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DIGITAL GLOBALIZATION: THE NEW ERA OF GLOBAL FLOWS

MARCH 2016

HIGHLIGHTS

Broadening participation

Boosting productivity and GDP

Changing the way companies go global

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MGI is led by three McKinsey & Company directors: Richard Dobbs, James Manyika, and Jonathan Woetzel. Michael Chui, Susan Lund, Anu Madgavkar, and Jaana Remes serve as MGI partners. Project teams are led by the MGI partners and a group of senior fellows, and include consultants from McKinsey & Company's offices around the world. These teams draw on McKinsey & Company's global network of partners and industry and management experts. In addition, leading economists, including Nobel laureates, act as research advisers.

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DIGITAL GLOBALIZATION: THE NEW ERA OF GLOBAL FLOWS

MARCH 2016

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PREFACE

The web of global economic connections is growing deeper, broader, and more intricate. Yet much of the public discussion surrounding globalization is stuck on the narrow topic of trade surpluses and deficits. This lens fails to take into account the new and more complex reality of a digitally connected global economy. While the global goods trade and financial flows have flattened since the Great Recession, cross-border flows of data are surging. They now tie the world economy together just as surely as flows of traditional manufactured goods.

Two years ago, the McKinsey Global Institute (MGI) set out to paint a comprehensive picture of how globalization is evolving. The resulting report, *Global flows in a digital age: How trade, finance, people, and data connect the world economy*, assessed the network of cross-border inflows and outflows of trade, services, finance, people, and data and its influence on economic growth. Building on that earlier work, this report provides a more detailed analysis of how global flows are continuing to evolve. It offers new insights into how companies and countries are participating in the web of flows and extends our econometric analysis, drawing on improved data and employing more sophisticated methodology. We find even stronger evidence of the economic value of participating in global flows—and we further find that data flows account for a substantial portion of that impact. Both inflows and outflows matter for growth as they circulate ideas, research, technologies, talent, and best practices around the world.

Today's more digital form of globalization is changing who is participating, how business is done across borders, how rapidly competition moves, and where the economic benefits are flowing. Even though advanced economies in general continue to be the leaders in most flows, the door has opened to more countries, to small companies and startups, and to billions of individuals. Our previous research found the biggest benefits of trade flows go to countries at the center of the global network. Interestingly, this report finds that countries at the periphery of the network of data flows stand to gain even more than those at the center. The convergence of globalization and digitization means that business leaders and policy makers will need to reassess their strategies—and given that we are only in the very early stages of this phenomenon, enormous opportunities are still at stake.

This research was led by James Manyika, a director of the McKinsey Global Institute based in San Francisco; Susan Lund, an MGI partner based in Washington, DC; Jacques Bughin, a McKinsey director based in Brussels who is a core leader of the Firm's High Tech, Telecom, and Media Practice, a current member of the MGI Council, and an incoming director of MGI; and Jonathan Woetzel, an MGI director based in Shanghai. The project team, led by Kalin Stamenov and Dhruv Dhingra, included Laura Cappellin, Ritesh Jain, Ayush Mittal, Katie Ramish, Soyoko Umeno, and Amber Yang. Esteban Arias, Joana Carreiro, Carlos Molina, Moira Pierce, and Vivien Singer provided valuable research and analytics support. Lisa Renaud served as senior editor. Sincere thanks go to our colleagues in operations, design,

production, and external relations, including Tim Beacom, Marisa Carder, Matt Cooke, Deadra Henderson, Richard Johnson, Julie Philpot, Mary Reddy, Rebeca Robboy, Margo Shimasaki, and Patrick White.

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A number of individuals and organizations generously contributed their time, data, and expertise. For their support in surveying startups, we thank: Donna Harris, Patrick McAnaney, Morgan Gress, and Kaitlin Walls of 1776, a global incubator and venture fund dedicated to accelerating innovation in areas of essential human need. We are also grateful to Molly Jackman of Facebook; Usman Ahmed of PayPal; Alan Elias of eBay; Robert Pepper of Cisco; Jarrad Hubbard of TeleGeography; and Uwe Deichmann, Deepak Mishra, and Daria Taglioni of the World Bank. Without them, this report would not have been possible.

This report contributes to MGI's mission to help business and policy leaders understand the forces transforming the global economy, identify strategic locations, and prepare for the next wave of growth. As with all MGI research, this work is independent and has not been commissioned or sponsored in any way by any business, government, or other institution. We welcome your comments on the research at MGI@mckinsey.com.

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IN BRIEF

DIGITAL GLOBALIZATION: THE NEW ERA OF GLOBAL FLOWS

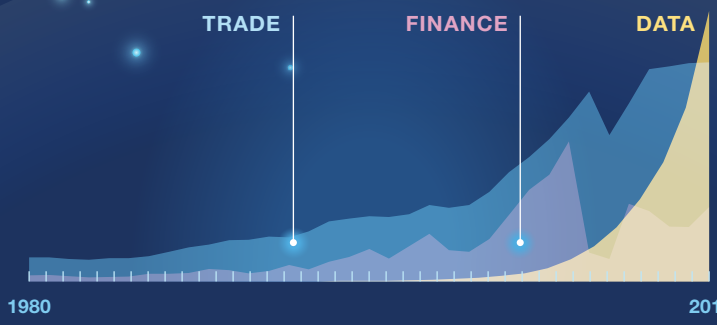
The rapidly growing flows of international trade and finance that characterized the 20th century have flattened or declined since 2008. Yet globalization is not moving into reverse. Instead digital flows are soaring—transmitting information, ideas, and innovation around the world and broadening participation in the global economy.

- The world is more interconnected than ever. For the first time in history, emerging economies are counterparts on more than half of global trade flows, and South-South trade is the fastest-growing type of connection.
- While flows of goods and finance have lost momentum, used cross-border bandwidth has grown 45 times larger since 2005. It is projected to grow by another nine times in the next five years as digital flows of commerce, information, searches, video, communication, and intracompany traffic continue to surge.
- Digital platforms change the economics of doing business across borders, bringing down the cost of international interactions and transactions. They create markets and user communities with global scale, providing businesses with a huge base of potential customers and effective ways to reach them.
- Small businesses worldwide are becoming "micro-multinationals" by using digital platforms such as eBay, Amazon, Facebook, and Alibaba to connect with customers and suppliers in other countries. Even the smallest enterprises can be born global: 86 percent of tech-based startups we surveyed report some type of cross-border activity. The ability of small businesses to reach new markets supports economic growth everywhere.
- Individuals are participating in globalization directly, using digital platforms to learn, find work, showcase their talent, and build personal networks. Some 900 million people have international connections on social media, and 360 million take part in cross-border e-commerce.
- Over a decade, global flows have raised world GDP by at least 10 percent; this value totaled $7.8 trillion in 2014 alone. Data flows now account for a larger share of this impact than global trade in goods. Global flows generate economic growth primarily by raising productivity, and countries benefit from both inflows and outflows.
- The MGI Connectedness Index offers a comprehensive look at how countries participate in inflows and outflows of goods, services, finance, people, and data. Singapore tops the latest rankings, followed by the Netherlands, the United States, and Germany. China has surged from No. 25 to No. 7.
- Although more nations are participating, global flows remain concentrated among a small set of leading countries. The gaps between the leaders and the rest of the world are closing very slowly, but catch-up growth represents a major opportunity for lagging countries. Some economies could grow by 50 percent or more over the long term by accelerating participation.
- Many companies grew more complex and inefficient as they expanded across borders. But digital technologies can tame complexity and create leaner models for going global. This is a moment for companies to rethink their organizational structures, products, assets, and competitors.

Countries cannot afford to shut themselves off from global flows, but narrow export strategies miss the real value of globalization: the flow of ideas, talent, and inputs that spur innovation and productivity. Digital globalization makes policy choices even more complex. Value chains are shifting, new hubs are emerging, and economic activity is being transformed. This transition creates new openings for countries to carve out profitable roles in the global economy. Those opportunities will favor locations that build the infrastructure, institutions, and business environments that their companies and citizens need to participate fully.

The new era of digital globalization

Global flows of trade and finance are flattening, while data flows are soaring



45X
growth in data flows 2005–2014

Digital technologies are changing how business is done across borders and broadening participation

Large multinationals

Attain truly global scale with new markets and suppliers

New strategies for products, assets, organization

SMEs

Use digital platforms to find customers and suppliers abroad

50M on Facebook, 10M on Alibaba, 2M on Amazon

Startups

>80% of tech-based startups are "born global"

Foreign customers, financing, suppliers from day one

Individuals

New ways to work, learn, and communicate across borders

>900M have international connections on social media

Global flows increase economic growth

10%
Increase in world GDP, worth $7.8T in 2014

$2.8T
GDP increase from data flows, larger impact than goods trade

~50%
Potential GDP boost for some countries by increasing participation in global flows

EXECUTIVE SUMMARY

Somewhere in Kenya, a girl logs on for a personalized math lesson from California-based Khan Academy. Thousands of Syrian refugees rely on Facebook updates for the latest information to guide their journey through Europe. A multinational energy giant launches plans to use sensors on 4,000 oil wells around the world to monitor production remotely. A manufacturer in Australia buys components from a Chinese supplier on Alibaba, and a clinical trial in India transmits patient data to US pharmaceutical researchers.

The world has become more intricately connected than ever before. Back in 1990, the total value of global flows of goods, services, and finance amounted to $5 trillion, or 24 percent of world GDP. There were some 435 million international tourist arrivals, and the public Internet was in its infancy. Fast forward to 2014: some $30 trillion worth of goods, services, and finance, equivalent to 39 percent of GDP, was exchanged across the world's borders. International tourist arrivals soared above 1.1 billion. And the Internet is now a global network instantly connecting billions of people and countless companies around the world.

Flows of physical goods and finance were the hallmarks of the 20th-century global economy, but today those flows have flattened or declined. Twenty-first-century globalization is increasingly defined by flows of data and information. This phenomenon now underpins virtually all cross-border transactions within traditional flows while simultaneously transmitting a valuable stream of ideas and innovation around the world.[1]

The shift to a more digital form of globalization changes who is participating, how business is done across borders, and where the economic benefits are flowing.

Digitization changes the economics of globalization in several ways. As digital platforms become global in scope, they are driving down the cost of cross-border communications and transactions, allowing businesses to connect with customers and suppliers in any country. Globalization was once for large multinational corporations, but platforms reduce the minimum scale needed to go global, enabling small business and entrepreneurs around the world to participate. As a result, new types of competitors can emerge rapidly from any corner of the world, increasing pressure on industry incumbents.

More than ever before, companies and countries cannot afford to ignore the opportunities beyond their own borders. Our econometric research indicates that global flows of goods, foreign direct investment, and data have increased current global GDP by roughly 10 percent compared to what would have occurred in a world without any flows. This value was equivalent to $7.8 trillion in 2014 alone. Data flows account for $2.8 trillion of this effect, exerting a larger impact on growth than traditional goods flows. This is a remarkable development given that the world's trade networks have developed over centuries but cross-border data flows were nascent just 15 years ago.

[1] This research builds on the 2014 McKinsey Global Institute report *Global flows in a digital age: How trade, finance, people, and data connect the world economy*.

Global flows support growth by raising productivity and creating more efficient markets with truly global scale. But not all countries are making the most of this potential. Our updated MGI Connectedness Index ranks countries on inflows and outflows of goods, services, finance, people, and data. Advanced economies are still the most globally connected. Although more developing countries are deepening their participation, they are narrowing the gap with the leading advanced economies only very slowly over time.

Accelerating catch-up growth is a major opportunity for the developing world. Our 2014 report showed that countries in the center of trade networks derive more benefit from goods flows than countries with few connections. But our new research shows that data flows offer stronger economic benefits to countries on the periphery of the world's digital networks.

The new age of digital globalization also poses challenges. Companies can enter new markets, but they are exposed to pricing pressures, aggressive global competitors, and disruptive digital business models. Data has to be protected against cybercrime. Students can educate themselves online from anywhere on earth, but their view into other societies can heighten their impatience with bleak job prospects at home. Social media creates global communities but also allows networks of extremists to connect. It will take more international coordination to deal with many of these issues. Today's version of globalization is vastly more complex and fast-paced, but connectedness can be a path to growth.

A NEW ERA OF DIGITAL GLOBALIZATION HAS BEGUN

The world has never been more deeply connected by commerce, communication, and travel than it is today. But the pattern of globalization is shifting. Trade was once dominated by tangible goods and was largely confined to advanced economies and their large multinational companies. Today global data flows are surging, and digital platforms allow more countries and smaller enterprises to participate. This shift has far-reaching implications.

Soaring cross-border data flows now generate more economic value than traditional flows of traded goods.

After a 20-year period of growing roughly twice as fast as the world economy, global flows of goods, services, and finance hit roughly $30 trillion in 2007, peaking at 53 percent of global GDP. But this rapid expansion has stopped in its tracks. Growth in global goods trade has flattened, financial flows have fallen sharply, and trade in services has posted only modest growth. These flows have finally regained their pre-recession levels in terms of dollar value, but they are now just 39 percent of world GDP (Exhibit E1).

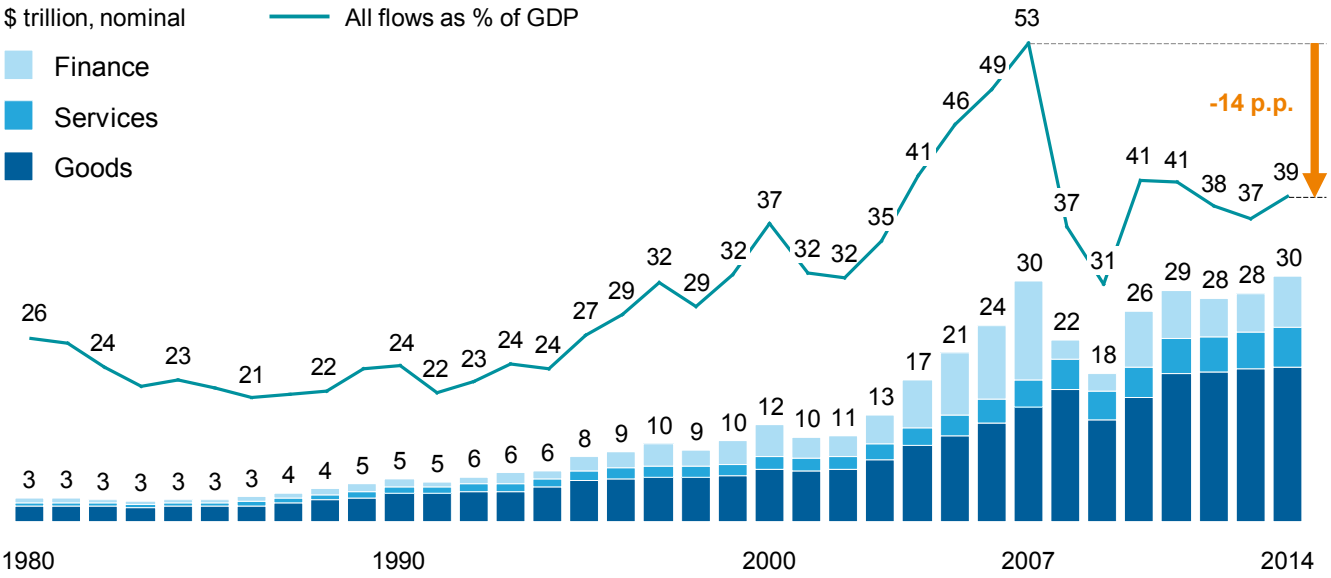
Many observers point to this trend as evidence that globalization has stopped.[2] We have a different view: globalization has instead entered a new era defined by data flows that transmit information, ideas, and innovation. Digital platforms create more efficient and transparent global markets in which far-flung buyers and sellers find each other with a few clicks. The near-zero marginal costs of digital communications and transactions open new possibilities for conducting business across borders on a massive scale.

[2] See, for example, David Smick, "Could globalization crack up?" *International Economy*, fall 2012; Joshua Cooper Ramo, "Globalism goes backward," *Fortune*, November 20, 2012; and Jeffrey Rothfeder, "The great unraveling of globalization," *Washington Post*, April 24, 2015.

Exhibit E1

After 20 years of rapid growth, traditional flows of goods, services, and finance have declined relative to GDP

Flows of goods, services, and finance, 1980–2014



SOURCE: UNCTAD; IMF Balance of Payments; World Bank; McKinsey Global Institute analysis

Traditional flows of goods, services, and finance have flattened

For two decades, the world's trade in goods (including commodities, finished goods, and intermediate inputs) grew roughly twice as fast as global GDP as major multinationals expanded their supply chains and established new bases of production in countries with low-cost labor. Global trade in goods soared from 13.8 percent of world GDP in 1986 to 26.6 percent in 2008 on the eve of the Great Recession. After a sharp decline and short-lived rebound, however, the goods trade has been growing more slowly than world GDP in recent years, puzzling economists and business leaders alike. Some of this decline is cyclical. Our analysis suggests that weak demand and plummeting prices for commodities account for nearly three-quarters of the decline in trade.

But trade in both finished and intermediate manufactured goods has also declined, thanks to several structural forces. The makers of many finished goods are beginning to place less importance on labor costs and more on speed to market and non-labor costs. As a result, some production is moving closer to end consumers. Trade is also declining for many intermediate goods such as chemicals, paper, textile fabrics, and communications and electrical equipment. This suggests that global value chains may be shortening, at least in part because of the cost of managing complex, lengthy supply chains.

In the decade ahead, the global goods trade may continue to decline relative to world GDP. At a minimum, it is unlikely to resume rapid growth. Not only are factor costs changing, but 3D printing and other technologies also have the potential to transform how—and where—goods such as electronics, vehicle parts, other transportation equipment, machinery and electrical equipment, medical instruments, and apparel are produced.

Cross-border financial flows—which include lending, foreign direct investment (FDI), and purchases of equities and bonds—link together national financial markets, connecting borrowers and savers from different countries. They grew from $0.5 trillion in 1980 (4.1 percent of global GDP) to $11.9 trillion in 2007 (20.7 percent of global GDP). But 2007 proved to be the height of a global credit bubble. Since then financial flows have fallen to less

than half their previous value ($5.2 trillion in 2014); they are only one-third as high relative to global GDP.[3] A decline in cross-border lending accounts for the majority of the overall drop in financial flows and may reflect a return to long-term trend. But other types of portfolio investment and FDI have also fallen, raising concerns about financing for emerging markets.

Accelerating flows of data and information are changing the dynamics of globalization

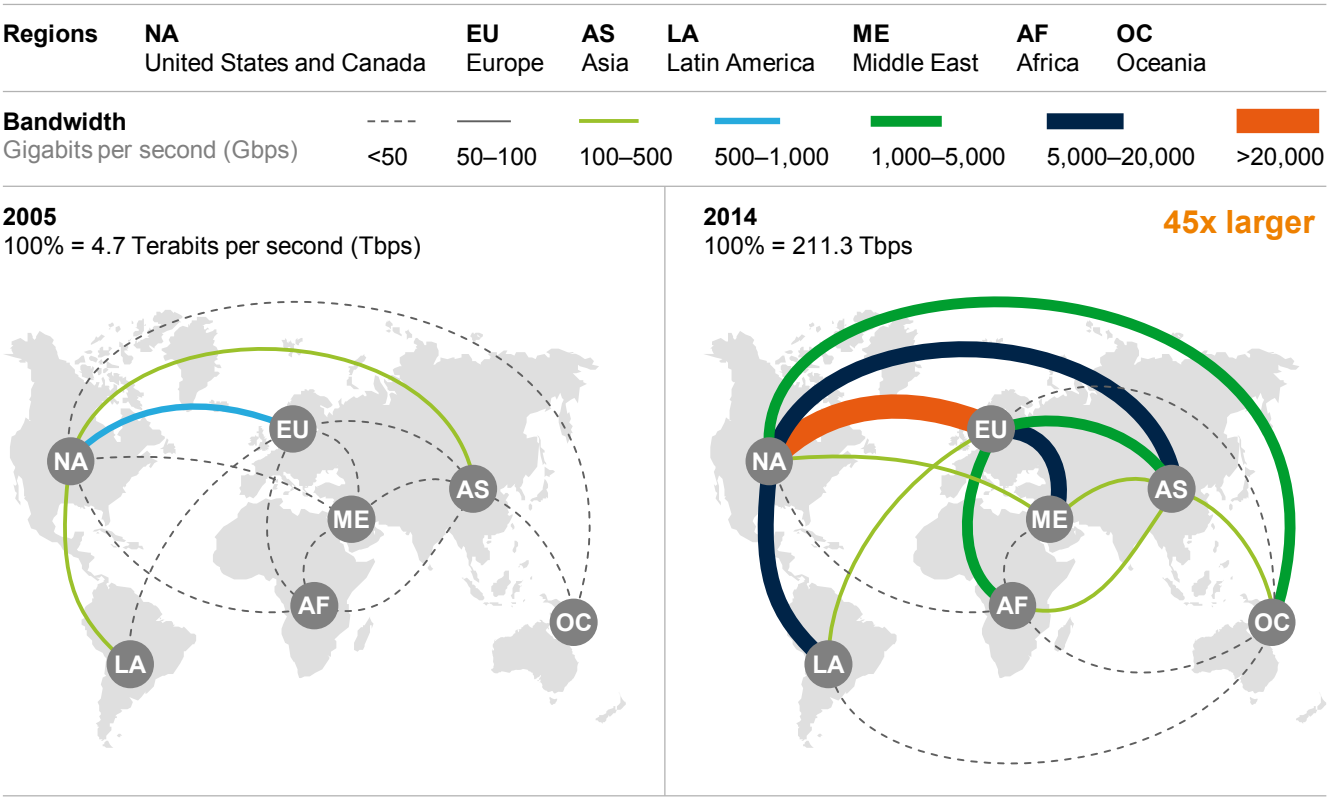
While global flows of trade and finance have lost momentum, the volume of data being transmitted across borders has surged, creating an intricate web that connects countries, companies, and individuals (Exhibits E2 and E3).[4]

Global flows of data primarily consist of information, searches, communications, transactions, video, and intracompany traffic. They underpin and enable virtually every other kind of cross-border flow. Container ships still move products to markets around the world, but now customers order them online, track their movement using RFID codes, and pay for them via digital transactions. Although videos use a majority of Internet bandwidth, the Internet of Things and other business applications are gaining importance. Indeed, Cisco estimates that machine-to-machine connections will account for more than 40 percent of global devices and connections by 2019.[5]

Exhibit E2

Cross-border data flows are surging and connecting more countries

Used cross-border bandwidth



NOTE: Lines represent interregional bandwidth (e.g., between Europe and North America) but exclude intraregional cross-border bandwidth (e.g., connecting European nations with one another).

SOURCE: TeleGeography, Global Internet Geography; McKinsey Global Institute analysis

[3] *Financial globalization: Retreat or reset?* McKinsey Global Institute, March 2013.
[4] To measure these flows, we track used cross-border bandwidth, which is highly correlated with Internet traffic.
[5] Cisco Visual Networking Index: Forecast and methodology, 2014–2019, Cisco, May 2015.

Exhibit E3

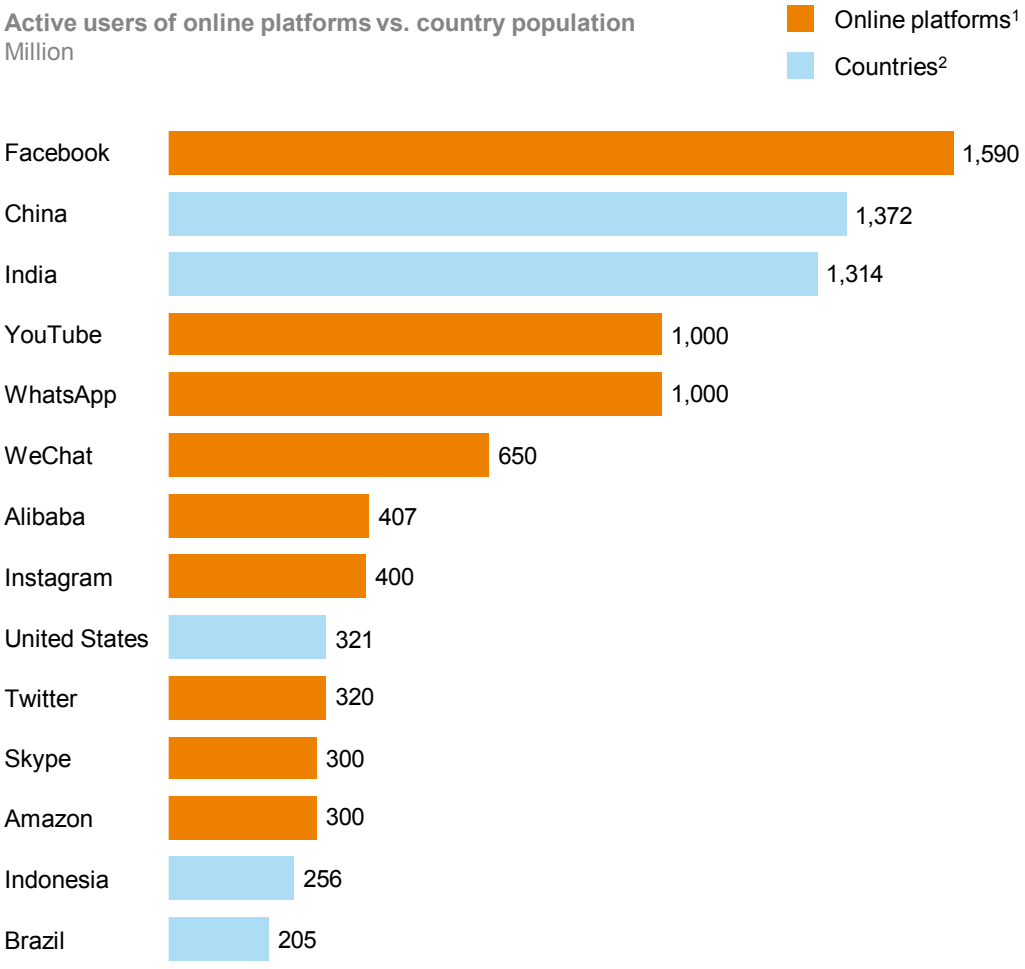
Globalization: Then vs. now

20TH CENTURY	21ST CENTURY
Tangible flows of physical goods	Intangible flows of data and information
Flows mainly between advanced economies	Greater participation by emerging economies
Capital- and labor-intensive flows	More knowledge-intensive flows
Transportation infrastructure is critical for flows	Digital infrastructure becomes equally important
Multinational companies drive flows	Growing role of small enterprises and individuals
Flows mainly of monetized transactions	More exchanges of free content and services
Ideas diffuse slowly across borders	Instant global access to information
Innovation flows from advanced to emerging economies	Innovation flows in both directions

Digital platforms are key to this new era of globalization. Over the past two decades, the largest corporations built their own digital platforms to manage suppliers, connect to customers, and enable internal communication and data sharing for employees around the world. But a diverse set of public Internet platforms has emerged to connect anyone, anywhere. These include operating systems, social networks, digital media platforms, e-commerce websites, and all kinds of online marketplaces. Their use of automation and algorithms drives the marginal costs of adding new interactions practically to zero, allowing the biggest platforms to support hundreds of millions of global users (Exhibit E4). Now users can more easily see details on products, services, prices, and alternative choices. This removes some information asymmetries so that markets function more efficiently, although it can disrupt some intermediaries in the process.

Exhibit E4

The biggest online platforms have user bases on par with the populations of the world's biggest countries



1 4Q15 or latest available.
2 2015 population.

SOURCE: Facebook; Twitter; Alibaba; *Fortune*; Statista; Population Reference Bureau; McKinsey Global Institute analysis

12%
of the global goods trade is e-commerce

Approximately 12 percent of the global goods trade is conducted via international e-commerce, with much of it driven by platforms such as Alibaba, Amazon, eBay, Flipkart, and Rakuten. Beyond e-commerce, digital platforms for both traditional employment and freelance assignments are beginning to create a more global labor market.[6] Some 50 percent of the world's traded services are already digitized.[7]

Digitization also enables instantaneous exchanges of virtual goods. E-books, apps, online games, MP3 music files and streaming services, software, and cloud computing services can all be transmitted to customers anywhere in the world there is an Internet connection. Many major media websites are shifting from building national audiences to global ones; a range of publications, including *The Guardian*, *Vogue*, BBC, and BuzzFeed, attract more than half of their online traffic from foreign countries. By expanding its business model from mailing DVDs to selling subscriptions for online streaming, Netflix has dramatically broadened its international reach to more than 190 countries. While media, music, books, and games represent the first wave of digital trade, 3D printing could eventually expand digital commerce to many more product categories.

Finally, "digital wrappers" are digital add-ons that enable and raise the value of other types of flows. Logistics firms, for example, use sensors, data, and software to track physical shipments, reducing losses in transit and enabling more valuable merchandise to be shipped and insured. Online user-generated reviews and ratings give many individuals the comfort level needed to make cross-border transactions, whether they are buying a consumer product on Amazon or booking a hotel room halfway around the world on Airbnb, Agoda, or TripAdvisor.

DIGITIZATION IS MAKING GLOBAL FLOWS MORE INCLUSIVE

Globalization was once driven almost exclusively by governments, large multinational corporations, and major financial institutions. Today artisans, entrepreneurs, app developers, freelancers, small businesses, and even individuals can participate directly on digital platforms with global reach.

SMEs can be micro-multinationals, and digital startups are born global

Small and medium-sized enterprises (SMEs) worldwide are using the "plug-and-play" infrastructure of Internet platforms to put themselves in front of an enormous global customer base and become exporters. Amazon, for instance, now hosts some two million third-party sellers. In countries around the world, the share of SMEs that export is sharply higher on eBay than among offline businesses of comparable size. PayPal enables cross-border transactions by acting as an intermediary for SMEs and their customers. Participants from emerging economies are senders or receivers in 68 percent of cross-border PayPal transactions. Microenterprises and projects in need of capital can turn to platforms such as Kickstarter, where nearly 3.3 million people representing nearly all countries made pledges in 2014.

Facebook estimates that 50 million SMEs are on its platform, up from 25 million in 2013; on average 30 percent of their fans are from other countries. To put this number in perspective, consider that the World Bank estimated there were 125 million SMEs worldwide in 2010. For small businesses in the developing world, digital platforms are a way to overcome constraints in their local markets. The ability of SMEs to reach global audiences supports economic growth everywhere.

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6 *A labor market that works: Connecting talent with opportunity in the digital age*, McKinsey Global Institute, June 2015.

7 Daniel Castro and Alan McQuinn, *Cross-border data flows enable growth in all industries*, Information Technology and Innovation Foundation, February 2015.

The increasing globalization of small businesses is starting to show up in national statistics. It is most clearly seen in the United States, where the share of exports by large multinational corporations dropped from 84 percent in 1977 to 50 percent in 2013. Among SMEs that export, the smallest (those with fewer than 50 employees) are gaining share the fastest. An analysis of export data for 16 OECD countries shows mixed evidence, with the SME share of total exports growing in ten of the countries.[8]

86%
of surveyed startups report at least one cross-border activity

Even new startups can form global connections and market to international customers from their inception. We surveyed 271 startups worldwide through a partnership with 1776, a global incubator and venture fund. By working with 1776 and its Startup Federation program, we were able to expand the reach of the survey to 19 countries. While these startups represent a more tech-savvy cross-section than the broader universe of entrepreneurs, the results show that even the smallest and youngest enterprises can execute a global vision if their business model is built on digital technologies. A surprising 86 percent of survey respondents pointed to at least one cross-border activity. Almost two-thirds have customers or users in other countries, and almost half reported sourcing talent from other countries.

Individuals can participate directly in globalization, with significant economic impact

Thanks to social media and other Internet platforms, individuals are forming their own cross-border connections. We estimate that 914 million people around the world have at least one international connection on social media, and 361 million participate in cross-border e-commerce (Exhibit E5). These figures are growing rapidly. On Facebook, 50 percent of users now have at least one international friend. This share is even higher—and growing faster—among users in emerging economies.

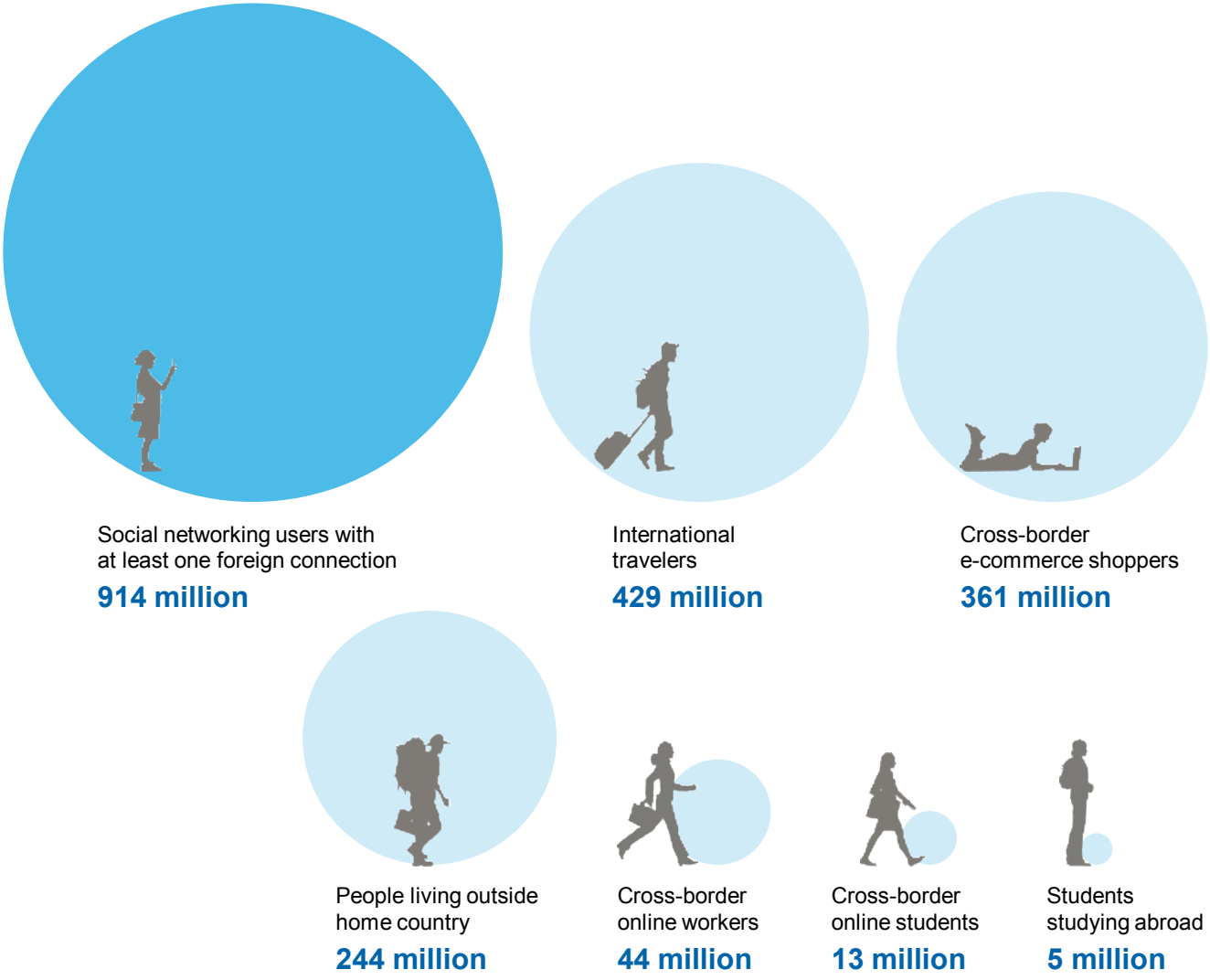
The business and economic implications of individual participation are significant. Digital platforms provide a huge built-in base of potential customers and effective ways to market to them directly. As social media exposes consumers from around the world to what is available, products can go viral on a scale that has never been seen before. In 2015, Adele's song "Hello" racked up 50 million views on YouTube in its first 48 hours, and her album *25* sold a record 3.38 million copies in the United States in its first week alone, more than any other album in history. In 2012, Michelle Obama wore a dress from British online fashion retailer ASOS in a photo that was retweeted 816,000 times and shared more than four million times on Facebook; it instantly sold out.

Digital platforms offer individuals new ways to learn, collaborate, and acquire new skills—and then to showcase their talents to potential employers. Some 44 million people around the world find freelance work on Freelancer.com, Upwork, and other digital platforms; nearly 400 million have posted their professional profiles on LinkedIn. Individuals with creativity and drive can propel themselves onto a global stage in ways that would have been unimaginable in the pre-digital world. A number of previously unknown singers have been discovered after posting videos on YouTube. The Weeknd, spotted on YouTube by Drake, dominated the Billboard charts in 2015 and recently earned an Oscar nomination for best original song.

[8] Some countries where SME share of exports declined were those suffering from a post-crisis credit crunch, such as Portugal.

Exhibit E5

Individuals are participating in globalization, and 914 million have cross-border social media connections



NOTE: Numbers adjusted to account for overlap between platforms and for individuals making multiple international trips in the same year.

SOURCE: Facebook; AliResearch; US Department of Commerce; OECD; World Bank; McKinsey Global Institute analysis

GLOBAL FLOWS DRIVE ECONOMIC GROWTH, BUT COUNTRY PARTICIPATION IS UNEVEN

In this report, we set out to develop more robust estimates of whether global flows contribute to economic growth, using an expanded and improved data set and more sophisticated statistical methods than in our last report on this topic, in 2014.[9] We find even stronger evidence that global flows increase GDP in the long term by raising productivity and that data flows have as much impact as goods trade. But we also find that country participation varies widely, and every type of flow remains dominated by a small group of leading countries. There is enormous value at stake for lagging countries in catching up.

[9] We first test for cointegration in the data and then use an error-correction econometric model. Our data cover 1995–2013 and 97 countries. See the technical appendix for a comprehensive discussion of the econometric model, different statistical tests, and the variables and data used.

Global flows raised world GDP growth by 10 percent, or $7.8 trillion, in 2014 alone

Our econometric analysis finds robust evidence that global flows of goods, FDI, people, and data contribute structurally to economic growth by increasing productivity.[10] It breaks new ground by testing the impact of all types of flows together, both inflows and outflows, and considering how countries are positioned in each web of flows.

Our results indicate that over a decade, global flows have raised world GDP by roughly 10 percent over what would have resulted in a world in without any flows. In 2014 alone, they generated roughly $7.8 trillion in value. Flows of goods and FDI account for about half of this impact, while data flows, the hallmark of 21st-century globalization, account for $2.8 trillion. All types of global flows boost productivity growth, and data flows additionally appear to increase the amount of labor and capital used in the economy.

We also examine how a country's position in the network of flows affects the benefits it receives. Countries in the center of the global network of goods trade benefit more than those at the periphery. The network of cross-border data flows, by contrast, is still rather new and less dense. The United States and Europe are at the center of the world's digital networks, facilitating links to other countries. But we find that countries at the periphery of this digital network stand to gain even more than those at the center. For economies that have been relatively disconnected, the arrival of new digital platforms and cross-border data flows can be transformational.

We find strong evidence that global flows increase GDP over the long term by raising productivity. Both inflows and outflows matter for growth.

Overall, our analysis underscores the value of connectedness—and the benefits are much broader and more nuanced than a simple accounting of net exports can capture. Countries that participate in global flows gain exposure to ideas, research, technologies, talent, and best practices from around the world. The most connected economies can draw on these flows to enhance their own competitiveness, innovation, and efficiency, positioning themselves to take advantage of growth opportunities in global markets. However, countries also need to have supporting institutions and policies in place to realize this potential.

Although more countries are participating, global flows remain concentrated among a relatively small group of leading countries

Today global connections link a larger and more diverse range of countries than ever. For the first time in history, emerging economies are counterparts on more than half of global trade flows, and South-South trade between these countries is the fastest-growing type of connection. The value of traded goods and services plus financial flows exceeded 80 percent of GDP for only 72 countries (mainly developed ones) in 1990; by 2014, that was true for 121 countries. But while more countries are participating in global flows, their level of participation varies widely.

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[10] We include only the FDI component of total financial flows, since those have been shown by other research to be correlated with GDP growth. The impact of other forms of financial flows on growth is mixed. We do not include service flows in our econometric analysis because they are highly correlated with FDI and with goods trade.

The MGI Connectedness Index offers a comprehensive look at how countries participate in inflows and outflows of goods, services, finance, people, and data (Exhibit E6).[11] Our index takes into account the size of each flow for a country relative to its own GDP or population (flow intensity) as well as its share of each total global flow. Combining these measures avoids making large and diversified economies appear closed simply due to the extent of economic activity taking place within their own borders.

Singapore, a small country that punches far above its weight in all types of global flows, tops this year's rankings. It is followed by the Netherlands (one of Europe's main digital hubs), the United States, Germany, Ireland, and the United Kingdom. China's surge is particularly noteworthy; it has climbed from 25th in our previous index to the No. 7 spot.

However, the world is still far from fully globalized. Advanced economies in general remain more connected than developing countries, and the top countries have far higher connectedness scores than the rest of the world Exhibit E7). All types of flows are concentrated among a small set of countries. The top 15 countries in traded goods account for 63 percent of the global total; that share is 62 percent in services and 79 percent in FDI.

We use statistical tests of convergence to see if the gaps between country participation in global flows are closing over time. Our results indicate that lagging countries are catching up to leading countries—but extremely slowly, given that the global flows of leading countries continue to rise. At current trends, cutting the gap in half would take eight years in the goods trade and 13 years in FDI flows. For data flows, we do not see any sign that laggards are catching up to leaders, perhaps reflecting that digitization has a long way to go in all countries and it is a relatively young phenomenon.

Lagging countries could realize tremendous growth potential by accelerating their participation in well-targeted ways. We find that countries in the top quartile increased their flow of goods relative to GDP at an average of 3 percent annually, for example, while goods flows grew at only 1 percent for the bottom quartile. The top-quartile countries increased FDI flows by 5 percent of GDP annually during this period, while those flows shrank by 8 percent annually for countries in the bottom quartile. If countries in the bottom three quartiles had increased participation in flows at the same rate as the top quartile over the past decade, global GDP would be an additional $10 trillion, or 13 percent, higher today. In other words, limited participation in global flows by many countries had a real cost to the world economy. For some individual countries, GDP would be more than 50 percent higher today.

Countries have taken different routes to become more globally connected. Top-ranked Singapore emerged decades ago as Southeast Asia's global shipping hub. It subsequently mapped out an explicit strategy to become a regional hub for finance and services by attracting skilled international talent and establishing incentives and promotional efforts to attract FDI. The Netherlands is a major hub for Europe's data traffic as well as a port for traded goods. Like Ireland, it has created tax and regulatory regimes to attract many subsidiaries, headquarters, and holding companies for multinational corporations. In contrast, the United States and Germany both follow a generalist model with strength across all five flows. The United Kingdom also has broad participation across flows, with a spike in cross-border service and financial flows, a reflection of London's role as a global financial hub.

[11] Several other indexes measure the degree to which countries are connected to global activity, although they use different data and weighting. These include the DHL Global Connectedness Index produced by Pankaj Ghemawat and Steven A. Altman and globalization indexes from Ernst & Young, A. T. Kearney, and the Swiss Economic Institute. See, for example, Pankaj Ghemawat and Steven A. Altman, *Depth Index of Globalization 2013: And the big shift to emerging economies*, IESE Business School, University of Navarra, 2013.

Exhibit E6

MGI Connectedness Index

Country connectedness index and overall flows data, 2014
Rank of participation by flow as measured by flow intensity and share of world total

Connectedness index rank 1–10 11–25 26–50 >50 **Flow intensity** 100+ 70–99 <70

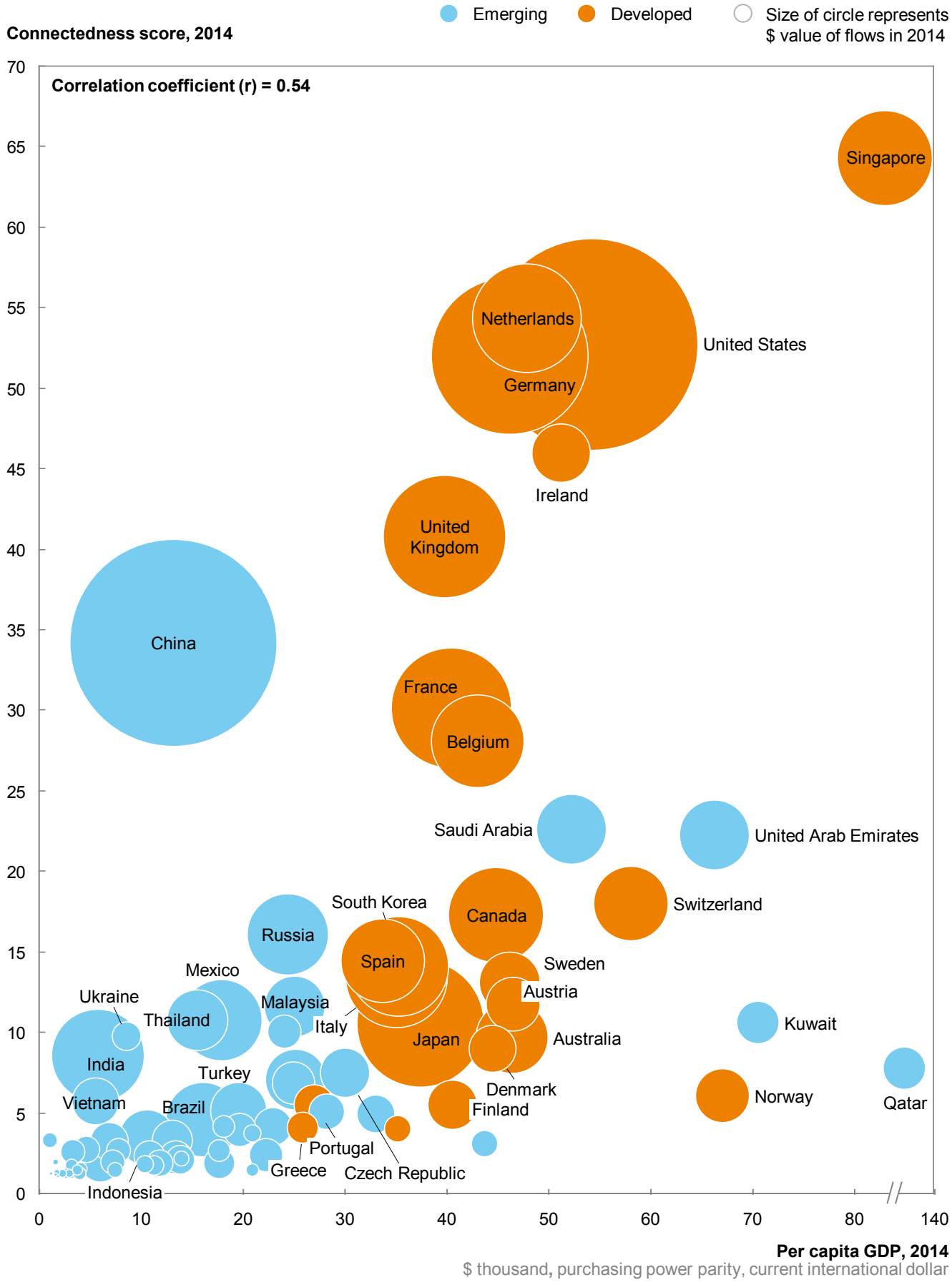
Rank	Country	Score	Connectedness Index rank					Flow value[1] $ billion	Flow intensity[2] % of GDP
			Goods	Services	Finance	People	Data		
1	Singapore	64.2	1	2	2	12	6	1,392	452
2	Netherlands	54.3	3	3	6	21	1	1,834	211
3	United States	52.7	7	7	3	1	7	6,832	39
4	Germany	51.9	2	4	8	3	2	3,798	99
5	Ireland	45.9	32	1	1	28	9	559	227
6	United Kingdom	40.8	13	5	5	6	3	2,336	79
7	China	34.2	4	16	4	82	38	6,480	63
8	France	30.1	11	8	9	7	4	2,262	80
9	Belgium	28.0	5	6	33	33	8	1,313	246
10	Saudi Arabia	22.6	20	28	27	2	53	790	106
11	United Arab Emirates	22.2	6	23	17	4	46	789	196
12	Switzerland	18.0	12	11	10	17	13	848	115
13	Canada	17.3	16	22	11	11	18	1,403	79
14	Russia	16.1	21	25	18	5	25	1,059	57
15	Spain	14.4	25	13	19	14	16	1,105	79
16	Korea	14.0	8	12	28	50	44	1,510	107
17	Italy	13.4	17	18	24	16	19	1,587	74
18	Sweden	13.0	29	14	22	31	5	572	100
19	Austria	11.7	26	17	31	20	12	470	108
20	Malaysia	11.6	9	19	25	26	43	610	187
21	Mexico	10.7	14	63	34	18	41	1,022	80
22	Thailand	10.7	10	15	36	44	64	605	162
23	Kuwait	10.6	37	46	13	13	75	306	153
24	Japan	10.5	15	20	12	81	20	2,498	54
25	Kazakhstan	10.0	48	73	41	8	57	176	83
26	Ukraine	9.8	38	39	87	10	34	133	101
27	Australia	9.7	30	34	21	15	33	825	57
28	Denmark	8.9	35	9	32	41	11	369	108
29	Jordan	8.8	73	50	75	9	83	50	138
30	India	8.5	24	10	35	58	70	1,316	64
32	Czech Republic	7.5	18	33	57	59	15	397	193
34	Poland	7.0	23	31	47	34	22	585	107
35	Hungary	6.8	22	30	26	62	17	287	209
36	Norway	6.0	36	24	20	46	24	458	92
37	Vietnam	5.7	19	54	45	103	61	350	188
39	Finland	5.5	46	27	23	70	10	390	144
40	Portugal	5.5	47	36	30	23	31	255	111
41	Turkey	5.1	28	40	53	38	29	521	65
43	Israel	4.9	51	32	49	24	56	248	82
44	Brazil	4.5	41	38	14	125	30	869	37
45	Chile	4.1	45	58	16	102	27	239	92
47	Greece	4.1	60	29	54	35	42	160	67
48	New Zealand	3.9	67	48	61	25	51	130	63
51	Indonesia	3.4	31	49	38	106	76	504	57
53	South Africa	3.3	34	57	52	64	80	277	79
54	Philippines	3.2	54	41	44	52	67	230	81
64	Morocco	2.6	58	43	74	56	65	104	97
73	Egypt	2.2	68	42	69	73	71	158	55
83	Nigeria	1.9	55	76	48	128	98	268	47
86	Peru	1.8	62	88	51	104	49	122	60
118	Kenya	1.3	100	84	127	119	91	35	58

1 Flows value represents total goods, services, and financial inflows and outflows.
2 Flow intensity represents the total value of goods, services, and financial flows as a share of the country's GDP.

SOURCE: McKinsey Global Institute analysis

Exhibit E7

A small group of leading countries are much more connected than the rest of the world



SOURCE: IMF; McKinsey Global Institute analysis

Although our report mainly assesses the global connectedness of countries, nation-states are not the only lens through which to observe globalization. Cities, regions within countries, and broader blocs of countries are connecting with the global economy in myriad ways and to varying degrees. For instance, our previous report found that the world had only eight truly "global cities" with strong connections in at least four of the five major flows: New York, London, Tokyo, Los Angeles, San Francisco, Singapore, Hong Kong, and Dubai. This year Tokyo drops off the list due to a decline in goods trade, while Shanghai takes its place.

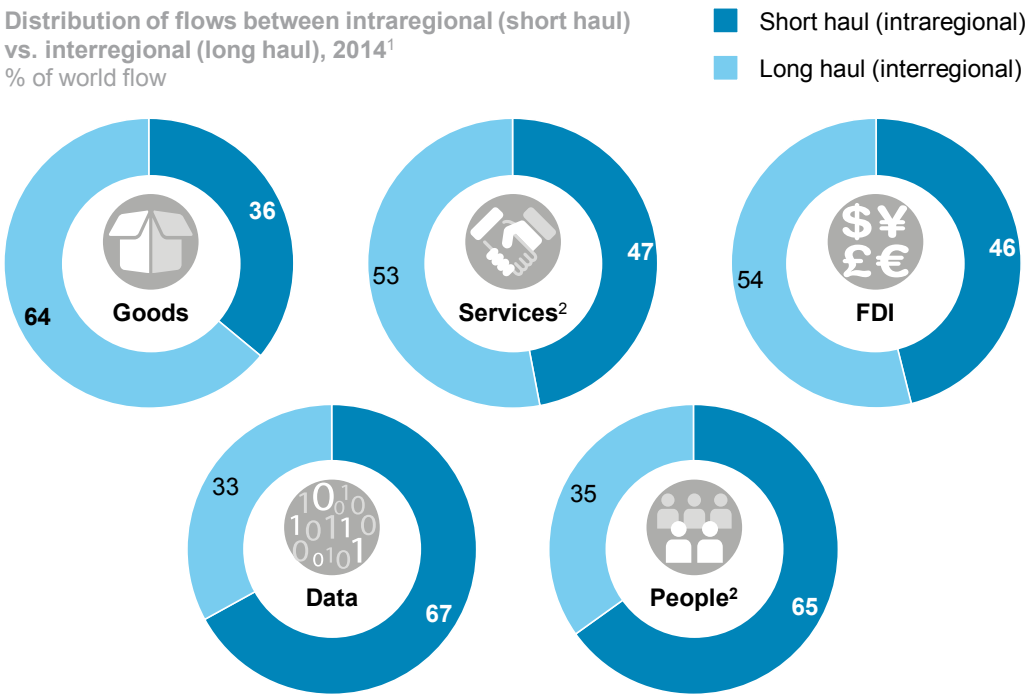
Within countries there can be very different patterns of globalization. In the United Kingdom and Germany, for instance, the variation across regions is modest. China, by contrast, has a handful of highly connected coastal provinces and largely unconnected inland provinces. Some highly connected states and provinces rank as economic powerhouses in their own right: China's booming province of Guangdong would rank sixth globally in terms of goods flows, while California would rank fourth in the world for people flows.

We also look at the patterns of trade among neighbors and trading blocs. Europe is the most integrated region; more than 60 percent of its trade in goods is intraregional. But the corresponding shares are sharply lower in Africa, Latin America, and South Asia. This indicates a significant opportunity for developing countries to increase their participation in flows by trading with their neighbors (Exhibit E8).

Exhibit E8

While much of the world's trade in goods is long distance, roughly half or more of other global flows move within the same region

Distribution of flows between intraregional (short haul) vs. interregional (long haul), 2014[1]
% of world flow



1 For goods, services, FDI, and travelers we have divided the world into 10 regions; for data flows we have used TeleGeography's six regions.
2 Distribution of services flows for 2014 estimated based on 2011 data; 2013 bilateral traveler data used for people flows.
NOTE: Numbers may not sum due to rounding.

SOURCE: UNCTAD; UN World Tourism Organization; TeleGeography, Global Internet Geography; IMF; McKinsey Global Institute analysis

COMPANIES MAY NEED TO REINVENT THEMSELVES TO WIN IN A DIGITAL GLOBAL MARKETPLACE

The new era of digital globalization offers unprecedented opportunities for companies to achieve both global scale and efficiency, but it also calls for reevaluating existing strategies, business models, and operations. Business leaders in all industries should consider the following issues:

- **Do your footprint and organizational structure make sense in a more digital world?** As companies expanded across borders, many encountered a "globalization penalty" due to the costs of rising complexity.[12] But now digital technologies allow companies to globalize in a leaner way. Digital tools for remote collaboration and instant communication mean that it is possible to centralize some global functions, such as back-office operations or R&D; to create virtual global teams that span borders; or even to forgo having one global headquarters location. Digitization is also enabling business models that are less capital-intensive. Rather than establishing a large physical presence in many countries, some companies focus local offices on sales and marketing only. Those that deliver digital goods and services can enter new international markets without establishing a physical presence at all.

- **Should you offer one brand and one product line around the world, or customize for local markets?** In some industries, product tailoring is driven by local regulatory requirements or language differences. In others, companies that sell into many global markets have expanded their product portfolios to appeal to local consumer preferences and price points. But others take a different approach: offering products that are the same everywhere in the world. Apple, for instance, offers just three models of its iPhone and iPad, all with consistent design and branding wherever they are sold. Facebook, Uber, and Airbnb have simply scaled up their digital platforms in country after country with limited customization. Many global automakers are attempting to strike a balance by whittling down the number of platforms used across their international manufacturing operations (that is, using fewer underlying designs that can be customized by swapping certain components to create differentiated models). The media and consumer technology industries are shifting to simultaneous global product launches, since consumers around the world can see instantaneously what is offered in other countries.

- **Do you have the right suppliers and customer channels?** Digital tools can orchestrate a multitude of vendors around the globe with greater precision and efficiency. But even as technology enables more complex global value chains, the importance of different factor costs is shifting. Until relatively recently, many companies were willing to fully outsource manufacturing and other functions to locations with low-cost labor. Today many are reevaluating those decisions and giving greater weight to energy prices, distance to market, infrastructure, ease of doing business, and risk. According to a recent UPS survey, approximately one-third of high-tech companies are moving manufacturing or assembly closer to end-user markets; this number is up by 25 percentage points from 2010.[13] As China's labor costs rise and the country moves into higher-value-added industries, more of the world's manufacturing business is up for grabs. Businesses will have to consider whether their suppliers and customer channels should change.

[12] Martin Dewhurst, Jonathan Harris, and Suzanne Heywood, "Understanding your 'globalization penalty,'" *McKinsey Quarterly*, July 2011.

[13] *Change in the (supply) chain*, United Parcel Service, 2015.

- **Do you have the right assets to compete digitally and globally?** Building digital platforms, online customer relationships, and data centers may be critical for a growing range of companies, far beyond the Internet giants. GE, for example, is transforming its core manufacturing capabilities to establish itself as a leader in Internet of Things technology. Businesses in all industries need to take a fresh look at their assets, including customer relationships and market data, and consider whether there are new ways to monetize them. Alibaba has a vast pool of transactional data on the vendors that operate on its platform, and it has built on it to move into new areas such as mobile payments and small business financing. The insurance industry could similarly harness its sophisticated data pools on different forms of risk to create new products and services.

- **Are you ready for a new era of digitally accelerated global competition?** Competition is intensifying and product cycles are shortening due to the confluence of three trends. First, emerging-market giants are going global. Many of them are aggressive, deep-pocketed, and able to operate with different time horizons and financial targets. By 2025, MGI estimates that companies headquartered in emerging markets will make up 45 percent of the global Fortune 500, up from 26 percent today.[14] Second, tech companies are expanding into new industries. Some of the truly disruptive players are siphoning value out of industries and giving it away for free to consumers as a way to build their positions. Finally, the largest Internet platforms allow millions of SMEs and startups to go head-to-head with incumbents. These new forms of competition have unleashed pricing pressures and industry disruptions. The Internet and international competition have cut into the window of exclusivity companies once enjoyed on new products and services; "copycat" versions can be launched in new markets even before the originator has time to scale up. It is more important than ever to stay alert to new competitive threats.

- **Are you prepared for new risks?** As the world grows more dependent on information systems, the private sector is also becoming more vulnerable to cyberattacks. It is difficult to stay ahead of increasingly sophisticated hackers, but companies can prioritize their information assets, test continuously, and work with frontline employees to emphasize basic protective measures. If a breach does occur, a decisive and forthright response from marketing, public affairs, and customer service functions can be critical to restoring customer trust.[15] Maintaining data security has to be a top priority for CEOs in every industry.

POLICY MAKERS FACE A NEW WORLD OF CHALLENGES

Countries cannot afford to shut themselves off from global flows, given the value at stake in raising productivity and long-term GDP growth. Pursuing this opportunity requires a new policy agenda that includes the issues outlined below.

- **Thinking strategically about the role your country can play.** Policy makers should carefully consider how to build on their country's comparative advantages. Many countries are trying to develop the next Silicon Valley, but innovation is notoriously difficult to orchestrate. Meanwhile, developing nations may face a shrinking opportunity to become low-cost manufacturers for the world as automation advances. But other opportunities exist. Some countries can build on their geographic proximity to major consumer markets, as Mexico and Eastern Europe have done. Others may develop a successful niche as global transit hubs, as Dubai has done in transportation and trade flows. Other countries have targeted a particular flow or industry to cultivate,

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[14] See *Playing to win: The new global competition for corporate profits*, McKinsey Global Institute, September 2015, and *Urban world: The shifting global business landscape*, McKinsey Global Institute, October 2013.

[15] *Risk and responsibility in a hyperconnected world: Implications for enterprises*, McKinsey & Company and the World Economic Forum, January 2014.

perhaps building on pools of talent within their borders (as India has done with business process outsourcing).

- **Addressing policy and administrative barriers that hinder global flows.** Pursuing bilateral and multilateral trade partnerships is the cornerstone of a more open approach. Another important step is removing import tariffs, quotas, and subsidies for national industries, all of which can introduce distortions. Other types of legal and administrative barriers also have to be dismantled to make the most of global flows; these may include limitations on foreign business ownership and investment, import licensing, regulatory requirements that deviate from international norms, and limits on immigration. The Association of South East Asian Nations (ASEAN), for instance, has largely eliminated import tariffs among its ten member states, but its ongoing effort to build a seamless trading bloc involves harmonizing product standards, certification procedures, customs requirements, and cross-border regulations covering traded services and the movement of labor.[16]

- **Addressing dislocations.** Even though their net global effect is ultimately positive, global flows can cause job losses and displacement in the short run. Governments have to consider these trade-offs and open to global flows at a pace their economies and societies can absorb. Few countries have adequately supported the workers and communities affected by exposure to international competition and disruptive business models. But these workers will need a clearer path to new roles—and the societal cost of neglecting this issue grows over time. It will take a much more proactive response to ensure that labor markets and training systems can deal with rapid change.

- **Investing in human capital.** The Internet can promote inclusiveness, but only if education and training systems provide language fluency, basic digital literacy, and other skills so that individuals can take advantage of the opportunities. Investment in human capital development will be a critical determinant of which nations come out on top.

- **Building the necessary infrastructure and closing the digital divide.** Even in a more digital world, roads, ports, airports, and rail remain vital as the conduits of trade and mobility. But today any list of infrastructure priorities also has to include universal, affordable Internet access. At the end of 2015, 57 percent of the world's population, or four billion people, remained offline, and only 15 percent had access to broadband.[17] The value of connecting these people is significant. Our own econometric analysis shows that countries with higher Internet penetration reap up to 25 percent more benefit from cross-border data flows than those with limited Internet penetration.

- **Creating a strong business and institutional environment.** A recent World Bank report finds that in many developing countries, the economic benefits of digital technologies have been limited by a lack of strong fundamentals such as education and good governance.[18] To capture the full growth potential of digital globalization, countries need to cultivate a healthy business environment that nurtures startups, allows inefficient firms to exit, ensures a level playing field, and establishes a solid legal framework for intellectual property and property rights.

- **Protecting data privacy while maintaining an open Internet.** Many countries have enacted or are considering limitations on what kind of data can be transmitted across borders; this may include requirements that companies use servers physically located

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[16] *Southeast Asia at the crossroads: Three paths to prosperity*, McKinsey Global Institute, November 2014.

[17] *The state of broadband 2015*, International Telecommunication Union and UNESCO, September 2015. For more on policy approaches to addressing this issue, see *Offline and falling behind: Barriers to Internet adoption*, McKinsey Technology, Media and Telecom Practice, September 2014.

[18] *World development report 2016: Digital dividends*, World Bank, January 2016.

within their borders to process and store data generated there. As we went to press, for example, the future of the "safe harbor" agreement governing data transfers between the European Union and the United States remained uncertain. Legitimate privacy concerns need to be addressed through thoughtful frameworks, but data localization and fragmented regulation may have real economic costs.[19]

- **Making cybersecurity a top priority.** One study has estimated that cybercrime costs the global economy some $400 billion in annual losses through consumer data breaches, financial crimes, market manipulation, and theft of intellectual property.[20] Hackers may also pose public safety and even national security risks. While companies are often at the forefront of ensuring cybersecurity, governments can invest in research, share information, model good security practices, and craft thoughtful rules. Governments will need to work closely with their global counterparts and with the business community to stay on top of new threats and share technology solutions. Regulators may need to mandate standards for securing consumer data, and public agencies need to safeguard their own assets.

•••

Many of the challenges associated with digitizing economic activity are now playing out on a global scale. Even measuring digital globalization in statistics has become a more complex undertaking, since much of the value being generated winds up as consumer surplus. Our analysis provides strong evidence of the economic value of openness—and it shows that both inflows and outflows matter, as they expose an economy to ideas, research, technologies, talent, and best practices from around the world. For countries that have been slow to participate, the opportunities for catch-up growth are too substantial to ignore.

[19] Matthias Bauer et al., *The costs of data localization: Friendly fire on economic recovery*, ECIPE occasional paper number 3/2014, May 2014, analyzes recently proposed or enacted data localization rules in seven economies. It found that these rules would lower GDP in all seven cases, with Vietnam (-1.7 percent), China (-1.1 percent), and Indonesia (-0.5 percent) poised for the largest losses.

[20] *Net losses: Estimating the global cost of cybercrime*, Center for Strategic and International Studies and McAfee, June 2014.

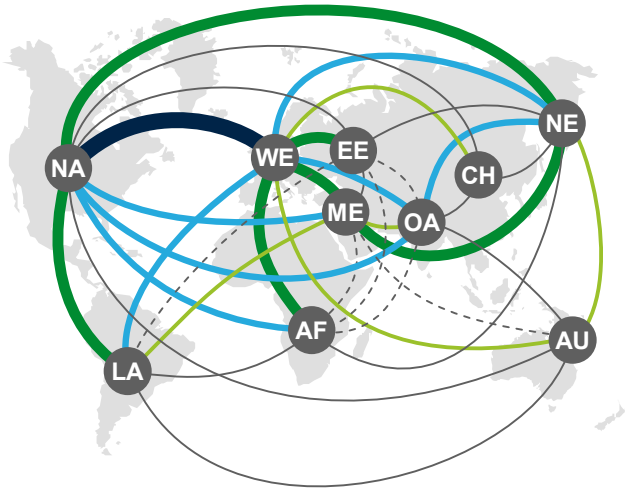
GOODS FLOWS

% of global GDP

0.02–0.05	0.05–0.10	0.10–0.25	0.25–0.50	0.50–1.00	>1.00

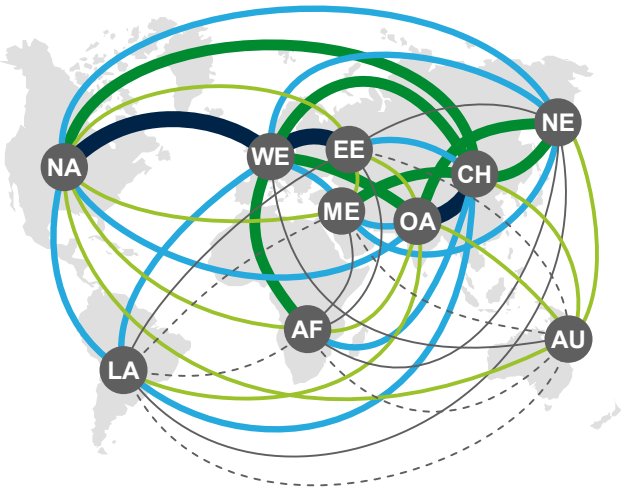
NA United States and Canada	**LA** Latin America	**ME** Middle East	**AF** Africa	**WE** Western Europe	**EE** Eastern Europe and Central Asia	**CH** China region	**NE** Northeast Asia	**AU** Australasia	**OA** Other Asia

1980
100% = $1.8 trillion (18.6% of GDP)



2014
100% = $19 trillion (24.6% of GDP)

10.5x larger



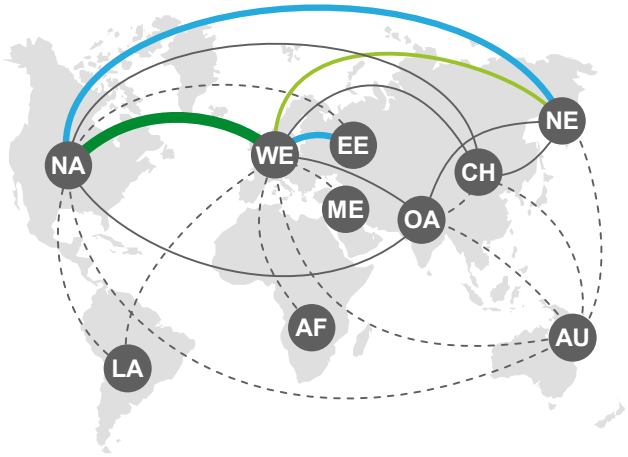
SERVICES FLOWS

% of global GDP

0.01–0.05	0.05–0.10	0.10–0.25	0.25–0.50	>0.50

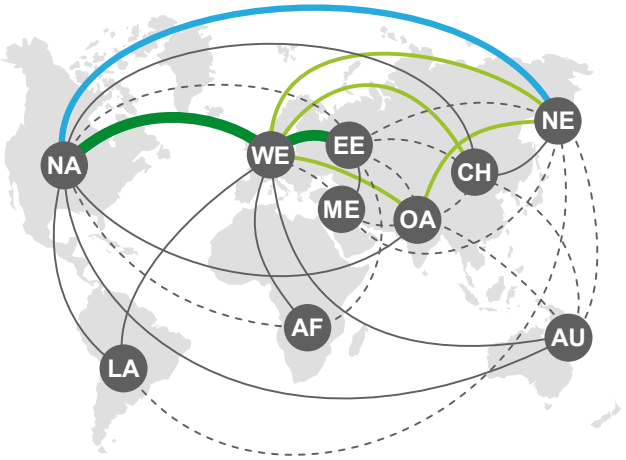
NA United States. Canada, and Mexico	**LA** Latin America	**ME** Middle East	**AF** Africa	**WE** Western Europe	**EE** Eastern Europe and Central Asia	**CH** China region	**NE** Northeast Asia	**AU** Austral-asia	**OA** Other Asia

2002
100% = $1.6 trillion (4.9% of GDP)



2014[1]
100% = $4.9 trillion (6.4% of GDP)

3.1x larger



1 Estimated from 2011 bilateral services flows data and 2014 services trade data from UNCTAD.
NOTE: For cross-border data flows, see Exhibit E2.

SOURCE: UNCTAD; McKinsey Global Institute analysis

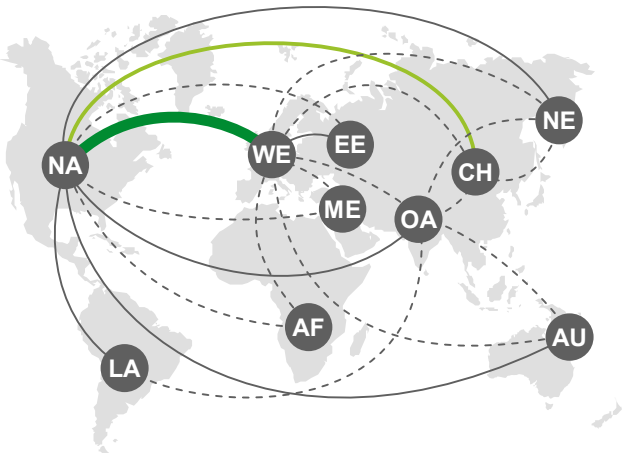
FINANCIAL FLOWS (FDI)[1]

% of global GDP

0.02–0.05 | 0.05–0.10 | 0.10–0.25 | 0.25–0.50 | 0.50–1.00

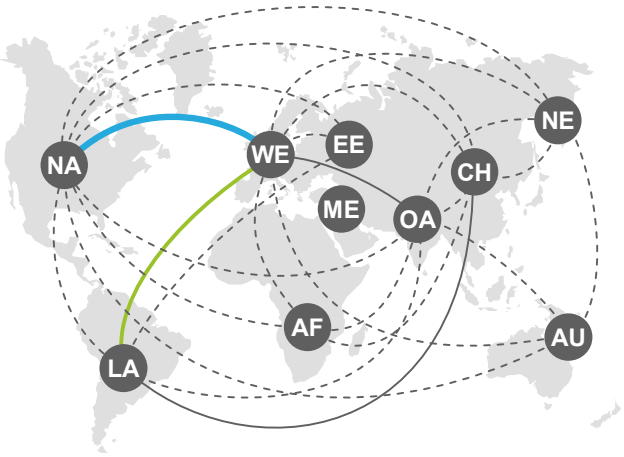
NA United States, Canada, and Mexico
LA Latin America
ME Middle East
AF Africa
WE Western Europe
EE Eastern Europe and Central Asia
CH China region
NE Northeast Asia
AU Austral-asia
OA Other Asia

2002
100% = $0.7 trillion (2.1% of GDP)



2014
100% = $1.65 trillion (2.1% of GDP)

2.3x larger



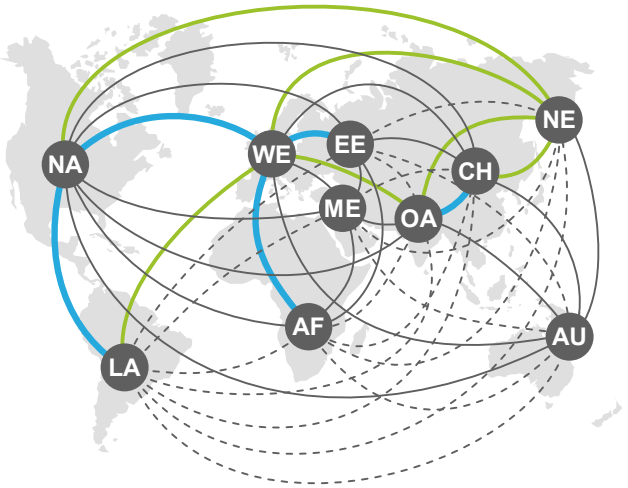
PEOPLE FLOWS

Million cross-border travelers

<1 | 1–5 | 5–10 | 10–50 | >50

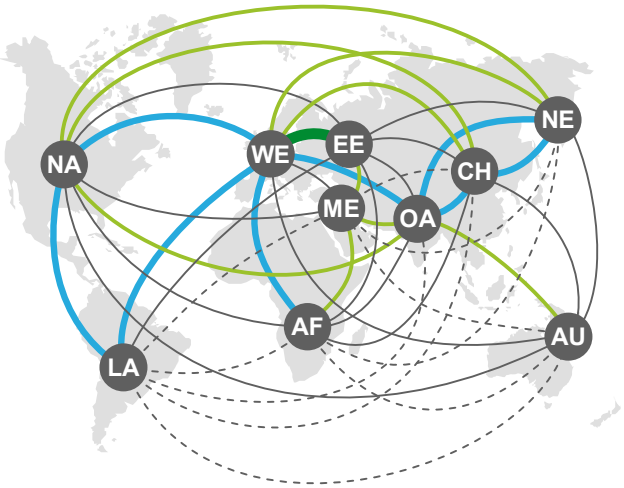
NA United States and Canada
LA Latin America
ME Middle East
AF Africa
WE Western Europe
EE Eastern Europe and Central Asia
CH China region
NE Northeast Asia
AU Australasia
OA Other Asia

2002
100% = 650 million



2013
100% = 1.03 billion

1.6x larger



1 Estimated from bilateral FDI stock data.
NOTE: For cross-border data flows, see Exhibit E2.

SOURCE: IMF CDIS; UN World Tourism Organization; McKinsey Global Institute analysis

1. A NEW ERA OF DIGITAL GLOBALIZATION

For decades, the movement of traded goods, services, and finance defined our image of globalization and deepened the connections between nations. Today, however, those traditional flows have lost their momentum. At least part of this shift appears to be structural rather than a temporary cyclical dip. But this does not mean that globalization has moved into reverse. Enormous streams of data are transmitted across borders every minute, and they are growing exponentially in both volume and variety. Today globalization is being accelerated and redefined by flows of data that embody ideas, information, and innovation.

45x
increase in used cross-border bandwidth since 2005

Increasingly, the World Wide Web provides the ties that bind the global economy together. Consider that some 50 percent of the world's traded services are already digitized.[21] Approximately 12 percent of the global goods trade is conducted via international e-commerce. Cross-border Skype calls equal 46 percent of the volume of traditional international calls. Across 18 countries analyzed by eBay, anywhere from 88 to 100 percent of the SMEs that use its platform are exporters.

By lowering the costs of communication and transactions, digitization opens new possibilities for conducting business across borders. As digital platforms grow in scale and sophistication, they are creating more efficient and transparent global markets in which far-flung buyers and sellers find each other with a few clicks. They provide businesses with enormous built-in customer bases and effective ways to connect with them—and they enable even microenterprises to participate directly in global flows. Digital flows are also shifting globalization into a faster gear as information ricochets around the world and collaboration spans time zones. Taken together, these shifts create economic value by increasing innovation, competition, and productivity.

Many of the challenges associated with digitizing national economies are now playing out on a global scale. Industries are being disrupted by new entrants, value chains are re-forming, and profit pools are shifting. Much of the value of digitization is going into unpriced benefits for consumers that are not captured in official GDP statistics. While the digital world may be more inclusive and closely connected, it is not truly "flat"—and digitization tends to accentuate disparities.

Digitization changes the economics of globalization in several ways, as we discuss in this chapter and the ones that follow. First, in contrast to the last era of globalization, we find that countries on the periphery of the network of global data flows benefit even more than the digital content producers at the center. In addition, the types of companies involved are different: instead of waiting for the benefits of globalization to trickle down from large corporations, SMEs can become micro-multinationals in their own right, and startups can be "born global." Finally, digitization is fueling competition as it enables innovative business models and allows companies to scale up quickly. This chapter brings the new and more digital version of globalization into focus.

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[21] Daniel Castro and Alan McQuinn, *Cross-border data flows enable growth in all industries*, Information Technology and Innovation Foundation, February 2015.

GROWTH IN TRADITIONAL FLOWS OF GOODS, SERVICES, AND FINANCE HAS FLATTENED

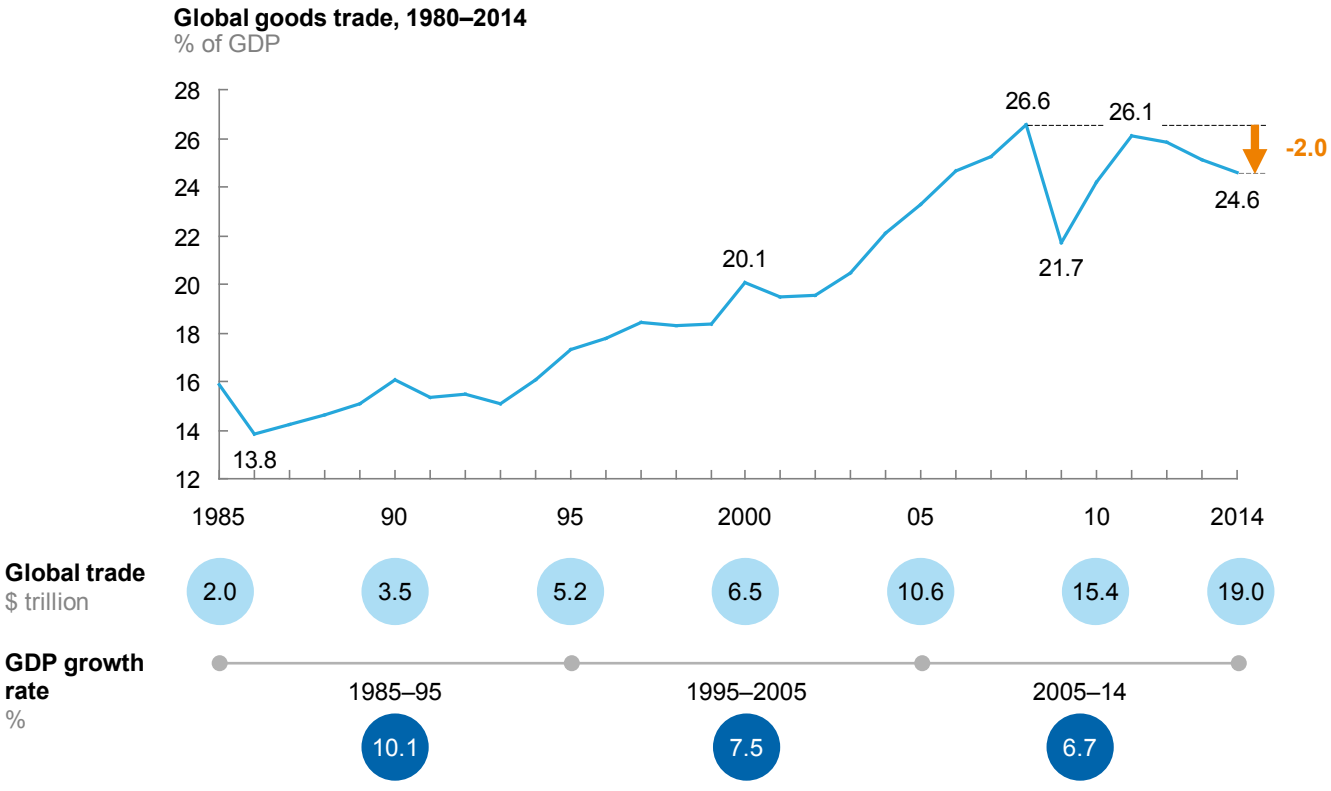
In the 20th-century version of globalization, the world built deeper and more intricate ties as the goods trade and cross-border finance grew in volume and scope. But both types of flows took sharp tumbles during the financial crisis and the Great Recession. Since then, global trade bounced back but is now flattening—and capital flows remain at a fraction of the heights reached during the bubble years. These traditional types of flows still form an important part of the global economy, but flows of data and information are providing the real momentum.

Global trade in goods has slowed dramatically since 2008, reflecting structural shifts

Between 1985 and 2007, the world's trade in goods grew roughly twice as fast as global GDP. This reflects major multinationals expanding their supply chains and establishing new bases of production to tap into the enormous pools of low-cost labor in emerging economies. Global trade in goods rose from 13.8 percent of world GDP in 1985 ($2 trillion) to 26.6 percent of GDP ($16 trillion) on the eve of the Great Recession. Since its post-crisis rebound, however, growth in goods trade has flattened—and it has even receded when measured relative to GDP (Exhibit 1).

Exhibit 1

After decades of steady growth relative to GDP, trade in goods has been declining since its post-recession rebound



SOURCE: UNCTAD; McKinsey Global Institute analysis

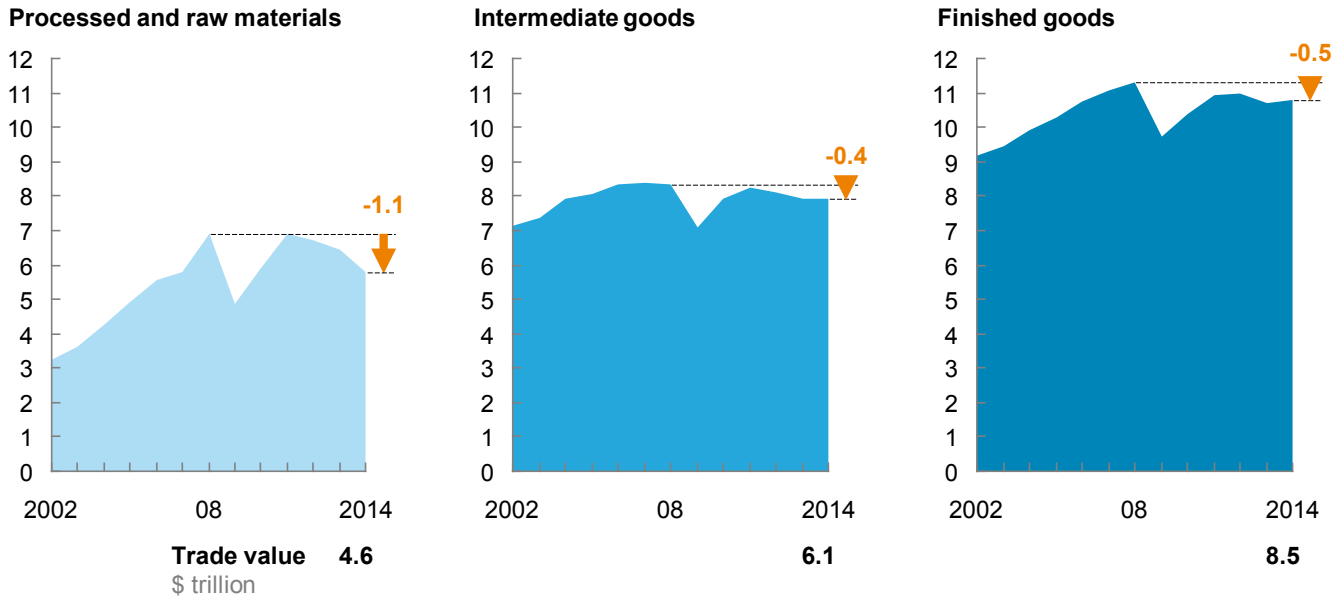
Much of the growth in goods trade since 2000—and much of its subsequent deceleration—is related to commodity prices. As emerging economies rapidly urbanized and industrialized, their appetite for raw materials such as steel, copper, and agricultural goods boosted trade volumes and sent commodity prices soaring to new heights. From 2000 to 2011, the price of many commodities doubled or even tripled. But today the picture is

remarkably different. Prices have declined sharply over the past few years, and the volume of commodities being traded has also flattened (Exhibit 2). From June to December 2014, the price of Brent crude fell from $112 a barrel to $62, and the price of copper has fallen by half since its peak in 2011.[22] We calculate that this slowdown in commodities accounts for nearly three-quarters of the decline in goods trade as a share of global GDP.

Exhibit 2

The commodities slump partly explains the loss of momentum in goods trade, but finished and intermediate goods have declined as well

Value of goods trade, 2002–14
% of world GDP



SOURCE: IHS; UNCTAD; McKinsey Global Institute analysis

Yet there is more behind the slowdown in global goods trade than a commodities cycle. Trade in manufactured goods has also been flat to declining for both finished goods and intermediate inputs. Global container shipping volumes grew by 7.8 percent from 2000 to 2005, but from 2011 to 2014, growth was markedly slower, at only 2.8 percent.[23]

Multiple cyclical factors have sapped momentum in the trade of manufactured goods. Many of the world's major economies—notably China, Europe, and Japan—have been experiencing slowdowns. China, for example, posted almost 18 percent annual growth in both imports and exports from 2000 to 2011. But since then its export growth has slowed to 4.6 percent, and imports have actually shrunk.

However, there may be structural reasons in global manufacturing that explain decelerating growth in traded goods. Our analysis find that global consumption growth is outpacing trade growth for some types of finished goods, such as automobiles, pharmaceuticals, fertilizers, and plastic and rubber goods. This indicates that more production is happening in the countries where the good is consumed. This may reflect the "reshoring" of some manufacturing to advanced economies as well as increasing consumption in emerging markets where these goods are produced.

[22] Oil prices from US Energy Information Administration data, January 2015. Our analysis extends through 2014, but commodity prices have continued their sharp decline since then.

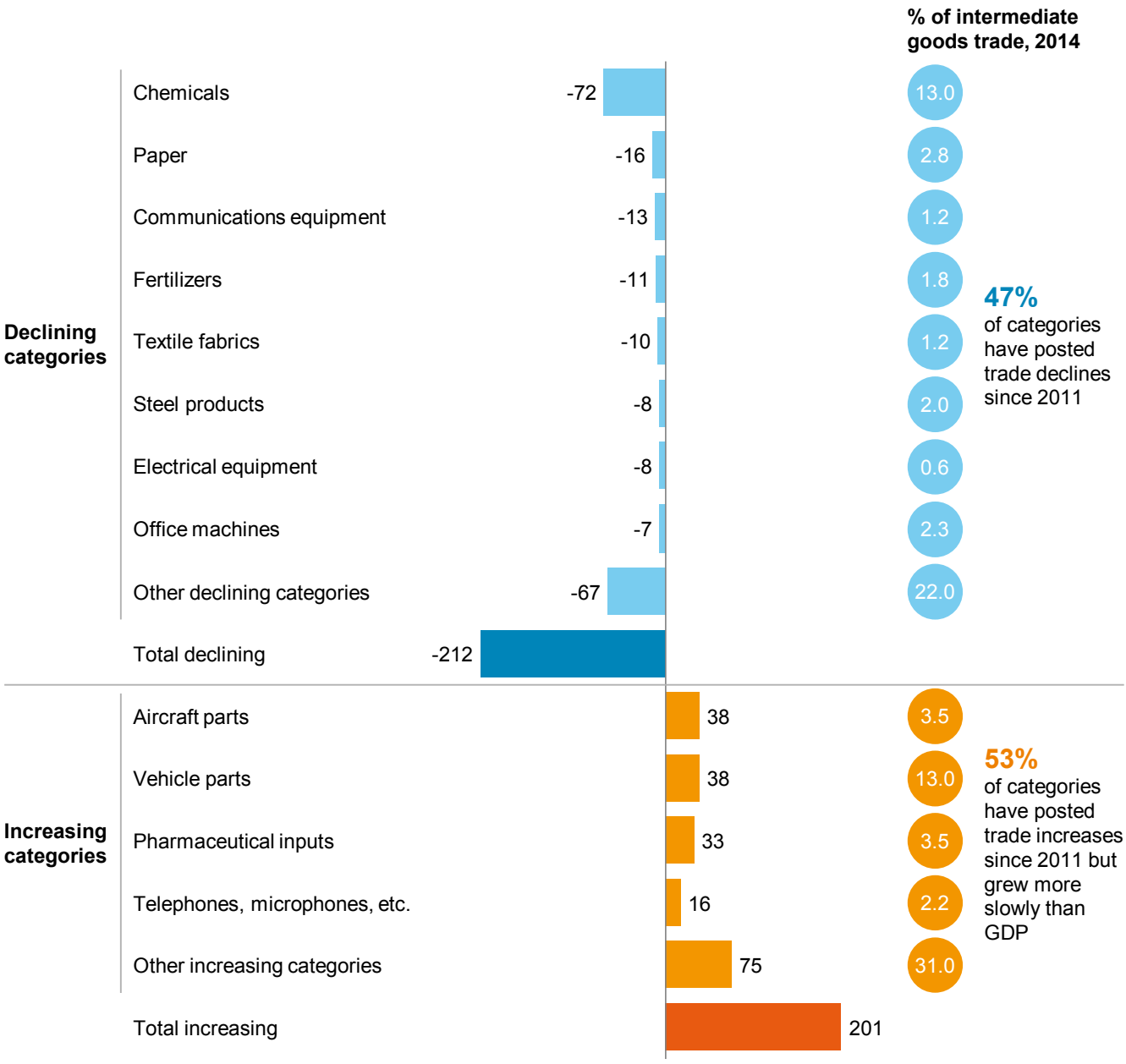
[23] Data from IHS.

For intermediate goods, declines in trade are more widespread across product categories, including chemicals, paper, textile fabrics, and communications and electrical equipment. In fact, the value of trade declined in roughly half of the categories of intermediate goods between 2011 and 2014 (Exhibit 3). This could indicate that global value chains are shortening.

Exhibit 3

Trade has declined in half of intermediate goods categories, reflecting shorter global value chains

Change in trade in categories of intermediate goods products, 2011–14
$ billion



NOTE: Numbers may not sum due to rounding.

SOURCE: IHS; McKinsey Global Institute analysis

The current slowing of trade growth may or may not reverse in the years ahead. The development of 3D printing has not yet had a clear effect on global trade, but if this technology is widely adopted by global manufacturers, it could reduce global trade volumes

as more products are "printed" where they are consumed. There are already examples of this at work. Consider GE Aviation, which is beginning to use 3D printing to produce fuel nozzles for its new Leap engine. A fuel nozzle made the traditional way consists of 20 different components, with a supply chain that spans countries. But 3D printing allows the company to produce best-quality nozzles in one piece, at one location, eliminating the need to ship intermediate parts across borders.

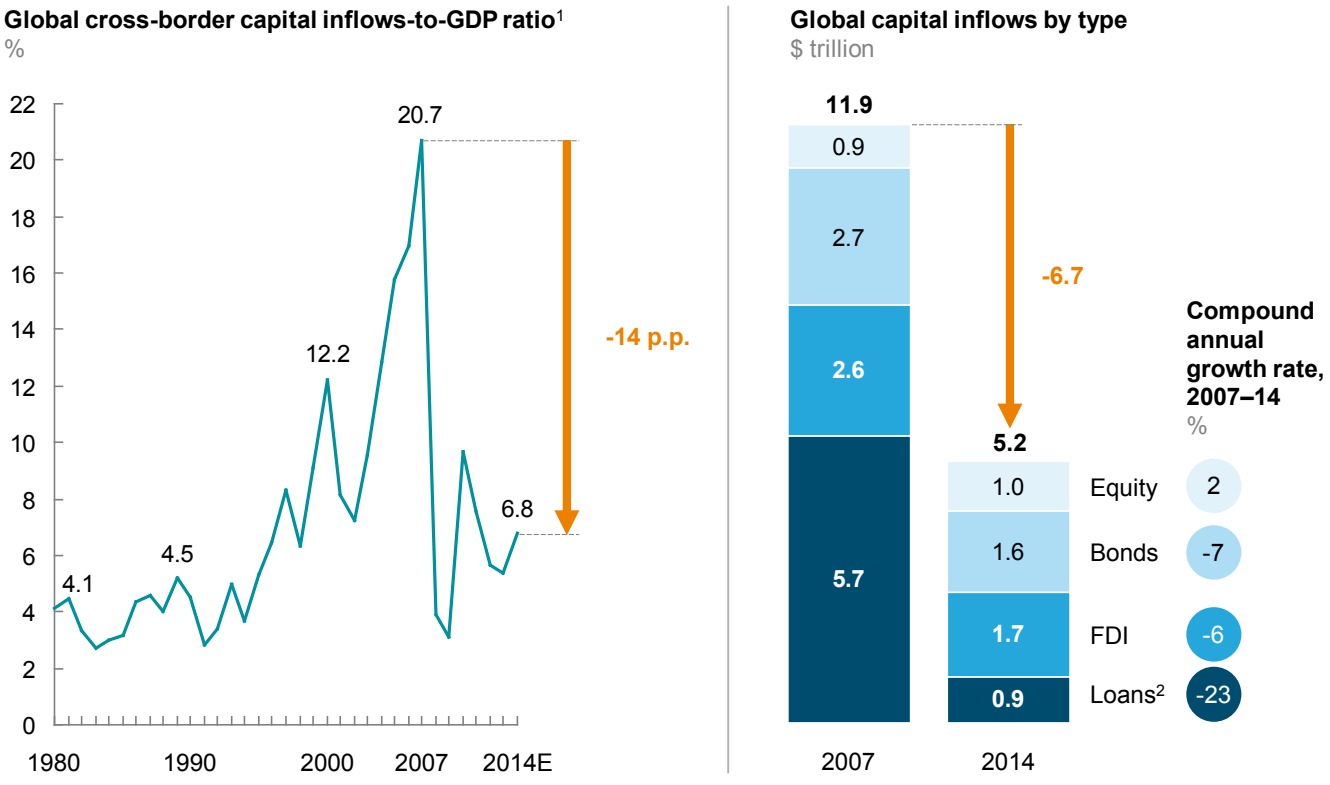
Examining a wide range of both R&D-intensive and labor-intensive products, we find significant potential to transform how—and where—many categories of goods are produced with 3D printing in the years ahead.[24] The applications are particularly relevant for electronics, vehicle parts, other transportation equipment, machinery and electrical equipment, medical instruments, and apparel.

Cross-border financial flows have fallen sharply since 2008 and show no sign of recovery

Cross-border capital flows—which include lending, foreign direct investment, and purchases of equities and bonds—link national financial markets, connecting borrowers and savers from different countries. For 25 years prior to the 2008 financial crisis, these flows grew faster than global GDP, rising from $0.5 trillion in 1980 to $11.9 trillion in 2007 (Exhibit 4).

Exhibit 4

Cross-border lending accounts for 70 percent of the drop in global financial flows, reflecting new banking regulation



1 Includes foreign direct investment, purchases of foreign bonds and equities, and cross-border loans and deposits.
2 Includes trade credits, loans, currency, and deposits.
NOTE: Numbers may not sum due to rounding.

SOURCE: IMF Balance of Payments; Economist Intelligence Unit; Bank for International Settlements; Institute of International Finance; McKinsey Global Institute analysis

[24] For more on 3D printing technology and its economic potential, see *Disruptive technologies: Advances that will transform life, business, and the global economy*, McKinsey Global Institute, May 2013.

7%
financial flows as a share of world GDP in 2014, down from 21% in 2007

But since their peak in 2007, financial flows have contracted sharply, dropping from 21 percent of global GDP in 2007 to just 7 percent in 2014. Much of the decline is in cross-border lending. Facing new regulations on capital and liquidity, as well as pressures from shareholders and regulators to reduce risk, many banks in advanced economies are winnowing down the geographies and business lines in which they operate. From early 2007 through the end of 2012, commercial banks sold off more than $722 billion in assets and operations, with foreign operations accounting for almost half of this total.[25] There is no sign of a reversal in this trend, and the sharp decline could indicate a reversion to a longer-term trend prior to the credit bubble years. Overall, the decline in cross-border lending explains 72 percent of the total drop in cross-border financial flows since 2007.

Beyond the retrenchment in cross-border lending, international investment flows in bonds, equities, and FDI are also flat or down. Cross-border bond and FDI flows have declined 41 percent and 35 percent, respectively, in absolute terms between the end of 2007 and the end of 2014. Cross-border equity flows are essentially flat in value but have also declined relative to global GDP. Preliminary data for 2015 show that global financial flows declined further across a broad range of developing countries.[26]

The only financial flows that have continued to grow since the Great Recession are remittances sent from global migrants to their home countries. These have grown 7 percent annually over the past five years and are now worth $583 billion annually. Although steady in nature, remittances are significantly smaller than equity flows (which totaled $1 trillion in 2014) and bond flows ($1.6 trillion in 2014). Growth in remittances reflects the increasing flows of migrants and other people flows (see Box 1, “People on the move”).

Global service trade continues to grow, albeit slowly

Global trade in services is a much smaller flow than trade in goods. It has grown slowly but steadily over the years, rising from some $400 billion in 1985 to approximately $5 trillion in 2014, or from 3.4 percent to 6.3 percent of global GDP. Compared with the $19 trillion goods trade, global trade in services remains small. Its compound annual growth rate of 8.8 percent since 1985 has outpaced global GDP growth over that period.

In the past, trade in services often involved people traveling around the world to deliver expertise, but today financial services, IT support, R&D, engineering and design, and many other services can be delivered digitally. Emerging economies such as Costa Rica, India, Morocco, the Philippines, and South Africa, for example, have relied on technology to build flourishing business process outsourcing industries that offer call center and technical support services to global clients. Trade in digitally deliverable services has more than doubled over the past decade, reaching $2.4 trillion in 2014. This amounts to almost 50 percent of total services exports. Advanced economies accounted for 81 percent of total digitally deliverable service exports in 2014. India and the Philippines were the only emerging economies ranking in the top ten net exporters of such services.

In the years ahead, the continued expansion of digital technologies, cross-border Internet connections, and global online marketplaces for freelance services could potentially increase traded services. Still, compared to the value of global goods trade, the global services trade is likely to remain a far smaller cousin.

[25] *Financial globalization: Retreat or reset?* McKinsey Global Institute, March 2013.
[26] Institute of International Finance data.

Box 1. People on the move

People are more mobile than ever—and digital technologies may partly facilitate this trend. We find that all types of people flows across borders are growing faster than the global population (Exhibit 5). Roughly a quarter of a billion people, or 3.4 percent of the world's population, lived outside the country of their birth in 2013, compared with 120 million, or 2.7 percent of the global population, in 1980. People can now use digital platforms to find work abroad and then stay closely connected with friends and family back home through voice over Internet protocol (VoIP) or Skype calling, instant messaging, and social media. New platforms can even help with logistics such as managing foreign bank accounts and remittances; TransferWise, for instance, offers users instant international monetary transfers without hefty currency conversion fees.

Other people have been forced from their homelands by conflict. After a decade of slight decline, the number of refugees worldwide jumped from 16.7 million in 2013 to 19.5 million in 2014—a spike that worsened in 2015 with the escalation of the Syrian refugee crisis.[1] Many of these recent refugees have been relying on real-time social media updates to guide their journey (for more on this, see Chapter 2).

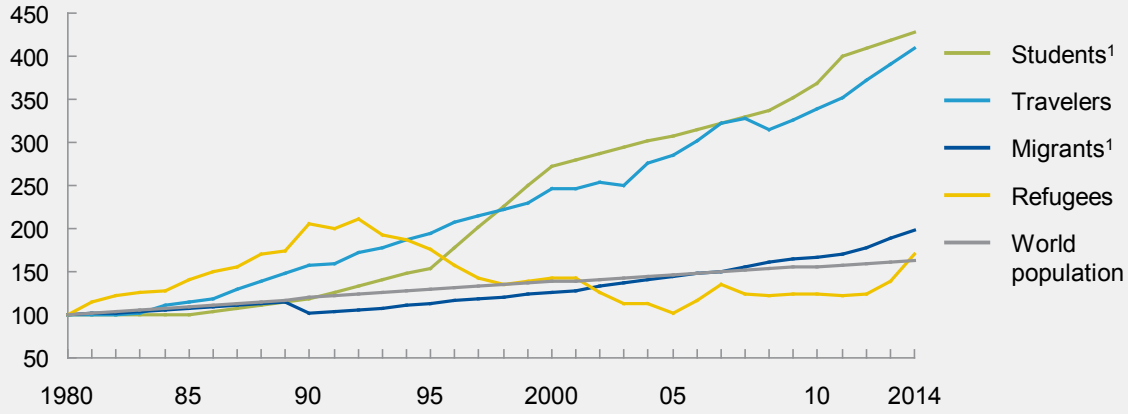
The number of international tourist arrivals hit 1.1 billion in 2014, continuing a trend of steady growth.[2] As incomes rise in emerging economies, the citizens of these countries are eager to experience in person the world they have seen online. Recent years have brought a huge influx of Chinese visitors to destinations ranging from Australia to the United States to Europe. Digital platforms enable these flows: online travel sites make it easier than ever for users to compare and book airfares, while sites such as Airbnb help them find the exact accommodations that suit their needs. Having guidance, user reviews, and GPS mapping at their fingertips has given travelers the ability to navigate unfamiliar destinations with greater confidence.

Additionally, OECD statistics show that some 4.5 million international students traveled abroad to study in 2012. The robust growth rate in this number may be a hopeful sign that a new generation is embracing the opportunity to become global citizens in a more mobile world.

Exhibit 5

All types of people flows are outpacing global population growth

Major change



Compound annual growth rate (%)	1980–90	1990–2000	2000–10	2010–14	1980–2014
Students	1.7	8.7	3.0	3.8	**4.4**
Travelers	4.7	4.6	3.8	4.9	**4.2**
Migrants	0.2	2.1	2.9	4.4	**1.7**
Refugees	7.5	-3.5	-1.4	8.0	**1.6**
World population	1.8	1.4	1.2	1.2	**1.5**

1 Latest data available are from 2012 for students and 2013 for migrants; 2012–13 growth was used for linear extrapolation to 2014.

SOURCE: OECD; World Bank; UN World Tourism Organization; UN High Commissioner on Refugees; UN Population Division; McKinsey Global Institute analysis

1 *UNHCR global trends report: World at war*, UN High Commissioner on Refugees, June 2015. Note that this number does not include the 38.2 million people who are internally displaced by war and persecution, nor the 1.8 million people who are awaiting the outcome of asylum claims. Both of these numbers are up sharply from 2013.

2 UN World Tourism Organization statistics. Note that the "people flows" metric in the MGI Connectedness Index adjusts this number down to account for individuals making multiple trips within a given year.

DIGITIZATION IS USHERING IN A NEW ERA OF GLOBALIZATION

As of the end of 2015, some 3.2 billion people around the world—accounting for 43.4 percent of the global population—were online.[27] The expansion of the Internet, combined with the introduction of digital platforms and other types of digital tools, has opened a new chapter in the story of globalization.

Virtually every type of cross-border transaction now has a digital component.

Cross-border data flows are the hallmarks of 21st-century globalization. Not only do they transmit valuable streams of information and ideas in their own right, but they also enable other flows of goods, services, finance, and people. Virtually every type of cross-border transaction now has a digital component. Container ships still move products to markets around the world, but now customers order them on digital platforms, track their movement using RFID codes, and pay for them via digital transactions. Massive online platforms such as Alibaba, Amazon, eBay, and Facebook link businesses and customers anywhere in the world. By reducing the cost of transactions and allowing digital goods, services, and capital to change hands instantly, digitization is creating a more hyperconnected, hyperspeed era of global flows.

Cross-border data flows are soaring and connecting more countries

50%
share of Facebook users with at least one international friend

As Internet usage continues to grow within individual economies, users are rapidly forming and deepening international connections. In 2015, 50 percent of Facebook users had at least one international friend, up from just 16 percent in 2012. Cross-border used bandwidth has grown 45 times larger over the past decade. In absolute terms, it has grown from 4.7 terabits per second (Tbps) in 2005 to 211.3 Tbps in 2014, for an annual growth rate of 52 percent.[28] Over the next five years, total Internet Protocol (IP) traffic is projected to triple, while cross-border used bandwidth is projected to post a ninefold increase (Exhibit 6).[29]

Most international Internet traffic travels via an extensive cable network found on the world's ocean floors, running along coastlines and between continents. Cross-border capacity expanded by 38 percent annually from 2007 to 2014 as new submarine cables were built and old ones were upgraded. Emerging economies are becoming more integrated into this network (Exhibit 7). In 2005, 75 countries used more than 1 gigabit per second of cross-border bandwidth; by 2014, that number was up to 164. Emerging economies started from a small base, but they have outpaced advanced economies in the growth of used cross-border bandwidth over the past decade.

[27] *The state of broadband 2015: Broadband as a foundation for sustainable development*, International Telecommunication Union and UNESCO Broadband Commission for Digital Development, September 2015.

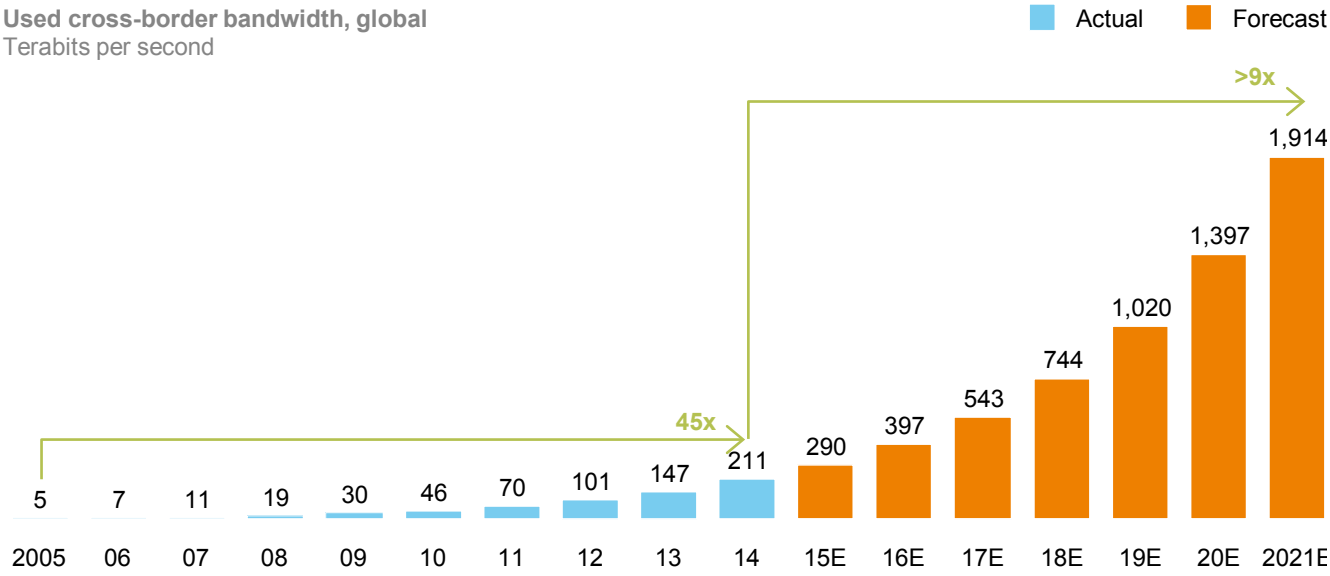
[28] TeleGeography, Global Internet Geography.

[29] Projections of total IP traffic from *Cisco Visual Networking Index: Forecast and methodology, 2014–2019*, Cisco, May 2015; projection of cross-border bandwidth from TeleGeography, Global Bandwidth Forecast Service.

Exhibit 6

Cross-border bandwidth has grown 45 times larger over the past decade—and may grow another nine times larger by 2021

Used cross-border bandwidth, global
Terabits per second

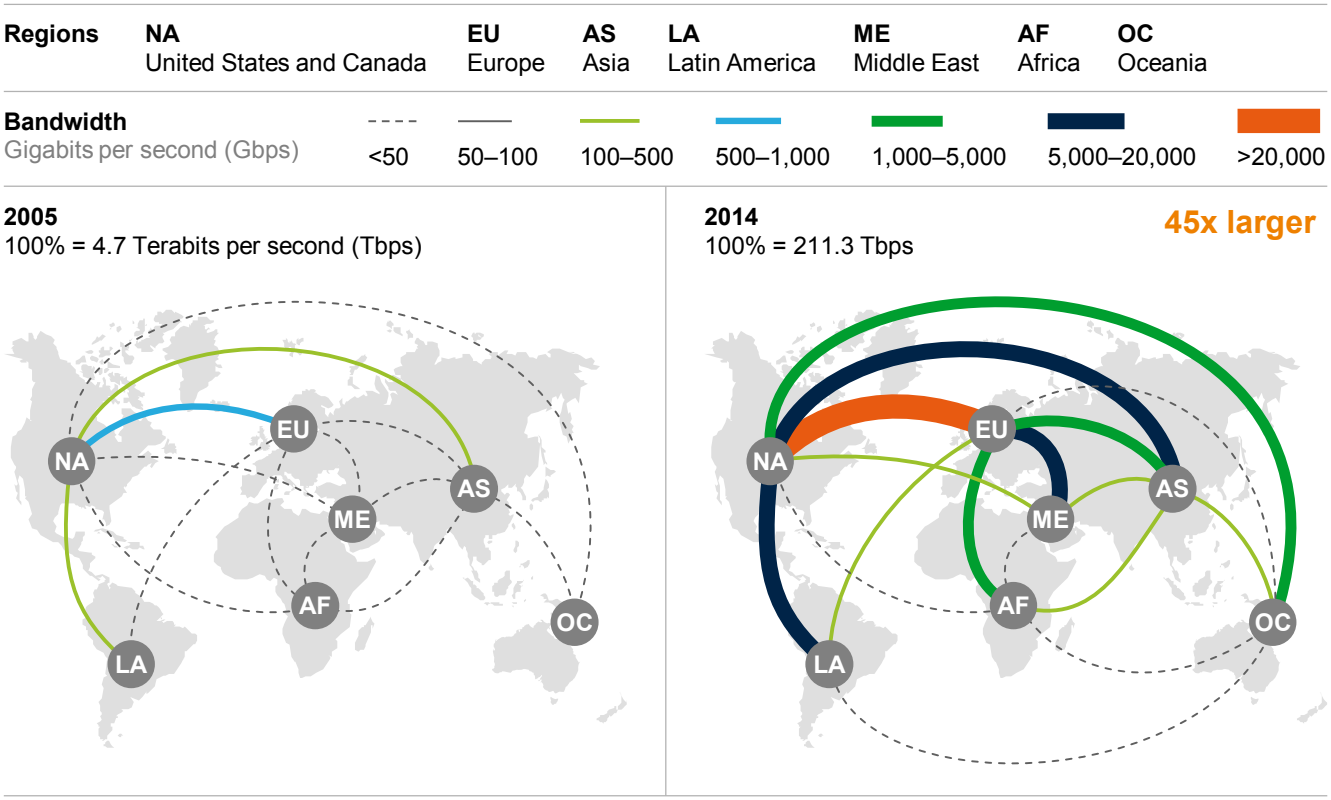


SOURCE: TeleGeography, Global Bandwidth Forecast Service; McKinsey Global Institute analysis

Exhibit 7

Cross-border data flows are surging and connecting more countries

Used cross-border bandwidth



NOTE: Lines represent interregional bandwidth (e.g., between Europe and North America) but exclude intraregional cross-border bandwidth (e.g., connecting European nations with one another).

SOURCE: TeleGeography, Global Internet Geography; McKinsey Global Institute analysis

However limitless the public Internet might seem, the portion of the Internet that has been indexed and can be navigated by anyone using standard search engines is only the surface of a much larger structure. The "Deep Web" cannot be accessed in the same way, and it is estimated to be hundreds of times larger than the public Internet. It includes private company networks, some enormous publicly accessible topic databases (such as climate data from the US National Oceanic and Atmospheric Administration), libraries and archives, private chat rooms, the underlying operations of social media sites and other platforms, and much more. Private data networks have been growing faster than the public Internet as technology giants expand their dedicated long-haul networks. The share of private networks in international used bandwidth has increased from 20 percent in 2009 to 35 percent in 2014.[30] Much of the Deep Web is legitimate and benign, but it does have some shadowy corners, collectively known as the "Darknet," where criminal trade flourishes.[31] This report measures data flows by analyzing used cross-border bandwidth. It therefore captures traffic of all types—public and private, legitimate and illicit—since these cannot be disaggregated.

Digital platforms are creating more efficient and transparent global markets. They provide businesses with enormous built-in customer bases and effective ways to reach them.

Data flows include a huge variety of business and personal communications, transactions, information, videos, and other digital media content, gaming, and much more. We also analyzed cross-border digital calls, which have more than doubled from 274 billion call minutes in 2005 to 569 billion call minutes in 2014. This rising volume is primarily attributable to the expanded use of voice over Internet protocol (VoIP) technology. Since 2005, VoIP call minutes have grown by 19 percent per year, while traditional call minutes have grown by 4 percent. Additionally, cross-border computer-to-computer Skype communications have soared, with call minutes increasing by some 500 percent over the past five years.[32] In 2014, computer-to-computer Skype call minutes were equal to 46 percent of traditional phone call minutes.

Data flows—both within countries and between them—reflect the activities of individuals and of businesses. Many people assume that the Internet is dominated by individuals viewing YouTube and other streaming videos, trading e-mails, and posting on social media. But a large share of Internet traffic is also driven by companies interacting with their foreign operations, suppliers, and customers. The business aspect of data flows is likely to take on a deeper dimension in the near future as more companies embed monitors, sensors, and tracking devices into their physical assets. As the Internet of Things is more widely adopted, Cisco estimates that machine-to-machine connections will account for more than 40 percent of global devices and connections by 2019. It could account for more than half not long after that (Exhibit 8).[33] These connections generate very small and intermittent data bursts that account for only a small share of IP traffic. But those flows represent a great deal of economic value for companies since they are directly related to making machines, processes, and supply chains more efficient.

30 TeleGeography, Global Bandwidth Research Service.

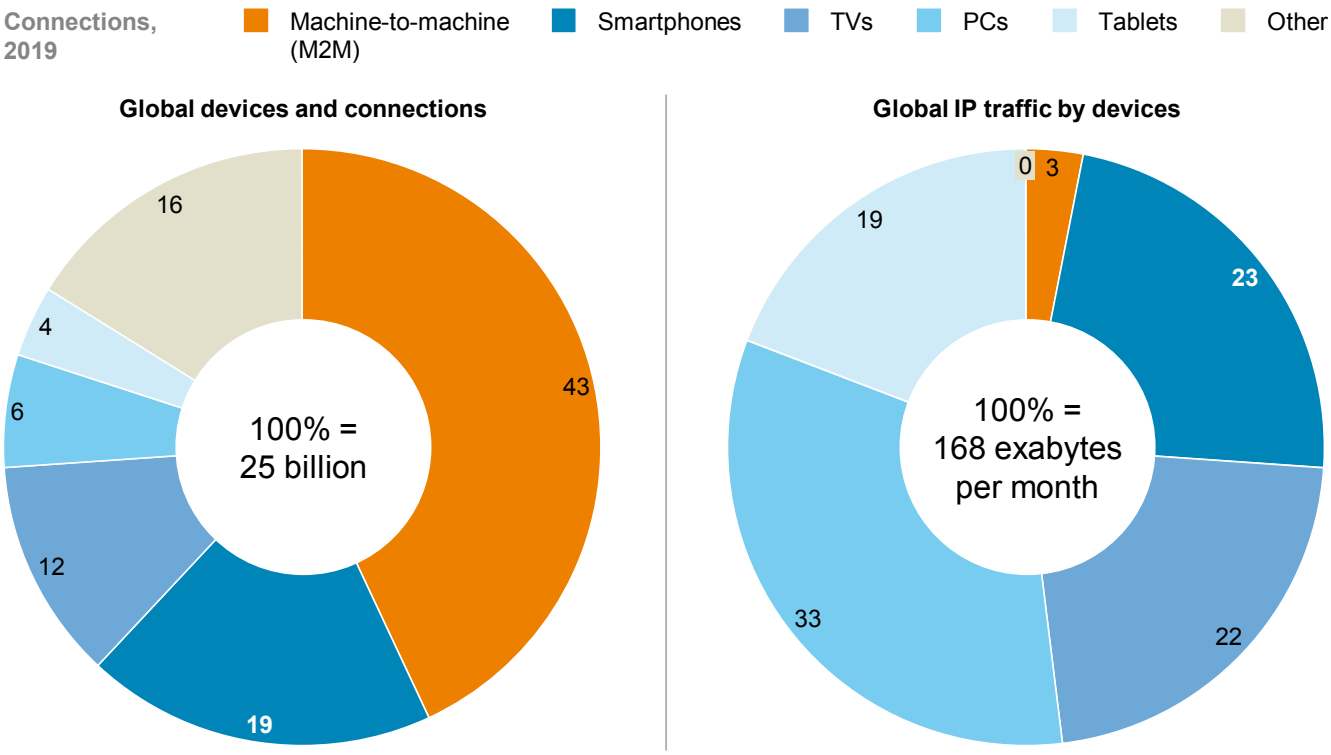
31 For an in-depth discussion of this topic, see Daniel Sui, James Caverlee, and Dakota Rudesill, *The Deep Web and the Darknet: A look inside the Internet's massive black box*, Woodrow Wilson International Center for Scholars, October 2015.

32 TeleGeography, Global Bandwidth Research Service.

33 *Cisco Visual Networking Index: Forecast and methodology, 2014–2019*, Cisco, May 2015.

Exhibit 8

By 2019, machine-to-machine connections are expected to account for more than 40 percent of global devices and connections



SOURCE: Cisco; McKinsey Global Institute analysis

Digitization transforms global flows in three ways

Globalization has a very different look today in part because digitization has introduced three new phenomena into the equation. First and foremost, large-scale Internet platforms have driven down the cost of cross-border interactions and transactions. Second, purely digital goods and services are now traded virtually and instantly. And finally, the addition of "digital wrappers" to traditional products is enhancing their value.

Digital platforms connect people around the world

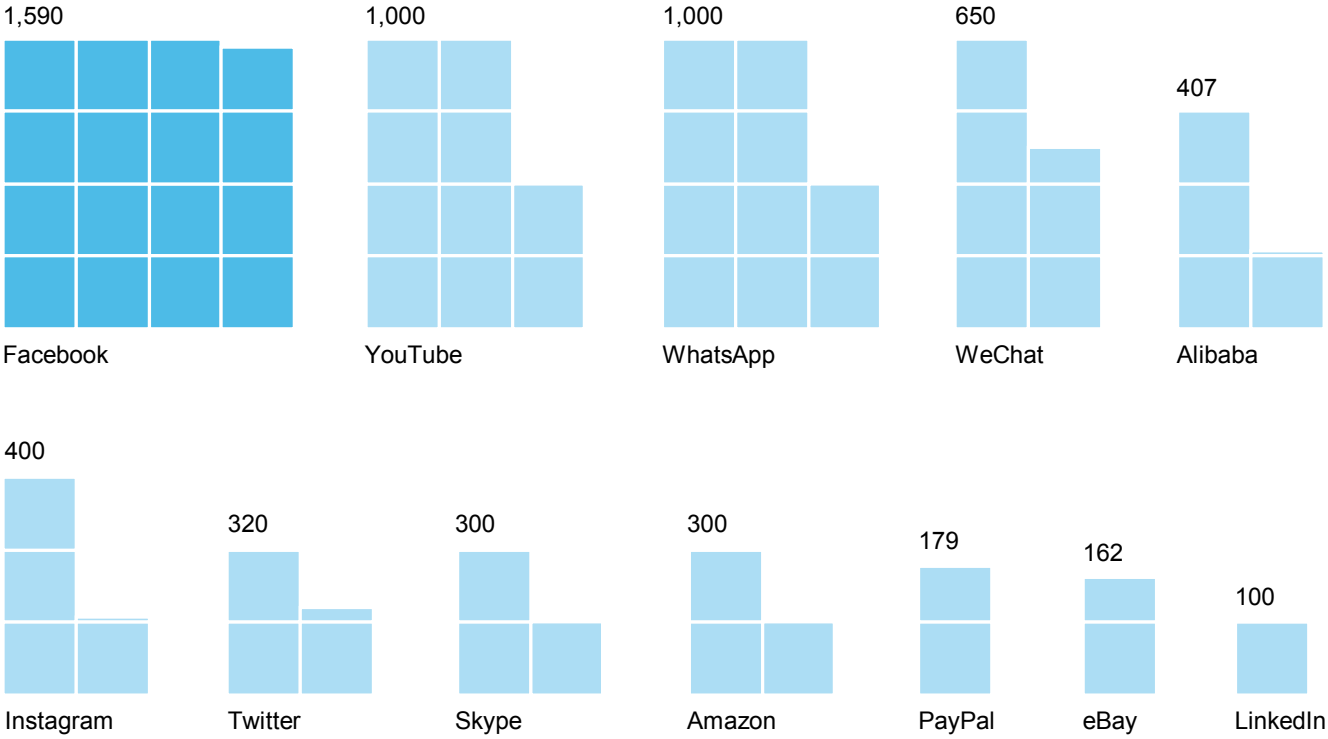
Digital platforms include e-commerce marketplaces, operating systems (such as Google's Android and Apple's iOS), social networks (such as Facebook, Instagram, Twitter, WeChat, and QQ), and digital media platforms (such as YouTube, Uvideos, Spotify, Hulu, and Netflix). Virtual global marketplaces now match job seekers with employers (LinkedIn), freelancers with assignments (Upwork), borrowers with lenders (Kiva), creative projects with funders (Kickstarter), travelers with accommodations (Airbnb), and students with education providers (Khan Academy).

The biggest platforms are creating truly global markets and user communities on a scale that has never been seen before (Exhibit 9). Facebook's monthly active user base, for example, has surpassed the size of China's population. As of early 2015, creators filming in YouTube Spaces have produced more than 10,000 videos that have generated more than one billion views. Alibaba recorded more than $14 billion in sales on its platforms in just 24 hours during its 2015 "Singles Day" promotion, smashing its record set the previous year. (See Chapter 2 for more on the scope of individual participation around the world.)

Exhibit 9

Digital platforms are connecting billions of people around the world

Active users on select platforms, 4Q15 or latest available
Million



SOURCE: Facebook; Twitter; Freelancer; Upwork; Mashable; *Fortune*; Statista; McKinsey Global Institute analysis

The largest corporations can build their own e-commerce sites or open innovation platforms. But the biggest and most widely recognized public platforms are open ecosystems that host an entire universe of diverse participants. E-commerce marketplaces such as Alibaba, Amazon, eBay, Flipkart, and Rakuten, for example, support millions of vendors, creating enough product variety and price competition to attract enormous global customer bases. These platforms give smaller enterprises exporting capabilities by providing them with payment infrastructure, logistics support, and global visibility.

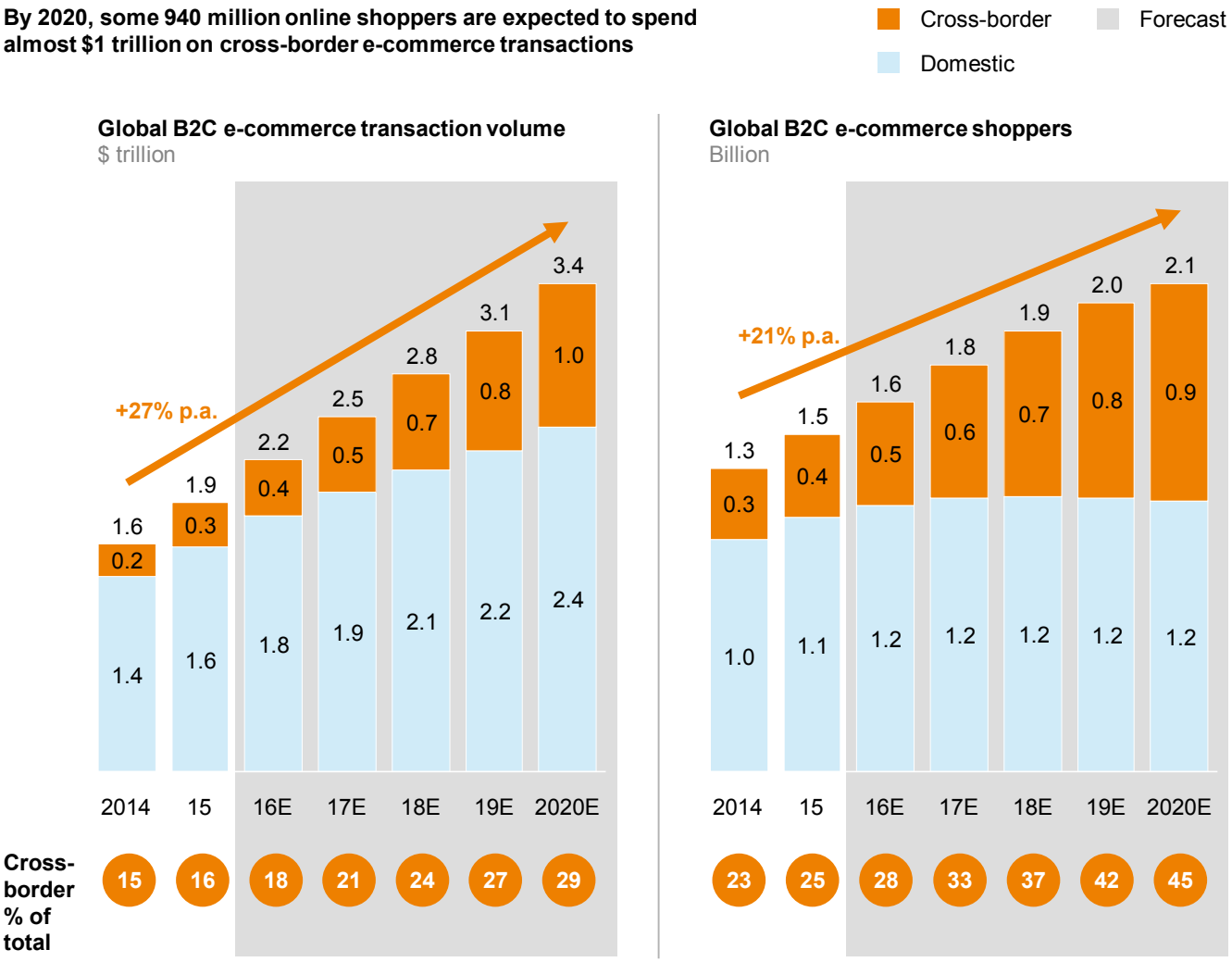
The influence of e-commerce marketplaces on international trade is significant—and still growing. Today some 16 percent of B2C e-commerce transactions are cross-border, and that share is projected to reach almost 30 percent by 2020, when international sales could hit $1 trillion (Exhibit 10). Cross-border B2B e-commerce is even bigger. In 2014, it was an estimated $1.8 trillion to $2 trillion market. Together, the roughly $2.2 trillion of cross-border e-commerce in 2015 is equal to approximately 12 percent of global goods trade. While growth in the overall goods trade has flattened, the portion enabled by e-commerce is growing.

The size of these platforms, combined with their use of automated processes driven by algorithms, lowers the marginal costs for platform operators practically to zero.[34] Platforms make it possible for users to research products, services, prices, and alternative choices. This removes some information asymmetries so that markets function more efficiently, although it may disrupt traditional intermediaries in the process.

[34] Michael Chui and James Manyika, "Competition at the digital edge: 'Hyperscale' businesses," *McKinsey Quarterly*, March 2015.

Exhibit 10

By 2020, some 940 million online shoppers are expected to spend almost $1 trillion on cross-border e-commerce transactions



NOTE: Numbers may not sum due to rounding.

SOURCE: AliResearch; McKinsey Global Institute analysis

For businesses, digital platforms provide a huge built-in base of potential customers and effective ways to market to them directly and launch new products. As social media exposes hundreds of millions of consumers from around the world to what is available, products can launch globally and go viral in unprecedented ways. In the fashion industry, for example, bloggers, vloggers, Instagram, and Twitter are accelerating trends by highlighting what celebrities wear (from Beyonce's "kale" sweatshirt to virtually any outfit Kate Middleton appears in). In 2012, Michelle Obama wore an affordable red-and-white checked dress from British online fashion retailer ASOS in a photo that was retweeted 816,000 times on Twitter and shared more than four million times on Facebook; it instantly sold out.

Digital platforms enable small businesses, entrepreneurs, and individuals to connect across borders, as we discuss in the next chapter.

Digital goods and services can be delivered instantaneously at very little cost

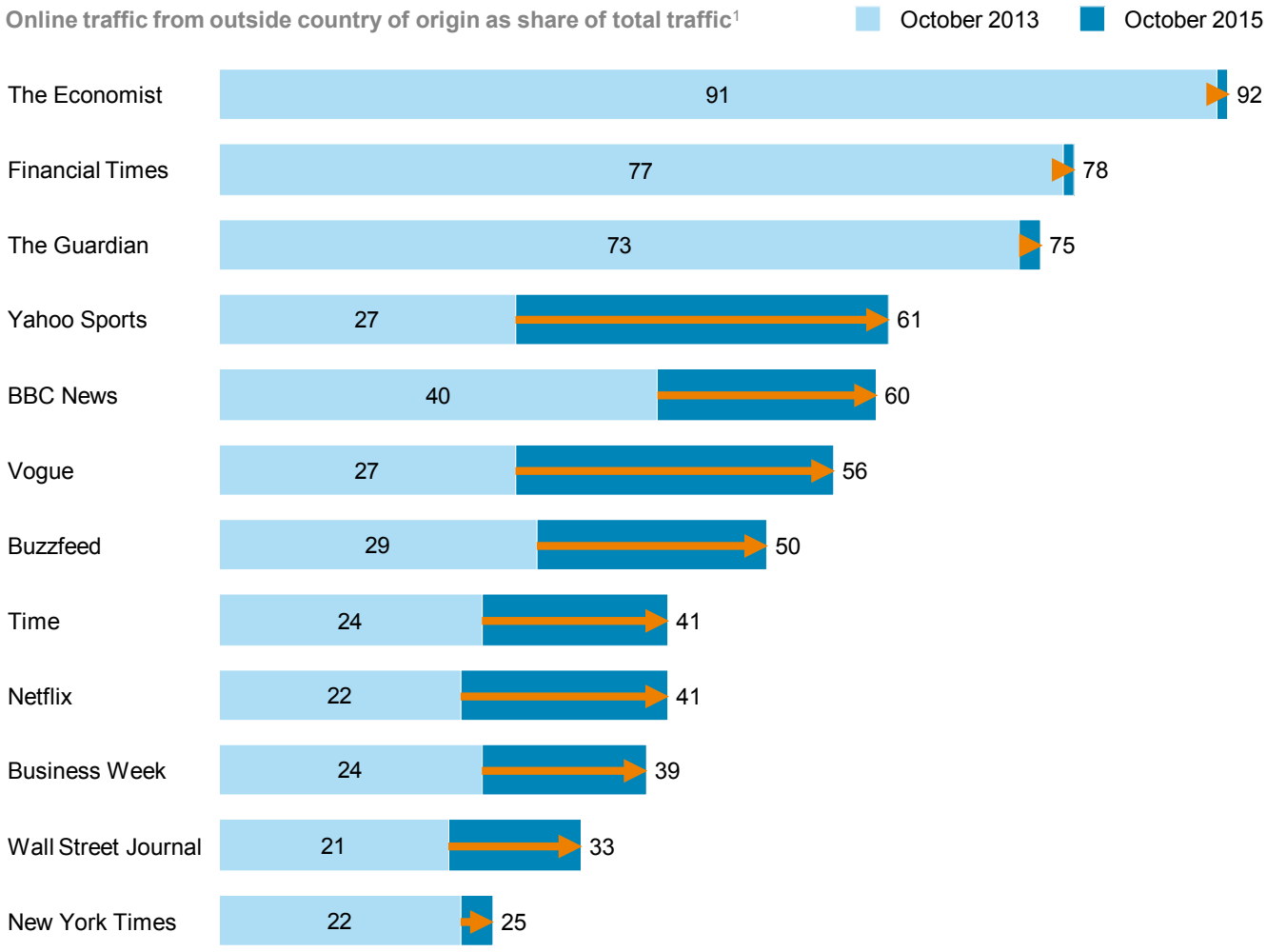
Today there is growing trade in digital goods and services that have near-zero transmission costs. McKinsey research shows that global spending on digital media grew at 18 percent annually from 2008 to 2013, compared with negative 5 percent growth in spending on

traditional media.[35] E-books, apps, online games, MP3 music files and streaming services, software, and cloud computing services can be transmitted instantaneously to customers anywhere in the world there is an Internet connection.

Major media websites, for example, are building global audiences (Exhibit 11). *The Wall Street Journal*'s international site traffic grew from 21 percent of its total online readership in 2013 to 33 percent in 2015. The international share of readers rose from 29 percent to 50 percent for BuzzFeed, and from 27 percent to 61 percent for Yahoo Sports. Roughly three-quarters of *The Guardian*'s online readership is outside the United Kingdom.[36] Netflix expanded its business model from mailing DVDs to selling subscriptions for online streaming in 2007, and by the end of 2015, it had subscribers in more than 190 countries.

Exhibit 11

Digital media is attracting global audiences



1 Based on monthly site traffic data from Similar Web.

SOURCE: Similar Web; McKinsey Global Institute analysis

[35] The McKinsey global media report defines this as spending on over-the-top (OTT) transactional digital video, OTT subscription digital video, digital recorded music downloads, digital recorded music-streaming subscriptions, consumer magazine digital circulation and advertising spend, daily newspaper digital circulation and advertising spend, electronic consumer books, online video games, mobile video games, and digital learning material. Traditional media consists of spending on physical home video sales and rentals, physical recorded music, consumer magazine print circulation and advertising spend, daily newspaper print circulation and advertising spend, print consumer books, and boxed-console and PC video games, and print education material.

[36] All international site traffic shares based on monthly site-traffic data from SimilarWeb, comparing shares in October 2013 and October 2015.

50M
YouTube views of Adele's "Hello" in the first 48 hours

Companies can take advantage of digital platforms to create international buzz and momentum for global product launches. In 2015, Adele's song "Hello" racked up 50 million views on YouTube in its first 48 hours, for instance. The following month, her smash album *25* was made available on CD and as a digital download (although not through streaming services) featuring the song. It sold 900,000 downloads on the first day, and during its first week of release, it was No. 1 on the download list of iTunes stores in 110 countries.[37] In the United States, 3.38 million copies of the album sold in the first week, the most since Nielsen began tracking point-of-sale music purchases in 1991.

"Digital wrappers" enhance and enable other types of flows

Adding a digital component to traditional types of flows can enhance their value. Automotive manufacturers are racing to develop "connected cars," with features ranging from voice recognition and smartphone functionality to preventive maintenance alerts, hazard reaction, and self-driving capabilities. Logistics companies are using sensors, data, and software to track physical shipments, reducing the volume of goods lost in transit. FedEx, for example, allows customers to monitor the progress of packages almost continuously by placing small tracking devices in them; it also uses sensors to monitor temperature, humidity, barometric pressure, and light exposure for sensitive cargo.[38]

This type of continuous data availability is invaluable for companies that operate long and complex supply chains. One study found that RFID technology can help to reduce inventory costs by up to 70 percent while improving efficiency. Case studies in Germany, including the logistics centers of Hewlett-Packard and BMW, found that the technology reduced losses in transit by 11 to 14 percent.[39] Rio Tinto, for example, transmits data continuously from its mines, processing plants, and vehicle fleets around the world to "excellence centres" located in Brisbane, Australia.

Online user-generated reviews and ratings are another type of digital wrapper. They give many individuals the comfort level they need to conduct a cross-border transaction, whether they are buying a consumer product on Amazon or booking a hotel room thousands of miles away on Airbnb, Agoda, or TripAdvisor. TripAdvisor, for example, has more than 250 million reviews and opinions from travelers on more than 5.2 million businesses and properties globally. A recent survey by the UN World Tourism Organization revealed that 70 to 92 percent of travelers in various advanced economies considered online guest reviews important or very important for their hotel booking decisions—meaning that these reviews influence billions of dollars in cumulative spending.[40]

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37 Clarisse Loughrey, "Adele's new album 25 is No. 1 on iTunes in almost every country in the world," *The Independent*, November 26, 2015.

38 *Disruptive technologies: Advances that will transform life, business, and the global economy*, McKinsey Global Institute, May 2013.

39 Aysegul Sarac, Nabil Absi, and Stéphane Dauzère-Pérès, "A literature review on the impact of RFID technologies on supply chain management," *International Journal of Production Economics*, volume 128, number 1, November 2010.

40 *Online guest reviews and hotel classification systems: An integrated approach*, UN World Tourism Organization, 2014.

DIGITAL GLOBALIZATION IS CREATING NEW CHALLENGES AS WELL AS NEW CHANNELS FOR GROWTH

Just as digitization is transforming individual economies and the business models of individual companies around the world, it is altering the broader global economy—and these shifts are even bigger and more complex since they are taking place across nations with different factor costs, levels of development, and regulatory regimes.

Opening to all types of flows, and particularly data flows and global platforms, has the potential to disrupt traditional industries even as it creates new channels for growth. (For more on the issue of jobs, see Chapter 3.) The ease of comparison shopping on digital platforms, for instance, encourages companies to compete on price. This shift works in the consumer's favor but creates pressure on the bottom line for companies. It is becoming a more competitive world in other ways as well. Digital platforms enable small enterprises and foreign competitors to move into new markets, and technology-powered companies are demonstrating the ability to add new business lines with ease.

Information can be transmitted halfway around the world in the blink of an eye, but so can disruptions. Students can educate themselves online from anywhere on earth, but their view into how other societies live can heighten their impatience with bleak job prospects at home. Social media creates global communities in a positive sense, but it also allows networks of extremists to form and strategize.

A world that runs on data flows is also more vulnerable to grid failures and cybercrime. One study has estimated that cybercrime costs the global economy some $400 billion in annual losses; these can include consumer data breaches, financial crimes, market manipulation, and theft of intellectual property.[41] This is not only a business risk; it can even pose national security risks. The issue of combating global cybercrime is discussed more fully in Chapter 5.

Information can be transmitted halfway around the world in the blink of an eye, but so can disruptions.

THE WORLD IS STILL FAR FROM FLAT

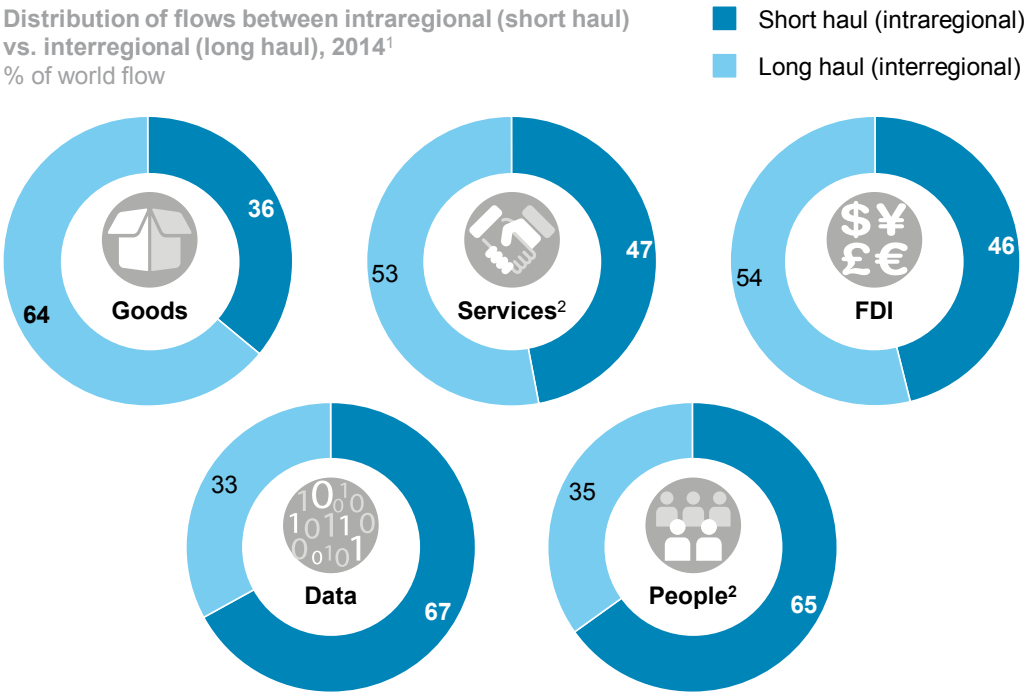
The Internet has enabled the creation of global markets, but it cannot fully erase the barriers of geography. Distance still matters. A significant share of each of the major types of global flows move within well-established regions rather than between them. This is particularly true of people and data flows. But even in the goods trade, where transportation costs have fallen dramatically over the past 25 years, 35 percent of global trade is still regional (Exhibit 12).

[41] *Net losses: Estimating the global cost of cybercrime*, Center for Strategic and International Studies and McAfee, June 2014.

Exhibit 12

While much of the world's trade in goods is long distance, roughly half or more of other global flows move within the same region

Distribution of flows between intraregional (short haul) vs. interregional (long haul), 2014[1]
% of world flow



1 For goods, services, FDI, and travelers we have divided the world into 10 regions; for data flows we have used TeleGeography's six regions.
2 Distribution of services flows for 2014 estimated based on 2011 data; 2013 bilateral traveler data used for people flows.
NOTE: Numbers may not sum due to rounding.

SOURCE: UNCTAD; UN World Tourism Organization; TeleGeography, Global Internet Geography; IMF; McKinsey Global Institute analysis

A look at each country's major trading partner (including exports and imports) reveals that for many countries, nearby neighbors are their largest trade partners. Canada trades heavily with the United States, Argentina and Brazil are major partners, and Germany trades with the rest of Europe (Exhibit 13). There are exceptions to this pattern, however. Notably, China has become the largest trade partner for large swaths of Latin America and Africa, while the United States is China's largest trade partner.

In e-commerce, the distance separating buyers and sellers reduces the volume of transactions that are completed, although to only about half the degree seen in physical trade. This effect may be due to the trust factor, language barriers, the presence of familiar payment systems, and shipping costs. A recent study based on more than ten billion online transactions found that a 0.5 percent increase in the distance between the two countries lowers the volume of online trade between them by 1 percent. Sharing a land border also significantly affects the volume of trade between two countries.[42]

The Internet itself is not a seamless global web, in part because the whole world is not connected. Six billion people do not have high-speed broadband, almost four billion do not have any Internet access at all, and nearly two billion do not have a mobile phone. Digital divides persist across income, age, geography, and gender. In Africa, the richest 60 percent are almost three times as likely to have Internet access as the bottom 40 percent, and the young and urban have more than twice the access of older and rural citizens.[43] These gaps

42 Bo Cowgill and Cosmina Dorobantu, *Worldwide gravity in online commerce*, August 2014.
43 *World development report 2016: Digital dividends*, World Bank, January 2016.

are hard to erase. Consider that electricity has been in use for more than a century—and yet some 1.2 billion people, or 17 percent of the global population, still lacked electricity as of 2013.[44]

Even among those who are connected, cross-border Internet traffic tends to be regional in nature. In 2014, two-thirds of used cross-border bandwidth was intraregional, reflecting to some degree the fact that the world's digital networks have a hub structure. Some academic research has characterized the Internet not as a global web but as a series of small worlds. Barnett and Park examine the network structure of the global Internet by looking at international hyperlink connections, cross-border bandwidth, and shared website use (from a website and national perspective). They find that the global Internet is very concentrated among a few core countries that serve as hubs for broader regions drawn together by shared language, cultural similarities, and historical ties. Their analysis of shared website use (web perspective) resulted in a Gini coefficient of .930, indicating that the Web-based network is very centralized among a small group of core countries: the United States, the United Kingdom, China, Germany, Brazil, France, India, Italy, Japan, Spain, and Russia.[45]

Exhibit 13

China, the United States, or Germany is the major trading partner for most countries

Largest trading partner in goods (exports and imports combined), 2014

NOTE: Data omitted for some small nations as indicated in gray.

SOURCE: UNCTAD; McKinsey Global Institute analysis

[44] *World energy outlook 2015*, International Energy Agency, November 2015.

[45] George A. Barnett and Han Woo Park, "Examining the international Internet using multiple measures: New methods for measuring the communication base of globalized cyberspace," *Quality and Quantity*, volume 48, issue 1, January 2014.

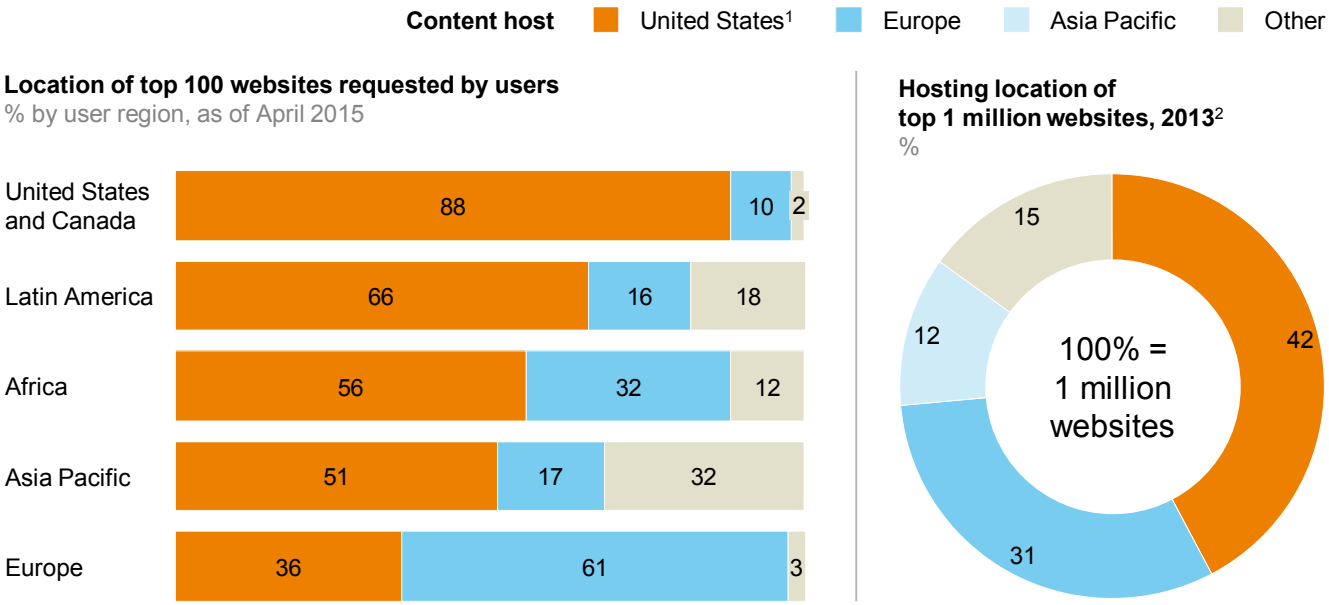
>50%
US share of digital content consumed in all regions except Europe

Another reason that the Internet is not yet fully global is that content production is concentrated in a few advanced economies. Hollywood, for example, has ruled the global movie box office and the world's television screens for decades, creating entertainment that attracts hundreds of millions of viewers worldwide. The United States continues to play that role in a more digital world. It accounts for more than 50 percent of online content consumed in all regions except Europe (Exhibit 14).[46] The Internet is a democratizing force in many regards, but some of the legacy structures and disparities that exist in the offline world persist online.

Still, the rise of cross-border data flows and a truly global Internet infrastructure is still in its early days. Just 15 years ago, cross-border data flows were negligible. As the underlying infrastructure continues to expand and as more users around the world join, the barriers of distance, languages, and cultural norms could erode, creating a more unified world.

Exhibit 14

The United States is the largest producer of digital content for Internet users across the globe



1 Includes United States and Canada for location of top 100 websites requested by users.
2 Based on Pingdom analysis of Alexa top 1 million websites.

SOURCE: TeleGeography, Global Internet Geography; Pingdom; McKinsey Global Institute analysis

•••

Immense flows of goods, services, finance, people, and data move across the world's borders, creating a more global world. The pervasiveness of Internet connectivity and the spread of digital technologies enable data and information to travel around the world instantaneously, and this capability is transforming all other types of flows. These forces have unleashed an accelerating wave of change and intensifying global competition. As digital platforms create new global marketplaces, they are making globalization a more inclusive phenomenon. Chapter 2 will discuss how individuals and small businesses—in advanced and emerging economies alike—are using these digital platforms to form their own global connections.

[46] TeleGeography, Global Internet Geography.

2. DIGITAL PLATFORMS OPEN THE DOOR TO NEW PARTICIPANTS

Globalization is no longer just the purview of the world's largest multinational corporations. Today digitization has erased many of the barriers that once prevented small and medium-sized enterprises (SMEs), entrepreneurs, and ordinary citizens from making cross-border connections.

Companies once had to grow to substantial size before they could afford the resources needed to export, but digitization has dramatically reduced the minimum scale required to do business across borders. Small businesses are joining the biggest e-commerce marketplaces to connect with customers and suppliers anywhere in the world. Capital is available for microenterprises on platforms such as Kickstarter, where close to 3.3 million people representing nearly all countries made pledges in 2014.[47] More than nine million freelancers from 180 countries have connected with clients on Upwork for assignments such as web development, graphic design, and marketing.[48]

The more inclusive nature of digital globalization has significant implications for businesses and economies, particularly in developing countries. In these nations, companies and individuals can use digital platforms as a way to overcome constraints in their local markets and tap into global customers, suppliers, financing, and talent. Instead of waiting for the benefits of globalization to trickle down from large corporations, SMEs can become micro-multinationals in their own right, and startups can be "born global." Individuals can discover opportunities, information, and ideas from anywhere in the world.

Instead of waiting for the benefits of globalization to trickle down from large corporations, SMEs and startups can go global in their own right.

SMALL AND MEDIUM-SIZED BUSINESSES ARE BECOMING MICRO-MULTINATIONALS

The ability of SMEs to reach global audiences supports economic growth. Digitization has empowered many to transform themselves into "micro-multinationals." Digital platforms provide small firms with "plug-and-play" infrastructure and the opportunity to put themselves in front of an enormous built-in global customer base.

Consider all of the tools and platforms that a small Chinese manufacturer has at its disposal when it becomes a Taobao merchant. The company can open and customize a Taobao "storefront" for free using a mobile app and upload its merchandise for sale. It can communicate with customers using an instant messaging service, handle payments through Alipay, choose an Alibaba-affiliated logistics company for shipping, place targeted digital ad buys through Alimama, and get a small loan instantly from an Alibaba microfinance subsidiary that can evaluate the merchant's credit based on data about its business

47 Kickstarter, 2014: Year in Review presentation.
48 Elance-oDesk annual impact report, 2014.

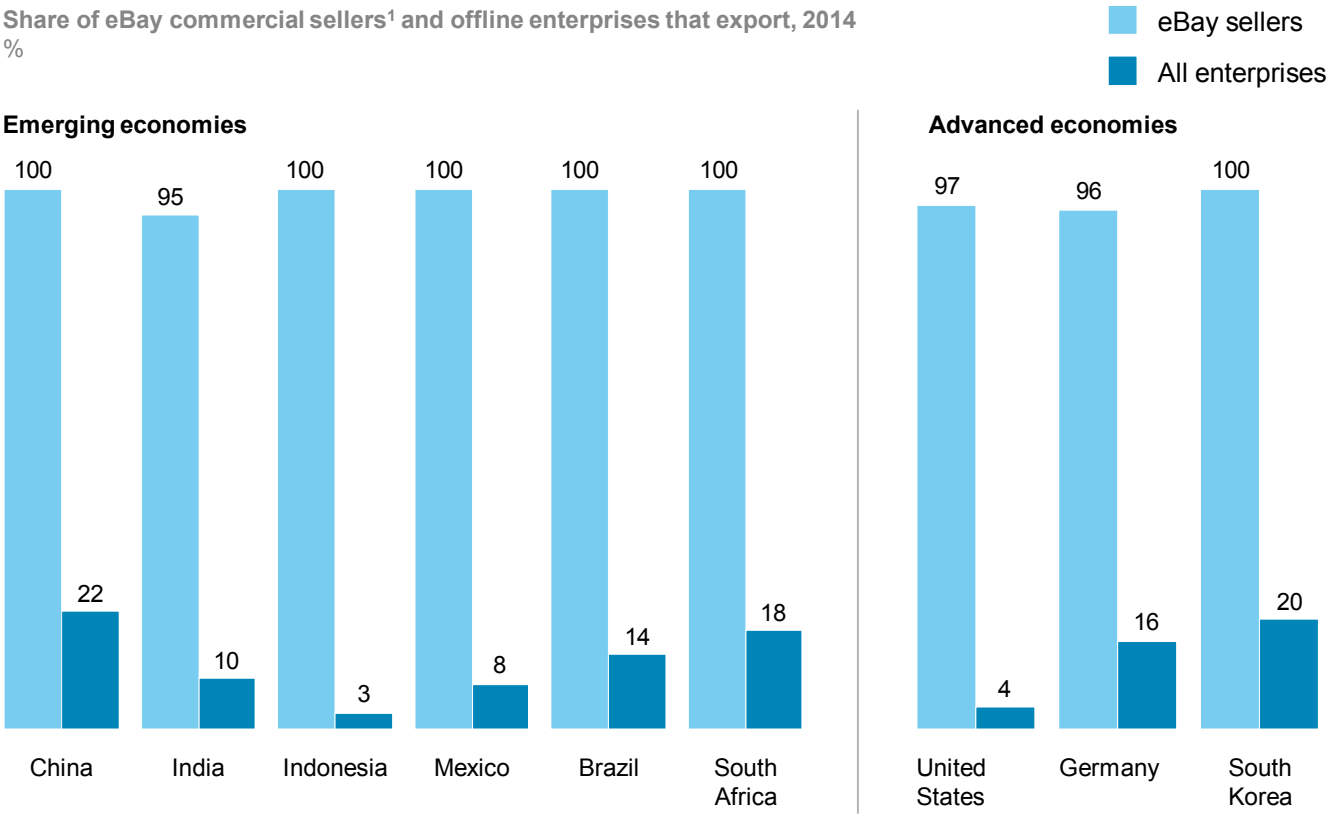
performance on the platform. Finally, the company can use Alibaba itself to buy supplies and professional services.[49]

Similarly, eBay has been helping merchants sell internationally by offering features such as the ability to be featured on eBay sites in other countries, a global shipping program, and the option to clear transactions with PayPal. One study found that more than 35 percent of the top 1,000 eBay sellers have significant cross-border trade, with premium or featured eBay stores in other countries.[50] The company's own analysis across select emerging and advanced economies shows that the share of SMEs that export is sharply higher on eBay's platform than among offline businesses of comparable size (Exhibit 15). Small businesses can use platforms to reach a greater number of markets: in China, South Korea, Indonesia, Thailand, and South Africa, 90 percent or more of eBay sellers export to more than ten international markets.[51]

Exhibit 15

eBay enables SMEs to attain global reach that comparable offline businesses have not achieved

Share of eBay commercial sellers[1] and offline enterprises that export, 2014
%



1 eBay commercial sellers are defined as sellers with sales of over $10,000 and at least 10 transactions in previous year.

SOURCE: eBay; World Bank Enterprise Surveys (using latest data available); McKinsey Global Institute analysis

PayPal enables cross-border transactions by acting as an intermediary for SMEs and their customers. Participants from emerging economies are senders or receivers in 68 percent of cross-border PayPal transactions. PayPal also helps facilitate small transactions: the average point-of-sale transaction using a foreign credit card was $169 across four emerging economies in 2013, while a sample of PayPal data from the same year suggests an average

49 "Alibaba defined," Alibaba corporate website. See also *China's e-tail revolution: Online shopping as a catalyst for growth*, McKinsey Global Institute, March 2013.

50 Andy Geldman, "The world's top eBay sellers," *Web Retailer*, February 7, 2014.

51 *Small online business growth report: Towards an inclusive global economy*, eBay Public Policy Lab, January 2016.

transaction sent to emerging economies of just $38. Alipay performs a similar function for Taobao merchants, providing a critical element of trust needed to facilitate transactions.

~10M
merchants operate on Alibaba

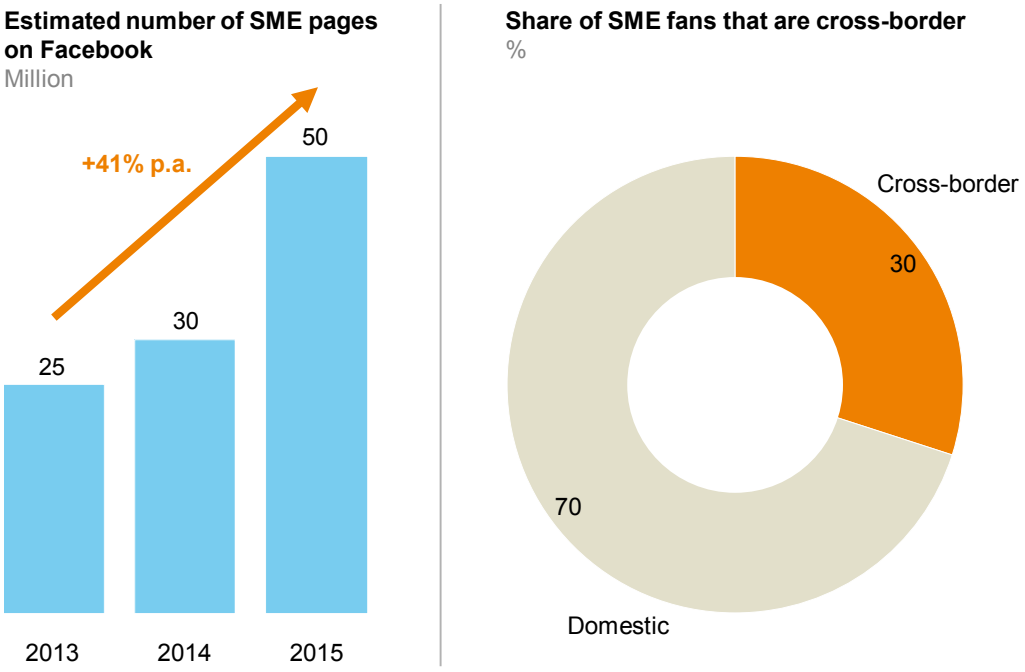
SMEs worldwide are joining e-commerce marketplaces to access business resources and reach new markets. Amazon now hosts two million third-party sellers, while some ten million small businesses have become merchants on Alibaba platforms.[52] Artisans and customers from around the world find each other on Etsy, a marketplace for handcrafted and vintage goods; nearly 30 percent of its gross merchandise sales are international.[53] More than 20,000 independent designers and artists showcase their work on Pinkoi, a Taiwan-based online marketplace. The company has connected with customers in more than 47 countries, using Facebook to expand its reach throughout the Asia-Pacific region.

Cross-border B2B e-commerce sales were approximately a $1.8 trillion to $2 trillion market in 2014. By 2020, cross-border e-commerce sales to consumers are projected to hit $1 trillion, accounting for almost 30 percent of total B2C sales.

For businesses, the biggest social media platforms represent a huge base of potential customers with built-in ways to reach them effectively and directly. Facebook estimates that more than 50 million SMEs are on its platform, up from 25 million in 2013, and some 30 percent of their fans are cross-border (Exhibit 16). To put this number in perspective, consider that the World Bank estimated there were 125 million micro, small, and medium-sized enterprises in the 132 countries in its database in 2010.[54] This points to the importance of social media exposure as a crucial marketing tool, particularly for companies that hope to raise their global profile.

Exhibit 16

50 million SMEs use Facebook to find customers, and 30 percent of their fans are from other countries



SOURCE: Facebook; McKinsey Global Institute analysis

[52] Amazon.com company facts, corporate website; Jack Ma, "America's online sales opportunity in China," *The Wall Street Journal*, June 8, 2015.

[53] 2015 third-quarter financial results, Etsy.

[54] Khrystyna Kushnir, Melina Laura Mirmulstein, and Rita Ramalho, *Micro, small, and medium enterprises around the world: How many are there, and what affects the count?* World Bank/IFC, 2010.

The increasing ability of SMEs to participate directly in globalization is a relatively new phenomenon, but it is starting to show up in national statistics. It is most clearly seen in the United States, where the share of exports by large multinational corporations dropped from 84 percent in 1977 to 50 percent in 2013.[55] Companies with fewer than 500 employees accounted for 97.8 percent of all identified US exporters and 97.2 percent of all identified US importers in 2011. The number of US exporting entities with fewer than 50 employees, in particular, has grown more rapidly than firms with 50 to 500 employees.[56]

An analysis of export data for 16 OECD countries shows mixed evidence of increased SME participation. Between 2005 and 2012, the SME share of total exports grew in ten of the countries, including the United States and France. But SMEs lost ground in exports in the remaining six countries (however, in Portugal and elsewhere, this was likely due to tightening access to credit for small businesses during a prolonged financial crisis).

MANY TECHNOLOGY-BASED STARTUPS ARE NOW "BORN GLOBAL"

The ability to connect globally opens new entrepreneurial possibilities for individuals. Anyone with a connection and a great idea can launch a business, drawing on the availability of enterprise software and cheap computing power in the cloud. Academic literature has highlighted the emergence of a new wave of global startups and SMEs that are making the most of these types of Web 2.0 tools to innovate. These capabilities are highly relevant for working with collaborators, customers, and partners in different countries.[57]

Today's digitally powered startups can be born global—attracting users, hiring talent, purchasing inputs, securing funding, and finding mentors across borders from day one. Consider coModule, an Estonian startup that created technology that brings the Internet of Things to electric bikes and scooters. Its prototype was unveiled in Barcelona, its seed funding came from Germany, and its components are sourced from China. The company is scaling up production and eyeing user markets across Europe and Asia.

Digitally powered startups can be "born global," connecting with international customers, suppliers, capital, and mentors from day one.

MGI surveyed 271 startups worldwide through a partnership with 1776, a global incubator and venture fund. By working with 1776's Challenge Cup competition and its Startup Federation program, we were able to expand the reach of the survey to 19 countries. The businesses surveyed included members of the Startup Federation, the Global Accelerator Network, and current and former competitors at 1776's Challenge Cup events around the world. (See the technical appendix for more detail on the survey.) While these startups represent a more globally connected and tech-savvy selection than the typical small business, the results suggest that even the smallest and youngest enterprises can execute a global vision if their business model is built on digital technologies. This is a relatively new development. When many of today's Internet giants were started, they focused on the US market alone for a significant period before expanding to other countries. Today, many digital-based startups market to a global audience from their inception.

[55] US trade in goods associated with US multinational corporations from US Bureau of Economic Analysis.

[56] "A profile of US importing and exporting companies, 2010–2011," US Census Bureau press release, April 5, 2013.

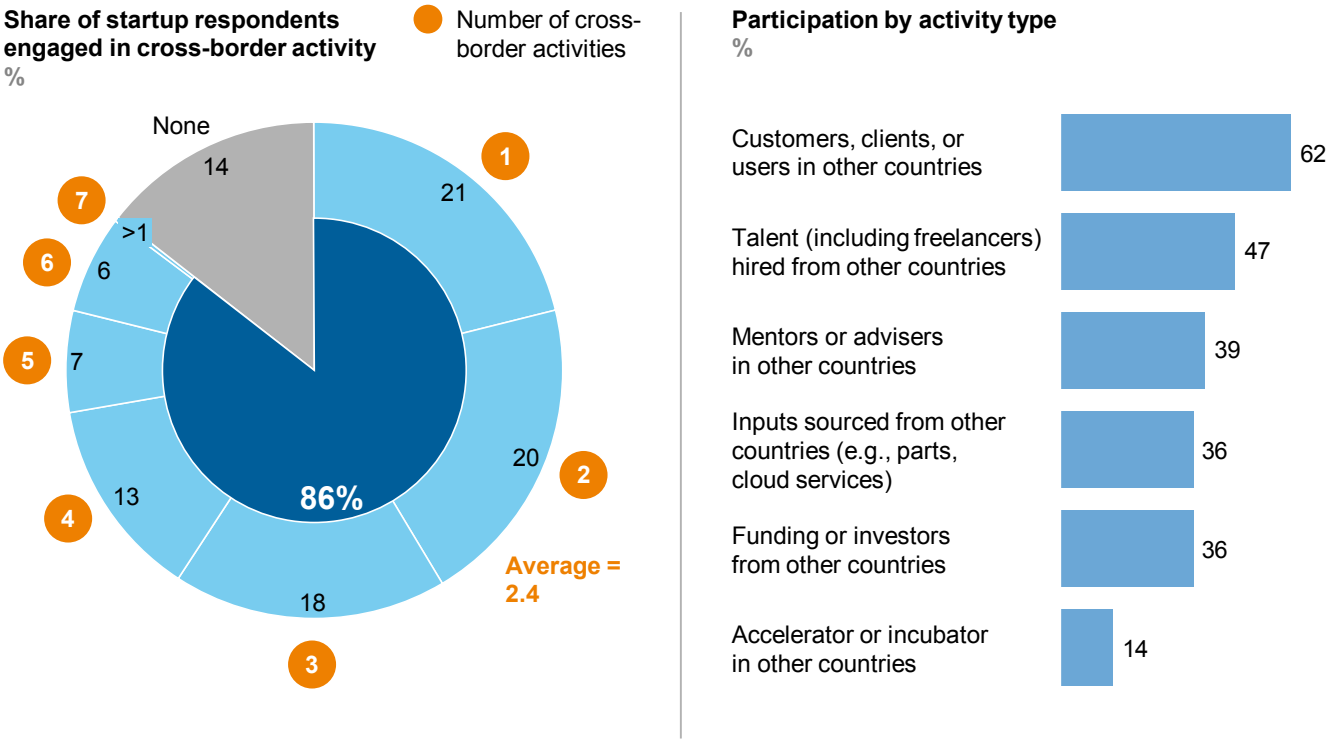
[57] Jim Bell and Sharon Loane, "'New-wave' global firms: Web 2.0 and SME internationalization," *Journal of Marketing Management*, volume 26, issue 3–4, April 2010.

A surprising 86 percent of survey respondents pointed to at least one cross-border activity (Exhibit 17). Almost two-thirds have customers or users in other countries, and almost half reported sourcing talent from other countries. The rate of cross-border participation varies widely by company stage. Companies in the growth and scaling phase report more than twice as many cross-border activities as companies in the concept phase.

Exhibit 17

86 percent of the tech-enabled startups surveyed by MGI engage in at least one cross-border activity

100% = 271 respondents



SOURCE: MGI Global Startup Survey 2015; McKinsey Global Institute analysis

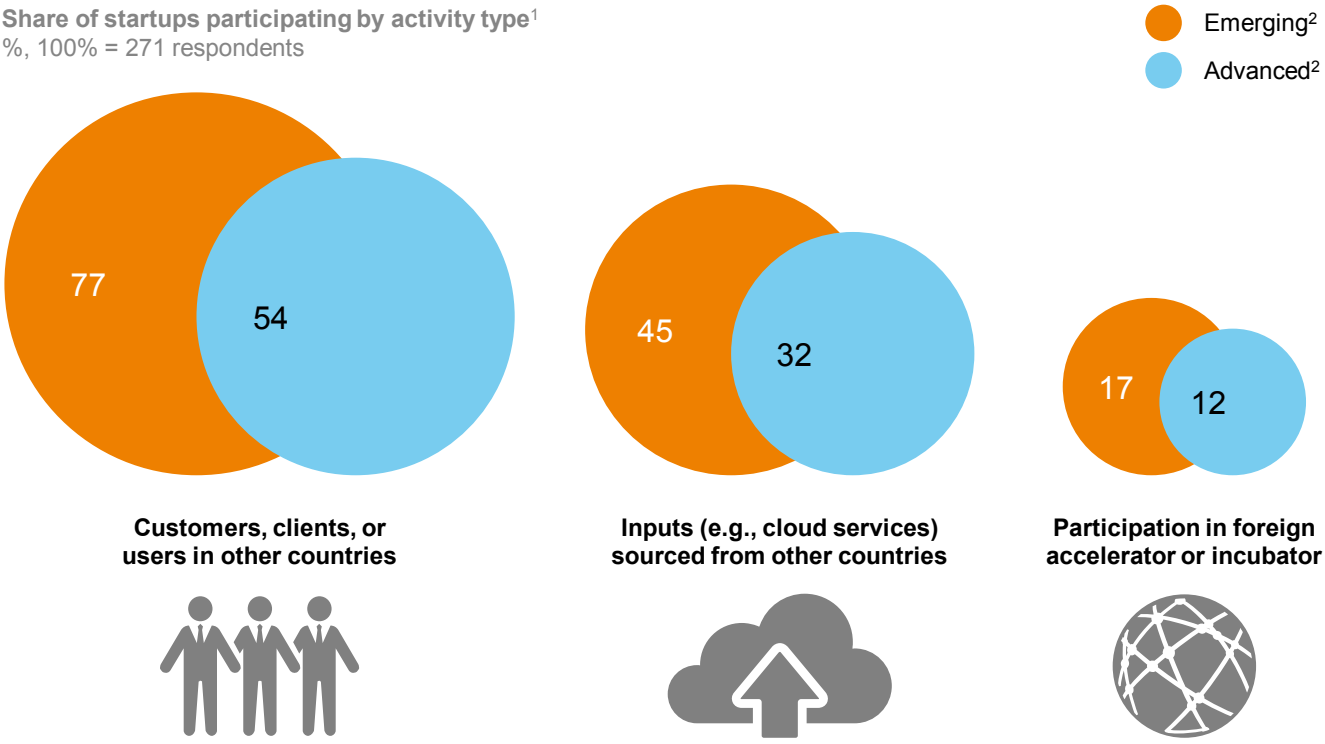
Moreover, the surveyed startups from emerging economies were more global across several dimensions than their counterparts in advanced economies (Exhibit 18). Specifically, they were more likely to report using foreign inputs, participating in an international accelerator or incubator program, and having international customers. Those based in South America had notably more global business activities than those in North America.

This disparity underscores the importance of global digital platforms for startups and small businesses seeking to overcome limited domestic markets and credit constraints. But the surveyed company founders reported a number of reasons for seeking out global ties. MPOWER, a US-based student loan financing company for international students, set out to solve a problem specific to users from other countries: the inability to get loans from traditional banks in the United States. Others, such as South Africa–based Anaso Diabitiz, a diabetes management platform, find that their product is discovered by international consumers through social media. As the product took off in its home market of South Africa, patients in Nigeria and Kenya learned about it through Facebook and Twitter—and today two-thirds of the subscribers are from across the broader African continent and the Middle East.

Exhibit 18

Tech-based startups from emerging economies were more likely than other survey respondents to report seeking out customers and inputs from abroad

Share of startups participating by activity type[1]
%, 100% = 271 respondents



1 The difference in participation rates between developed and emerging startups is statistically significant. P-values for inputs (p = 0.005), incubator/accelerator (p = 0.05), and customers (p = 0.07) are significant at the 0.07 level and below.
2 Emerging economies represented in the survey are Argentina, Armenia, Brazil, China, Colombia, Cyprus, Egypt, Estonia, Hungary, India, Israel, Jordan, Kenya, Mexico, Moldova, Pakistan, Poland, Russia, South Africa, and Ukraine. Advanced economies represented in the survey are Australia, Canada, Germany, Ireland, the United Kingdom, and the United States.

SOURCE: MGI Global Startup Survey 2015; McKinsey Global Institute analysis

Whether it is deliberate or serendipitous, international cross-pollination is likely to continue and accelerate in a more digitally connected global world. But while digital platforms are enablers for startups, they do not negate the need for local ties and personal connections based on trust. Our surveyed startups continue to find talent in low-tech ways (with almost three-quarters relying on personal referrals), and they rated local mentors as more effective than foreign mentors.

INDIVIDUAL PARTICIPATION HAS GROWING ECONOMIC AND SOCIAL IMPORTANCE

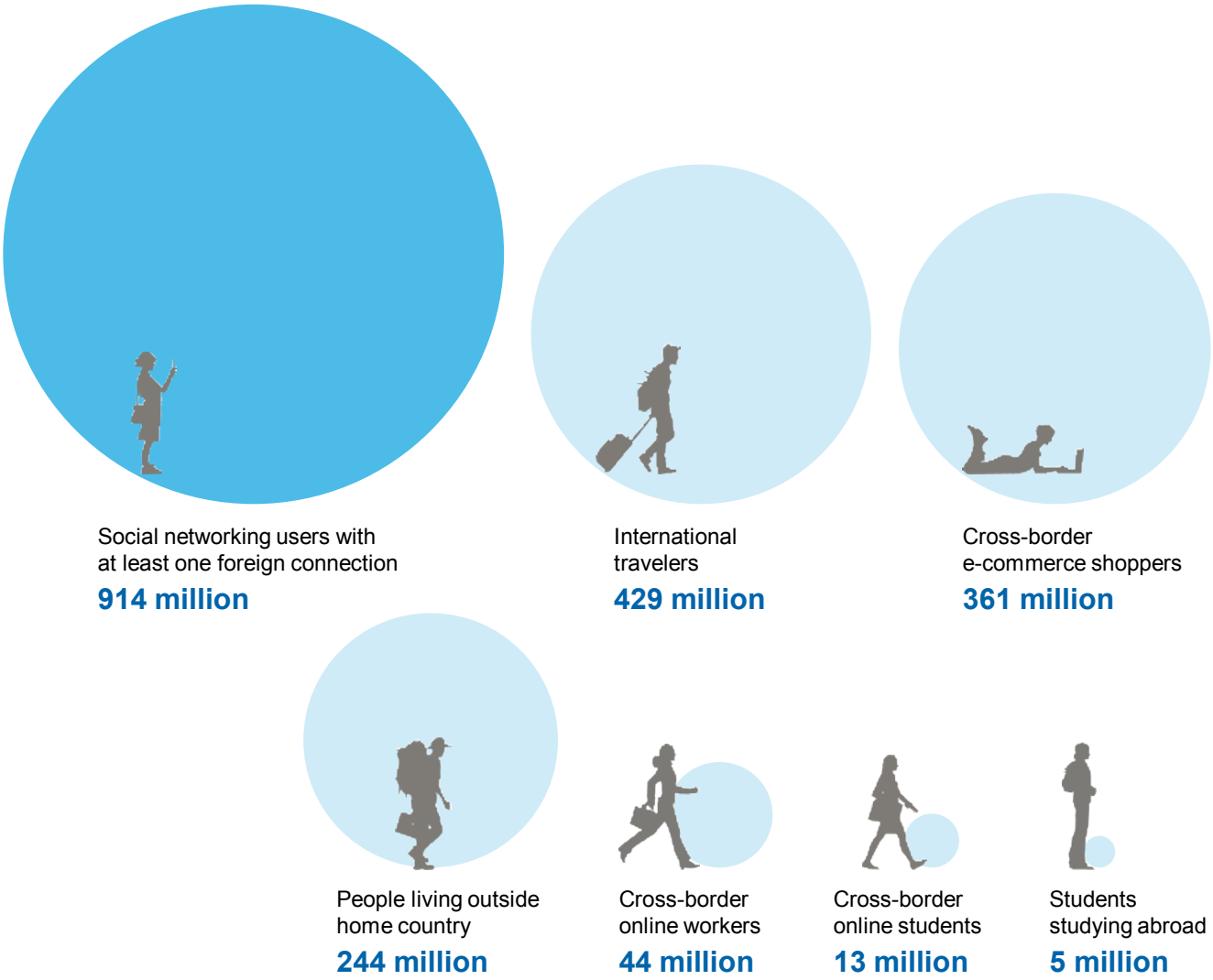
Thanks to social media and other Internet platforms, individuals are forming cross-border connections as well. Some 29 percent of Skype call minutes are cross-border, for instance, compared with less than 2 percent of standard telephone call minutes. Some 92 percent of online project work on Freelancer.com is cross-border, while only 16 percent of the workforce in the United States and 7 percent of the workforce in the European Union is foreign-born. Some 37 percent of Khan Academy students are from foreign countries, while only 8 percent of all tertiary students in the OECD are foreign-born.

We estimate that nearly one billion individuals around the world are direct participants in some form of globalization (Exhibit 19). MGI analysis of international ties on Facebook, Twitter, LinkedIn, and WeChat shows that some 914 million people have at least one international connection on a social media platform (even adjusting for overlap between users of these platforms). Each year, some 360 million people participate in cross-border

e-commerce.[58] Forty-four million individuals provide services to clients in other countries on the biggest digital marketplaces for freelance work.[59] We estimate that some 12.6 million people take part in online courses developed and offered in other countries.[60]

Exhibit 19

Individuals are participating in globalization, and 914 million have cross-border social media connections



NOTE: Numbers adjusted to account for overlap between platforms and for individuals making multiple international trips in the same year.

SOURCE: Facebook; AliResearch; US Department of Commerce; OECD; World Bank; McKinsey Global Institute analysis

In addition to facilitating cross-border e-commerce, the biggest digital platforms have built global communities that generate tremendous flows of personal communication, information, news, and content. Facebook averaged more than a billion daily active users in December 2015, and Google processes some 3.5 billion searches a day.[61] Tencent's WeChat instant messaging platform now has 549 million monthly active users—a number

58 *Cross-border B2C e-commerce market trends*, AliResearch and Accenture, June 2015.

59 Rate observed from site traffic on Freelancer.com applied to total participation in the major platforms described in Siou Chew Kuek et al., *The global opportunity in online outsourcing*, World Bank and Dalberg Global Development Advisors, June 2015.

60 We sum the total membership of leading educational platforms (Coursera, Khan Academy, edX, and Udacity) and assume the Khan Academy cross-border rate of 37.2 percent for all.

61 Corporate websites and Internet Live Stats.

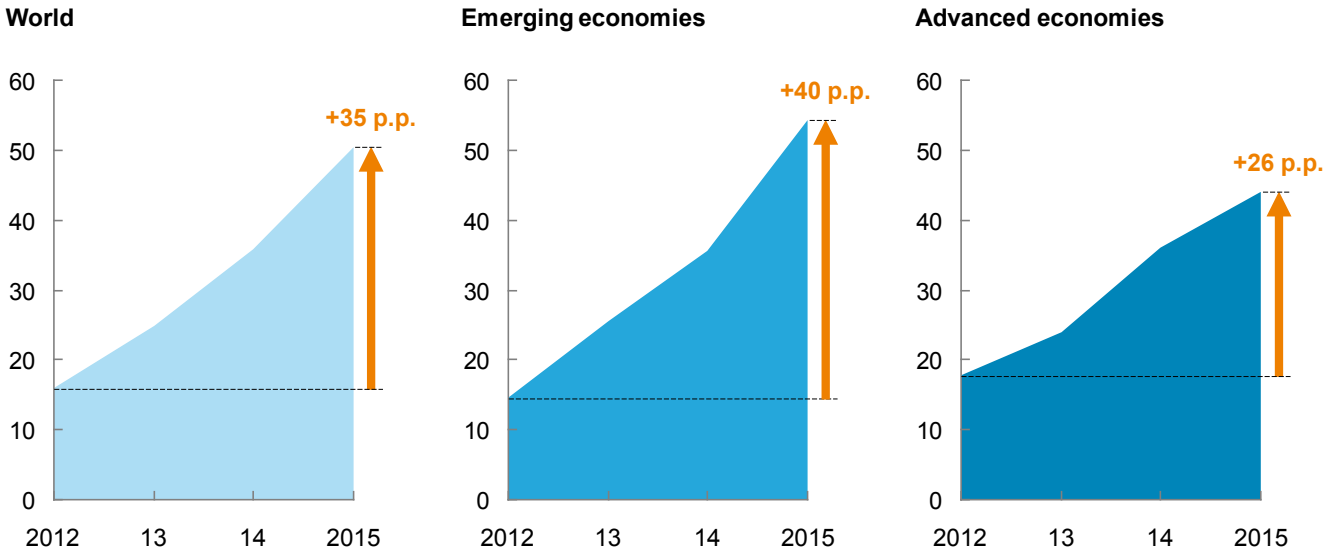
that is beginning to approach the population of the entire ASEAN region.[62] YouTube has more than one billion users, and 300 hours of video are uploaded every minute.[63]

Furthermore, social media plays an increasingly important role in connecting people in developing nations to the rest of the world, opening new avenues for work, learning, and communication. The share of Facebook users with cross-border friendships is higher in emerging countries than in developed countries (54 percent vs. 44 percent). It is growing rapidly, having increased by 3.7 times since 2012 (Exhibit 20). Almost half of those followed by Twitter users in emerging economies are from other countries, compared with just under 40 percent in advanced economies. This could be because social media users in emerging economies would already tend to be among that country's most tech-savvy and globally minded segment of the population. But it also speaks to the point that people in developing countries are embracing social media platforms as their link to the rest of the world.

Exhibit 20

The share of Facebook users with at least one international friend tripled in just three years, with the fastest growth in emerging economies

% of monthly active Facebook users with at least one international friend[1]



1 Weighted by number of Internet users to arrive at world average and averages for emerging and advanced economies.

SOURCE: Facebook; World Bank; UNCTAD; McKinsey Global Institute analysis

Virtual connections are changing the way people interact with friends, family, and even strangers across borders—and they sometimes spill over into the physical world. In the 24 hours after the 2015 terrorist attacks in Paris, 4.1 million people in and around the city marked themselves as safe through Facebook's Safety Check feature, triggering notifications to 360 million users around the world that their friends and family were unharmed.[64] Earlier that year, after a major earthquake struck in Nepal, Facebook implemented a special "donate" button that brought in more $15 million in contributions to relief efforts from 770,000 people in more than 175 countries.[65]

62 Tencent corporate financial statement, first quarter 2015.

63 YouTube corporate website.

64 Robinson Meyer, "One small worry about Facebook Safety Check," *The Atlantic*, November 18, 2015.

65 Ken Yeung, "Over 770K Facebook users donated $15M to support Nepal earthquake relief," VentureBeat, September 28, 2015.

Of course, there are limits to the depth and endurance of online connections. Oxford anthropologist and psychologist Robin Dunbar famously concluded that the maximum number of casual friendships the human brain can sustain is around 150, while the average Facebook user has 388. His findings have been borne out by subsequent researchers applying his theory to the world of social media.[66] A study of one million Coursera users taking massive open online courses offered by the University of Pennsylvania concluded that only around half of those who register for a course view any lectures, and the average completion rate was just 4 percent.[67] And while social media can be an effective political organizing tool, it can also be a vehicle for what has been termed "clicktivism," in which large numbers of people join a cause by liking, tweeting, or signing an online petition but are not motivated to take real action.

190+
countries with Airbnb listings

Despite these caveats, there are in fact ways in which online connections can translate into tangible economic impact. Digital platforms such as Expedia, TripAdvisor, Yelp, Agoda, and many more facilitate leisure travel and tourism. Founded in 2008, Airbnb has quickly built a network of hosts in 34,000 cities in more than 190 countries. Within 40 days of the United States and Cuba reopening ties, the platform was listing some 2,000 properties on the island.[68] Couchsurfing.com has ten million members around the globe; its network of free homestays gives travelers on a tight budget the means to see the world and take part in face-to-face cultural exchanges.[69]

Digital networks may also facilitate migration. Online talent platforms aggregate data on candidates and job openings across broader regions and even globally, enabling users to find international career opportunities.[70] As social media use becomes more ingrained into daily life around the world, expatriates have a way to stay in closer touch with family and friends in their homeland, reducing the social and emotional hardship of moving to a new country. Social media can also notify migrants and refugees of changes to government policies. When a government agency in Nuremburg tweeted in German that it would loosen immigration protocols for Syrian citizens, the news went viral and led to a rush of 20,000 refugees over the German border within a week.[71]

Digital platforms offer individuals new ways to learn, collaborate, and develop new skills—and to showcase their talents to potential employers. Some 44 million people worldwide find freelance work on Freelancer.com, Upwork, and other digital platforms, while nearly 400 million have posted their professional profiles on LinkedIn. Individuals with creativity and drive can use digital platforms to propel themselves onto a global stage in ways that would have been unimaginable in the pre-digital world (see Box 2, "The YouTube economy").

66 R. I. M. Dunbar, "Coevolution of neocortical size, group size, and language in humans," *Behavioral and Brain Sciences*, volume 16, issue 4, December 1993. See also Nicole Ellison, "Connection strategies: Social capital implications of Facebook-enabled communication practices," *New Media & Society*, volume 13, number 6, September 2011; Bruno Goncalves, Nicola Perra, and Alessandro Vespignani, "Modeling users' activity on Twitter networks: Validation of Dunbar's number," *PLOS One*, volume 6, number 8, 2011; and Maria Konnikova, "The limits of friendship," *The New Yorker*, October 7, 2014.

67 Laura Perna et al., "The life cycle of a million MOOC users," presented at the MOOC Research Initiative Conference in Austin, Texas, December 5, 2013.

68 Airbnb corporate website. See also Mark Scott, "What Uber can learn from Airbnb's global expansion," *The New York Times*, July 7, 2015.

69 Couchsurfing.com, About Us.

70 *A labor market that works: Connecting talent and opportunity in the digital age*, McKinsey Global Institute, June 2015.

71 Andrea Thomas, Matt Bradley, and Friedrich Geiger, "Obscure German Tweet helped spur migrant march from Hungary," *The Wall Street Journal*, September 10, 2015.

Box 2. The YouTube economy

YouTube is proving to be a powerful marketing tool for global brands and established stars, but it can also launch individuals from obscurity to opportunity. Consider Havard Rugland, a Norwegian whose dreams of playing American football once seemed far-fetched. But his mind-boggling YouTube video of his kicking skills received three million hits, earning him tryouts and an NFL signing (if not yet stardom).

A number of self-made YouTube stars have created channels that attract millions of subscribers—and millions in ad revenue. While many adults may not recognize their names, teenagers certainly do. A recent survey by *Variety* asked teens to rank celebrities on various measures of influence, and eight of the top ten slots went to YouTube creators rather than to more mainstream media stars.[1]

Felix Kjellberg, the Swedish Internet sensation known as "PewDiePie," became a sensation after posting videos of himself playing video games. He eventually racked up some 40 million subscribers to his YouTube channel and millions in annual earnings. Now he and some of his fellow YouTube stars will be showcased on Revelmode, a digital network backed by Disney-owned Maker Studios.[2] DisneyCollectorBR, one of the most popular channels on YouTube, is devoted simply to unwrapping and critiquing toys. More than eight million subscribers follow beauty vlogger Michelle Phan's channel for makeup tutorials. She parlayed this influence into deals with Lancôme and L'Oréal—and eventually into her own subscription cosmetics company, recently valued at $500 million.[3]

A number of singers have been discovered after posting videos of themselves performing on YouTube. They include Cody Simpson, Austin Mahone (who became an opening act for Taylor Swift), and 5 Seconds of Summer (who wound up touring with One Direction). Arnel Pineda, who spent part of his youth homeless in the Philippines, famously posted videos of his band performing Journey covers—and went on to be hired by Journey as its lead singer. The Weeknd, spotted on YouTube by Drake, dominated the Billboard charts in 2015 and recently earned an Oscar nomination for best original song.

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1 Susanne Ault, "Digital star popularity grows versus mainstream celebrities," *Variety*, July 22, 2015.

2 David Pierson, "YouTube sensation PewDiePie launches his own network," *Los Angeles Times*, January 13, 2016.

3 Natalie Robehmed, "How Michelle Phan built a $500 million company," *Forbes*, October 5, 2015; Andrea Chang, "YouTube's biggest stars are cashing in offline," *Los Angeles Times*, August 7, 2014.

Platforms such as Facebook, Instagram, YouTube, and Twitter, along with countless blogs and comment boards, are changing the nature of media content in fundamental ways. For decades, movies, music, and news were created by large companies and consumed by passive audiences. But now individual users anywhere in the world can comment, debate, share, parody, co-create, and upload their own original content. The Internet has turned a one-way monologue into a two-way digital conversation in which anyone can make their voice heard.

•••

Globalization was once driven almost exclusively by the world's governments, large multinationals, and major financial institutions. Today artisans, app developers, freelancers, and all manner of startups can participate. SMEs can scale up rapidly and even go head-to-head with more established businesses. And individuals from Canada to Cameroon can forge their own global connections, whether for business, personal ties, entertainment, creativity, or simple curiosity about the world beyond their own borders. While this capability is a tremendous social good, it does not mean that all countries share in the benefits of globalization equally, as Chapter 3 will discuss.

3. HOW COUNTRIES, CITIES, AND REGIONS ARE CONNECTING

Now that commerce, data, and people move more fluidly across the world's borders, most countries have been drawn into networks of global flows to at least some degree. But their connectedness varies enormously, and there is room for nations to play different types of roles within those networks.

Our previous report on global flows introduced the MGI Connectedness Index to provide a multidimensional picture of how extensively countries around the world are engaging with the broader global economy.[72] But globalization does not stand still. Our latest index offers an updated snapshot—and by using improved data sources, it also brings our picture of the world's connections into sharper focus. This year's index finds Singapore, a small country that punches far above its weight in all types of global flows, at the top of the rankings. It is followed by the Netherlands (one of Europe's main digital hubs), the United States, Germany, Ireland, and the United Kingdom.

Singapore, the Netherlands, the United States, Germany, Ireland, the United Kingdom, and China top the latest MGI Connectedness Index.

However, nation-states are not the only unit of analysis for understanding globalization. Within countries, individual cities and states are pursuing their own opportunities to take part in global flows. We find that there are only eight truly "global" cities, most of which are in advanced economies. Some states and provinces, such as California and Guangdong, have developed such extensive international ties that they should be considered major players in the global economy in their own right. At a broader level, larger trading blocs and various regions of the world have different flow dynamics and levels of connectedness. This view reveals that regions populated by countries that rank lower on our Connectedness Index, such as those in Africa and Latin America, could start the process of deepening their global ties by focusing on interactions with their neighbors. Measuring globalization through each of these lenses provides additional insights into how the world's web of connections is constantly evolving.

SINGAPORE TOPS THE LATEST MGI CONNECTEDNESS INDEX

The MGI Connectedness Index offers a comprehensive ranking for 139 countries based on inflows and outflows of goods, services, finance, people, and data. For each country, it takes into account the size of each flow relative to GDP or population (flow intensity); it also considers that country's share of the global total within each type of flow. The combination of these two factors results in a "connectedness score" for each type of flow. To gauge the overall connectedness of a given country, we calculate an average of its score on each of the five flows. (See the technical appendix for a full discussion of methodology.)

[72] *Global flows in a digital age: How trade, finance, people, and data connect the world economy*, McKinsey Global Institute, April 2014.

Our index is not the only ranking that examines how countries participate in globalization.[73] Other studies differ in the metrics included and how each is weighted. Some look at a combination of flows and other indicators such as trade barriers. Others also include measures of cultural globalization. The technical appendix of this report provides an overview of several of these indexes and their key differences.

We believe that our Connectedness Index is the simplest, most transparent measure of how countries are actually participating in globalization, or their openness to all types of flows. In addition, our index methodology controls for the size effect of a country when measuring openness. Some other indexes focus solely on flow intensity, examining each country's level of trade or capital flows relative to GDP. However, in dollar terms, this leaves the world's largest economies—notably the United States and China—looking comparatively closed; their domestic markets are so large that only a relatively small share of their economic activity is cross-border. Conversely, Luxembourg, Singapore, and other smaller countries inevitably have larger flows of goods, services, and finance relative to the size of their economies. We therefore combine flow intensity with each country's share of the global total to offer a more accurate perspective on its significance in world flows.

Exhibit 21 shows the index rankings for the top 25 countries along with a selection of other major advanced and emerging economies. The technical appendix contains the complete results for all 139 countries we analyzed.

Singapore claims the top spot in the rankings this year. Its globalization journey began decades ago when it emerged as Southeast Asia's global shipping hub, particularly for oil and fuels. The nation also adopted four official languages (English, Mandarin, Tamil, and Malay); this not only reflected its multicultural population but also positioned the country to do business with the world. In recent decades, Singapore has implemented an explicit strategy to become a regional hub for services and finance; attracting skilled international talent and establishing tax policies and incentives to draw FDI were key priorities to make this a reality. Singapore ranks second overall in the World Economic Forum's Global Competitiveness rankings, with particularly high scores for infrastructure, higher education and training systems, and transparent and efficient institutions. It is also one of the most digitally wired countries in the world; government statistics show that 87 percent of households had broadband access in 2014.

Following Singapore are the Netherlands, the United States, Germany, Ireland, and the United Kingdom. All of these countries have slightly different profiles. The Netherlands is a major hub for Europe's data traffic as well as a port and distribution point for traded goods. It has created tax and regulatory regimes to become a major financial center and to attract the holding companies and subsidiaries of many major corporations, boosting both financial flows and services trade. Ireland has taken a similar approach, establishing corporate tax and regulatory policies to attract high levels of FDI and significant trade in services. A long list of major US companies, including some of the biggest tech and pharmaceutical firms, have incorporated or established European operations in Ireland because of its tax advantages. In fact, foreign-owned enterprises contribute 55 to 60 percent of the gross value added of all companies located there. As a result, Ireland rose from No. 14 in MGI's previous index to No. 5 in this year's ranking.

[73] See, for example, Pankaj Ghemawat and Steven A. Altman, *DHL Global Connectedness Index 2014: Analyzing global flows and their power to increase prosperity*, DHL, 2014; and *The ICT globalisation index*, the Economist Intelligence Unit, 2014.

Exhibit 21

MGI Connectedness Index

Country connectedness index and overall flows data, 2014
Rank of participation by flow as measured by flow intensity and share of world total

Connectedness index rank 1–10 | 11–25 | 26–50 | >50 **Flow intensity** 100+ | 70–99 | <70

Rank	Country	Score	Connectedness Index rank					Flow value[1] $ billion	Flow intensity[2] % of GDP
			Goods	Services	Finance	People	Data		
1	Singapore	64.2	1	2	2	12	6	1,392	452
2	Netherlands	54.3	3	3	6	21	1	1,834	211
3	United States	52.7	7	7	3	1	7	6,832	39
4	Germany	51.9	2	4	8	3	2	3,798	99
5	Ireland	45.9	32	1	1	28	9	559	227
6	United Kingdom	40.8	13	5	5	6	3	2,336	79
7	China	34.2	4	16	4	82	38	6,480	63
8	France	30.1	11	8	9	7	4	2,262	80
9	Belgium	28.0	5	6	33	33	8	1,313	246
10	Saudi Arabia	22.6	20	28	27	2	53	790	106
11	United Arab Emirates	22.2	6	23	17	4	46	789	196
12	Switzerland	18.0	12	11	10	17	13	848	115
13	Canada	17.3	16	22	11	11	18	1,403	79
14	Russia	16.1	21	25	18	5	25	1,059	57
15	Spain	14.4	25	13	19	14	16	1,105	79
16	Korea	14.0	8	12	28	50	44	1,510	107
17	Italy	13.4	17	18	24	16	19	1,587	74
18	Sweden	13.0	29	14	22	31	5	572	100
19	Austria	11.7	26	17	31	20	12	470	108
20	Malaysia	11.6	9	19	25	26	43	610	187
21	Mexico	10.7	14	63	34	18	41	1,022	80
22	Thailand	10.7	10	15	36	44	64	605	162
23	Kuwait	10.6	37	46	13	13	75	306	153
24	Japan	10.5	15	20	12	81	20	2,498	54
25	Kazakhstan	10.0	48	73	41	8	57	176	83
26	Ukraine	9.8	38	39	87	10	34	133	101
27	Australia	9.7	30	34	21	15	33	825	57
28	Denmark	8.9	35	9	32	41	11	369	108
29	Jordan	8.8	73	50	75	9	83	50	138
30	India	8.5	24	10	35	58	70	1,316	64
32	Czech Republic	7.5	18	33	57	59	15	397	193
34	Poland	7.0	23	31	47	34	22	585	107
35	Hungary	6.8	22	30	26	62	17	287	209
36	Norway	6.0	36	24	20	46	24	458	92
37	Vietnam	5.7	19	54	45	103	61	350	188
39	Finland	5.5	46	27	23	70	10	390	144
40	Portugal	5.5	47	36	30	23	31	255	111
41	Turkey	5.1	28	40	53	38	29	521	65
43	Israel	4.9	51	32	49	24	56	248	82
44	Brazil	4.5	41	38	14	125	30	869	37
45	Chile	4.1	45	58	16	102	27	239	92
47	Greece	4.1	60	29	54	35	42	160	67
48	New Zealand	3.9	67	48	61	25	51	130	63
51	Indonesia	3.4	31	49	38	106	76	504	57
53	South Africa	3.3	34	57	52	64	80	277	79
54	Philippines	3.2	54	41	44	52	67	230	81
64	Morocco	2.6	58	43	74	56	65	104	97
73	Egypt	2.2	68	42	69	73	71	158	55
83	Nigeria	1.9	55	76	48	128	98	268	47
86	Peru	1.8	62	88	51	104	49	122	60
118	Kenya	1.3	100	84	127	119	91	35	58

1 Flows value represents total goods, services, and financial inflows and outflows.
2 Flow intensity represents the total value of goods, services, and financial flows as a share of the country's GDP.

SOURCE: McKinsey Global Institute analysis

In contrast, the United States and Germany both follow a generalist model with strength across all five flows. The United Kingdom also has broad participation across flows, with a spike in cross-border service and financial flows, a reflection of London's role as a global financial hub.

China's surge in our rankings is particularly noteworthy. It has climbed from 25th in our previous index to the No. 7 spot. Now the second-largest economy in the world, it accounts for a larger share of all the total world's flows. Although its participation has risen across all types of flows, it is strongest in trade and FDI and notably lower in data flows and people flows. China ranks only 38th for data flows, reflecting government restrictions on access to foreign Internet sites. China's short-term people flows are rising: it welcomed 56 million tourists in 2014, and 109 million Chinese traveled abroad, a tenfold increase since 2000.[74] Despite those trends, it ranks only 82nd in people flows, since this metric is based heavily on long-term migrants.

Singapore's top ranking reflects its successful strategy to become a regional hub for services and finance. Attracting skilled talent and FDI were among its key priorities.

Japan and South Korea have similar patterns of strong participation in traditional flows of goods, services, and finance but much weaker participation in data and people flows. Japan ranks only 24th in overall connectedness, below Malaysia, Mexico, and Thailand. Like China, it posts a particularly low ranking on people flows, at only 81st in the world. Japan also ranks only 20th for both data flows and service flows. Language and cultural barriers may explain part of this result, as may the residual effects of the country's history as a closed society. Japan also attracts relatively little foreign investment, and despite its manufacturing prowess, its goods trade has been hindered over the years by an adherence to its own proprietary technologies and standards rather than an embrace of open platforms.[75] South Korea ranks higher in our index, although still only No. 16 in the world, due to lower rankings on finance, data, and people flows.

Saudi Arabia places 10th in the rankings, followed by the United Arab Emirates at No. 11. Both are major oil exporters that meet most of their demand for manufactured consumer goods through imports. In addition, both have very high rankings in people flows—second and fourth in the world, respectively—reflecting large numbers of both low-skill guest workers and highly skilled professionals. In fact, more than half of Saudi Arabia's labor force is made up of foreign workers on temporary contracts.[76] The UAE has significant service and financial flows in addition to oil exports. Dubai has actively built a role as one of the world's major ports, transit hubs, and financial centers.

[74] United Nations World Tourism Organization statistics.

[75] *The future of Japan: Reigniting productivity and growth*, McKinsey Global Institute, March 2015.

[76] *Saudi Arabia beyond oil: The investment and productivity transformation*, McKinsey Global Institute, December 2015.

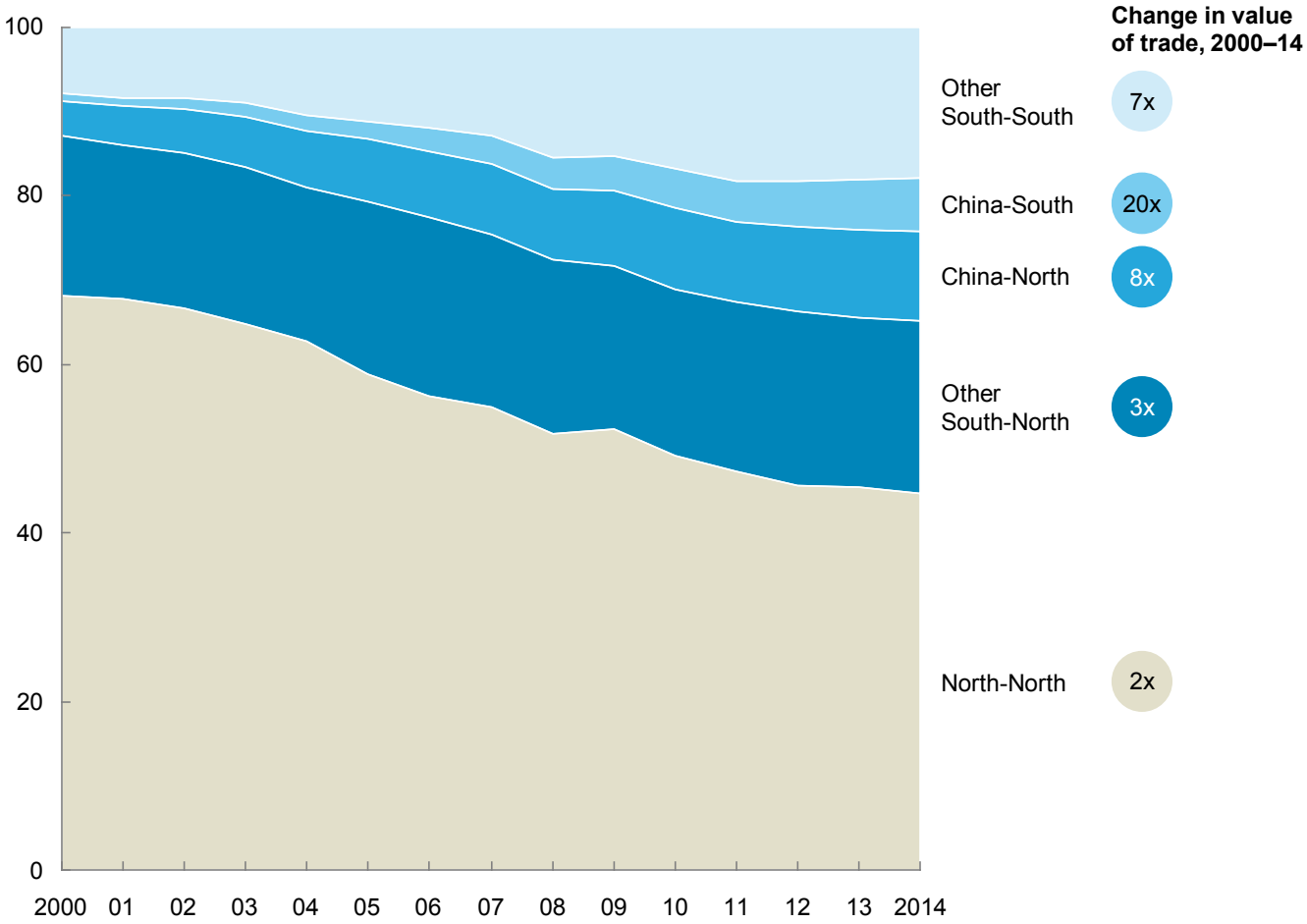
ALTHOUGH MORE COUNTRIES ARE BUILDING GLOBAL CONNECTIONS, THERE ARE LARGE GAPS IN PARTICIPATION

Today global connections link a larger and more diverse range of countries. For the first time in history, emerging economies are counterparts on more than half of global trade flows, and South-South trade among these countries is the fastest-growing type of connection (Exhibit 22). The value of traded goods and services plus financial flows exceeded 80 percent of GDP for 72 countries in 1990. By 2014, 121 nations were above this threshold. Today even the smallest countries are participating to some degree in globalization.

Exhibit 22

Emerging economies are now involved in more than half of the world's goods trade

Bilateral goods trade by development status, 2000–14
% of total goods trade



SOURCE: UNCTAD; McKinsey Global Institute analysis

Flows are concentrated in a few leading countries

Despite these trends, the world is still far from fully globalized. The MGI Connectedness Index shows that advanced economies in general remain more connected than developing countries—and the leading countries are far ahead of everyone else. The aggregate connectedness score (shown in the third column of Exhibit 21) reveals a very large distance between Singapore, the overall leader with a score of 64, and every other country. Ireland is No. 5 in the ranking, but its overall score is only 46, indicating that it is roughly two-thirds as connected as Singapore.[77] Saudi Arabia ranks No. 10 overall, but its score is only 23, meaning it is only one-third as connected as Singapore. Beyond the top 25, all 114

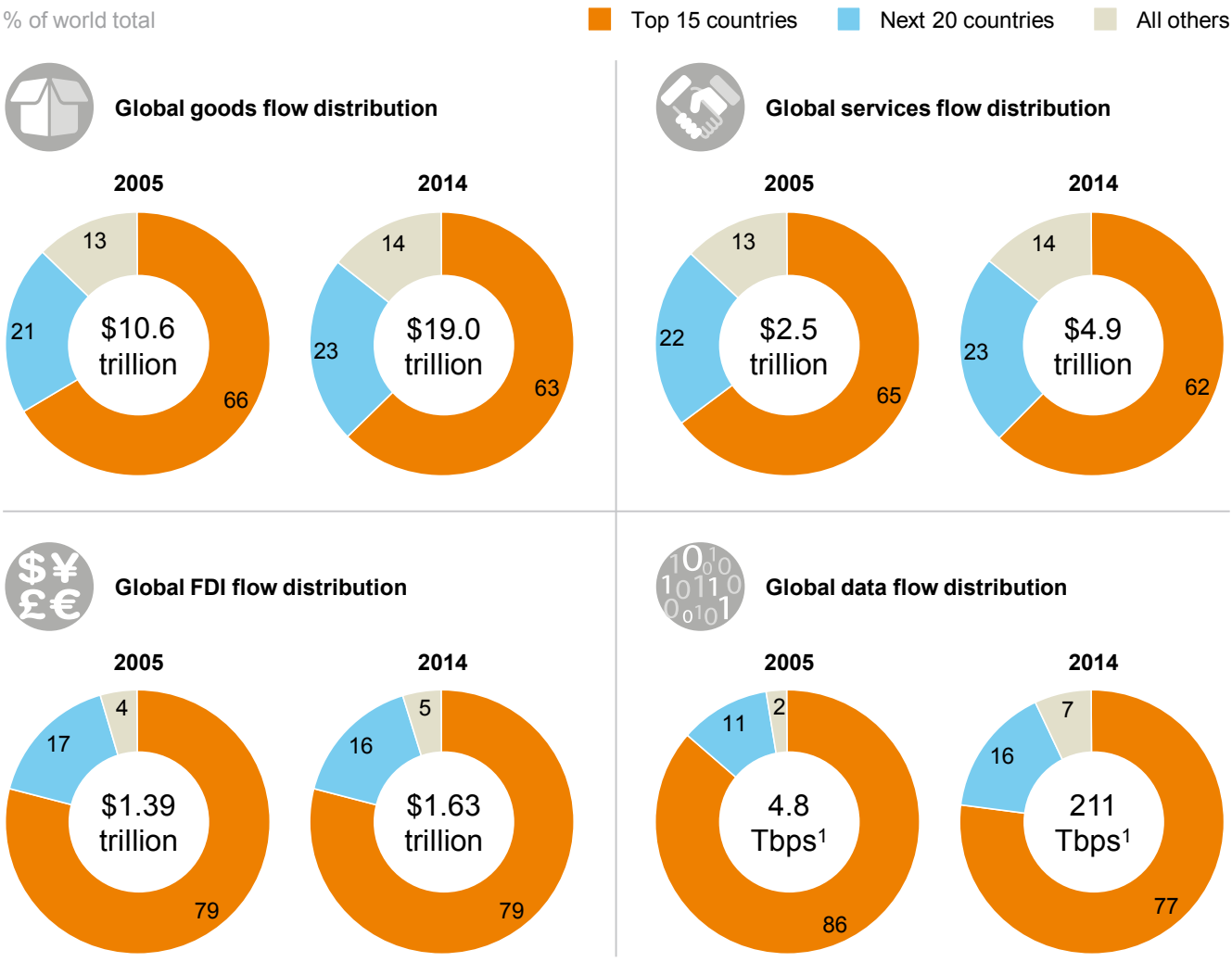
[77] See the technical appendix for details on how the scores were calculated and how the index was constructed.

remaining countries have overall connectedness scores in the single digits. This indicates that all countries have significant room to expand their participation in global flows.

This pattern is apparent not only in the aggregate connectedness score but also within each type of flow. All flows are disproportionately concentrated among a small set of countries, with huge gaps between leaders and laggards (Exhibit 23). The top 15 countries in traded goods, for instance, account for 63 percent of the global total, down only slightly since 2005. That share is 62 percent in services, and 79 percent in FDI. At this simple level, only cross-border data flows have a clear reduction in the share of the top 15 countries, falling from 86 percent in 2005 to 77 percent in 2014.

Exhibit 23

Flows remain concentrated among a few leading countries, with little change since 2005



1 Tbps = terabits per second.
NOTE: Numbers may not sum due to rounding.

SOURCE: UNCTAD; IMF; TeleGeography, Global Internet Geography; McKinsey Global Institute analysis

The individual country scores for each type of flow present an even starker picture, with large drop-offs between the most connected country and the second, third, and following countries. For goods flows, the fifth-ranked country, Belgium, has a score that is only 78 percent of Singapore's leading score. Global service flows are even more skewed, with the fifth-ranked country (the United Kingdom) at just 35 percent of the leader (Ireland). In data flows, the fifth-ranked country (Sweden) is only 25 percent as connected as the leader (the Netherlands).[78]

Lagging countries are catching up to leaders only very slowly

We use statistical tests of convergence to see if the gaps between country participation in global flows are closing over time. Beta convergence, for instance, measures the extent to which lagging countries are catching up to leaders, while sigma convergence measures whether the variation between countries overall is narrowing. The results show that goods and migration flows have positive beta convergence, indicating that lagging countries are catching up—but only very slowly.

If current trends hold, the convergence tests indicate that it will take at least eight years for the gap in goods flows between leaders and laggards to be reduced by half, and 11 years for the same to happen in migration flows. The gap between the leading countries and the rest of the pack is particularly stubborn in foreign investment. The top 15 countries in FDI flows have consistently accounted for approximately 80 percent of the world total over the past 20 years—and we estimate it would take 13 years for the current trajectory to cut the gap between laggards and leaders by half. Data flows do not show beta convergence, indicating that lagging countries are not catching up to the leaders. This may reflect the fact that data flows are still a relatively new phenomenon and continuing to grow quickly for even leading countries.

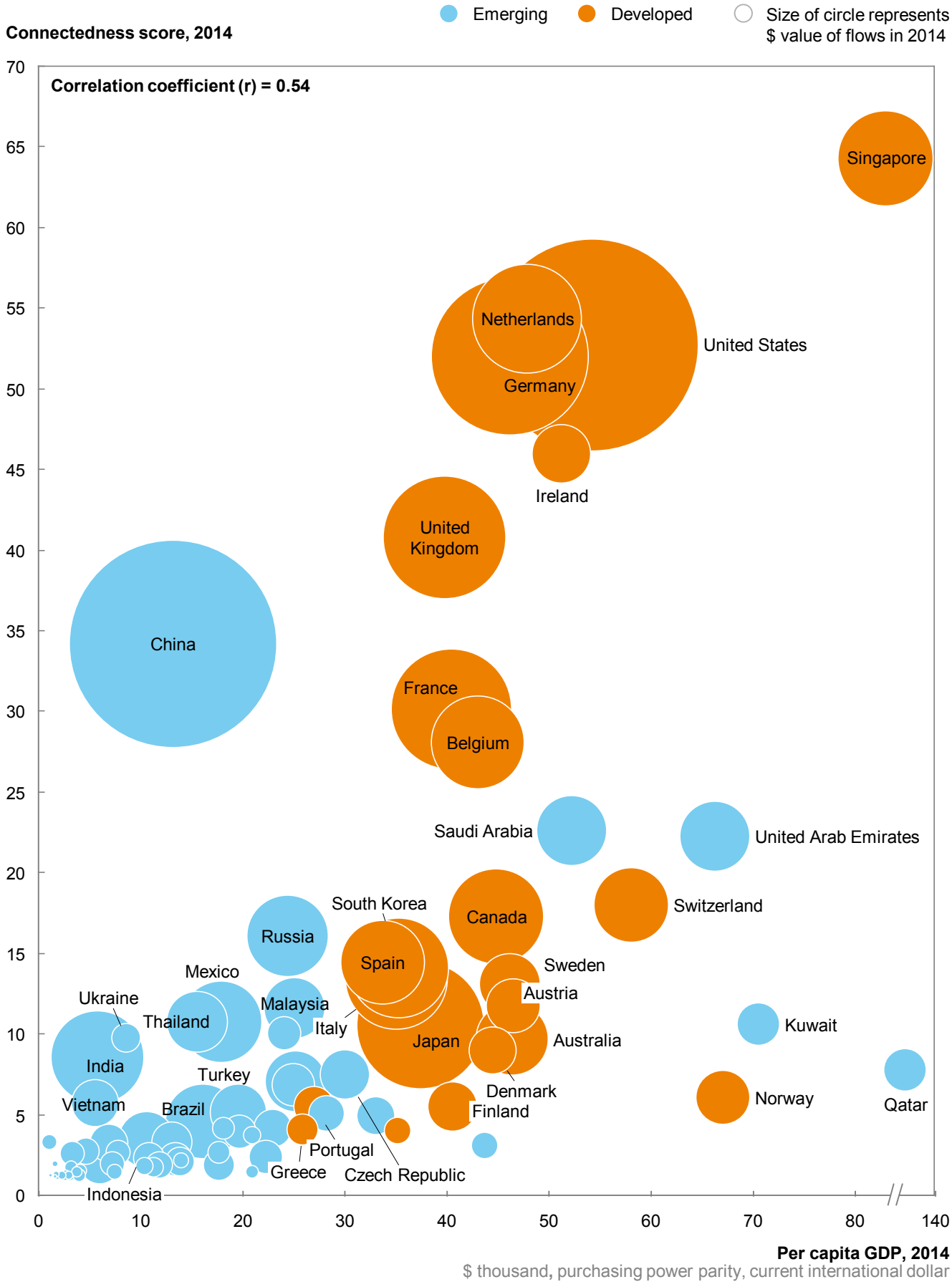
The MGI Connectedness Index shows that advanced economies are generally more connected than developing countries—and the leaders are far ahead of everyone else.

These gaps in participation matter given the economic value of global flows—a topic that will be explored more fully in Chapter 4. Exhibit 24 graphically illustrates the large gaps between leading countries and the rest of the world in the context of their relative prosperity. It shows each country's overall connectedness score on the vertical axis and its per capita income on the horizontal axis. In general, country connectedness rises with income, but there are interesting exceptions. China stands out for its high level of connectedness relative to its income level. This reflects not only its outsized role in global manufacturing value chains, but also its significant financial flows and its growing flows of services. At the other extreme are several Middle Eastern economies that have high per capita income but much lower global connectedness.

[78] See the technical appendix for rankings by type of flow.

Exhibit 24

A small group of leading countries are much more connected than the rest of the world



SOURCE: IMF; McKinsey Global Institute analysis

GLOBAL CONNECTEDNESS CAN ALSO BE VIEWED THROUGH THE LENS OF CITIES, PROVINCES, AND REGIONAL BLOCS

The MGI Connectedness Index assesses how countries are participating in global flows—but they are not the only actors in the global economy. Cities, regions within countries, and broader blocs of countries are connecting with the global economy in myriad ways and to varying degrees. Looking through these various lenses provides unique insights into the new patterns of globalization.

There are eight truly global cities, but only two are in emerging countries

Cities are the real engines of the world economy and serve as major waypoints for global flows. Previous MGI research suggested that just 600 cities will generate some two-thirds of world GDP by 2025.[79] Cities with major ports can become important hubs in the global flow of goods. Urban centers with significant Internet infrastructure can play the same kind of role for data and communication flows. Large cities in countries with low barriers to immigration can attract people from around the world.

Acting as a waypoint generates significant economic output and high-quality jobs, and it helps a city accumulate knowledge, skills, and talent, with positive spillover effects on its broader economy. Once a city has established itself as a waypoint for a particular flow, other economic activity tends to coalesce or co-locate along with it. A city that establishes itself as a financial hub, for instance, is likely to attract insurance companies and other professional service firms. One that acts as a major waypoint for people and goods traffic through a major airport will become a magnet for logistics and distribution companies. Amsterdam invested in the Amsterdam Internet Exchange (AMS-IX) in the early days of the Internet and continues to be one of the largest data hubs in the world. Since it offers faster connection speeds than any other European city, it has attracted other types of high-tech businesses.

New York, Los Angeles, San Francisco, London, Singapore, Shanghai, Hong Kong, and Dubai are the world's truly global cities.

Unfortunately, data on global flows are not available at the city level. However, we have obtained data that serve as proxies for each of our five global flows. Container port volumes approximate goods flows; airport passenger volumes serve as a proxy for goods, service, and people flows; the ranking of cities in the Global Financial Centers Index by the Z/Yen Group provides an indication of financial flows; the number of foreign-born residents in a city measures people flows; and Internet bandwidth approximates data flows.

Our last report found that the world had only eight truly "global cities," defined as ranking in the top 25 in at least four of the five major flows: New York, London, Tokyo, Los Angeles, San Francisco, Singapore, Hong Kong, and Dubai. This year, using updated data, we find that Tokyo drops off the list due to a decline in goods trade, while Shanghai takes its place (Exhibit 25). In fact, Chinese cities generally rose in the rankings, while a number of European cities (such as Bremen, Hamburg, Frankfurt, Brussels, Geneva, and Madrid) fell.

[79] *Urban world: Cities and the rise of the consuming class*, McKinsey Global Institute, June 2012.

Exhibit 25

Only eight of the world's major cities are hubs for at least four of the five major flows

City participation in major flows by rank and change over previous year in each flow[1]

Rank[2]	Goods	Goods, services, people	Financial	People	Data and communication
1	Shanghai	Atlanta	London	New York	Frankfurt
2	Singapore	Beijing	New York	Los Angeles	London
3	Shenzhen	London	Hong Kong	London	Amsterdam
4	Hong Kong	Tokyo	Singapore	Hong Kong	Paris
5	Ningbo	Los Angeles	Tokyo	Toronto	New York
6	Busan	Dubai	Seoul	Paris	Los Angeles
7	Guangzhou	Chicago	Zurich	Miami	Miami
8	Qingdao	Paris	Toronto	Sydney	Stockholm
9	Dubai	Dallas/Fort Worth	San Francisco	Chicago	San Francisco
10	Tianjin	Hong Kong	Washington, DC	Singapore	Singapore
11	Rotterdam	Frankfurt	Chicago	San Francisco	Hong Kong
12	Port Klang	Jakarta	Boston	Melbourne	Tokyo
13	Kaohsiung	Istanbul	Geneva	Moscow	Moscow
14	Dalian	Amsterdam	Frankfurt	Houston	Milan
15	Hamburg	Guangzhou	Sydney	Dubai	Vienna
16	Antwerp	Singapore	Dubai	Riyadh	Washington, DC
17	Xiamen	Denver	Montreal	Washington, DC	Hamburg
18	Tanjung Pelepas	New York	Vancouver	Dallas	Beijing
19	Los Angeles	Shanghai	Luxembourg	Jeddah	Marseille
20	Long Beach	Kuala Lumpur	Osaka		Copenhagen
21	Laem Chabang	San Francisco	Shanghai		Brussels
22	Tanjung Priok	Bangkok	Qatar		Warsaw
23	Ho Chi Minh City	Incheon	Shenzhen		Shanghai
24	Bremen	Charlotte	Busan		São Paulo
25	New York	Las Vegas	Tel Aviv		Madrid

1 Metropolitan areas with at least 1 million foreign-born residents. Exact foreign-born population of Jeddah not known, so it is included at the bottom of the list.
2 Rankings come from different years: ports (2014), airports (2014), financial centers (2014), migration (2011), and online traffic (2015).

SOURCE: Lloyd's List; *Containerisation International*; Airports Council International; Global Financial Centers Index; Migration Policy Institute; TeleGeography, Global Internet Geography; McKinsey Global Institute analysis

It is notable how few cities in the developing world appear in the top 25 across multiple flows, although some do play major roles in one individual flow. Only two of the eight global cities are in emerging economies (Dubai and Shanghai). Five cities in advanced economies (Tokyo, Paris, Chicago, Frankfurt, and Washington, DC), but none in emerging economies, appear in the top 25 for three of the five dimensions. Four cities in emerging countries (Beijing, Guangzhou, Shenzhen, and Moscow) appear in the top 25 for two types of flows. The urban giants of the developing world have room to expand the ways in which they participate in global glows, especially as the world's economic center of gravity shifts in their direction.

Examining the global connectedness of states and provinces reveals large variations within countries

Within countries, the global connectedness of different states and provinces may vary dramatically. For several large countries (China, Germany, the United Kingdom, and the United States), we have obtained data on state-level participation in global flows of goods and migration.

China has the most striking variation in global goods flows across its provinces (Exhibit 26). Only six of its 34 administrative divisions account for some three-quarters of its foreign trade in goods. [80] These coastal provinces, plus the areas around Beijing and Shanghai, are hubs of cross-border activity. But the interior of China remains largely disconnected from the world. The United States also has significant variation in how states participate in the global goods trade: California and Texas rank highest, reflecting ports in California and the oil sector in Texas. By contrast, industry is spread widely across multiple provinces in Germany and the United Kingdom, and so are their global flows. Goods flows relative to GDP for Germany's most connected state (North Rhine–Westphalia) were 8.7 times the median, while China's most connected state (Guangdong) stood at 26 times the median.

Evaluating how states and provinces would stack up in the global rankings against nation-states underscores their range of performance and the global role that some play. China's booming coastal province of Guangdong, for instance, is a major manufacturing and trade hub that would rank sixth globally in terms of goods flows—above the United States. Shanghai and Beijing would top Japan and Italy in goods flows (Exhibit 27).

California would rank fourth in the world for people flows, above the United Kingdom, France, and the UAE. At the other end of the spectrum, South Dakota would rank 261st globally in goods flows, below Grenada, Samoa, and Cape Verde. These types of extremes are not apparent in Germany, however. Germany's most connected states for flows of goods and people rank only 44th and 33rd, respectively, in global terms—but Germany as a whole ranks second in goods flows and third in people flows, reflecting the fact that all of its regions actively participate in global flows.

Building global connections does not have to be left to national policy makers. Local business and government leaders everywhere have the ability to forge their own global ties directly—and digital globalization gives them a multitude of new ways to pursue these opportunities.

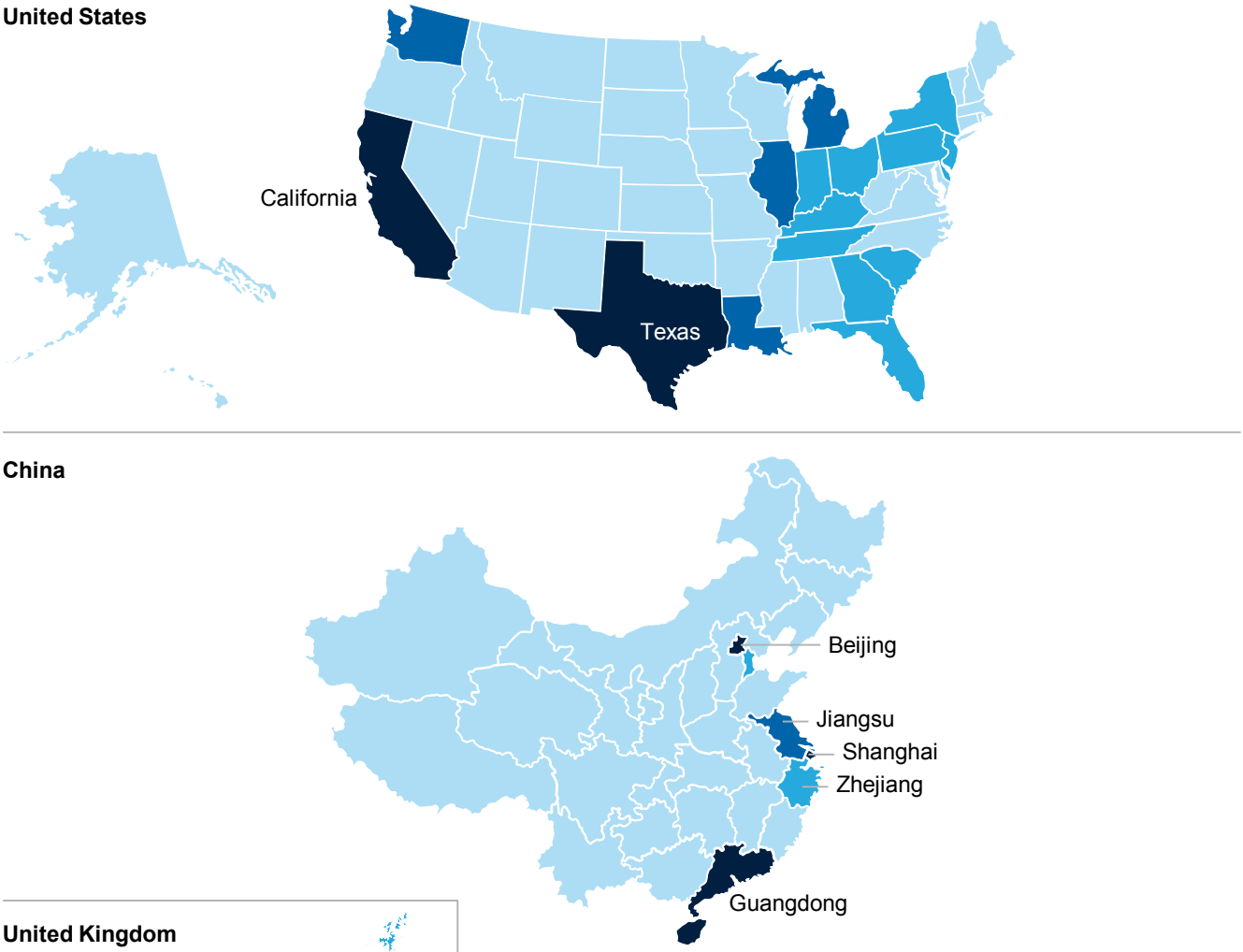
[80] China's administrative divisions include provinces, municipalities, autonomous regions, and special administrative regions.

Exhibit 26

Within countries, regional connectedness varies greatly

Regional goods trade connectivity score, 2014
Higher number indicates greater connectedness

0–10.0 | 10.1–20.0 | 20.1–40.0 | 40.1–100.0



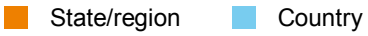
NOTE: Countries not to scale.

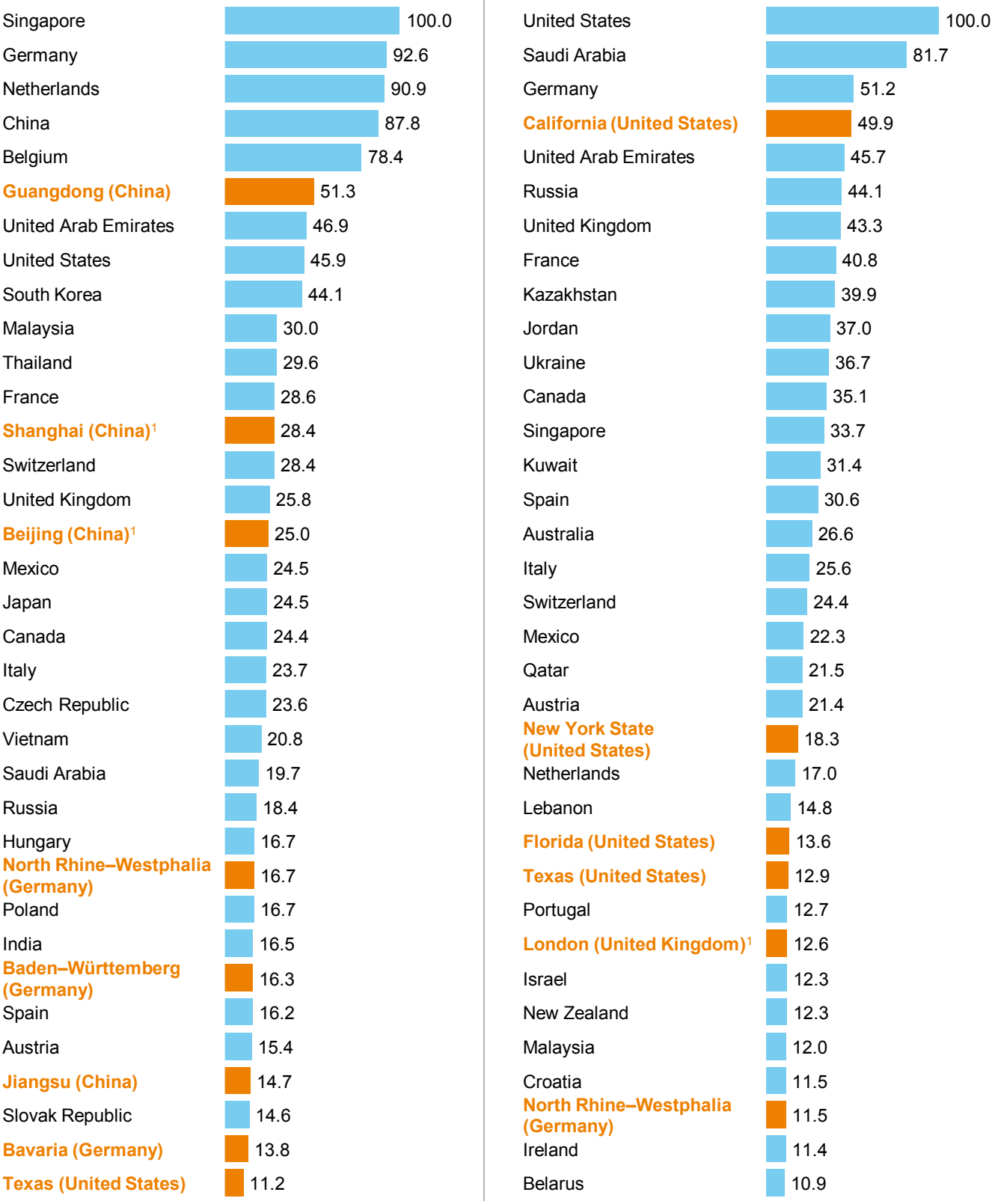
SOURCE: McKinsey Global Institute analysis

Exhibit 27

If states and provinces are ranked among countries, Guangdong would be sixth globally in goods flows and California would rank fourth in people flows

Connectedness index score, goods and people flows, 2014





1 Metropolitan areas considered as states/provinces by national authorities.

SOURCE: McKinsey Global Institute analysis

A great deal of global trade circulates among neighbors

Connecting with the world starts close to home. As described in Chapter 1, we find a significant share of each flow circulates within geographic regions rather than across long distances. However, this pattern varies around the world. In goods trade, the highest share of intraregional trade is in Europe (61 percent). Countries including Croatia, the Czech Republic, Hungary, Latvia, Norway, Portugal, and Romania conduct most of their trade with their European neighbors (Exhibit 28). Some 45 percent of East Asia's trade is intraregional, followed by North America (which includes Mexico) at 42 percent. The corresponding share is far lower in Africa, Latin America, and South Asia, where most countries score far lower on the MGI Connectedness Index. This indicates a significant opportunity for developing countries to increase their participation in flows by trading with their neighbors.

One way to facilitate greater intraregional trade is to form an economic community or trade bloc. Academic research shows that being part of a formal trade bloc—that is, a region defined by an intergovernmental agreement to reduce or eliminate regional barriers to trade—increases both the level and the impact of global goods trade.[81] However, our data show that the intensity of intraregional trade within the world's biggest trading blocs varies widely.

Developing countries have a significant opportunity to increase their participation in global flows by trading with their neighbors.

Exhibit 29 shows the share of goods flows that occurs within these established regions. After the North American Free Trade Agreement (NAFTA) was established, the share of goods trade between the United States, Canada, and Mexico peaked at 45 percent of their total in 2000. However, that share had fallen back to 42 percent in 2014 as these countries all began to trade more actively with China. China now accounts for 13 percent of trade with NAFTA countries.

Trade between the Association of Southeast Asian Nations group of countries remains far lower than trade within the European Union and NAFTA, at just 24 percent of their value of total trade in 2014, somewhat higher than the 16 percent share in 1990. Recognizing the opportunities at stake, ASEAN's leaders are working to implement an ambitious ASEAN Economic Community (AEC) integration plan to harmonize many administrative procedures and regulatory standards among member states, creating an open market of 600 million consumers and a more seamless production base.[82]

The East African Community (EAC) enacted a free trade zone in recent years to eliminate all tariffs among its five member countries (Burundi, Kenya, Rwanda, Tanzania, and Uganda). However, its intraregional trade stands at only 10 percent. Interestingly, EAC trade with China is higher than even ASEAN's trade with China, at 17 percent compared with 15 percent, despite ASEAN's proximity.

[81] The World Trade Organization has investigated preferential trade agreements and their effects in detail. These bilateral agreements have grown in importance as multilateral agreements have become more difficult to establish and negotiate. See *World trade report 2011: The WTO and preferential trade agreements: From co-existence to coherence*, World Trade Organization, 2011.

[82] *Southeast Asia at the crossroads: Three paths to prosperity*, McKinsey Global Institute, November 2014.

Increasing intraregional trade among developing country trade blocs is a clear priority—one that could be a stepping-stone to increasing their overall connectedness and capturing the benefits of scale, specialization, and competition. Although the impact of distance on all forms of global flows is falling as transportation and communication costs decline, economic ties among countries in the same region are still the norm. Bolstering regional ties, particularly in Africa and Latin America, is an opportunity to boost flows—and to raise GDP, as we will discuss in the next chapter.

Exhibit 28

Some European countries trade predominantly with their neighbors

Intraregional goods trade in Europe (includes imports and exports), 2014[1]
% share of total trade

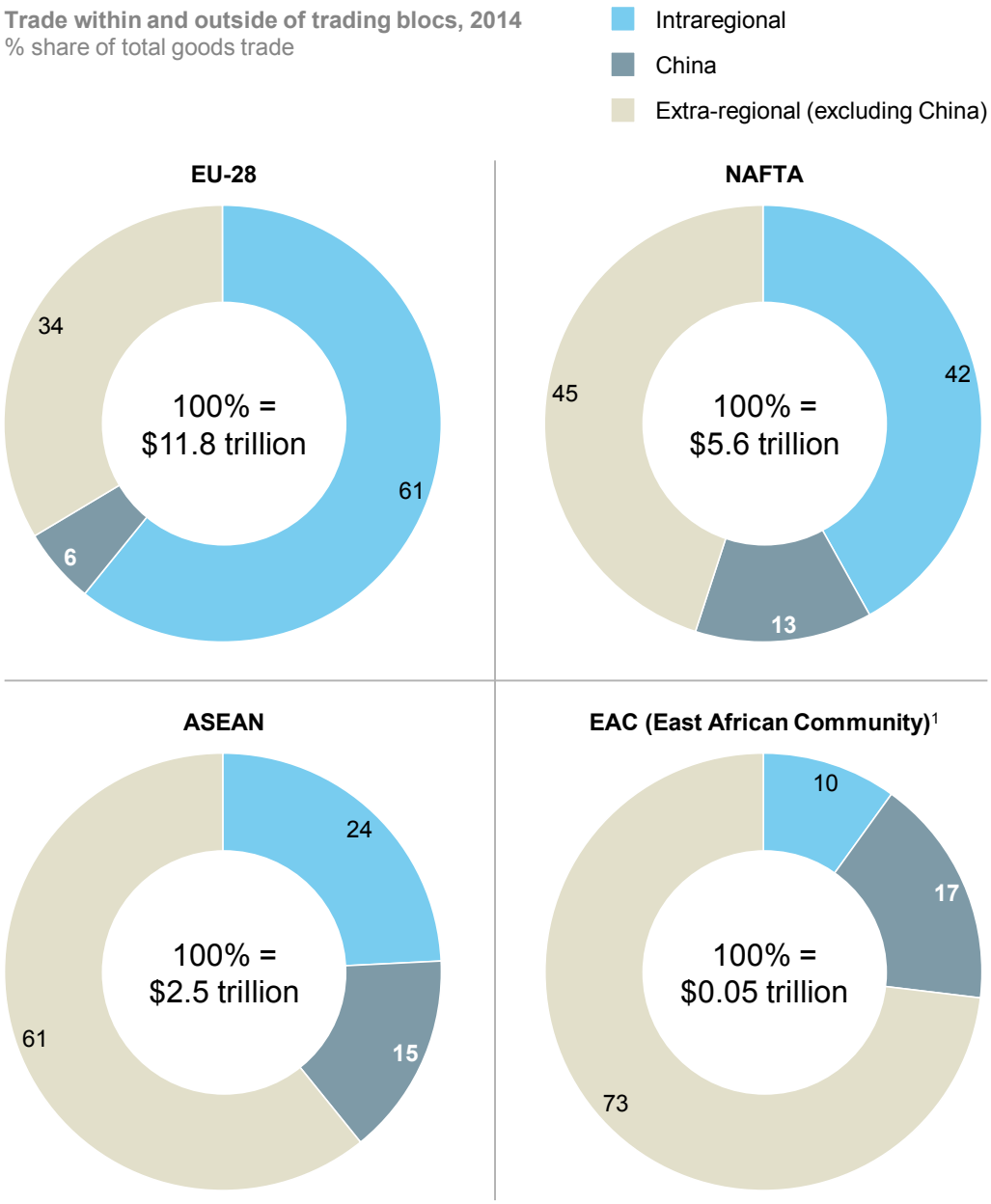
1 Includes EU-28 and select Western European countries including Andorra, Iceland, Norway, and Switzerland.

SOURCE: UNCTAD; McKinsey Global Institute analysis

Exhibit 29

The EU is the most integrated of the world's major trading blocs

Trade within and outside of trading blocs, 2014
% share of total goods trade



1 Comprises Burundi, Kenya, Rwanda, Tanzania, and Uganda.
NOTE: Numbers may not sum due to rounding.

SOURCE: UNCTAD; IMF; McKinsey Global Institute analysis

•••

Measuring the connectedness of different countries, cities, and regions around the world illustrates how far globalization has advanced—and how much further it could still progress. Much of the momentum behind globalization is still being driven by a handful of highly connected countries, and much of the world has only just begun to tap into global flows. The next chapter will provide detailed econometric analysis of the value of connectedness, underscoring the importance for emerging economies to pursue catch-up growth.

4. GLOBAL FLOWS BOOST ECONOMIC GROWTH

The economic impact of globalization is growing as the web of connections between countries and companies grows broader and deeper. As vast populations in emerging economies gain a new foothold in the middle class, more of the world's business involves cross-border flows. Digital flows of data, information, and communication allow ideas and innovation to ricochet around the world; they enable companies to bring together the best inputs and talents to create higher-quality goods and services. Perhaps most important, global flows expose companies to more competition and best practices, spurring them to improve performance and productivity.

To measure the economic impact of global flows, we have undertaken extensive econometric analysis, building on our previous report and applying improved data and more sophisticated methodology. We use data on the cross-border inflows and outflows of goods, services, finance, people, and data for 97 countries from 1995 to 2013 to assess the impact of flows on GDP and productivity.[83] Our analysis breaks new ground by testing the impact of all types of flows together and by analyzing the impact of gross inflows and outflows, rather than looking more narrowly at trade balances.

Both inflows and outflows support growth by circulating ideas, research, technologies, talent, and best practices around the world.

$7.8T
contribution to world GDP in 2014 by all types of global flows combined

We find strong evidence that country participation in global flows has both short-term (cyclical) and long-term (structural) impact on GDP. Our results indicate that over the past decade, global flows have raised world GDP by roughly 10 percent over what would have resulted in a world in without any flows. In 2014 alone, this impact was equal to $7.8 trillion in global GDP. Flows of goods and FDI, the two categories most heavily associated with the last era of globalization, account for about half of this. But data flows, worth some $2.8 trillion in 2014, now exert a larger impact on global GDP than the flow of goods. Their role in the global economy has expanded with astonishing speed. After all, the world's trade networks have developed over the course of centuries while global data flows were negligible as recently as 15 years ago.

Chapter 3 showed that each type of flow remains concentrated among a short list of leading countries, and lagging countries are catching up only very slowly. Here, we find that some lagging countries could have boosted their current GDP by 50 percent or even more by accelerating their participation in global flows over the past ten years. They can still realize tremendous opportunities by targeting ways to build deeper ties to the global economy.

[83] Our data end in 2013 because that is the most recent year for which a large set of countries report inflows and outflows of migrants.

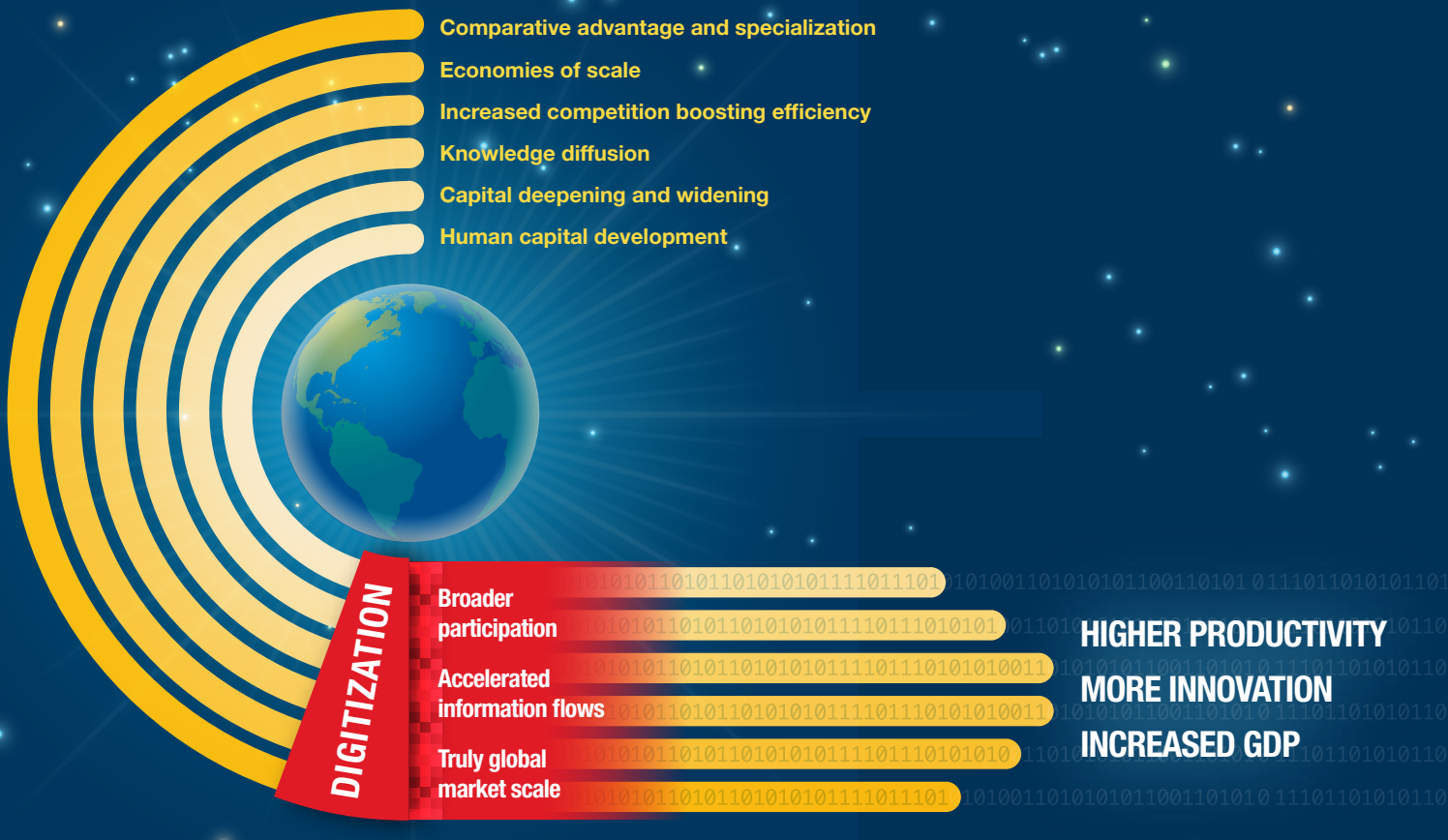
Overall, our analysis provides strong evidence of the economic value of openness—and the benefits are much broader and more nuanced than a simple accounting of net exports. Consumers, for instance, gain purchasing power from trade in goods, which delivers a wider variety of products at lower prices. One study found that middle-class Americans gain more than a quarter of their purchasing power from trade.[84]

Both inflows and outflows of goods, services, finance, people, and data are important as they expose economies to ideas, research, technologies, talent, and best practices from around the world. Countries that participate in global flows can specialize in what they produce, realize economies of scale, and invite competition, which spurs both efficiency and innovation in local industries. These benefits have been recognized since they were outlined by economist David Ricardo in the early 19th century—but today there is a difference. As they transform traditional flows and enable broader participation, digital technologies are amplifying these effects (Exhibit 30).

[84] *The economic benefits of US trade*, Executive Office of the President, May 2015.

Exhibit 30

How globalization increases GDP



GLOBAL FLOWS HAVE INCREASED CURRENT WORLD GDP BY AT LEAST 10 PERCENT, ADDING $7.8 TRILLION IN 2014

Our ongoing research into global flows aims to create a clearer view of a diffuse and evolving phenomenon. A key part of that is providing a better understanding of how flows affect economic growth. Our last report established that global flows contribute to GDP growth and that countries that are more central in the networks of global trade in goods benefit disproportionately, irrespective of the direction of the flows.[85] It also found that data flows are an increasingly important driver of economic growth.

For this report, we set out to sharpen our picture of global flows by refining our econometric methodology and using updated and improved data. For example, we previously used international telephone calls as a proxy for data flows. But this arguably measured only the communication aspect of data flows rather than the way they transmit information and enable transactions. Now we are able to track used cross-border bandwidth, which is a much closer measure of cross-border data flows. To measure people flows, we use the stock of migrants, both inbound and outbound. Our analysis also separates the impact of foreign direct investment and other types of financial flows. We make this distinction since a large body of academic literature finds that while FDI has a clear positive impact on growth, the evidence for the impact of other types of financial flows (cross-border lending and portfolio investments of equity and debt) is mixed.[86]

Cross-border data flows added some $2.8 trillion to world GDP in 2014, surpassing the impact of the global goods trade.

The technical appendix of this report contains a detailed description of our methodology. In short, we use a co-integrated, two-step error-correction model that enables us to examine without bias both the short- and long-term impacts of global flows on growth. To measure the one-way effect from flows on GDP growth, we use lagged covariates as instrumental variables to correct for possibly endogeneity. Our methodology allows us to control for unobserved country-specific effect and for correlation among the variables. We also test the impact of flows on productivity compared with the utilization of capital and labor. Finally, using two different measures of network centrality, we test how a country's position in the network of global flows contributes to its growth.

Our model considers how all types of global flows act in concert to generate growth

Our results provide robust evidence that goods, data, and FDI flows have both a positive short-term impact on GDP and a positive long-term structural impact (Exhibit 31). Our results for migration flows are surprising: we find a negligible or even negative impact on GDP growth for developing economies, possibly reflecting the loss of skilled labor (commonly referred to as "brain drain") or the difficulty that some have in absorbing a large influx of refugees or migrants. We find, however, that migration flows have a positive impact on productivity for advanced economies, which is consistent with other literature.[87]

[85] *Global flows in a digital age: How trade, finance, people, and data connect the world economy*, McKinsey Global Institute, April 2014.

[86] See, for example, Joshua Aizenman, Yothin Jinjarak, and Donghyun Park, "Capital flows and economic growth in the era of financial integration and crisis, 1990–2010," *Open Economies Review*, volume 24, issue 3, July 2013.

[87] For instance, see Ekrame Boubtane, Jean-Christophe Dumont, and Christophe Rault, *Immigration and economic growth in the OECD countries, 1986–2006*, IZA discussion paper number 8681, November 2014.

Exhibit 31

The coefficients from our econometric model have the expected sign

Dependent variable (Log)
Real GDP

Independent variables (Log)

Flow variables

Name of variable	Granger causality with real GDP	Short-/long-term impact: Expected sign of coefficient	Short-/long-term impact: Estimated sign of coefficient
FDI	Two-way	Positive/positive	Positive/positive
Goods trade flow	Two-way	Positive/positive	Positive/positive
Immigration	Two-way	Positive/positive	Insignificant/negative[1]
Data flows	Two-way	Positive/positive	Positive/positive
Services trade flow	Two-way	Positive/positive	Extended due to correlation with FDI
Fixed capital stock	n/a	Positive/positive	Positive/positive
Employment	n/a	Positive/positive	Positive/positive
Average years of education	n/a	Positive/positive	Insignificant/negative

1 Migration flows are negligible or slightly negative at the global level, possibly due to the loss of skilled labor in developing countries or the difficulties of absorbing a large influx of refugees or migrants. However, migration flows have a positive impact on productivity in advanced economies.

SOURCE: McKinsey Global Institute analysis

The magnitude of the increases in both GDP level and growth generated by global flows is quite striking. In one specification of the model, using the value of flows for each country normalized by their size, we find that over a decade, all types of flows acting together have raised world GDP by 10.1 percent over what would have resulted in a world without any cross-border flows. This amounted to some $7.8 trillion in 2014 alone.

Flows of goods trade and FDI account for roughly half of this growth effect (raising world GDP by 3.5 percent and 1.6 percent, respectively; Exhibit 32). Data flows alone directly raised world GDP by 3.0 percent. In addition, however, they also enable trade flows, FDI, and even people flows. If we account for both the direct and indirect impact of data flows, we find they exert an even larger impact on world GDP than physical trade flows (see Box 3, "Valuing cross-border data flows"). People flows have raised the level of world GDP by 2.0 percent.[88]

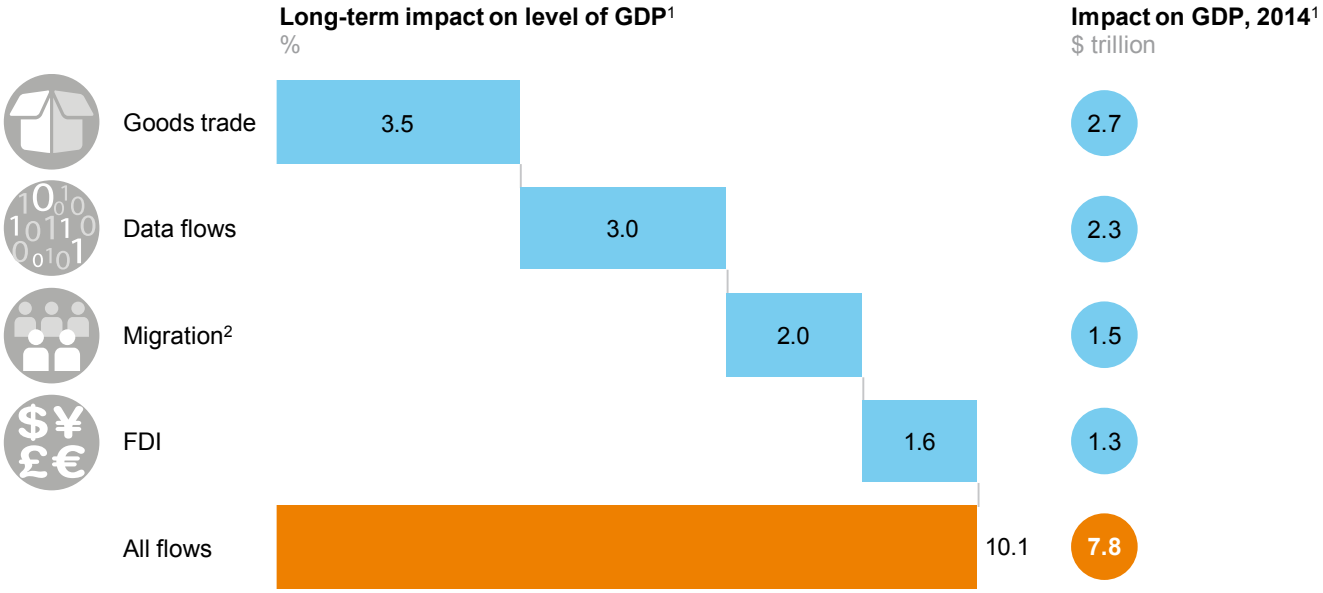
Viewed another way, the impact of flows on global GDP may even be larger than 10.1 percent. In a second econometric model specification, we used data on each country's score in the MGI Connectedness Index for each flow, rather than the value of inflows and outflows. This corrects for the fact that cross-border flows may be lower relative to GDP for a very large economy (such as the United States) simply due to the huge size of its domestic markets. Using connectedness scores instead of actual flows, we find that the contribution

88 As noted above, our econometric results show that migration flows have a negative elasticity with respect to GDP at a global level (despite the positive impact of immigration on productivity in advanced economies). We find an overall positive effect on lifting global GDP in the period we analyzed (2003–13) because global migration flows actually declined slightly over the period relative to world population, thus producing a net positive effect on global growth. Although people flows include growing business travel, tourism, and study abroad in reality, our model considers only long-term migration due to a lack of historical data on other types of people flows for many countries around the world.

of flows to world GDP in 2014 could be as high as 18.7 percent, or $14.4 trillion—meaning that one in every six dollars of value added in the world comes from cross-border connections.[89]

Exhibit 32

Our econometric model shows that global flows account for approximately 10 percent of global GDP output



1 Includes inflows and outflows data for 139 countries in MGI Global Flows model; see technical appendix for more details.
2 Global migration flows declined slightly from 2003 to 2013, resulting in a positive impact despite a negative coefficient. Migration flows are negligible or slightly negative at the global level, possibly due to the loss of skilled labor in developing countries or the difficulties of absorbing a large influx of refugees or migrants. However, migration flows have a positive impact on productivity in advanced economies.
NOTE: Numbers may not sum due to rounding.

SOURCE: McKinsey Global Institute analysis

89 See technical appendix for the model results.

Box 3. Valuing cross-border data flows

Flows of goods, services, and finance are measured in dollar terms that reflects the monetary value of the transactions. Our data on cross-border data flows, in contrast, are measured in volume, or terabits per second. To accurately compare the scale of these flows, we need a common unit of measurement.

We have therefore attempted to calculate cross-border data flows in value-added terms. Our methodology is admittedly imprecise by its nature and requires some assumptions. Still, the results are striking even if only directionally correct. We begin with our econometric analysis, which finds that the direct impact of data flows raises world GDP by 3.0 percent annually. This equates to $2.2 trillion in 2014. However, we also know that cross-border data flows enable other types of flows. Consider that cross-border e-commerce now accounts for 12 percent of global trade. In addition, digital communication and platforms likely enable nearly every trade transaction on the planet today. In addition, data flows allow service exports to be delivered digitally, and digital transactions and communication enable foreign direct investment. Even people flows may benefit from digital platforms and the ability to book travel online and research foreign destinations.

We make the conservative assumption that data flows account for 12 percent of the value created by other types of flows. This contributes an additional $0.6 trillion to their 2014 impact. Adding these indirect effects to the direct effects found in our model, we find that cross-border data flows may have raised world GDP by roughly $2.8 trillion in 2014. This surpasses the $2.7 trillion impact of the global goods trade. In just a decade, global data flows have generated as much economic value as trade networks formed over the course of centuries.

Our research is unique in that it considers the impact of all types of flows acting together. Yet our estimates of the impact of flows on GDP are broadly consistent with other academic findings (see the technical appendix for a complete literature review), even if other studies typically focus on one type of flow for a set of countries. This is an important distinction, because we know that flows are correlated with one other. We performed a principal component analysis on how flows move together. The results indicate that one component captures more than 60 percent of all flows. This means that examining the impact of only one type of flow may overestimate its impact on GDP by picking up observed effects from other flows.

Nonetheless, our findings for the impact of each individual flow are in line with academic findings. In general, our estimates are smaller since we correct for the effect that one flow may have on another. For example, Wacziarg posits that every increase in trade of ten percentage points relative to GDP adds 0.7 percent to GDP, while our model shows an increase of 0.5 percent.[90] Har et al. find that every increase in FDI of ten percentage points relative to GDP raises GDP by as much as 0.5 percent, vs. 0.4 percent in our model.[91] Boubtane et al. observe that every ten percentage point increase in immigration raises GDP by one percentage point in OECD countries.[92] Our model shows a negligible or even negative impact at the global level, but it similarly finds that migration has a positive impact on productivity in advanced economies. We have not found a study that measures the effect of cross-border data flows on GDP. Due to the difficulties of collecting data on this subject, most of the literature has assessed the GDP impact of increasing Internet penetration. For example, Meijers finds that a ten percentage point increase in Internet penetration leads indirectly to a 0.17 percentage point increase in economic growth.[93] Our model shows that a ten percentage point increase in data flows relative to global population raises GDP by 0.2 percent.

The economic impact of flows comes mainly from raising productivity, and data flows are central to this effect

Global flows can raise GDP growth either by increasing productivity or by increasing the amount of capital and labor used in production. We find both effects at work, although different flows act through different channels, and the productivity effect has by far the largest impact on GDP.

Traditional flows of goods and FDI raise productivity in an economy but do not necessarily increase the capital and labor inputs used. This suggests that in the long term, participation in flows promotes more efficiency and innovation, perhaps stemming from increased competition or the faster spread of best practices. We find that data flows support both productivity improvement and increased capital and labor inputs. This indicates that so far, data flows and digitization have raised net employment within countries rather than reducing it, contrary to conventional wisdom. The benefits of data flows are not due to replacing workers (see Box 4, "The impact of global flows on employment").

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90 Romain Wacziarg, "Measuring the dynamics gains from trade," *World Bank Economic Review*, volume 15, number 3, October 2001.

91 Wai Mun Har, Kai-Lin Teo, and Yee Kar Man, "FDI and economic growth relationship: An empirical study on Malaysia," *International Business Research*, volume 1, number 2, April 2008.

92 Ekrame Boubtane, Jean-Christophe Dumont, and Christophe Rault, *Immigration and economic growth in the OECD countries, 1986-2006*, IZA discussion paper number 8681, November 2014.

93 Huub Meijers, "Does the Internet generate economic growth, international trade, or both?" *International Economics and Economic Policy*, volume 11, issue 1, February 2014.

Box 4. The impact of global flows on employment

Our own analysis, like that of academic researchers, shows that trade, foreign direct investment, people flows, and data flows have a net positive effect on growth and prosperity in the long run. As countries specialize in what they do best, global GDP rises and employment growth should follow.[1] But globalization also delivers an element of creative destruction as it exposes local industries to international competition and disruptive business models. This is ultimately a healthy dynamic that spurs efficiency and innovation, but it may displace some local industries and workers in the process.

In the long run, countries that participate in global flows will find new channels for growth, and workers who lose their jobs in one industry should find opportunities elsewhere. Yet this process does not always play out neatly and quickly. Workers in a shrinking industry must gain new skills to be employed in other sectors—and those opportunities may not be in the same geographies, requiring them to relocate. This can have profound effects on entire communities that lose traditional industries to global trade and competition. Recent research has found, for instance, that increased US goods trade with China since 2000 resulted in the loss of thousands of manufacturing jobs in the United States and that the effects have persisted for more than a decade.[2]

Providing support to workers who are affected—and to broader local communities that suffer when industries are lost—has too rarely been treated as an urgent policy priority. But the societal cost of neglecting this issue grows over time and spurs negative sentiments toward globalization.

Traditional labor market policies and training systems in most countries are not prepared to deal with large-scale, rapid changes.[3] Workers displaced by trade (and similarly by automation) will need clearer paths to new roles. This means creating widespread access to accelerated training programs that will help them acquire skills that are in demand. A range of policy options are possible, but all governments must address the issue. One possible policy response is wage insurance.[4] Germany may offer a useful model for other countries as well. It is one of the world's most connected countries, ranking fourth in our global index. But it has avoided widespread unemployment, even at the height of the global recession, by providing income support, paying companies to retain workers, and taking a proactive approach to labor market reforms and reemployment services.[5]

Interestingly, our econometric analysis suggests that global data flows increase employment in the long run. While the goods trade changes the location of some production activities, data flows enable innovation, remote work, and new types of economic activity that did not exist before. It is too early to say definitively how cross-border data flows will affect employment in the future, particularly given the unpredictable nature of technology innovation, but digital platforms could be a welcome source of opportunity to find work for some individuals. They could also help to deliver some of the educational and training programs that individuals will need to reinvent themselves with new skills.

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1 For a discussion of when this may not be the case, see Paul Samuelson, "Where Ricardo and Mill rebut and confirm arguments of mainstream economists supporting globalization," *Journal of Economic Perspectives*, volume 18, number 3, summer 2004.

2 David H. Autor, David Dorn, and Gordon H. Hanson, "The China syndrome: Labor market effects of import competition in the United States," *American Economic Review*, volume 103, number 6, 2013, and David H. Autor, David Dorn, and Gordon H. Hanson, *The China shock: Learning from labor market adjustment to large changes in trade*, NBER working paper number 21906, January 2016.

3 For a deeper discussion of labor market inflexibility and possible responses to it, see *A labor market that works: Connecting talent with opportunity in the digital age*, McKinsey Global Institute, June 2015.

4 See, for example, Lori G. Kletzer, "Why the US needs wage insurance," *Harvard Business Review*, January 25, 2016.

5 Marco Caliendo, *Income support systems, labor market policies and labor supply: The German experience*, IZA discussion paper number 4665, December 2009.

COUNTRIES ON THE PERIPHERY HAVE THE MOST TO GAIN FROM CROSS-BORDER DATA FLOWS

Finally, we assess how a country's position in the global network of flows changes the economic impact. We do this using two different measures of network centrality: one that measures the number of a country's bilateral connections compared with the total number possible, and one that measures how connected a country's trading partners are (a concept known as eigenvector centrality).

Our last report tested centrality only within trade flows, given data limitations within other types of flows. We found that the benefits to GDP growth were up to 40 percent higher for countries that were more central in the global network of goods trade—with more bilateral partners and partners that were themselves more connected—than for countries with only a few trading partners.[94] This finding showed that it is better to have a broader network of connections and to connect with countries that are more central to the network than to trade solely with a few neighbors.

Countries at the periphery of the world's digital networks stand to gain even more than those at the center.

This report extends our centrality analysis to cross-border data flows—and the findings do not show the same effects as in trade flows. Data flows are still in a nascent stage, with links between countries that are less dense and have less reciprocity. In the case of data flows, we find that the benefits to GDP growth for countries at the periphery of the global network are actually higher than for countries at the center of the network.

Periphery countries may be using their exposure to data flows to enable broader participation. Moreover, data flows offer access to all the world's knowledge, information, and innovations. For economies that have been relatively disconnected, the arrival of new digital platforms can have a bigger ripple effect on trade in goods and services than it might have in advanced economies that already have more extensive trade links in place. Our analysis shows that 15 to 30 percent of the GDP impact of data flows comes from consumers, while the remainder comes from B2B linkages within value chains.

As policy makers in many countries consider how their countries should participate in a more digital global economy, many are seeking to create the "next Silicon Valley." Others are erecting barriers to global digital platforms to allow domestic platform providers to grow. But we find that countries benefit from receiving cross-border digital flows as well as producing them. In other words, countries do not need to transform themselves into digital content or platform producers to benefit from data flows.

[94] *Global flows in a digital age: How trade, finance, people, and data connect the world economy*, McKinsey Global Institute, April 2014.

SOME LAGGING COUNTRIES COULD INCREASE GDP BY 50 PERCENT IN THE LONG TERM BY RAISING PARTICIPATION IN FLOWS

With clearer evidence in hand that global flows drive GDP growth, it becomes apparent that there is an opportunity cost associated with limited participation—and closing the gap between leaders in global flows and laggards would create substantial economic value.

To determine the size of this unrealized opportunity, we calculate the value that countries realized by increasing participation in each type of flow relative to the size of their economies from 2003 to 2013 (the latest year for which there are global data for all flows). We find that countries in the top quartile increased their flow of goods relative to GDP at an average of 3 percent annually, while goods flows grew at only 1 percent for the bottom quartile. The top-quartile countries increased FDI flows relative to GDP by 5 percent of GDP annually during this period, while those flows shrank by 8 percent annually for countries in the bottom quartile. A similar pattern holds for data flows and people flows. We calculate that if the bottom three quartiles of countries had increased participation in each of the flows at the same rate as the top quartile over the past ten years, global GDP would be some $10 trillion, or 13 percent, higher today. In other words, limited participation in global flows by many countries had a real cost to the world economy.

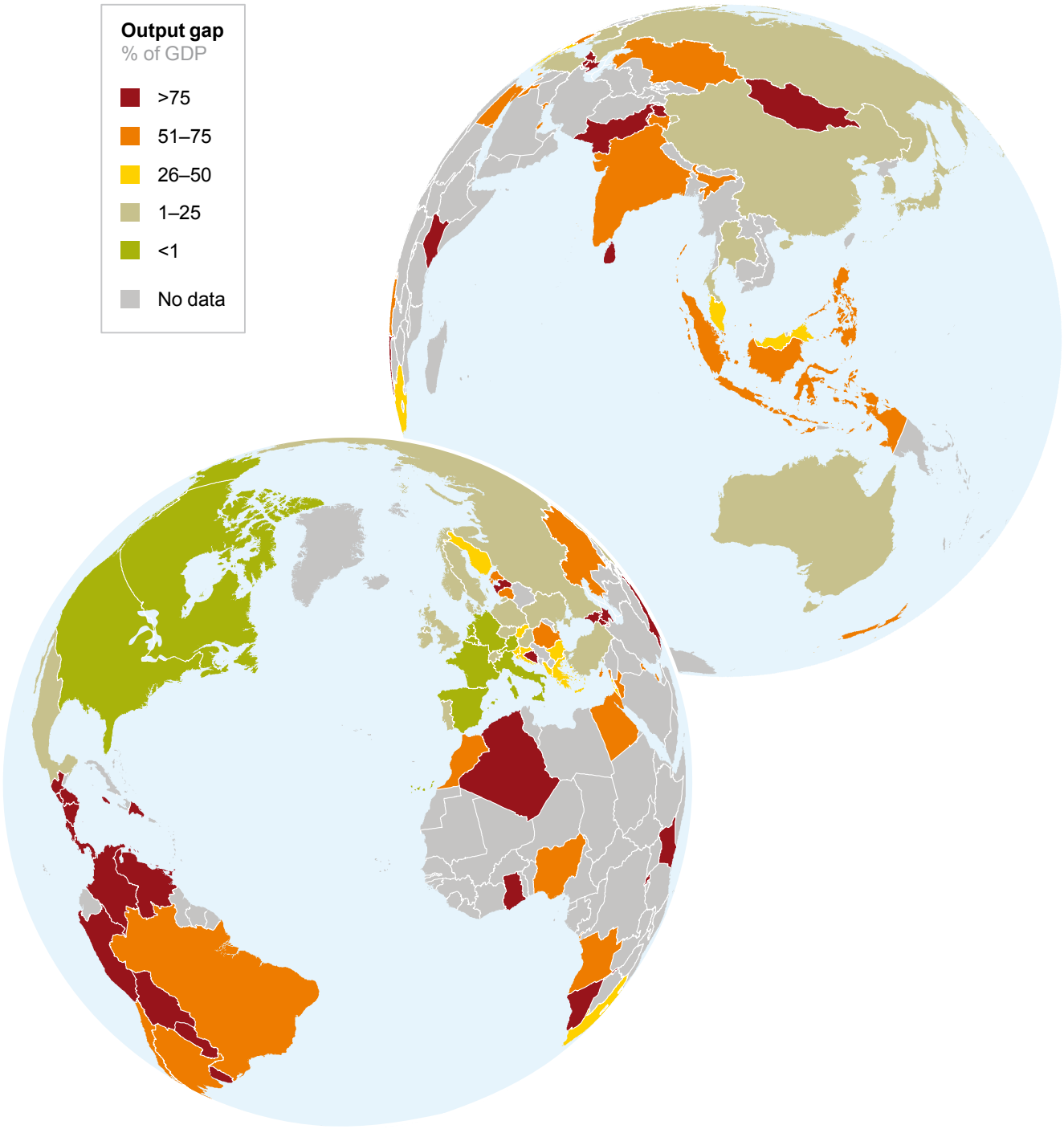
Because few countries are consistently strong across all five flows, there is substantial potential value for many to capture. As discussed in Chapter 3, we find that most countries are relatively connected within one or two flows: for instance, Luxembourg in financial flows and services, or Belgium in goods and service trade. Only a few countries, such as Germany or the United States, rank highly across all flows. In addition, a large set of countries, mostly in the developing world, post low or barely average scores across all flows, and they are catching up to the most connected countries at a very slow pace.

Limited participation in global flows by many countries has had a real economic cost.

Some countries have made explicit moves to open their economies and participate more fully in global flows. For lagging countries, the potential payoff from a well-targeted strategy of opening may be substantial (Exhibit 33). If India, for instance, had accelerated its participation in all types of global flows to match the top-quartile countries over the past ten years, its GDP would have been $1.2 trillion higher (or 58 percent larger) by 2014. Despite its thriving business process offshoring sector, India ranks only 70th in the world for data flows—down from 64th in the previous edition of the index, indicating that other countries have increased data flows faster than India. According to the Internet and Mobile Association of India, the country passed the benchmark of 350 million Internet users in 2015, and penetration is continuing to grow. It will not be simple to create the digital infrastructure and skills development necessary to bring the rest of India online, but the government's Digital India initiative aims to accelerate the process of connecting the country's vast rural population to the world economy.

Exhibit 33

Lagging countries could realize enormous growth potential by increasing their participation in global flows



SOURCE: McKinsey Global Institute analysis

Similarly, Brazil could have added some $1.4 trillion to its GDP over the past ten years, making its economy 60 percent bigger by 2014, by accelerating its participation in all types of global flows. Previous MGI research has explored Brazil's relative lack of global connectedness. Brazil has not capitalized on its proximity to the lucrative US consumer market, for instance. In 2012, even before the current commodity price decline, exports were equivalent to 13 percent of GDP, far below India (24 percent) and Mexico (33 percent). Brazil's imports are also lower, at 10 percent of GDP, compared with 22 percent for India and 32 percent for Mexico. A number of barriers have constrained trade growth, including poor road and rail infrastructure, cumbersome procedures and inadequate capacity

at its ports, and high import tariffs and taxes. Brazil is particularly low on people flows, ranking only 125th in the world for migrants and travelers. Since 1999, the country has lost 38 percent of its share of South America's inbound tourism and 30 percent of its share of world inbound tourism.[95]

These missed opportunities are not lost forever, however—and digitization is creating new ways for countries to participate. As growth in conventional flows of goods and finance flatten, the next wave of growth from globalization will come from data and information flows. Countries can increase their exposure to these flows by expanding Internet penetration and creating thoughtful frameworks that allow data to move both securely and freely across their borders. Conversely, academic studies point out that restrictions on data flows may lower GDP growth by one to two percentage points.[96] Chapter 6 contains further discussion of these and other public policy implications.

•••

Participating in global flows is not a panacea for the other factors that may dampen a country's economic growth, such as an uncompetitive business environment, weak rule of law, or corruption. Still, countries that seal themselves off from global flows—and particularly data flows—are forgoing important sources of growth. Continuing to expand the network of global data flows is possible because this new version of globalization is not merely a zero-sum game in which countries compete for low-cost manufacturing: one country's participation in data flows does not necessarily come at another's expense; it can actually increase economic growth across the board.

[95] *Connecting Brazil to the world: A path to inclusive growth*, McKinsey Global Institute, May 2014.

[96] Matthias Bauer et al., *The costs of data localization: Friendly fire on economic recovery*, ECIPE occasional paper number 3/2014, May 2014.

5. COMPETING IN A DIGITAL GLOBAL LANDSCAPE

After expanding across borders in pursuit of new international markets and the advantages of scale, many major corporations now derive more than half of their revenue internationally. But along the way, they may have incurred a "globalization penalty." Managing across multiple geographies with different cultures, languages, regulations, and tax regimes is no small challenge. It often involves going up against local competitors that may have deeper market insights and better ability to execute on their own turf. The costs of coping with complexity can take a toll on the bottom line as well as organizational health, making it harder to create a cohesive culture and strategy.[97]

Digitization can tame complexity, however, allowing large companies to manage their global operations in a leaner and more efficient way. Using digital platforms and tools effectively can enable companies to sell in far-flung but fast-growing markets while keeping virtual teams connected in real time. Companies have new ways to identify the best suppliers, inputs, and talent from around the world.

The successful global companies of the future will have a very different look than those of the past.

The convergence of globalization and digitization means that the world is changing rapidly—and business leaders will need to reassess their organization, strategy, assets, and operations accordingly. The approaches that worked for going global even ten years ago may no longer be relevant. As digitization changes how companies think about what should be global and what should be local, many are reevaluating past decisions about their footprint and international market strategies. The successful global companies of the future will have a very different look than those of the past.

A SUCCESSFUL DIGITAL GLOBALIZATION STRATEGY CONSIDERS SEVEN KEY DIMENSIONS

Digital innovation has greatly expanded the toolbox companies can use to globalize their market reach and operations (Exhibit 34). Because of these new capabilities, business leaders have an opportunity to rethink organization and strategy—starting with the fundamental question of what kind of global footprint is optimal. For many years, globalization centered on building production facilities around the world to take advantage of low-cost labor, but digitization is changing that equation. Additionally, while in the last era of globalization products were significantly tailored to local markets, some companies are moving toward global products and global product launches. As global value chains shift, decisions about where to base production are becoming more nuanced than simply looking for the lowest labor costs. To compete effectively, companies will have to build new types of assets, including the right arsenal of digital capabilities—and meeting that requirement will require a more global approach to finding and deploying the best talent. Finally, digital globalization calls for building more resilience into organizations.

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[97] Martin Dewhurst, Jonathan Harris, and Suzanne Heywood, "Understanding your 'globalization penalty,'" *McKinsey Quarterly*, July 2011.

Exhibit 34

Digitization is transforming business models in ways that enable more cross-border activity

Cross-border implications of digitization		Flow type: Data	Goods	Services	Finance	FDI
Remote monitoring	Remote tracking	●	●			
	Remote maintenance	●	●			
Supply-chain management	Remote inventory management	●	●			
	Supplier management	●	●			
Access to global markets	Cross-border access to customers	●		●	●	
	Cross-border access to labor	●		●		
	Cross-border access to finance	●			●	
Business operations and strategy	Centralized back-office operations	●		●		
	Cross-border digital payments	●			●	
	Real-time communications and collaboration	●		●		
	Data sharing and analytics-driven decision making	●	●	●	●	●

SOURCE: McKinsey Global Institute analysis

Do your footprint and organizational structure make sense in a more digital world?

Companies once expanded globally by building a replica of their entire firm in each country where they operated, complete with human resources, finance, sales and marketing, and product development departments. Each country operation mirrored the vertical structure of the parent entity. But now digital technology is expanding the options for how to organize a global company. Companies can establish global hubs for some functions and combine those structures with smaller dispersed sites and sales offices around the world. This option captures the advantages of efficiency and scale for some functions but maintains sales and marketing teams in proximity to local customers. The choices companies make about their footprint and how to manage it have never been wider—and the payoff, in terms of both reach and agility, has never been bigger.

Many multinationals are centralizing global functions and back-office operations. In human resources, for example, self-service digital platforms can draw on data flows between countries to handle many overarching issues, while regional managers can retain discretion over decisions such as hiring. Singapore-based Flextronics migrated its fragmented human resources systems for 200,000 workers in 25 countries into one global platform that

automatically supports 14 languages.[98] The Canada-based Four Seasons chain, which has 42,000 employees in hotels around the world, similarly moved to a globally scaled cloud-based HR system that offers organizational consistency where possible and local customization where necessary.[99]

Companies can also create virtual teams that span borders, using digital tools for remote collaboration (such as Box and Slack) and customer relationship management (such as Intercom and Zendesk). Unilever, for example, used technology solutions to streamline some 40 global service lines, including financial reporting, internal communications, market research, requisitions and payments, and HR. It created global, virtual delivery organizations with team members who meet via video conference. In the past, Unilever had more than 400 intranets spanning different countries, product groups, and functions—a structure that led to unnecessary expense and misaligned communications. These were replaced with one global intranet that is accessible in more than 20 languages.[100]

There is no one-size-fits-all solution that will work for every company, however. In R&D and product development, for instance, Apple concentrates its engineering and design talent in Cupertino, California, and brings foreign hires to work there. Google has gone another route, with engineering and design teams in major tech hubs around the world.

Sometimes proximity to specialized talent pools can shape these decisions. Boeing maintains a design center in Moscow to take advantage of Russia's abundance of aerospace scientists and engineers. Cisco established a global development center in Bangalore to tap into the local concentration of engineering talent. This center, Cisco's largest facility outside the United States, houses R&D operations focused on developing new disruptive technologies and strategies for emerging markets. More than 1,000 of the company's patents have been filed from India as a result.[101]

Footprint decisions can also be driven by market demand and expansion opportunities. As emerging economies build their health-care systems, virtually all major Western pharmaceutical companies have established R&D operations in Asia. AstraZeneca, for instance, is creating a new global hub for pharmaceutical development in Shanghai to complement its R&D centers in the United Kingdom and Sweden; it already has 11,000 employees in China.[102] The main R&D hub for Novartis is co-located with its global headquarters in Switzerland, but the company also has research facilities in China, India, Japan, Singapore, and the United States. Pharmaceutical companies in emerging markets are similarly expanding their international R&D capabilities. India's Sun Pharmaceuticals, for example, has R&D centers in Israel and the United States.

In a more digitally connected age, some companies are breaking from the traditional model of having one global headquarters location. Lenovo is incorporated in Hong Kong and has headquarters in both Beijing and North Carolina; the company also bases some top executives and research centers in other major hubs across the globe. GM has a China office in Shanghai to serve what is now the world's largest auto market, plus an international headquarters in Singapore to oversee operations in the rest of Asia, Africa, Australia, and the Middle East. Honda has established multiple independent manufacturing subsidiaries,

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98 "Flextronics completes world's largest deployment of a core HR system in the cloud," Workday corporate press release, December 9, 2011.

99 Matthew Finnegan, "Four Seasons chooses Workday HCM cloud over 'costly' on-premises ERP systems to manage global workforce," *ComputerworldUK*, October 20, 2015.

100 Pascal Visée, "The globally effective enterprise," *McKinsey Quarterly*, April 2015.

101 Cisco India Overview, corporate fact sheet, 2016.

102 "AstraZeneca continues strategic investment in China to accelerate delivery of innovative biologics and targeted medicines," corporate press release, December 16, 2015. See also "Innovating in China's pharma market: An interview with AstraZeneca's head of R&D in Asia and emerging markets," McKinsey.com Insights & Publications, February 2012.

including Honda China, Honda of North America, and Honda Europe. These divisions are run locally, and each market determines which models to sell.

Digitization also enables less capital-intensive business models. Companies that deliver digital goods and services can enter new international markets without establishing a physical presence at all. When Netflix created a subscription model for online streaming of video content in 2007, it gained the ability to add global customers without setting up full-fledged physical operations around the world (after receiving local regulatory approval). By the end of 2015, the company had broadened its international reach to more than 190 countries. As it did so, it closed all of its data centers and moved all of its streaming services onto the public cloud.[103]

Should you offer one product line around the world or customize for local markets?

In many industries, companies that sell into a range of global markets have expanded their product portfolios with tailored offerings that appeal to local consumer preferences and are sensitive to their price points. South Korea's LG, for example, markets original products in India, including appliances with programming menus in local languages, large washing machines for big families, and microwaves with one-touch "Indian menu" functions.[104] Mondelez found that the Oreos beloved by Americans did not have the same appeal elsewhere, so it tweaked the cookie's formulation, size, shape, packaging, and price points in China and India to appeal to local palates and preferences.[105]

In some industries, product tailoring is driven by local regulatory requirements or language differences. Food companies, for example, must meet one set of requirements for their products to be certified as halal in Malaysia and a different set of standards in Indonesia (and neither country's requirements are in line with Saudi Arabia's standards).[106]

But some companies eschew this strategy and offer truly global products that are the same everywhere in the world. Apple, for instance, offers just three models of its iPhone and iPad, all with consistent design and branding no matter where they are sold; settings can be reconfigured to change the language. Even its retail stores have the same design aesthetics the world over. Luxury brands typically take the same strategy. Brands such as Gucci, Burberry, and Prada position themselves as aspirational for newly affluent consumers in emerging markets and provide the same products and customer experience everywhere.

Creating a single global product is not just for companies that target upscale customers. Now that social media allows everyone to see the latest celebrity trends, many consumers around the world want the same styles. Some mass market retailers, including H&M and Ikea, offer a consistent brand, store format, and core product selection worldwide but tweak a small share of the merchandise mix to reflect local differences.

Digital products often follow the one-world model. Google, for example, has search, mapping, and e-mail products that are not designed with any particular set of regional customers in mind (although different languages are available). Facebook, Uber, Airbnb, and various e-commerce marketplaces have simply scaled up their digital platforms in country after country with limited customization. The success of this model has encouraged digital entrepreneurs to think about designing globally scalable products and expanding

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[103] Caroline Donnelly, "Netflix shuts down final data centre to go all-in on public cloud," *Computer Weekly*, August 17, 2015.

[104] *Winning the $30 trillion decathlon: Going for gold in emerging markets*, McKinsey & Company, August 2012.

[105] See Jeff Beer, "Marketing to China: Oreo's Chinese twist," *Canadian Business*, November 22, 2012; and "Smart cookie," case study from the Aditya Birla India Centre of London Business School, *Business Today* (India), March 31, 2013.

[106] *Southeast Asia at the crossroads: Three paths to prosperity*, McKinsey Global Institute, November 2014.

internationally much earlier in their life cycle than earlier generations of companies (a topic discussed in Chapter 2).

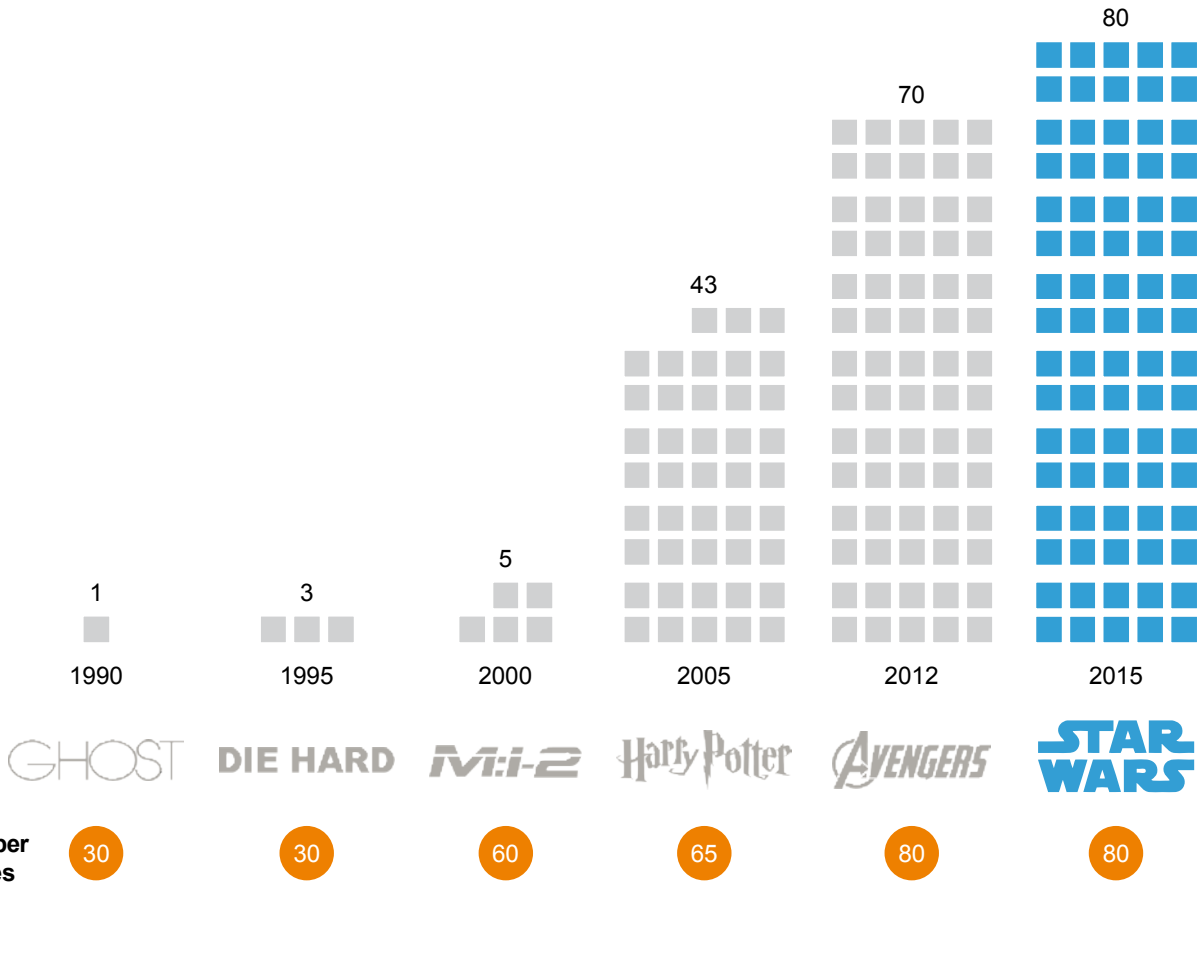
80
countries where the latest *Star Wars* was released in its first week

Digitization has also created a shift toward launching products globally as opposed to staggering releases country by country. The entertainment industry is a case in point. For many years, Hollywood studios waited until after a movie's US run to release it overseas, where the foreign box office could still compensate for domestic disappointments. The highest-grossing movie of 1995, *Die Hard: With a Vengeance*, was screening in only three countries within ten days of its US release date; they represented only 10 percent of the total markets where it would eventually be released. In 2015, *Star Wars: The Force Awakens* launched in every major market (80 countries) except China in the same week, and more than half of its record-breaking debut weekend box office came from international ticket sales (Exhibit 35). The information transparency offered by the Internet means that consumers around the world can see reviews immediately. There is no longer an opportunity to tweak and remarket; if a movie bombs in one place, it will be a global bomb.

Exhibit 35

Hollywood releases illustrate the growing trend toward simultaneous global launches

Simultaneous release of highest-grossing Hollywood movies in multiple countries[1]



1 Within 10 days of release data; excludes movie premieres. Highest-grossing movies in their respective years.
2 Rounded.

SOURCE: IMDB.com; boxofficemojo.com; McKinsey Global Institute analysis

Music, games, and books are following the same trend toward global releases. As social media exposes consumers from around the world to what is available, products have a chance to go viral. In 2015, Adele's song "Hello" racked up 50 million views on YouTube in its first 48 hours, and during its first week of release, her smash album *25* was No. 1 on the download list of iTunes stores in 110 countries.[107] An additional incentive for global product releases is to protect intellectual property and capitalize on the initial wave of demand before piracy can strike.

This is not to say that tailoring for local markets is dead. The need to create offerings at a lower price point for emerging economies is still valid. Microsoft, for instance, recently announced a new Nokia smartphone with extended battery life that will retail for around $20, with an eye toward selling it in emerging markets.[108] GE Healthcare has produced low-cost products such as a handheld ultrasound device and a CT scanner with emerging markets specifically in mind; it recently announced the formation of a Sustainable Healthcare Solutions business line to continue this focus on "frugal" product development.[109] In fact, some of the low-cost offerings developed for emerging markets can now boomerang back to advanced economies, where there is also demand for value-engineered products.

Many global automakers are attempting to balance the need for localization against the need for global scale in a complex manufacturing process by using a platform approach. They rely on a set of common underlying designs that can be customized by swapping certain components to create differentiated models. Today most major carmakers are whittling down the number of platforms across their international manufacturing operations—a streamlining effort that could produce billions in savings.

Some companies are finding artful ways of combining the global and the local in their marketing initiatives. The right approach can put a more intimate or relatable face on a global brand or take a fundamentally local experience and imbue it with a broader, more aspirational message. Starbucks, for example, launched a "Meet Me at Starbucks" global campaign through a mini-documentary shot in 59 different stores in 29 countries. The project, which shows a day in the life of a Starbucks store to emphasize its role as a community gathering place around the world, spans New York, Rio, Bogotá, Singapore, Beijing, Mumbai, Toronto, Paris, and Berlin.[110] The long-running "keep walking" campaign for Diageo's Johnnie Walker scotch was adapted for the Chinese market by associating it with the traditional Confucian saying that "the journey of a thousand miles begins with a single step."

As global value chains shift, do your suppliers and customers channels still make sense?

Multinationals and their long, intricate supply chains are the driving force behind the world's flows of goods. Digital tools can orchestrate a multitude of vendors stretching around the globe with greater precision and efficiency, opening up new possibilities for procurement. Companies such as Cisco and P&G have built "control towers" that offer up-to-the-minute visibility across complex global supply chains. These hubs synthesize information from sensors, actuators, RFID tags, GPS tracking, and more into dynamic models that can help managers evaluate alternatives instantly if risks or bottlenecks arise.[111]

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[107] Clarisse Loughrey, "Adele's new album 25 is No. 1 on iTunes in almost every country in the world," *The Independent*, November 26, 2015.

[108] "The new Nokia 105 helps give people a voice," Microsoft corporate blog, June 3, 2015.

[109] "GE Healthcare announces $300 million commitment to support emerging market health," corporate press release, September 23, 2015.

[110] Maureen Morrison, "Starbucks launches first brand campaign, 'Meet me at Starbucks,'" *Ad Age*, September 29, 2014.

[111] See, for example, the interviews with supply chain executives in Bob Trebilcock, "What does it take to remain a supply chain leader?" *Supply Chain Management Review*, January 2, 2015; and Steve Banker, "Procter & Gamble's futuristic control tower environment," Forbes.com, July 1, 2015.

But even as technology enables more complex procurement and collaboration, the importance of different factor costs is shifting. After years of choosing production locations largely on the basis of where low-cost labor is available, many manufacturers are beginning to reassess those decisions. Factors such as logistics costs, lead time, productivity, consumer preferences, and proximity to other company operations are being given greater weight.

For some products, low-cost labor will continue to be the decisive factor. As China's wages rise and the country makes a push to move up the value chain into more innovative, higher-value-added industries, more of its manufacturing business is up for grabs. Japan, for instance, has been shifting FDI from China to Southeast Asia. Now even some Chinese companies are shifting textile and apparel production to Africa.

1 OF 3
high-tech companies report plans to move production closer to end-user markets

However, more than two-thirds of global manufacturing activity takes place in industries that tend to locate close to demand—and companies have to consider emerging markets as sources of that demand, not just supply. As incomes rise in these regions, demand is fragmenting as customers expect greater variation and more after-sales service.[112] According to a recent UPS survey, approximately one-third of high-tech companies are moving manufacturing or assembly closer to end-user markets—and this number is up by 25 percentage points from 2010.[113]

In the future, 3D printing could change the very definition of what constitutes an intermediate good, disrupting logistics companies. UPS, for example, recently launched a pilot program to experiment with offering industrial-grade 3D printing services.[114]

Do you have the right assets to compete digitally and globally?

Companies will need new types of assets to succeed in this new landscape. Building digital platforms and data centers may be critical for a growing range of companies, not just the Internet giants. Advanced digital capabilities are a major source of competitive advantage, and even traditional industries that lagged behind in the first wave of digitization are beginning to transform rapidly.

Consider how big data analytics are transforming manufacturing. The manufacturers at the leading edge are digitizing and connecting their equipment, facilities, fleets, and other physical assets with the Internet of Things.[115] They are developing expertise in big data analytics to generate insights from the flood of data being collected. GE, for example, is boosting investment to position itself as a leader in the industrial Internet. The company hopes to improve productivity, innovation, and customer retention in its own manufacturing operations and to become a provider of related services, applications, and platforms to other industrial firms.

Other companies are taking a similar path. Rio Tinto, for example, transmits data continuously from its mines, processing plants, and vehicle fleet to "excellence centres" located in Brisbane, Australia. Analysts interact with this data on some of the largest touch screens in the world, creating models to head off potential production delays before they occur and making decisions about operational efficiency almost in real time. The company plans to open a third excellence centre for analytics in India in early 2016.[116]

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[112] Katy George, Sree Ramaswamy, and Lou Rassey, "Next-shoring: A CEO's guide," *McKinsey Quarterly*, January 2014. See also *Manufacturing the future: The next era of global growth and innovation*, McKinsey Global Institute, November 2012.

[113] *Change in the (supply) chain*, United Parcel Service, 2015.

[114] Lindsay Ellis and Laura Stevens, "UPS tests a 3D printing service," *The Wall Street Journal*, September 18, 2015.

[115] *Digital America: A tale of the haves and have-mores*, McKinsey Global Institute, December 2015.

[116] Carly Leonida, "Rio Tinto to open Mining Excellence Centre," *Mining Magazine*, February 25, 2015.

Businesses in all industries need to take a fresh look at the assets they hold, including customer relationships and market data, and consider whether there are new ways to monetize them given the emergence of new markets and new technologies. Alibaba, for instance, is at the center of China's e-commerce ecosystem and has a vast pool of transactional data on the vendors that operate on its platform. Building on these advantages, the companies has moved into new areas such as mobile payments and small business financing. The insurance industry could similarly harness its sophisticated data pools on different forms of risk to create new products and services.

Another key asset that many companies undervalue is an effective online presence. A passive corporate website is no longer sufficient. Companies also need a responsive social media voice and perhaps even their own proprietary platform. In consumer-facing industries, customer reviews on social media are increasingly important in driving business—and conversely, poor reviews can cause harm. Airline complaints on Twitter can go viral, and bad reviews on TripAdvisor or Yelp can cost hotels and restaurants dearly as growing numbers of international travelers rely on these sites to shape spending decisions. Many e-commerce sites now invite customers to post product reviews, and integrating their feedback quickly into the next product development cycle can pay real dividends. Creating a 24/7 team to monitor social media, handle customer complaints, and maintain a reputation is critical.

Are you ready for a new world of digitally accelerated global competition?

Corporate competition has intensified dramatically as emerging-market giants and digital disruptors go global. Both sets of competitors are lean, agile, and aggressive; both have cost advantages that enable them to take on established industry leaders. They are also demonstrating the ability to operate fluidly across geographic and sector boundaries.[117] As digital technologies reduce the time, capital, and minimum scale needed for startups to compete globally, these dynamics are accelerating. From 1965 to 2012, the "topple rate" at which companies lose market-leading positions increased by almost 40 percent—and the world is only speeding up from here.[118]

Emerging-market companies are breaking into the top ranks of their industries globally. Between 1980 and 2000, the share of Fortune Global 500 companies based outside developed regions stayed relatively flat, at 5 percent. By 2010, this share was up to 17 percent of the total, and it climbed further still to reach 26 percent in 2013. Based on projected growth by region, MGI has forecast that emerging economies will account for more than 45 percent of the Fortune Global 500 by 2025 (Exhibit 36).[119]

Unlike publicly listed companies in the United States and Europe, many of the new emerging-market competitors are state- or family-owned, which can give them the flexibility to pursue longer-term strategies. Having grown up in difficult operating environments, they have a natural advantage in other fast-growing emerging markets. The Chinese telecom firm Huawei, for example, has become the third-largest smartphone vendor in the world, with a strong presence in markets from Africa and India to Myanmar. Indonesia's Indofood has successfully introduced its Indomie noodles across Africa, becoming the most popular brand in the huge Nigerian market.

As the global playing field becomes more crowded with international companies, the war for talent is taking on another dimension. A recent survey of US executives found that almost 40 percent of companies had missed business opportunities in the past five years due to lack of international competencies. More than a quarter of companies indicate that it is

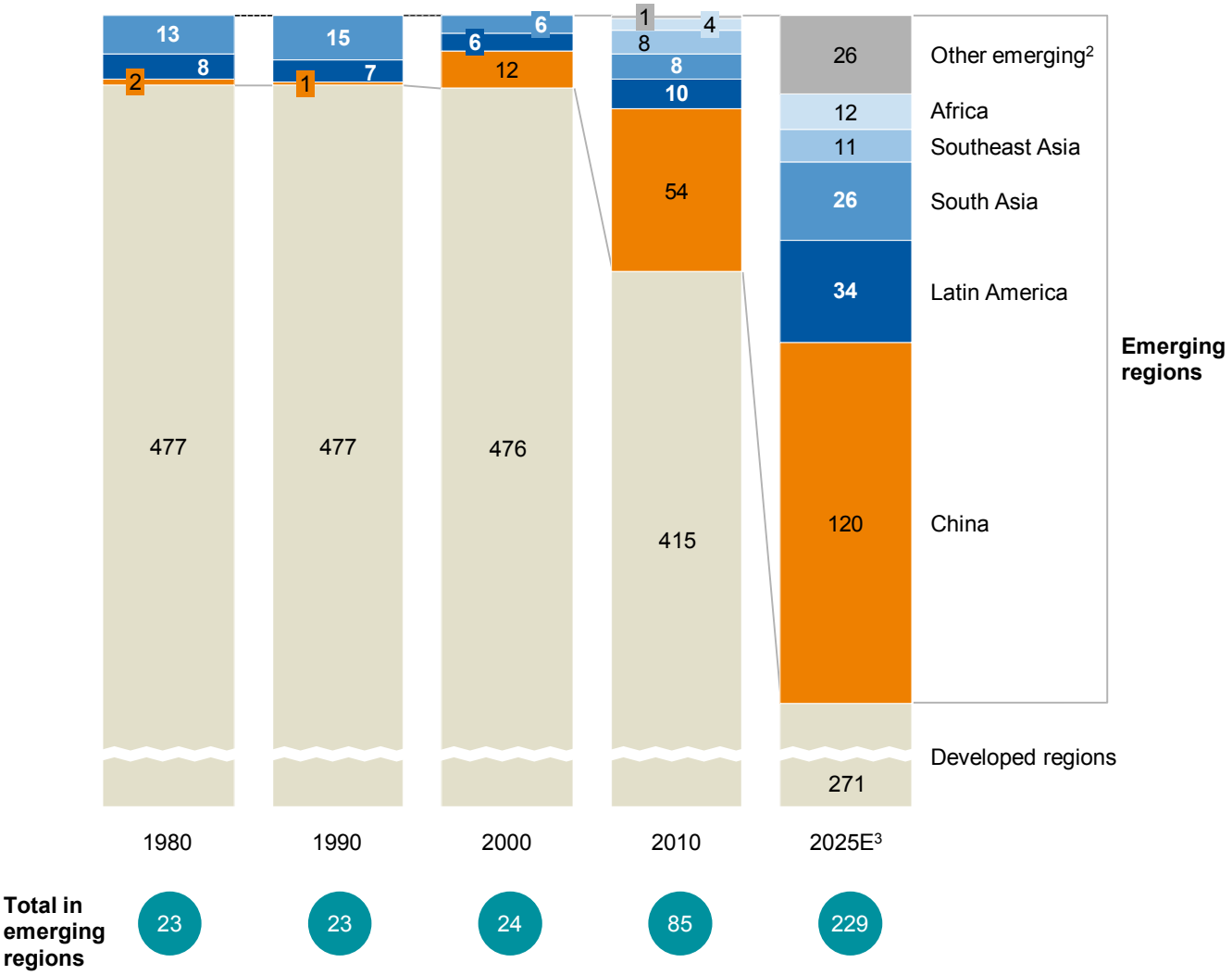
[117] *Playing to win: The new global competition for corporate profits*, McKinsey Global Institute, September 2015.
[118] John Hagel III et al., *2013 Shift Index metrics: The burdens of the past*, Deloitte, 2013.
[119] *Urban world: The shifting global business landscape*, McKinsey Global Institute, October 2013.

difficult to find US talent with the international knowledge, expertise, and language skills needed to manage global operations.[120] Online talent platforms are creating a more global labor market—and this development gives workers more mobility and gives companies new ways to poach their competitors' top performers. Attracting and retaining valued employees is a growing issue for Western multinationals operating in emerging economies. These companies were once considered the most prestigious employers in these countries, but now local firms are becoming global players themselves, and they can offer competitive compensation and career paths. One survey found that 34 foreign firms were listed among the 50 most attractive employers in China in 2004, but only 15 made the list in 2014.[121]

Exhibit 36

By 2025, emerging regions are expected to be home to almost 230 companies in the Fortune Global 500, up from 85 in 2010

Number of Fortune Global 500 companies[1]



1 The Fortune Global 500 is an annual ranking of the top 500 companies worldwide by gross revenue in US dollars.
2 All emerging regions with the exceptions of China and Latin America combined until 2000.
3 Fortune Global 500 share in 2025 projected from revenue share of countries in 2025.
NOTE: Numbers may not sum due to rounding.

SOURCE: MGI CompanyScope; McKinsey Global Institute analysis

[120] Shirley J. Daniel, Fujiao Xie, and Ben L. Kedia, *2014 US business needs for employees with international expertise*, presented at the Internationalization of US Education in the 21st Century research conference in Williamsburg, Virginia, April 11–13, 2014.

[121] Universum global survey of most attractive employers, 2014.

Technology firms represent another huge source of competition. Some of the truly disruptive players are siphoning value out of industries and giving it away for free to consumers as a way to build their positions. Skype, for instance, shifted some $37 billion to consumers in 2013 alone by offering free international calls.[122] Many technology-enabled firms are blurring traditional industry boundaries as they add new business lines. Alphabet has expanded into areas well beyond Google's original search and advertising businesses, including longevity and biotech research, smart home products, venture capital investing, and high-speed Internet fiber services.

The largest Internet platform operators are giving rise to yet another competitive threat: huge pools of SMEs that can now reach customers around the world. Thousands of Chinese manufacturers operating on Alibaba now have global reach, as do thousands of SMEs using eBay. The smaller firms operating within global e-commerce marketplaces now have the resources and reach to cherry-pick customers from industry incumbents.

The Internet is also creating global pricing pressures. Consumers can comparison shop across multiple channels and markets, making it more difficult for companies to implement tiered pricing strategies. Apparel brands that could maintain a luxury image and command higher prices in certain markets now have difficult decisions to make. To get around this issue, some supermarkets and other retailers have introduced private-label brands. This trend is even spreading to major B2B distributors, with companies such as Grainger and Sysco increasingly emphasizing their own private labels.

The Internet has also cut into the window of exclusivity companies once enjoyed on new products and services. Similar versions can be launched in new markets before the originator has time to scale up. Just months after the launch of Uber, there were similar companies operating in China and India. Rocket Internet, a German startup incubator, specializes in financing online businesses that bring successful business models from one country to new international markets.[123]

How do you manage new types of risk in a more digital and interconnected world?

The impact of external shocks is magnified in a more interconnected world—and ripple effects spread even faster in a more digital world. The 2008 financial crisis showed how rapidly the linkages between the world's capital markets can allow contagion to spread. Just a few years later, a series of natural disasters underscored the vulnerability of long global supply chains. Toyota's production, for example, took a major hit in the aftermath of the 2011 Japanese earthquake and tsunami—because of damage not to its own factories but to the operations of its suppliers. In fact, the ramifications were felt around the world, with component shortages causing the temporary shutdown of GM and Ford plants in the United States.[124] Heavy monsoons in Thailand that same year produced flooding in a region that produced nearly half of the world's supply of hard drive disks, sending global prices soaring.[125] Global executives polled in McKinsey's latest survey on economic conditions cited geopolitical instability as the greatest risk to growth.[126]

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[122] *Playing to win: The new global competition for corporate profits*, McKinsey Global Institute, September 2015.

[123] Sarah Gordon and Dan McCrum, "Rocket Internet: Waiting for lift-off," *Financial Times*, October 19, 2015.

[124] Bill Canis, *The motor vehicle supply chain: Effects of the Japanese earthquake and tsunami*, Congressional Research Service report for Congress, May 2011.

[125] Rich Miller, "How floods in Thailand made AWS rethink its supply chain," *Data Center Frontier*, October 8, 2015.

[126] McKinsey survey of more than 2,000 executives from companies representing a range of geographies, industries, and sizes. *Economic conditions snapshot, December 2015: McKinsey Global Survey results*, McKinsey & Company, December 2015.

Risk management has to be near the top of every corporation's agenda. Some companies have created multidisciplinary risk teams and implemented more flexible procurement contracts and manufacturing systems. Regionalizing production near large end markets can both reduce complexity in supply chains and minimize exposure to disruptions in transit. Manufacturers need to periodically reevaluate the right balance between the use of global suppliers and the resilience of operations. One of the most important precautions is to diversify the supply chain, avoiding overreliance on any single supplier. In the pharmaceuticals manufacturing industry, up to 30 percent of company revenue can be traced to a single production site; up to three-quarters of revenue for some blockbuster drugs is at risk due to single-sourcing somewhere along the supply chain.[127]

As the world grows more dependent on information systems, new types of risk—such as the failure of power grids or damaging information leaks—enter the equation. The private sector is also becoming more vulnerable to cyberattacks by disgruntled employees, criminals, political activists, and even other nations. High-profile hacks and breaches have hit many of the world's largest companies. One study has estimated that cybercrime costs the global economy some $400 billion in annual losses; these can include consumer data breaches, financial crimes, market manipulation, and theft of intellectual property. This is line with an estimate from Lloyd's of London.[128]

A recent joint study by McKinsey and the World Economic Forum found that nearly 80 percent of technology executives said that they cannot keep up with attackers' increasing sophistication and that protective measures (such as avoiding public cloud services or limiting the degree to which employees share information) are already having a negative business impact. Companies can prioritize information assets based on business risks, test continuously to improve incident response, and work with frontline employees to emphasize basic protective measures. If a breach does occur, a quick, decisive, and forthright response from marketing, public affairs, and customer service functions can be critical to restoring customer trust.[129]

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As digital technologies and globalization continue to reshape industries, the challenges for companies are mounting—but so are the opportunities. This new world similarly poses more complex questions for policy makers and regulators as economies around the world race to carve out new roles in global value chains. Chapter 6 will explore some of the implications for governments seeking to capture benefits of participating in global flows.

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[127] *Manufacturing the future: The next era of global growth and innovation*, McKinsey Global Institute, November 2012.

[128] *Net losses: Estimating the global cost of cybercrime*, Center for Strategic and International Studies and McAfee, June 2014. See also Stephen Gandel, "Lloyd's CEO: Cyber attacks cost companies $400 billion every year," Fortune, January 23, 2015.

[129] David Chinn, James Kaplan, and Allen Weinberg, *Risk and responsibility in a hyperconnected world: Implications for enterprises*, McKinsey & Company and the World Economic Forum, January 2014.

6. THE NEW WORLD OF POLICY CHALLENGES

Countries cannot afford to shut themselves off from global flows. Given their role in substantially raising GDP and boosting productivity growth, there is too much value at stake. But the goal is much broader than simply running a trade surplus. Our analysis finds that inflows and outflows alike contribute to growth. Narrow export strategies often ignore the real value of globalization: the flow of ideas, talent, and inputs that allow companies to innovate in new ways and raise productivity in the economy.

Pursuing this value has never been a straightforward proposition, and today's more digital form of globalization makes the calculus even more complex. Trade negotiations will need to include new dimensions to address issues surrounding cross-border data flows and the exchange of information and communication technology (ICT) goods. National policy makers increasingly need a global mindset to avoid erecting barriers that can lead to competitive disadvantages.

Many of the challenges associated with digitizing economic activity are now playing out on a global scale.

The current wave of churn and transition creates openings for countries to carve out profitable roles in the global economy. Those opportunities will favor locations that build the infrastructure, institutions, and business environments that their companies and citizens need to participate fully. Building these enablers can have the double benefit of boosting domestic productivity—and without them, the economic impact of flows will be muted.

Realizing the full economic potential of global marketplaces, platforms, and communities will require a deeper level of international cooperation. It will also depend on whether policy makers can successful manage the volatility associated with an interconnected and rapidly evolving digital economy. While it is impossible to anticipate all of the issues that will come into play, this chapter offers a framework.

POLICY MAKERS NEED A CLEAR AGENDA TO CAPTURE THE FULL POTENTIAL OF GLOBAL FLOWS

Even as governments try to create the right enabling environments for technology to fuel growth, digitization is handing them a host of entirely new policy challenges. Many digital firms have innovative business models that existing regulatory structures never considered. The digital economy evolves so rapidly that regulators have to take a test-and-learn approach to keep up with the pace of innovation.

Think strategically about the role your country can play in global value chains

Officials building a national agenda to compete successfully in this new era could start by taking a step back and thinking strategically about how their country can participate in global flows based on assets they already have or could build. As global value chains shift, countries can redefine the roles they play within them. The United States, for example, has long been a major engine of consumer demand for imported goods, but it now plays an equally important role as the world's leading producer of digital platforms and content. As new digital hubs form, the network of global flows may be redrawn in the years ahead.

Automation is narrowing the window of opportunity for developing countries to become the world's low-cost manufacturers, and 3D printing could transform how—and where—many categories of goods are produced. But other types of opportunities exist.

Some countries could build on their geographic proximity to major consumer markets, as Mexico and countries in Eastern Europe have done. Others may develop successful niches as global transit hubs, although it is crucial to find ways to add value in addition to serving as a waypoint. Singapore, for instance, has become central to flows of goods and services, while Dubai has become a hub of transportation, trade, and finance. Other countries have used a selective approach, targeting a particular flow or industry to cultivate: China long ago transformed itself into the world's manufacturing powerhouse, for instance, and is now pursuing an active strategy to move up the value chain into more innovative industries. The Philippines, Morocco, and South Africa have built on the advantages of language to become global providers of business process outsourcing services. Countries may also build on pools of talent within their borders, as Italy has done with high-end fashion design and textiles and as India has done with IT engineering.

Recognizing the value of data flows, many locations are trying to create the "next Silicon Valley." But innovation is notoriously hard to orchestrate—and that is not the only way to participate in the digital global economy. Our research finds that countries benefit from receiving cross-border digital flows as well as producing them. In other words, countries do not need to transform themselves into digital content or platform producers to benefit from data flows.

Address policy and administrative barriers that hinder global flows

For national economies, opening up to all types of global inflows and outflows is crucial for sustaining growth. Previous MGI research on global productivity trends has underscored this effect in Brazil, where some sectors have been more exposed to global market forces and some remain heavily protected. Embraer, the country's flagship aerospace company, for example, was privatized and now successfully goes head-to-head with global competitors. Because Brazil lifted import tariffs on aircraft components, the company is able to source from global suppliers. By contrast, import tariffs on vehicles have encouraged foreign carmakers to establish production within Brazil to serve its large consumer market, but the Brazilian automotive industry has not integrated effectively into global value chains. Its productivity lags well behind peer economies such as Mexico, which has developed world-class assembly plants and rapidly gained global market share. Within Mexico, too, sectors that have privatized, embraced free trade, and welcomed foreign investment and technology have pulled far ahead of traditional industries in terms of productivity performance.[130]

Pursuing bilateral and multilateral trade partnerships is the cornerstone of a more open approach. Another important step is removing import tariffs, quotas, and subsidies for national industries, all of which can introduce distortions. Other types of legal and

[130] See previous MGI studies: *Connecting Brazil to the world: A path to inclusive growth*, May 2014, and *A tale of two Mexicos: Growth and prosperity in a two-speed economy*, March 2014.

administrative barriers can constrain the impact of global flows; these may include limitations on foreign business ownership and investment, import licensing, regulatory requirements that deviate from international norms, and limits on immigration. ASEAN, for instance, has largely eliminated import tariffs among its ten member states, but its ongoing effort to build a seamless trading bloc involves painstaking multilateral efforts to harmonize many types of product standards, certification procedures, customs requirements, and cross-border regulations covering traded services and the movement of labor.[131] Removing these types of barriers can enable large multinational companies, SMEs, entrepreneurs, and individuals alike to take advantage of opportunities beyond their own borders.

Address the dislocations

Although the overall economic benefits of opening to global flows are clear, they can also disrupt local industries by exposing them to international competition and new business models. Some jobs and businesses may be lost even as new opportunities for growth are created. (See Chapter 4 for more on this topic.) Governments have to consider these trade-offs and open themselves to global flows at a pace their economies and societies can absorb.

Labor markets and training systems in most countries have not proven flexible enough to deal with rapid change on this scale. But providing support to affected workers and creating a clearer path for them to find new roles deserves greater priority. Wage insurance is one policy option.[132] Another is ensuring that adults who are already in the workforce have access to short, concentrated training programs for acquiring new skills. Germany may offer a useful model for policy makers to consider. One of the world's most connected countries, ranking fourth in our global index, it has avoided large-scale unemployment by providing income support and taking a proactive approach to labor market reforms.[133]

Invest in human capital

The Internet can promote inclusiveness, as long as education and training systems provide language fluency, basic digital literacy, and other skills so that individuals can take advantage of the opportunities. But educational systems in most countries are not keeping up with the demands of a digital world; few mandate computer programming classes in primary or secondary school.

Even as the new digital era is raising the importance of education, technology also offers new possibilities for increasing its quality and reaching more people of all ages, whether through online educational platforms with open access, learning programs that adapt to a student's performance, or classroom tools that allow teachers to tailor instruction.

A more digital economy places a new premium on skills, innovation, and adaptability. The countries that are reaping disproportionate benefits are able to cultivate and attract pools of highly educated and specialized technical talent. Investment in human capital development will be a critical determinant of which nations come out on top.

Build the necessary physical infrastructure and close the digital divide

Even in a more digital world, physical infrastructure remains vital for tapping into global flows of all types. Roads, ports, airports, and rail are the conduits of trade and mobility; investment that modernizes and maintains these systems can propel economic growth. Many countries—emerging and advanced economies alike—have paid insufficient attention to those assets, creating economic inefficiencies and allowing foundational systems to erode.

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131 *Southeast Asia at the crossroads: Three paths to prosperity*, McKinsey Global Institute, November 2014.

132 See, for example, Lori G. Kletzer, "Why the US needs wage insurance," *Harvard Business Review*, January 25, 2016.

133 Marco Caliendo, *Income support systems, labor market policies and labor supply: The German experience*, IZA discussion paper number 4665, December 2009.

Today any list of infrastructure priorities also has to include universal, affordable Internet access. The number of worldwide Internet users now exceeds 3.2 billion, but growth is slowing. In 2011, the UN Broadband Commission set targets of reaching 60 percent worldwide Internet penetration by 2015, with 40 percent household penetration in developing nations. Those goals remain unmet, however: at the end of 2015, 57 percent of the world's population, or four billion people, remained offline.[134] The enormous digital divide in the world's poorest countries and along gender lines remains stubbornly hard to bridge. As the flow of ideas, information, and innovation becomes more central to participating in the global economy, access to digital platforms and communication becomes an urgent development issue.

The value of connecting the offline population to the Internet is significant. The World Bank has calculated that a 10 percent increase in broadband access is associated with a 1.38 percentage point increase in GDP growth in developing countries and a 1.21 percentage point increase in advanced economies.[135]

Our econometric analysis shows that countries with higher Internet penetration reap up to 25 percent more benefit from cross-border data flows than those with limited Internet penetration. Tremendous value can be created organically and unexpectedly when companies and citizens consume data and information—and then combine it with their own ingenuity.

Create a strong business and institutional environment for the digital economy to thrive

Just as purchasing IT systems offers no guarantee that a company will be a digital leader, building Internet infrastructure is not sufficient for countries to capture the full potential benefits of digital globalization. Their business sectors and consumer populations need to be able to engage and innovate online.

A recent World Bank report finds that digital technologies have not improved productivity and reduced inequality to the degree once hoped in countries that lack strong fundamentals such as education, good governance, and a supportive business environment.[136] These attributes have always been important for attracting foreign investment, and they are even more critical today. The benefits of digital globalization are heavily concentrated among countries with those ingredients in place, and lagging countries that fail to make broader reforms in these areas risk falling even further behind.

The Internet can accelerate development and promote efficiency in emerging economies, but it is not a shortcut around building good governance. Countries still need healthy business environments that nurture startups, allow inefficient firms to exit, support research, and provide a solid legal framework for intellectual property and property rights. Without these elements, local companies will not be able to use global flows to raise their game, and foreign investors and companies will be deterred. India, for example, is attempting to tackle these issues and build a stronger foundation through initiatives such as Startup India and Digital India.

A recent McKinsey survey found that business executives around the world believe that government agencies can provide more transparency and information on opportunities for domestic companies in foreign markets and opportunities for foreign companies

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[134] *The state of broadband 2015: Broadband as a foundation for sustainable development*, International Telecommunication Union and UNESCO Broadband Commission for Digital Development, September 2015.

[135] Christine Zhen-Wei Qiang and Carlo M. Rossotto with Kaoru Kimura, "Economic impacts of broadband," in *Information and communications for development 2009: Extending reach and increasing impact*, World Bank, 2009.

[136] *World development report 2016: Digital dividends*, World Bank, January 2016.

within the country. Having a one-stop shop to obtain such information, identify potential business partners, and understand the regulatory and approval process is becoming essential. Now that small firms have new avenues for participating in digitally facilitated global trade, governments can raise awareness of these growth opportunities. Expanding the information, mentoring, and financing available to small businesses can help them take advantage of this new shift in cross-border commerce.

Governments can provide another enabler by opening their enormous data sets to encourage private-sector innovation. Making data more open and widely available in shareable formats can create substantial economic value, estimated at more than $3 trillion by MGI. Governments from India, Mexico, New Zealand, Singapore, the United Kingdom, and the United States are among those that have launched open data initiatives.[137]

Maintain an open Internet while protecting privacy

Taking an open approach to cross-border data flows can accelerate growth. Yet many countries are considering limitations on what kind of data can be transmitted across borders and where data must be stored. Some are moving toward regulations that would require companies to use servers physically located within their borders to process and store data generated there. Variations on this type of law exist in Indonesia, Nigeria, Russia, Vietnam, and elsewhere. Other countries limit certain types of personal data transfers or have unique consent requirements.[138] In 2014, Brazil passed a sweeping "Internet bill of rights"; some technologists questioned whether its privacy provisions, restrictions on data collection, and requirements that Brazilians' data must remain stored on servers within the country could limit the use of large-scale analytics.[139]

Privacy has been a major issue in Europe. A 2014 ruling by the European Court of Justice upheld the "right to be forgotten"—that is, requiring search engines to honor requests from individual users to remove links to personal, inaccurate, or outdated information. As we went to press, the future of the "safe harbor" agreement governing data transfers between the European Union and the United States remained uncertain.

Requirements that data must be sequestered locally raise a host of issues for companies, including cloud data storage and even personnel data for multinationals with operations and employees in restricted nations. In particular, some of the business models surrounding the Internet of Things are predicated on transmitting data to intermediaries, some of which may be in other countries. Some companies are proceeding with building their own data centers in locations around the world to cope with these types of requirements. But the compliance burdens of sequestering data and operating across multiple countries with varying regulations could limit the economic benefits of cross-border data flows.

Beyond those governments that are acting out of concern for the privacy of their citizens, others regard the freewheeling nature of the Internet as a challenge to their authority and have moved to censor content, block websites, or place users under surveillance.

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[137] *Open data: Unlocking innovation and performance with liquid information*, McKinsey Global Institute, October 2013.

[138] *Data localization: A challenge to global commerce and the free flow of information*, Albright-Stonebridge Group, September 2015.

[139] Maria Medrano, "Brazil's Internet Bill of Rights," *Americas Quarterly*, April 2015.

While legitimate privacy concerns do need to be addressed through the development of universal standards, the movement toward data localization raises the danger of balkanizing the Internet. The economic benefits of cross-border data flows could be limited if the Internet becomes governed by a web of varying country-specific regulations. A study by the European Centre for International Political Economy examined the impact of recently proposed or enacted data localization and security regulations in seven economies. It found that these rules would lower GDP in all seven cases, with Vietnam (-1.7 percent), China (-1.1 percent), and Indonesia (-0.5 percent) poised for the largest losses.[140]

Another persistent issue is the tendency of parts of the digital economy to develop natural monopolies. The biggest platforms have enormous network effects and low marginal costs precisely because of their enormous size. Some governments are wary of this type of market power being held by a foreign company. But restricting the biggest global platforms denies that country's citizens and small businesses the opportunity to participate. Our analysis described in Chapter 4 finds that countries benefit significantly from data consumption, not merely from being home to Internet companies and platform providers. Governments may want to consider whether their countries can produce their own robust digital platforms to compete (as China has done). But walling a country off from global platforms while failing to cultivate its own is a harmful combination.

Make cybersecurity a top priority

A world that runs on data flows is also vulnerable to cyberattacks. Private-sector companies and government agencies alike have suffered serious data breaches at the hands of hackers. One study has estimated that cybercrime costs the global economy some $400 billion in annual losses; these can include consumer data breaches, financial crimes, market manipulation, and theft of intellectual property.[141] Aside from the substantial business costs, hackers may pose public safety and even national security risks. Governments will need to work closely with the business community to stay on top of new threats and share information and new technology solutions. Regulators may need to mandate standards for securing consumer data, and public agencies need to take additional steps to safeguard their own assets.

Data privacy and security are thorny issues in almost every area of digital use. They are central to realizing the full economic value of big data analytics and the Internet of Things, which are predicated on collecting and sharing data. Governments have to make choices about data collection, access, usage, and consent, especially for data generated in public spaces. The dangers that hackers could create in physical settings have to be carefully considered and guarded against; policy makers can help to address security issues by creating frameworks for liability.[142]

Beyond the threat of breaches, governments need to be aware of what is lurking on the so-called Darknet. The public Internet is vast, but it is dwarfed in size by the "Deep Web" of non-indexed websites, as we explain in Chapter 1. Much of the Deep Web is simply private information held by companies, enormous government databases, pay-to-use databases, or private message boards. It is also used by activists, dissidents, journalists, whistleblowers, and others who have legitimate needs for maintaining anonymity. But hidden on the Darknet portion of the Deep Web is an entire online world of criminal activity, including money laundering, drug trafficking, human trafficking, child pornography, hackers for hire, and terrorist networks. Some criminal rings have been broken up and their members

[140] See Matthias Bauer et al., *The costs of data localization: Friendly fire on economic recovery*, ECIPE occasional paper number 3/2014, May 2014. The study also found that investment could drop by 4.2 percent in Brazil, 3.9 percent in the European Union, and 3.1 percent in Vietnam.

[141] *Net losses: Estimating the global cost of cybercrime*, Center for Strategic and International Studies and McAfee, June 2014.

[142] *The Internet of Things: Mapping the value beyond the hype*, McKinsey Global Institute, June 2015.

prosecuted, including the founder of the notorious Silk Road black market. But reining in the illicit global trade being conducted in cyberspace will require deeper international coordination.[143]

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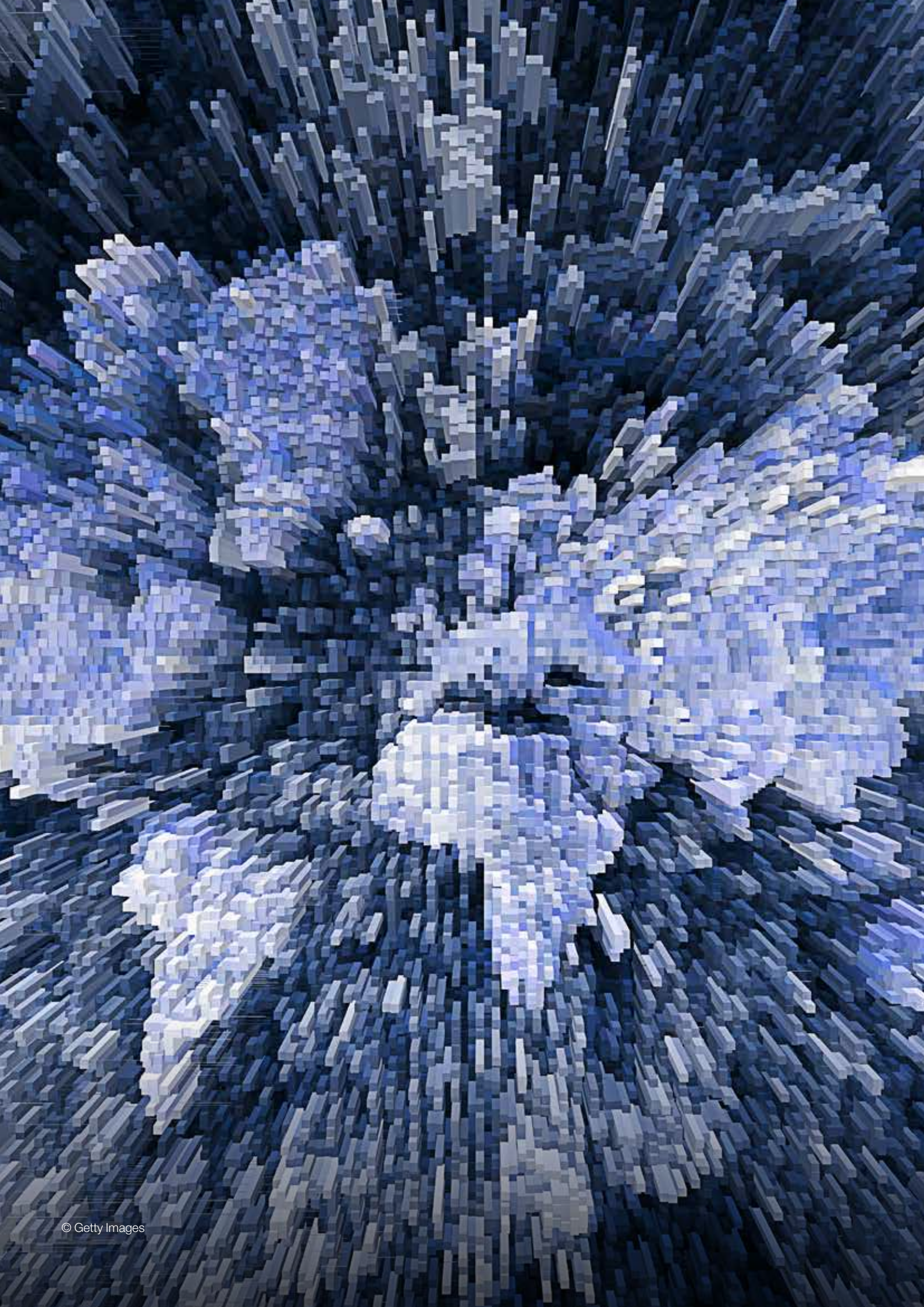
Policy makers have to strike the right balance between capturing the benefits of openness while mitigating the risks—and in a digital world, both opportunities and challenges are appearing with unprecedented speed. This new version of globalization is creating a faster-moving and vastly more complex global economy, but it offers new ways to realize the value of connectedness. This wave of change can accelerate growth for the countries that approach it with optimism and vision.

[143] Daniel Sui, James Caverlee, and Dakota Rudesill, *The Deep Web and the Darknet: A look inside the Internet's massive black box*, Woodrow Wilson International Center for Scholars, October 2015.



TECHNICAL APPENDIX

This appendix outlines key points on the methodology in the following sections:

1. Data sources and definitions
2. Econometric model and statistical analyses
3. Academic literature on the relationship between global flows and GDP
4. Methodology for the MGI Connectedness Index
5. Methodology for global connectedness of regions within countries
6. Global survey of startups

1. DATA SOURCES AND DEFINITIONS

Global cross-border flows

We compiled a data set covering five categories of flows for 139 countries from 1980 to 2014 or the latest data available (Exhibit A1). The data set draws on multiple sources that we describe in more detail later in this section.

For each type of flow, we assembled inflows and outflows for each country individually, and wherever possible bilaterally. The coverage of bilateral data over time and across countries varies by flow. Figures for total flows used in this report refer to the broadest coverage available.

We used subcategories of overall goods, services, and financial flows for specific analyses. For example, our analysis of knowledge-intensive flows includes only the knowledge-intensive subcategories of each aggregate flow. The mapping to the goods categories has been performed based on the United Nations' six-digit harmonized coding system, HS 2002. We assigned service categories using the 11 chapters in the Comtrade database of global commodities trade statistics maintained by the United Nations Statistics Division. We categorized financial flows by the nature of their investment (i.e., FDI, equity, bonds, and loans) and based them on data from several sources. People flows are not composed of any single aggregate flow. Instead, we analyzed several components such as international student flows, long-term migrants, refugees, and overnight visitors. For data flows, we examined used cross-border bandwidth from TeleGeography.

Exhibit A1

The compiled data set contains hundreds of countries and provides comprehensive coverage of the past decade

	Major flows	88 90 95 00 05 10 15	Source	Maximum number of countries
Goods	Goods total		UNCTAD	218
	R&D-intensive goods		UNCTAD	160
	Capital-intensive goods		UNCTAD	160
	Labor-intensive goods		UNCTAD	160
	Primary resources		UNCTAD	160
Services	Services total		UNCTAD	181
	Knowledge-intensive services		UNCTAD	135
	Labor-intensive services		UNCTAD	146
	Capital-intensive services		UNCTAD	146
	Cultural and social services		UNCTAD	104
	Government services		UNCTAD	138
Finance	Total financial flows		IMF	194
	FDI flow		IMF	265
	Portfolio investment		IMF	251
	Equity		IMF	113
	Bonds		IMF	125
	Loans		IMF	260
	Reserves		IMF	112
	Remittance		World Bank	185
	Total financial stock		EWN[1]	273
People	Migrants		World Bank	214
	Travelers		UNWTO	221
	International students		OECD	201
Data	Used bandwidth		TeleGeography	171

1 External Wealth of Nations database.

SOURCE: McKinsey Global Institute analysis

Goods flows

This report analyzes the historical growth in the global flow of goods, its dispersion across countries and regions, and its transformation due to digitization and knowledge intensity.

The primary source is the UNCTAD database, which provides non-bilateral data from 1980 onward. We analyzed more than 5,200 product codes between 2002 and 2014, dividing them into four categories: capital-intensive manufacturing, labor-intensive manufacturing, primary resources, and R&D-intensive manufacturing. For bilateral trade, we used data from the World Bank's World Integrated Trade Solution database, which is available from 2000 to 2014.

Each of the four categories of goods trade mentioned above has a number of subgroups.

- **Capital-intensive manufacturing**
  - *Food, beverages, and tobacco.* Includes the production, processing, and preservation of meat, fish, fruit, vegetables, oils, and fats; the manufacture of dairy products, grain mill products, and starches and starch products; and the production of other food products and beverages including spirits, wines, malt liquors, soft drinks, and mineral waters. Also includes items related to the manufacture of tobacco products.
  - *Paper products and publishing.* Includes the manufacture of pulp, paper, and paperboard; the manufacture of corrugated paper and paperboard and containers made out of those materials; and the manufacture of specialty paper products, including carbon paper, toilet paper, envelopes, and postcards.
  - *Manufacturing of petroleum, rubber, plastic, mineral, and metal products.* Includes the production of products related to the commodities of metals, mining, and oil and gas.
- **Labor-intensive manufacturing**
  - *Textiles.* Includes the spinning, weaving, and finishing of textiles; the manufacture of carpets, rugs, rope, twine, and netting; and the manufacture of knitted and crocheted fabrics and articles.
  - *Leather, fur products, and apparel.* Includes the manufacture of fur and non-fur apparel, and the dressing and dyeing of fur. Also includes the production of footwear, the tanning and dressing of leather, and the manufacture of leather products.
  - *Wood products and furniture.* Includes the sawmilling and planing of wood; the manufacture of wood, cork, and straw; and the manufacture of wood products, including furniture, musical instruments, sporting goods, and toys.
- **Primary resources**
  - *Agriculture, hunting, fishing, and related activities.* Includes the growing of crops, the farming of animals, the hunting and trapping of animals, fishing, and the operation of fish hatcheries and farms.
  - *Forestry and logging.* Includes goods produced through forestry and logging and related service activities.

- *Metals.* Includes the manufacture of basic iron and steel, basic precious and non-ferrous metals, and the casting of metals. Also includes other fabricated metal products, such as tanks, reservoirs, and construction materials.

- *Mining.* Includes the mining and agglomeration of hard coal and lignite, uranium, and thorium ores; the mining of ferrous and non-ferrous metal ores; the mining and quarrying of stone, sand, and clay; and the extraction of crude petroleum and natural gas.

- *Oil and gas.* Includes the manufacture of coke oven products and refined petroleum products as well as the processing of nuclear fuel.

- **R&D-intensive manufacturing**

  - *Chemicals and chemical products.* Includes the manufacture of basic chemicals, fertilizers and nitrogen compounds, plastics and rubbers, pesticides and other agro-chemical products, paints, pharmaceuticals, soaps and detergents, artificial or synthetic fibers, yarn, and filaments.

  - *Electrical, telecommunication, and computing machinery.* Includes the manufacture of office, accounting, and computing machinery; electrical machinery such as motors, generators, transformers, wires and cables, and electrical equipment; television and radio transmitters and receivers; and sound and video recording equipment.

  - *Motor vehicles and other transport equipment.* Includes the manufacture of motor vehicles, trailers and semitrailers, and parts and accessories for motor vehicles and their engines; and other transport equipment such as ships, railway and tramway locomotives, aircraft and spacecraft, motorcycles, and bicycles.

  - *Medical, precision and optical instruments.* Includes the manufacture of medical appliances and instruments, optical instruments, photographic equipment, and watches and clocks.

  - *Other machinery and equipment.* Includes the manufacture of general-purpose machinery such as engines, turbines, pumps, compressors, ovens, and lifting and handling equipment; special-purpose machinery such as agricultural machinery, weapons and ammunition; machinery for the production of mining and metal products, food, beverage, and tobacco products; and domestic appliances.

We separately subdivided goods into three categories: finished goods, intermediate goods, and raw materials. The broad economic categories (BEC) classification system specified by the United States has three designations: consumer goods, capital goods, and intermediate goods. We consider both consumer and capital goods as finished goods. We further subdivide intermediate goods into raw materials and intermediate goods.

- **Finished goods.** Includes finished capital and consumer goods such as industrial machines, ships and aircrafts, refined petroleum, sugar, and apparel.

- **Intermediate goods.** Includes parts used as inputs for making finished products such as pharmaceutical inputs, vehicle parts, and steel products.

- **Raw materials.** Includes commodities and processed commodities. Examples of commodities are coal, corn, cotton, and crude petroleum. Processed commodities include materials such as animal fats and oils, coffee, and processed metal.

Services flows

All non-bilateral flows of services draw on UNCTAD and UN Comtrade data. We subdivided services flows into five categories: knowledge-intensive, labor-intensive, capital-intensive, cultural and social, and government. However, the coverage of services data is most effective at the aggregate level rather than broken into these five categories.

Each of these also has a number of subgroups:[144]

- **Knowledge-intensive services**
  - *Insurance services.* The provision of insurance to non-residents by resident insurance enterprises and vice versa; services provided for freight insurance on goods exported and imported; services provided for other types of direct insurance including life and non-life; and services provided for re-insurance.
  - *Financial services.* Financial intermediation services and auxiliary services conducted between residents and non-residents other than those related to insurance enterprises and pension funds.
  - *Computer and information services.* Resident and non-resident transactions related to hardware consultancy, software implementation, information services (i.e., data processing, data base, news agency), and maintenance and repair of computers and related equipment.
  - *Royalties and license fees.* Includes receipts (exports) and payments (imports) of residents and non-residents for the authorized use of intangible non-produced, non-financial assets and proprietary rights such as trademarks, copyrights, patents, processes, techniques, designs, manufacturing rights, and franchises; and the use, through licensing agreements, of produced originals or prototypes such as manuscripts and films.
  - *Other business services.* Covers merchanting and other trade-related services as well as operational leasing services; and miscellaneous business, professional, and technical services.[145]
- **Labor-intensive services**
  - *Travel. Goods* and services, including those related to health and education, acquired by travelers during visits of less than one year. The goods and services are purchased by, or on behalf of, the traveler or provided, without a quid pro quo, for the traveler to use or give away.
  - *Construction services.* Construction and installation project work performed on a temporary basis in the compiling economy or in extraterritorial enclaves by resident and non-resident enterprises and associated personnel, excluding foreign affiliates.

[144] The definitions used for the subgroups are closely based on IMF Balance of Payments Manual definitions.

[145] Purchase of a good by a resident of the compiling economy from a non-resident and the subsequent resale of the good to another non-resident. Value created between purchase and resale is recoded as value of merchanting service.

- **Capital-intensive services**
  - *Communications services.* Communications transactions between residents and non-residents (i.e., postal, courier, and telecommunications services).
  - *Transportation.* Transportation services performed by residents of one economy for those of another and vice versa, and that involve the carriage of passengers, the movement of goods (freight), rentals (charters) of carriers with crew, and related supporting and auxiliary services.
- **Cultural and social services.** Audiovisual and related services and other cultural services provided by residents to non-residents and vice versa.
- **Government services.** All services (e.g., spending by embassies and consulates) associated with government sectors or international and regional organizations and not classified under other items.

Financial flows

Aggregate financial flows comprise the following asset classes:

- **FDI.** Investments that establish at least a 10 percent stake in a foreign entity. Any subsequent lending between the direct investor and the financial recipient is also captured in this category.
- **Equity.** Any equity or share purchased by an investor in another country that gives the investor no more than a 10 percent stake.
- **Bonds.** Any tradable debt security that is purchased by a foreign investor, including public and corporate (both financial and non-financial) bonds, mortgage-backed securities, other asset-backed securities, and collateralized debt obligations.
- **Loans.** Any other assets not classified in the above three categories, primarily loans, currency, and deposits, and a small share of trade credit.

In addition to these four classes, data on outward investments capture a fifth category of reserve assets: assets acquired or held by monetary authorities in a foreign currency. Reserve assets are distinguished from the other four classes to avoid double-counting.

We take all these data from balance of payments statistics from the International Monetary Fund.

Further, we also look at data on flows of remittances from the World Bank. We do not include these flows in our core analysis of major financial flows because they either overlap with other financial flows, such as loans, or are the reverse of goods and services flows. We also analyze a bilateral data set for FDI, which gives us an indication of the origin and destination of this flow.

In addition to financial flows data, we take countries' foreign assets and foreign liabilities (financial stock data) into consideration. This is sourced from Philip R. Lane's "External Wealth of Nations" data set.

People flows

Unlike for flows of goods, services, and finance, we do not have additive data sets on people flows. Instead, we look at overlapping categories and describe people flows from different angles. All data we collected for people flows are bilateral, indicating both departure and arrival countries. We use three direct measures:

- **Migrants.** While all other measures capture or approximate flows of people, our migration data are stock data, indicating foreign-born residents by country. Data are from the World Bank and are available for 1980 to 2013.
- **Travelers.** Arrivals of non-resident visitors or tourists at national borders, drawn from the UN World Tourism Organization, available from 1995 to 2013.
- **Students.** International flows of mobile students at the tertiary level (ISCED 5 and 6) from the UNESCO Institute for Statistics, available from 1999 to 2013,

Data flows

For data flows, we look at cross-border used bandwidth data from TeleGeography, which provides data by region, country, and key routes from 2005 to 2014. Used capacity is the sum of all capacity deployed for Internet backbones, private networks, and switched voice networks. It does not include capacity that is used for restoration and redundancy purposes.

Knowledge-intensive flows

We define knowledge-intensive flows as cross-border goods, services, finance, people, and data and communications flows that are rich with ideas, knowledge, and information. The aim is to approximate a value of global flows that are linked to today's knowledge economy. We define the following subcategories of global flows as knowledge-intensive:

- **R&D-intensive manufacturing (goods flows).** Of all goods flows, those classified as R&D-intensive manufacturing are considered to have the highest portion of knowledge involved in production or development. When these goods cross borders, the knowledge embodied in these products or their development is at least partially transferred across those borders.
- **Knowledge-intensive services (services flows).** Knowledge-intensive services are those requiring the highest skill level of the parties providing the service (e.g., financial services) or that directly represent the realized value of knowledge or content creation (e.g., the payment of royalties and license fees).
- **FDI (financial flows).** Of all financial flows, FDI is most clearly linked to the transfer of knowledge across borders as companies conducting greenfield FDI transfer knowledge to the new location. We also consider brownfield FDI as a transfer of knowledge because companies that acquire other companies either use their own knowledge and management techniques to improve the business of the acquisition or use the knowledge embedded in their investment to improve their own business.
- **Cross-border telecom revenue (data and communication flows).** In our services database, telecommunications is a financial-intensive service. However, it is an important proxy for data and communication flows and represents a minimum value of those flows. Therefore, we have included this revenue in an attempt to capture a significant portion of the value of data and communication flows. We have elected to include only business, as opposed to residential, revenue because we believe these flows have the most substantial knowledge component.

- **Business traveler spending (people flows).** In our services database, business travel is a labor-intensive service. However, it can be used as a proxy for knowledge-intensive people flows and, at the very least, represents a minimum value of such flows. When business travelers move across borders, they carry knowledge with them; in fact, these travelers have likely traveled to a different country to either impart that knowledge or acquire knowledge that they will carry back to their home country.

Country classifications

For some analyses, we classify each of the 139 countries in our sample as either a developing or a developed economy. For developed economies, we use the term "advanced economies" interchangeably. We refer to developing economies as "emerging markets" or "emerging economies."

We also assigned each country to one of ten regions, six of which we define as emerging and four as developed. This classification of countries and their assignment to regions follows the approach used in previous McKinsey Global Institute reports.[146] We define Singapore, Hong Kong, Taiwan, and Macao as developed economies despite the fact that they are located in emerging-market regions (Exhibit A2).

Exhibit A2

Classification of countries into regions and development level

	Europe, Middle East, and Africa	Americas	Asia
Developed regions	**Western Europe** ▪ Austria ▪ Belgium ▪ Denmark ▪ Finland ▪ France ▪ Germany ▪ Greece ▪ Iceland ▪ Ireland ▪ Italy ▪ Malta ▪ Netherlands ▪ Norway ▪ Portugal ▪ Spain ▪ Sweden ▪ Switzerland ▪ United Kingdom	**North America** ▪ Canada ▪ United States	**Northeast Asia** ▪ Japan ▪ South Korea **Australasia** ▪ Australia ▪ New Zealand
Emerging regions	**Eastern Europe and Central Asia** ▪ Bulgaria ▪ Czech Republic ▪ Hungary ▪ Kazakhstan ▪ Lithuania ▪ Latvia ▪ Poland ▪ Russia ▪ Slovakia ▪ Turkey Plus 19 other countries **Africa and Middle East** ▪ Algeria ▪ Angola ▪ Botswana ▪ Cameroon ▪ Egypt ▪ Ghana ▪ Iran ▪ Israel ▪ Jordan ▪ Kenya ▪ Kuwait ▪ Lebanon ▪ Morocco ▪ Nigeria ▪ Saudi Arabia ▪ South Africa ▪ Tunisia ▪ United Arab Emirates Plus 26 other countries	**Latin America** ▪ Argentina ▪ Bolivia ▪ Brazil ▪ Chile ▪ Colombia ▪ Costa Rica ▪ Dominican Republic ▪ Ecuador ▪ Guatemala ▪ Jamaica ▪ Mexico ▪ Panama ▪ Uruguay ▪ Venezuela Plus 10 other countries	**China region** ▪ China **South Asia**[1] ▪ India ▪ Pakistan ▪ Bangladesh ▪ Sri Lanka ▪ Maldives **Southeast Asia**[1] ▪ Philippines ▪ Malaysia ▪ Cambodia ▪ Indonesia ▪ Thailand ▪ Vietnam ▪ Singapore[2] Plus 5 other countries

1 Combined to form "Other Asia" in analysis regarding interregional vs. intraregional trade.
2 Classified as developed despite being located in a region classified as emerging.

SOURCE: McKinsey Global Institute Financial Assets database; McKinsey Global Institute analysis

[146] See, for example, *Financial globalization: Retreat or reset?* McKinsey Global Institute, March 2013.

2. ECONOMETRIC MODEL AND STATISTICAL ANALYSES

In Chapter 4 of this report, we discuss why openness to global flows matters for economic performance. According to the classical Solow growth model, the main factors determining GDP growth are the physical capital stock of a nation and its human capital.[147] Newer growth-theory models also include a role for technological progress or innovation. To test for the additional effect of cross-border flows on GDP growth, which may raise total factor productivity or increase the utilization of capital and labor, we employ a two-step error regression model.

Our econometric model

Our model is based on a classic Cobb-Douglas production function of the following form:

$$Y = A \times K^{\alpha} \times L^{\beta} \quad (1)$$

where Y represents GDP, K is the fixed capital stock in an economy, L is the labor stock in an economy, and A is total factor productivity, which includes technological progress and innovation.

We used a two-step error correction model (ECM). The ECM allows us to incorporate two aspects into our analysis: first is the inter-temporal relation in GDP growth (i.e., this year's growth affects next year's growth). We can thus estimate the change in GDP growth as a function of changes in independent variables such as flows. This inter-temporal relationship also allows us to differentiate between the short-term and long-term effects of the independent variables of GDP growth.

We use data from 97 countries, from 1995 to 2013 (the latest year for which those data are available for all flows and all countries). To account for country-specific fixed effects that may also contribute to GDP growth, we format the data as a panel data set, pooling cross-sectional and time-series data, and run the regression on it using a fixed-effect model. This controls for time-invariant effects, such as the legal system or colonial history of the country.

Given that we are using long time series in our analysis, we also pay attention to testing for cointegration in the data series. This is especially troublesome in building a dynamic econometric model, as cointegrated data series share a common trend and thus may lead to a false finding of correlation among the variables. We first used sophisticated methods to test for and correct cointegration and then used a two-step error-correction model for the estimation.

To begin, we test the long-term relationship between the data series. We run a unit root test on the residual from this step and select a model whose residual is cointegrated. In the second step, we estimate the short-term relationship with the same set of covariates from the long-run relationship and its residual. Lastly, we control our potential endogeneity in the data series using instrumental variables. As instruments, we use the difference between the three-year lag of flows and four-year lags.[148] We tested different time lags to see which instruments are stronger and determined that the three- to four-year lag is most suitable.

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147 For an overview of different growth models, see, for example, Robert J. Barro and Xavier Sala-i-Martin, *Economic growth*, MIT Press, 2003.

148 Given that our specification includes the one-year lag of GDP, our lagged instrumental variables are at least t–2 or t–3. Given our panel data, we could have used the GMM method, which increases the number of lagged instruments. The gain in efficiency was small, so we report the traditional instrumental techniques, with Hausman test passed for their validity.

Using the ECM in this way allows us to make a more credible claim regarding the direction of causality. We thus examine the impact of the growth of flows in one period on the growth of GDP for the subsequent period, controlling for unobserved country-specific effect, the noise from the covariates that are not integrated, and endogeneity among the covariates and GDP.

The transformation of the Cobb-Douglas function to logarithmic scale allows us to estimate the elasticities of each variable (i.e., by how much does GDP growth change if the explanatory variable changes by 1 percent). The estimated model takes the following form:

Step 1 of two-step ECM

$$\log GDP_{i,t} = \alpha + Sk\beta_k logCV_{i,k,t} + Si\beta_i logFlow_{i,j,t-1} + \varepsilon_{i,t}$$

where i represents country i, t the current year , $t-1$ the past year, S is the symbol of sum, j is the index of flow, and k is the index of control variables.

The definition of each variable is as follows:

- $logGDP_{it}$ is the marginal change in real GDP for country i between year t and $t-1$ in natural log
- α is the constant term
- $logCV_{i,k,t}$ is the k-th control variable and is the marginal change in the lagged level of respective control variables for country i in time t. Their coefficient estimates are interpreted as the long-term elasticity of real GDP with respect to a change in the control variable.
- $logFlow_{i,j,t-1}$ is the j-th flow and is the change in the lagged level of the respective flow. It determines the long-term elasticity.
- $\varepsilon_{i,t}$ is the residual or error that we will save for the second step, which has to be cointegrated (i.e., it does not suffer from having a unit root).

Step 2 of two-step ECM:

$$\Delta \log GDP_{i,t} = \alpha + Sk\beta_k \Delta logCV_{i,k,t} + Sj\beta_j \Delta logFlow_{i,j,t} + \gamma logGDP\ per\ capita_{i,t-2} + \delta\varepsilon_{i,t-1} + u_{i,t}$$

- $\Delta logGDP_{i,t}$ is the change in growth of real GDP for country i between year t and $t-1$ in natural log
- $\Delta logCV_{i,k,t-1}$ comprises the set of k control variables and is the change in growth of the respective control variable from year $t-1$ to t in natural log. Its coefficient estimates are interpreted as the short-term elasticity of real GDP growth with respect to the control variables.
- $\Delta logFlow_{i,j,t-1}$ comprises the set of j flows and is the change in growth of the flows in natural log. Its coefficient estimates determine the short-term elasticity of real GDP growth with respect to flows.

- $logGDP\ per\ capita_{i,t-2}$ is the two-year lagged value of real GDP per capita in natural log, capturing the catch-up effect of the developing countries on the real GDP growth. Since this effect does not apply to countries that already have high GDP per capita (i.e., advanced countries), its coefficient γ is expected to be negative.

- $\varepsilon_{i,t-1}$ is the lagged residual from the step one. Its coefficient δ needs to be negative and statistically significant for the second step to be statistically valid. Conceptually, this coefficient captures the rate of the short-term model converging into the long-term model.

- $u_{i,t}$ is the error term from step two of ECM.

Each of the control variables enters the regression as a stand-alone term. The control variables CV in the estimation are as follows:

- Human capital, measured by average years of schooling in the adult population

- Real fixed capital stock, derived from the accumulated real fixed investment in the country after depreciation, to capture capital inputs in the economy

- Employment, to capture labor inputs in the economy.

We test the relationship between flows and GDP by measuring flows in different ways. First, we use the sum of inflows and outflows for the country, normalized by nominal GDP (for goods trade and FDI) or population (for migration flows and data flows). Second, we use each country's score in the MGI Connectedness Index. The normalized flows used in the estimation are goods trade, migration, FDI flows, and cross-border data usage. The connectedness scores used are for goods trade, labor-intensive services trade, travelers, FDI flow, and used cross-border bandwidth. These variables are selected by assessing their correlation with each other, Granger causality with GDP, and using a backward/forward stepwise model selection.

We obtain the signs we expected on each of the flow variables (Exhibit A3), with the exception of migration flows. The coefficient on migration flows is negative for long-term elasticity, while we would expect it to be positive. We believe this result is due to loss of skilled labor in developing countries or their difficulty in absorbing large migrant or refugee flows. Exhibits A4 and A5 show the short-term and long-term elasticities from the two measures of global flows described above.

Exhibit A3

The coefficients from our econometric model have the expected sign

Dependent variable (Log)
Real GDP

Independent variables (Log)

Flow variables

Name of variable	Granger causality with real GDP	Short-/long-term impact: Expected sign of coefficient	Short-/long-term impact: Estimated sign of coefficient
FDI	Two-way	Positive/positive	Positive/positive
Goods trade flow	Two-way	Positive/positive	Positive/positive
Immigration	Two-way	Positive/positive	Insignificant/negative[1]
Data flows	Two-way	Positive/positive	Positive/positive
Services trade flow	Two-way	Positive/positive	Extended due to correlation with FDI
Fixed capital stock	n/a	Positive/positive	Positive/positive
Employment	n/a	Positive/positive	Positive/positive
Average years of education	n/a	Positive/positive	Insignificant/negative

1 Migration flows are negligible or slightly negative at the global level, possibly due to the loss of skilled labor in developing countries or the difficulties of absorbing a large influx of refugees or migrants. However, migration flows have a positive impact on productivity in advanced economies.

SOURCE: McKinsey Global Institute analysis

Exhibit A4

GDP impact of global flows, using normalized flow values

Dependent variable: Real GDP
97 countries, 1995–2013

Elasticities

Long term	Coefficients	P-values
Flow variables		
▪ Goods trade	0.05	0.0129
▪ FDI	0.04	0
▪ Migration	-0.05	0.0036
▪ Data	0.02	0
Macroeconomic variables		
▪ Fixed capital stock	0.48	0
▪ Employment	0.39	0
▪ Average years of education	Insignificant	n/a

Short term	Coefficients	P-values
Flow variables		
▪ Goods trade	0.0817	0.0002
▪ FDI	0.0039	0.0761
▪ Immigration	Insignificant	n/a
▪ Data usage	0.025	0.0154
Macroeconomic variables		
▪ Fixed capital stock	0.76	0
▪ Employment	0.49	0
▪ Average years of education	Not available	n/a

SOURCE: McKinsey Global Institute analysis

Exhibit A5

GDP impact of global flows, using connectedness scores for each flow

Dependent variable: Real GDP
97 countries, 1995–2013

	Elasticities			
	Long term		Short term	
	Coefficients	P-values	Coefficients	P-values
Connectedness scores				
▪ Internet traffic	0.0180	0.1202	Insignificant	n/a
▪ Goods trade	0.0706	0.0006	0.4264	0.0022
▪ Service trade[1]	0.0249	0.0498	Insignificant	n/a
▪ Travelers	0.0399	0.0407	Insignificant	n/a
▪ FDI flow	0.0204	0.0444	Insignificant	n/a
Macroeconomic variables				
▪ Fixed capital stock	0.4718	0	0.70	0
▪ Employment	0.4685	0	0.48	0
▪ Average years of education	Insignificant	n/a	n/a	n/a

1 We use data on labor-intensive services trade only, not knowledge-intensive services or capital-intensive services, because the latter are highly correlated with FDI.

SOURCE: McKinsey Global Institute analysis

Calculating the impact of flows on GDP output and GDP growth

After we estimate the two-step ECM, we use the short-term and long-term elasticities (shown in Exhibit A4) to calculate the contribution of flows to both the level of GDP and the growth rate of GDP for a country *i* for flow *j* at time *t* as follows:

$$\textit{flow's GDP share in level}_{i,j,t} = \frac{(\textit{flow}_{i,j,t})^{\beta_j}}{\textit{real GDP}_{i,t}}$$

Where β_j is the flow *j*'s GDP long-term elasticity from step one of two-step ECM

$$\textit{flow's GDP share in growth}_{i,j,t} = \frac{\left(\log(\textit{flow}_{i,j,t}) - \log(\textit{flow}_{i,j,t-1})\right) \times \beta_j}{\left(\log(\textit{real GDP}_{i,t}) - \log(\textit{real GDP}_{i,t-1})\right)}$$

Where β_j is the flow *j*'s GDP short-term elasticity from step two of two-step ECM. These expressions are derived from the two-step ECM because it is a combination of the change in GDP in level (the long-term model) and the change in GDP growth (the short-term model). We calculate the above for both normalized flows and for a model specification using connectedness index scores. The results indicate that flows accounted for 10.1 percent of global GDP over the past ten years (Exhibit A6).

Exhibit A6

All flows combined contributed 10.1 percent of GDP from 2003 to 2013, with goods and data having largest impact

Flows contribution to GDP

FLOWS MODEL—ALL COUNTRIES

Shares of output
%

	Midpoint			5th percentile			95th percentile		
	2008–13	2003–13	1998–2013	2008–13	2003–13	1998–2013	2008–13	2003–13	1998–2013
All flows	9.36	10.05	11.03	8.97	9.62	10.55	10.06	10.82	11.90
Goods trade	3.20	3.51	3.97	3.28	3.56	4.03	3.21	3.46	3.91
FDI flow	1.68	1.64	1.52	1.74	1.70	1.58	1.62	1.58	1.46
Immigration	1.74	1.95	2.24	1.16	1.30	1.50	2.61	2.92	3.36
Data flow	2.70	2.95	3.29	2.79	3.06	3.43	2.62	2.85	3.17

SOURCE: McKinsey Global Institute analysis

Impact on productivity

Flows may increase GDP by raising either the usage of capital and labor, or by raising productivity. To calculate this impact, we run a separate model specification that includes GDP/employment, or labor productivity.[149] The difference between the coefficient on this variable and the coefficient of flows on GDP is the residual, which is the impact on productivity.

The results are shown in Exhibit A7. We find that all flows affect GDP mainly through productivity. Goods flows, FDI, and data flows all positively increase productivity. Migration flows have a negative impact on productivity for emerging economies. As noted above, this may reflect the impact of "brain drain" (the loss of skilled labor) or the difficulties developing countries encounter when absorbing large migrant or refugee flows. For advanced economies, we find a positive impact of migration on productivity. Exhibit A7 also shows that data flows have a positive impact on an economy's utilization of capital and labor. Thus far, fears about digital flows reducing employment appear unfounded.

Exhibit A7

All flows contribute to raising productivity, but only data flows contribute to increasing labor and capital inputs

Flows model

Flow variables	Long-term elasticity for real GDP	Impact on productivity	Impact on increased inputs
Goods trade	0.05	0.05	0
FDI	0.04	0.05	-0.0023
Migration	-0.05	-0.04	-0.0101
Data usage	0.02	0.02	0.0029

SOURCE: McKinsey Global Institute analysis

[149] We run a similar regression using capital productivity and find similar results.

Network centrality

In a separate analysis, we investigated the importance of a country's position within the network of trade flows and within the network of data flows for its GDP growth. More connections with a greater number of neighbors should reflect a more diverse portfolio of imports and data. A broader portfolio benefits a country by enriching the consumption basket, by enabling companies to source ideas and inputs from all over the world, and by taking advantage of the global competitive landscape to diversify and reduce dependence on any single partner. Broader network coverage for exporters reflects their competitiveness and ability to sell in many markets. More routes and a more central position in the network therefore indicate the presence of highly competitive firms that can participate in global trade and markets and thereby have a positive impact on their home country's GDP.

To estimate the impact of centrality, we use two measures: the eigenvector centrality of data flow and the number of routes. The eigenvector centrality of data flow is the position in a network from calculating the eigenvector based on a country's neighbors' positions. It is the data-trading partners' network rather than direct links that affects a country's eigenvector centrality. In contrast, the number of routes directly measures the connections of a given country with other countries.

We use the same model specification in terms of control variables as we do for the combination of flows. Centrality is introduced as an interaction term with log of data flow for the long run and with the difference in log of data flow:

Step 1 of two-step ECM

$$\log GDP_{i,t} = \alpha + Sk\beta_k logCV_{i,k,t} + Sj\beta_j logFlow_{i,j,t-1} + \theta_j centrality_{i,t} logDataFlow_{i,j,t} + \varepsilon_{i,t}$$

Step 2 of two-step ECM

$$\log GDP_{i,t} = \alpha + Sk\beta_k logCV_{i,k,t} + Sj\beta_j logFlow_{i,j,t-1} + \theta_j centrality_{i,t} logDataFlow_{i,j,t} + \gamma logGDP\ per\ capita_{i,t-2} + \delta\varepsilon_{i,t-1} + u_{i,t}$$

Correlation between the data flow and its interaction with either measure of centrality is found to be negligible. When the centrality has a dampening effect on GDP through data flow, we expect θ_j to be less β_j than for the data flow. We observe that countries on the periphery of the data flows actually benefit more than those at the center of the data flows.

3. ACADEMIC LITERATURE ON THE RELATIONSHIP BETWEEN GLOBAL FLOWS AND GDP

A large body of academic literature has examined the impact of different types of global flows on GDP, productivity, and innovation. Generally, these studies are based on one type of flow (i.e., trade, financial flows, or immigration) and often on one country. Some have created their own indexes of globalization including trade and other flows, as well as other metrics such as trade restrictions, enhanced technology transmission, and improvements in macroeconomic policy.

From this literature, we find general consensus that trade, FDI, and immigration support higher levels and growth rates of GDP and also of productivity growth. However, the size estimates of this impact vary across studies. These estimates are shown in Exhibit A8, along with our own, which are in a similar range.

Exhibit A8

Academic literature on flows and GDP growth

10% increase in flow results in the following % increase in GDP

Flow	Literature review	MGI model	Reference literature
Goods trade	0.2–1.5	0.5	▪ Frankel and Romer, "Does trade cause growth?" *American Economic Review*, 1999 ▪ Bianjing, Zuoshi, and Jingkui, *Endogenous international trade and economic growth: Empirical study based on 120 Chinese cities*, 2011 ▪ Wacziarg, "Measuring the dynamics gains from trade," *World Bank Economic Review*, 2001 ▪ US Executive Office of the President, *The economic benefits of US trade,* 2015 ▪ De Loecker and Goldberg, "Firm performance in a global market," *Annual Review of Economics*, 2013
FDI flow	0.04–0.5	0.4	▪ Aizenmann, Jinjarak, and Park, "Capital flows and economic growth in the era of financial integration and crisis," *Open Economies Review*, 2013 ▪ Bordo, Meissner, and Stuckler, "Foreign currency debt, financial crises and economic growth: A long-run view," *Journal of International Money and Finance,* 2010 ▪ Reinhart and Reinhart, "Capital flow bonanzas: An encompassing view of the past and present," in *NBER International Seminar on Macroeconomics 2008*, 2009 ▪ Kose, Prasad, and Terrones, *Does openness to international financial flows raise productivity growth?* NBER, 2008
Migration[1]	1.0–5.0	-0.5[1]	▪ Peri, *The effect of immigration on productivity: Evidence from US states*, 2009 ▪ Boubtane, Dumont, and Rault, *Immigration and economic growth in the OECD countries, 1986–2006,* IZA discussion paper, 2014 ▪ US Executive Office of the President, *The economic benefits of fixing our broken immigration system,* 2013
Internet penetration	0.2–1.4	0.2	▪ Qiang and Rossotto with Kimura, "Economic impacts of broadband," in *Information and communications for development 2009: Extending reach and increasing impact*, World Bank, 2009 ▪ Freund and Weinhold, "The effect of the Internet on international trade," *Journal of International Economics*, 2004 ▪ Meijers, "Does the Internet generate economic growth, international trade, or both?" *International Economics and Economic Policy*, 2014 ▪ Falk and Hagsten, *E-commerce trends and impacts across Europe*, UNCTAD discussion paper, 2015 ▪ USITC, *Digital trade in the US and global economies, part 2*, 2014 ▪ Onyejiwu, *Inter-country variations in digital technology in Africa*, WIDER discussion paper, 2002

1 We find that migration flows are negligible or slightly negative at the global level, possibly due to the loss of skilled labor in developing countries or the difficulties of absorbing a large influx of refugees or migrants. However, we find that migration flows have a positive impact on productivity in advanced economies, consistent with other academic literature.

SOURCE: McKinsey Global Institute analysis

Flows of goods and services

The academic literature provides a wide range of estimates on the impact of trade flows on GDP growth. Frankel and Romer use bilateral date for 63 countries for 1985 and estimate that a one percentage point increase in the trade-to-GDP ratio causes almost a 1.5 percentage point increase in per capita income growth.[150] At the other end of the range, Bianjing, Zuoshi, and Jingkui, based on international trade of 120 cities, suggest that a 1 percent increase in international trade produces only a 0.19 to 0.22 percentage point increase in income.[151]

Wacziarg analyzed data for 57 countries from 1970 to 1989, measuring the impact of trade policy openness on economic growth, where openness is a function of investment, enhanced technology transmission, and improvements in macroeconomic policy. The analysis suggests that an 8.5 percentage point increase in the trade policy measure, corresponding roughly to one standard deviation, is associated with a 0.6 percentage point increase in annual GDP growth. Investment is the most important channel, accounting for almost two-thirds of this effect.[152]

The US Council of Economic Advisors reviewed the effects of trade and found that the reduction of trade barriers since World War II has raised US GDP by 7.3 percent, or approximately $1.3 trillion in 2014. It also found that a 10 percent increase in an industry's exports is associated with a 0.2 percent increase in that industry's labor productivity. Based on the average industry's increase in exports, international trade may have been responsible for about one-quarter of total US productivity growth over the 1990s and 2000s. The paper also emphasizes that trade spurs both labor productivity and innovation, as measured by total factor productivity. A 10 percentage point decrease in tariffs corresponds to about a 0.4 percentage point increase in labor productivity growth and about a half percentage point increase in TFP growth over the two decades.[153]

Other studies have also examined the impact of trade on productivity growth. De Loecker and Goldberg review the literature and conclude that there is strong evidence that globalization raises firm-level productivity.[154]

The econometric analysis in this report is consistent with the low end of the range. We find that a 1 percent increase in goods trade to GDP results in a 0.05 percent growth in GDP. This may reflect the fact that in our analysis, we control for other types of flows, such as data flows and financial flows, that may accompany trade flows.

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150 Jeffrey A. Frankel and David Romer, "Does trade cause growth?" *American Economic Review*, volume 89, issue 3, June 1999.

151 Ma Bianjing, Xie Zuoshi, and Li Jingkui, *Endogenous international trade and economic growth: An empirical study based on 120 Chinese cities*, available at SSRN, August 2011.

152 Romain Wacziarg, "Measuring the dynamics gains from trade," *World Bank Economic Review*, volume 15, number 3, October 2001.

153 *The economic benefits of US trade*, Executive Office of the President, May 2015.

154 Jan De Loecker and Pinelopi Koujianou Goldberg, "Firm performance in a global market," *The Annual Review of Economics*, October 2013.

FDI and other financial flows

The literature on the impact of financial flows on GDP growth is mixed. In general, academic studies find that FDI has a positive impact on GDP growth, while broader financial flows and capital account openness have a mixed effect. For instance, Mun et al. find that a 1 percent increase in FDI flows relative to GDP result in a 0.05 percent increase in GDP growth.[155] This is based on analyzing data from Malaysia spanning 1970 to 2005. Similarly, Aizenman, Jinjarak, and Park examine a sample of 100 countries using data from 1990 to 2010 and find that a one standard deviation increase in FDI inflow has increases the growth of GDP per capita by 0.90 to 0.94 percent.[156]

The impact of broader financial flows (including cross-border lending and portfolio purchases of equities and bonds) on GDP growth is less clear. Bordo et al. find that flows of foreign currency debt increase the risk of financial crises, based on their study of foreign currency debt, financial crises, and short- and long-term output effects from 1880 to 1913 and from 1973 to 2003 for 45 countries.[157] Similarly, Reinhart and Reinhart examine a large group of countries over nearly 50 years and find that episodes of heavy capital inflows are associated with a higher incidence of banking, currency, and inflation crises, particularly in developing countries.[158] While Kose et al. find that a 10 percentage point increase in ratio of FDI and equity liabilities to GDP would be associated with a 0.4 percentage point increase in TFP, a similar increase in ratio of debt liabilities to GDP would lead to a decrease in TFP growth of 0.2 percentage points.[159]

Migration flows

The economic literature typically finds a positive impact of immigration on GDP growth for the destination country receiving migrants. Peri analyzes all 50 US states plus Washington, DC, in census years between 1960 and 2006; he finds that when immigrants produce a 1 percent increase in employment in a US state, income per worker rises by 0.5 percent.[160] Boubtane and Dumont observe that a one percentage point increase in immigration results in 0.1 percentage point increase in economic growth for 22 OECD countries.[161] The US Council of Economic Advisors finds that enhancing immigration reforms that increase immigration would increase real GDP relative to current projections by 3.3 percent by 2023 and 5.4 percent by 2033.[162]

Our research finds a negative, albeit small, impact of immigration on GDP growth. This may be the result of developing countries losing skilled talent or poorer countries encountering difficulties in absorbing a large influx of refugees or unskilled immigrants. We find, however, that migration flows have a positive impact on total factor productivity for advanced economies, which is consistent with other literature.[163]

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156 Joshua Aizenman, Yothin Jinjarak, and Donghyun Park, "Capital flows and economic growth in the era of financial integration and crisis, 1990–2010," *Open Economies Review*, volume 24, issue 3, July 2013.

157 Michael D. Bordo, Christopher M. Meissner, and David Stuckler, "Foreign currency debt, financial crises and economic growth: A long-run view," *Journal of International Money and Finance*, volume 29, 2010.

158 Carmen Reinhart and Vincent Reinhart, "Capital flow bonanzas: An encompassing view of the past and present," in *NBER International Seminar on Macroeconomics 2008*, Jeffrey Frankel and Christopher Pissarides, eds., University of Chicago Press, 2009.

159 M. Ayhan Kose, Eswar S. Prasad, and Marco E. Terrones, *Does openness to international financial flows raise productivity growth?* NBER working paper number 14558, December 2008.

160 Giovanni Peri, *The effect of immigration on productivity: Evidence from US states*, NBER working paper number 15507, November 2009.

161 Ekrame Boubtane, Jean-Christophe Dumont, and Christophe Rault, *Immigration and economic growth in the OECD countries, 1986–2006*, IZA discussion paper number 8681, November 2014.

162 *The economic benefits of fixing our broken immigration system*, Executive Office of the President, July 2013.

163 For instance, see Ekrame Boubtane, Jean-Christophe Dumont, and Christophe Rault, *Immigration and economic growth in the OECD countries, 1986–2006*, IZA discussion paper number 8681, November 2014.

Data flows

Most of the literature available on the impact of data flows on economic growth relates to increase in Internet penetration. For example, Choi and Yi use data from 207 countries from 1991 to 2000 and find that that a one percentage point increase in the Internet user ratio leads to a 0.057 percentage point increase in GDP.[164] Meijers finds that a 10 percentage point increase of Internet penetration leads to a 0.17 percentage point increase of economic growth and an increase in international trade.[165] A World Bank study for 120 countries from 1980 to 2006 reports that a 10 percent increase in broadband penetration resulted in a 1.38 percent point increase in GDP growth in developing countries and a 1.21 percent point increase in growth in developed countries.[166] Increases in Internet usage can also promote more trade. One study concludes that a 10 percent increase in Internet access leads to a 0.2 percent increase in exports.[167]

A recent study of EU firms also found that engaging in e-commerce increases labor productivity and that e-commerce accounted for 17 percent of EU labor productivity growth between 2003 and 2010.[168] A 2014 study by the US International Trade Commission (ITC) calculated the productivity gains from the Internet by surveying US businesses and converting the results into an economic model. The ITC found that the productivity gains from the Internet have increased US real GDP by 3.4 to 3.5 percent.[169]

4. METHODOLOGY FOR THE MGI CONNECTEDNESS INDEX

The MGI Connectedness Index ranks countries on the extent of their engagement with the global economy through inflows and outflows of goods, services, finance, people, and data. To obtain a more granular picture, the index ranks countries on their connectedness to each individual flow as well as compiling an aggregate score.

We consider each country's inflows and outflows of goods, services, finance, people, and data. Financial flows include FDI, equity, debt, and other flows (mainly cross-border lending). For people flows, we consider countries' connectedness in terms of the stock of foreign-born migrants resident in a given country and that country's citizens living abroad.

After assigning each country a score for each type of flow, we weight those scores equally to obtain that country's overall connectedness score. Our methodology differs from other globalization indexes in both the weighting and the data used (Exhibit A9). Our 2014 index assesses 139 countries that provide data for 2014 for each of these flows. For people flows, however, data are available only through 2013.

[164] Changkyu Choi and Myung Hoon Yi, "The effects of the Internet on economic growth: Evidence from cross-country panel data," *Economic Letters*, volume 105, issue 1, October 2009.

[165] Huub Meijers, "Does the Internet generate economic growth, international trade, or both?" *International Economics and Economic Policy*, volume 11, issue 1, February 2014.

[166] Christine Zhen-Wei Qiang and Carlo M. Rossotto with Kaoru Kimura, "Economic impacts of broadband," in *Information and communications for development 2009: Extending reach and increasing impact*, World Bank, 2009.

[167] Caroline L. Freund and Diana Weinhold, "The effect of the Internet on international trade," *Journal of International Economics*, volume 62, 2004.

[168] Martin Falk and Eva Hagsten, *E-commerce trends and impacts across Europe*, UNCTAD discussion paper number 220, March 2015.

[169] United States International Trade Commission, *Digital trade in the US and global economies, part 2*, August 2014.

Exhibit A9

The MGI Connectedness Index measures five types of inflows and outflows, unlike other studies

Dimension variables (variable weight)
XX Percentage weight in overall index

		MGI		DHL/Ghemawat		E&Y/EIU		KDF	
	Overview	▪ 139 countries in 2014 ▪ 1980–2014 ▪ 5 dimensions: goods, services, finance, people, and data		▪ 140 countries in 2014 ▪ 2012–14 ▪ 5 dimensions: goods, services, finance, people, and data and communications		▪ 60 countries in 2012 ▪ 2009–12 ▪ 6 dimensions: goods, services, finance, people, data and communications, and culture		▪ 187 countries in 2015 ▪ 1970–2015 ▪ 7 dimensions: goods, services, finance, people, data and communications, culture, and political globalization	
Dimensions	**Goods**	**20**	▪ Total goods flows (100%)	**35**	▪ Total goods flows (75%)	**22**	▪ Total goods and services flows (40%) ▪ Trade openness[1] barriers (10%) ▪ Tariff and non-tariff[1] barriers (10%) ▪ Ease of trading[1] (10%) ▪ Current account restrictions (10%) ▪ Share of main trading partners in total trade (20%)	36	▪ Total goods and services flows (11%) ▪ Hidden trade barriers (12%) ▪ Mean tariff (14%) ▪ Taxes on international trade (13%)
	Services	**20**	▪ Total goods flows (100%)		▪ Total service trade (25%)				
	Financial	**20**	▪ FDI flows (40%) ▪ Portfolio investment flows (10%) ▪ Bank and other flows (10%) ▪ Foreign investment assets and liabilities (40%)		▪ FDI stocks (25%) ▪ FDI flow (25%) ▪ Portfolio equity stock (25%) ▪ Portfolio equity flows (25%)		▪ FDI stock (50%) ▪ Portfolio capital flows (8%) ▪ Policy toward FDI[1] (8%) ▪ Domestic favoritism[1] (8%) ▪ Expropriation risk (8%) ▪ State control (8%)		▪ FDI stocks (13%) ▪ Portfolio investment stocks (12%) ▪ Income payments to foreign nationals/GDP flows (13%) ▪ Restrictions on capital account (11%)
	People	**20**	▪ Immigrant stock (80%) ▪ Travelers flow (20%)	**15**	▪ Immigrant stock (33%) ▪ Travelers flow (33%) ▪ International student flow (33%)	**19**	▪ Net immigration rate (40%) ▪ Travelers flow (40%) ▪ Hiring of foreign nationals (20%)	**36**	▪ Immigrant stock (21%) ▪ Travelers flow (26%) ▪ International calls flow (25%) ▪ International letters flow (25%)
	Data and communi-cation	**20**	▪ Cross-border used Internet bandwidth (100%)	**15**	▪ International bandwidth stock (40%) ▪ International calls flow (40%) ▪ Traded publications (20%)	**21**	▪ ICT goods flows (30%) ▪ Creative goods flows (30%) ▪ Broadband subs stock (20%) ▪ Internet subs stock (20%)		▪ Internet users stock (36%) ▪ Television stock (38%) ▪ Trade in newspapers flows (26%)
	Cultural/ political					**17**	Cultural integration ▪ Travelers flow (33%) ▪ International fixed telephone call (33%) ▪ Openness to foreign culture influence[1] (33%)		Cultural globalization ▪ McDonald's restaurants (44%) ▪ IKEA stores (44%) ▪ Trade in books (11%)
								26	Political globalization ▪ Embassies, memberships, UN Security Council missions, international treaties

1 Elasticity for TFP with respect to flows is calculated by subtracting the elasticity for labor (or capital) productivity from that for GDP.

SOURCE: McKinsey Global Institute analysis

Normalization and ranking

We assess each country's connectedness within each type of flow by looking at two dimensions: flow intensity and flow share.

Flow intensity measures the size of a given flow as a share of a given country's GDP or population. As an illustration, Germany's flow intensity in the goods trade is 71 percent—that is, the value of all goods imported to and exported from Germany in 2014 was equivalent to 71 percent of Germany's GDP. It is important to note that flows in goods and services are measured in nominal values, while national accounts capture GDP as value added. This is why the ratio of trade to GDP can easily exceed 100 percent. The intensity of goods, services, and financial flows is calculated relative to GDP. The intensity of people and data flows is measured relative to the size of a country's population.

Relying on flow intensity alone would artificially boost small countries over those with large, diversified domestic economies in the rankings. To correct for this, we include a measure of each country's share of the global total of each flow, which we call *flow share*. Germany's flow share for goods is 7 percent—that is, Germany accounted for 7 percent of all global inflows and outflows of goods in 2014.

To combine these two measures of connectedness into an index and calculate composite trade intensity, we use the following methodology:

$$\textit{Compound flow intensity score} = \frac{(n-1) \times (\textit{inflow} + \textit{outflow})^2}{\textit{GDP} \times \textit{global flow}}$$

To smooth the distribution between countries, we use the resulting figure to assign countries a normalized score relative to other countries on a scale of 1 to 100.

$$\textit{Normalized compound flow intensity score} = \left\{ \frac{99 \times (\textit{Compound flow intensity score} - \textit{min})}{(\textit{max} - \textit{min})} \right\} + 1$$

This normalized score can be used to rank all the countries in each of the five types of flows.

Subcomponents of the scores on people and financial flows

The scores for people flows consider two components: migrants and travelers. The migrant and traveler compound intensity scores are calculated separately following the methodology described above. The overall score for people flows is a weighted average of the migrant score and the traveler score. We assign the migrant score a weighting of 80 percent, while travelers account for 20 percent of the overall score.

Financial flows have four components: FDI, portfolio investment flows (equity and bonds), other financial flows (loans and deposits), and the stock of foreign financial assets and liabilities. The overall financial flows score is a weighted average of these four flows. FDI and foreign assets and liabilities stock are given weights of 40 percent each, while portfolio investment flows and other flows have weights of 10 percent.

A country's overall connectedness score is calculated by weighing the score on each of the five types of flows equally and calculating a simple average. This score then determines each country's position in the overall rankings.

The MGI Connectedness Index: Full rankings

The abbreviated version of the MGI Connectedness Index that appears in Chapter 3 contains the top 25 countries plus a selection of other major economies. Exhibits A10 through A12, however, list the full rankings for all 139 countries.

As noted in Chapter 3, more countries are participating in global flows today, but we also observe that flows remain concentrated among a small set of highly connected countries. We can see this from the connectedness score of each country on each flow. Exhibit A13 shows the top 15 countries in each flow. The score for the top country is normalized to 100, so the scores for the other countries can be interpreted in relation to the most connected country. We see that data flows are the most heavily concentrated, with the steepest drop-offs from the leaders. Service flows are the second most concentrated. Goods flows are the least concentrated, with country scores declining less rapidly after the leading country. Financial flows and people flows are similar, and people flows in particular have higher scores for a larger set of countries.

Exhibit A10

MGI Connectedness Index (1/3)

Country connectedness index and overall flows data, 2014
Rank of participation by flow as measured by flow intensity and share of world total

Connectivity index rank 1–10 11–25 26–50 >50 **Flow intensity** 100+ 70–99 <70

Rank	Country	Score	Connectedness Index rank					Flow value[1]	Flow intensity[2]
			Goods	Services	Finance	People	Data	$ billion	% of GDP
1	Singapore	64.2	1	2	2	12	6	1,392	452
2	Netherlands	54.3	3	3	6	21	1	1,834	211
3	United States	52.7	7	7	3	1	7	6,832	39
4	Germany	51.9	2	4	8	3	2	3,798	99
5	Ireland	45.9	32	1	1	28	9	559	227
6	United Kingdom	40.8	13	5	5	6	3	2,336	79
7	China	34.2	4	16	4	82	38	6,480	63
8	France	30.1	11	8	9	7	4	2,262	80
9	Belgium	28.0	5	6	33	33	8	1,313	246
10	Saudi Arabia	22.6	20	28	27	2	53	790	106
11	United Arab Emirates	22.2	6	23	17	4	46	789	196
12	Switzerland	18.0	12	11	10	17	13	848	115
13	Canada	17.3	16	22	11	11	18	1,403	79
14	Russia	16.1	21	25	18	5	25	1,059	57
15	Spain	14.4	25	13	19	14	16	1,105	79
16	Korea	14.0	8	12	28	50	44	1,510	107
17	Italy	13.4	17	18	24	16	19	1,587	74
18	Sweden	13.0	29	14	22	31	5	572	100
19	Austria	11.7	26	17	31	20	12	470	108
20	Malaysia	11.6	9	19	25	26	43	610	187
21	Mexico	10.7	14	63	34	18	41	1,022	80
22	Thailand	10.7	10	15	36	44	64	605	162
23	Kuwait	10.6	37	46	13	13	75	306	153
24	Japan	10.5	15	20	12	81	20	2,498	54
25	Kazakhstan	10.0	48	73	41	8	57	176	83
26	Ukraine	9.8	38	39	87	10	34	133	101
27	Australia	9.7	30	34	21	15	33	825	57
28	Denmark	8.9	35	9	32	41	11	369	108
29	Jordan	8.8	73	50	75	9	83	50	138
30	India	8.5	24	10	35	58	70	1,316	64
31	Qatar	7.8	33	35	29	19	59	300	141
32	Czech Republic	7.5	18	33	57	59	15	397	193
33	Malta	7.4	97	26	7	90	50	31	308
34	Poland	7.0	23	31	47	34	22	585	107
35	Hungary	6.8	22	30	26	62	17	287	209
36	Norway	6.0	36	24	20	46	24	458	92
37	Vietnam	5.7	19	54	45	103	61	350	188
38	Lebanon	5.6	82	21	46	22	103	69	151
39	Finland	5.5	46	27	23	70	10	390	144
40	Portugal	5.5	47	36	30	23	31	255	111
41	Turkey	5.1	28	40	53	38	29	521	65
42	Slovak Republic	5.0	27	60	68	67	14	205	205
43	Israel	4.9	51	32	49	24	56	248	82
44	Brazil	4.5	41	38	14	125	30	869	37
45	Chile	4.1	45	58	16	102	27	239	92
46	Belarus	4.1	40	66	101	29	47	92	121
47	Greece	4.1	60	29	54	35	42	160	67

1 Flows value represents total goods, services, and financial inflows and outflows.
2 Flow intensity represents the total value of goods, services, and financial flows as a share of the country's GDP.

SOURCE: McKinsey Global Institute analysis

Exhibit A11

MGI Connectedness Index (2/3)

Country connectedness index and overall flows data, 2014
Rank of participation by flow as measured by flow intensity and share of world total

Connectivity index rank 1–10 11–25 26–50 >50 **Flow intensity** 100+ 70–99 <70

			Connectedness Index rank					Flow value[1]	Flow intensity[2]
Rank	Country	Score	Goods	Services	Finance	People	Data	$ billion	% of GDP
48	New Zealand	3.9	67	48	61	25	51	130	63
49	Romania	3.9	39	51	83	36	28	194	97
50	Croatia	3.7	76	45	104	27	37	57	100
51	Indonesia	3.4	31	49	38	106	76	504	57
52	Mozambique	3.3	95	70	15	117	110	40	246
53	South Africa	3.3	34	57	52	64	80	277	79
54	Philippines	3.2	54	41	44	52	67	230	81
55	Bulgaria	3.1	49	53	67	48	23	92	165
56	Albania	3.1	114	72	79	30	73	16	117
57	Oman	3.1	44	65	55	54	66	121	148
58	Bosnia and Herzegovina	3.0	86	123	113	32	62	21	117
59	Lithuania	2.8	43	55	112	68	35	87	181
60	Cote d'Ivoire	2.7	80	104	136	37	114	28	82
61	Slovenia	2.7	42	56	64	75	36	105	212
62	Pakistan	2.7	78	91	84	39	88	116	47
63	Azerbaijan	2.6	75	62	37	57	69	92	122
64	Morocco	2.6	58	43	74	56	65	104	97
65	Estonia	2.6	56	47	60	72	21	54	209
66	Bangladesh	2.6	71	99	62	43	113	109	62
67	Serbia	2.5	74	61	103	45	45	52	118
68	Bahrain	2.4	65	118	56	49	58	28	82
69	Moldova	2.4	105	102	102	40	52	12	154
70	Cyprus	2.3	122	37	43	76	55	18	79
71	Jamaica	2.3	115	69	100	42	72	17	113
72	Argentina	2.3	64	68	63	60	32	198	37
73	Egypt	2.2	68	42	69	73	71	158	55
74	Colombia	2.2	61	89	40	83	54	197	52
75	Latvia	2.2	66	67	76	66	26	51	158
76	Armenia	2.2	121	97	99	47	81	12	113
77	Libya	2.2	53	78	59	84	108	65	159
78	Panama	2.1	69	44	42	129	39	74	161
79	Dominican Republic	2.1	94	77	93	53	82	41	64
80	El Salvador	2.1	98	110	94	51	89	26	104
81	Algeria	2.0	52	82	91	91	85	152	71
82	Angola	1.9	50	64	86	134	111	100	76
83	Nigeria	1.9	55	76	48	128	98	268	47
84	Burkina Faso	1.9	123	117	139	55	134	8	67
85	Venezuela	1.9	57	85	71	86	60	172	34
86	Peru	1.8	62	88	51	104	49	122	60
87	Macedonia, FYR	1.8	93	101	124	63	48	18	156
88	Georgia	1.8	106	79	77	65	63	20	123
89	Sri Lanka	1.8	91	81	81	69	93	56	75
90	Guyana	1.7	118	128	116	61	125	4	133
91	Brunei	1.7	89	138	58	74	95	25	146
92	Cambodia	1.7	70	71	72	94	112	35	210
93	Ecuador	1.7	72	112	111	80	79	67	66

1 Flows value represents total goods, services, and financial inflows and outflows.
2 Flow intensity represents the total value of goods, services, and financial flows as a share of the country's GDP.

SOURCE: McKinsey Global Institute analysis

Exhibit A12

MGI Connectedness Index (3/3)

Country connectedness index and overall flows data, 2014
Rank of participation by flow as measured by flow intensity and share of world total

Connectivity index rank 1–10 11–25 26–50 >50 **Flow intensity** 100+ 70–99 <70

			Connectedness Index rank					Flow value[1]	Flow intensity[2]
Rank	Country	Score	Goods	Services	Finance	People	Data	$ billion	% of GDP
94	Tunisia	1.7	63	74	108	107	78	53	110
95	Mongolia	1.6	99	98	39	136	86	23	194
96	Kyrgyz Republic	1.6	102	87	88	78	118	13	173
97	Paraguay	1.6	83	133	121	77	94	26	84
98	Iran, Islamic Rep.	1.6	59	86	106	127	96	185	45
99	Costa Rica	1.5	81	75	65	101	74	43	87
100	Lao PDR	1.5	125	131	122	71	120	8	68
101	Ghana	1.5	77	80	126	109	100	32	83
102	Suriname	1.4	116	134	133	79	119	5	83
103	Liberia	1.4	134	121	50	100	139	7	333
104	Bolivia	1.4	84	108	85	93	84	33	98
105	Honduras	1.4	79	100	80	112	99	29	148
106	Yemen	1.4	90	116	114	88	116	26	70
107	Iceland	1.4	107	59	98	123	40	20	120
108	Guatemala	1.4	88	105	92	99	92	44	75
109	Montenegro	1.4	131	111	89	85	77	5	105
110	Uruguay	1.4	103	95	70	95	68	35	60
111	Maldives	1.4	132	52	109	121	126	7	225
112	Nicaragua	1.4	92	113	90	97	90	17	144
113	Gabon	1.4	101	126	130	87	105	13	73
114	Tajikistan	1.4	119	114	78	89	127	11	120
115	Barbados	1.3	136	93	73	108	87	4	97
116	Fm Sudan	1.3	124	129	105	92	97	20	27
117	Mali	1.3	120	106	110	98	131	11	95
118	Kenya	1.3	100	84	127	119	91	35	58
119	Fiji	1.3	113	90	119	111	121	7	163
120	Congo, Dem. Rep.	1.3	110	120	66	118	138	15	46
121	Cape Verde	1.2	137	107	125	105	123	2	114
122	Lesotho	1.2	111	139	129	110	133	3	167
123	Samoa	1.2	138	135	132	96	129	1	121
124	Zambia	1.2	87	124	82	138	115	29	105
125	Senegal	1.2	109	103	117	120	106	15	93
126	Botswana	1.2	85	137	120	133	107	19	121
127	Namibia	1.2	96	122	96	132	101	16	120
128	Uganda	1.2	126	83	95	131	117	18	67
129	Guinea	1.2	130	132	107	113	136	5	82
130	Tanzania	1.2	108	94	97	135	104	25	51
131	Cameroon	1.2	112	96	137	126	124	17	54
132	Benin	1.2	127	125	128	115	132	7	78
133	Rwanda	1.2	135	127	135	114	130	5	64
134	Swaziland	1.1	117	115	138	124	128	5	143
135	Papua New Guinea	1.1	104	92	118	139	137	10	55
136	Belize	1.1	133	119	123	122	102	3	153
137	Grenada	1.1	139	136	134	116	109	1	96
138	Sierra Leone	1.1	128	130	115	130	135	5	96
139	Seychelles	1.1	129	109	131	137	122	3	179

1 Flows value represents total goods, services, and financial inflows and outflows.
2 Flow intensity represents the total value of goods, services, and financial flows as a share of the country's GDP.

SOURCE: McKinsey Global Institute analysis

Exhibit A13

Flows are concentrated among a few leading countries

The 15 most connected countries within each type of flow, 2014
Connectedness score

Goods

Singapore	100.0
Germany	92.6
Netherlands	90.9
China	87.8
Belgium	78.4
United Arab Emirates	46.9
United States	45.9
South Korea	44.1
Malaysia	30.0
Thailand	29.6
France	28.6
Switzerland	28.2
United Kingdom	25.8
Mexico	24.5
Japan	24.5

Services

Ireland	100.0
Singapore	83.7
Netherlands	38.5
Germany	36.2
United Kingdom	34.7
Belgium	33.5
United States	29.9
France	27.5
Denmark	20.0
India	16.8
Switzerland	15.5
South Korea	14.7
Spain	14.5
Sweden	12.9
Thailand	12.7

Finance

Ireland	100.0
Singapore	83.2
United States	68.9
China	66.5
United Kingdom	57.3
Netherlands	25.2
Malta	25.0
Germany	24.2
France	18.8
Switzerland	18.3
Canada	16.2
Japan	14.2
Kuwait	11.4
Brazil	10.8
Mozambique	10.8

People

United States	100.0
Saudi Arabia	81.7
Germany	51.2
United Arab Emirates	45.7
Russia	44.1
United Kingdom	43.3
France	40.8
Kazakhstan	39.9
Jordan	37.0
Ukraine	36.7
Canada	35.1
Singapore	33.7
Kuwait	31.4
Spain	30.6
Australia	26.6

Data

Netherlands	100.0
Germany	55.5
United Kingdom	42.7
France	34.8
Sweden	24.5
Singapore	20.6
United States	18.8
Belgium	14.9
Ireland	10.3
Finland	6.8
Denmark	6.7
Austria	5.8
Switzerland	3.5
Slovak Republic	3.4
Czech Republic	3.2

SOURCE: McKinsey Global Institute analysis

5. METHODOLOGY FOR GLOBAL CONNECTEDNESS OF REGIONS WITHIN COUNTRIES

In addition to measuring the global connectedness of countries, we have looked at variation in the global connectedness of states and provinces within five large countries: the United States, the United Kingdom, Germany, Brazil, and China. We were able to obtain data for goods flows (imports and exports) for specific regions within these five countries as well as immigration data. For the United States, we were also able to obtain FDI inflows and outflows and service exports by state.

We did the regional analysis using two approaches. The first compared the global connectedness of different regions within a given country. The second treated each region as a country to see how it would compare if inserted into the MGI Connectedness Index for 2014.

Regional comparison within each country

For regional comparison within a country, we used a formula for compound intensity similar to that used in the MGI Connectedness Index:

$$\textit{Compound flow intensity score} = \frac{(n_{regions} - 1) \times (\textit{inflow}_{region} + \textit{outflow}_{region})^2}{GDP_{region} \times \textit{country flow}}$$

The key differences are that here regions are treated as the entities. Hence ***n*** becomes the total number of regions in the country, ***GDP*** is the GDP of the region, and inflows and outflows are the global flows for the region. We use the same method to normalize the flow intensity scores, i.e.:

$$\textit{Normalized compound flow intensity score} = \left\{ \frac{99 \times (\textit{Compound flow intensity score} - \textit{min})}{(\textit{max} - \textit{min})} \right\} + 1$$

In this case, we use the maximum and minimum compound intensity scores among the regions within the country. For the United Kingdom, for example, we analyze 12 regions. The southeast has the highest compound intensity score, whereas Northern Ireland has the lowest compound intensity score.

The results show considerable variation in the connectedness of regions within countries, particularly for China and the United States. Germany, in contrast, has the least variation among regions in international goods trade.

Comparison of regions with countries

To compare regions with countries, the relevant formula for compound intensity score becomes:

$$\text{Compound flow intensity score} = \frac{(n_{countries} - 1) \times (inflow_{region} + outflow_{region})^2}{GDP_{region} \times world\ flow}$$

World flow is used instead of country flow to normalize the regional flow, since the region is treated as a separate country. The ***n*** continues to be the overall number of countries. Since the region is already included as a part of the country, the total world flow remains the same, and we keep ***n*** constant as the number of countries. To calculate the normalized compound intensity score, we use a similar technique as for countries, using the maximum and minimum compound intensity scores among all countries for normalizing.

The results show that if states and provinces were countries, many would be among the most connected in the world. For instance, California would rank fourth in the world in people flows, while Guangdong would rank sixth in the world in goods flows.

6. GLOBAL SURVEY OF STARTUPS

Background and methodology

In collaboration with 1776, a global incubator and venture fund, and its Challenge Cup competition and Startup Federation programs, MGI undertook a survey and set of interviews to understand the extent to which it is now possible for startups to form global connections from their inception.

The survey included:

- Demographic questions (industry, company stage, home country, company age)
- One core question regarding the types of global activities in which respondents participate (i.e., users in other countries, talent hired from other countries, funding from other countries, inputs from other countries, mentors/advisers in other countries, incubators in other countries)
- Several targeted follow-up questions based on responses to the core question (e.g., for those who responded that they had users in other countries, the survey asked the number of countries with users, the share of user base that was international, and what that share would likely be in five years)
- A final question asking respondents to rank the barriers to additional global activities.

The research was conducted in October and November 2015 through two primary methods. The first involved e-mail outreach to 1776's global community of startups and Startup Federation partners, Global Accelerator Network, and current and former participants in 1776's Challenge Cup competition to encourage them to participate in the survey online. This resulted in 168 responses (62 percent of all responses). The second method involved in-person interviews of startup founders attending Challenge Cup events in Montreal (October 22, 2015), Washington, DC (October 29), Bogotá (November 5), Beijing (November 10), Budapest (November 12), Pretoria (November 18), and Mumbai (November 21). These discussions resulted in 103 responses (38 percent of all responses).

- The sectors represented include education, health, cities and transportation, energy and sustainability, technology and communication, enterprise software, e-commerce, entertainment, and financial technology, among others.
- Company stages include startups in concept phase (16 percent), product launch (24 percent), customer validation (21 percent), and growth/scaling phase (39 percent).
- A majority of respondents (59 percent) said their startups were founded in 2014 or 2015, with the remainder founded between 2006 and 2013.
- US startups accounted for 56 percent of respondents. Also represented were Asia and Australia (13 percent), Europe (11 percent), Africa and the Middle East (11 percent), and South America (5 percent).

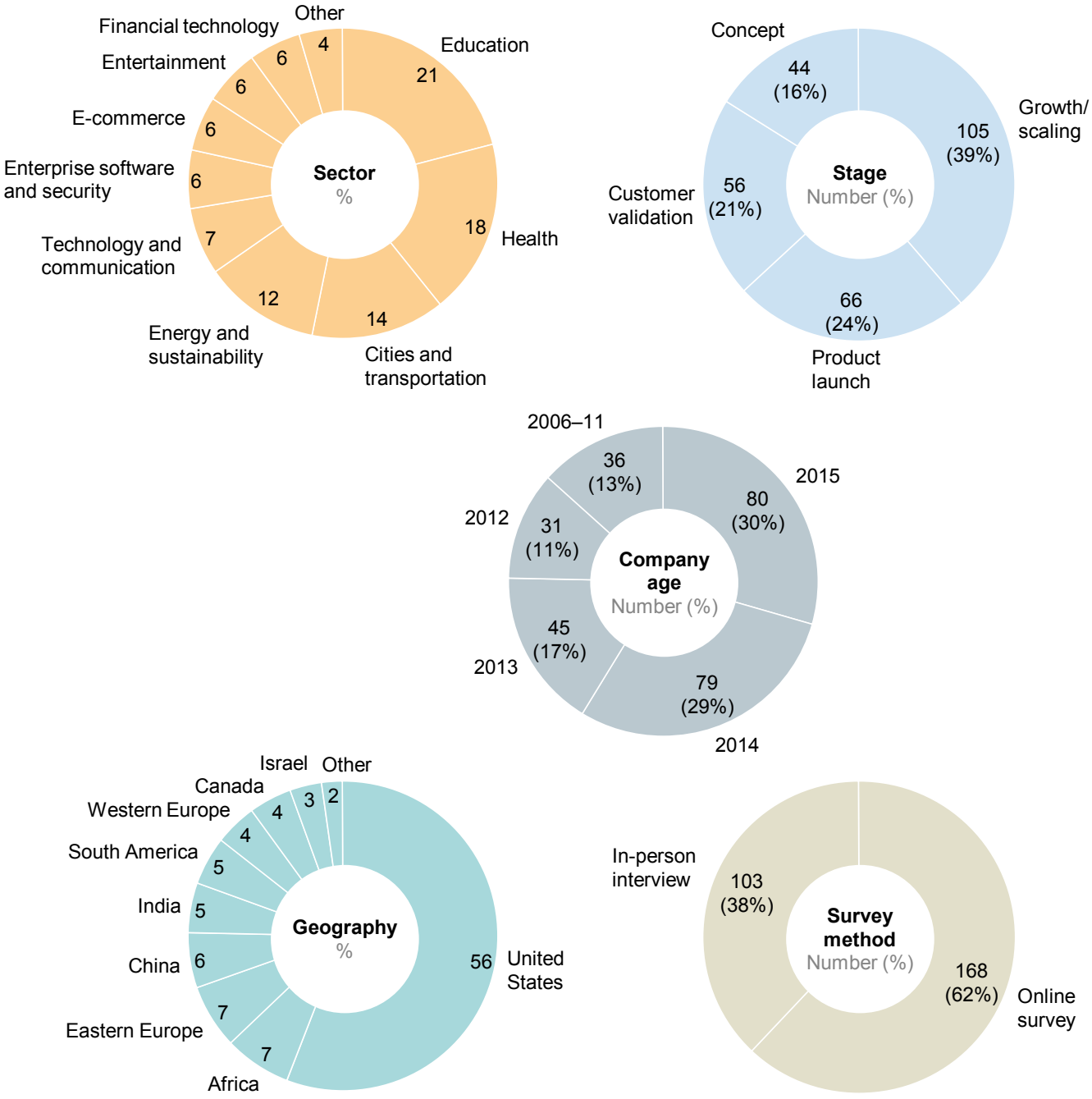
Despite this diversity, it is important to note that respondents are not typical of the average startup. Participation in cross-border networks such as the Startup Federation and pitch competitions like 1776's global Challenge Cup suggest that respondents are likely more sophisticated, internationally minded, and technologically savvy than entrepreneurs or small businesses focused on delivering local services. Even with that caveat, however, the data suggest that there is a significant and influential subset of digitally empowered startups that are now global from inception.

The 271 survey participants are a diverse group across a range of metrics (Exhibit A14).

Exhibit A14

MGI Global Startup Survey 2015: Respondent demographics

100% = 271 respondents



NOTE: Numbers may not sum due to rounding.

SOURCE: McKinsey Global Institute Global Startup Survey 2015

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