked at a 30-year span, with data taken in 1990, 2000, and 2010, to ensure statistical consistency.

For the quality factor, we calculated the Herfindahl-Hirschman Index—a widely used measure of the diversity of population groups in such areas as occupation, language, and religion—of immigrant stocks to define a country's diversity score. A nation with a high score for diversity

has immigrants from many places in even proportions. We measured complexity by calculating the weighted average score on the Economic Complexity Index (devised by Harvard Growth Lab) of the countries of origin, weighted to reflect the relative size of the immigrant population from each origin. Economic complexity is a function of the intensity of capabilities and know-how that go into producing and selling any given product.

For the connectivity factor, we measured centrality by interpreting the stock-weighted, directed migrant network data as a mathematical network to calculate “betweenness centrality,” a standard measurement in network analysis. “Betweenness centrality” not only measures overall connectedness, but also reflects the importance of nodes that are crucial to the network's connectivity. To gauge circularity, we tracked the number of global mobile inventors who submitted patents from each country in a given year. The term *global mobile inventors*—coined by the economists Bahar, Choudhury, Miguelez, and Signorelli in their working paper of the same name—refers to people who have patented inventions in more than one country in the course of their career.

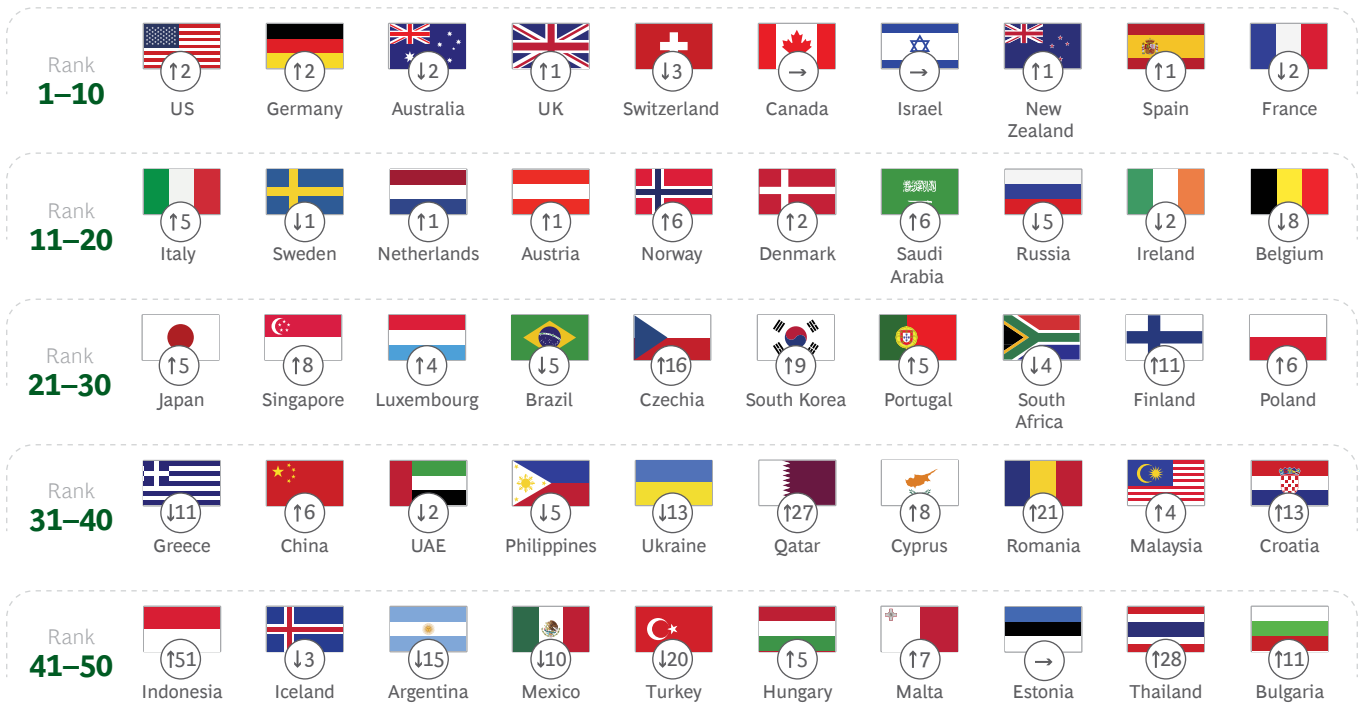
The Basis of the Six Index Factors

	Measurement	Relevance
 <p>Quantity</p>	Immigrant stock/destination population	Higher immigration rates can address labor market shortages and increase entrepreneurship and innovation
	Market share of “high-skilled” immigrants ¹	Immigrants with high formal education tend to have more per capita impact on economic output and innovation
 <p>Quality</p>	Herfindahl-Hirschman index of immigrant stocks	Immigrants from many places bring varied perspectives that drive innovation; such diversity also enjoys more public support
	Weighted average of sending countries' economic complexity ²	High-complexity countries have sophisticated and specialized production knowledge that immigrants can import
 <p>Connectivity</p>	Betweenness centrality of stock-weighted, directed migrant network	High scorers are hubs of transmission, both of migrants and of the knowledge they carry
	Number of GMIs—people who have patented from more than one country	GMIs are super innovators: they produce more patents than their domestic counterparts, and their patents are more influential (more frequently cited)

Sources: For market share of “high-skilled” immigrants (pull): Barro & Lee (2013), “A New Data Set of Educational Attainment in the World, 1950-2010,” *Journal of Development Economics* 104(C): 184–98. For weighted average of sending countries' economic complexity (complexity): Harvard Growth Lab, Economic Complexity Index. For global mobile inventors (circularity): Bahar, Choudhury, Miguelez & Signorelli, “Global Mobile Inventors” (mimeo), working paper; PatentsView (US Patent and Trademark Office); BCG analysis.

Note: Population data for all subfactors except pull and circularity comes from UN Population Division, bilateral migration stocks. GMI = global mobile innovators.

Exhibit 8 - The GTMix Top 50



Source: BCG analysis.

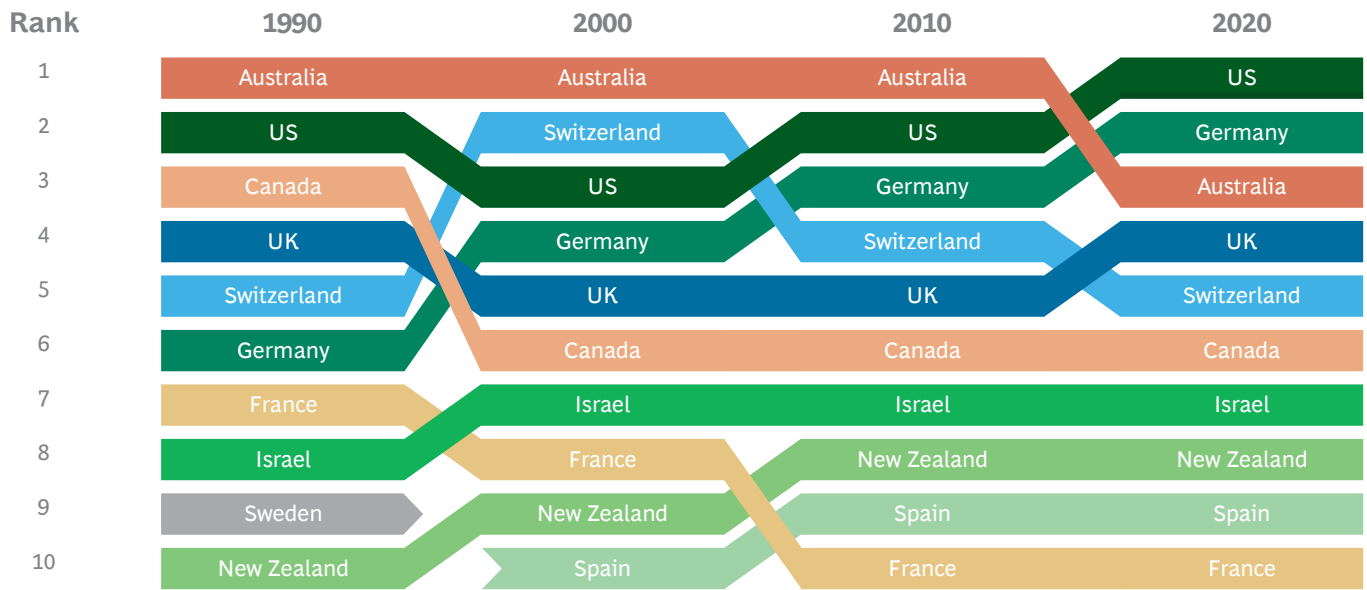
Note: Arrows show change in rank since 2000. GTMix = Global Talent Migration Index.

Performance by Factor. Countries may achieve a high ranking in different ways. Every country that ranks near the top overall leads the pack by a substantial margin in some dimensions while scoring at least somewhat lower in others. The US and Germany earned stellar scores in three criteria (pull, centrality, and circularity), while Australia, Sweden, and Israel achieved their high overall scores by ranking in the top 15 across five of the six criteria. Conversely, despite ranking outside the top 20 in five of the six criteria, Norway and Denmark won spots in the top 20 overall, thanks to their high diversity scores.

Despite these differences in underlying scores, countries that earn a high overall mark on the GTMix enjoy greater productivity and innovation. Countries that attract the most “highly skilled” immigrants are not the only winners. The GTMix emphasizes the fact that the mix matters; it encourages public leaders to think beyond the competition for “highly skilled” talent so their countries can unlock the economic benefits that come from investing in a large, diverse immigrant population and a well-connected emigrant diaspora.

GTMix and Integration. Immigrant integration is critical to translating the economic potential of a high-scoring migration mix into positive results. By plotting MIPLEX scores, which reflect the effectiveness of countries’ integration policies, against GTMix scores, we can see which countries are most primed for success. (See Exhibit 10.) Migration mix and integration policies are clearly correlated, yet only one country in the GTMix top 10—Canada—also ranks in the top MIPEX tier. The US and Australia have less than optimal integration policies, and Germany, the UK, and Switzerland have even more room for improvement on their integration measures if they want to fully realize the potential economic benefits of their migration mix.

Exhibit 9 - The GTMix Top 10



Source: BCG analysis.

Note: GTMix = Global Talent Migration Index.

Putting the GTMix into Practice

Let's take a closer look at how some countries have managed to improve their scores across the six dimensions.

PULLING THE QUANTITY LEVERS

Countries can improve their size and pull factors in the following ways.

Increasing Size. If public sentiment is immigrant-averse, policymakers can start by expanding short-term, job-specific permits for foreign workers. By using this approach, Japan has more than doubled its percentage of nonnative residents from less than 0.8% of its population in 1990 to more than 1.8% as of 2020.²² To make citizens more amenable to newcomers from abroad, government policies should support both native and migrant workers' economic opportunities. Public communications emphasizing that the country will protect native employment and carefully manage immigration can go a long way toward overcoming resistance. Moreover, messaging that consistently respects immigrants from all walks of life will help attract globally mobile talent in search of a welcoming destination.

To bring in more blue-collar workers, policymakers should consider launching skills partnership programs with origin countries. For example, South Korea's Employment Permit System (EPS) offers the country's foreign workers pre- and post-admission vocational, cultural, and language training, as well as reintegration support when they return to their country of origin.²³ Established in 2004, EPS has reduced the cost to legally employ foreign workers by two-thirds while raising EPS workers' wages.²⁴ Other levers to increase size include diaspora engagement—Israel, Portugal, Spain, and others offer visas to descendants of citizens abroad and residents of colonial relatives—and uncapped visa pathways, such as the US's Temporary Agricultural Worker visa.²⁵

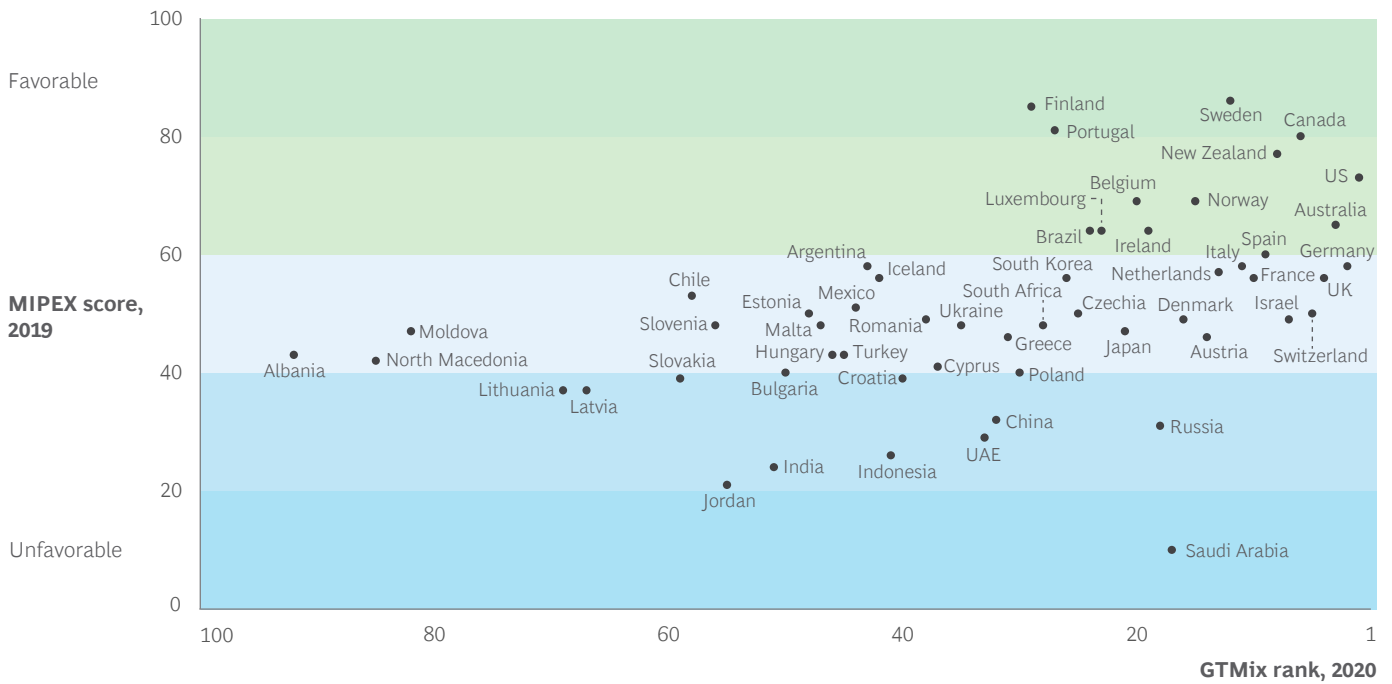
22. <https://www.migrationpolicy.org/article/its-population-ages-japan-quietly-turns-immigration>.

23. <https://gsp.cgdev.org/legalpathway/employment-permit-system-eps/>.

24. <https://olc.worldbank.org/system/files/2-4.pdf>.

25. <https://www.programaregressar.gov.pt/en/>; <https://www.nbn.org.il/life-in-israel/government-services/rights-and-benefits/the-law-of-return/>; <https://www.immigrationspain.es/en/spanish-citizenship-descent/>; <https://www.uscis.gov/working-in-the-united-states/temporary-workers/h-2a-temporary-agricultural-workers>.

Exhibit 10 - The GTMix and Integration Must Go Hand in Hand



Sources: Migration Policy Group, 2020; BCG analysis.

Note: MIPEX scores are not available for all countries in the GTMix ranking. GTMix = Global Talent Migration Index; MIPEX = Migrant Integration Policy Index.

Strengthening Pull. There is no shortage of strategies for attracting “highly skilled” talent. Granting work permits to international students who graduate from the receiving country’s schools is a common method, and some countries, such as the UK, also provide permits to graduates of reputable foreign institutions.²⁶ If the country’s schools don’t currently attract international students, policymakers might consider investing in enhancing their international appeal, as China has done.²⁷ Or they might look to partnerships with schools overseas—in such forms as study abroad and faculty rotation programs—to begin enticing foreign workers with advanced educations into the country.

Attracting “highly skilled” workers outside academia is another strategy. Well-marketed entrepreneurship and investor visa programs can effectively increase a country’s pull. Several countries offer startup visas to appeal specifically to technology entrepreneurs by bundling business resource benefits with work permits. Chile’s innovative startup visa program, for instance, offers immigrant entrepreneurs startup capital, coworking space, and domestic business connections alongside work authorization.²⁸

26. <https://www.cnbc.com/2022/05/30/uk-launches-new-visa-for-worlds-top-graduates.html>.

27. <https://theconversation.com/how-china-has-been-transforming-international-education-to-become-a-leading-host-of-students-157241>.

28. <https://startupchile.org/en/apply/>.

29. A points-based visa system assesses applicants by applying a rubric that awards points for different characteristics (e.g., an advanced diploma) and grants admission to those whose total score passes a certain threshold; <https://www.beehive.govt.nz/speech/immigration-law-changing-world>.

30. <https://www.bbc.com/news/business-61603429>.

ACTIVATING THE QUALITY LEVERS

Countries can tap diversity and complexity to bolster their migration mix in a number of ways.

Enriching Diversity. To increase diversity, policymakers should consider whether their current policies impede this important dimension. For instance, following New Zealand’s switch from bilateral agreements with other former British possessions and with the UK itself to a points-based system in 1987, the country’s odds that two random migrants would hail from different countries of origin increased by 75% over the next three decades.²⁹ Similarly, in the wake of Brexit, the UK is attracting a more global set of immigrants now that EU residents can no longer bypass the points-based system that had been in place for allocating visas to all other migrants since 2008.³⁰

Although they might represent a step in the right direction for diversity overall, points-based visas may systematically discriminate against certain groups of candidates, particularly those from lower-income countries. Consequently, countries should be mindful of this possibility and consider creating alternative pathways for those groups. The US's lottery-based Diversity Visa program, for example, designates visas for workers from underrepresented countries.³¹

Enhancing Complexity. Countries seeking to develop a specific industry might target bilateral migration with nations that possess the desired expertise—for example, Singapore or Finland for green technology, China or Hungary for electric vehicle batteries, or the US or Germany for pharmaceuticals. Countries with recently globalized economies can also leverage their foreign business relationships and economic growth to increase the complexity of their migration mix. After more than 20 years of trade policy expansion, Vietnam has extended the duration of its investor visa residence permit from one year to five years and has streamlined real estate acquisition policies for foreigners.³² Although Vietnam ranked in the bottom ten in complexity among the 100 countries we studied in 1990, it ranked in the top 50 in 2020. Government investments in infrastructure and living standards, together with attractive residency permits for nonnatives, can encourage foreign businesspeople to put down roots.

MOVING THE CONNECTIVITY LEVERS

Countries should consider immigration and emigration together to boost connectivity.

Capturing the Centrality Dividend. Migrant networks help build countries' economic, social, and cultural connectivity and influence. Among countries ranked in the GTMix top 20 in 2020, South Korea, Turkey, and South Africa have greatly increased their centrality scores since 2000. In each case, the stronger centrality ranking resulted from growth in the country's immigrant and emigrant networks. Besides seeing their immigrant population increase by more than 300%, these countries have experienced emigrant population growth of 30% to 80%. This growth has helped construct and reinforce these nations' global identities: South Korea as a booming soft power, Turkey as a bridge between East and West, and South Africa as “the gateway to Africa.”

Multinational mobility compacts such as the Schengen Agreement can help countries develop network connections in both directions and thus boost their centrality. Since joining the agreement in 2003, Estonia has seen its centrality ranking rise amid growing emigration. As its prime minister observed in 2004, just prior to the nation's entry into the EU, “A small nation can be successful only if the people can move around the world to work, to live, and then, of course, to return.”³³ Despite initial concerns, economists at Estonia's University of Tartu report that no “brain drain” occurred.³⁴ To the contrary, Estonia has recently seen roughly 30% growth in knowledge-intensive jobs.³⁵ Like immigrants, emigrants expand economies and fuel innovation, linking the sending countries to markets, knowledge, and resources abroad.

Tapping the Value of Circularity. To rank high in circularity, countries must attract global mobile inventors: foreigners and returnees alike who have prolific records of patenting in multiple countries. Academia, we've found, is among the most important institutional channels for fostering circularity. China, which now ranks second in circularity, saw its score climb 25 points over the past three decades. This significant change arose in part from the country's investment in bolstering its universities' brands globally. It is also a function of China's sprawling emigrant population; in both the US and the UK, roughly one-third of international university students are Chinese.³⁶

Germany's state-funded German Academic Exchange Service (DAAD), the world's largest such sponsor, offers scholarships, prizes, and awards that incentivize German researchers to work abroad and foreign researchers to work in Germany. Instead of sponsoring individual student exchanges, India's University Grants Commission has promoted international higher-education partnerships by developing programs jointly with foreign schools. Participating students must complete at least 30% of their coursework abroad.³⁷

Unlike policies that focus only on immigration, circularity taps into migration's broader potential value as a two-way conduit of knowledge, resources, and economic growth.

31. <https://www.fwd.us/news/diversity-visa-program/#:~:text=The%20statutory%20annual%20cap%20for,diversity%20visa%20cap%20at%2050%2C000.>

32. <https://vir.com.vn/vietnam-a-top-destination-for-expats-69391.html>.

33. <http://edition.cnn.com/2004/WORLD/europe/04/14/eu.estonia/>.

34. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2070036.

35. <https://foreignpolicy.com/2021/04/02/it-is-western-europes-turn-for-a-brain-drain/>.

36. <https://www.scmp.com/news/china/diplomacy/article/3197473/china-still-top-source-international-students-us-despite-tensions>; [https://www.studying-in-uk.org/international-student-statistics-in-uk/#:~:text=In%202021%2C%2032%25%20\(the,from%20China%20in%20the%20UK.](https://www.studying-in-uk.org/international-student-statistics-in-uk/#:~:text=In%202021%2C%2032%25%20(the,from%20China%20in%20the%20UK.)

37. <https://monitor.icef.com/2022/05/india-simplifies-procedures-for-foreign-institution-partnerships/>.

A winning migration strategy can deliver both near-term and long-term payoffs. It can reignite the world's sputtering engine of progress and boost economic well-being within and well beyond a country's borders. Such a strategy requires not only effective integration of immigrants, but also an optimal migration mix—one that acknowledges the many forms of additive value that global talent offers. This means thinking beyond the battle for highly educated STEM and business professionals and recognizing that the right mix is what matters.

BCG's GTMix and its underlying principles can help policymakers identify the spectrum of skills, talent, and knowledge that migration inflows and outflows offer to fuel a resilient and innovative economy. Amid intensifying labor shortages and innovation slowdowns, the value of talent migration is perhaps greater than ever. As public leaders seek new ways to bolster economic prosperity, the principles behind BCG's GTMix reflect one basic truth: a country's blend of talent—brains and brawn—is the fundamental source of its progress. It's time to design strategies to broaden that mix, for the benefit of all.

About the Authors



Johann Harnoss is a partner and associate director in the Berlin office of Boston Consulting Group. He is also a BCG Henderson Institute fellow and a cofounder and CEO of Imagine Foundation, an NGO. You may contact him by email at harnoss.johann@bcg.com.



Janina Kugel is a BCG senior advisor, a non-executive board member for multiple companies, and former CHRO of Siemens. You may contact her by email at kugel.janina@advisor.bcg.com.



Marley Finley is a consultant in BCG's New Jersey office. She is also a BCG Henderson Institute ambassador. You may contact her by email at finley.marley@bcg.com.



Dany Bahar is an associate professor of practice of International and Public Affairs at Brown University's Watson Institute, a faculty affiliate of Brown University's Economics Department, and a senior fellow of The Growth Lab at the Harvard Center for International Development. You may contact him by email at dany_bahar@brown.edu.



Hillel Rapoport is a professor at the Paris School of Economics, where he holds the PSE Chair in International Migration Economics. He is also scientific advisor at CEPII and the Luxembourg Institute of Socio-Economic Research. He held visiting positions at Stanford University, Harvard Kennedy School, and at the European University Institute. You may contact him by email at hillel.rapoport@psemail.eu.



Rebekah Smith is the founder and executive director of Labor Mobility Partnerships, where her mission is to create better job opportunities for workers from low-income countries. A practitioner and policy entrepreneur, she has spent a decade leading efforts to expand the scope and quality of migration pathways. You may contact her by email at rsmith@lampforum.org.



BCG

**BCG
HENDERSON
INSTITUTE**