McKinsey Global Institute




April 2014

Global flows in a digital age: How trade, finance, people, and data connect the world economy

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Global flows in a digital age: How trade, finance, people, and data connect the world economy

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Preface

The global web of economic interconnections between countries and companies is growing ever larger and more complex. Yet often the public discussion focuses on narrow metrics, such as exports, or individual flows such as cross-border financial flows or immigration. Much less research has been done to analyze the comprehensive web of cross-border interactions that increasingly characterize our world. This report contributes to addressing that gap.

In this report, the McKinsey Global Institute and the McKinsey High Tech Practice examine the evolution of global flows of goods, services, finance, people, and the data and communication flows that underlie the others. We compiled a comprehensive dataset on the inflows and outflows in each of the five categories for 195 countries from 1990–2013, drawing on both public and proprietary data sources. We focus specifically on how two major forces are shaping global flows: the shift in the weight of the global economy toward emerging economies, and the spread of digital technologies and Internet connectivity.

We look at how the network structures of these flows are broadening and deepening, and how countries and cities are positioned in these networks. As part of this project, we built a new McKinsey Global Institute Connectedness Index that gauges how different countries and regions in the global economy are connected to global flows. Our index builds on the work of others, including the Globalization Index produced by Pankaj Ghemawat and Steven A. Altman, as well as globalization indexes from Ernst & Young, AT Kearney, and the Swiss Economic Institute. One unique feature of our index is that it adjusts for country size, avoiding the situation in which large, diversified economies appear less connected to global activity because flows are a relatively small part of the overall GDP.

Any attempt to build a comprehensive view of all global flows of economic relevance is an ambitious project. We acknowledge that our analysis is far from complete. Data limitations—both over time and also across all aspects of the flows—have constrained our ability to draw a fully comprehensive picture. We know a great deal in a data-driven sense about trade and financial flows, but less about services, people, and data and communication flows. Our approach has been to combine macro analysis using available data with microdata where possible, and to bring to bear industry and geographic expertise and examples to illustrate the trends we see in the data. However, we believe that businesses and policy makers should work together to improve the data that are available so that collectively we can more fully understand their impact. We regard this report as a first foray into an area to which we will return as we know more. We hope that others will join us in this effort.

This research was led for MGI by James Manyika, a senior partner based in San Francisco, and Susan Lund, a partner in Washington, DC, and for the McKinsey High Tech Practice by Jacques Bughin, a senior partner in Brussels, and Olivia Nottebohm, a partner in Silicon Valley. David Poulter, a consultant based in Silicon Valley, and Sebastian Jauch, a consultant based in Munich, led the project team. The team comprised Alex Katz, Patrick MacKenzie, Soyoko Umeno, Frederic Wagner, and Amber Yang. We thank MGI colleagues Michael Chui, Sree Ramaswamy, Jan Mischke, and Jonathan Ablett for their advice and input. Research assistance was provided by the MGI economics research team, including Eduardo Doryan Jara, Alan Fitzgerald, Jan Grabowiecki, Carlos Molina, and Moira Pierce.

We thank the academic advisers who helped shape this research and provided challenges and insights and guidance: Martin N. Baily, Bernard L. Schwartz Chair in Economic Policy Development and senior fellow and director of the Business and Public Policy Initiative at the Brookings Institution; Matthew Slaughter, associate dean of the MBA program and the Signal Companies Professor of Management at Tuck School of Business at Dartmouth University; Michael Spence, Nobel laureate and William R. Berkley Professor in Economics and Business at NYU Stern School of Business; Laura Tyson, S. K. and Angela Chan professor of Global Management at Haas School of Management, University of California at Berkeley; and Hal R. Varian, chief economist at Google and emeritus professor in the School of Information, Haas School of Business and the Department of Economics at the University of California at Berkeley. In addition to

these close academic advisers, we have benefited from insights and feedback provided by J. Bradford Jensen, professor of International Business and Economics at the McDonough School of Business at Georgetown University, and AnnaLee Saxenian, dean and professor in the School of Information and professor in the Department of City and Regional Planning at the University of California at Berkeley.

We are grateful for the input and industry expertise from many McKinsey colleagues in various geographies and sectors around the world, including Henrik Arwidi, Vicente Assis, Chinta Bhagat, Jaap Bouwer, Susan Colby, Toos Daruvala, Wouter De Ploey, Alex Dichter, Dan Ewing, David Fine, Katy George, Timo Glave, Andrew Grant, Brian Gregg, Wieland Gurlit, Maryanne Hancock, Staffan Hertzell, Endre Holen, Eric Kutcher, Eric Labaye, Alan Lau, Dan Leberman, Nicolas Leung, Diaan-Yi Lin, Vik Malhotra, Jürgen Müller, Thomas Netzer, Gordon Orr, Kausik Rajgopal, Louis Rassey, Stefan Rehbach, Christian Riis-Hansen, Paul Roche, Nick Santhanam, Jimmy Sarakatsannis, Hugo Sarrazin, Jürgen Schröder, Colin Shaw, Marc Singer, Ozgur Tanrikulu, Oliver Tonby, Fransje van der Marel, Arend Van Wamelen, and Dilip Wagle.

This independent MGI initiative drew from MGI research, the experience of our McKinsey colleagues more broadly, and McKinsey's Technology, Media and Telecom Practice and its collaboration with Google, which included data and insights from Eric Schmidt, Betsy Masiello, Nikesh Arora, Pablo Chavez, Ross LaJeunesse, Nicklas Lundblad, Patrick Pichette, Patrick Ryan, Johanna Shelton, Amit Singhal, Kent Walker, Steve Walter, David Weller, and Rachel Whetstone. In addition, this initiative benefited from published reports and data from many industry and academic researchers. In particular, we are grateful for data and insights we learned from researchers at Facebook, Sarah Wynn-Williams, Maritza Johnson, Ruddy Wang, and Chris Weasler; from AT&T, Jake Jennings and Richard Clarke; from eBay, Usman Ahmed and Devin Wenig; Ian Hathaway at Engine Advocacy; Ray Bingham at Flextronics; Steve Stewart at IBM; Greg Slater at Intel; Marc Parich at MetLife; John Horton at oDesk; and Leila Janah at Samasource.

We would also like to thank Alan Wheatley, former global economics editor of Reuters, for his input on early report drafts.

MGI's operations team provided crucial support for this research. This includes senior editors Janet Bush and Lisa Renaud; Rebeca Robboy and Gabriela Ramirez in external communications; Julie Philpot, editorial production manager; data visualization and design experts Marisa Carder, James Newman, and Mary Reddy; Tim Beacom, knowledge operations specialist; and Deadra Henderson, manager of personnel and administration.

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, although it has benefited from the input and collaborations that we have mentioned. We welcome your emailed comments on the research at MGI@mckinsey.com.

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April 2014

Global flows …

$26 trillion flow of goods, services, and finance in 2012, equal to 36% of global GDP

Up to **$450 billion** added to global GDP growth each year by flows—and 40% more benefit for the most connected countries than the least connected

63% of global goods flows through the top 50 routes in 1990, down to **54%** in 2011

18-fold increase in cross-border Internet traffic between 2005 and 2012

38% of total cross-border flows of goods, services, and finance from emerging economies in 2012, up from **14%** in 1990

… by the numbers

Up to **$85 trillion** flow of goods, services, and finance by 2025, three times the value in 2012

500% increase in international Skype call minutes since 2008

12% of global goods trade from China in 2012, vs. **2%** in 1990

Growth in knowledge-intensive goods trade **1.3x** as fast as in labor-intensive goods

90% of commercial sellers on eBay export to other countries, vs. less than **25%** of traditional small businesses

Contents

Executive summary

Global flows have been a common thread extending through the mercantilist and colonial eras, from trade routes of old such as the renowned Silk Road through the industrial revolutions that swept across Europe and North America in the 18th and 19th centuries to the more recent rise of emerging economies. But today the web of cross-border exchanges has exploded in scope and complexity.

The opening up of economies that started in the early 1990s and brought Eastern-bloc countries and Asia fully into the global economy set the stage. However, two major forces are now accelerating the growth and evolution of global flows. The first is increasing global prosperity. By 2025, 1.8 billion people around the world will enter the consuming class, nearly all from emerging markets, and emerging-market consumers will spend $30 trillion annually, up from $12 trillion today.[1] This will create enormous new hubs for consumer demand and global production. The second major force is the growing pervasiveness of Internet connectivity and the spread of digital technologies.[2] More than two-thirds of us have mobile phones. In 2012, there were 2.7 billion people connected to the Internet. A torrent of data now travels around the world. Cross-border Internet traffic grew 18-fold between 2005 and 2012.

In this report, we examine how these forces are transforming global flows and explore why they matter for nations, companies, and individuals. We track inflows and outflows of goods, services, finance, and people, as well as the underlying flows of data and communication that cut across all of them (Exhibit E1).[3] Our database covers 195 countries between 1980 and 2012 and enables us to study the dynamics and network structure of these flows and their cumulative impact on countries and growth. We have also created the McKinsey Global Institute Connectedness Index, which measures each country's level of integration into the global network of flows for 131 countries.[4]

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1 *Urban world: Cities and the rise of the consuming class*, McKinsey Global Institute, June 2012; Yuval Atsmon, Peter Child, Richard Dobbs, and Laxman Narasimhan, "Winning the $30 trillion decathlon: Going for gold in emerging markets," *McKinsey Quarterly*, August 2012.

2 *Internet matters: The Net's sweeping impact on growth, jobs, and prosperity*, McKinsey Global Institute, May 2011.

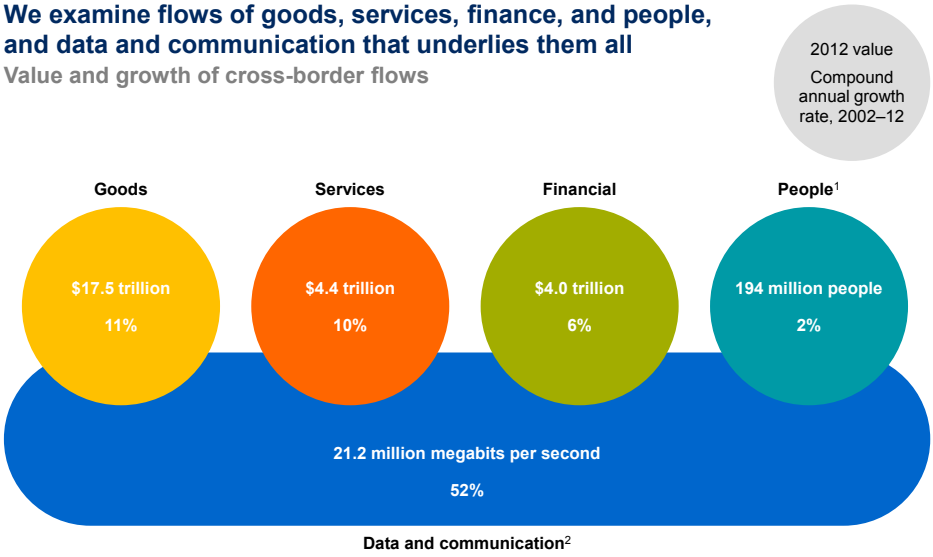
3 We define goods and services flows as the sum of imports and exports of goods and services for each country; financial flows are the inflows and outflows of foreign direct investment, equity and bond flows, and cross-border lending and deposits; people flows include the number of people who move for long-term migration, short-term travelers, and students; and data and communication flows include the volume of cross-border Internet traffic and international call minutes. For each flow, we also explore emerging digital flows such as e-commerce, online work platforms, remittances and payments, and other microdata. See the technical appendix for a full definition.

4 The MGI Connectedness Index builds on similar work measuring the degree to which different countries are connected to global activity, including the DHL Connectedness Index produced by Pankaj Ghemawat and Steven A. Altman, and globalization indexes from Ernst & Young, AT 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 E1

We examine flows of goods, services, finance, and people, and data and communication that underlies them all

Value and growth of cross-border flows



1 Measured by cross-border migrants; values from 2000 and 2010.
2 Measured by cross-border Internet stock traffic; values from 2005 and 2013.
SOURCE: Comtrade; IHS Economics & Country Risk; World Bank; Bank for International Settlements; IMF Balance of Payments; Telegeography; Web of Science, Thomson Innovation; McKinsey Global Institute analysis

Among our key findings are the following:

- **Global flows are growing and contribute to GDP growth.** Flows of goods, services, and finance in 2012 reached $26 trillion, or 36 percent of global GDP—1.5 times as large relative to GDP as they were in 1990. If the spread of digital technologies and rising prosperity in emerging economies continues, global flows could nearly triple by 2025 and boost economic growth. We find an overall positive correlation between each type of flow and GDP growth, and we estimate that global flows contribute between $250 billion and $450 billion of growth every year to world GDP, or 15 to 25 percent of total global growth. In addition, we find that economies with more connections see up to 40 percent more benefit from participation than do less connected economies.

- **The McKinsey Global Institute Connectedness Index shows that developed economies remain more connected than emerging markets—but that the latter are rising rapidly.** Overall, developed economies remain more connected to global flows than emerging markets, but some are rising quickly. Germany tops the overall list, while the United States is third. Among emerging markets that are becoming more connected are Brazil, China, India, Morocco, and Saudi Arabia. For some countries, "flow intensity"—the value of flows relative to the size of their economy—is significant and growing. Among the world's large economies, Germany has a flow intensity of 110 percent, China, 62 percent, Mexico, 78 percent, and India, 61 percent.

- **The knowledge-intensive portion of global flows increasingly dominates—and is growing faster than—capital- and labor-intensive flows.** In the past, global flows were dominated by labor-intensive flows from low-cost manufacturing nations and commodity-intensive flows from resource-rich economies. But today knowledge-intensive flows account for half of global flows, and they are gaining share. For instance, knowledge-intensive goods flows are growing at 1.3 times the rate of labor-intensive goods flows. Although

developed economies as a group dominate knowledge-intensive flows, China's knowledge-intensive flows are the world's second largest.

- **Digitization is transforming and enriching all flows.** Digitization reduces the marginal costs of production and distribution and is transforming flows in three ways: through the creation of purely digital goods and services that are either transformations of physical flows or entirely new products, through "digital wrappers" that enhance the value of physical flows, and through digital platforms that facilitate cross-border production and exchange. Moreover, digitization has begun to change the mix of flows. Some goods flows are becoming services flows, for instance. All this is creating significant new opportunities for innovation and disruption.

- **Networks of global flows are broadening and deepening as emerging economies join in.** Emerging economies are becoming important as both consumers and producers in the global economy, and now account for 38 percent of global flows, nearly triple their share in 1990. South-South trade between developing economies has grown from just 6 percent of goods flows in 1990 to 24 percent in 2012. In absolute terms, the increase has been from $198 billion to $4.4 trillion.

- **Global flows are shaped by—and are influencing—trends in major sectors.** As global supply chains become more fragmented and countries specialize in production, flows of intermediate goods (as opposed to final goods) are soaring. Digitization is likely to help to transform global logistics and manufacturing sectors by replacing some physical flows with virtual flows. Digital platforms are enabling new players to participate in sectors ranging from shipping to payments.

- **Companies, entrepreneurs, and individuals have more opportunities to participate.** Governments and multinational companies were once the only actors involved in cross-border exchanges, but today digital technologies enable even the smallest company or individual entrepreneur to be a "micromultinational" that sells and sources products, services, and ideas across borders. Traditional business models are being challenged by microscale activities ranging from microwork to micropayments and microshipments.[5]

The new era of dramatically broadening and deepening global flows will create many new opportunities for governments and companies to drive growth and innovation and will open the door to greater participation by entrepreneurs and individuals. But there will need to be new investments and focused policy, above all to embrace the increasingly digital nature of global flows. A concerted effort to improve the data in this area will be essential. At the same time, both business leaders and policy makers will need to negotiate a range of challenges, including stresses to business models, support for workers caught in the transition, and risks to data privacy and security that are part and parcel of an increasingly data-driven world. Incumbent businesses across industries will face a new wave of competition from new types of competitors both at home and abroad.

5 "Microwork" refers to a series of disaggregated tasks that together make up a single project. Several people may contribute to the project, each one handling an individual set of discrete tasks.

Finding ways to harness the positive potential of global flows to raise living standards and shared prosperity while mitigating the risks is imperative. The cost of being left behind—for countries, companies, and individuals—is rising.

Global flows have created a tightly interconnected world economy

Given the twin forces of rising prosperity in emerging markets and the increasing impact of digital technologies, a growing share of the world's economic activity involves cross-border flows. Today, 35 percent of goods cross borders, up from 20 percent in 1990. More than a third of all financial investments in the world are international transactions, and a fifth of Internet traffic is cross-border. Services and people, however, remain far less internationally traded—because of their intrinsic link to relatively immobile human capital.

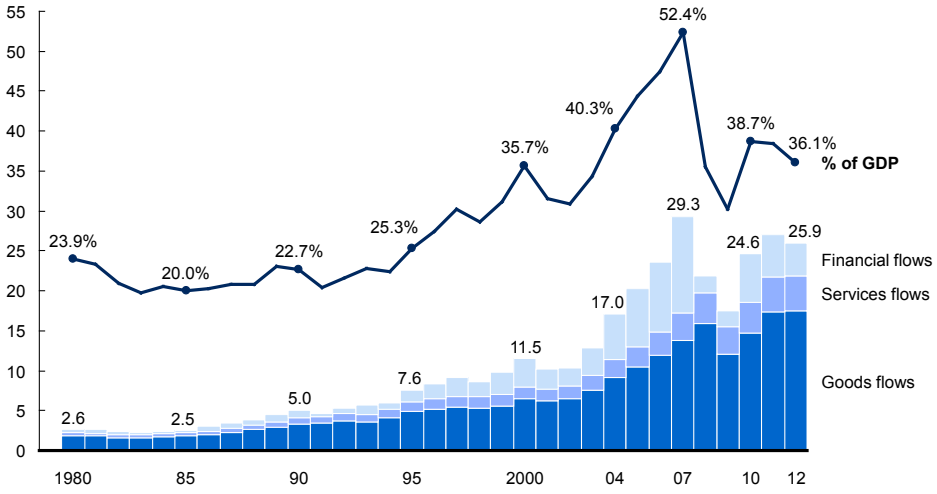
By 2012, the combined value of trade in goods and services plus financial flows reached $26 trillion, or 36 percent of global GDP, compared with just $5 trillion, or 23 percent of world GDP, in 1990 (Exhibit E2).

Exhibit E2

Traditional flows of goods, services, and finance reached $25.9 trillion in 2012

Goods, services, and financial flows; share of GDP, 1980–2012

$ trillion, nominal; %



SOURCE: Comtrade; IMF Balance of Payments; World Trade Organization; McKinsey Global Institute analysis

Although services sectors now account for roughly two-thirds of world GDP, trade in goods (including commodities) remains by far the largest type of flow, at $17.8 trillion in 2012, or 24 percent of global GDP. This was more than four times the value of either services flows at $4.2 trillion or cross-border financial flows of $3.9 trillion.

As goods flows have increased, their direction has also changed. Developed economies used to dominate global trade—54 percent of all goods trade in 1990 was between developed economies—but in 2012 these flows accounted for only 28 percent. This shift has been offset by the increasing participation of emerging economies in global goods trade, both as exporters and as importers. Emerging

economies now account for 40 percent of goods flows, and 60 percent of those go to other emerging economies—so-called South-South trade.

All types of global flows dropped during the 2008 financial crisis and recession, but goods and services flows have since surpassed their 2007 peak. In contrast, financial flows remain almost 70 percent below their pre-crisis level, falling from 21 percent of global GDP to only 5 percent in 2012. This reflects the correction from the global credit bubble and deleveraging of the financial system. Financial flows have changed direction, too, with outflows from emerging markets rising from 7 percent of the global total in 1990 to 38 percent in 2012. The share of financial flows among developed regions fell from 89 percent in 2002 to 57 percent in 2012.

The picture is mixed on flows of people. While the share of people living outside their home country has remained remarkably steady at 2.7 percent since 1980, short-term travel and students enrolling in foreign universities have grown at 3.4 percent and 4.8 percent per annum, respectively, between 2002 and 2010. The direction of people flows has changed as well. A larger share of migrants is moving from emerging to developed economies—29 percent of migrants in 1990 compared with 42 percent in 2010. But a different pattern is emerging in short-term travel. Here, emerging economies are gaining share of total inbound and outbound travelers. Flows of short-term travelers between emerging economies have grown from 18 percent of total flows in 2002 to 23 percent in 2010. Also in 2010, emerging economies accounted for 33 percent of all outbound travelers, up from 25 percent in 2000, and 51 percent of all inbound travelers, from 44 percent in 2000.

Underlying these four flows is the soaring exchange of data and communication across borders. Global online traffic has grown from 84 petabytes a month in 2000 to more than 40,000 petabytes a month in 2012—a 500-fold increase.[6] Cross-border voice traffic has more than doubled over the past decade, primarily due to digital calls. Skype call minutes grew to 39 percent of the level of traditional international phone call minutes, having increased more than 500 percent since 2008.

Global flows matter for economic growth

Many people harbor misgivings about the risks and costs that global flows entail. Volatile capital flows can wreak havoc on economic growth and some local jobs are eliminated as global supply chains are restructured. While acknowledging these costs, our analysis confirms the academic literature in finding a positive correlation between each of the global flows and GDP growth. These results persist in a variety of model specifications and indicate that flows (normalized by GDP for goods, services, financial, and data and communication flows, and by population for people flows) contribute to faster GDP growth. We estimate that global flows raise world GDP growth by between $250 billion and $450 billion annually—approximately equivalent to the GDP of Finland or Norway. We also find that countries that are more connected within global networks of flows experience

6 One petabyte is 10^{15} bytes of digital information where 1 byte is the standard measure of one unit of digital information.

larger benefits in terms of GDP growth than countries that are less connected.[7] The most central countries to the global network of flows in our database can expect to increase GDP growth from flows up to 40 percent more than the least connected countries. For example, Thailand, a high-centrality country, would disproportionately benefit compared with Laos, its low-centrality neighbor.

To gauge the potential scale of future flows, we developed a range of scenarios that consider how the twin forces of rising emerging-market prosperity and digitization could play out in the future. We find that global flows of goods, services, and finance could increase from $26 trillion, or 36 percent of GDP, in 2012 to between $54 trillion and $85 trillion in 2025, or 38 percent to 49 percent of global GDP, depending on the scenario. The key determinants of where within this range flows actually materialize are the strength of economic growth in emerging economies and their decisions on participation in global flows, whether the potential transformation of flows from digital technologies reaches its full potential, and policy decisions made by governments around the world.

Developed economies remain more connected than emerging markets—but the latter are gaining ground rapidly

The McKinsey Global Institute Connectedness Index measures the connectedness of 131 countries across all five flows of goods, services, finance, people, and data and communication. The index reflects the level of inflows and outflows of all types of flows adjusted for country size. It is not sufficient to look at flow intensity alone—a country's level of flow relative to GDP—because, in dollar terms, this leaves the world's largest and more diversified economies looking relatively closed. This happens because a relatively small share of their overall economic activity happens across borders. Conversely, smaller economies look exaggeratedly prominent in flows because they inevitably have larger flows of goods, services, and finance compared with the size of their GDP. Smaller European countries such as Luxembourg, Belgium, Ireland, and the Netherlands have all seen large increases in intensity. In Asia, Hong Kong and Singapore have experienced a 400 to 500 percent increase in flows intensity.

Our index assesses both a country's global share of flows (to control for country size) and its flow intensity. The index is a single measure to reflect connectedness across flows, and it enables us to understand how a country's connectedness has increased or decreased over time, what types of flows are responsible, and how the direction of the country's flows has changed (Exhibit E3).[8] Our index yields some interesting—and sometimes surprising—results (Exhibit E4).

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7 Our methodology, an error-correction model that allows for non-stationarity of variables, indicates causality as well as correlation. The centrality measures we use come from the French economic research institution CEPII. See L. De Benedictis et al., *Network analysis of world trade using the BACI-CEPII dataset*, CEPII working paper, 2013; Rob Clark and Matthew C. Mahutga, "Explaining the trade-growth link: Assessing diffusion-based and structure-based models of exchange," *Social Science Research*, volume 42, number 2, March 2013. Also see the technical appendix for a discussion of our regression analysis.

8 See Chapter 4 and the technical appendix for more detail.

Exhibit E3

MGI Connectedness Index

Country connectedness index and overall flows data, 2012[1]

Rank of participation by flow as measured by flow intensity and share of world total

Economy: Developed, Emerging

Connectivity Index Rank: 1–10, 11–25, 26–50, 51+

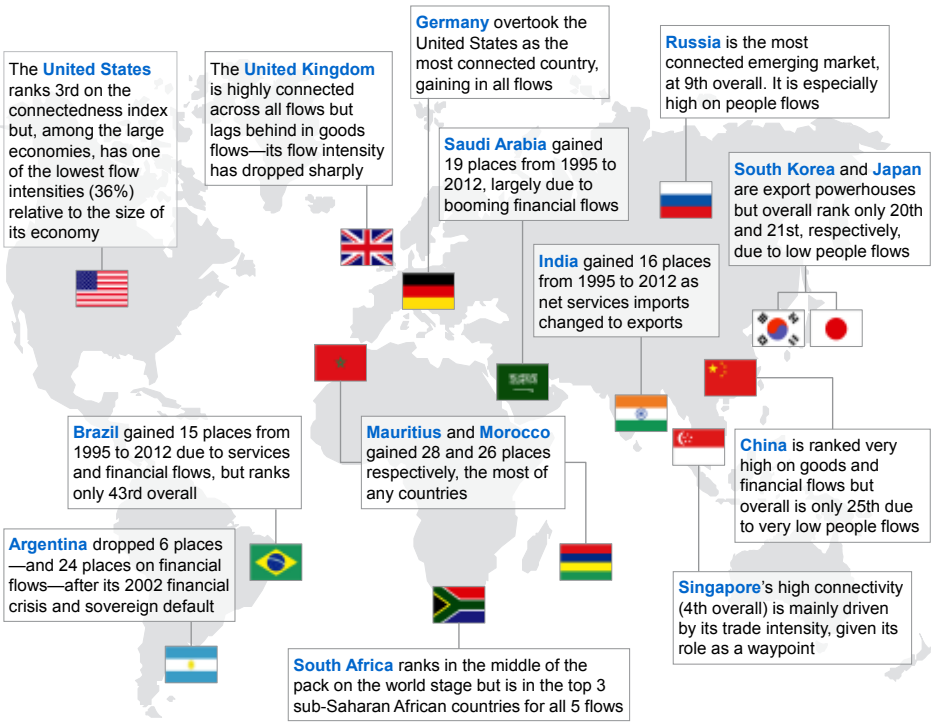
Flow intensity[2]: 100+, 70–99, <70

Rank	Country	Change in rank, 1995–2012[3]	Goods	Services	Financial	People (2010)	Data and communication (2013)	Flows value[4] $ billion	Flow intensity %	Change in flow intensity, 1995–2012 %
1	Germany	1	3	5	7	5	2	3,770	110	+53
2	Hong Kong, China		1	4	3	14		1,437	546	
3	United States	-1	8	9	5	1	7	5,622	35	+2
4	Singapore	1	2	3	4	18	5	1,198	436	+8
5	United Kingdom	-1	13	6	9	7	3	1,471	60	-26
6	Netherlands	2	6	7	15	29	1	1,213	157	+39
7	France	-1	9	10	36	15	4	1,581	60	+8
8	Canada	-1	16	22	13	9	18	1,381	76	-3
9	Russia		19	30	16	2	21	1,277	63	
9	Italy	0	11	20	31	16	10	1,187	59	+4
11	Belgium		4	8	30	39	11	937	194	
12	Spain	0	21	12	35	12	12	932	70	+14
13	Switzerland	-1	23	16	11	28	17	851	135	+64
14	Ireland	2	29	1	23	23	24	476	226	+32
15	Sweden	0	28	15	17	45	6	573	123	+17
16	Saudi Arabia	19	20	29	19	8	44	729	103	+40
17	Australia	-1	32	34	14	11	30	813	53	+5
18	Malaysia	1	10	23	34	26	32	528	173	-29
19	Poland	5	22	31	28	34	22	478	98	+41
20	South Korea		7	14	25	58	34	1,393	123	
21	Japan	-1	14	24	10	82	15	2,652	44	+18
21	Austria	-10	24	17	62	33	9	424	107	+22
24	Luxembourg		63	2	1	69	16	1,432	2,594	
25	China	5	5	21	6	93	33	5,124	62	+8
27	Mexico	-6	17	67	22	13	48	921	78	+17
27	Turkey	-1	30	43	32	31	31	524	66	+14
30	India	16	27	13	26	47	64	1,131	61	+37
35	Greece	-2	59	27	44	27	41	265	106	+65
36	Thailand	-3	12	19	27	94	56	630	172	+55
41	Chile	9	42	54	20	95	36	261	97	+38
43	Brazil	15	39	40	18	115	38	757	34	+11
43	New Zealand	-3	61	59	58	25	47	106	63	0
47	Argentina	-6	55	60	53	59	40	200	42	+9
49	South Africa	4	43	50	49	56	73	242	63	+12
50	Estonia	3	54	46	74	76	26	54	241	+72
53	Morocco	26	57	42	79	41	63	91	95	+46
54	Latvia	1	66	69	77	54	27	41	143	53
56	Indonesia	-3	31	49	39	113	65	494	56	-2
63	Nigeria		36	57	33	114	90	267	102	
63	Egypt	-12	60	41	115	53	61	139	53	+2
78	Tunisia	-19	58	66	93	102	62	53	116	11
85	Pakistan	-30	68	81	117	61	79	78	35	-8

1 Index calculations use migrants data for people flows and cross-border Internet traffic for data and communication flows.
2 Flow intensity represents the total value of goods, services, and financial flows as a share of the country's GDP.
3 Change in rank calculations do not include data and communication flows, for which data are not available for 1995.
4 Flows value represents total goods, services, and financial inflows and outflows.
NOTE: Blank cells indicate unavailable data.
SOURCE: Comtrade; IHS Economics & Country Risk; World Trade Organization; Telegeography; World Development Indicators, World Bank; McKinsey Global Institute analysis

Exhibit E4

Select findings from the MGI Connectedness Index: Changes and surprises for countries in their global flows participation



SOURCE: Comtrade; UNCTAD; IMF Balance of Payments; World Development Indicators, World Bank; McKinsey Global Institute analysis

Knowledge-intensive flows—rather than labor-, capital-, or resource-intensive—increasingly dominate global flows

In addition to examining the major flows individually, we isolate the knowledge-intensive portion of each. Knowledge-intensive goods and services flows (as opposed to labor-, capital- or resource-intensive ones) include goods and activities that have a high R&D component or utilize highly skilled labor. As such, they help transmit information, ideas, or expertise among exchanging parties. Examples include high-tech products such as semiconductors and computers, pharmaceuticals, automobiles and other machinery, and business services such as accounting, law, and engineering. Within financial flows, we consider foreign direct investment to be knowledge-intensive, as it often entails transfer of management expertise and technology as well. In addition, payments for royalties and patents, business traveler spending, and cross-border telecom revenue from businesses are knowledge-intensive. The value of these flows together reached $12.6 trillion in 2012, nearly half the combined total value of goods, services, and financial flows and more than the combined 2012 GDP of China and Germany. This mirrors the rise of the knowledge economy globally.

Moreover, we find that the knowledge-intensive components of global flows are growing faster and thus gaining share from capital-, labor-, and resource-intensive flows. Trade in knowledge-intensive goods, such as pharmaceuticals or semiconductors, is growing around 1.3 times as fast as trade in labor-intensive goods such as textiles and toys.[9] The same is true in services.

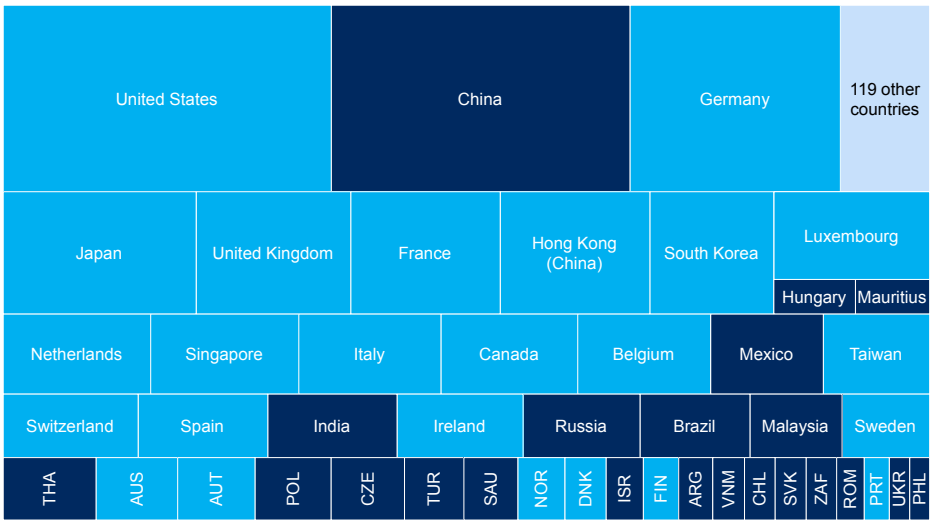
Today, countries in the developed world account for two-thirds of knowledge-intensive flows (Exhibit E5). Moreover, over the past ten years, developed economies have seen knowledge-intensive flows relative to GDP grow more quickly than in emerging economies, perhaps reflecting their more highly skilled labor forces, better-developed innovation platforms, and more advanced connectedness, especially in technology. To gain share of these flows, emerging economies would need to accelerate efforts to build skilled workforces, develop institutions that enable and encourage innovation in the private sector, and improve their Internet infrastructure that underlies data and communication flows.

Exhibit E5

The vast majority of knowledge-intensive inflows and outflows occur in developed economies

Total knowledge-intensive inflows and outflows, 2012[1]

Relative area corresponds to the portion of global inflows/outflows



1 A knowledge-intensive flow is a flow with embedded information, ideas, or expertise that is transferred when exchanged. Foreign direct investment is classed as a knowledge-intensive flow because it often entails the transfer of embedded ideas, management expertise, and technology.

SOURCE: Comtrade; IMF Balance of Payments; McKinsey Global Institute analysis

9 The nominal value of global commodity flows over the past ten years has grown faster, reflecting the large price increase in oil and hard minerals. If measured in real, price-adjusted terms, then knowledge-intensive flows have grown faster.

Digitization is transforming all flows and expanding opportunities for smaller players to participate

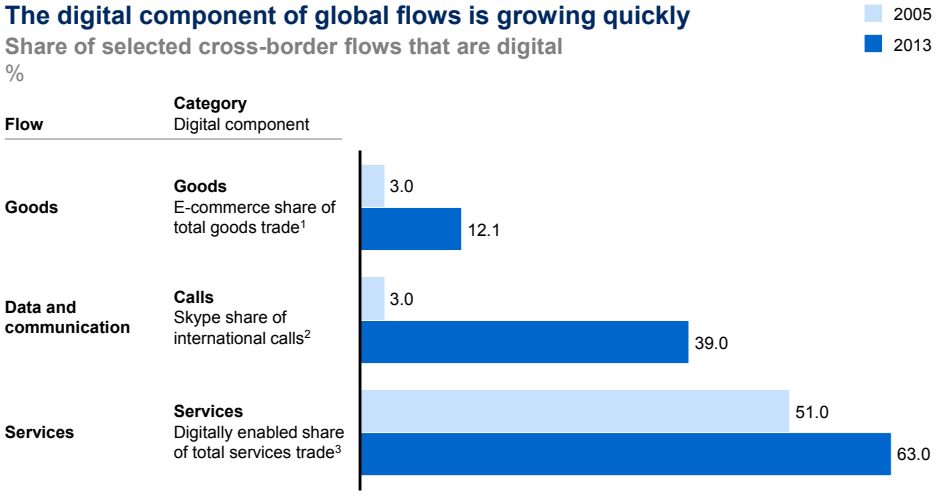
The rise of digital technologies is not only powering the flow of data and communication but also transforming and enabling flows of goods, services, capital, and even people (Exhibit E6). Digitization is transforming global flows in three ways.

Exhibit E6

The digital component of global flows is growing quickly

Share of selected cross-border flows that are digital

%



1 Based on China data.
2 Excludes other VOIP minutes.
3 Based on US data.
NOTE: 2005 values for services are calculated by interpolating from prior and subsequent years based on constant growth rates.
SOURCE: iResearch; Telegeography; OECD; US Bureau of Economic Analysis; McKinsey Global Institute analysis

The first way is by changing tangible flows into digital flows with lower costs of access, transport, and marginal production. One prominent example is rising cross-border trade in items such as e-books and digital news and entertainment, and greater penetration of e-readers, MP3 players, and game consoles. In some manufacturing industries, 3-D printing can transform the shipment of a physical good into the online transfer of a digital file that can be used to produce the good at its point of consumption. Many digital flows create value but have not been fully monetized—for example, YouTube provides videos to users for free but makes fees from advertisements before the videos run. The advertising revenue reflects only a small part of the value to consumers from YouTube.

Digital technology is also turning some physical flows of people into virtual flows. The growing ubiquity of email first made it feasible to work remotely from anywhere in the world, and tools for virtual collaboration, such as Google Docs, and file-sharing, such as Dropbox, continue to expand these possibilities. We also see a proliferation of online labor marketplaces, such as oDesk and Mechanical Turk, which bring jobs to people around the world rather than requiring people to migrate for jobs.

The second crucial aspect of digitization is its potential to enhance physical flows—making them more manageable and, in many cases, more valuable—through the addition of "digital wrappers." For example, digital tracking of physical shipments has reduced the volume of goods lost in transit and has helped boost trade in goods and enabled cross-border e-commerce.

Third, digitization is creating online platforms that facilitate production and cross-border exchanges. Online exchanges such as eBay and Alibaba are two of the linchpins of global e-commerce, facilitating exports. More than 90 percent of eBay commercial sellers export to other countries, compared with an average of less than 25 percent of traditional small businesses. Online platforms enable even the smallest SMEs (small and medium-sized enterprises) and even individuals to become micromultinationals. Fund-raising platforms such as Kickstarter enable individuals to raise money across borders. The Samasource platform seeks to extend microwork and microfinance models to people who have not had the opportunity to participate in global flows to date.

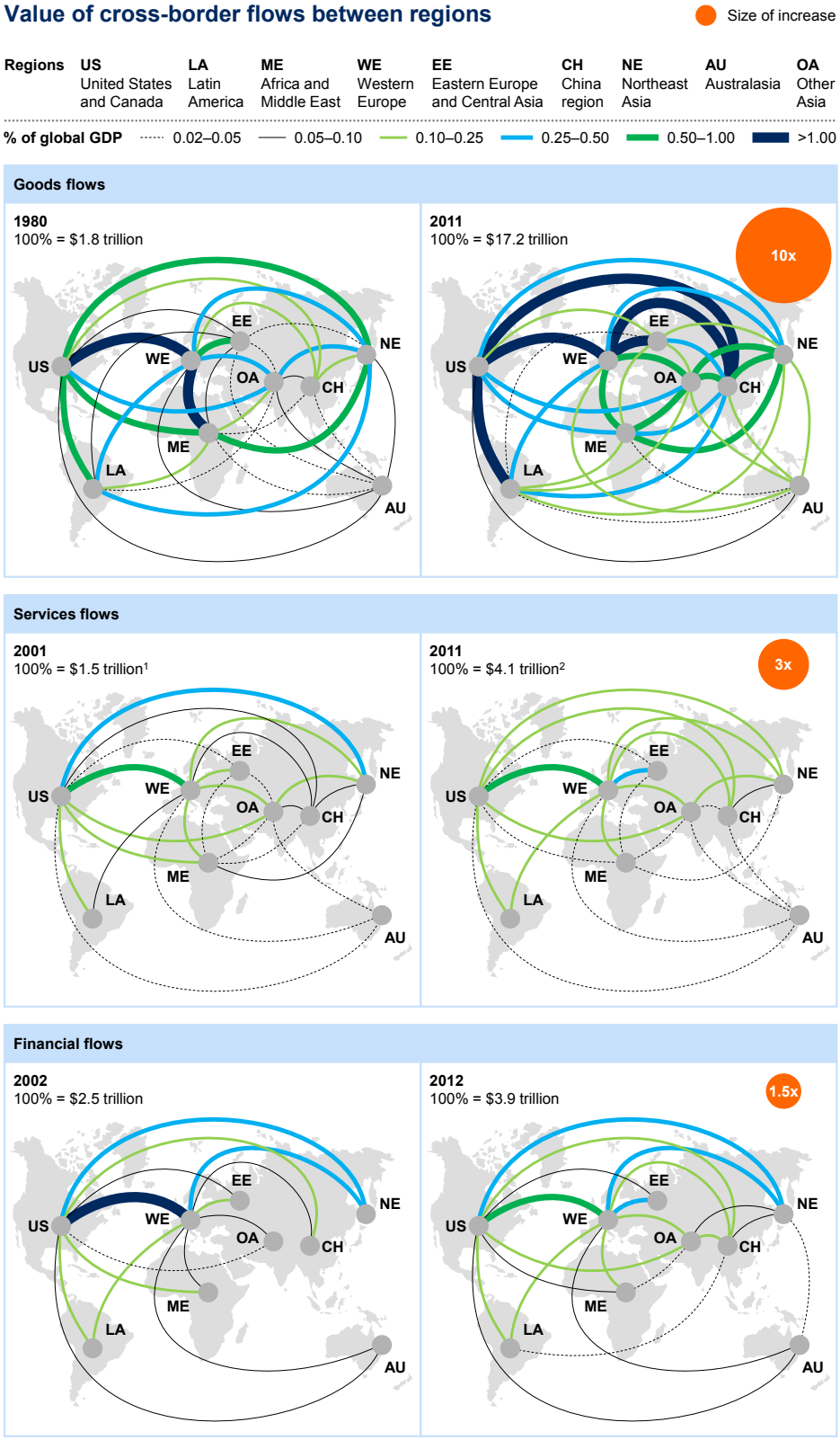
The power of digitization comes especially from its marginal cost economics that reduce costs associated with access, discovery, and distribution of goods and services to nearly zero. As a result, the cost of participating in flows is lowered for individuals, small firms, and entrepreneurs. This is already leading not only to innovations in business models but also to the emergence of micromultinationals, microwork, and microsupply chains that are able to tap into global opportunities. This significantly removes barriers to participating in global flows, broadening opportunities. It also will put pressure on *all* companies to innovate their business models to capture the opportunities and respond to new sources of competition, and to counter the pressure on their existing business models from digitization's marginal-cost economics.

Networks of global flows are broadening and deepening to more countries and a wider range of companies

Once concentrated among the largest advanced economies, global flows are now growing more dispersed, embracing an ever larger number of countries and participants within those countries. Well-established trading routes are deepening and broadening, and networks are expanding as the emerging world becomes more deeply integrated into global value chains, a development that has accelerated over the past decade. This change can be seen visually for goods, financial, and data flows in Exhibits E7 and E8.

Exhibit E7

Value of cross-border flows between regions

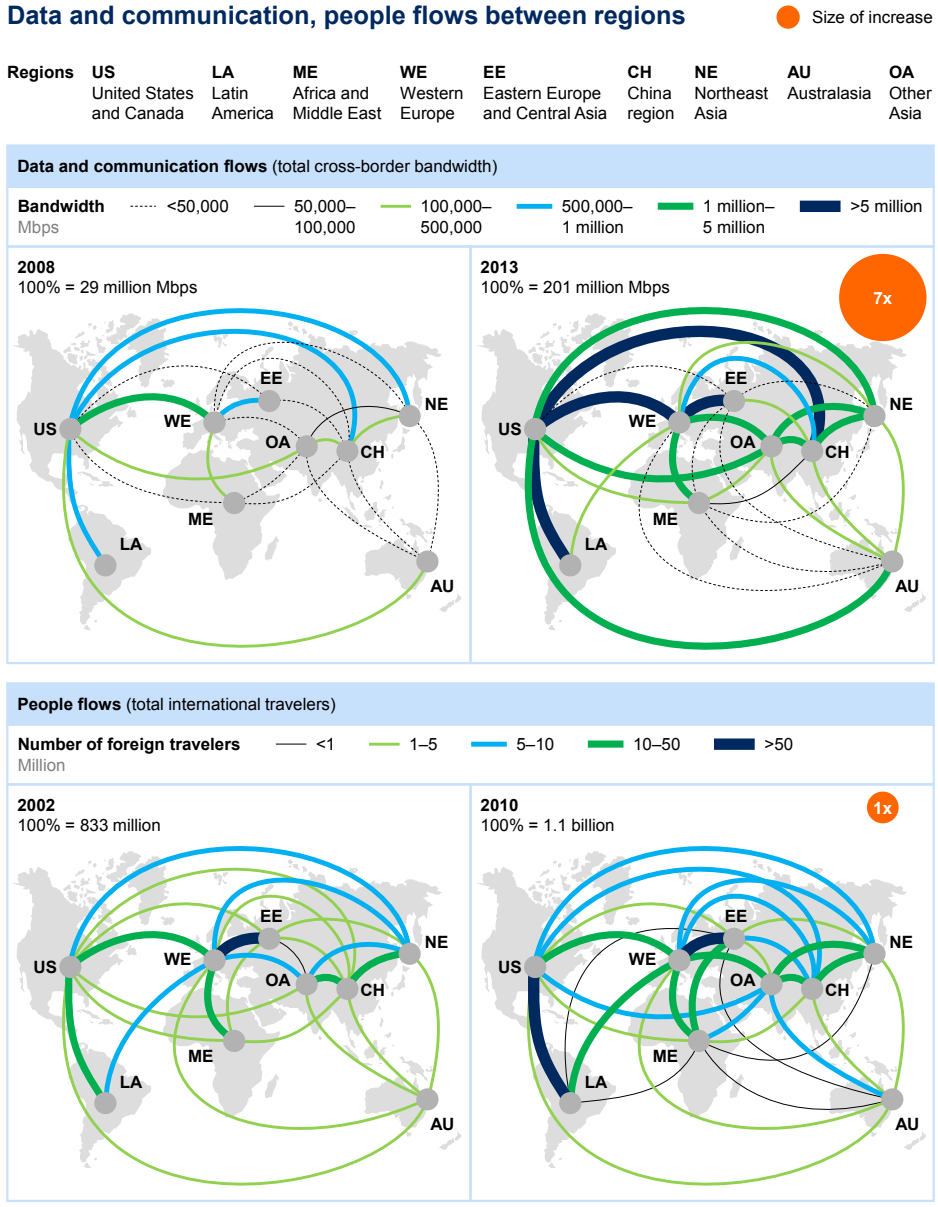


1 2001 services flows are estimated based on 55 percent coverage with a bilateral data set.
2 2011 services flows are estimated based on 61 percent coverage with a bilateral data set.

SOURCE: Comtrade; IMF Balance of Payments; World Development Indicators, World Bank; McKinsey Global Institute analysis

Exhibit E8

Data and communication, people flows between regions



SOURCE: Telegography; World Trade Organization; McKinsey Global Institute analysis

New routes have increased their share of the whole network. For instance, 40 percent of the increase in goods trade since 1990 has come from only 2 percent of trade routes—around half of which were not in the top 50 routes in 1990. The share of the largest routes in total trade has fallen. The top 50 goods trading routes accounted for 63 percent of world goods trade in 1990 but only 54 percent in 2011. In the case of data and communication flows, the speed of change is even faster: the top 50 routes carried nearly half of Internet traffic in 2006 but only one-third in 2013.

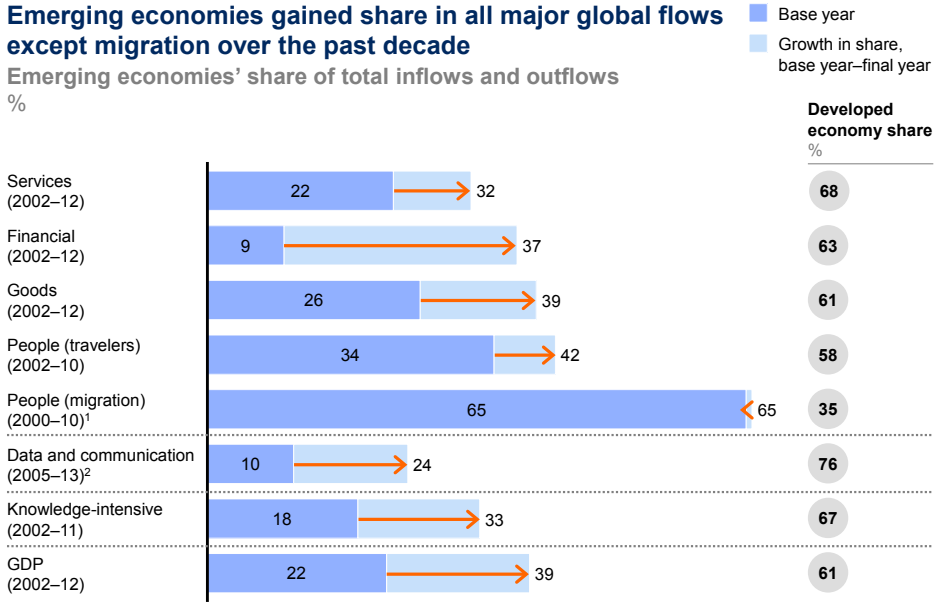
The proportion of cross-border flows that occurs between countries within a region vs. in different regions varies by flow. Intraregional flows account for nearly two-thirds of data and communication flows and people flows and nearly half of services flows—but only one-third of goods flows or financial flows. Western Europe has the highest share of intraregional flows in the world, reflecting the creation of the European Union and the euro. In contrast, the share of trade within the North American Fair Trade Agreement (NAFTA) has actually declined over the past decade as trade with China has grown. Connectivity between emerging regions is also increasing rapidly. South-South trade has grown at double-digit rates annually for the past three decades, rising from 6 percent of global trade in 1990 to 24 percent by 2012.

The emerging world is gaining a stronger foothold in global flows. In 2012, emerging economies accounted for 39 percent of goods flows and 37 percent of financial flows, up from 26 percent and 9 percent, respectively, in 2002 (Exhibit E9). Their participation in global services flows is lower, however.

Exhibit E9

Emerging economies gained share in all major global flows except migration over the past decade

Emerging economies' share of total inflows and outflows
%



1 Emerging economies accounted for 65.4 percent of migrants in 2000 and 64.7 percent in 2010.
2 Measured by cross-border bandwidth.
SOURCE: IHS Economics & Country Risk; Comtrade; Telegeography; IMF Balance of Payments; World Development Indicators, World Bank; McKinsey Global Institute analysis

Emerging markets' share of global goods flows has increased even more sharply in terms of volume than in terms of value. This is apparent in many major categories of goods (including automobiles, computers, and books, to name just a few), reflecting the new role of emerging economies as powerhouses of global production. It also reflects the predominance of lower-value goods, such as labor-intensive manufactured goods, in emerging-market trade, although such flows are growing more slowly than knowledge-intensive ones overall.

In data and communication flows, emerging economies lag significantly behind developed economies. They account for just 24 percent of cross-border Internet traffic, and only three of the top 20 countries in broadband penetration are outside high-income countries: Israel, Slovenia, and the United Arab Emirates. Low penetration has reinforced high bandwidth prices. IP transit costs in Lagos are 21 times as high as in London. Despite the promise of the Internet as an equalizing platform, the growing digital divide could leave developing economies further behind.

Cities can also participate in global flows by acting as waypoints that link large parts of networks. For example, cities with major ports can become critical hubs in the global flow of goods, such as Singapore, while those with the right infrastructure and open policies can become waypoints for data and communication flows, such as Amsterdam. Acting as a waypoint can generate significant economic output and high-quality jobs, and it helps a city accumulate knowledge, with positive spillover effects on the broader economy. We find that only six cities are major hubs across all types of flows—Dubai, London, Hong Kong, New York, Singapore, and Tokyo—suggesting significant opportunities for other cities to play a more prominent role in global flows.[10]

Smart strategy and policy could expand these opportunities

The new landscape of global flows offers more entry points to a far broader range of players than in the past. Emerging markets, small businesses, and individuals will all be able to play a larger role, thanks to digitization and falling costs. But companies, policy makers, and individuals need to ensure that they keep pace with change and adapt their approaches if they are to take full advantage of global flows.

While most executives have thought in global terms about their businesses for many years, McKinsey research has found that Western multinationals remain significantly underweight in emerging markets, and that up-and-coming global companies from these countries are investing aggressively. That means executives need to redouble their efforts for this next wave of global flows. They must plan early to scale up internationally, adapt business models to different markets, get to know and monitor their new competitors, develop talent to manage a global enterprise, and prepare for shocks and volatility in an increasingly interconnected world economy. There will be significant scope to carve out new opportunities enabled by digital technologies, including opportunities for big data and analytics and the creation of new digital platforms

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

to enable and support participation in flows and new types of business models. Businesses that largely focused on cost effectiveness in their global supply chains now increasingly need to prioritize value, considering how value chains may evolve as a result of global flows, including who the participants may be, which regions may play a role, and where value may be created along the value chain. Established companies also need to brace themselves for a new wave of competition propelled by the low cost of starting up a business in a digital era—from large, already global companies from the emerging world to small, nimble entrepreneurs and even companies from outside their own sectors—as digital technologies shift value between sectors. This era of global flows is unfolding new opportunities for globally minded entrepreneurs to disrupt established business models by operating as micromultinationals within global value chains. However, all companies, large and small, will need to think carefully about the business models that enable monetization, data security, and intellectual property issues that come with digitization.

Individuals stand to gain in many ways. As consumers, they will enjoy the benefits of vastly expanded choices of products and services as well as from digitization, which is making the benefits of cross-border flows more accessible at a lower cost and delivered through a proliferation of new channels. There will be greater possibilities for individuals to become entrepreneurs in for-profit as well as social ventures. As workers, individuals can take advantage of this new landscape to claim greater flexibility in the workplace through the use of virtual collaboration technology such as web meeting software and file-sharing sites. They can offer their services around the world through online work platforms, and the most educated citizens in the world's poorer countries will find attractive opportunities to join the global labor market. Workers in advanced economies will need to continually upgrade their skills if they are to thrive in the knowledge economy and meet strong demand for specific capabilities from business. Other workers may lose in this transition—at least in the short term—so their challenge will be to retrain for the opportunities that are available, and many will need support to do so.

Policy makers in developed and emerging markets face pressing questions, too. Taking factors such as the stage of economic development and sources of comparative advantage into account, how should their economy participate in flows? Given that the more open a country is to inflows and outflows alike, the greater the economic benefits are likely to be, so what can the government do to enable participation through the right business environment, infrastructure, and talent? How can governments ensure that the benefits of flows are shared fairly across society? What trade, investment, and immigration policies do they need? Perhaps above all, is their economy in a position to capitalize on the growing trend toward knowledge-intensive and digital flows? In all aspects of policy they need to move away from the mercantilist mindset of the past to thinking that is more reflective of an increasingly interconnected global economy and that encourages participation in global flows.

There is a shared imperative for businesses and policy makers to plug gaps in data on global flows that currently limits our full understanding. Only by being more broadly informed will they be able to engage in smart strategy and smart policy making.

□ □ □

We now take for granted that we live in an interconnected world, but a closer examination of global flows reveals a web of connections that continues to evolve. While the last era of globalization can be characterized by the search for low-cost production, the next era will be one in which knowledge-intensive flows are an increasingly large and dynamic component of this cross-border activity. Digitization is profoundly changing the composition of flows and how they travel, opening up new opportunities to SMEs and individuals. The network of flows is being redrawn as supply chains become more global and emerging economies become more central hubs in the world economy. The pace of change is likely to accelerate even more dramatically as more of the world goes online. For players of all types—whether regions, countries, cities, businesses, or individuals—there are major economic opportunities from participating in global flows. The imperative for policy makers is to fully embrace the new era and ensure that their economies are positioned to benefit from it.

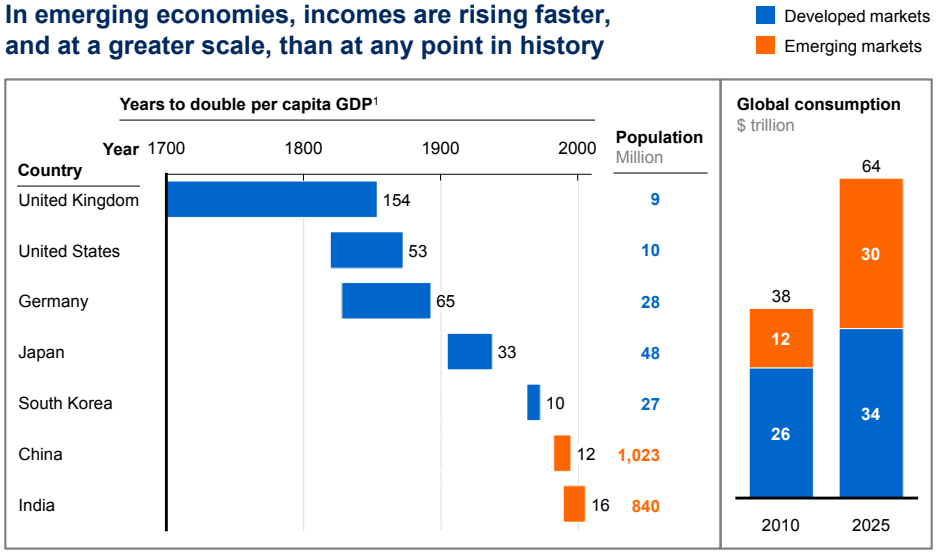
1. Global flows have created a tightly interconnected world economy

The global financial crisis of 2008 underscored the intricate web of connections in the global financial system, which allowed contagion to spread rapidly. The resulting recession brought about a sharp drop in cross-border financing as well as a slump in other types of global flows. But now that economic growth is generally recovering, it is an opportune time to take stock of how global flows are developing and the forces that will shape them in the years ahead.

Today an increasing share of global economic activity takes place across borders. Two powerful forces are at work. The first is increasing prosperity around the world, notably in emerging economies, where incomes are increasing at an unprecedented rate. It took the United Kingdom 150 years to double the per capita income of a population of nine million during the Industrial Revolution starting in the late 1700s. But China and India have doubled per capita income in one-tenth of that time and each with a population of one billion—a feat roughly 1,000 times larger in magnitude (Exhibit 1).

Exhibit 1

In emerging economies, incomes are rising faster, and at a greater scale, than at any point in history



1 Time to increase per capita GDP in purchasing power parity (PPP) terms from $1,300 to $2,600.

SOURCE: Angus Maddison, *The world economy: Historical statistics*, OECD, 2003; *Resource Revolution: Meeting the world's energy, materials, food, and water needs*, McKinsey Global Institute, 2011; McKinsey Global Institute analysis

As urbanization began to sweep across the emerging world, the consuming class added 1.2 billion new members in 20 years, from 1990 to 2010. By 2025, MGI expects the global consuming class to add 1.8 billion people, to reach a total of 4.2 billion.[11] Total consumption is expected to reach $64 trillion, nearly half of it in emerging economies. These developments are driving global flows of goods, services, finance, people, and data and communication as emerging economies become both consumers and producers in the global economy.

11 Ibid.

The second force is an explosion in connections to the Internet and the spread of digital technologies that reduce the barrier of distance and cut costs dramatically. In the past, communication could move only as fast as people or the postal service traveled. The invention of the telegraph and then the telephone sped up that flow. But the advent of email and the Internet has quickened the pace dramatically. In 1830, for instance, it would have cost around $2,000 of today's money to transmit one letter from London to India, and it could have taken up to six months to reach its destination.[12] Today, a letter can be shipped internationally for $3 and reach its destination in only a few days. Going beyond that, the world is flush with near-instantaneous communication of all kinds, from tweets to SMS texts, and from instant messenger software to calls via VoIP (voice-over Internet protocol). Technological change means not only that most types of global flows are growing in volume but also that global networks of flows are evolving more rapidly. As a result, the world is increasingly connected and dynamic—and potentially more volatile.

To capture this evolving picture as comprehensively as possible, we have built a database covering flows of goods, services, finance, and people, as well as the soaring flows of data and communication that cut across all of them. The database tracks both inflows and outflows of each type for up to 195 countries from 1980 to 2012. Although there is a large body of academic research on the economic impact of specific types of flows, such as immigration or trade, this database enables us to study the cumulative impact of all these flows, giving a deeper picture of their interaction and dynamics. In this chapter, we take stock of how each type of global flow is growing and evolving.

Today, there is growing skepticism regarding the benefits of greater openness to global flows, a legacy of the recent financial crisis and subsequent recession. The world remains particularly wary about volatility in financial flows that can swiftly transmit shocks from one country to the rest of the world, damaging economies in the process. With unemployment remaining stubbornly high across advanced economies, the threat to local jobs posed by new global supply chains is keenly felt. Public opinion has grown guarded. In 2001, a *Washington Post* poll found that six out of ten Americans viewed deepening economic ties with the rest of the world as a positive development; however, a decade later, barely more than one-third said that a more interconnected global economy was a good thing.[13]

Against this backdrop, we used our database on the movement of global flows to test their influence on economic growth. Our analysis confirms that global flows are associated with faster growth in GDP and productivity, and they contribute to higher standards of living. We find that global flows could contribute between $250 billion and $450 billion growth to the world economy annually (see Box 1, "The economic impact of global flows").[14]

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12 Andrew Odlyzko, *The history of communications and its implications for the Internet*, AT&T Labs, June 2000.

13 Jon Cohen and Peyton M. Craighill, "Poll: Americans increasingly view global economy as a negative for US," *The Washington Post*, January 28, 2011.

14 We define goods and services flows as the sum of imports and exports of goods and services for each country; financial flows are the inflows and outflows of foreign direct investment, equity and bond flows, and cross-border lending and deposits; people flows include the number of people who move for long-term migration, short-term travelers, and students; and data and communication flows include the volume of cross-border Internet traffic and international call minutes. For each flow, we also explore emerging digital flows such as e-commerce, online work platforms, remittances and payments, and other microdata. See the glossary and the technical appendix for a full definition.

Box 1. The economic impact of global flows

The long-held economic theory of comparative advantage suggests that countries receive a net benefit from participating in trade flows. Each country can specialize, building on its relative strengths and available resources.[1] Although there may be costs to some companies and workers that are displaced by trade, overall economic wealth is increased. Given the dramatic reduction in transportation and communication costs over the past three decades, as well as faster and cheaper flows of data and communication around the world, it is now easier than ever to trade internationally and benefit from increased specialization. New theories of economic growth highlight endogenous factors such as technological progress that can be enhanced by the flow of ideas and spillover effects.[2] More recent academic literature has made the argument that a country's economic growth can be understood only when examined in the context of its position in the global trade network.[3]

There is a large body of academic literature exploring the link between economic growth and flows of goods, services, and finance. Early work found that exports led to higher growth. More recent studies have examined exports and imports together, demonstrating that a country's openness and connectedness to trade has a more statistically robust effect on GDP growth than exports in isolation; in other words, economies can benefit from importing as well as exporting. The empirical evidence broadly confirms a positive impact on GDP growth from trade in goods and services as well as immigration.[4] The evidence on flows of finance are more mixed but generally show that long-term financial flows, such as foreign direct investment, have a positive impact on productivity and GDP growth, which short-term flows of lending and debt—so-called hot money—may not.[5]

We built on this work by assessing the impact of openness to flows (inflows plus outflows relative to country GDP) on GDP growth rates (see the technical appendix for more detail). Our research aims to make several important contributions. First, while the existing body of work has typically focused on individual types of flows, we assess the impact of flows of goods, services, finance, and data and communication simultaneously. Second, we use a dynamic econometric model (error-correction model, or ECM) that enables us to estimate both the simultaneous and the longer-term relationship of flows and GDP growth, getting closer to establishing true causality than a simple Ordinary Least Squares approach could.

1 This theory was most notably formulated by David Ricardo and later extended by Eli Heckscher and Bertil Ohlin at the Stockholm School of Economics and others. See David Ricardo, *On the principles of political economy and taxation*, first edition, John Murray, 1817.

2 See, for example, Robert J. Barro and Xavier Sala-i-Martin, *Economic growth*, MIT Press, 2004.

3 For example, see Ricardo Hausmann and César A. Hidalgo, "The network structure of economic output," *Journal of Economic Growth*, volume 16, number 4, December 2011.

4 See, for example, Jeffrey A. Frankel and David Romer, "Does trade cause growth?" *American Economic Review*, volume 89, number 3, June 1999; Matthias Busse and Jens Koeniger, *Trade and economic growth: A re-examination of the empirical evidence*, HWWI research paper number 123, 2012.

5 See, for example, Fernando Broner, Tatiana Didier, Aitor Erce, and Sergio L. Schmukler, *Gross capital flows: Dynamics and crises*, World Bank working paper number 5768, August 2011; Kristin J. Forbes and Francis E. Warnock, *Debt- and equity-led capital flow episodes*, NBER working paper number 18329, August 2012; Silvio Contessi and Ariel Weinberger, "Foreign direct investment, productivity, and country growth: An overview," *Federal Reserve Bank of St. Louis Review*, volume 91, number 2, March/April 2009. .

Box 1. The economic impact of global flows (continued)

This ECM corrects for the fact that economic data often have an obvious upward trend over time. This approach allows us to obtain more precise estimates of the size of the variables' impacts on each other. Third, using network theory, we also seek to evaluate the impact of a country's position in the global trade network—measured by the number of a country's trading partners and the number of trading partners of a country's own trading partners—on its ability to benefit from flows—its "centrality."[6]

Across a variety of model specifications, we generally find that greater openness to cross-border exchanges of goods, services, finance, and data and communication flows is linked to faster growth in GDP, with both a short-term and a long-term effect on growth. Our model suggests that the impact of flows on growth is around 5 percent of the impact of fixed capital stock in the economy. Our model suggests that the impact of increased connectedness to flows takes about five to seven years to unfold its full long-term impact on GDP growth. Strong correlation in the data series between flows of goods and services makes it difficult to determine the separate impact of each, however. Despite significant public focus on promoting exports, our results confirm that both inflows and outflows matter for prosperity. Moreover, we find that a country's centrality in global trade—or the number of connections it has with trading partners—amplifies the benefits of global flows. Indeed, we find that a country with perfect inflow centrality (that is, importing from all countries in the world) is likely to realize 60 percent more GDP growth from the same increase in trade than a country importing from only a single country. In our database of countries, this translates into approximately 40 percent more GDP growth accruing to leading countries for centrality compared with trailing countries. For example, Thailand, a high-centrality country, would disproportionately benefit compared with Laos, its low-centrality neighbor.

Conceptually, openness to both inflows and outflows is linked to greater economic growth in various ways: by promoting the efficient allocation of resources, by increasing competition, or by giving the domestic market access to ideas and innovations. It can also allow a country to specialize in its relative strengths or comparative advantages, thus taking advantage of economies of scale and of scope. While each specific global flow affects economic growth differently, all flows provide the common benefit of raising productivity and reducing costs for consumers.

We find that, at their historical growth rates, flows account for between 15 and 25 percent of global GDP growth, adding $250 billion to $450 billion growth to the global economy every year. This is equivalent to adding an economy between the size of Finland's and Norway's economies to the world economy each year. Our findings indicate that data and communication flows are likely to contribute as much to growth as flows of goods, services, and finance combined, given the former's higher historical and expected growth rates.

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6 The centrality measures we use come from French economic research institution CEPII (see the technical appendix for more detail). See, for example, Rob Clark and Matthew C. Mahutga, "Explaining the trade-growth link: Assessing diffusion-based and structure-based models of exchange," *Social Science Research*, volume 42, number 2, March 2013; and L. De Benedictis et al., *Network analysis of world trade using the BACI-CEPII dataset*, CEPII working paper number 2013, August 24, 2013.

A growing share of the world's economic activity flows across borders

Today an increasing share of global economic activity involves cross-border transactions. Roughly one dollar out of every five spent on goods in the global economy goes toward a product that is shipped across borders, up from one in seven in 1995. Foreign sources of financing now constitute more than one-third of total global financing, up from less than 20 percent in 1990. Data and communication flows, measured by cross-border Internet traffic and the volume of international call minutes, are experiencing dramatic growth. Cross-border Internet traffic grew by 60 percent a year over the decade to 2012. International calls tripled between 2002 and 2011, and digital calls are transforming the way we communicate. Nearly one-quarter of data and communication flows now crosses borders.

By contrast, people and services do not move as fluidly. Cross-border flows in these two categories account for only 3 percent and 7 percent of their totals, respectively. Nevertheless, there were still one billion international border crossings in 2011 as people moved around to work temporarily or permanently, attend educational institutions, or travel for business or pleasure.

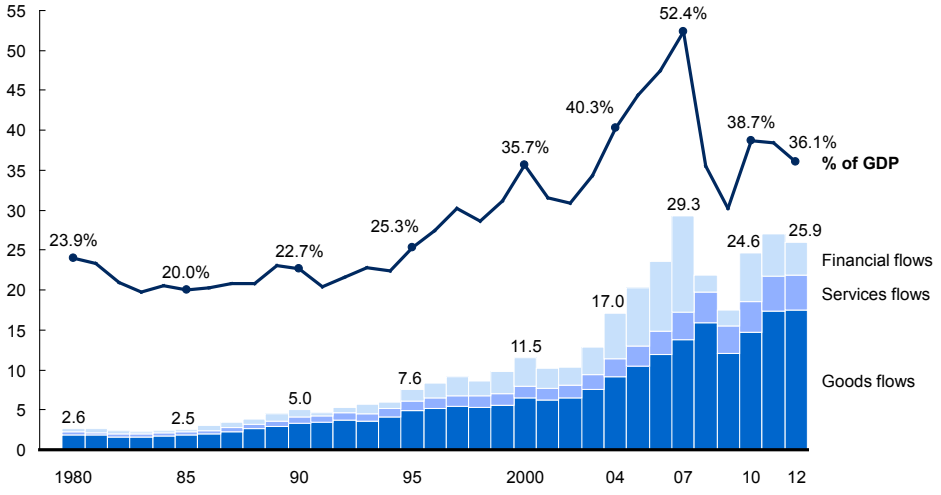
The dollar value of cross-border flows has also soared. In 1980, the combined value of trade in goods and services and financial flows was $3 trillion, or 24 percent of global GDP. By 2012, the value of these flows had increased by more than eight times to $26 trillion, or 36 percent of global GDP (Exhibit 2).

Exhibit 2

Traditional flows of goods, services, and finance reached $25.9 trillion in 2012

Goods, services, and financial flows; share of GDP, 1980–2012

$ trillion, nominal; %



SOURCE: Comtrade; IMF Balance of Payments; World Trade Organization; McKinsey Global Institute analysis

TRADE IN GOODS IS STILL THE WORLD'S LARGEST TYPE OF FLOW

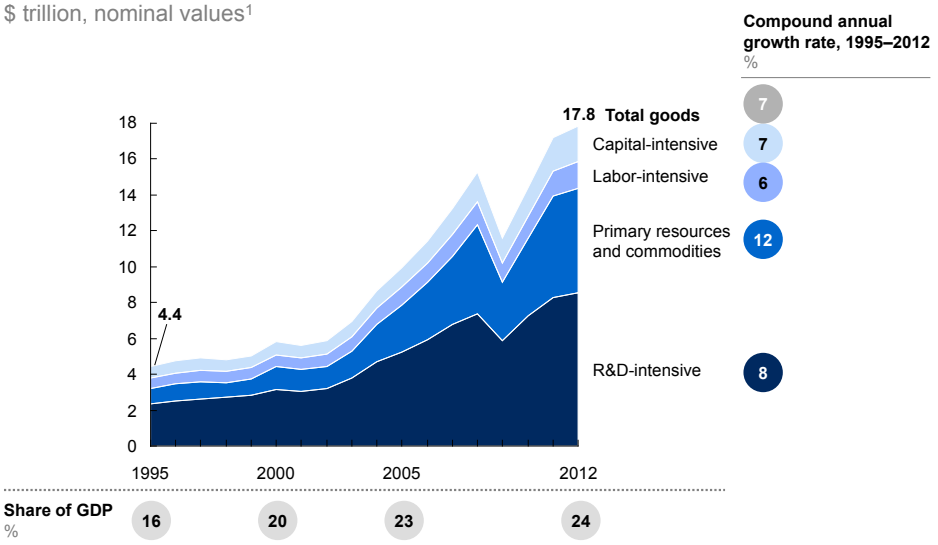
Despite the shift of the global economy toward services, international trade in goods remains the largest type of flow, growing from just $6.4 trillion, or 19 percent relative to global GDP, in 2002 to $17.8 trillion, or 24 percent relative to global GDP, in 2012 (Exhibit 3).[15] This includes flows of intermediate goods, finished goods, and commodities. The nominal value of cross-border goods flows was more than four times as large as the equivalent value of services flows and 4.4 times the size of global financial flows.

Exhibit 3

Goods trade has increased in both value and share of GDP since 1995

Growth of goods trade over time

$ trillion, nominal values[1]



1 Values do not sum to other goods trade values because of different data sources.

SOURCE: Comtrade; IHS Economics & Country Risk; World Development Indicators, World Bank; McKinsey Global Institute analysis

With the proliferation of global supply chains, the flow of goods around the world has soared. From 1995 to 2012, the flow of goods has grown by an average of 7.8 percent annually, in line with the 7.7 percent growth in services trade and faster than the 5.4 percent growth in financial flows. Relative to GDP, these flows are growing 2.4 percent, 2.3 percent, and 0.1 percent, respectively. Throughout this report, we normalize the nominal value of flows by GDP to control our analysis of participation in trade by the growth in GDP. This ratio of trade relative to GDP is commonly called trade intensity.[16]

This rapid rise in the global trade in goods reflects several factors. First and foremost is the growing complexity and geographic reach of today's supply chains. Consider Apple's iPod. This small device contains 451 distinct components sourced from all around the globe; the ten most valuable components alone are sourced from six different countries.[17] Globally, 17 percent of traded manufactured goods are final consumer products, 55 percent are

15 For a more detailed look at global trade, see *Trading myths: Addressing misconceptions about trade, jobs, and competitiveness*, McKinsey Global Institute, May 2012.

16 Note that flows are given in value traded while GDP figures are value added.

17 Greg Linden, Kenneth L. Kraemer, and Jason Dedrick, "Who captures value in a global innovation network? The case of Apple's iPod," *Communications of the ACM*, volume 52, issue 3, March 2009.

intermediate goods such as sheet metals serving as inputs to other products, and 19 percent are capital goods like production machinery (the remaining 9 percent are unclassified).

Other factors are also contributing to this rise in the value of global goods trade. As the share of knowledge-intensive goods trade rises, so the value of trade increases overall. The rising value of goods flows is also partly due to growth of trade in commodities and natural gas. Nominally worth $1.0 trillion in 2002, trade in commodities was worth $5.2 trillion in 2012, a fivefold increase in just ten years. This trend reflects heightened demand from the booming cities of the emerging world and the rise of manufacturing in China and other emerging markets. If we look at global goods flows by volume rather than value, however, a different view emerges (see Box 2, "Value vs. volume in global trade").

Box 2. Value vs. volume in global trade

We primarily analyze global flows of goods by value, denominated in dollars. However, it is also important to consider two other measures of trade: value added and volume. Looking at trade in dollar terms gives an idea of the total value of flows moving in and out of a country, but looking at value added can illuminate that country's role in the global supply chain. For example, over the past ten years, most economies have seen an increase in the share of foreign value added in exports, indicating a growing reliance on other countries in the production process. When we look at the volume of goods shipped, a different picture emerges. In particular, emerging markets have a much higher share of these flows, reflecting the fact that they now account for a substantial share of global production in a variety of product categories (Exhibit 4).

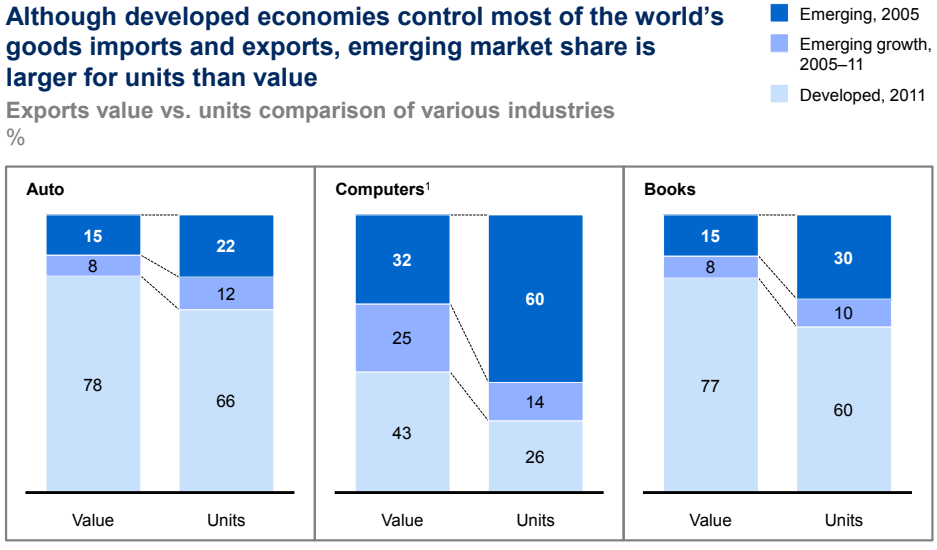
In automobiles, for example, emerging economies' share of global production is 12 percentage points higher in terms of volume than in terms of value. This is partly due to the fact that advanced economies such as Germany tend to produce goods with much higher price tags than those produced in emerging markets like India—compare the price tag of BMW or Mercedes cars with Tata's Nano vehicle, for example.[1] As emerging economies grow wealthier, the value of their high-volume flows is likely to increase. At the same time, developed economies will also benefit from rising wealth in the emerging world. Relatively expensive German cars will become increasingly within reach for greater numbers of consumers in emerging economies. China is already a larger market for BMW than the United States.[2]

Exhibit 4

Although developed economies control most of the world's goods imports and exports, emerging market share is larger for units than value

Exports value vs. units comparison of various industries

%



1 2003 values used in place of 2005 values.
NOTE: Numbers may not sum due to rounding.
SOURCE: Comtrade; McKinsey Global Institute analysis

1 The price of a 1 series BMW is 14 times that of a Tata Nano.

2 BMW company website.

TRADE IN SERVICES IS DWARFED BY THE FLOW OF GOODS AND IS GROWING AT ABOUT THE SAME PACE

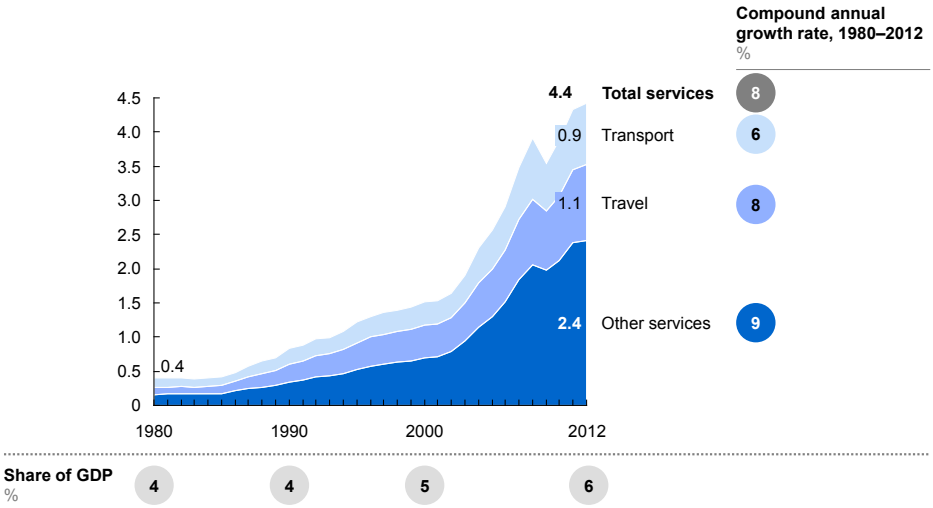
Over the past decade, services have become an increasingly important part of the global economy. In 2012, they accounted for 70 percent of GDP.[18] The dramatic decline in the cost of international communication, Internet connections, and travel has enabled international trade in many types of services. The offshoring of call centers and back-office processing are prime examples, but many other services—including engineering, financial services and banking, travel and transportation, and even construction—are increasingly traded. Despite these developments, global trade in services is only one-quarter of the size of trade in goods. By 2012, trade in services was just $4.4 trillion, or 6 percent of global GDP (Exhibit 5).

Exhibit 5

Services trade has increased in both value and share of GDP since 1980

Growth of services trade over time

$ trillion, nominal values



SOURCE: UNCTAD; World Development Indicators, World Bank; McKinsey Global Institute analysis

One reason for the relatively small size of trade in services is that this total does not include sales by the foreign affiliates of service companies, which, in the United States, for example, are twice the value of the services trade. Many traded services are delivered locally by highly skilled knowledge workers—bankers, architects, and engineers. However, when trade between two markets in such services grows large enough, a company tends to open up an office in the foreign location, and the services delivered there are no longer considered exports. Sales of foreign affiliates in the services sector dwarf direct exports of services. In 2011, foreign affiliates of US companies supplied $1.3 trillion in services to other countries, more than double US service exports that year.[19] Including affiliates in our interpretation of total services trade would greatly increase services flows.[20]

18 World Development Indicators, World Bank, 2013 edition.

19 Bureau of Economic Analysis.

20 We should note that the same is true for goods flows. In 2011, foreign affiliates of US companies supplied $3.9 trillion of goods exports to other countries, nearly triple the value of US exports that year.

Trade in services is also much lower than trade in goods because services are produced and consumed simultaneously, especially when they involve face-to-face interaction. This factor makes some service categories inherently more local and less tradable. Linked to this point is the fact that services requiring such interaction are amenable only to limited economies of scale, reducing their potential and the incentive to produce centrally and to trade across borders. A third factor limiting the size of the services trade is that categories such as professional services have tended to be heavily regulated at the national level, and no global standards have been set. This makes it difficult for a professional in one country—say, a lawyer or an accountant—to operate in another country.

Despite these limitations, global services trade has been growing at about the same rate as trade of goods since 1980, with the rate increasing by around one and a half times over this period. While trade in goods grew from 16 percent to 25 percent of global GDP, trade in services increased from 4 percent to 6 percent of global GDP.

FINANCIAL FLOWS HAVE DECLINED BY MORE THAN 65 PERCENT SINCE 2007, AND THEIR MIX HAS CHANGED SIGNIFICANTLY

While flows of goods and services have regained their pre-recession levels since 2008, cross-border flows of finance, including foreign direct investment (FDI), purchases of foreign bonds and equities, and cross-border lending and deposits, remain 67.5 percent below their peak. These flows are distinct from trade in goods, and they reflect the activities of global investors, banks and other financial institutions, and companies setting up operations abroad.

Between 1980 and 2007, global financial flows grew faster than any other type of flow, increasing from $470 billion to a peak of $12 trillion, or from 4 percent of GDP to 21 percent of GDP. This surge reflected the emergence of large global banks, growing foreign investment by major pension funds and asset managers, and a rise in FDI by multinational companies.

However, the financial crisis triggered a sharp retreat. Financial flows plunged in 2008, and, as of 2012, they totaled just $3.9 trillion, or 5 percent of GDP, some two-thirds below their pre-crisis level (Exhibit 6).[21] Banks experienced an extended period of deleveraging and retrenchment, and cross-border lending fell by some 96 percent, from $5.8 trillion in 2007 to just $235 billion in 2012. Most of the decline in cross-border lending was between developed economies, most notably within Europe. Cross-border lending to emerging markets held up better, but it still fell by more than 80 percent, from $750 billion in 2007 to only $140 billion in 2012.

FDI has held up better than other types of financial flows and now accounts for nearly half of the global total. This reflects the fact that FDI is the least volatile type of financial flow and is therefore less subject to sudden redemption or withdrawal than short-term lending flows, or “hot money.” Previous MGI research has found that short-term cross-border lending is the most volatile type of financial flow. FDI is just the opposite, and its growing share of global financial flows creates

21 For more detail, see *Financial globalization: Retreat or reset?* McKinsey Global Institute, March 2013.

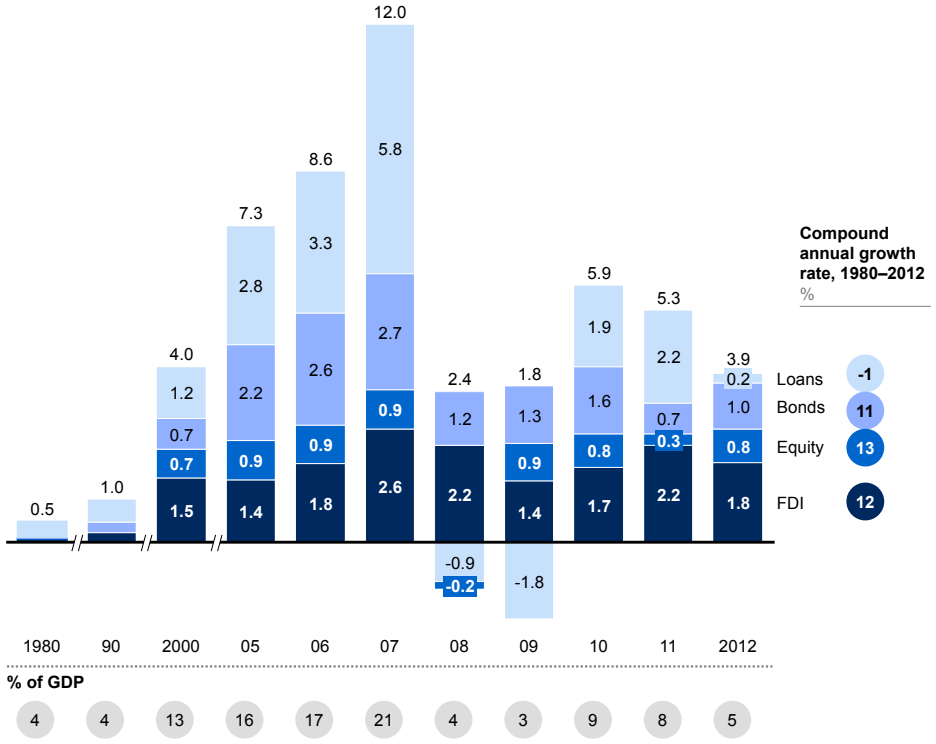
the potential for more stable cross-border flows in the future.[22] Financial flows to emerging markets have fared better than those to developed economies. They totaled $1.4 trillion in 2012, not far off their peak in 2007 of $1.7 trillion. Financial flows to some emerging regions such as China, South Asia, Latin America, and Africa have regained their pre-crisis peaks. This appears to bode well for financing the large capital investment needs generated by urbanization and industrialization in emerging markets.

Exhibit 6

Cross-border financial flows experienced a strong surge, but then a correction after 2008

Total financial flows by category

$ trillion, nominal values



NOTE: Numbers may not sum due to rounding.
SOURCE: IMF Balance of Payments; McKinsey Global Institute analysis

In addition to the flows of finance captured in countries' capital accounts, other forms of finance flow across borders. Remittances by immigrants to their home countries are one example. These remittances reached $523 billion in 2012, more than two times the size of cross-border lending. They have grown 5.5 percentage points faster than global GDP since 2000 and held up during the global recession. For some countries, remittances are an important source of foreign exchange. In Tajikistan, remittances sent from abroad comprise 49 percent of its GDP.[23] In Haiti, remittances amount to 21 percent of GDP; in Kosovo, it's 18 percent.

22 Ibid.

23 World Bank, *Migration and development brief*, November 2012.

Cross-border payments include all those initiated by retail, corporate, public, and non-bank financial institutions such as insurance companies or asset managers (e.g., credit card payments, intercompany lending, and trade payments).[24] In 2011, the latest year for which data are available, these totaled $170 trillion, ten times the value of annual trade in goods and more than two times global GDP.[25] The volume of cross-border payments is growing, but the size of individual payments flying around the world has diminished as smaller economic actors have engaged in cross-border trade, enabled by lower transaction costs online and the rise of international e-commerce. Between 2007 and 2011, that average value fell by 27 percent in the United Kingdom, 58 percent in Germany, and 71 percent in Mexico.

THE MOVEMENT OF PEOPLE ACROSS BORDERS IS GROWING MORE SLOWLY THAN OTHER FLOWS AND FACES A NUMBER OF BARRIERS

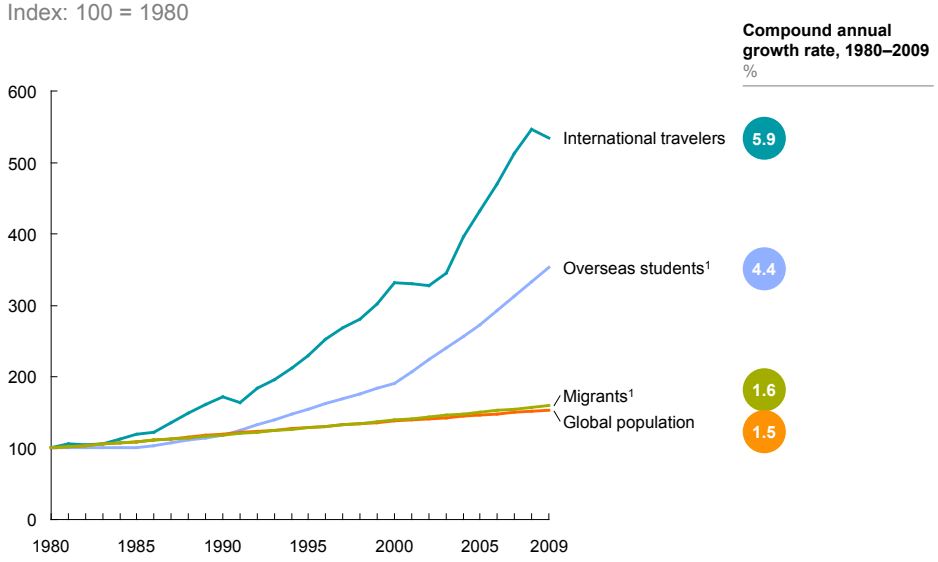
Although immigration is a sensitive political issue in many countries, the actual flow of people across borders has grown very little. In fact, the number of long-term migrants around the world has increased only in line with population growth over the 30 years to 2009 (Exhibit 7).

Exhibit 7

The number of long-term migrants has stayed in line with global population growth, while flows of short-term travelers and students have grown faster

Evolution of international people flows, 1980–2009

Index: 100 = 1980



1 Data for overseas students are in five-year increments, and data for migrants are in ten-year increments of stock data.
SOURCE: International Civil Aviation Organization; Education at a glance, OECD; McKinsey Global Institute analysis

24 We do not include payments 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.

25 We exclude interbank payments.

Since 1980, a consistent 2.7 percent share of the world's population has been living outside its country of origin, reflecting continuing barriers to the movement of people. Flows of migrants into advanced economies that are members of the Organisation for Economic Co-operation and Development (OECD) have increased only slightly faster, at 2.7 percent a year between 2002 and 2011.[26] Migrant flows into some emerging markets are much faster, albeit from a low base. For instance, immigration into Mexico and Chile grew at 6 percent and 4 percent a year, respectively.

The short-term movement of people through international travel, however, has grown more rapidly. In 2010, the latest year for which data are available, there were more than one billion border crossings by individuals traveling to a country other than their country of origin, a 13 percent increase since 2005. There were 1.5 billion seats on international commercial flights in 2011, up from 910 million in 2000. The number of business and leisure travelers totaled 900 million in 2012, up 6 percent since 1980. The number of students going to study abroad was around three million in 2012—a number equivalent to the size of Lithuania's population—and has grown at only 4 percent per year.

In theory, the incentives for people to move across borders are strong, given considerable wage differentials in various parts of the world. For low-skilled workers, these differentials can be as high as 1,000 percent, orders of magnitude larger than price differences for goods, services, or financial products across countries.[27] But the fact is that immigration restrictions remain formidable barriers to the movement of people across borders.

SOARING DATA AND COMMUNICATION FLOWS UNDERLIE THE OTHER FLOWS

Today, people and companies around the world are using digital and mobile connections to share ideas, collaborate, and make social connections. More than two-thirds of us have mobile phones, and one-third of the planet is online. The more than one-billion-strong community of Facebook users is the equivalent of the second-largest nation on earth.[28]

The volume of data flowing across borders is growing exponentially. Between 2005 and 2012, cross-border Internet traffic grew at over 50 percent annually. This reflects both an increase in the number of Internet users around the world and a sevenfold increase in cross-border Internet usage (Exhibit 8). This surge of data and communication moving instantly across borders not only constitutes a massive flow in and of itself but is also transforming the other types of flows. Much of this flow of data facilitates the movement of goods, services, finance, and people.

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26 We opted to investigate inflows into OECD countries because global longitudinal data on migration flows are not available.

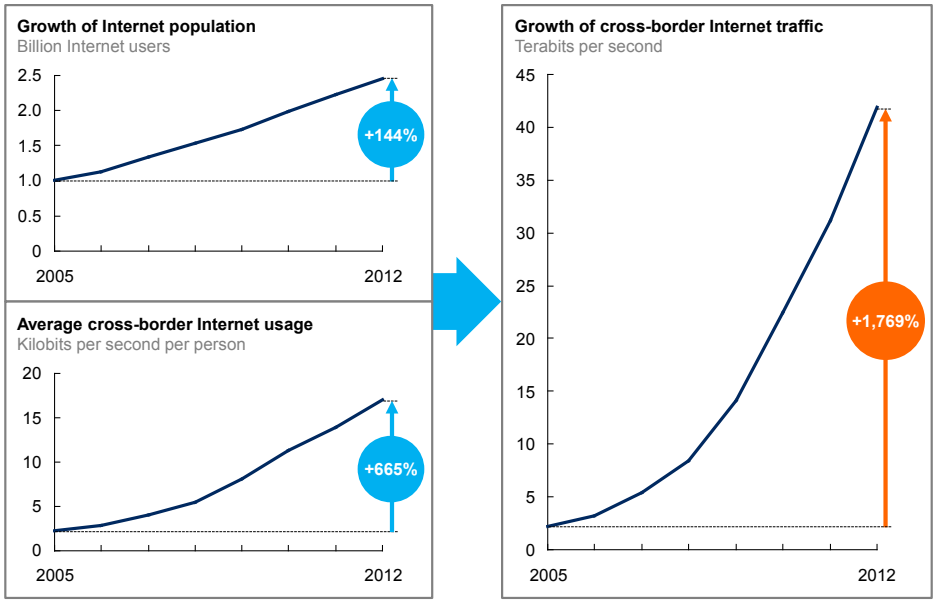
27 Michael Clemens provides an overview of research on the very large potential impact of free movement of labor on GDP, estimated at between 50 percent and 150 percent of global GDP. See Michael A. Clemens, "Economics and emigration: Trillion-dollar bills on the sidewalk?" *Journal of Economic Perspectives*, volume 25, number 3, summer 2011.

28 *Internet matters: The Net's sweeping impact on growth, jobs, and prosperity*, McKinsey Global Institute, May 2011; and *Online and upcoming: The Internet's impact on aspiring countries*, McKinsey High Tech Practice, January 2012.

As transmission costs have plummeted and speeds have soared, the methods and mechanisms for transmitting data and communicating have also proliferated. A researcher in one country can use an idea patented in another to develop a new product that is sold globally. Two friends in different countries can share their latest news via phone, email, Facebook, Twitter, Instagram, or a dozen other social media sites. A business executive can instant message a colleague in a foreign office. Photo sharing on Facebook illustrates the sheer scale and speed at which social media allows content to race around the world. When President Barack Obama was re-elected in 2012, his official victory photo was shared more than 600,000 times and "liked" more than seven million times—and more than 60 percent of those shares and likes came from outside the United States.[29] That record was shattered when a "selfie" taken by 2014 Oscars host Ellen DeGeneres was retweeted more than two million times before the end of the televised ceremony, crashing Twitter at one point.

Exhibit 8

Growth in the number of Internet users and per capita Internet use has led to a surge in cross-border Internet traffic



SOURCE: Telegeography; McKinsey Global Institute analysis

Global cross-border calls have also soared, more than tripling over the past decade, from 162 billion call minutes in 2002 to 547 billion call minutes in 2013. This rising volume of calls is primarily attributable to the expanded use of VoIP. Since 2004, the number of call minutes on VoIP has increased by 24 percent per year, while traditional call minutes have grown by less than 7 percent. In addition to traditional calls, cross-border computer-to-computer Skype calling has soared over the past decade and the volume of Skype calls is now equal to 39 percent of traditional international calls.

29 P. Alex Dow, Lada A. Adamic, and Adrien Friggeri, "The anatomy of large Facebook cascades," presented at Seventh International Conference on Weblogs and Social Media in Cambridge, Massachusetts, July 8–11, 2013.

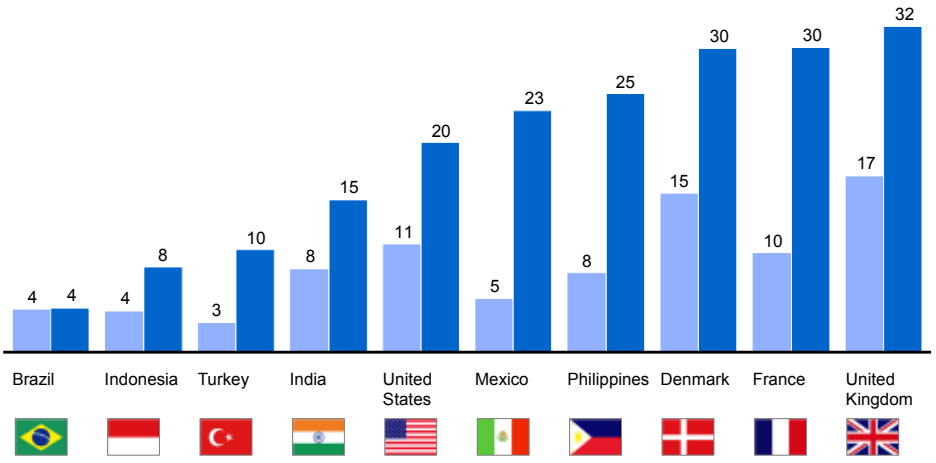
The growth in global data and communication flows can also be seen in other ways. For instance, cross-border co-authorship of academic papers has surged over the past two decades. In 1995, just 9 percent of academic papers involved collaboration across borders; by 2012, that share had more than tripled to 30 percent. There is also greater international collaboration in open-source software projects. For the Apache web server, for instance, collaborators almost exclusively worked remotely and across international borders. In social media, 26 percent of all Twitter followers are from countries other than where the tweet originates. On Facebook, 16 percent of Facebook friends are international.[30] In fact, online social media platforms such as Facebook are becoming increasingly international (Exhibit 9). Both emerging and developed markets have seen substantial increases in the share of users with at least 10 percent of friends from other countries. The value of these cross-border collaborations is difficult to measure. Yet their rapid adoption and evolution hint at the value of bringing together the best ideas and talent from across the world.

Exhibit 9

Facebook users increasingly have international friends

Share of users by country with >10% international, 2011 and 2014

%



SOURCE: Facebook; McKinsey Global Institute analysis

The knowledge-intensive components of all flows increasingly account for more of their value

To fully understand the dynamics of the global network, we also look at the most knowledge-intensive components within the five major categories of flows we have described. These include knowledge-intensive goods and services, payments for royalties and patents, FDI, cross-border revenue earned by telephony and Internet carriers, and business travel. In addition, we look at examples of non-commercial collaboration flows including cross-border co-authorship by academics.

We estimate that the knowledge-intensive parts of goods, services, and finance together reached $13 trillion in 2012, nearly half the combined total value of these flows (Exhibit 10). Examples include trade in high-tech products, pharmaceuticals,

30 Johan Ugander et al., *The anatomy of the Facebook social graph*, 2011.

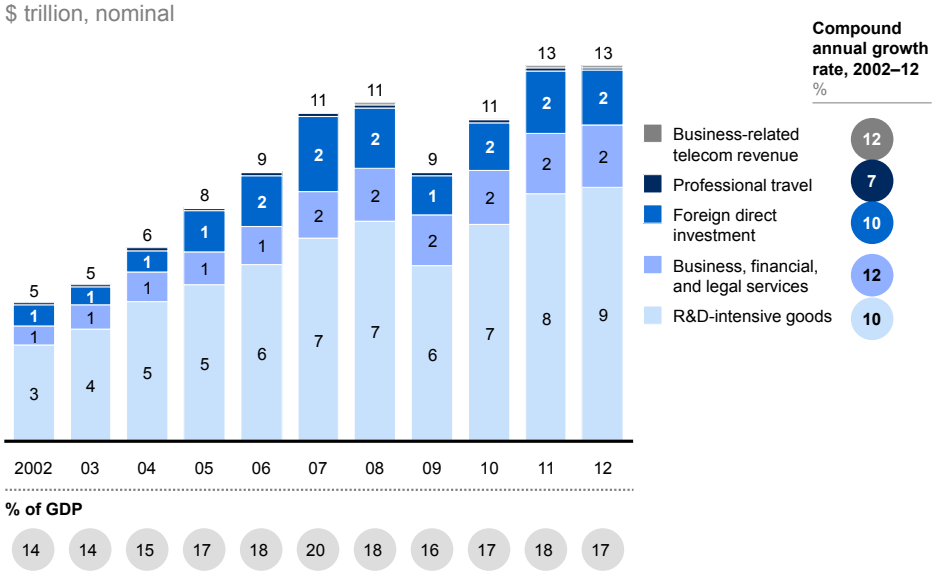
business services, patents and royalties, and business travel. The value of knowledge-intensive flows is almost three times as large as global financial flows or traded services—and larger than the combined GDP of China and Germany in 2012.

Exhibit 10

The value of cross-border knowledge-intensive flows reached $13 trillion in 2012

Cross-border knowledge-intensive flows, 2002–12

$ trillion, nominal



NOTE: Value labels <1 not shown. Numbers may not sum due to rounding.
SOURCE: Comtrade; UN Services Trade Database; World Development Indicators, World Bank; McKinsey Global Institute analysis

The flow of ideas, data, communication, and knowledge around the world continues to gain momentum. But the true value of knowledge-intensive flows is likely to be far greater than their realized market value perhaps even by several orders of magnitude. There are several reasons for this. First, much of the value of knowledge-intensive flows has yet to be realized. For example, the world's supply of research has made a leap forward as emerging markets have come online and as academics have begun collaborating with international colleagues at a rate not seen before. These cross-border collaborations among the world's top experts are undoubtedly producing even higher-quality research from which the world will benefit in coming years. Furthermore, online education platforms such as Massive Open Online Courses (MOOCs) are delivering world-class educational content to parts of the globe that have never had such access. The result will likely be a broadening and deepening of global human capital, which could be the linchpin of further growth and innovative activity.

On a more fundamental level we acknowledge that a market value is always an imperfect measure of true value; it is only indicative of the price an individual paid in the market. In reality the product may be worth more to this individual (consumer surplus) as well as to society (externalities). Second, rapidly growing capabilities embedded in knowledge-intensive goods are not reflected in their price. Real prices of durable goods (most of it knowledge-intensive) have been flat since 1980 despite greater capabilities and intrinsic value in everything from cars to smartphones. Technological improvements and innovation will logically enhance the value of such products, but this is not reflected in our measurement

of price. Finally, we know intuitively that there is tremendous value in knowledge-intensive content exchanged for free (including, for instance, YouTube instructional videos, news and reference websites such as Wikipedia, and entertainment content shared online), none of which appears in our valuation.[31] The barriers to accessing these valuable sources of knowledge are lower than ever and continue to decline, even though the content itself is not directly monetized.

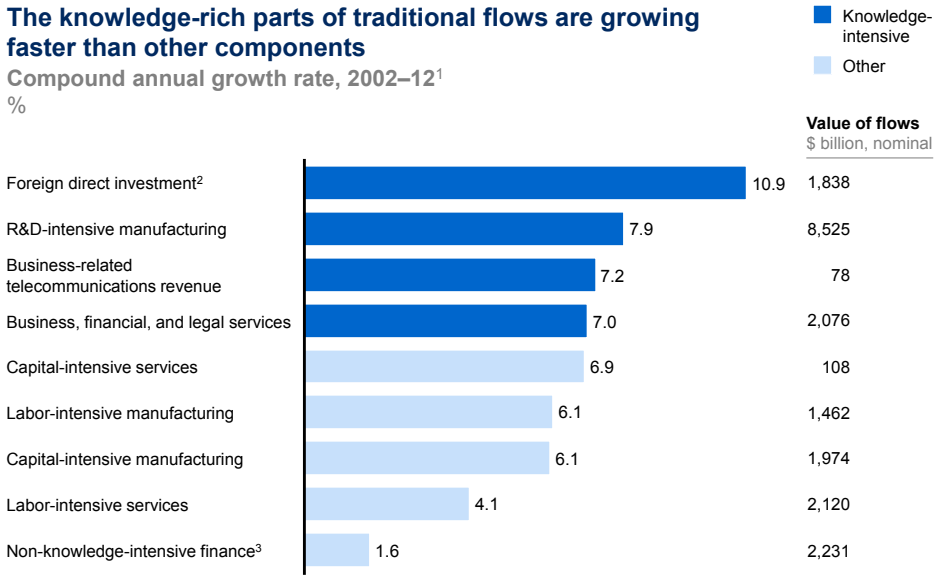
The knowledge-intensive portions of global flows are growing more quickly than other components (Exhibit 11). We estimate that trade in knowledge-intensive goods such as pharmaceuticals, semiconductors, and automobiles is growing nearly 1.3 times as fast as labor-intensive goods such as textiles and toys. The same is true in the services trade, where professional services and payments for patents and royalties are growing much faster than labor-intensive services such as back-office processing. Knowledge-intensive business, financial, and legal services grew by 7.0 percent a year between 2002 and 2012, compared with 4.1 percent growth in labor-intensive services. Even in flows of finance, FDI by companies can be considered knowledge-intensive because it embeds management techniques and new technologies. FDI flows grew by 10.3 percent a year between 2002 and 2012, compared with only a 3.5 percent increase in other financial flows. Today, FDI accounts for nearly half of all financial flows, up from 22 percent before the global financial crisis. The emerging world accounts for 32 percent of knowledge-intensive flows, largely because it attracts nearly half of global FDI, but for now, most knowledge-intensive flows are still concentrated in advanced economies (Exhibit 12).

Exhibit 11

The knowledge-rich parts of traditional flows are growing faster than other components

Compound annual growth rate, 2002–12[1]

%



1 Growth rates of flows of services and goods are based on real value of services and goods trade. Services was adjusted with a macro-level GDP deflator; goods trade was based on real trade values estimated by IHS Economics & Country Risk. Growth rates of financial flows are based on three-year average value.
2 Foreign direct investment is classed as a knowledge-intensive flow because it often entails the transfer of embedded ideas, management expertise, and technology.
3 Includes debt, equity, and loans.
SOURCE: Telegeography; Comtrade; IHS Economics & Country Risk; IMF; McKinsey Global Institute analysis

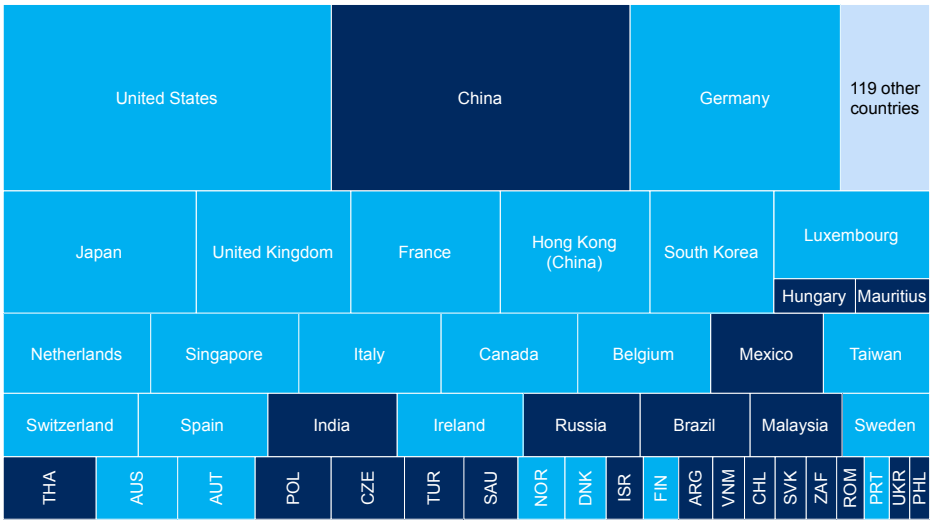
31 *The social economy: Unlocking value and productivity through social technologies*, McKinsey Global Institute, July 2012; *Internet matters: The Net's sweeping impact on growth, jobs, and prosperity*, McKinsey Global Institute, May 2011; and *Online and upcoming: The Internet's impact on aspiring countries*, McKinsey High Tech Practice, January 2012.

Exhibit 12

The vast majority of knowledge-intensive inflows and outflows occur in developed economies

Total knowledge-intensive inflows and outflows, 2012[1]

Relative area corresponds to the portion of global inflows/outflows



1 A knowledge-intensive flow is a flow with embedded information, ideas, or expertise that is transferred when exchanged. Foreign direct investment is classed as a knowledge-intensive flow because it often entails the transfer of embedded ideas, management expertise, and technology.

SOURCE: Comtrade; IMF Balance of Payments; McKinsey Global Institute analysis

□ □ □

Global flows have been part and parcel of our world for centuries, binding together people and economies. Today, these flows are expanding and accelerating in a new era. Although trade in goods continues to dominate global flows, the knowledge economy is rapidly becoming a reality. In the next chapter, we discuss how digital technologies are transforming all flows and enabling greater participation by a larger number of actors in the global economy.

2. Digitization is transforming all flows

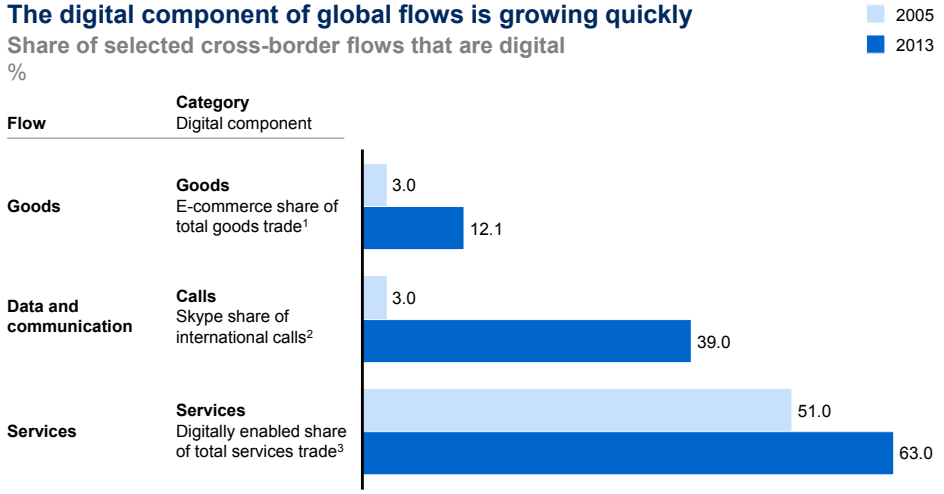
The spread of digital technologies is transforming all types of global flows—and this transformation is only in its earliest stages. Already, more and more of our world lends itself to instantaneous cross-border exchange, from books and music to design files that enable 3-D printing. As the infrastructure that supports the Internet expands, barriers of distance and cost that once seemed insurmountable have begun to fall away. This has set the stage for the explosive growth we now see in flows of data and communication. More fundamentally, we see huge growth in the digital portions of flows of goods and services—a process we call digitization (Exhibit 13).

Exhibit 13

The digital component of global flows is growing quickly

Share of selected cross-border flows that are digital

%



1 Based on China data.
2 Excludes other VOIP minutes.
3 Based on US data.
NOTE: 2005 values for services are calculated by interpolating from prior and subsequent years based on constant growth rates.
SOURCE: iResearch; Telegeography; OECD; US Bureau of Economic Analysis; McKinsey Global Institute analysis

Digitization is transforming global flows by reducing marginal production and distribution costs. This process is occurring in three main ways. The first way is through the creation of purely digital goods such as books and movies that can easily be transported and reproduced across the globe. Digitization is even transforming some physical flows of people into virtual flows by enabling remote work using tools for virtual collaboration. Second, digitization enhances the value of physical flows through the use of “digital wrappers” around traditional products—such as sensors embedded in goods as they flow through the global value chain. This makes their flow more efficient and valuable. Third is the creation of online platforms for production, exchange, and consumption.

The power of digitization comes especially from its marginal cost economics that lower expenses associated with access, discovery, distribution, and non-exclusivity in use to near zero. As a result, the cost of participating in flows is cut for individuals, small firms, and entrepreneurs. This is already leading not only to innovations in business models but also to the emergence of micromultinationals, microwork, and microsupply chains that are able to tap into global opportunities. This democratization of global flows significantly broadens opportunities, but it also will put pressure on *all* companies to innovate their business models to capture the opportunities and respond to new sources of competition.

The volume of digital goods is soaring

Digital goods are by no means a new phenomenon for the global economy. Cross-border software sales, for instance, have been an important flow for at least two decades. However, today the proliferation of devices with which consumers can access digital content has converted a niche into a transformative global industry.

Digitization is changing the game by lowering—or even practically eliminating—transportation and marginal production costs of virtual goods. This has encouraged rising cross-border flows in items such as e-books and digital news media. Today, consumers can choose from a near-endless supply of games, movies, music, books, magazines, and newspapers from anywhere in the world. The rate of adoption has been significant and is still increasing. Between 2008 and 2011, online newspaper subscriptions grew by more than 30 percent a year; online music downloads such as iTunes by more than 20 percent per year; subscriptions for video content, through Netflix, for example, by over 40 percent; and virtual goods obtained through companies like Zynga by more than 30 percent per year.[32]

Although the majority of sales of digital goods are consumed in the country where they were produced, a growing share is in cross-border sales. Netflix, which provides movies and television shows online, has become an increasingly international business. By 2013, nearly one-quarter of its streaming customers lived outside the United States, a testament to the speed at which companies can establish a global footprint courtesy of digital technologies.[33] Some 40 percent of Amazon's revenue in 2013 came from sales outside of North America.[34]

The use of apps that enable customers to purchase virtual goods on devices—such as games or publication subscriptions or virtual items in a game—has become a significant industry. The volume of such purchases was almost zero in 2009. By 2013, sales totaled nearly $6 billion.[35] The combination of Android-powered devices with the Google Play store is an example of a collaboration that has created a new ecosystem by combining hardware, software, and online platforms. More than one million apps are now available on Google Play, which logs 2.5 billion downloads every month from customers around the world. Google

32 McKinsey & Company iConsumer survey, United States 2008–11. The survey covered US online consumers aged 13 to 64.

33 Netflix 10-K filing, 2013.

34 Amazon.com Incorporated 10-K filing, January 3, 2014.

35 Strategy Analytics, "In-App Virtual Goods Revenue" forecast, June 2013.

Play's paid applications are available in more than 130 countries.[36] Books sold on Google Play are available in nearly 50 countries.[37] Apple and other major players have created similar ecosystems that are providing a platform for the development of entrepreneurial new businesses around the world. Developers can now sell apps nearly anywhere in the world to a potential customer base of nearly one billion Android mobile phone users. Indeed, businesses are being created on the back of a single software application sold through the major app platforms.

As the volume of digital flows has expanded, the value of these flows has grown, too. However, there are many prominent examples of the value, embedded as value add, lagging behind volume. For example, user-generated content on blogs and on YouTube is driving very high volumes of traffic, but very little of this content has been monetized, at least not directly from their consumers. As a result, the significant value that this content generates does not show up in economic statistics but instead reveals itself as "consumer surplus." Previous McKinsey research has shown that the surplus from the United States and Europe alone is close to €250 billion each year.[38]

Digital wrappers are unlocking immense value within established trade routes

The second way that digitization is transforming flows is by making physical flows more valuable through the use of "digital wrappers" that embed information within a good or service. The potential for digital wrappers has existed for some time, but their use has been soaring recently. One example of a digital wrapper is an online site that provides information that helps consumers make informed decisions. Customers have a growing ability to add reviews on e-commerce platforms to help others to choose the right product. The addition of such reviews on sites like TripAdvisor and Amazon increases the value of the platform and boosts sales. For overseas customers, reviews can help to reduce ambiguity and uncertainty about a product's quality and help to increase sales.

Use of radio-frequency identification (RFID) technology to track the flow of physical goods is another prominent example of a digital wrapper. The use of such sensors grew at a rate of 20 percent a year between 2005 and 2012, significantly greater than the 7 percent pace of growth in nominal goods flows.[39] RFID uses wireless radio communications to uniquely identify objects or people and collect information about a product, place, time, or transaction. RFID has a variety of uses, including access management, payments, and logistics. RFID use in logistics, in particular, has created enormous value and has been a significant driver of the overall use of the technology. By 2013, the RFID industry had achieved $7.9 billion in global revenue compared with $1.9 billion in 2005.[40]

36 Google Play website.

37 Ibid.

38 Jacques Bughin and James Manyika, "The mobile Internet's consumer dividend," *McKinsey Quarterly*, February 2014.

39 Raghu Das and Peter Harrop, *RFID forecasts, players, and opportunities, 2014–2024*, IDTechEx, November 2013.

40 Ibid.

The rapid pace of adoption of such tools demonstrates the significant value that these digital wrappers are creating in global flows by improving visibility throughout the supply chain and boosting reliability and efficiency. RFID has proved highly effective in inventory management in long global supply chains, helping to reduce inventory costs by up to 70 percent even while improving the service offered.[41] Digital tracking of physical shipments also reduces the volume of goods lost in transit, enabling trade in larger volumes and higher-value goods. A study of four major RFID implementations in Germany, including at the logistics centers of Hewlett-Packard GmbH and BMW, found that the technology reduced losses in transit by between 11 and 14 percent.[42]

Digital wrappers have even greater potential value in emerging economies that have less developed trade infrastructure. One study looked at the Kenyan exports market, which has relatively high levels of taxation and inadequate infrastructure. The research found that the ability to improve the tracking of exports promised significant returns, both for the government seeking better security and greater tax revenue and for businesses seeking more efficiency. A pilot RFID study in the country found that the technology significantly increased the efficiency of exports by decreasing turnaround times by 45 percent, greatly benefiting truck and cargo owners.[43]

Digital platforms enable cross-border exchanges in all types of flows

Digitization is creating online platforms that facilitate production and cross-border exchanges across the full scale of participants, from multinational companies to SMEs to individuals and entrepreneurs. A broad range of "micro" trends, including microlending, micropayments, microwork, and micromultinationals, have become possible in the past decade only because of digitization and digital platforms' capacity to connect individual market participants across international boundaries.

Online platforms such as Skype have revolutionized global communication. By 2013, cross-border computer-to-computer Skype calling was at the level of 39 percent of traditional international calls. Over the past decade, Skype calling has more than doubled every two years, growing at 51 percent a year compared with 9 percent in the case of traditional calls (Exhibit 14). This amounts to a more than 500 percent increase in international Skype call minutes since 2008.

Digital platforms for e-commerce are transforming trade flows of goods and services, too. The global nature of the Internet cuts search costs and harmonizes prices, improving producers' ability to market to consumers around the world. The result has been an explosion in e-commerce. Global e-commerce sales reached almost $1.3 trillion in 2013—nearly 2 percent of global GDP.[44] Alibaba,

41 Aysegul Sarac, Nabil Absi, and Stéphane Dauzere-Peres, *A literature review on the impact of RFID technologies on supply chain management*, Ecole des Mines de Saint-Etienne working paper number 2009/2, March 2009.

42 Ibid.

43 Joseph K. Siror et al., "Impact of RFID technology on tracking of export goods in Kenya," *Journal of Convergence Information Technology*, volume 5, number 9, November 2010.

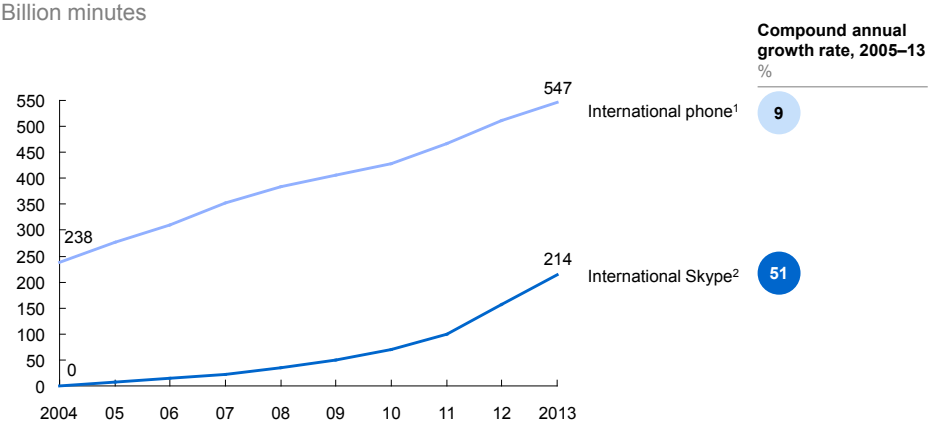
44 "Ecommerce sales topped $1 trillion for first time in 2012," *eMarketer*, February 5, 2013.

the leading e-commerce platform in China that includes marketplaces for B2B, B2C, and P2P e-commerce, posted gross merchandise value more than $157 billion in 2012, larger than Amazon and eBay combined.[45] This enables more and faster flows of trade in goods and allows smaller companies to participate in exporting and importing. On eBay, for instance, more than 90 percent of commercial sellers export goods to customers in foreign countries, compared with less than 25 percent in the case of traditional small businesses in most countries (Exhibit 15).

Exhibit 14

Computer-to-computer Skype calls are now at the level of nearly 40 percent of traditional international telephone calls

International call traffic, 2004–13
Billion minutes

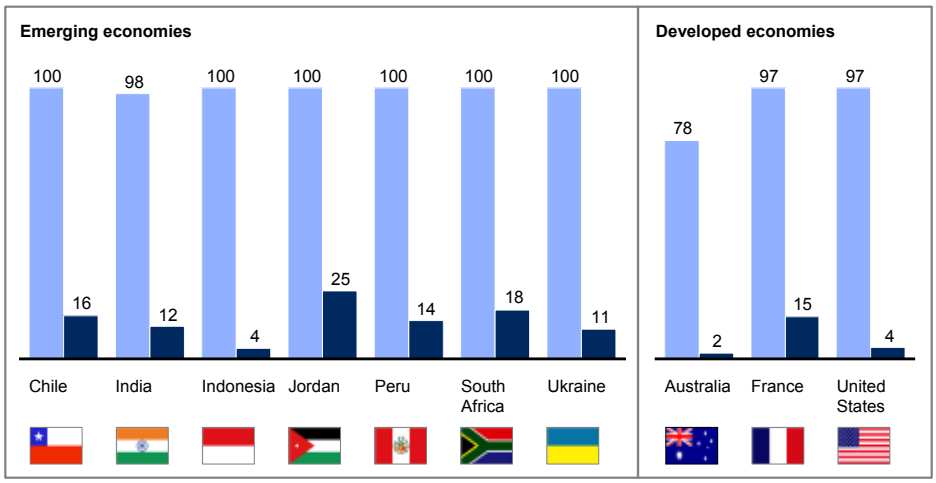


1 Includes time-division multiplexing (TDM) and voice-over Internet protocol (VoIP).
2 Includes only cross-border, computer-to-computer Skype calls.
SOURCE: Telegeography; McKinsey Global Institute analysis

Exhibit 15

Online platforms enable businesses to attain global reach that comparable offline businesses have not achieved

Share of eBay commercial sellers and offline SMEs[1] that export, 2012
%



1 Small and medium-sized enterprises.
2 eBay sellers are defined as a commercial seller with sales of over $10,000.
SOURCE: Enterprise Surveys, World Bank, 2012; Australia Bureau of Statistics, 2012, 2007; eBay; McKinsey Global Institute analysis

45 Press release from Alizila, news and commentary subsidiary of Alibaba Group.

Online marketplaces are also being developed to facilitate services flows. For example, InnoCentive is an online platform that crowdsources innovation; today it has 300,000 registered solvers in nearly 200 countries.[46] One study of the platform found that it had enabled solutions to one-third of a sample of problems that large R&D-intensive firms in a variety of industries including pharmaceuticals, defense, and electronics had been unable to solve.[47]

Shapeways, which has production facilities in the Netherlands and in New York that ship products globally, is an example of a digital platform that cuts across manufacturing and services, making both virtual. This e-commerce platform enables designers to upload designs for products, use 3-D printing to create the physical items, and manage logistics to reach end consumers. The creator of the product needs only to interact with the economy digitally, although the end-product is physical. In the future, end consumers could have 3-D printers in their homes and the flow would involve only the transfer of a digital design file and a digital payment.

Open-source software projects are an example of the power of online collaboration tools to enable complex collaboration among participants in multiple locations. In the case of Apache, the most widely deployed web server, open-source collaborators are distributed around the globe and rarely, if ever, work in person.[48] In one Apache project, nearly 400 people provided code and identified close to 3,000 bugs. The coordination of such a large and distributed team for a project of such complexity demonstrates the immense sophistication and potential of online collaboration tools.[49]

Financial flows have long been digitized, but now new platforms are enabling smaller “micro” financial flows between individuals and small businesses. Although these flows are only a fraction of total global financial flows, digital platforms such as Kiva, Kickstarter, and Zopa are increasingly used to raise money and loans, often across borders. Since launching its foundation in 2005, Kiva, the world’s largest online platform for microlending, has facilitated loans worth more than $500 million. Through Kiva, more than one million people in more than 190 countries have lent money to another one million—most of them in the emerging world. Almost all of this volume is in the form of small financial transactions between people who have never met and who live thousands of miles apart. While the amount borrowed through Kiva is still only a tiny fraction of total global financial lending, this platform demonstrates the power of the Internet to connect individuals living in different parts of the world.

46 Innocentive.com.

47 Karim R. Lakhani, Lars Bo Jeppesen, Peter A. Lohse, and Jill A. Panetta, *The value of openness in scientific problem solving*, Harvard Business School working paper number 07–050, January 2007.

48 Netcraft.com Web Server Survey, June 2013.

49 Audris Mockus, Roy T. Fielding, and James D. Herbsleb, “Two case studies of open source software development: Apache and Mozilla,” *ACM Transactions on Software Engineering and Methodology*, volume 11, number 3, July 2002.

Another example of the power of digitization in financial flows is text-based donations that have significantly increased the speed of fund-raising for international disaster relief and charities. In the United Kingdom, the public used mobile and online platforms to donate £13 million—all of it via mobile and online—in the first 24 hours after a typhoon hit the Philippines in November 2013. The American Red Cross raised $35 million in just 48 hours for the 2010 Haiti earthquake relief effort; text-based donations accounted for more than one-fifth of all the funds raised. And digitization has enabled more people to give even small amounts. According to PayPal, the volume of global donations to non-profit organizations is growing by 20 percent, but the average size of those donations is dropping. Global Giving, an online global charity fund-raising platform that some have called the "eBay of philanthropy," connects local projects with a global fund-raising base and has raised more than $100 million to date from givers around the globe and in small amounts. Projects thus far have ranged from constructing irrigation infrastructure for a Rwandan orphanage to paying for a year of primary school for a girl in Nepal.

Online platforms can enable funding of larger projects, too. Crowdfunding—the use of large networks, usually online, to raise money—has experienced near-exponential growth since 2009. For example, Kickstarter, a crowdfunding platform that connects entrepreneurs to individuals interested in funding their creative projects, has attracted 5.8 million people from 214 countries who have pledged $1 billion to fund 58,000 creative projects since 2009. Bitcoin, a digital currency, is facilitating peer-to-peer and payments transactions across the world and has network nodes in almost 200 countries.[50]

Even global labor markets are being transformed by online marketplaces. oDesk, the largest online labor marketplace, was processing $30 million of contracts per month in May 2012. The vast majority of oDesk users are companies in high-income countries hiring workers in low-income countries. For example, India is the largest destination for outsourced contracts on oDesk, with more than one-third of the global total, and the United States purchases two-thirds of all contracts outsourced to India on oDesk.[51]

Academic literature on the impact of distance on trade finds that the effects of distance have begun to decline, driven in large part by digitization. Barriers such as transportation costs or regulation on cross-border flows are significantly lower for digital or even digitally enabled flows than traditional physical flows.[52] One study of e-commerce in the European Union (EU) found that costs associated with distance affected offline trade far more than online B2C trade.[53] It also found that digitization cuts the distance effect of physical flows by two-thirds.

50 Bitnodes website.

51 Ajay Agrawal et al., *Digitization and the contract labor market: A research agenda*, National Bureau of Economic Research working paper number 19525, 2013.

52 Massimo Riccaboni, Alessandro Rossi, and Stefan Schiavo, "Global networks of trade and bits," *Journal of Economic Interaction and Coordination*, volume 8, number 1, April 2013.

53 Bertin Martens and Geomina Turlea, *The drivers and impediments for online cross-border trade in goods in the EU*, Institute for Prospective Technological Studies, Digital Economy working paper number 2012/1, July 2012.

Digitization is enabling SMEs to participate in global flows

Global flows were once the domain preserve of governments and the largest companies. But digitization is now opening the door of global flows to small and medium-sized enterprises and even individual entrepreneurs to take part in cross-border commerce and exchanges, giving rise to a new era of micromultinationals.

The example of eBay that we have discussed shows how even small companies can export through online platforms. Previous McKinsey research has shown that the Internet doubles the export share of sales of SMEs.[54] This may be even more valuable in emerging markets, where traditional transport and logistics costs are relatively higher. For instance, small commercial sellers on eBay in Chile sell to buyers in an average of 28 different countries, compared with just three different countries in the case of traditional exporters.

The global reach afforded by online e-commerce platforms has opened up international market niches that small businesses could not access until recently. For example, the crafts e-commerce platform Etsy supports independent artisans who create handmade-goods businesses, enabling them to reach a global audience. It attracts 30 million buyers and sellers around the world.

The scale of the Internet means that a "long tail" area of interest can actually represent a significant opportunity. For example, in the past, *The Oatmeal*, an online comic strip, was not likely to have been able to attract enough of a following within a single city to obtain the financial support it needed to thrive; to do so, it would need to be run regularly by a local newspaper that would require evidence of a broad fan base. But the Internet has enabled the company to find a widely dispersed international audience of fans who are even prepared to pay for content-related products.

Digitization has also cut the fixed costs of starting a business, since more and more inputs can be purchased on a marginal basis. In the past, online businesses needed to buy servers and hire large engineering teams to build their systems more or less from scratch. A company today can buy incremental server capacity from Amazon Web Services, for instance, and hire leaner development teams that can build on top of pre-existing platforms. Business-support services such as legal and accounting services can also be outsourced online. This means that businesses can start up with far less up-front investment and can scale up much more quickly. The implication is that the pace of innovation has the potential to further accelerate as an increasing number of lean-and-mean entrepreneurs and engineers test and iterate more ideas.

54 *Internet matters: The Net's sweeping impact on growth, jobs, and prosperity*, McKinsey Global Institute, May 2011.

Digitization also opens the door for individuals to participate in global flows

Digital platforms enable individuals to participate in global flows as consumers, workers, students, and entrepreneurs. As consumers, digitization is elevating consumer choice to a new level and enabling consumers, like SMEs, to play new roles in shaping the supply chains of the goods and services. They can, for instance, customize apparel or edit reference websites such as Wikipedia. The boundaries between producers and consumers are increasingly blurred—the notion of the "pro-sumer" is becoming a reality as technologies such as 3-D printing make it possible for individuals to design and manufacture goods in their own homes.

As workers, many individuals are being empowered by digitization, which is giving them greater flexibility. Individuals can offer their services across borders and time zones and with more flexibility than ever before through tools such as web collaboration software and videoconferencing. The world of work is increasingly one in which workers operate more like entrepreneurs, honing skills they can contract for one-off pieces of work to the highest bidder in a 24-hour, global marketplace. Online sites such as oDesk and Mechanical Turk enable people around the world to do remote work for companies in other countries. Such platforms are one way to overcome immigration barriers, by bringing jobs to workers abroad rather than requiring them to emigrate. For individuals in developing economies, these platforms can be very good jobs that offer a significantly higher level of wages than they would have otherwise been able to earn. In India, for instance, the average wage paid to oDesk workers is $10.21 per hour, compared with less than $3 an hour for data entry and administrative support jobs.[55] Some online platforms combine training and work. Samasource, for example, combines training with online jobs in areas of the world with few employment opportunities. Samasource operates nine delivery centers in Haiti, India, Kenya, and Uganda, and has performed digital-based work for Google and Microsoft. Today, Samasource has created opportunities for nearly 5,000 workers and 15,000 dependents.

Of course, not all workers win from the digitization of work and creation of an increasingly global labor market. For instance, many jobs have disappeared in the newspaper industry as web-based media has proliferated. Workers in all countries will be pressured to upgrade their skills to compete (see Chapter 7 for more discussion of implications for workers). Digitization may offer part of the solution to workers through online training and educational courses. Although the rise of Massive Open Online Courses may not entirely obviate the need to travel to become a foreign student, MOOCs enable people around the world to tap into world-class knowledge. Khan Academy, a non-profit provider of free education around the world, reports that 25 percent of its users are from countries outside the United States. Furthermore, more than half of the ten countries that send the most users to the site are in the emerging world; most prominent are India, South Africa, and Mexico.[56] Coursera, another online education provider started in the United States, offers more than 600 free online courses in 12 languages. More

55 Ejaz Ghani, William R. Kerr, and Christopher T. Stanton, *Diasporas and outsourcing: Evidence from oDesk and India*, NBER working paper number 18474, October 2012.

56 Alexa.com, unique visitor data to Khanacademy.org, March 19, 2014.

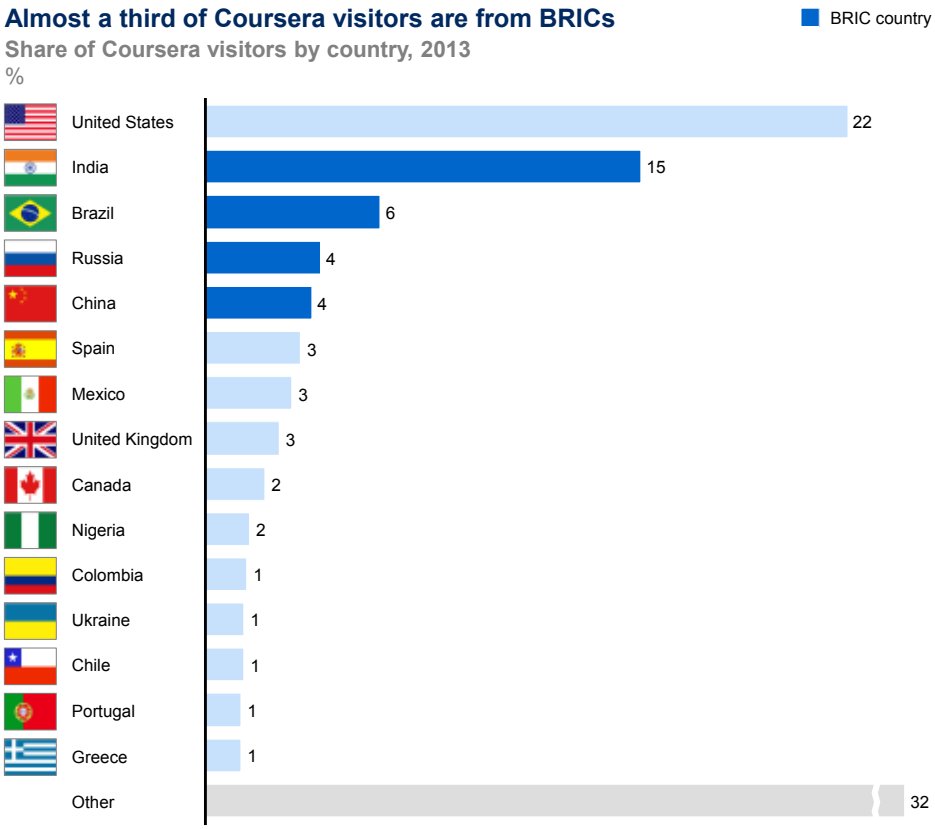
than three-quarters of Coursera users come from countries other than the United States, and almost one-third are from Brazil, Russia, India, and China (Exhibit 16).

Exhibit 16

Almost a third of Coursera visitors are from BRICs

Share of Coursera visitors by country, 2013

%



SOURCE: Alexa.com; McKinsey Global Institute analysis

There is further scope for digital platforms to reduce barriers to global flows

Despite the undoubted advances made by digital platforms, barriers remain. The growth of e-commerce is one instructive case study. While e-commerce has experienced very strong growth—21 percent in 2012—cross-border e-commerce flows have lagged significantly behind domestic flows. For example, the United States had $384.8 billion in total e-commerce expenditure in 2013 but only $40.6 billion in cross-border expenditure—or 11 percent of total e-commerce.[57] We see a similar situation in Europe, despite significant levels of economic integration within the region. In the United Kingdom, for example, nearly 70 percent of individuals reported buying at least one item from a national e-commerce seller, but only 10 percent said they had bought from sellers in other EU countries. A similar result holds true for the majority of EU countries, including the large markets of Germany, France, and the Netherlands.[58]

57 "Ecommerce sales topped $1 trillion for first time in 2012," *eMarketer*, February 5, 2013; *Modern spice routes: The cultural impact and economic opportunity of cross-border shopping*, PayPal, July 2013.

58 Linda Kool, Anne Fleur van Veenstra, Gudrun Rumpf, and Elena Chernovich, *Barriers to ecommerce and trustmarks inventory*, IntraSoft International, December 2012.

There are a number of reasons for the significant divergence between domestic and cross-border e-commerce. On the consumer side, individuals pointed to language gaps and fear of fraud. In fact, a survey of European e-commerce consumers found that nearly 60 percent of individuals found these two factors to be major deterrents to cross-border e-commerce. On the supply side, policies and regulations are a significant part of the story. A Swedish Board of Trade paper concluded that customs barriers, tax regulation, and cross-border data transfer issues were all having a substantial drag on cross-border flows.[59]

The cases of cross-border e-commerce and Bitcoin both suggest that significant opportunities still exist to expand the use of digital platforms and further reduce the effects of traditional barriers. Today, language, security concerns, and trade policies remain barriers to cross-border digital flows. The onus is on governments, trade organizations, and other international institutions to further facilitate the flow of goods, services, financial, and information data and communication around the globe.

□ □ □

Our increasingly digital world is changing every kind of flow and offers significant economic benefits. Amazon, eBay, Google, Alibaba, and other companies, none of which existed 25 years ago, are reshaping the world. Digital technologies are connecting people and businesses to the world economy as never before and at an unforeseen scale. In the next chapter, we look at how the network of global flows is changing.

59 *E-commerce—new opportunities, new barriers: A survey of e-commerce barriers in countries outside the EU*, Swedish National Board of Trade, November 2012.


Gates / Portes
101-157
168-181, 500-550

3. Networks of global flows are becoming deeper and broader

The global map of flows is changing very rapidly. Well-established trade routes are deepening and broadening, and new routes are proliferating as an increasing number of countries begin to participate. The rise of emerging economies has been a major force for change particularly over the past decade, and it will continue to reshape the map of global flows. In the past, these flows were concentrated among the largest of the advanced economies, but the dominance of these countries is waning. Nevertheless, emerging economies have yet to tap the full potential of global flows. In this chapter, we discuss each of these developments, as well as varied patterns of interregional and intraregional trade, to build up a detailed picture of the developing landscape of global flows.

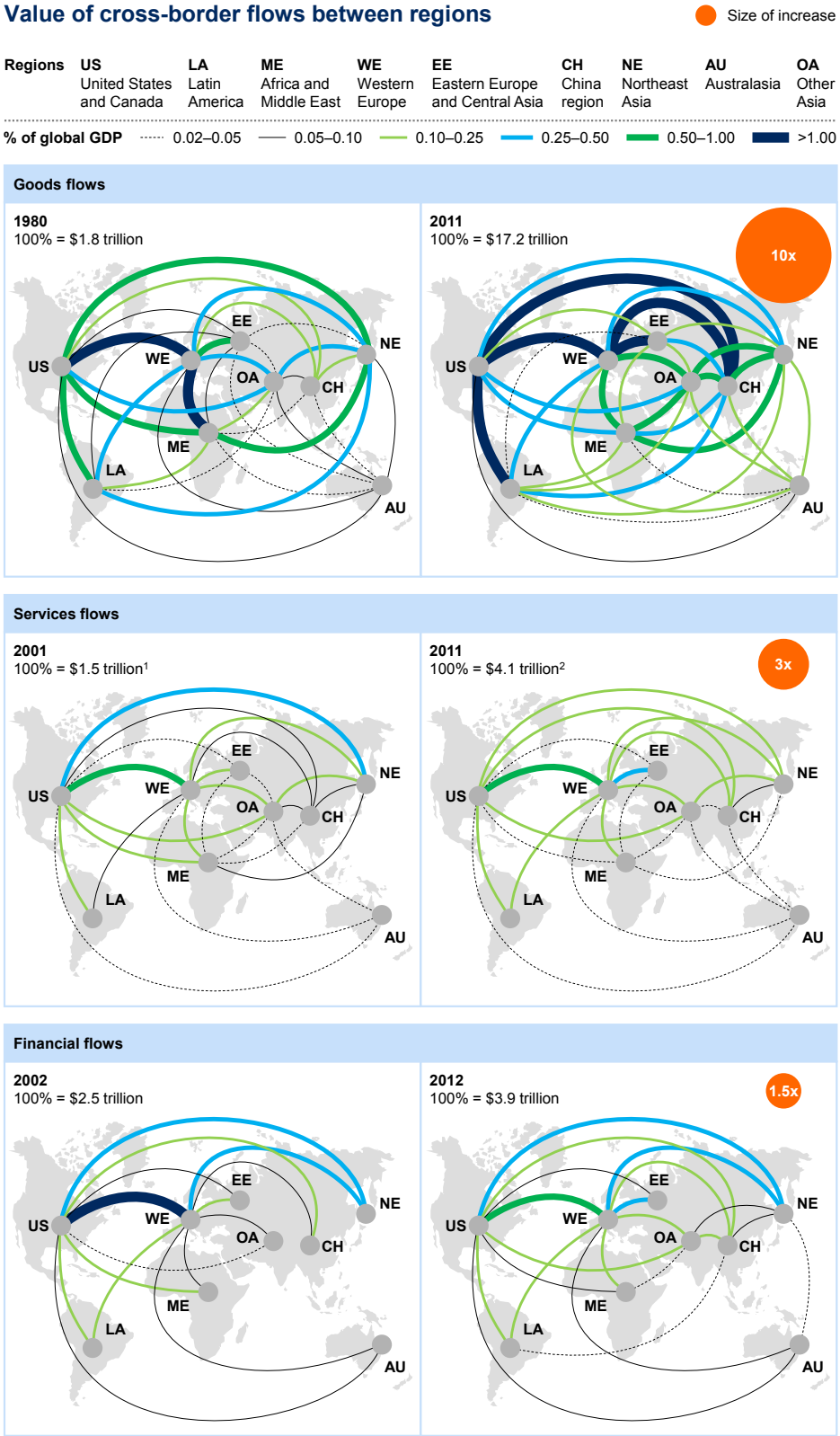
The degree of interconnection and dispersion in global networks differs by flow

The world is becoming increasingly connected through all types of flows, but the degree to which this is happening—and how dispersed flows are—differs by the type of flow. Exhibits 17 and 18 show bilateral networks for each flow at two different points in time. The thickness and color of each line represents the size of the flows between each region.[60] The lines for global flows of goods, services, and finance are all measured in dollar terms, and their thickness is scaled by the ratio of the value of trade across each route relative to world GDP so that it is possible to compare across flows. For all flows, there are more lines and nodes today than in the earlier year, and those lines have thickened recently.

60 Hyunjin Seo and Stuart J. Thorson, "Networks of networks: Changing patterns in country bandwidth and centrality in global information infrastructure, 2002–2010," *Journal of Communication*, volume 62, number 2, April 2012.

Exhibit 17

Value of cross-border flows between regions

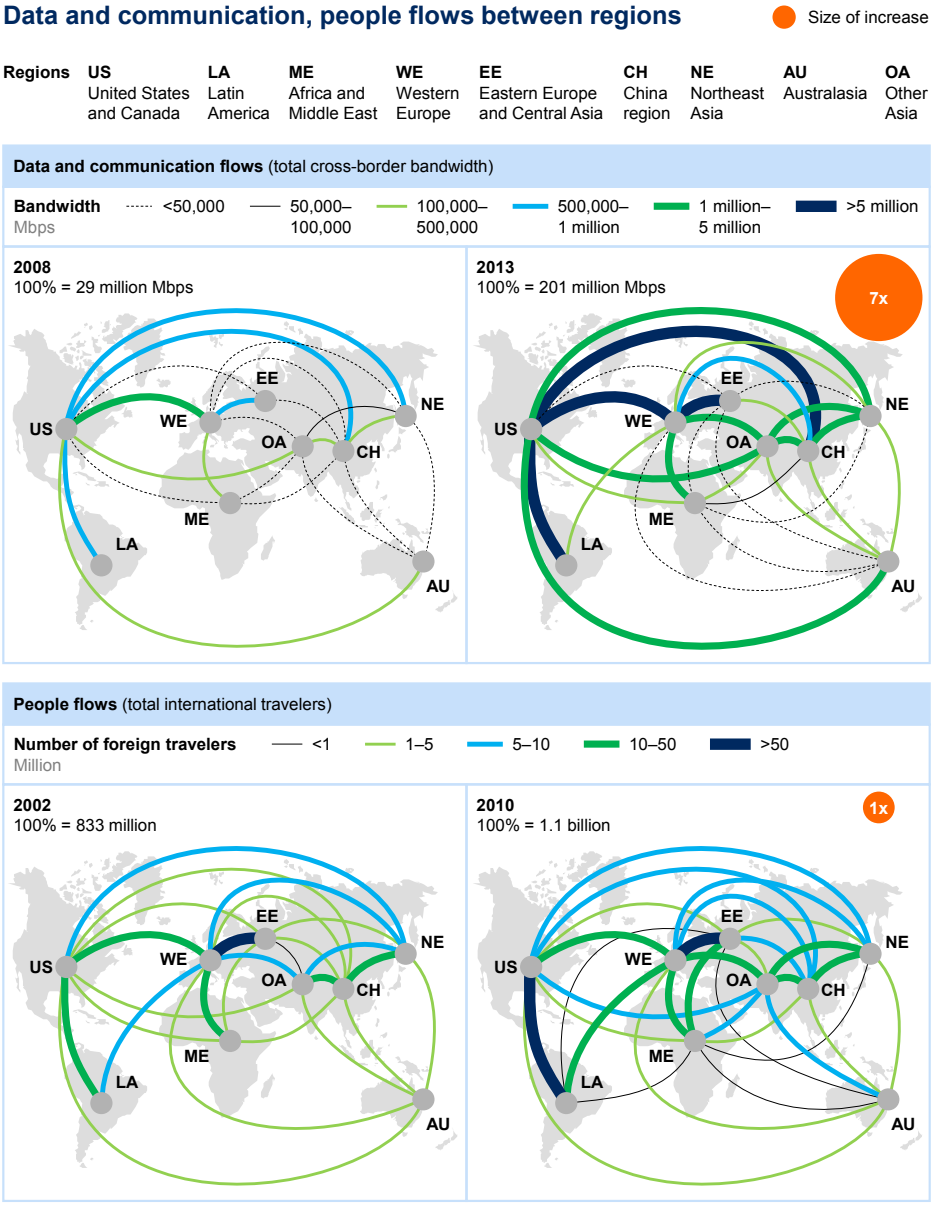


1 2001 services flows are estimated based on 55 percent coverage with a bilateral data set.
2 2011 services flows are estimated based on 61 percent coverage with a bilateral data set.

SOURCE: Comtrade; IMF Balance of Payments; World Development Indicators, World Bank; McKinsey Global Institute analysis

Exhibit 18

Data and communication, people flows between regions



SOURCE: Telegography; World Trade Organization; McKinsey Global Institute analysis

The global network of goods trade is the most complex and dispersed, and it has the deepest connections between countries. Three out of every four countries around the world increased their ratio of goods trade (imports and exports) relative to GDP between 1990 and 2011. At the same time, the share of global trade flowing through the largest trade routes has been declining as trade in small and medium-sized routes has gained share. In 1990, the top 50 goods trading routes accounted for 63 percent of global goods trade; by 2011, that share had fallen to 54 percent.

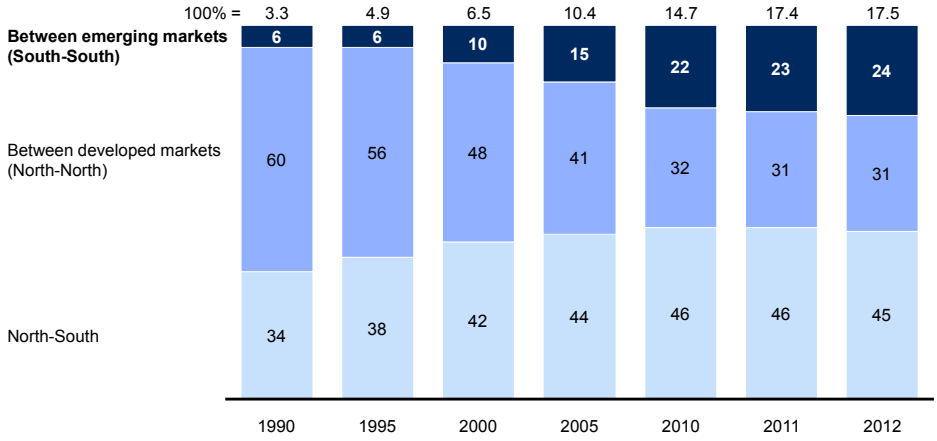
The share of trade between advanced economies—North-North trade routes—declined from 57 percent in 1990 to 28 percent in 2012. Over the same period, trade between developing economies—South-South routes—increased from just 6 percent to 24 percent (Exhibit 19). Nevertheless, the largest economies still dominate goods flows. Of the ten largest goods trading routes in 2011, only two did not include the United States or China.

Exhibit 19

Goods trade among emerging markets ("South-South") has quadrupled its share of global goods trade since 1990

Goods trade among countries

%; $ trillion



NOTE: Numbers may not sum due to rounding.
SOURCE: Comtrade; McKinsey Global Institute analysis

The global network of trade in services is much less dense than that of goods, reflecting the smaller amount of services flows. One reason is that there is more services trade within regions than between regions. Furthermore, a significantly lower share of services can be considered tradable, which reduces the size of the global services network. Nevertheless, as we have discussed, digitization has begun to significantly broaden the types of services that are tradable, and this will continue to reshape global services trade.

Despite these barriers, services flows are growing. Two out of three countries increased their ratio of services trade to GDP between 1990 and 2011. Emerging economies have increased their share of global trade in services over the past decade but still lag significantly behind developed economies. The share of North-North trade routes in total global services flows declined from 79 percent in 2000 to 70 percent in 2011. Over that period, three new North-South routes entered the top 20, reflecting services trade between the United States and China, India, and Brazil.

The global network of financial flows has grown more strongly connected since the early 1990s. Nearly half of the countries in the world experienced an increase in financial flows relative to GDP between 1993 and 2011, and seven out of ten countries did so between 1993 and 2007.[61] The dispersion of that network has increased significantly. The top 20 FDI routes now account for 33 percent of total flows, down from 47 percent in 2002. Several important routes have emerged, mainly connecting Asian regions with each other and with Latin America and the Middle East and Africa region. Several routes strengthened relative to global GDP, including those connecting Western Europe with Eastern Europe, China, and the Middle East and Africa; those connecting the United States and Canada with Other Asia (which includes Southeast Asia and South Asia); and connecting China with other Asian countries.

Two extremes are apparent in the network in people flows. The international travel network is among the most dispersed of all global flow networks, as demonstrated in Exhibit 18, even though the overall volume of passengers has grown only modestly. Airline travel capacity between developed markets declined to just 40 percent of the total airline capacity in 2011, and emerging economies have become major participants. Several new important travel routes have emerged since 2002, connecting the Middle East and Africa region with Latin America, Northeast Asia, and Australasia. Many existing routes were strengthened, including Western Europe's connections to China, other Asian countries, and Latin America, as well as routes between the United States and Latin America and between Northeast Asia and Other Asia.

In contrast to international travelers, flows of students are the most highly concentrated type of all major global flows. Only five countries—the United States, the United Kingdom, France, Australia, and Germany—attract two-thirds of all students who study abroad, and just 13 countries account for 50 percent of all students sent abroad. Among sending countries, China and India together account for 28 percent of the total—21 percent and 7 percent, respectively.

Of all flows, the network of global data and communication flows is developing and dispersing the fastest. It is clear from the map of interregional bandwidth in 2008 and 2013 shown in Exhibit 18 that every major route has increased dramatically and that all routes have become more connected. Concentration among major routes is declining. In 2006, the top 20 routes accounted for just over one-third of online traffic; by 2013, that share was down to less than one-quarter at 24 percent. In 2002, the United States was indisputably the global center of the online traffic network. A decade later, however, Western Europe—notably the United Kingdom, Germany, and the Netherlands—had overtaken it by developing into the hub for Eastern Europe and the Middle East and Africa.[62] The rapid expansion of bandwidth penetration across the world has been a driving force behind greater global connectivity. Across 74 countries that we examined, broadband penetration on average increased from 27 percent of households in 2007 to 47 percent in 2012. All told, more than 2.3 billion people had consistent Internet access in 2013.[63]

61 We include only the countries where data are available.

62 Hyunjin Seo and Stuart J. Thorson, "Networks of networks: Changing patterns in country bandwidth and centrality in global information infrastructure, 2002–2010," *Journal of Communication*, volume 62, number 2, April 2012.

63 *Measuring the information society 2012*, International Telecommunication Union, March 2013.

The share of global flows within and between regions varies by type of flow

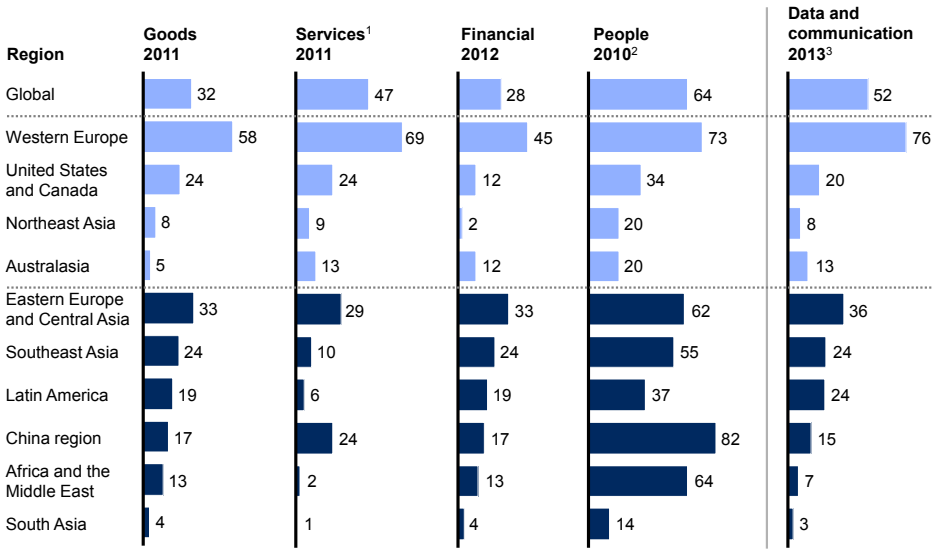
The proportion of global flows that take place within a region rather than between countries in different regions varies significantly by type of flow, as well as by region. For instance, while 72 percent of financial flows occur between countries in different regions, only 36 percent of people flows are between regions (Exhibit 20).

Exhibit 20

The level of intraregional exchange varies across regions, and financial flows are less intraregional than other flows

Share of cross-border flow activity that occurs intraregionally

%



1 Data coverage on bilateral service is 61 percent of all cross-border services flows.
2 Measured by number of travelers.
3 Measured by Internet bandwidth.
SOURCE: World Development Indicators, World Bank; Comtrade; IMF Balance of Payments; World Trade Organization; Telegeography; McKinsey Global Institute analysis

Intuitively, one might expect a large share of services to be traded within regions because services tend to be more tied to their location—and it is, indeed, the case that almost half of all global services flows are intraregional, a higher share than goods or finance. However, this is not the case for all regions. Eastern Europe and Latin America are examples of regions that largely trade in services with other regions, reflecting the increasingly important role of Poland and Costa Rica in services trade, for instance.

The flow of online traffic remains surprisingly concentrated within regions as well. This is particularly true in Western Europe, although much less so in the United States and Canada. One reason that online traffic still tends to take place largely intraregionally is that regional hubs and content distribution networks have emerged with higher data delivery speeds, reducing the need to transmit data over long, interregional distances. Another reason is that cultural and language barriers still stand in the way of the fully free flow of data and communication.

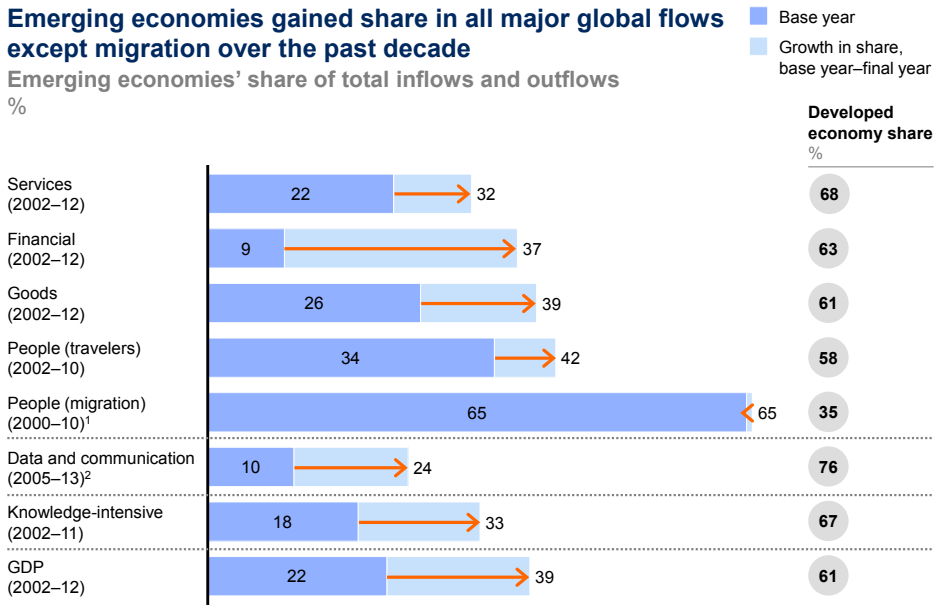
The soaring participation of emerging markets has driven the dispersion of networks

Emerging markets have made substantial strides in their participation in most global flows over the past decade. Their share of global goods in 2012 was 39 percent; for financial flows, it was 37 percent. Both are broadly in line with their 39 percent share of global GDP. However, these nations still lag behind somewhat in services trade and in flows of data and communication through Internet traffic and international phone calls. Although emerging markets are the source of the majority of long-term migrants and nearly half of global travelers, their share is still far lower than their 86 percent share of the world's population (Exhibit 21).

Exhibit 21

Emerging economies gained share in all major global flows except migration over the past decade

Emerging economies' share of total inflows and outflows
%



1 Emerging economies accounted for 65.4 percent of migrants in 2000 and 64.7 percent in 2010.
2 Measured by cross-border bandwidth.
SOURCE: IHS Economics & Country Risk; Comtrade; Telegeography; IMF Balance of Payments; World Development Indicators, World Bank; McKinsey Global Institute analysis

Emerging markets have a strong presence in the flow of goods. Their share of the global total increased from 26 percent in 2002 to 39 percent in 2012. Although emerging markets tend to be known as large exporters of commodities and labor-intensive manufactured goods, in fact they are active on both sides of trade, accounting for 41 percent of global goods exports and 38 percent of global imports. In absolute terms, they imported $6.6 trillion of goods in 2012 and exported $7.0 trillion. If we exclude trade in commodities and natural resources, imports were $4.3 trillion and exports $4.2 trillion. Emerging markets' goods imports and exports each grew at a rate of 13 percent a year between 2002 and 2012.

One notable indicator of the increased participation of emerging markets in global goods trade has been the shift in the location of the world's largest shipping ports away from developed markets. In 1970, the top 25 percent of the world's ports were in developed economies; by 2011, nearly half of the top 25 were in emerging economies, many of them in Asia (see Chapter 5 for a discussion of shipping).

The economic renaissance of China is a major factor in the increasing participation of emerging markets in global trade. China alone accounts for 12 percent of global goods exports and 10 percent of imports—nearly one-third of total emerging-markets trade. Seven of the top 20 trade routes in the world involve an emerging market, and six of those seven include China.

Emerging markets are also playing a growing role in global financial flows, both as recipients and as sources. Financial flows into emerging markets now account for 37 percent of total financial flows, up from just 7 percent in 1990. Between 2002 and 2012, financial inflows and outflows involving emerging markets grew by 22 percent yearly in the case of inflows and 20 percent a year for outflows. Although financial flows involving developed economies in 2012 were 75 percent below their 2007 peak, those involving emerging markets were down by only 25 percent.

Foreign investors have long flocked to emerging markets to benefit from their rapid economic growth and rising prosperity. Today, these markets are increasingly important investors in the global economy. Financial outflows from emerging markets accounted for 38 percent of the global total in 2012, up from only 3 percent in 1990. One type of financial outflow from emerging markets is the purchase of foreign reserve assets by central banks, which grew at 11 percent a year between 2002 and 2012. China's central bank is a key player. However, other types of financial outflows are growing quickly. FDI by emerging-market companies grew at a rate of 34 percent a year between 2002 and 2012. The second-fastest-growing type of financial outflow from emerging economies was lending by their banks, which grew at an annual rate of 31 percent during that period.

In contrast to flows of goods and finance, emerging markets account for a smaller share of global services trade at 32 percent of the global total. Moreover, services flows involving emerging markets grew more slowly than flows of goods between 2002 and 2012, only in line with growth in the GDP of these economies. Unlike goods trade, where emerging economy imports and exports are similar in terms of share of global imports and exports (both around 40 percent), emerging economies receive a far greater share of imports of services than the amount they are exporting—37 percent of global service inflows in 2012, compared with 27 percent of global service exports.

Within services trade, approximately 60 percent of both imports and exports are labor-intensive services. Knowledge-intensive services are growing rapidly in emerging markets' services exports. Emerging markets' share of labor-intensive service inflows of 42 percent is significantly higher than their share of knowledge-intensive or capital-intensive services, both around 25 percent. Since 2002, growth in inflows has been very similar for both labor- and knowledge-intensive services. However, for exports, knowledge-intensive services have grown significantly faster than any other subcategory and now represent more than one-third of services exports from emerging markets, up from 21 percent in 2002. The rise of various categories of services offshoring has been a key driver of this growth, especially in South Asia, Eastern Europe, and, in more recent years, Latin America.

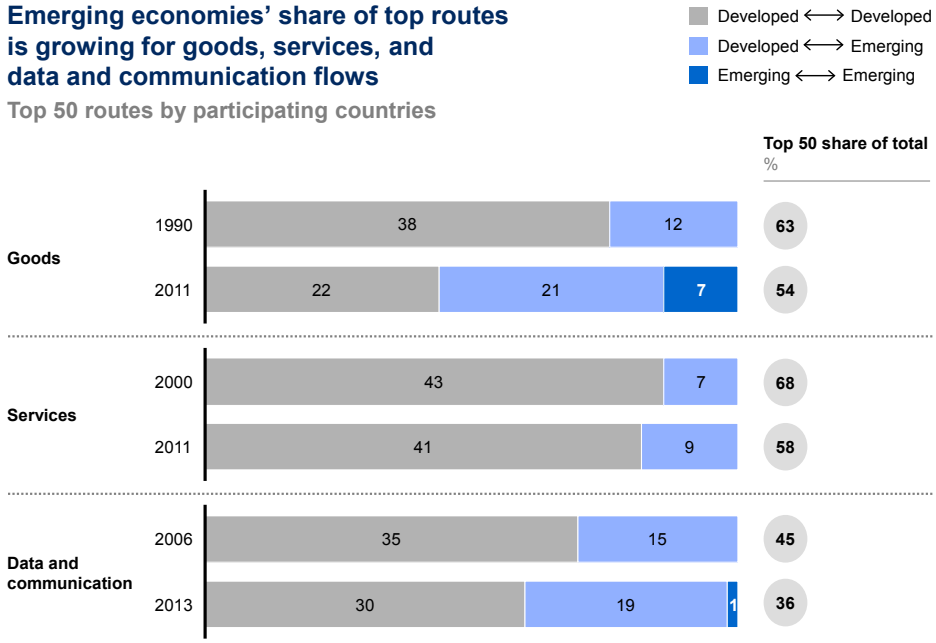
In the case of people flows, emerging markets are the source of about 85 percent of long-term immigrants, roughly equal to their share of the global population. Long-term immigration flows involving the emerging world are growing about 1.4 percent per year, only slightly faster than the world's population growth of about 1.3 percent per year. Emerging markets also account for the majority of students studying abroad, at 73 percent in 2011. The source of these students has shifted since 1999. As noted previously, China and India now send 21 and 7 percent of total students, respectively, to study abroad, up from just 7 and 3 percent in 1999. As compared to their share of students studying abroad, emerging markets' share of travelers is lower. These countries received 52 percent of international travelers in 2010 and were the source of just 32 percent of travelers.

As emerging economies become larger participants, the concentration of major routes in developed economies that characterized the cartography of global flows in the past is waning (Exhibit 22).

Exhibit 22

Emerging economies' share of top routes is growing for goods, services, and data and communication flows

Top 50 routes by participating countries



SOURCE: Comtrade; International Trade Commission; UN Services Trade; Telegeography; McKinsey Global Institute analysis

Emerging-market participation in data and communication flows lags behind that of developed economies

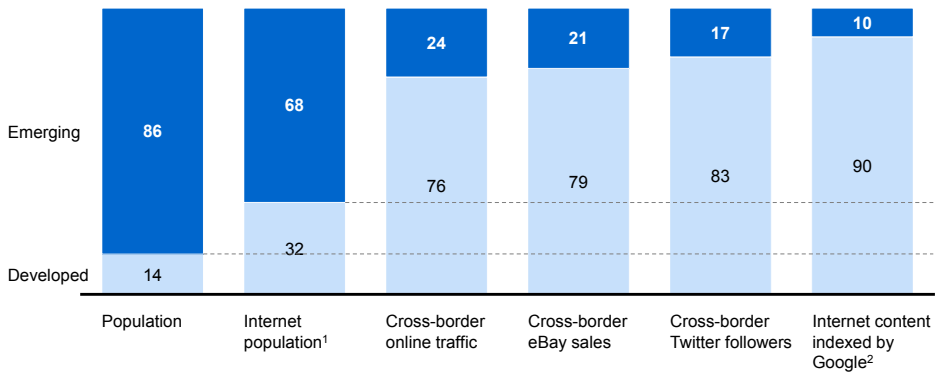
Despite expectations that the Internet would enable emerging markets to participate as fully in global networks as developed economies do, emerging economies still lag behind in their broadband and digital infrastructure and quality and affordability of access. Therefore, they also trail in their production and consumption of valuable data and communication flows (Exhibit 23). In 2013, emerging markets accounted for only 24 percent of global online traffic, up from 10 percent in 2005 but still far below their share of Internet users. In per capita terms, the developed world's lead is even larger. For example, per capita online traffic in Western Europe in 2013 was nearly 13 times that of online traffic in China and more than 20 times that of the Africa and Middle East region.

Exhibit 23

Emerging economies' share of Internet population is large, but their share of data and communication flows remains low

Population and Internet activity, 2012

%



1 We define Internet population as total country population multiplied by the broadband penetration rate of the country.
2 Total amount of user-generated content indexed by Google in 2009. The United States, Europe, and Japan created 90% of total content.

SOURCE: World Development Indicators, World Bank; International Telecommunication Union; Telegeography; eBay; Twtrland; *Geographies of the world's knowledge*, Oxford Internet Institute, 2012; McKinsey Global Institute analysis

Limitations to Internet access also means that there is still a large disparity in the prevalence of key online platforms between emerging and developed economies. For instance, 90 percent of Internet content indexed by Google online is generated by the United States, Europe, and Japan. In the case of Twitter, the developed world accounts for 74 percent of total accounts. However, if we broaden the scope of adoption of social networks to include domestic platforms—as opposed to cross-border use—such as China's Weibo and India's Babajob, this increases the penetration rate of such platforms dramatically.[64]

64 According to Sina, which owns Weibo, the platform's daily active users numbered more than 61 million in 2014.

This persistent digital divide has led to gaps in the level of economic output from the Internet between developed and emerging economies. MGI's 2011 *Internet matters* report found that the Internet's contribution to GDP growth had been significantly higher in the developed world.[65] Between 2004 and 2009, 1.5 percent of the GDP growth for the BRIC quartet of Brazil, Russia, India, and China was attributable to the Internet, compared with much larger shares for developed economies.[66]

This imbalance between developed and emerging markets in data and communication flows has persisted for a number of reasons. Insufficient broadband and digital infrastructure is the most important. Only three of the top 20 countries measured by broadband penetration were in the emerging world: Israel, Slovenia, and the United Arab Emirates. Low penetration has reinforced high bandwidth prices in emerging economies. For instance, global IP transit prices in Lagos are 21 times those in London. While prices have come down considerably over the past three years, the gap continues to be substantial.

In addition, many emerging economies do not have sufficient proficiency in English, the lingua franca of the Internet. The vast majority of the world's research is published in English, even in countries where English is not the primary language. For example, in Germany, the Netherlands, and Switzerland more research is published in English than in these countries' primary language. More broadly, education levels are significant enablers of information data and communication flows, and emerging markets lag behind developing economies in this respect.

□ □ □

Global flow networks are spreading as emerging markets become ever more important players in the world economy. Traditional routes are deepening and broadening, and many emerging regions are forging new routes. Data and communication flows promise significant economic benefits to emerging economies, but, thus far, these countries remain underweight in these types of flows. The imperative for them will be to build the infrastructure and the human capital that will enable them to overcome the digital divide that is constraining their growth today. In the next chapter, we look at the changing mix of participants in global flows.

65 *Internet matters: The Net's sweeping impact on growth, jobs, and prosperity*, McKinsey Global Institute, May 2011.

66 Ibid.


7:14pm on Time
12:48pm on Time
6:05pm on Time
3:08pm on Time
4:03pm on Time
7:55pm on Time
11:01am LANDED
1:06pm Delaye

4. More countries and cities are participating in global flows

A rich tapestry of countries and, within them, cities, is now taking part in cross-border commerce and exchanges. Their connectedness to global flows and their position in the network of flows—or their degree of centrality—varies enormously. To provide a detailed snapshot of how countries participate in global flows, we have created the McKinsey Global Institute Connectedness Index. In this chapter, we discuss the results of this research and how countries have performed over time. We provide case studies of seven countries with different modes of participating in global flows: Germany, the United States, Singapore, China, India, Brazil, and South Africa. We also offer a perspective on regional and city-level participation.

Connectedness is still strongest in the developed world, and Germany tops the ranking

The McKinsey Global Institute Connectedness Index builds on similar work measuring the degree to which different countries are connected to global activity.[67] But we believe our index offers a new perspective. Other measures of globalization have tended to focus on a country's level of trade or flows relative to GDP—a measure called flow intensity. However, in dollar terms, this leaves the world's largest trading and exchanging countries—the United States and China—looking comparatively closed because the diversity of these economies and the large size of their domestic markets mean that only a relatively small share of their economic activity is cross-border. Conversely, smaller countries such as Luxembourg or Singapore inevitably have larger flows of goods, services, and finance compared with the size of their economies. To account properly for a country's significance in world flows, we, therefore, also need to assess its global share of trade and exchange.

Our index evaluates the connectedness of a country by looking at both the size of its inflows and outflows relative to its GDP or population, and its share of global flows, drawing on a methodology developed by others.[68] Taking both measures into account corrects the tendency for small countries to rank high on trade intensity measures alone (Exhibit 24).

We looked at a total of 131 countries that have complete data for flows of goods, services, finance, immigration, and Internet traffic.[69] We ranked each country based on its connectedness in each flow. Our overall measure of connectedness

67 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.

68 Jay Squalli and Kenneth Wilson, *A new approach to measuring trade openness*, Economic Policy Research Unit, Zayed University, Dubai, working paper number 06–07, May 2006.

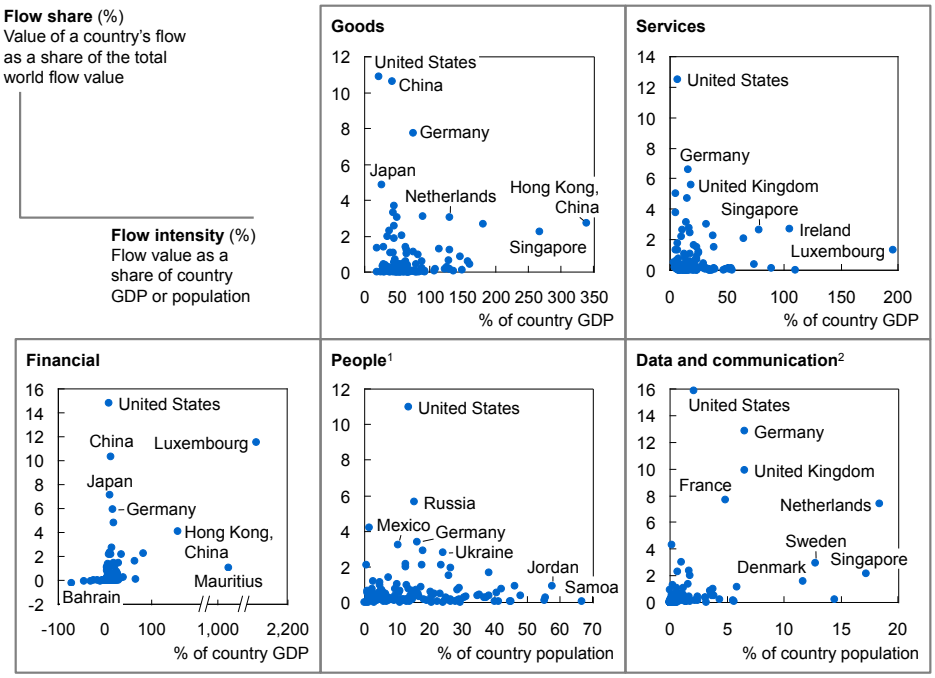
69 Note that Hong Kong is included even though it has no reported Internet traffic data. We make this exception because of Hong Kong's high level of connectedness on all other measures.

is the simple average rank across the five flows (for more detail, see the technical appendix). We used broadly the same methodology to assess the change in connectedness over the past two decades, focusing on 1995 and 2012. Only 106 countries report data for both years. Incomplete data also mean that we can look at connectedness for only four of the five types of flows in 1995, since cross-border Internet traffic statistics are not available before 2005.

Exhibit 24

MGI's new index assesses connectedness along two key dimensions

Overview of country connectedness by trade intensity and trade share of total global flow



1 Inflow and outflow of migrants in 2010.
2 Cross-border Internet traffic in 2013, measured as gigabits in an average second.
NOTE: Not to scale.
SOURCE: Comtrade; IMF Balance of Payments; World Development Indicators, World Bank; Telegeography; Jay Squalli and Kenneth Wilson, *A new approach to measuring trade openness*, Economic Policy Research Unit, Zayed University, Dubai, working paper number 06–07, May 2006; McKinsey Global Institute analysis

According to our index, the most connected country is Germany, which ranks in the top seven on all flows (Exhibit 25). As expected, some smaller countries are also highly connected. Hong Kong ranks second and Singapore fourth (the United States is third). The index reveals that, overall, developed economies tend to be more connected than emerging economies, with an average rank of 21st compared with 77th.[70] This gap between developed and emerging economies is slightly more pronounced in flows of data and communication (19th vs. 77th), reflecting disparity in Internet access—often called the digital divide. Despite clear differences in income and education levels, the magnitude of the gap is a surprise, given the potential that data and communication flows offer emerging economies to catch up with developing markets. Closing this gap will be vital if emerging economies are to participate more fully in the broad range of global flows. There is also a large gap between developed and emerging economies on flows of people, reflecting large flows of migrants into developed economies seeking work.

70 The sample size is 131 countries.

Exhibit 25

MGI Connectedness Index

Country connectedness index and overall flows data, 2012[1]

Rank of participation by flow as measured by flow intensity and share of world total

Economy: Developed, Emerging

Connectivity Index Rank: 1–10, 11–25, 26–50, 51+

Flow intensity[2]: 100+, 70–99, <70

Rank	Country	Change in rank, 1995–2012[3]	Goods	Services	Financial	People (2010)	Data and communication (2013)	Flows value[4] $ billion	Flow intensity %	Change in flow intensity, 1995–2012 %
1	Germany	1	3	5	7	5	2	3,770	110	+53
2	Hong Kong, China		1	4	3	14		1,437	546	
3	United States	-1	8	9	5	1	7	5,622	35	+2
4	Singapore	1	2	3	4	18	5	1,198	436	+8
5	United Kingdom	-1	13	6	9	7	3	1,471	60	-26
6	Netherlands	2	6	7	15	29	1	1,213	157	+39
7	France	-1	9	10	36	15	4	1,581	60	+8
8	Canada	-1	16	22	13	9	18	1,381	76	-3
9	Russia		19	30	16	2	21	1,277	63	
9	Italy	0	11	20	31	16	10	1,187	59	+4
11	Belgium		4	8	30	39	11	937	194	
12	Spain	0	21	12	35	12	12	932	70	+14
13	Switzerland	-1	23	16	11	28	17	851	135	+64
14	Ireland	2	29	1	23	23	24	476	226	+32
15	Sweden	0	28	15	17	45	6	573	123	+17
16	Saudi Arabia	19	20	29	19	8	44	729	103	+40
17	Australia	-1	32	34	14	11	30	813	53	+5
18	Malaysia	1	10	23	34	26	32	528	173	-29
19	Poland	5	22	31	28	34	22	478	98	+41
20	South Korea		7	14	25	58	34	1,393	123	
21	Japan	-1	14	24	10	82	15	2,652	44	+18
21	Austria	-10	24	17	62	33	9	424	107	+22
24	Luxembourg		63	2	1	69	16	1,432	2,594	
25	China	5	5	21	6	93	33	5,124	62	+8
27	Mexico	-6	17	67	22	13	48	921	78	+17
27	Turkey	-1	30	43	32	31	31	524	66	+14
30	India	16	27	13	26	47	64	1,131	61	+37
35	Greece	-2	59	27	44	27	41	265	106	+65
36	Thailand	-3	12	19	27	94	56	630	172	+55
41	Chile	9	42	54	20	95	36	261	97	+38
43	Brazil	15	39	40	18	115	38	757	34	+11
43	New Zealand	-3	61	59	58	25	47	106	63	0
47	Argentina	-6	55	60	53	59	40	200	42	+9
49	South Africa	4	43	50	49	56	73	242	63	+12
50	Estonia	3	54	46	74	76	26	54	241	+72
53	Morocco	26	57	42	79	41	63	91	95	+46
54	Latvia	1	66	69	77	54	27	41	143	53
56	Indonesia	-3	31	49	39	113	65	494	56	-2
63	Nigeria		36	57	33	114	90	267	102	
63	Egypt	-12	60	41	115	53	61	139	53	+2
78	Tunisia	-19	58	66	93	102	62	53	116	11
85	Pakistan	-30	68	81	117	61	79	78	35	-8

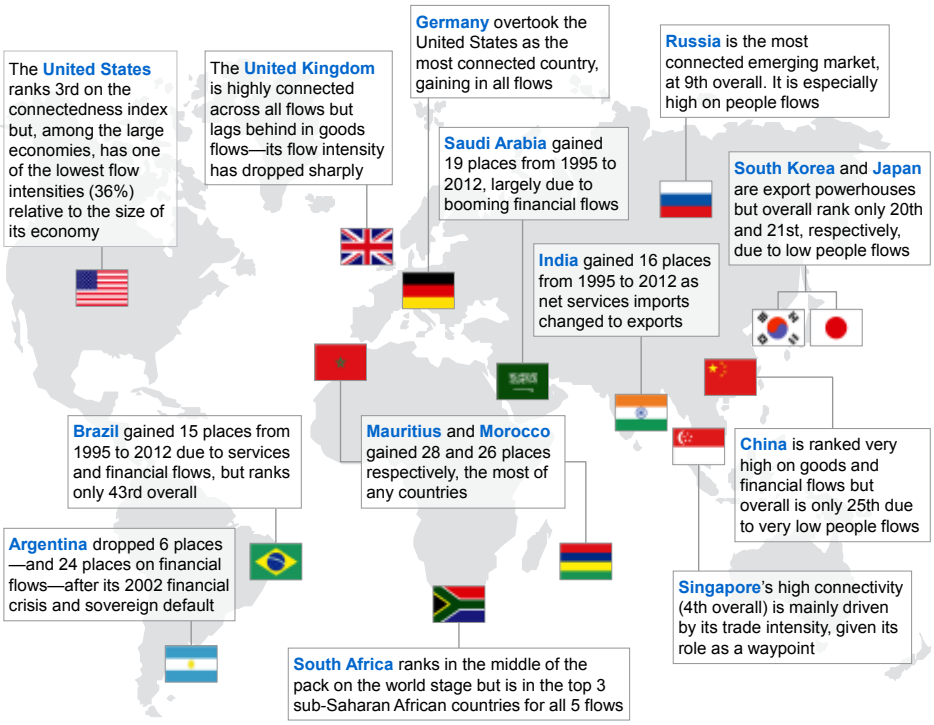
1 Index calculations use migrants data for people flows and cross-border Internet traffic for data and communication flows.
2 Flow intensity represents the total value of goods, services, and financial flows as a share of the country's GDP.
3 Change in rank calculations do not include data and communication flows, for which data are not available for 1995.
4 Flows value represents total goods, services, and financial inflows and outflows.
NOTE: Blank cells indicate unavailable data.

SOURCE: Comtrade; IHS Economics & Country Risk; World Trade Organization; Telegeography; World Development Indicators, World Bank; McKinsey Global Institute analysis

Looking at how connectedness has changed over the past 20 years, we find that the most connected countries in 1995 have broadly remained the most connected in 2012. Most countries have seen very little change in their ranking. However, some countries have made strong gains while others have lost ground, and the index reveals a few surprises (Exhibit 26).

Exhibit 26

Select findings from the MGI Connectedness Index: Changes and surprises for countries in their global flows participation



SOURCE: Comtrade; UNCTAD; IMF Balance of Payments; World Development Indicators, World Bank; McKinsey Global Institute analysis

Among those countries that have become more connected is Morocco. The country's ranking has increased second most between 1995 and 2012, rising 26 places on the index. Its connectedness to goods, services, and financial flows has increased, reflecting proactive government policy that has aggressively attracted FDI to develop services and automotive manufacturing offshoring, and has transformed agricultural productivity. Saudi Arabia gained 19 places, largely reflecting surging financial flows since 2000 as the kingdom has invested oil revenue overseas. India has gained 16 places over the past 20 years, driven in particular by its export of services but also due to its increased overall participation in the global economy linked to the country's economic reforms. Estonia and Lithuania boosted their ranking on services flows by 24 and 33 places, respectively, as they became significant net exporters of services.

Argentina is among the economies that have become less connected to global flows. It dropped 6 places between 1995 and 2012 overall and 24 places on financial flows after it broke the peso peg to the US dollar in 2002 and defaulted on government bonds. In the subsequent recession, Argentina's goods and services flows both fell five places. Hungary has dropped 21 places on overall connectedness since 1995 and 77 places on financial flows as the economy suffered a steep recession after the global financial crisis and foreign investors

withdrew capital. Austria, a waypoint for capital flows into Eastern Europe, was another victim of the global financial crisis and Eurozone turmoil, dropping ten places on its overall ranking and 26 places on financial flows.

Some countries have experienced significant swings in the direction of flows. India was a net services importer until 2004, but it has since become a services exporter. In goods flows, Singapore shifted from a net inflow of 22 percent of GDP in 1990 to a net outflow of 11 percent in 2012.

Regions differ in their level of connectedness

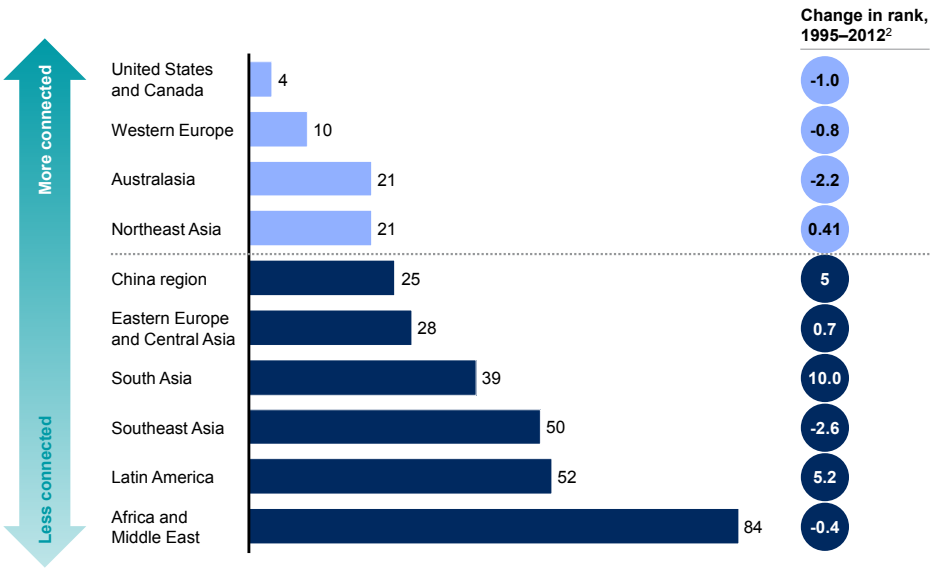
Taking a regional perspective, we find that the United States, Canada, and Western Europe are the most connected of the regions examined (Exhibit 27). This arguably reflects the fact that they are part of very large, formal, regional trade blocs (see Box 3, "The role of regional trade blocs"). Australasia and Northeast Asia—both developed-world regions—are strongly connected to goods, services, and financial flows. On people flows, Australasia is relatively more connected and Northeast Asia relatively less connected, which is likely to reflect the more restrictive immigration policies of the latter. All of these developed-world regions have marginally lost ground to emerging regions in terms of the average change in rank across their constituent countries.

Exhibit 27

Developed regions rank high in overall connectedness

MGI Connectedness Index, 2012[1]

Average country rank by region



1 Country ranks are overall ranks cross all flows by country. Regional ranks are calculated as the average across countries, weighted by countries' population.
2 Change in rank is calculated as the difference between the average rank in 1995 and 2012, calculated across four flows: goods, services, financial, and people, weighted by countries' population

SOURCE: Comtrade; IMF Balance of Payments; World Development Indicators, World Bank; McKinsey Global Institute analysis

The emerging regions that most improved their overall connectedness to flows over the past two decades were South Asia, Latin America, and China. Other emerging regions have made up less ground, and their relative level of connectedness has remained broadly flat. Southeast Asia has experienced a decline in relative connectedness, especially in goods and services trade.

Despite their recent changes, Latin America and the Africa and Middle East regions remain the two least connected regions. In Africa and the Middle East, there were strong gains by Mauritius (gain of 28 places), Morocco (gain of 26), Oman (gain of 25), and Saudi Arabia (gain of 19). While those gains are large, many other countries in the region had significant declines in rank, including Yemen, with a decline of 22, and Tunisia and Malawi, with a 19-place and 17-place fall, respectively.

Box 3. The role of regional trade blocs

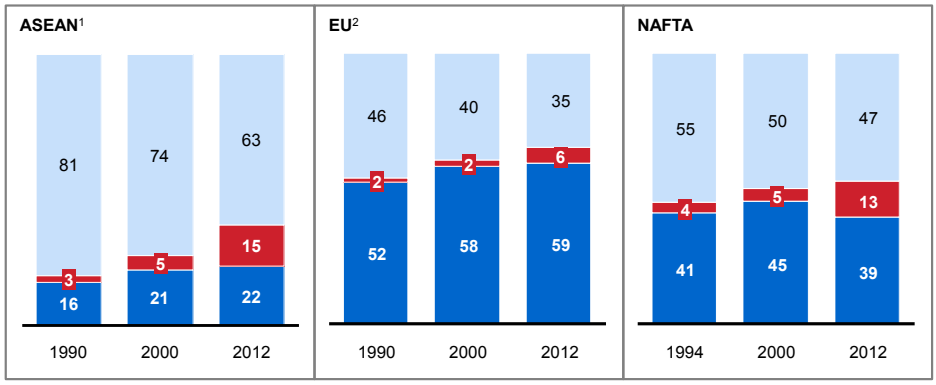
Academic research shows that being part of a formal trade bloc—an intergovernmental agreement to reduce or eliminate regional barriers to trade—has increased both the level and the impact of global goods trade.[1] However, our data show that the intensity of intraregional trade within the main trading blocs varies widely (Exhibit 28).

Exhibit 28

The level of intraregional trade varies across the three major trading blocs

Trade within and outside of trading blocs

Share of total goods trade (%)



1 ASEAN has ten member countries and does not include China.
2 EU includes EU-15 countries in 2000, and EU-27 countries in 2012.
NOTE: Numbers may not sum due to rounding.
SOURCE: Comtrade; McKinsey Global Institute analysis

The EU is the most integrated trading bloc. Almost 60 percent of its total goods trade was intraregional in 2012 compared with 52 percent in 1990. Trade between the United States, Canada, and Mexico was 41 percent of all trade in these economies in 1994, when NAFTA came into effect, and peaked at 45 percent in 2000. However, that share fell back to 39 percent in 2012 as NAFTA's constituent countries began to trade more actively with China, which increased its share of total NAFTA trade from 5 percent to 13 percent as it captured a share of NAFTA low-cost production from Mexico. Trade between the Association of Southeast Asian Nations (ASEAN) group of countries remains far lower than trade within the EU and NAFTA at just 22 percent of their value of total trade in 2012, modestly higher than the 16 percent share in 1990. However, over the past decade, there has been little progress in boosting intraregional trade.

1 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*, World Trade Organization, 2011.

Countries can successfully participate in flows as generalists, specialists, or waypoints

Drawing on the findings of the McKinsey Global Institute Connectedness Index, we have looked at three broad ways that countries participate in global flows: as generalists, specialists, and waypoints or intermediaries. In this section, we profile seven countries that illustrate these archetypes today—or could illustrate them in the future.

Generalist countries have broadly balanced participation in all flows. Germany and the United States, large developed economies that we discuss in more detail below, both rank in the top ten on all five types of flows. Russia, Malaysia, and Poland are all large emerging economies whose participation in flows is roughly balanced across the five types but at a slightly lower rank than their developed-world counterparts.[71] We also discuss Brazil, which has relatively lower participation in flows but could follow the generalist model, and South Africa, another aspiring generalist with a significant role in its region.

Specialist countries are disproportionately more connected to one or two of the five flows. They can be large or small economies, and they can originate or receive flows. India, which we discuss in this chapter, is at least 13 places higher in services flows than the other four flows. We also profile China, which we classify as a specialist because of the spike in its participation in goods flows. Mexico's connectedness on flows of goods and migrants is at least 50 places higher than its connectedness in services. New Zealand's rank in people connectedness is ten to 20 places higher than its rank in goods, services, or financial flows.

Relatively small economies that rank high on their participation in flows tend to be waypoints. They do not originate or receive large flows for domestic consumption but, rather, channel and redistribute flows from many sources to many destinations, building leading positions as hubs. We profile Singapore, which is highly connected across all flows but most prominent in goods trade. Other examples include the Netherlands, which is a major hub only for data and communication flows; Belgium, a significant waypoint for flows of goods and services; and Luxembourg, notable for financial and services flows.

71 Russia and Malaysia have particular strengths in connectedness to people and goods flows, respectively.

GENERALIST: GERMANY

Germany is in the top seven on all five flows and ranks as the most connected country in the global economy. This makes the German economy a strong generalist. Through its strength in advanced manufacturing, Germany has built a leading position in knowledge-intensive goods flows, buoyed by its central position in the EU Single Market and underpinned by a supportive government approach to industrial and trade policy, human capital, and infrastructure investment. Together with this enabling public-policy environment, Germany's sophisticated innovation capabilities and advanced business ecosystem have extended the economy's strength in other flows.

Germany is currently the world's third-largest exporter, and its goods trade as a share of GDP stands at 75 percent today. Around half of Germany's trade is with EU partners. However, China and the United States are its third- and fourth-largest trade partners, accounting for 20 percent of its total trade in goods.[72] In value terms, knowledge-intensive goods flows were valued at 60 percent relative to Germany's GDP in 2012, up from 43 percent in 2002. Also in 2012, Germany overtook China as the economy with the largest goods trade surplus at $241 billion, or 7 percent relative to its GDP, largely due to its surplus in knowledge-intensive goods. Germany has particular strength in motor vehicles, machinery, electrical equipment, and chemicals. The automotive industry accounted for approximately one-fifth of total goods exports in 2012. Germany's position is also due to its high inflows, particularly of commodities; it is the world's sixth-largest primary energy consumer, and in 2012, more than one-quarter of Germany's goods imports were primary commodities.[73]

Germany's strength in goods flows is partly due to the strong position of its SMEs—or *Mittelstand*—in the industrial sector. German manufacturing is unique in the predominance of these SMEs, which have found successful niches for their products and account for more than half of net value added in the economy. In 2010, the German *Mittelstand* contributed nearly 20 percent to Germany's goods and services exports by German firms, up 30 percent from 2000.[74] Germany's *Mittelstand* are typically family-owned, highly specialized, deeply integrated into global value chains, and heavily invested in innovation. The *Mittelstand* is part of Germany's social-partnership model in which wage negotiations between employers and trade unions are a genuine collaboration. This system has been credited with helping to reduce inflation in Germany's unit labor cost compared with other EU economies. Germany's apprenticeship and vocational training systems are important in cultivating the talent needed for its advanced manufacturing sector, according to Germany Trade & Invest.

Germany's central location in Europe and sound economic fundamentals also mean that it ranks highly on services and people flows. In services flows, travel and transportation have accounted for almost 50 percent of the total value since 2000. With respect to people flows, Germany is a major destination for both migrants and international students. In 2011, 12 percent of the German population was born outside of the EU and an additional 9.4 percent were born outside the country but within the EU, according to Eurostat. In 2011, UNESCO reported that

72 *Ranking of Germany's trading partners in foreign trade*, Statistisches Bundesamt, 2013.

73 International Energy Agency Database, 2011.

74 *German Mittelstand: Engine of the German economy*, Federal Ministry of Economics and Technology, Germany, July 2013.

Germany was the sixth most popular destination in the world for college-level international students.

On data and communication flows, Germany ranks second. In 2013, its cross-border Internet traffic, adjusted for population, was double the developed economy average. Its success here is partly due to Germany's heavy investment in telecommunications infrastructure and liberalization of its telecommunications market.

One factor underlying Germany's success in participating in global flows is the high quality of its infrastructure, including a well-developed network of airports, high-speed railways, highways, and sea ports. In its 2013–14 global competitiveness rankings, the World Economic Forum judged Germany to be in third place for the quality of its infrastructure.[75]

GENERALIST: THE UNITED STATES

The United States ranks third in our connectedness index in 2012, one spot below its rank in 1995. It is in the top ten for all flows, making it a generalist. This is unsurprising given that the US economy is the largest source of consumption in the global economy and is at the center of global flows of finance, services, and data and communication. The United States also ranks highest in flows of people, reflecting its openness to immigration and its ability to attract a steady flow of international talent.

Its supportive business environment, well-developed financial markets, leadership in innovation, and strong legal and political institutions create a sturdy foundation for US participation in global flows. The country has also made a concerted effort to reduce the costs of and barriers to international trade with 20 bilateral free-trade agreements with nations around the world.[76]

Until 2012, when it was surpassed by China, the United States was the largest participant in flows of goods trade for many decades. As the world's largest consumer market, it remains the world's biggest importer of goods. Unlike other advanced economies, the United States is a major importer of R&D-intensive goods such as cars and computers and runs a trade deficit in R&D-intensive goods.[77] R&D-intensive manufactured goods also account for more than half of US goods exports, with machinery, electrical and high-tech goods, and medical goods alone worth nearly one-third of total exports. The United States continues to rely on imports to cover its energy needs; petroleum, natural gas, and nuclear-fuel imports accounted for nearly one-fifth of total imports in 2012, although the current boom in shale gas and tight-oil production could reduce US energy import requirements.

The United States has been a net exporter of services for more than three decades. With leading positions in business, technology, and finance, it has a particularly strong record on exports of knowledge-intensive services. Exports of professional services and financial services account for one-third of all US service exports. US-generated entertainment, media, and online content is

75 *Global Competitiveness Index 2013–14*, World Economic Forum, 2013.

76 The United States Trade Representative Office.

77 *Game changers: Five opportunities for US growth and renewal*, McKinsey Global Institute, July 2013.

eagerly consumed by people all over the world and helps support the country's services trade surplus. Payments of royalties and license fees for copyrighted content account for more than 20 percent of all service exports, compared with an average of 8 percent for other developed economies.

It is no surprise that the country ranks high on financial flows—fifth overall—with the dollar as the world's reserve currency, New York as a global financial hub, and the country home to the headquarters of 17 of the world's 50 largest companies. In 1990, US capital inflows and outflows were valued at less than 4 percent of GDP. By the peak of the credit bubble in 2007, they were equivalent to 26 percent of GDP, almost equaling the value of total US trade in goods and services combined. Inflows of bonds and private-sector lending accounted for 42 percent of total capital flows compared with the global average share of 35 percent. Total US capital flows have since declined by 80 percent, with the largest percentage decline in equity. In 2012, total capital flows were $716 billion, or 4.4 percent of GDP. Still, the United States remains the third most attractive destination for FDI, after China and Luxembourg, and this may accelerate as the shale boom attracts additional investment.

The United States remains a magnet for those seeking economic opportunity and the chance to study at some of the world's best academic institutions. From 2000 to 2011, on average, the United States attracted more than one-quarter of the world's flow of college-level international students. In 2013, some 800,000 international students were attending US colleges and universities.[78] In 2010, the total of foreign-born migrants in the United States reached 40.3 million, twice the number in 1980 and more than one-fifth of the world's total migrants. Foreign-born migrants contribute significantly to the US innovation ecosystem; they lead one-quarter of the science and technology companies established between 1995 and 2005 and have founded more than 50 percent of startups in Silicon Valley.[79] Today, 14 percent of the US population is made up of immigrants, compared with a global average of around 3 percent.

US high-tech companies have created many of the major Internet-based platforms, from search engines to social media, that are powering worldwide flows of data and communication. In 2011, the United States accounted for the greatest share of international telephone call minutes worldwide, equaling the total of the next three countries combined. Our index ranks the United States seventh on connectedness to data and communication flows.

Despite its strength in connectedness across major flows, the US benchmarks low on flow intensity even in comparison with other large economies. China, for example, is almost twice as flow-intensive, at 62 percent, as the United States, at 35 percent. With a flow intensity of 110 percent, Germany's reading is more than three times that of the United States. This may indicate significant further potential for the United States to expand its participation in flows.

78 *Open doors report on international exchange*, Institute of International Education, November 2013.

79 Vivek Wadhwa, *Foreign-born entrepreneurs: An underestimated American resource*, Kauffman Thoughtbook 2009, The Ewing Marion Kauffman Foundation.

ASPIRING GENERALIST: BRAZIL

Brazil has the potential to be a generalist in global flows, but today the country has a much lower level of connectedness overall than other generalists and emerging-market peers. Given its large population, growing consumer class, and endowments of natural resources, Brazil is surprisingly unconnected to the global economy. It ranks 43rd in our index, barely in the top third, and lower than India, China, Russia, or Mexico, countries to which it is often compared. While the country ranks relatively high in financial flows, at 18th, it places around 40th on flows of goods, services, and data and communication flows, and only 115th out of 131 countries on people flows. However, Brazil has become more connected, rising 15 places overall since 1995. Brazil's high participation in global financial flows is explained mainly by FDI and cross-border loans and deposits. Cross-border loans and deposit flows have grown at an annual rate of 24 percent since 2002, with loans driving most of this growth, and, by 2012, accounted for 40 percent of the country's total financial flows. Brazil continues to attract significant FDI, which, while not growing as fast as loans, accounts for 44 percent of its total financial flows. FDI inflows go mainly into commodity sectors such as mining and petroleum, although investment in services and automotive manufacturing is also increasing. Brazil is today the world's seventh-largest automaker, and motor vehicles contribute 6 percent of exports.

Brazil's openness to financial flows has been a mixed blessing. Inflows into Brazilian bonds grew sharply over the past five years as central banks in the United States, the United Kingdom, and Japan embarked on quantitative easing; interest rates in those countries fell to historic lows while Brazil's real interest rate remained relatively attractive. Total inflows into bonds averaged negative $0.7 billion between 2000 and 2006 but grew to an average of $15 billion between 2007 and 2012. In 2011, Brazil imposed a tax on short-term capital inflows to avoid unwanted currency appreciation. Since then, some of that money has flown out of the country as the US Federal Reserve has begun tapering its quantitative easing support. Overall volatility of the Brazilian real has increased markedly since 2008.

In other flows, Brazil's participation is much lower. Its goods flows remain dominated by commodity sectors, thanks to vast agricultural land and natural endowments that enable the country to run a small trade surplus. Agricultural products, beverages, metal ore, and basic metals accounted for nearly 40 percent of Brazil's exports in 2012. However, the success of Brazil's commodities trade has not always been positive for other sectors because it has put upward pressure on the value of the Brazilian real. Indeed, while other emerging markets are increasingly moving toward the production of more complex products, Brazil's economy is increasing its reliance on resource-intensive and commodity products.[80]

80 MIT Observatory of Economic Complexity, 2011.

Brazil's services trade is limited. The country has the lowest services trade intensity of all BRIC economies, around 5 percent of its GDP. About half of all services exports are professional services, and 30 percent is tourism-related travel and transportation services. Services trade may be hampered by Brazil's relatively low ranking on Internet data flows. Brazil is becoming more connected to the global network of data and communication flows but at a slower pace than the average for emerging economies. Its cross-border Internet traffic has increased by 49 percent per annum since 2007, compared with an average of 64 percent for all emerging economies. Language barriers may help explain these limitations as most of the country speaks Portuguese rather than the Spanish of its Latin American neighbors. Brazil also benchmarks low on proficiency in the English language.[81]

Brazil's very low ranking on people flows is surprising given its heritage as an immigrant country. In the early 1900s, more than 5 percent of the Brazilian workforce was foreign-born, while today that figure stands at less than 0.5 percent. This appears to reflect significant barriers to migrants obtaining work permits, and perhaps language barriers as well. In addition, few Brazilians emigrate abroad compared with other countries, such as Mexico or India.

Looking across flows, Brazil's history of protectionism—as successive governments sought to control the flow of goods and services to strengthen domestic industries—has hampered its participation. A ban on computer goods imports introduced in the late 1970s was designed to incubate the country's nascent domestic computer industry, for instance. Overall, Brazil maintains relatively high and volatile tariffs and taxes. Its mean tariff rate was 7.9 percent in 2011, which was the highest of any BRIC economy.[82] Because Brazil is part of the Mercosur Latin American trading bloc, its tariff rate is stipulated to be the same as other members with exceptions made for 100 chosen products. Brazil's 100 exceptions include knowledge-intensive consumer goods such as cell phones, telecommunications equipment, computers and printers, and certain chemicals and pharmaceuticals. Brazil's complex tax system also increases the prices of imports.[83] In 2011, for instance, the government imposed a 30 percent increase on the base price on foreign vehicles.[84]

Brazil's infrastructure capacity and business environment do not fully support flows either. Brazil's investment in transportation infrastructure as a share of GDP has fallen steadily for decades, from around 5 percent in the 1970s to around 2 percent in the 2000s.[85] This has resulted in the World Bank ranking Brazil only 124th in the world for ease of trading across borders. Similarly, the country's credit downgrade by Standard and Poor's in March 2014 reflected waning investor confidence in Brazil and suggests its ability to continue to improve its connectedness through attracting global flows is under threat.

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81 English Proficiency Index website.

82 The rate is the average weighted mean tariff rate of all products; World Bank.

83 Office of the United States Trade Representative.

84 The tax increase was implemented under the Industry Product Tax, a domestic tax category. However, the vehicles affected are those that do not meet Brazil's stipulation that a minimum of 65 percent of components need to be sourced domestically, essentially targeting foreign vehicles.

85 *Brazil infrastructure: Paving the way*, Morgan Stanley Blue Paper, Morgan Stanley Research Global, May 5, 2010.

ASPIRING GENERALIST: SOUTH AFRICA

South Africa has a balanced profile of connectedness across major flows but ranks in the middle of the pack at 49th overall in 2012, four places higher than in 1995. However, South Africa has emerged as an important hub for the sub-Saharan African area, where it ranks in the top three across all flows and is top-ranked in its connectedness to flows of services and data and communication.

South Africa has made significant efforts to develop connections around the world and especially within Africa, where it has played a leading economic role. After the end of apartheid and the lifting of economic sanctions in 1994, the country established trade agreements and partnerships with the EU in 1999 and with the Southern African Development Community in 2000. More recently, South Africa has established trade partnerships with large emerging markets, including Brazil and India in 2006 and China in 2007 and 2010. As a result, the share of South Africa's total goods trade with the EU and the United States fell from 52 percent of its total trade in 2002 to 33 percent of its total trade in 2012. Its share of trade with China tripled, from 4 percent to 13 percent, and the share of its trade with India also tripled, from 1.3 percent to 4.4 percent.

Given South Africa's relatively high per capita GDP, its large base of private-sector companies, and its strong institutional framework, the country has also emerged as a leading player in intraregional flows in sub-Saharan Africa, with 16 percent of manufactured goods exports going to neighboring countries. Seventeen percent of the value of South Africa's goods and services trade is with the rest of Africa. Large South African companies such as SABMiller, MTN, Shoprite, and Standard Bank are expanding into other sub-Saharan African markets. This strength in its region means that foreign companies seeking exposure to the rest of Africa often choose to invest in South African companies. For example, Walmart's acquisition of Massmart in 2011 gave it access to 13 other African markets.

The value of South Africa's goods trade stood at 47 percent of GDP in 2012, half of which were commodities such as iron ore, diamonds, platinum, and coal. South Africa also has a significant foothold in manufacturing exports, and R&D-intensive goods exports totaled 6 percent of the country's GDP in 2012. South Africa's services trade was equivalent to 8.5 percent of GDP in 2012, largely driven by travel and transportation. However, South Africa also has the most developed equity market in the African continent as well as a well-developed banking sector. Its overall financial flows in 2012 were equivalent to 7.7 percent of its GDP, ranking South Africa 49th among 131 countries.

South Africa ranks 56th on people flows, the fifth-highest in the African region, behind Côte d'Ivoire, Burkina Faso, Egypt, and Morocco. This relatively high rank among African countries is mainly due to its location as the gateway to Africa. South Africa's combined annual flow of inbound and outbound travelers and international students are, respectively, 2.5 and three times the average of other African and Middle Eastern region countries adjusted for population. South Africa's people flows are also driven by outbound migrants, whose number increased by 180 percent between 1980 and 2010. Inbound migration increased by only 3 percent during the same period, although it remains higher than outbound migration in absolute terms.

South Africa underperforms the global average on its connectedness to data and communication flows but scores well in Southern Africa. The fixed broadband penetration rate is 25 percent among households and 41 percent among individuals, higher than all Southern African countries except Mauritius.[86] The country's High Court ruled in 2008 that telecommunication service providers could build their own network. That decision has stimulated investment in infrastructure, leading to developments such as the implementation of the West Africa Cable System in 2011.[87] However, Internet use is low due to South Africa's lack of data infrastructure, which causes Internet access to be expensive. The World Economic Forum ranked South Africa 95th out of 144 countries on its information and communications technology (ICT) infrastructure in 2013.[88]

SPECIALIST: INDIA

For an emerging market, India has average to high participation across all flows and ranks as the 30th most connected country overall, up 16 places from 1995. Given that India has high participation across flows, one might assume that it is a generalist. But we count India as a specialist because its participation in global services flows stands out so starkly. Over the past two decades India has succeeded in developing a major role in the global network of services flows while its participation in the other flows still trails behind.

In 2012, India ranked 13th in terms of connectedness to services trade, the highest ranking of all emerging markets on the index and higher even than Japan, South Korea, Canada, Italy , and some other developed economies. Services exports accounted for one-third of all Indian goods and services exports in 2012, even greater than the average share of developed economies at 24 percent. This growth in services exports is a relatively recent phenomenon (Exhibit 29). Only a decade ago, India ran a deficit on services trade. Its transformation into a global services provider has been primarily driven by knowledge-intensive industries. In 2002, inflows and outflows of knowledge-intensive services were roughly equal by value; by 2012, outflows of knowledge-intensive services were twice as large as inflows. Much of this growth has been in IT service exports including IT consulting, systems integration, call centers, and outsourcing of back-office functions. In 1998, these activities accounted for less than 20 percent of India's total services exports, but that share had risen to nearly 40 percent by 2012.

India was arguably the first major emerging market to be successful in a strategy focused on developing a services-export industry. Its rise as an IT and business process outsourcing (BPO) center in the mid-1990s and 2000s was built on a large, technically trained, English-speaking workforce and low labor costs. In 1988, India's technology industry came together to create the National Association of Software and Services Companies (NASSCOM), which has been a vocal advocate ever since. The federal government provided support by establishing software technology parks with high-quality infrastructure and offering significant long-term tax breaks to resident IT and IT services companies. Software and IT hubs emerged around Bangalore, Pune, and other cities that

86 *The state of broadband 2013: Universalizing broadband*, Broadband Commission, September 2013.

87 Arthur Goldstuck, *Internet matters: The quiet engine of the South African economy*, World Wide Worx, 2012.

88 Beñat Bilbao-Osorio, Soumiytra Dutta, and Bruno Lanvin, eds., *The global information technology report 2013: Growth and jobs in a hyperconnected world*, World Economic Forum, 2013.

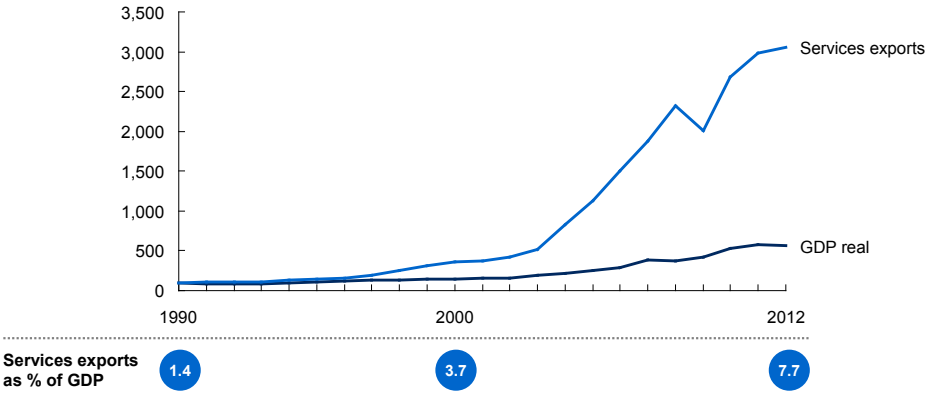
already had pools of technical talent and local industry clusters in technology, aerospace, and defense.

Exhibit 29

Over the past two decades, India has rapidly grown its services exports

Real GDP vs. services exports

Index: 100 = 1990



SOURCE: Comtrade; World Development Indicators, World Bank; McKinsey Global Institute analysis

American and European multinationals started to realize the potential of India's services sector in the early 1990s when the country also undertook a wave of economic reforms that included reducing trade tariffs and restrictions on FDI. In 1992, IBM set up a joint venture with Tata, and Siemens established an IT subsidiary in India. In 1994, American Express set up a processing center in Gurgaon to serve its customers in Japan and the Asia-Pacific region. These early ventures met with immediate success. American Express, for example, lowered costs by 50 percent while improving service quality.[89] By the mid-1990s, Indian software companies Infosys and TCS were already growing rapidly as they established credible reputations among their foreign (largely US) client base, especially for their work on millennium bug issues. Many more multinationals located in India, leading to a surge in FDI. Between 1992 and 2002, FDI inflows grew by 35 percent every year, increasing from $280 million to $5.6 billion, supporting rapid growth in India's IT and BPO sectors. Revenue of the Indian BPO sector soared from $0.93 billion in 2000 to $7.3 billion in 2005 and $16 billion in 2012.[90] More than two-thirds of this revenue came from exports. Today, the IT and BPO sectors employ about three million people and account for 8 percent of India's GDP.[91]

India's performance in other flows has not matched its success in services. In goods and financial flows, India ranks 27th and 26th, respectively. In both cases, connectedness is driven primarily by inflows. In goods, India has an expanding trade deficit. In 2012, the value of goods inflows was 1.5 times that of goods outflows. This largely reflects the rising value of India's imports of commodities that accounted for one-third of the country's goods imports in 2002 but two-thirds in 2012. Continuing industrialization and an expanding middle class have

89 Alpesh B. Patel, *Outsourcing success: The business imperative*, Tata McGraw-Hill Education, 2005.

90 NASSCOM.

91 Ibid.

boosted India's energy consumption. In 2012, petroleum products accounted for more than half of total commodity imports, although a portion of these imports was crude oil for refining and subsequent export. Imports of gold and other precious metals were the second most significant import category. They have nearly doubled over the past decade and today account for around 23 percent of commodity imports, again reflecting the rising incomes of India's expanding middle class. In financial flows, inflows and outflows were roughly in balance in 2004, but by 2012, inflows were more than five times the size of outflows. This shift was driven by growing inflows of lending, which accounted for more than half of all financial flows in 2012, up from 35 percent in 2002. FDI has also grown—although more slowly than lending—and India's services sector receives more than half of the country's FDI inflows.

India ranked 47th on people flows in 2010, reflecting large numbers of Indians moving abroad to work or study. In that year, there were more than twice as many outbound migrants as inbound migrants. India has become the second-largest country of origin for students studying abroad after China, accounting for 7 percent of the worldwide total.

On cross-border data and communication flows, India ranks only in 64th place, lower than all other BRIC countries. Its Internet penetration is only one-third of the average of emerging markets, at 10 percent vs. 28 percent. These figures partly reflect India's very large population, as we normalize data flows on population size. However, cross-border Internet traffic is growing quickly, increasing by more than 80 percent a year between 2006 and 2013, compared with the average emerging-market increase of 64 percent.

SPECIALIST: CHINA

Only three decades ago, China had limited foreign trade and exerted tight control over the movement of goods and services, people, finance, and communication. But China has since strategically opened and transformed itself from a closed society to the world's largest goods exporter. Overall, China is ranked as the 25th most connected country in the world, five places higher than it was in 1995. We consider China to be a specialist given its relative strength in goods and financial flows, in which it ranks fifth and sixth, respectively, roughly on par with the United States. However, China scores lower on services flows, ranked 21st, on people flows, ranked 93rd, and on data and communication, ranked 33rd.

In the 1970s, prior to China's far-reaching economic reforms, the country's trade flows were negligible. But by 2012, China had surpassed the United States as the world's largest trading nation in goods, and in that year ranked fifth on connectedness in goods flows. This journey began in the 1980s when the government established special economic zones open to foreign investment and trade. By the 1990s, 15 free trade zones, 32 state-level economic and technological development zones, and 53 new and high-tech industrial development zones had been established, many of them in underdeveloped areas, all supported by investment in road and rail infrastructure. In their early days, special economic zones were financed with government support, but they later became self-financing.[92] Before the establishment of these special economic zones, there were virtually no solely foreign-owned and -funded companies

92 Wei Ge, *Special Economic Zones and the economic transition in China*, World Scientific Publishing Company, August 1999.

operating in China; by the early 2000s, there were nearly 200,000.[93] Until 1986, foreign businesses were permitted to invest in China only if they agreed to form joint ventures with Chinese businesses. This limited foreign ownership and therefore the ability of domestic companies to obtain knowledge through collaboration.[94]

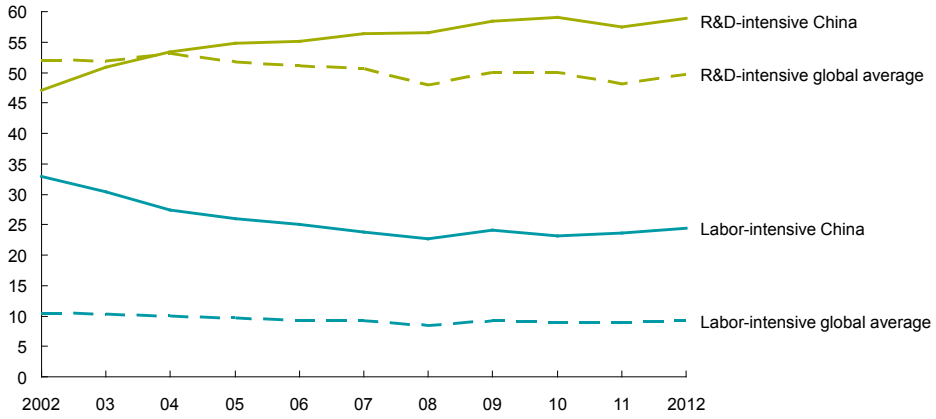
China's initial success in goods flows was based on labor-intensive exports of manufactured goods. Apparel alone accounted for one-quarter of Chinese goods exported during the 1990s. But over the past two decades, China has sought to steadily move to higher value-added activities and industries and has increased the share of R&D-intensive goods in total goods exports (Exhibit 30).

Exhibit 30

R&D-intensive goods have continued to increase as a share of China's total goods exports

Share of goods exports by category

%



SOURCE: Comtrade; World Development Indicators, World Bank; McKinsey Global Institute analysis

By capitalizing on its relatively low labor costs and proximity to innovation centers in East Asia, China has become a major participant in the global supply chains of industries such as electronics, computers, and other high-tech equipment. Today, homegrown Chinese companies Haier, Lenovo, and Huawei are among the world's largest in their sectors. High rates of investment in infrastructure and industrial capacity have helped foster the local production of large capital goods such as the machinery and equipment used in construction and mining. R&D-intensive goods have also flourished. Chemicals, machinery, and communication devices now account for almost 40 percent of total Chinese goods exports.

Simultaneously, rising prosperity, urbanization, and industrialization have driven Chinese demand for energy and raw materials. Commodities have more than doubled as a share of total goods imports over the past decade. Indeed, imports of mined inputs and petroleum products quadrupled their share of total inputs, accounting for one-quarter of total Chinese inputs in 2012.

93 "China Economic reform timeline," Center for Strategic & International Studies, http://csis.org/blog/china-economic-reform-timeline.

94 Note that China granted some exceptions to this requirement to partner with domestic Chinese firms and permitted foreign firms to set up a representative office or branch in the country. See Alex Easson and Li Jingyan, "Taxation of foreign business and investment in the People's Republic of China," *Northwestern Journal of International Law & Business*, volume 7, issue 4, 1986.

China's participation in financial flows has undergone a remarkable transformation over the past few decades. Although its financial markets remain tightly regulated, China now ranks sixth on its connectedness of financial flows. This reflects both large flows of financing into the country and outflows of capital from China's central bank and other private-sector financial players. The Chinese government has provided an array of incentives to attract FDI. In the period to 2008, foreign investors enjoyed preferable tax rates for activities geared toward reinvestment, new ventures, advanced technologies, and underdeveloped regions.[95] Between 1985 and 2000, FDI inflows grew more than 20-fold and now account for 92 percent of total financial inflows ($308 billion in 2012). Over the past decade, China alone has accounted for an average of 10 percent of global FDI inflows.

Until 1997, Chinese financial flows were largely inflows. Over the past decade, however, China has begun to invest overseas its very substantial foreign reserves accumulated as the result of big trade surpluses. In the past, China mostly invested foreign-exchange reserves (which stood at $3.3 trillion at the end of 2012) in low-risk sovereign debt such as US Treasuries. In recent years, however, China has started to diversify its foreign holdings. In 2007, the China Investment Corporation, one of the world's largest sovereign wealth funds, was established and now holds a diversified portfolio of international equities, global real estate, and stakes in mining, energy, and infrastructure projects around the world. The government also encourages domestic companies to invest abroad and expects nearly $100 billion to be invested overseas in 2014.[96] Chinese companies—both state-owned and private sector—have been increasingly prominent investors overseas in recent years, sometimes financed by domestic banks. Over the past decade, outflows of loans from China's commercial banks and development banks have more than quintupled, albeit from a relatively low base, to more than $200 billion in 2012. There is every chance that China's significant role in the network of international financial flows will keep increasing as its financial markets continue to deepen and if its renminbi currency should become fully convertible.[97]

China's participation in other flows has remained more modest. It ranks 21st on services flows. Over the past decade, it has been a net importer of services, notably transportation, insurance services, and royalty payments. China's participation in people flows is also limited, possibly due to relatively restrictive immigration policies and language barriers. However, China participates strongly in some forms of people flows. It has become the most significant country of origin for international flows of students, accounting for more than one-fifth of all students studying abroad in 2011. The flow of Chinese travelers to foreign countries has also been increasing at a rate of 13 percent a year, nearly twice the average rate of emerging markets. In data and communication flows, despite being home to the world's largest population of Internet users, China ranks only 33rd, likely due to its large domestic market and specific language profile, as well as its relatively stringent data policies.

95 In 2008, the Chinese government also extended most incentives to domestic companies. See Andrew Halkyard and Ren Linghui, "China's tax incentive regimes for foreign direct investment: An Eassonian analysis," in *Globalization and its tax discontents*, Arthur J. Cockfield, ed., University of Toronto Press, 2010.

96 *China's economic and social development plan*, The National People's Congress of China, 2014.

97 Richard Dobbs, Nick Leung, and Susan Lund, "China's rising stature in global finance," *McKinsey Quarterly*, July 2013.

WAYPOINT: SINGAPORE

Singapore is a small country that punches far above its weight in global trade, primarily by acting as an intermediary of flows moving between other countries. Although its population was only 5.3 million in 2012, its GDP was $275 billion, making it the world's 35th-largest economy. Blessed with a natural deep harbor and nurtured by supportive government policy, Singapore has a strong position in global goods trade. Its strength as an intermediary for goods and financial flows and its high participation in other flows have made Singapore the world's fourth most connected country, one place higher than in 1995. Its ascendancy has been underpinned by rapid growth of cross-border Internet traffic that has grown at 1.5 times the rate of the average of developed economies over the past five years.

In 2012, Singapore ranked second on goods trade. Its trade intensity for goods is the second-highest in the world at 285 percent of GDP, behind only Hong Kong at 360 percent of GDP. Singapore re-exports 44 percent of all the goods it imports.[98] Indeed, the country is primarily a hub for intra-Asian trade, which accounted for more than 70 percent of all its goods exports in 2012. It is a notable trading hub for commodities such as refined petroleum, which accounted for more than one-fifth of all exports in 2011, and Singapore has among the largest oil refineries in the world. It is also rapidly emerging as a liquefied natural gas (LNG) trading hub for Asia, with one receiving LNG terminal already operational and another being built.[99] Other goods that Singapore re-exports include processed foods, textiles, and electronic components, while integrated circuits make up nearly one-fifth of its exports. The nation has cultivated a highly trained workforce and high-tech manufacturing facilities to transform lower-value imports into higher-value exports, and has been steadily increasing its value-added contribution in knowledge-intensive industries such as electronics, biotech, and pharmaceuticals.

Singapore's connectedness has benefited from considerable infrastructure investment. Its container harbor, the world's second largest, has received extensive support from the government to build capacity despite land constraints. The government has also invested heavily in transportation and logistics infrastructure, including one of the world's busiest airports, and it finances a number of institutions focused on logistics research to further deepen the nation's expertise in global shipping. The government's education policy has encouraged the supply of people with strong IT skills who are able to design and operate IT systems to improve operational efficiency.[100]

A proactive and open trade policy, combined with a supportive investment environment, has helped to develop Singapore's excellent infrastructure. Singapore has the status of a free harbor, so it charges no import tariffs on goods meant for re-export. Further, the government has struck free trade agreements with many of the world's leading trading economies, including the United States, Japan, Australia, China, India, and South Korea. Singapore has also established a smooth paperless customs process. It has a long tradition of encouraging FDI through lower tax rates and dedicated initiatives run through its Global Trader

98 *Singapore's Merchandise Trade Performance, 2003–2012*, Singapore Statistics Agency, March 2013.

99 *Singapore Country Brief*, US Energy Information Administration, 2013.

100 John R. M. Gordon , Pui-Mun Lee, and Henry C. Lucas, "A resource-based view of competitive advantage at the Port of Singapore," *Journal of Strategic Information Systems*, volume 14, number 1, March 2005.

Programme. Over the past 30 years, Singapore's FDI inflows have averaged roughly 13 percent of GDP. The government agency IE Singapore actively promotes the overseas growth and international trade of Singaporean companies.

Such trade policies have supported Singapore's role as a global hub for services and finance. Singapore places third for its connectedness to services. Service exports are now equal to 40 percent of GDP. Transportation and logistics services are the main drivers, and these account for 35 percent of total trade in services. Singapore has also actively developed its financial services industry to become a financial hub. The Singapore Stock Exchange today lists stock for 771 companies, including foreign and domestic firms. Singapore's government also took steps to become a regional center for foreign exchange and is trying to capitalize on China's internationalization of the yuan. Beyond that, the nation is the largest offshore wealth management center in Asia and the world's second-largest center for offshore private assets.[101] The country attracted nearly 170 banks and more than 800 foreign financial institutions by 2012, both reflecting and reinforcing its strong financial services.

Singapore now ranks fourth for connectedness in global financial flows. Relative to Singapore's GDP, the value of financial flows has increased nearly 1.5 times, from 44 percent in 2002 to 67 percent in 2012. Outbound lending flows have grown almost 30 percent over the past decade, reflecting the establishment of many global banks in Singapore as a regional Asian hub. The regional expansion of Singaporean banks such as the Development Bank of Singapore has greatly facilitated the outflows of loans to Asia.[102]

Singapore's role as a major waypoint is further reflected in its above-average level of connectedness to people and data flows. In 2010, nearly two million foreign-born nationals lived in Singapore, out of a population of just over five million, while only 300,000 Singaporeans lived permanently abroad. Singapore has opted consciously for open migration policies that include an easy process for skilled employees to obtain working visas and reimbursements for relocation expenses. Singapore ranks eleventh on cross-border Internet traffic, which grew at 67 percent a year between 2005 and 2013, compared with a global average of 46 percent. Singapore also has one of the world's highest Internet penetration rates at 88 percent—higher than the 82 percent average for developed economies.

101 Jessica Tan, Vinayak H. V., and Thongchie Shang, *Future of Singapore financial services*, McKinsey & Company, March 2014.

102 Denis Hew, *Singapore as a regional financial centre*, Institute for South East Asian Studies, AT10 Research Conference, March 7–8, 2002.

Cities are important participants in global flows

Cities are increasingly important economic units in the world economy and are major waypoints for global flows. Previous MGI research suggested that nearly 70 percent of global economic activity takes place in the world's 600 largest cities.[103]

Cities with major ports can become important hubs in the global flow of goods. Urban centers with significant Internet infrastructure can become waypoints for data and communication flows. Large cities in countries with low barriers to immigration can attract people flows. Acting as a waypoint generates significant economic output and high-quality jobs, and it helps a city accumulate knowledge 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 to take advantage of the activity taking place. For instance, a city that establishes itself as a waypoint for financial flows and becomes a financial hub is likely to attract insurance and other business services companies. A city that acts as a major waypoint for people flows and goods traffic through a major airport hub can 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 exchanges in the world. With Amsterdam's faster connection speeds than any other European city, other types of high-tech businesses have sprung up around it.

We have assessed city participation in global flows on five dimensions: container ports; international airports; financial centers; inward migration; and online traffic hubs. Only six urban areas—Dubai, Hong Kong, London, New York, Singapore, and Tokyo—rank in the top 25 cities on at least four out of the five dimensions and, as such, are the most connected global cities (Exhibit 31). It is notable that three of these cities are in emerging regions. But in the next tier of connectedness, where we consider cities that appear in the top 25 for two or three of the five dimensions, only four of the 22 cities are in emerging markets: Kuala Lumpur, Moscow, Doha, and Shanghai. Their rise to prominence gives an indication of the significant opportunities for cities in emerging markets to play a more prominent role in global flows, especially as the world's economic center of gravity shifts in their direction.[104]

103 *Urban world: Mapping the economic power of cities*, McKinsey Global Institute, March 2011.

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

Exhibit 31

There are few truly connected global cities—only six are hubs for at least four of the five major flows

City participation in major flows

Hub in at least four major flows

Flow	Goods	Goods, services, people	Financial	People	Data and communication
Proxy	Ports	Airports	Financial centers	Migration[1]	Online traffic
Rank[2] 1	Shanghai	Atlanta	**London**	**New York**	Frankfurt
2	**Singapore**	Beijing	**New York**	Los Angeles	**London**
3	**Hong Kong**	**London**	**Hong Kong**	**Hong Kong**	Amsterdam
4	Shenzhen	**Tokyo**	**Singapore**	Toronto	Paris
5	Busan	Chicago	**Tokyo**	Miami	**New York**
6	Ningbo	Los Angeles	Zurich	**London**	Los Angeles
7	Guangzhou	**Dubai**	Boston	Chicago	Stockholm
8	Qingdao	Paris	Geneva	Sydney	San Francisco
9	**Dubai**	Dallas/Fort Worth	Frankfurt	San Francisco	Miami
10	Rotterdam	Jakarta	Seoul	Moscow	**Tokyo**
11	Tianjin	**Hong Kong**	Toronto	Houston	**Singapore**
12	Kaohsiung	Frankfurt	San Francisco	Paris	Milan
13	Kuala Lumpur	**Singapore**	Luxembourg	**Dubai**	**Hong Kong**
14	Hamburg	Amsterdam	Chicago	Riyadh	Moscow
15	Brussels	Denver	Sydney	Washington, DC	Hamburg
16	Los Angeles	Guangzhou	Shanghai	Dallas	Madrid
17	Tanjung Pelepas	Bangkok	Washington, DC	Melbourne	Washington, DC
18	Xiamen	Istanbul	Montreal	**Singapore**	Vienna
19	Dalian	**New York**	Vancouver	Jiddah	Brussels
20	Long Beach	Kuala Lumpur	Vienna		Prague
21	Bremen	Shanghai	Calgary		Copenhagen
22	Laem Chabang	San Francisco	Kuala Lumpur		Warsaw
23	Jakarta	Charlotte	Monaco		Budapest
24	**New York**	Las Vegas	Qatar		Beijing
25	**Tokyo**	Incheon	**Dubai**		Taipei

1 Metropolitan areas with at least one million foreign-born residents. Exact foreign-born population of Jiddah not known, so it is included at the bottom of the list.
2 Rankings come from different years: ports (2011), airports (2013), financial centers (2013), migration (2007), and online traffic (2013).

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

□ □ □

The MGI Connectedness Index shows wide variations in countries' participation in global flows. Countries that perform strongly in the connectedness rankings show that there are many ways to participate—as generalists, specialists, or waypoints for different flows. As networks of flows disperse and more countries take part, there are considerable opportunities not only for multinationals, many of which are already established in international markets, but increasingly for small and medium-sized enterprises. In the next chapter, we turn to a discussion of the opportunities for business in several key sectors.

5. Sector perspectives on global flows

The shifting patterns in global flows that we have described are shaped by the dynamics of different sectors of the global economy and, in turn, have an impact on a range of industries. To obtain a fuller picture of the dynamics of global flows, in this chapter we take a micro perspective that examines some key sectors that are affected by changing flows. The five sectors we discuss are manufacturing, commodities, air travel, shipping, and payments. The two forces of rising participation by emerging markets and digitization feature prominently in each of these five sectors. We draw on previous MGI research on these key sectors as well as the expertise of McKinsey colleagues around the world.

Manufacturing: Expansion in emerging regions, global supply chains, and the impact of 3-D printing

Manufacturing is a highly significant sector for flows of trade and FDI. In trade flows, it is responsible for two-thirds of global trade in goods and is growing fast: exports of manufactured goods have risen by 11 percent a year in nominal value over the past decade to 2012. Global trade in manufactured goods rebounded strongly after 2009 and had exceeded pre-recession levels by 2011 to reach $11 trillion, although growth stagnated between 2011 and 2012. In FDI flows, manufacturing industries has grown by 3 percent per year over the past decade, compared with 10 percent in the case of overall FDI between 2002 and 2012. However, manufacturing has increased its share of total goods greenfield FDI, from 52 percent in 2002 to 67 percent in 2011.[105]

There are three main trends in global manufacturing that have significant implications for global flows. First, emerging economies are becoming more important sources of both consumption and production in manufacturing, expanding the network of flows. Emerging markets are developing their manufacturing sectors, and this is far more than a Chinese growth story. Russia, Brazil, and India are the three emerging economies with the highest value added in the sector. As a result, flows of manufactured goods have increased in emerging regions, driven by both imports and exports of finished and intermediate goods. This includes rising South-South flows between emerging-market countries. Second, the growth of globally fragmented supply chains means that intermediate goods are growing as a share of total flows. This trend is set to continue, creating new opportunities for large and small producers to participate in global flows. Finally, digitization could act as a counter to this trend by transforming some value chains, making physical components flow more directly to consumers. Although still in its early days, the adoption of 3-D printing could replace flows of intermediate components and parts in some industries with flows of 3-D designs that are converted to a product only at the final market location.

105 Greenfield FDI refers to the purchase or expansion of new productive assets such as land or a factory by foreign investors, whereas brownfield FDI is the purchase or lease of existing assets.

CONSUMPTION AND PRODUCTION OF MANUFACTURED GOODS IS EXPANDING IN EMERGING MARKETS

By 2025, half of global consumption growth is projected to come from emerging markets, with much of that growth in manufactured goods.[106] This shift is already well under way. Most demand for cars, for example, comes from emerging markets. China displaced the United States as the largest car market in the world in 2009 and has produced more vehicles every year since. Indeed, the recent global recession has accelerated this change in the profile of global consumption, which, in turn, has helped to support the recovery.

Emerging markets' share of consumption rose from 32 percent in 2010 to 49 percent in 2012, and this level looks set to continue to increase given rising incomes in the emerging world. Between 2000 and 2010, annual growth in demand in China, India, and other large emerging regions has been 1.5 to three times as fast as the global average in industries ranging from steel and aircraft to food and pharmaceuticals.[107]

As consumption grows, emerging economies' imports of final goods have been rising rapidly, from $151 billion in 2002 to $702 billion in 2011, or 19 percent a year. China's growing appetite for imports makes it a leading consumer for a wide range of products from advanced economies, such as North American aircraft (for which China is the largest export market)[108] and European automobiles (for which China is the second-largest export market).[109]

Emerging economies are also becoming important locations for manufacturing production, reflecting increasing domestic consumption as their citizens' incomes rise and their middle classes expand. The majority of the rising manufacturing investment in these economies stems from companies' desire to locate production facilities closer to demand—for example, to improve speed of fulfillment or reduce costs and waste. Previous MGI research found that roughly two-thirds of global manufacturing activity takes place close to end customers.[110] Such regional processing-manufacturing industries as food, plastics, fabricated metals, and printing accounted for 28 percent of global manufacturing value added.

106 *Urban world: Cities and the rise of the consuming class*, McKinsey Global Institute, June 2012; and Yuval Atsmon, Peter Child, Richard Dobbs, and Laxman Narasimhan, "Winning the $30 trillion decathlon: Going for gold in emerging markets," *McKinsey Quarterly*, August 2012.

107 *Manufacturing the future: The next era of global growth and innovation*, McKinsey Global Institute and the McKinsey Operations Practice, November 2012.

108 Based on 2012 and 2013 aerospace industry data from US Department of Commerce, US Census, and Industry Canada.

109 Eurostat data on international trade in motor cars, August 2012.

110 *Manufacturing the future: The next era of global growth and innovation*, McKinsey Global Institute and the McKinsey Operations Practice, November 2012.

This shift in manufacturing production toward emerging markets has been under way for a long time. In 2012, China overtook the United States to become the world's largest manufacturer, and today, Brazil, India, Indonesia, Mexico, and Russia all rank among the top 15 countries for manufacturing value added according to IHS Economics & Country Risk's data. The emerging world's growing manufacturing strength goes far beyond helping domestic firms to serve their large home markets. Many of these companies are using this platform as a springboard to achieve global scale. Companies based in the emerging world are claiming a growing share of global revenue in industries such as basic metals and mineral products, electrical equipment, food and beverages, and chemicals. Between 2002 and 2011, the share of manufactured goods exported by emerging economies nearly doubled, from 22 percent to 39 percent. South-South trade has experienced particularly rapid growth. Trade among emerging markets today makes up 24 percent of the global total, up from 6 percent in 2002. In addition, in 2012, an emerging economy was one or both partners in 73 percent of global goods trade, up from 52 percent in 2000.

Over the next ten years, the shift in manufacturing production and investment toward emerging markets is likely to continue, judging by investment flows to emerging economies that increased from 17 percent of global FDI flows in 1990 to 58 percent in 2012. Since the recession, emerging economies have also accounted for a growing share of global FDI inflows, from 43 percent in 2008 to 58 percent in 2012 (Exhibit 32). The automotive industry provides an interesting demonstration of this dynamic. Major manufacturers including Renault, Volkswagen, GM, Ford, Toyota, and Honda, are all increasing their production capacity in emerging economies (Exhibit 33).

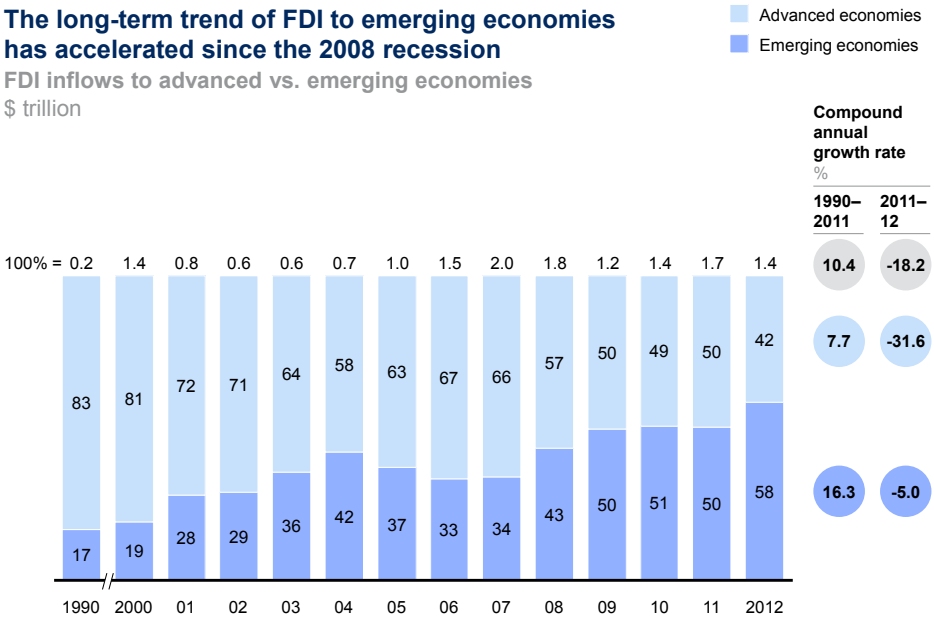
The future outlook for this continuing shift of global goods flows to and from emerging markets will, however, be shaped to a large degree by national policies. Policy continues to have a marked impact on manufacturing flows with many governments focused on expanding or reinvigorating their manufacturing sectors as a strategy to grow exports, attract investment, and create jobs. In the United Kingdom, for instance, business secretary Vince Cable recently announced a plan to identify sectors in which the economy has competitive advantage and to craft a sector development strategy in collaboration with industry. Another review of the United Kingdom's aerospace sector culminated in a government grant of £1 billion for research funding through 2020 to be matched by private industry. Japan's industrial competitiveness council is considering the establishment of special economic zones in Tokyo, Aichi, and Osaka prefectures, and its government is encouraging the consolidation of competing firms to improve profitability in industries ranging from electronics to transport equipment. Emerging markets such as Brazil and India frequently use local content and sourcing requirements as a precondition for market access that could both discourage and stimulate flows. In the United States, federal policies range from a proposal to create a National Network of Manufacturing Innovation to training initiatives focused on manufacturing skills. Individual states continue to compete to offer incentives for manufacturers to locate within their borders. Several other policy tools have also been employed by countries, such as those related to preferential taxes, performance standards, and various forms of financial support.

Exhibit 32

The long-term trend of FDI to emerging economies has accelerated since the 2008 recession

FDI inflows to advanced vs. emerging economies

$ trillion



NOTE: Numbers may not sum due to rounding.

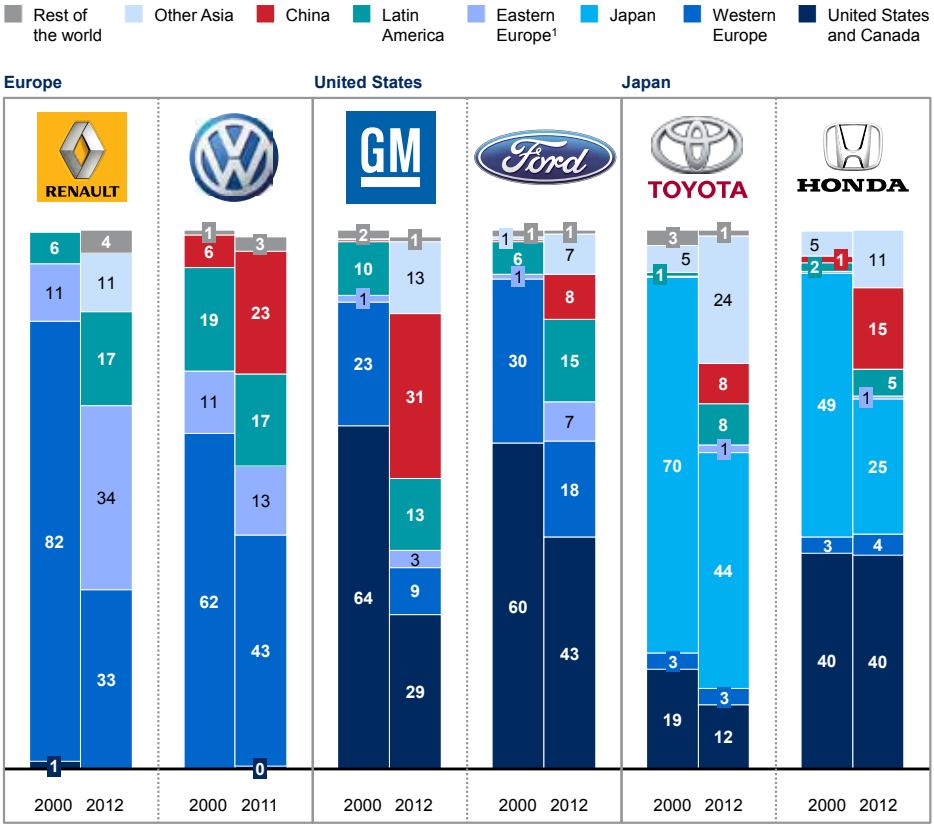
SOURCE: UNCTAD; McKinsey Global Institute analysis

Exhibit 33

Automotive companies are increasing their production footprint in emerging markets

Selected automotive original equipment manufacturer production by region

% of total production (units)



1 Including Russia and Turkey.

NOTE: Value labels <1 not shown. Numbers may not sum due to rounding.

SOURCE: The International Organization of Motor Vehicle Manufacturers (OICA), OICA correspondents survey; McKinsey Global Institute analysis

As manufacturers invest in local assembly facilities in emerging economies, the nature of trade is also changing, with intermediate manufactured goods—which includes parts, components, and commodities—making up a greater share of cross-border flows of goods. Eventually, as large global manufacturers achieve scale in emerging markets, they may pull many of their suppliers to enter these regional markets, too, which could slow the growth of trade in intermediate goods. However, there will be other factors, too, that reshape manufacturing flows in the future. For instance, rising labor costs in China may continue to shift more labor-intensive manufacturing to countries such as Mexico, Vietnam, and Bangladesh, which could see a resulting increase in exports.

Multinational corporations account for nearly 80 percent of global trade in goods and services through their relationships with affiliates and arm's-length contracts with suppliers.[111] The global supply chains of these firms are becoming more complex as companies seek out new markets and new sources of resources and intermediate inputs. In 2012, 55 percent of global trade was made up of intermediate goods and services flowing through supply chains. The share of disintegrated supply-chain transaction is increasing in many manufacturing industries.

Research suggests that the global fragmentation of manufacturing supply chains over the past two decades has picked up again after a pause during the 2008 recession as nations become more vertically specialized in their supply-chain activities.[112] As global manufacturers continue to tap into emerging markets, there are increasing opportunities for suppliers of all sizes to provide components, including service inputs. SMEs, in particular, can benefit from global flows indirectly by acting as second-tier or third-tier component suppliers within the global supply chains of multinational companies.

SOME FLOWS OF MANUFACTURED GOODS COULD BECOME DIGITIZED BY THE USE OF 3-D PRINTING

Manufacturing flows in some industries could be fundamentally reshaped by additive manufacturing (AM), a set of technologies that build solid objects from three-dimensional software designs, layer upon layer. These techniques are in contrast to traditional manufacturing techniques such as die cutting and machining that are subtractive in nature. In some AM applications, high-powered lasers are used to fuse small particles of powdered materials into shape. In others, a filament of plastic resin is extruded through a heated nozzle to create the desired shape one layer at a time. Although it is only one of many AM technologies, 3-D printing has become a commonly used term to refer to all of these technologies. This new way of printing has already proven useful in the context of design. The ability to send prototypes cross-border nearly instantaneously in the form of digital files has enabled dispersed teams to collaborate in far more sophisticated ways on increasingly complex projects. The use of additive manufacturing has grown substantially, with 6,500 industrial AM production units shipped in 2011, nearly twice the level of 2005. Until recently, the majority of 3-D printing was used for prototyping, functional models, or presentation models, but its application is broadening.

111 Ibid.

112 Marcel P. Timmer et al., *Slicing up global value chains*, Groningen Growth and Development Centre, University of Groningen, GGDC research memorandum 135, May 2013.

The advent of 3-D printing creates the potential to transform manufacturing production. In advanced industries that produce higher-value items but at lower volumes, the ability to turn around a specific part quickly could have a substantial impact on supply chains. This technology is already being integrated into the production of aerospace components, consumer durables, and medical prosthetics. Companies will be able to replace production facilities in a single location with a distributed system of 3-D printers located all around the world, eliminating the need to ship, warehouse, and distribute physical parts. The potential value that could be created is particularly high in after-market parts, for which demand is harder to predict. The ability to collaborate remotely has important implications for how companies structure their global operations.

AM technologies are unlikely to become standard in most manufacturing production in the near future. For some applications, AM techniques are still significantly less accurate and more expensive to operate than traditional casting—albeit that traditional casting does not easily enable mass customization.[113] AM processing often requires inputs in powder form, which can be 200 times as costly as using a sheet model. Some experts therefore believe that 3-D printing and other forms of AM are already reaching a plateau, but we expect that these technologies still have considerable further potential if significant obstacles can be overcome.

Commodities: New sources of demand and supply, digitized operations, and volatility

Commodities, or unprocessed raw materials—including hard minerals, metals, and oil and gas—are a large and growing part of global trade. They accounted for one-quarter of the total value of global goods flows in 2012, and they grew 20 percent in nominal value per year between 2002 and 2012, driven in large part by price increases.[114] Measured in volume terms (kilograms shipped), mining products grew by only 8 percent, while metal products and oil and gas each grew by 5 percent per year. As of 2011, resources accounted for at least 20 percent of exports, 20 percent of fiscal revenue, or 10 percent of economic output, in 81 countries around the world. The fact that 77 of these economies are in the emerging world underscores how commodities' growth is reinforcing the rise of emerging markets.[115]

Like manufactured goods, global commodities flows are being shaped by several trends. First, the increasing participation of emerging economies is reshaping global commodities flows as both producers and consumers. Second, digitization is enabling new efficiencies in operations, which are necessary to help navigate a world that is likely to be characterized by continuing high and volatile resource prices.[116] Finally, we expect to continue to see increased volatility in commodities

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

114 *Reverse the curse: Maximizing the potential of resource-driven economies*, McKinsey Global Institute, the McKinsey Global Energy and Materials Practice, and the McKinsey Sustainability & Resource Productivity Practice, December 2013.

115 Ibid.

116 *Resource Revolution: Tracking global commodity markets*, McKinsey Global Institute and the McKinsey Sustainability & Resource Productivity Practice, September 2013.

flows because of surging demand, supply constraints, and a higher correlation between commodity prices that stems from a more tightly interconnected world.

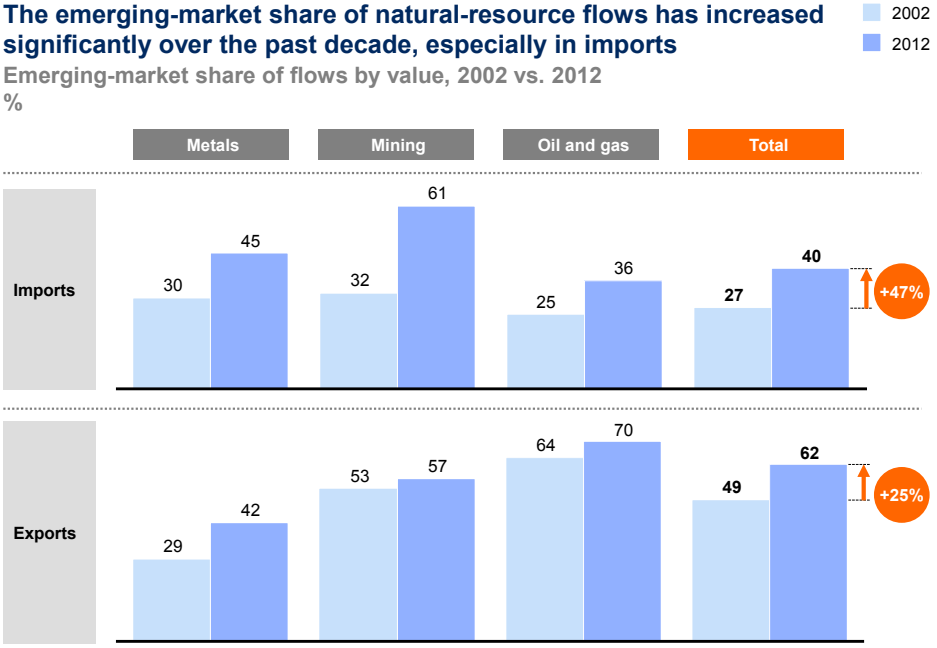
DEMAND FOR COMMODITIES—AS WELL AS THEIR PRODUCTION—IS SHIFTING TOWARD EMERGING ECONOMIES

Emerging economies are becoming larger participants in the global commodities markets, with rising levels of production, consumption, and investment. These economies have significantly raised their share of both import and export commodity flows over the past decade. The emerging world's share of the global value of metals, minerals, and oil and gas exports increased from 49 percent in 2002 to 62 percent in 2012 (Exhibit 34). These countries now produce more than two-thirds of oil and gas exports—more than half of which come from the Middle East—and nearly 60 percent of mining exports—half of which originate in Latin America.

Exhibit 34

The emerging-market share of natural-resource flows has increased significantly over the past decade, especially in imports

Emerging-market share of flows by value, 2002 vs. 2012
%



NOTE: Numbers may not sum due to rounding.
SOURCE: Comtrade; McKinsey Global Institute analysis

Exploration and production is also moving to emerging regions. Almost half the world's known reserves of minerals and oil and gas are in countries that are not members of either OPEC or the OECD. This fact undoubtedly understates the true potential for resource production in the emerging world, where relatively little exploration has taken place so far.[117] Historically, exploration took place mostly in regions like the United States, South Africa, and Australia, due to the strong mining heritage of these countries and the lack of sufficiently sophisticated exploration techniques to explore more hostile regions. With the boom in demand, coupled with deteriorating grades and escalating costs, mining companies were forced to look at other regions. As mining technology improved, it became easier to explore in frontier economies, and high-quality reserves were found in more

117 *Reverse the curse: Maximizing the potential of resource-driven countries*, McKinsey Global Institute, the McKinsey Global Energy and Materials Practice, and the McKinsey Sustainability and Resource Productivity Practice, December 2013.

countries, many of them in the emerging world. Chile and Peru now produce more than 40 percent of the world's copper, and some of the largest remaining high-grade copper reserves are in countries such as the Democratic Republic of Congo and Afghanistan. Production of large amounts of iron ore has shifted to China, and the next wave of production is expected from countries such as Guinea, where what will likely be one of the largest iron ore mines in the world is under construction.

Investment is following the shift in production. Previous MGI research found that, historically, almost 90 percent of total industry investment in minerals and in oil and gas was concentrated in high-income and upper-middle-income countries, but the share going to low-income and lower-middle-income countries could almost double to reach between $1.2 trillion and $3 trillion by 2030.[118] In the mining sector, companies from emerging economies are increasingly international in their investment. Among the many emerging-market companies that have expanded internationally are private multinationals such as Brazil's Vale as well as state-owned enterprises like China Minmetals (which bought OZ Minerals in Australia) and Poland's KGHM-Quadra FNX.

One exception to the general shift in the resources landscape toward the emerging world is the US shale gas boom, which could enable the United States to be a net exporter of energy. The rise of natural gas and light tight oil production fundamentally changes the US position in the network, potentially reducing its net energy imports to zero or even transforming it into a net exporter. This net outward flow of energy from the world's largest economy was unthinkable just a decade ago.[119]

DIGITIZATION IS RESHAPING COMMODITY FLOWS BY ENABLING INCREASINGLY COMPLEX GLOBAL OPERATIONS

The growth of connected sensors, devices, and networks is producing enormous quantities of data about oil and gas reserves and their production. The oil industry has used real-time data for many years to help develop difficult-to-access deposits, and now the industry is using big data on the production side, too. The automated, remotely monitored oil field is becoming the norm. In the "digital oil field," a single system captures data from well-head flow monitors, seismic sensors, and satellite telemetry systems. The data are then transmitted to very large data farms before being relayed to a real-time operations center. Experience thus far suggests that the digital oil field can cut operational costs by 10 to 25 percent even while potentially boosting production by 5 percent or more.[120] These greater efficiencies could drive increased production, resulting in significantly higher flows of resources around the globe. So far, however, such automation has mainly been used in the North Sea and other developed regions—possibly acting as a brake on the rise of emerging economies in commodities sectors, although deployment of these techniques into emerging markets is surely inevitable.

118 Ibid.

119 *Game changers: Five opportunities for US growth and renewal*, McKinsey Global Institute, July 2013.

120 *Big data: The next frontier for innovation, competition, and productivity*, McKinsey Global Institute, May 2011.

Digitization opportunities are also beginning to reshape the way that the oil and gas industry participates. Increasingly, software and digitally enabled service companies are creating more of the industry's total value, and these businesses are often significantly smaller than traditional participants in the sector. For example, Drillinginfo, a small but fast-growing company with around $39 million in revenue in 2013, has used publicly available information to create a comprehensive database on reserves and production facilities in almost every corner of the globe.[121] This kind of perspective is especially powerful for major resource companies making investment decisions across a global portfolio and running global operations.

The mining industry, in general, has lagged behind the oil and gas sector in its use of digital technology, but this is beginning to change. Some mining companies are now implementing similar automated, data-driven systems to their counterparts in oil and gas, with the promise of similar operational and cost improvements and, therefore, similar potential to drive further growth in commodity flows.

THE LANDSCAPE OF COMMODITIES FLOWS WILL LIKELY CONTINUE TO SHIFT TO EMERGING MARKETS; HIGH PRICES AND VOLATILITY WILL PERSIST

The changing resource landscape has a number of significant implications for the network of global commodity flows. First, the growth of consumption in emerging markets—especially in India and China—is likely to have an impact across all the major commodity sectors. China and India together are expected to account for 60 percent of the total increase in primary energy growth worldwide, and China alone was responsible for 30 percent of the growth of emerging-market commodity imports between 2002 and 2011.[122]

Second, resource prices are likely to remain high, at least in the medium term, due to surging demand at a time of constrained supply. We are also likely to observe continued volatility in commodity prices observed since roughly the turn of the century, but we expect even more fluctuation looking ahead. Over the past 13 years, the average annual volatility of resource prices has been almost three times as high as in the 1990s.[123] As production shifts to riskier geographies, it is likely that volatility will continue and even become exacerbated. In fact, resource-driven countries accounted for 19 of the 35 "fragile country situations" identified by the World Bank Group in 2013.[124] The trend toward greater integration of the global economy, especially in terms of goods trade through global supply chains, has left individual countries more exposed to fluctuations in production in distant regions of the world.

Finally, the shift in energy production to new—and many emerging—regions could reshape the flows of other energy-intensive goods and associated services. For example, industries such as petrochemicals and fertilizers are receiving investment in the United States to take advantage of low-cost natural gas enabled

121 Standard and Poor's Capital IQ.

122 *Resource Revolution: Meeting the world's energy, materials, food, and water needs*, McKinsey Global Institute and the McKinsey Sustainability and Resource Productivity Practice, November 2011.

123 *Resource Revolution: Tracking global commodity markets*, McKinsey Global Institute and the McKinsey Sustainability & Resource Productivity Practice, September 2013.

124 *Harmonised list of fragile situations FY13*, World Bank, 2013.

by the shale gas revolution.[125] The growth of such industries could have a profound effect on the global economy. Previous MGI research has estimated that the United States could generate $380 billion to $690 billion of additional output from shale energy industries.[126]

Air travel: Rising demand and growing importance of megahubs

Two major forces are reshaping the global airline industry. The first is increasing demand from emerging markets where incomes are rising and people want to travel more for both leisure and business. Industry deregulation, increasing competition, and a continued focus on cost reduction are likely to lead to lower airfares, further encouraging the rising volume of travel. The second force is the expected increased role for airport megahubs in international routes as the industry seeks efficient ways to deal with ever greater volumes of traffic.

RISING DEMAND FROM EMERGING MARKETS

As incomes rise in emerging economies, the center of gravity of the global network of air travel—a critical enabler for flows of tourist and business travelers—is shifting toward the East, and the entire network is growing more dispersed as cities in emerging markets become more significant destinations. Growth in air travel seat capacity in the developed world slowed to just 3 percent per year from 2000 to 2012, while that of the emerging world surged to 7 percent per year. Emerging markets' share of total flight seat capacity reached 42 percent in 2012 (Exhibit 35). In the Asia-Pacific region, the number of regularly served cities grew by 23 percent between 2005 and 2011, while in Africa and the Middle East, growth was 19 percent.[127] Asia is expected to surpass North America as the largest air travel market in coming years; it is already home to some 50 low-cost carriers, the most of any global region.[128]

The air travel industry has long been focused on boosting capacity and efficiency. Such improvements will help reinforce rising demand and volume of travel by reducing prices for customers. Since 1950, aircraft passenger seat capacity of the largest planes has grown at a rate equivalent to 4 percent a year because of both increasing global prosperity and technological advances in aircraft manufacturing driving greater cost efficiency. Planes have grown larger and are today capable of traveling faster and covering longer distances, while simultaneously becoming more efficient, significantly reducing operating costs (Exhibit 36). Over a 50-year period, the time required to fly from London to Sydney declined at a rate of 2 percent per year, while passenger seat capacity grew modestly at a rate equivalent to 3 percent per year.

125 *Game changers: Five opportunities for US growth and renewal*, McKinsey Global Institute, July 2013.

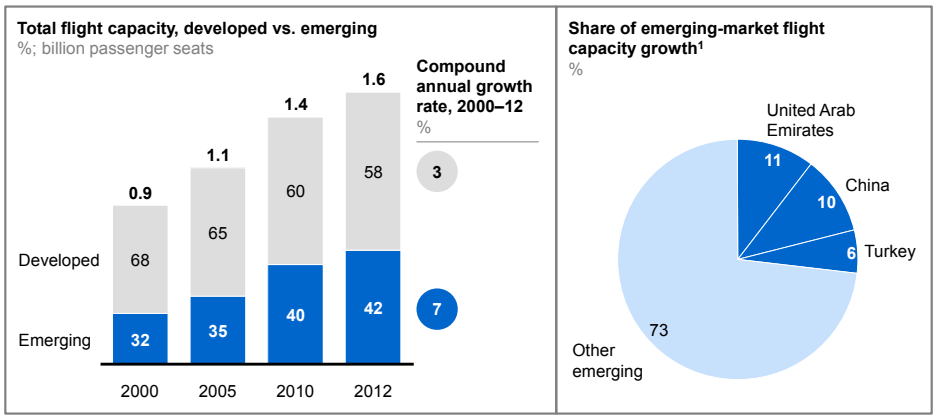
126 Ibid.

127 Regular service is defined as at least two daily departures on a 150-plus-seat aircraft. See *Global market forecast 2013–2032: Future journeys*, Airbus, October 2013.

128 *Asia-Pacific 2014 outlook: Faster growth for low-cost airlines as LCC fleet reaches 1,000 aircraft*, Center for Aviation, January 2014.

Exhibit 35

Emerging markets are driving growth in air travel, particularly in the United Arab Emirates, China, and Turkey

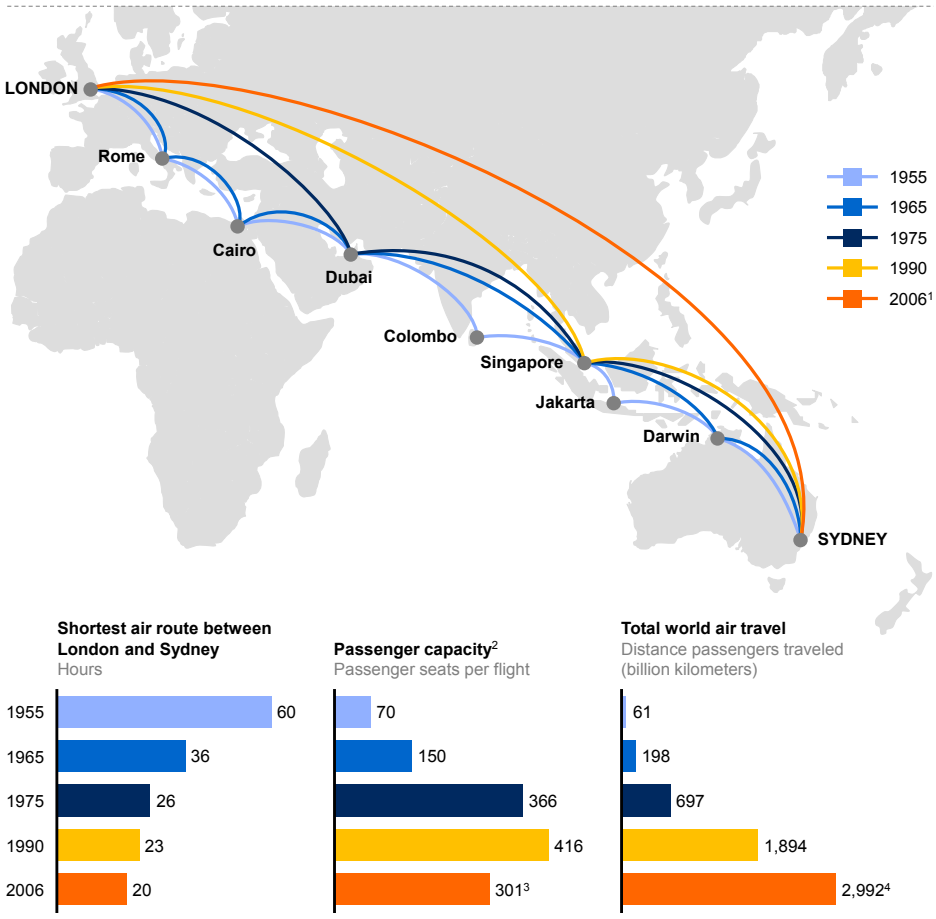


1 Measured by passenger seats.
NOTE: Numbers may not sum due to rounding.
SOURCE: OAG; McKinsey Global Institute analysis

Exhibit 36

Travel times decreased by 68 percent and capacity on long-distance routes increased sevenfold between 1955 and 2006

Air route between London and Sydney



1 In 2006, the route between Sydney and London became technically possible with the Boeing 777-200LR; however, this route is not currently operational.
2 Based on passenger seats on a typical aircraft used for this route.
3 The Boeing 777-200LR is a smaller aircraft than the 747-400 used in 1990.
4 2003 data.
SOURCE: Hofstra University; International Civil Aviation Organization; McKinsey Global Institute analysis

The cost of flying has come down significantly over recent decades, opening the door to many more travelers. For example, in the United States, some have estimated that the cost of flying declined by 40 percent from 1980 to 2011.[129] In addition to improved technology, increased competition and deregulation helped bring down the cost of flying in the 1970s and 1980s. Operational efficiency has also improved, driven by low-cost carriers. Practices pioneered by these carriers, including minimizing onboard services and maximizing use of seating space, are increasingly commonplace across the sector, and costs are dropping across the industry. Although the industry faces challenges in the form of volatile fuel prices, the outlook for air travel's ability to enable global people flows remains positive in view of very substantial prospective growth in demand from the emerging world.

CONTINUED TREND TOWARD MAJOR HUBS DRIVEN BY AIRLINE STRATEGY

Air hubs and waypoints are becoming increasingly important because this model enables airlines to operate an ever growing network of flights efficiently. They achieve efficiency by aggregating demand volumes, facilitating more frequent service, spreading fixed overhead costs more efficiently through economies of scale, and improving the resilience of airlines' operating model. All of these improvements enable carriers to serve more markets and thereby diversify risk. There is a clear network effect in the hub model: every additional flight routed through a hub provides value to the next flight.

Because of these efficiencies, we are seeing the emergence of megahubs. While 51 percent of long-haul traffic occurred between megacities in 2012, 75 percent of such traffic will occur between megacities in 2032, demonstrating the trend for hubs to capture a greater share of airline traffic.[130] At the same time, Airbus expects flights will increasingly originate from more places but also flow through a smaller number of hubs or megahubs. In 2012, 93 percent of long-haul traffic flowed through 42 megacities (defined as having populations of more than ten million). By 2032, we expect that 99 percent of long-haul traffic will flow through 89 megacities. This means flights will depart from more than double the number of megacities. So, air travel flows are set to experience both a shift toward larger hubs and a dispersion in the number of sources and destinations of traffic.

The airports likely to grow the most are those with airlines that enable connections between existing networks and new and growing areas of demand. We are already seeing new hubs and destinations in the emerging world come to prominence and start to reshape the network of air travel flows. Of the world's 25 busiest airports, none was in an emerging-market country in 2000. By 2013, there were nine. Three countries alone—the United Arab Emirates, China, and Turkey—accounted for almost 27 percent of emerging-market air travel growth from 2000 to 2012. Dubai and Istanbul, in particular, have emerged as major international hubs, driven by airline strategies focused on connecting traffic. Total passenger seat capacity for the two cities grew at 12 percent and 11 percent, respectively, over the past decade, and both Dubai and Istanbul are now among the 20 largest airports for international travel. Turkish Airlines and Emirates, in particular, are increasingly challenging European airlines for market share of major routes from Europe to Asia, the Middle East, and Africa, enabled by light regulation,

129 American Enterprise Institute, 2012.

130 *Global market forecast 2013–2032: Future journeys*, Airbus, October 2013.

committed governments, and the luck of advantageous geography. Both cities sit at nearly the center of many of the most important air travel routes, with nearly six billion people living within an eight-hour flight radius.[131] Regulation can have an important impact. The United States is one of very few nations that require people making a flight connection to go through security and passport control in transit. As a result, US carriers are less well positioned to capture international air traffic.

IMPLICATIONS

In this new era for the airline industry, megahubs that offer economies of scale and are located near rising demand—i.e., emerging economies—will play a key part in enabling the sector to meet the increased demand from business and leisure travelers.

Those cities that partner with airlines to move first to become a megahub and, therefore, key waypoint for flows of people are likely to enjoy first-mover advantage. Nevertheless, there will be scope for airlines to run profitable routes on smaller-capacity flights that get customers to the major hubs. Demand for aircraft will continue to be split between large-capacity, ultra-efficient long-haul planes connecting major hubs, and smaller airplanes shuttling passengers to those hubs.

Overall, these developments are likely to support increased flows of people and reflect shifts in other major flows such as goods, services, and financial flows that they enable.

Shipping: Rising demand and higher efficiency, digital transformation, and new players

Shipping is critical to the global flow of goods trade. As cross-border trade in commodities and manufactured goods has increased, so the shipping industry has expanded as well. In 2010, the sector had about $400 billion in revenue, with most of that value coming from container shipping. Overall, growth in shipping flows occurs in tandem with the trends we have already discussed in manufacturing and commodities.

There are three key trends affecting shipping and the broader logistics industry. First, shipping flows are growing because of efficiency gains and growth in demand for commodities, manufactured goods, and e-commerce. Second, digitization could transform shipping, by enhancing efficiency through the use of digital sensors and tracking devices but also by reducing volume because of the digitization of many physical goods. Finally, there are many new players in shipping, including a rising number of major ports in Asia.

131 Ibid.

GROWTH OF SHIPPING FLOWS IS DRIVEN BY HIGHER EFFICIENCY AND NEW DEMAND

Global shipping flows have increased substantially over the past few decades. For instance, the volume of port traffic increased from 4.4 million twenty-foot equivalent units (TEU) in 1970 to more than 493 million TEUs in 2012, with growth accelerating between 2002 and 2007.[132] This strong growth has been driven by gains in efficiency and, therefore, falling costs, as well as stronger demand for goods.

In recent decades, the sector has been defined by the continued search for greater efficiency and lower cost per item shipped. Ships have become larger, move more slowly and therefore with greater fuel economy, and increasingly pass through large, highly efficient shipping hubs. Improvements in operating models and technology have significantly brought down costs of moving physical items and have been key drivers of the global expansion in goods trade. The development of shipping and logistics hubs and waypoints in the emerging world is a sign of the continued shift in global demand and the attempt to serve these consumers in low-cost ways.

Containerization is generally considered one of the fundamental drivers of efficiency in global shipping (Exhibit 37). The idea of containerization is to use standard-sized metal boxes that can be easily transferred between different modes of transport, such as ship, rail, and truck. The first use of containers, in 1956, was found to reduce goods transport costs by 25 percent.[133] In the early 1960s, the port of Oakland, California, became one of the first to make a significant investment in a container terminal, believing it could revolutionize trade with Asia. In the mid-1960s, the container became an international standard and began to be adopted by ships and ports globally; by 1980, nearly 50 percent of ports worldwide had adopted containerization. As of 2010, that share had risen to 85 percent. The use of containers has increased port labor productivity, allowed for bigger ships and faster turnaround times, reduced theft and insurance costs, and enabled the rapid growth of global supply chains. Recent research indicates that containerization may even have contributed more than free trade agreements to the growth of global trade and industrialization of emerging economies.[134]

Today's global shipping and logistics network continues to pursue efficiency gains by increasingly following a hub-and-spoke model, with massive container ships moving along primary trade routes and further distribution occurring from trans-shipment hubs. To capture scale economies, reduce fuel costs, and better match demand, ships have changed. The average size of newly purchased vessels has tripled, from 2,000 TEUs in the 1990s to 6,000 TEUs in 2011, and ships now tend to travel at lower speeds—between 15 knots and 18 knots compared with 25 knots in the past.[135]

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132 Part of this increase is associated with the growth in containerization (see Exhibit 37).

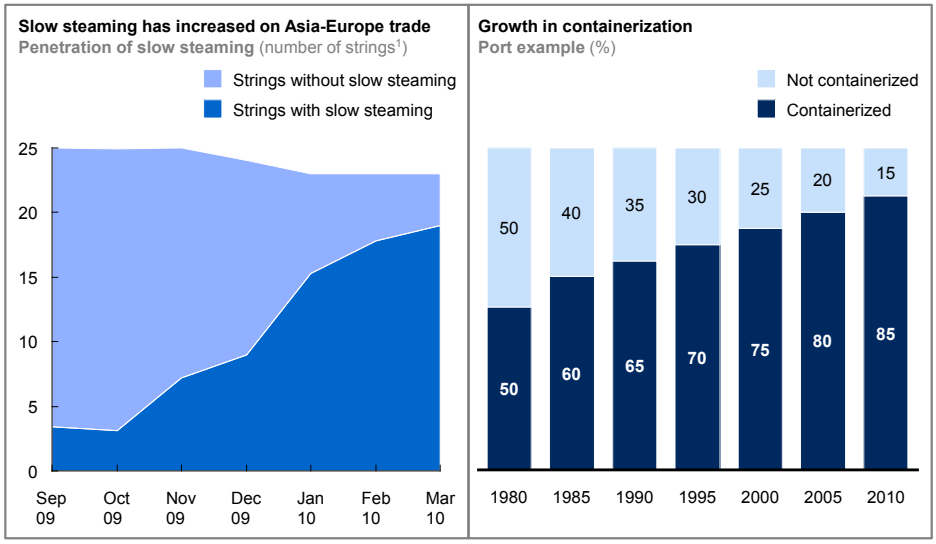
133 Anthony Mayo and Nitin Nohria, "The truck driver who reinvented shipping," excerpt from *In their time: The greatest business leaders of the twentieth century*, Harvard Business School, October 2005.

134 Daniel M. Bernhofen, Zouheir El-Sahli, and Richard Kneller, *Estimating the effects of the container revolution on world trade*, Lund University, February 2013.

135 Christa Sys et al., *In search of the link between ship size and operations*, July 2008.

Exhibit 37

Slow steaming and containerization have both increased substantially, driving significant cost savings



1 In shipping a string (of containerships) is the number of ships needed to maintain a regular service on a particular route.
NOTE: Numbers may not sum due to rounding.

SOURCE: *Containerisation International*; Alphaliner; American Association of Port Authorities; McKinsey Global Institute analysis

In addition to efficiency and lower costs, global shipping flows have grown due to increased global demand for commodities and manufactured goods. The scale and shape of demand-driven growth of shipping flows is directly due to many of the trends discussed in previous sections: growth of consumption and imports in emerging economies; rise of emerging economies as large production centers; growth of global supply chains, trade in intermediate goods, and South-South trade; and the rise of new resource-producing nations and new commodity trade routes. Most of the recent growth has occurred in Asia and among emerging economies. Between 2004 and 2012, the major shipping routes that grew their share of world container traffic the most were those between Asia and South America, which experienced 11 percent annual growth in container volumes, and short- and long-haul routes between Asian countries, which experienced 9 percent and 10 percent annual growth, respectively.

The growth of e-commerce is also helping to fuel demand for shipping, although e-commerce largely affects shipments made by air rather than by sea. The amount of goods sold over e-commerce platforms is growing, especially in China. China's e-tail market has been growing at a compound annual rate of more than 120 percent a year since 2003 and, with an e-tail market of $1.2 billion in 2011, is now the world's second largest after that of the United States. By 2020, Chinese e-tail could be as big as today's markets in the United States, Japan, the United Kingdom, Germany, and France combined.[136] This e-commerce explosion has powered the growth of consumer distribution companies such as FedEx and UPS, whose revenue grew by 7 percent and 5 percent a year, respectively, between 2003 and 2013. As e-commerce takes hold in emerging markets more broadly, we anticipate that this will provide additional growth in shipping flows—and distribution companies' revenue.

136 *China's e-tail revolution: Online shopping as a catalyst for growth*, McKinsey Global Institute, March 2013.

However, growing trade flows in knowledge-intensive goods may work in the opposite direction because some of these high-value items such as electronics and pharmaceuticals need to get to their destinations faster than ships allow, particularly as the speed of containers slows. Knowledge-intensive goods are more likely to benefit volumes in the air cargo sector.

DIGITIZATION IS ENABLING COMPLEX SUPPLY CHAINS BUT COULD ALSO THREATEN GROWTH

Digital wrappers and digitally enabled services have the potential to create significant value for the shipping industry, which already uses many types of scanners, including RFIDs, bar codes, and dot matrixes to gather data. *Emma Maersk*, the first E-class container ship, is now equipped with an integrated computer system that monitors 8,000 data signals. The industry is experimenting with new ways to use tracking devices in containers and container ships. There have been some successful trials of tracking and locating container boxes in real time so that shipping companies can balance container movements in and out of depots of customer premises. Such systems enable shipping companies to avoid situations in which too many container boxes end up in one region and too few in another. Sensors can also gather information on temperature, allowing remote devices that manage the heating and cooling of containers to be much more effective, saving on energy consumption. Digitization can create value not only for the shipping industry but also for its customers, keeping them up to date on where items are and when they are likely to arrive. This digital information also allows shipping companies to manage inventory more proactively. Being able to tag and track individual containers allows them to manage imbalances, improve storage planning, improve stacking on vessels and in terminals, and make port turnaround times more reliable. Ports, too, are becoming increasingly automated, adding to the speed and efficiency at which containers can be loaded, unloaded, and transported to their next destination.

It is worth noting that digitization trends also have the potential to erode some of the logistics and shipping industries' core businesses. Although we have not yet seen digital technologies have an impact on the majority of goods that are shipped, as some types of goods become digitized, the need for shipping of physical goods diminishes. For example, as movies and music are increasingly streamed online, the need to ship CDs, DVDs, and the specialized home electronic equipment that plays these devices has waned. In manufacturing, 3-D printing is another example of how digitization may begin to erode shipping business in non-media goods.[137] Rather than transporting a physical input, manufacturing companies will increasingly choose to transmit digital data across borders to a 3-D printer located at a production facility in a different geography.

137 See the discussion in the manufacturing section of this chapter.

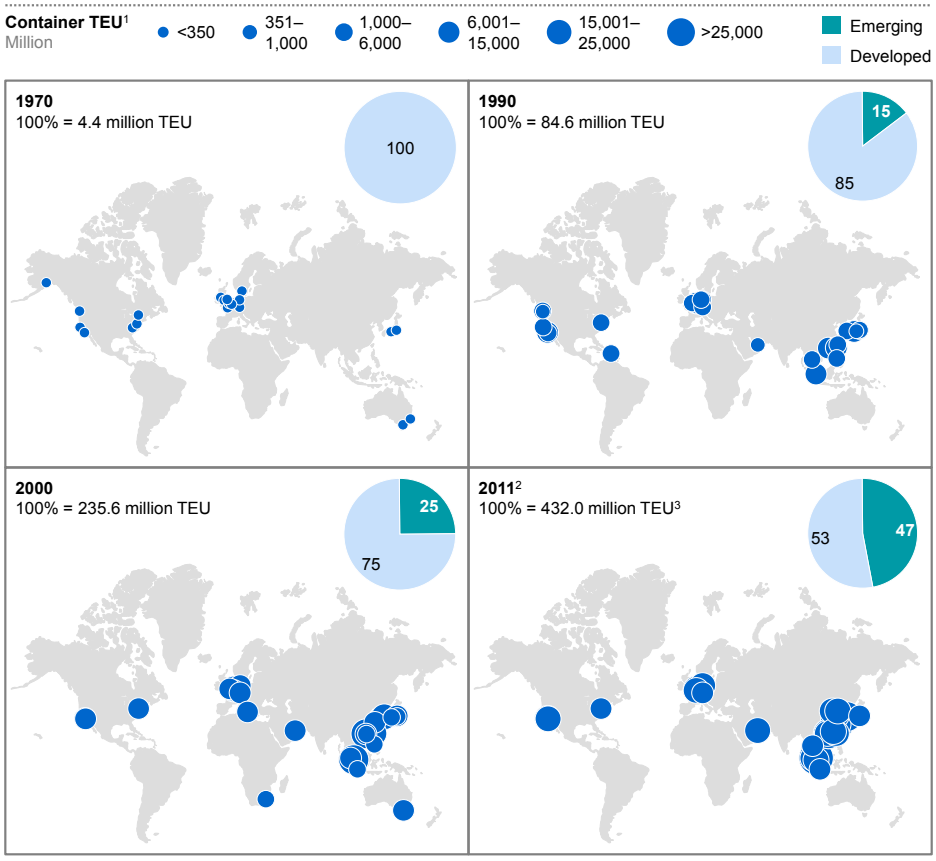
AS THE SHIPPING INDUSTRY GROWS AND CONSOLIDATES, OPPORTUNITIES ARE BEING CREATED FOR NEW TYPES OF PLAYERS

As shipping flows have expanded in emerging economies, new infrastructure has also been put in place, with port capacity increasing as a result. Asia now boasts significant origination hubs like Shanghai and trans-shipment hubs like Singapore and Hong Kong. These three cities are now home to the largest container-shipping ports in the world, with each processing around 5 percent of total global container volume. A dramatic change has occurred in the largest world seaports by market share. In 1980, Dubai did not make the world's top 25 container ports; by 2011, it was in the top ten. Shanghai was outside the top 25 in 1990 but by 2011 was the largest port in the world in terms of container traffic (Exhibit 38).

Exhibit 38

Led by Asia, emerging-economy ports have increased their share of world shipping since 1970

Top 25 ports each year; share of volume shipped by top 25 ports (%)



1 TEU = Twenty-foot equivalent unit, a standard measure of container capacity.
2 Largest in other continents (ranking): Africa: Said, Egypt (31), Durban, South Africa (45); South America: Santos, Brazil (45); Australia: Melbourne, Australia (48).
3 Total figures represent 2009 data.

SOURCE: *Containerisation International*; American Association of Port Authorities; McKinsey Global Institute analysis

Shipping-industry players are mostly large, established multinational corporations, but their work will help unlock opportunities for many small producers to increase their participation in global flows. The logistics and shipping industry is highly concentrated, with very few companies capable of playing a truly global role in supply chains. Most firms offer integrated solutions, and the largest companies are still increasing their market share. In the shipping industry, the share of container fleet capacity of the top ten shipping lines has increased from 38 percent in 2002 to 50 percent in 2010.[138] The trend toward consolidation is likely to continue, as the top 10 shipping lines are expected to increase market share through organic and M&A-driven growth, as well as global strategic alliances between major players. These large companies are increasingly able to facilitate the participation of smaller businesses in flows. For instance, micromultinationals can participate because logistics companies can increasingly combine microshipments into bulk orders. The large shipping players also work with smaller local partners that specialize in delivering goods in the final local stretch.

This trend is also evident in the broader logistics industry. Marketplace platforms such as eBay and Amazon are taking on much of the logistical effort involved in cross-border e-commerce, from e-commerce platforms and payments to warehousing, managing returns, navigating customs, and distributing products to customers. Amazon has 56 fulfillment centers in the United States and Canada as well as approximately 50 fulfillment facilities elsewhere. The company offers shipping to 66 countries, while eBay has joint ventures with a number of postal operators, including USPS, SingPost, China Post, and Hongkong Post so that it can offer simpler and more efficient delivery of small parcels on the most heavily used Asia–United States trade lanes.

Increasingly, logistics companies will be relied upon to provide massive amounts of data on physical items in the form of digital wrappers to enable manufacturing companies to manage extensive and highly complex supply chains. Digitization will enable this further expansion and will create significant value for the industry. We expect a small number of companies to be able to provide such services at global scale. However, the emergence of companies providing logistics support for smaller businesses will enable greater participation in global flows by such businesses and other smaller actors. The e-commerce platforms and logistics services provided by eBay and Amazon have enabled significant and growing participation by SMEs and individuals, and we expect their participation to increase strongly in the future as such digital platforms gain further traction.

138 Based on data from Lloyd's List, *Containerisation International*, and Clarkson Integrated Shipping Services.

Payments: Rapid growth, major potential for digitization, and new participants

The cross-border payments sector is broad, spanning everything from wire money transfers to currency exchange. We focus our discussion primarily on electronic and card-based payment systems from consumers to businesses and from peer-to-peer (P2P) because these payments largely mirror cross-border trade in goods and services.

Cross-border electronic payments flows are already substantial and growing rapidly, driven in part by a proliferation of digital platforms and electrification in emerging markets. By 2016, electronic payments are expected to account for 81 percent of the value of all global payments flows, up from 65 percent in 2006.[139] Internet access and e-commerce, both of which are growing rapidly, are two important enablers for digital P2P growth.

ELECTRONIC PAYMENT PENETRATION IS LOW IN EMERGING MARKETS TODAY, BUT SIGNIFICANT GROWTH IS EXPECTED

The nature of the payment sector varies across the globe. In some countries, the payments sector is treated as a business, with companies charging a fee on transactions or on the issuance of a payment card—as in the United States and the United Kingdom. However, in other countries, such as China, payments simply enable other flows and do not intrinsically offer a commercial opportunity. Depending on which model is prevalent, the speed of expansion in the payment sector and the pace of innovation will vary.

Emerging markets currently have low penetration of electronic payments and therefore the largest opportunities for payment companies to expand. In emerging economies, more than 90 percent of total transactions are paid for using cash or checks.[140] In stark contrast, the United States and Canada today have the most developed electronic and card-payment system, which together are used for just less than half of all transactions. In Western Europe and developed economies in the Asia-Pacific region such as Australia, Japan, Hong Kong, South Korea, and Singapore, electronic and card payments are used in more than one-third of total transactions (Exhibit 39).

139 McKinsey Global Payments Map.

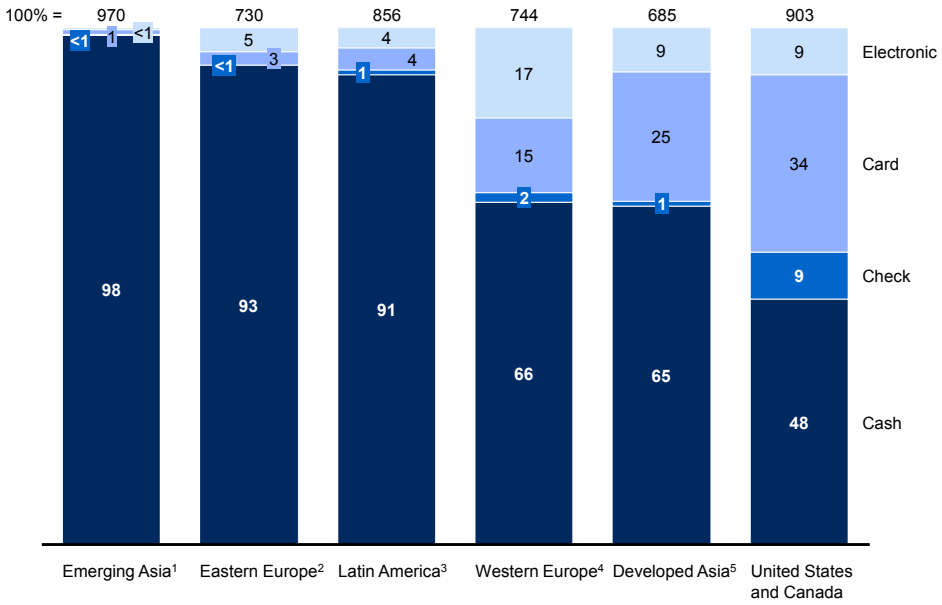
140 Ibid.

Exhibit 39

Payment behavior differs strongly across regions

Payments, 2011

%; transactions per capita



1 China, India, Indonesia, Malaysia, and Thailand.
2 Czech Republic, Hungary, Poland, Romania, Russia, Slovakia, and Slovenia.
3 Argentina, Brazil, Chile, Colombia, Mexico, and Peru.
4 Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.
5 Australia, Hong Kong, Japan, Singapore, South Korea, and Taiwan.
NOTE: Numbers may not sum due to rounding.
SOURCE: McKinsey Global Payments Map; McKinsey Global Institute analysis

Emerging economies are set to experience significant growth in their use of electronic payment systems as financial inclusion grows. Today, only 44 percent of the world's population has access to banking services, but that share is increasing.[141] The BRIC countries remain largely cash-based, but we expect them to be among the next wave of serious adopters of electronic payment systems. These countries are all major targets of leading players in the industry, including Visa, MasterCard, and American Express. By 2016, for example, out of the ten largest countries in terms of card usage, three are expected to be emerging economies, and China is expected to have the second-largest number of card payments of any country (Exhibit 40). Asia-Pacific's share of global card transactions is expected to increase from 17 percent of the total in 2007 to 33 percent by 2017, largely at the expense of the United States and Canada region, which is already a highly penetrated market.[142] Today, large payment companies are less focused on smaller emerging economies, suggesting opportunity for innovation in payment systems in these markets by smaller players.

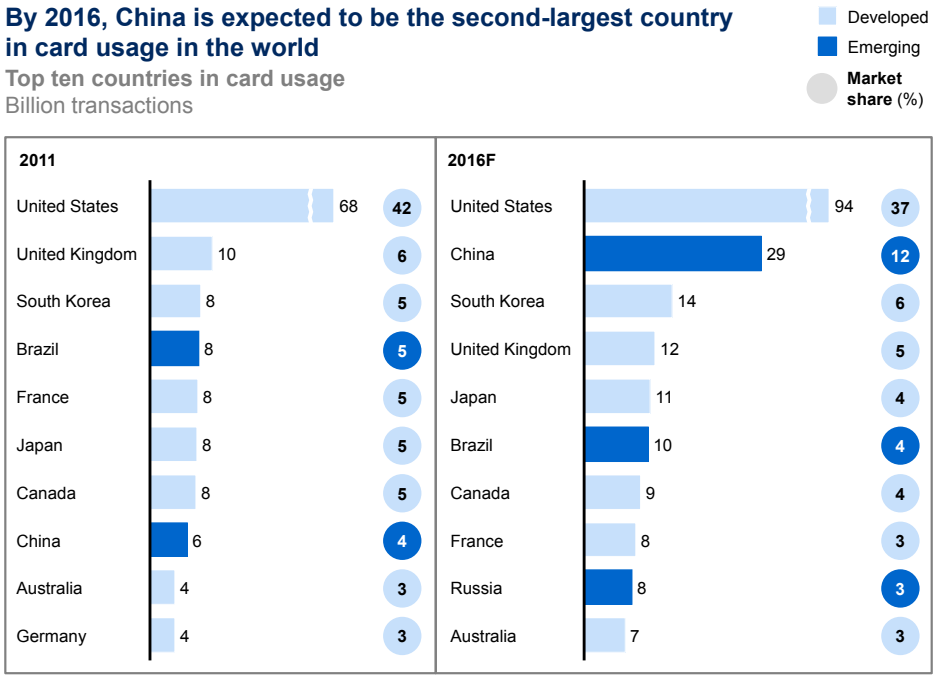
141 Oya Pinar Ardic, Maximilien Heimann, Nataliya Mylenko, *Access to financial services and the financial inclusion agenda around the world*, CGAP, January 2011.

142 McKinsey Global Payments Map.

Exhibit 40

By 2016, China is expected to be the second-largest country in card usage in the world

Top ten countries in card usage
Billion transactions



SOURCE: McKinsey Global Payments Map; McKinsey Global Institute analysis

DIGITAL PAYMENT PLATFORMS ARE LOWERING BARRIERS TO CROSS-BORDER TRANSACTIONS

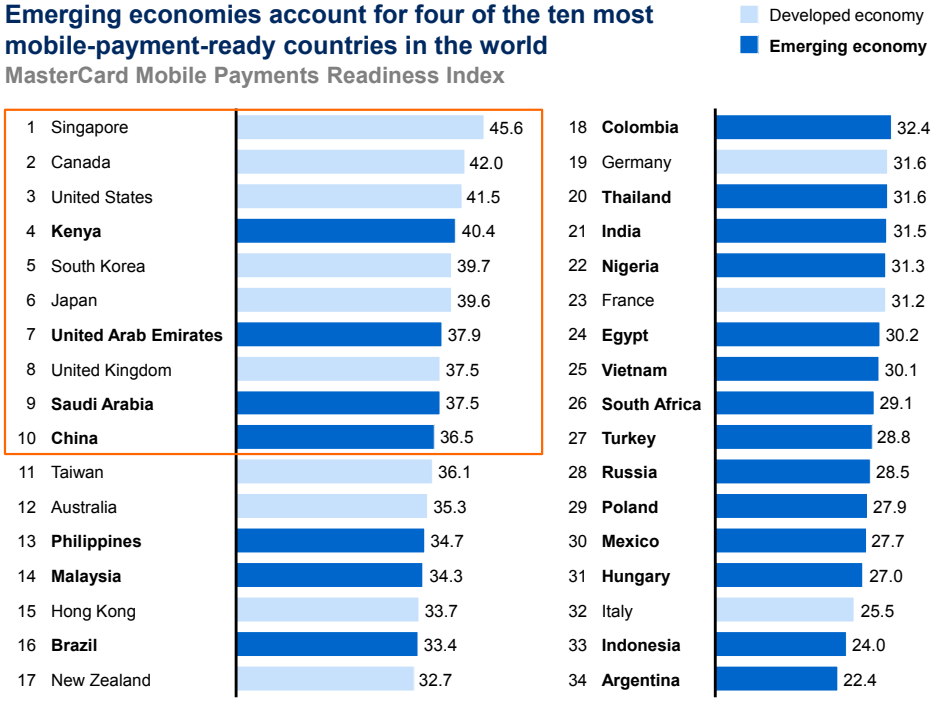
Digital payment platforms such as PayPal are making it far easier to send money across borders and, as such, are enabling growth in international e-commerce. These platforms typically improve transparency and deliver payments at far lower cost than traditional infrastructure but compete with established incumbent players such as banks and credit card issuers. Consequently, these companies are creating new services that are encouraging cross-border payments targeted at specific segments. Xoom, for instance, focuses on affluent immigrant workers in the United States who use the service as a low-cost alternative to remitting money to their home countries. Square primarily serves micromerchants that can accept offline credit and debit card payments through their smartphone and tablet computers and so complete transactions on the move. Such innovations are not limited to new players in developed markets. The 163-year-old Western Union has positioned its WU Digital offering to attract digitally-savvy customers, for example. In Africa, we are seeing a proliferation of companies using mobile telephones as a conduit for payments—M-Pesa in Kenya being an example—which is less time-consuming and expensive than building a brick-and-mortar banking system.

Kenya is one of the most mobile-payment-ready markets in the world, with China the tenth most "ready" market for mobile payments, according to a data-driven survey of the global mobile payment landscape produced by MasterCard (Exhibit 41).[143] China and Kenya are not the only emerging economies "ready" for mobile payments, however. Twenty-one of the top 34 mobile-payment-ready economies are emerging. Dynamic companies in both developed and emerging markets are building payment services that facilitate the enormous and growing flow of e-commerce around the world. China's Alipay, which is building a footprint in the United States, is just one example of a company connecting different countries' payment systems. PayPal, Yandex, and Stripe are yet more companies serving this need.[144]

Exhibit 41

Emerging economies account for four of the ten most mobile-payment-ready countries in the world

MasterCard Mobile Payments Readiness Index



SOURCE: MasterCard International, Mobile Payments Readiness Index; McKinsey Global Institute analysis

DIGITAL PAYMENT PLATFORMS ARE HELPING SMALL PLAYERS TO PARTICIPATE IN GLOBAL FLOWS

We expect that the major payment companies such as Visa, MasterCard, and American Express will continue to have leading positions in the largest emerging markets because of the risk and expense involved in building a fully operational payment system. However, smaller companies still have an opportunity to build market share in smaller emerging economies through low-price models. There will also be scope for companies to create the platforms and infrastructure to enable flows of payments. In business-to-consumer payments, it will be easier than ever for small and medium-sized enterprises to accept payments, enabling an increase in their cross-border goods and services flows.

143 MasterCard International Mobile Payments Readiness Index.

144 Stripe recently launched with the ability to make online payments in 139 different currencies, promising its customers that it will handle all currency conversions.

Individuals, too, will be able to participate more easily in cross-border transactions. Digital payment platforms make it more straightforward for individuals to be able to send and receive money internationally much more than they have done in the past. Consumer-to-consumer and consumer-to-business payments are expected to move quickly toward electronic payments. Between 2011 and 2016, the share of the value of card and electronic payments is expected to rise from 53 percent to 60 percent in the case of consumer-to-consumer payments and from 64 percent to 75 percent for consumer-to-business payments. In volume terms, however, we project that around 99 percent of consumer-to-consumer transactions will still be in cash in 2016, as will 86 percent of consumer-to-business transactions.[145] Digital platforms and innovative uses of digital data are also enabling more participants to engage in the credit system. For instance, Cignifi in Brazil is using mobile-phone data to determine the credit worthiness of individuals. The implication is that far greater numbers of people will be able to access credit in that market, overcoming the barriers that a lack of traditional credit-evaluation institutions have presented to date.

□ □ □

The evolution of the global network of flows will have significant implications for nearly every industry on the planet. The industries discussed here—manufacturing, commodities, air travel, shipping, and payments—are likely to be among the most affected as they are already defined in large part by cross-border flows. The rise of emerging markets and the transformative effects of digitization have the potential to reshape these industries and will require substantial rethinking by leaders of multinational companies and policy makers alike. In the next chapter, we turn to a discussion of our projections for how global flows could evolve by 2025.

145 McKinsey Global Payments Map.

6. Global flows could triple by 2025 if current forces unfold

Although the 2008 financial crisis and recession caused a decline in global flows, most types of flows have recovered, and the twin forces of increasing prosperity in emerging markets and the advent of waves of new technologies will continue to drive their development.

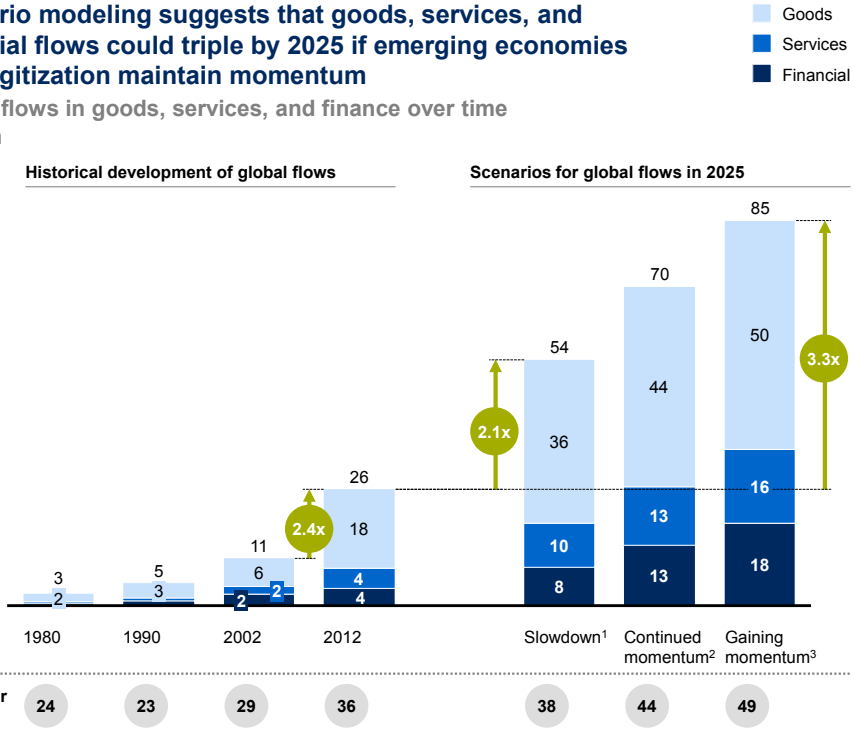
In this chapter we explore several scenarios for how these forces could influence global flows over the next decade. In our slow-growth scenario, we imagine a world of growing protectionism and weak economic growth. We also consider two more-optimistic scenarios. The first of these assumes that the forces having an impact on global flows remain as strong as they have been to date, and the second assumes that their impact continues to strengthen. In these three scenarios, we find that global flows of goods, services, and finance could grow in nominal terms from $26 trillion in 2012 to between $54 trillion and $85 trillion by 2025, or from 36 percent of GDP to between 38 and 49 percent of GDP (Exhibit 42).

Exhibit 42

Scenario modeling suggests that goods, services, and financial flows could triple by 2025 if emerging economies and digitization maintain momentum

Global flows in goods, services, and finance over time

$ trillion



1 Simulates a loss of momentum in the growth of global flows: assumes goods trade to grow at 0.4%, services trade intensity at 0.8%; assumes financial flows to reach trade intensity of 6.9% in 2025; nominal GDP to grow at 5.8%.
2 Simulates a continuation of recent trends: assumes goods trade intensity to grow at 1.2%, services trade intensity at 2.2%; financial flows to reach trade intensity of 8.2%; nominal GDP to grow at 6.4%.
3 Simulates an acceleration of recent trends: assumes goods trade intensity to grow at 2.0%, services trade intensity at 3.5%; financial flows to reach trade intensity of 10.5%; nominal GDP to grow at 7.3%.
NOTE: Value labels <1 not shown. Numbers may not sum due to rounding.
SOURCE: IHS Economics & Country Risk; McKinsey Global Institute analysis

Our slow-growth scenario still results in a significant increase in global flows over the next decade. The absolute increase of flows in this scenario—$28 trillion—is equivalent to nearly eight times the increase in China's trade flows—albeit in nominal terms—over the past ten years. That a slow-growth scenario can still produce such an outcome in part reflects the resilience and extent of interconnections built up over recent decades in the form of global supply chains, foreign investment, and the global flows underpinned by surging data and communication flows described in this report.

In this chapter, we also consider how future flows of people and data and communication could grow. Our analysis of these flows is separate from those of goods, services, and finance because they are expressed in terms of volume, rather than value.

Different scenarios for goods, services, and financial flows result in flows of $54 trillion to $85 trillion in 2025

In our scenarios, we imagine how the world would look in 2025 with different trends in two main forces. The first is the degree to which rapid growth continues in emerging economies and their participation in global flows. The second is whether digital technologies continue to propel and transform other flows. Underpinning these forces, and flows more generally, are the global policy environment and infrastructure supporting global flows.

To model these scenarios, we looked at how different types of flows grew during the periods over the past 30 years that resemble the assumptions in each scenario. Given the intimate link between growth in global flows and GDP growth, we also assume different nominal GDP growth rates for each scenario. Finally, in each of the three scenarios, we employ the conservative assumption that commodities flows rise only in line with global GDP growth, implying no further rise in resource prices.[146]

SCENARIO 1: SLOWDOWN AND PROTECTIONISM

Scenario 1—our most pessimistic simulation of how the world might look in 2025—assumes that the momentum in flows over the past three decades dissipates and nations turn inward as global economic growth remains sluggish. In this scenario we assume the impact of digitization on global flows is constrained by policy makers' attempts to monitor and strictly control flows of data across international borders, to restrain e-commerce in order to protect traditional industries, and to restrict the trade in digital goods. A restrictive policy mindset toward digital flows could extend to trade policy more broadly; resistance to free trade and even renewed protectionism could grow. Global GDP growth would be constrained, and many export-driven emerging economies would be hit particularly hard.

146 World Bank Commodities Price Forecast expects most commodity prices to stabilize or decline in real terms by 2025.

To model this scenario, we assume that global goods and services flows grow relative to GDP at the same pace as they did between 1980 and 2000. For most of those two decades, neither digitization nor the rise of emerging markets played a significant role. Between 1980 and 1990, emerging economies' share of goods trade declined from 23 percent to 15 percent. Global goods trade overall also decreased, from more than 16 percent of GDP to 14 percent. Toward the latter end of this period, emerging economies' share of trade returned to 23 percent and international trade picked up again, in part driven by the signing of important free-trade agreements such as NAFTA in 1994 and the continued expansion of the European Single Market. Still, between 1980 and 2000, growth in trade as a share of GDP—trade intensity—was only 0.4 percent a year in the case of goods and minus 0.8 percent for services. With financial flows, we assume they grow only slightly relative to global GDP compared with their current size, rising to 5.9 percent of global GDP by 2025 from 5 percent in 2012, but still far below the 20 percent they reached at the peak of the global credit bubble in 2007. Finally, we attempt to capture the relationship of GDP growth and the growth of flows. We assume a compound annual growth rate for nominal GDP of 5.5 percent, as seen in the world economy from 1980 through 2000. This rate is slower than IHS Economics & Country Risk's baseline global forecast for nominal GDP growth of 6.3 percent to 2025.

Even in this scenario, nominal flows of goods, services, and finance would roughly double, from $26 billion in 2012 to $54 trillion in 2025. Relative to global GDP, flows would increase only marginally, from 36 percent in 2012 to 38 percent in 2025. Most of the growth in goods and services trade and financial flows would come from growth in GDP rather than rising trade intensity. Indeed, in this scenario, trade intensity growth slows to 0.4 percent, down from 2.2 percent a year between 2002 and 2012. Although flows would continue to grow, this scenario simulates a world in which most of the momentum is lost because the impact of driving forces of emerging economies and digitization does not gain its full potential.

SCENARIO 2: CONTINUED MOMENTUM

In this scenario, we imagine what the world would look like in 2025 if the rise in emerging-market prosperity and digitization continued the momentum seen over the past decade and if current trade policies are maintained.

To model this scenario, we assume that flows of goods and services relative to GDP continue the growth of the period from 2002 to 2012. These were years when the GDP of emerging markets increased rapidly, at 14 percent per annum, and the rise of digital technologies and the spread of the Internet took hold. In that decade, trade intensity in goods grew by 1.2 percent a year, compared with 0.4 percent in Scenario 1. Services intensity grew 2.2 percent per annum in this period, compared with 0.8 percent in Scenario 1. Emerging economies' share of global trade grew from 26 percent in 2002 to 39 percent in 2012, an annual growth rate of 5 percent. In the case of financial flows, we wanted to avoid the boom that occurred in the run-up to the 2007 and 2008 financial crisis and the subsequent bust; both periods are unrepresentative of long-term trends. So we chose to examine the level of financial flows seen in the seven-year period between 1997 and 2003 following the Asian financial crisis. We disregard the year

2000 because this was a year that was distorted by the 2000 equity and dot-com bubble. In the six years we consider—1997 to 1999 and 2001 to 2003—the average level of financial flows as a share of GDP was 8.2 percent. Finally, we look at actual nominal GDP growth from 1998 to 2012 as the basis for this scenario. GDP grew at a compound annual rate of 6.4 percent over that period, similar to IHS Economics & Country Risk's baseline global forecast of 6.3 percent.

In nominal terms, flows of goods, services, and finance would increase 2.7-fold between 2012 and 2025, to around $70 trillion a year. This is broadly in line with the development of flows from 2002 to 2012, a period when nominal flows increased 2.5 times. In this scenario, we would have to believe that growth in the nominal value of global flows relative to GDP slows significantly, from a rate of 2.2 percent a year between 2002 and 2012, to 1.5 percent from 2012 to 2025. This suggests that, in reality, there is scope for flows to gain significant momentum beyond this "continued momentum" case as the twin forces we have discussed have an even larger impact.

SCENARIO 3: RISING MOMENTUM

Our final scenario imagines growing momentum in global flows as emerging markets, digitization, and policy combine to encourage an increasing level of cross-border activity and a wider range of countries and actors participate. In the world of Scenario 3, we can imagine that trade liberalization continues and participation by relatively unconnected regions such as Latin America and Africa accelerates. Digitization of flows gains momentum through advancing technology to integrate yet more players around the world into value chains. Services flows would grow rapidly, and people flows would gain speed as well.

We make a simple but bold assumption: that the change in connectedness between Scenario 1 and Scenario 2 is replicated again to produce Scenario 3. We assume that the increase in momentum that we observed between Scenario 1 and Scenario 2 as the forces of digitization and rise of emerging economies unfolded can be replicated and produce a further increase. We assume that the trade intensity of goods flows increases at 2.0 percent annually over the period, compared with 0.4 percent and 1.2 percent in the other two scenarios, and that services flows relative to GDP increase at 3.5 percent annually, compared with 0.8 percent and 2.2 percent in Scenarios 1 and 2. We imagine that annual financial flows grow to 10.5 percent of global GDP by 2025, up from 5.4 percent in 2012—and that would still be only half the level of financial flows seen at the peak of the global credit bubble in 2007. Finally, in this scenario we assume that nominal global GDP growth averages 7.3 percent per year, compared with 6.4 percent and 5.5 percent in the previous scenarios.

In this scenario, global flows of goods, services, and finance increase 3.3 times in nominal terms between 2012 and 2025 to around $85 trillion a year. Relative to global GDP, they reach 49 percent, from 36 percent in 2012. Under these circumstances, we would have to believe that growth in global flows outpaces global GDP growth even more than it has in the past and that flows relative to GDP increase at 2.5 percent per year, compared with 2.2 percent in the 2000s. While aggressive, this assumption is not implausible if more emerging markets participate in global flows, the impact of digitization on flows continues, and more companies and individuals of all sizes join in as well.

Cross-border Internet traffic could increase eightfold by 2025, a key driver in addition to current momentum

Today's expanded and improved global Internet bandwidth infrastructure has enabled cross-border traffic to surge by significantly cutting the price of Internet traffic. Between 2010 and 2013, IP transit prices decreased by nearly 70 percent in Western Europe and the United States, and by between 50 percent and 60 percent in Asia and Latin America, respectively, although wide disparities in prices remain across regions.[147]

Driven by growth in the number of users and expansion of usage, global IP traffic could reach 330,000 petabytes a month by 2025, assuming strong but slowing growth, a near eightfold increase over 2012. If growth were to remain on its exponential path, as Cisco projects for the period from 2012 to 2017, global IP traffic could reach 625,000 petabytes a month, or 14 times the volume today.[148] However, if growth settles into a linear pattern, IP traffic could instead be 240,000 petabytes per month, a sixfold increase compared with today. In any of these scenarios, cross-border data and communication flows will continue to surge.

Latin America, Africa, and Asia, in particular, are likely to drive growth in online traffic as many millions more people go online. For example, significant infrastructure investment to improve broadband access in landlocked West African countries is scheduled to come online by 2014.[149] As bandwidth catches up with pent-up demand, high-density content such as video may continue to increase its share of overall online activity. Improvements in communications technology are likely to facilitate ever greater levels of collaboration among teachers and students, researchers, and business units, and also among industry clusters and cities. The benefits of tighter networks, greater collaboration, and further knowledge sharing will undoubtedly provide enormous benefits for both emerging and developed economies and both producers and consumers of data and communication.

Growth in people flows will hinge on policy choices

The share of long-term migrants in the world has not risen since the early 1980s, remaining at a remarkably steady 2.7 percent of global population. More than any other type of flow, there are significant restrictions and barriers to migration. Uncertainty about political decisions around immigration makes it difficult to project any substantial change to that ratio with any degree of certainty. Aging populations in Europe, Japan, South Korea, and even China could prompt policy makers to create more opportunities for young people from emerging economies to migrate and bolster the labor force, possibly through short-term guest worker programs. If this were to happen, migration flows could gain scale.

147 *Global Internet geography*, Telegeography, 2014.

148 *Visual Networking Index: Forecast and methodology, 2012–2017*, Cisco, May 29, 2013.

149 *Lions go digital: The Internet's transformative potential in Africa*, McKinsey Global Institute, November 2013.

Air travel by business and leisure travelers has been growing faster than migration at 6 percent annually over the past 30 years.[150] Industry projections indicate that the number of air passengers will grow substantially over the next decade, reflecting an expanding middle class in emerging economies and lower-cost options in tourism. The emergence of major air travel hubs in the emerging world—notably Dubai and Istanbul—represent efforts to prepare for growth in demand from the emerging world. However, they also point to a very new type of emerging-economy participation in global flows, as such hubs are increasingly serving a global base of customers in both the developed and emerging worlds. The continued growth and improvement of information and communication technologies may, however, dampen the need for some business travel and offset some of the rise of emerging-market travelers. If the 6 percent growth in short-term travel observed over the past 30 years were to hold, there would be about two billion short-term travelers in 2025.

While emerging markets' share of international travelers has steadily increased from 34 percent to 42 percent between 2002 and 2011, their share of total migration has not increased over the past decade. But we are likely to see a shift in global dynamics of migration; as successful emerging markets grow wealthier and older, such countries will begin to act as magnets to migrants seeking opportunity. Student flows may also experience a shift toward South-South flows as students from emerging markets increasingly seek opportunities for international study in higher-education hubs in their own region or in other emerging markets.

The composition, source, and destination of global flows will continue to evolve

Beyond the quantitative measures of growth in global flows, flows will continue to evolve in terms of their composition, sources, and destinations. These qualitative shifts could lead to some important changes in their dynamics, too.

GOODS FLOWS COULD TILT TOWARD INTERMEDIATE GOODS AND EMERGING MARKETS

In the two more-optimistic scenarios we present, over the next decade the balance of goods trade will continue to shift toward the developing world as emerging economies increase their participation. By 2025, countries that we define today as emerging economies are expected to account for 55 percent of global GDP, and we expect that the majority of global flows of goods and commodities will involve at least one emerging economy by that time. However, realizing this outcome will be contingent on these countries making the necessary investments in infrastructure and logistics needed to facilitate such trade.

South-South trade routes will also gain share in Scenarios 2 and 3. In 2012, 24 percent of global goods flows took place between two emerging economies, up from only 6 percent in 1990. This shift will continue as their economic prosperity rises. Over the past decade, seven trade routes between emerging economies entered the top 50 global trade routes; ten years earlier there were none.

150 International Civil Aviation Organization.

Global goods flows will also shift toward intermediate goods—especially in volume terms—as supply chains continue to fragment. To drive cost efficiency or take advantage of unique conditions, countries have begun to specialize in specific parts of the production process. Vertical specialization—defined as the import content within exports—increased in nearly every OECD country from 1995 to 2005 and, on average, by 20 percent.[151] The greater interconnectedness of supply chains is resulting in intermediate goods representing a greater share of gross trade. One implication is that the global trading network can be increasingly affected by disruptions in even distant parts of the world. Indeed, the volatility of many commodity prices has increased substantially over the past several decades, including in energy, food, metals, and agricultural materials. Going forward, companies are more likely to include supply chain resiliency in sourcing and production decisions, which could temper the trend toward ever greater vertical specialization.

Finally, we expect flows of knowledge-intensive goods to continue to outpace flows of labor-intensive goods. Knowledge-intensive goods now represent nearly half of total goods trade, and in Scenario 3, knowledge-intensive goods will represent the significant majority of goods trade by 2025. The continued shift toward knowledge-intensive goods indicates that the value density of global shipments is likely to increase; therefore, the value of goods trade will likely outgrow the volume of trade, as measured in TEUs or kilograms.

GROWTH IN SERVICES FLOWS COULD OUTPACE GOODS FLOWS

Over the next decade, our scenario model shows cross-border flows of services growing faster than goods flows, in contrast to the past two decades, when they have grown at roughly the same rate. This reflects emerging economies climbing the income ladder to thresholds at which penetration of services increases, and information and communications technology enabling all countries to trade in increasingly complex and valuable types of services. Digitization has expanded the range of services that can be performed remotely and traded across borders, creating opportunities for emerging economies to participate. The remote call center and back-office processing operations were just the beginning of this transformation. Today, increasingly complex and high-value services such as legal, accounting, and R&D and product design now take place with virtual teams spanning the globe. Even in our most conservative Scenario 1, the ratio of services flows relative to global GDP reaches 7.0 percent by 2025, up from 6.1 percent today. In Scenarios 2 and 3, services flows reach 8.1 percent and 9.2 percent of global GDP, respectively, by 2025.

While emerging economies' share of global goods flows has surged over the past decade, the increase in share of services has been more modest, increasing from 20 percent in 2002 to 26 percent in 2011. All of their services flows were with developed economies. In 2011, there still were no emerging-to-emerging trade routes in the list of top 50 largest services trade routes. However, we expect more substantial emerging economy catch-up growth in services in the coming decade in the two optimistic scenarios. From 2002 to 2012, emerging economies' growth

151 Sébastien Miroudot and Alexandros Ragoussis, *Vertical trade, trade costs, and FDI*, OECD, trade policy working paper number 89, July 2009. Note that "vertical specialization" measures the value of imported inputs in the overall exports of a country, the remainder being the domestic content of exports.

of knowledge- and labor-intensive services flows outpaced those of developed economies. In the case of knowledge-intensive services exports, those from emerging economies grew at 20 percent annually compared with just 11 percent from developed markets. For labor-intensive services exports, emerging economies' grew 12 percent annually, compared with 8 percent for developed economies. Over the next decade, we expect emerging economies to continue to substantially outpace developed economies in both services exports and imports.

FINANCIAL FLOWS ARE LIKELY TO EXPERIENCE GROWING EMERGING-MARKET PARTICIPATION

Financial flows today are substantially lower than their pre-crisis peak, worth just 5.4 percent of global GDP compared with more than 21 percent in 2007. This reflects a significant retrenchment of cross-border activity by global banks and a reversal of cross-border investments in the Eurozone. Over the next decade, these flows may recover to some degree. In Scenario 1, we assume that financial flows relative to GDP rise to 5.6 percent between 2012 and 2025. This increase in the GDP share by 0.5 percentage points may seem small, but it is the equivalent of about $350 billion per year—higher than the GDP of Denmark today. New regional financial hubs may continue to emerge, most notably in Asia and the Middle East, as the global financial center of gravity shifts away from New York and London.

The rise of emerging markets in global financial flows will be one of the drivers of growth. In just the past decade, emerging markets' share of global financial flows increased from 8 percent to 36 percent as they became larger destinations of foreign capital as well as a major source of finance. For inflows and outflows of foreign direct investment, emerging economies' share grew from 14 percent in 2002 to 34 percent in 2012. While outflows of finance from emerging economies initially flowed primarily to developed financial markets, they are increasingly targeting investment opportunities in other emerging markets directly, bypassing traditional hubs. The share of flows of FDI from one emerging economy to another more than quintupled over the past decade, from 2 percent to 11 percent. The emergence of these South-South flows will be an important emerging characteristic of the global financial network in the coming decade.

In addition to investment, emerging-market participation is likely to grow especially quickly in sectors like payments, driven by further opportunities to expand electronic payments. In many emerging regions, including emerging Asia, Eastern Europe, and Latin America, more than 90 percent of transactions use cash.[152] There is a very large opportunity for digitization to enable greater levels of cross-border commerce, especially online. Furthermore, digital payments platforms will enable greater levels of individual participation in global flows than ever before.

152 McKinsey Global Payments Map.

□ □ □

A combination of increasing participation in global flows by emerging markets that are experiencing rapid growth and rising incomes, on the one hand, and digital technologies sweeping through the world economy, on the other, is likely to drive the expansion of these flows for at least the next decade, and very likely for longer. The web of the world economy will continue to broaden and become more intricate in its pattern. In our final chapter, we examine how companies, individuals, and policy makers might respond.

7. Capturing the opportunity will require smart strategy and policy

The broadening and deepening of global flows creates new opportunities for business and governments to drive growth, opens the door to a greater range of participants than ever before, and provides new impetus for innovation. But it also poses new challenges. Companies will find some business models become obsolete, face a new wave of competition from other geographies and sectors, and potentially see more volatility. Policy makers will need smart policies and new investments to enable their economies to fully capture the opportunities from global flows, and they must address the costs to individuals caught in the transition. To avoid paying the rising penalty of being left behind in the new era, companies, policy makers, and individuals must keep pace with the fast-moving changes in global flows and adapt their response. The pertinent question is how.

This report has attempted to paint a picture of how a broad set of global flows is evolving. In particular, we have noted the growing importance of knowledge-intensive flows, the impact of digital technologies, the growing role of emerging economies, and the expansion of opportunities for participation by more countries, more types of companies, and more individuals. Our research has also highlighted a serious lack of robust data needed for a comprehensive study of global flows, particularly beyond goods trade, as well as of the cross-cutting effects of digitization.[153] Without doubt, gaps in the data currently hinder private-sector and public-sector decision making and strategy formulation. Better data are needed in order to know what approaches will succeed in these new, and rapidly evolving, times. So the first imperative for private- and public-sector players is to fill current data gaps. In addition to collecting their own data, they should make it a priority to work together to publish relevant data capable of enhancing their understanding of the new frontiers of global flows.

Beyond the fundamental need for improved and expanded data, a number of broad implications for strategy and policy emerge from our analysis. In this chapter, we explore how businesses—large and small—and governments can think about changing global flows and what they should do to take full advantage of their opportunities and minimize the risks.

153 While bilateral goods data offer strong coverage on countries and product categories, the quality of services data, which cover just over half of total services flows and mainly for developed economies, has been a significant factor limiting our research. Furthermore, there are no reliable and comprehensive data sets that measure digital flows, either in relationship to flows of goods and services or to flows of data. See the technical appendix for detail on the data used in this report.

Business models need to adapt to an increasingly connected, competitive, and digitized world

CEOs at most of the world's largest companies are well aware of the expanded opportunities to create global businesses today, including the increasing participation of emerging markets and the powerful alchemy of digitization. These companies now serve more international markets than ever before, and these operations are becoming more critical to their growth and profitability.

Yet the fact remains that even the world's largest multinational companies remain underweight in emerging markets. In 2010, McKinsey research found that 100 of the world's largest companies headquartered in developed economies derived just 17 percent of their total revenue from emerging markets—despite the fact that those markets accounted for 36 percent of global GDP and are likely to contribute more than 70 percent of global GDP growth between now and 2025.[154]

Business leaders need to not only invest more in emerging markets but also understand how the role of these countries in the world economy is undergoing a historic transformation. In the first wave of globalization, developing countries first supplied commodities and raw materials for production and then economies recently became an abundant source of cheap labor for global supply chains. In the current wave of globalization, the emerging world is increasingly becoming a source of new customers. But a third wave is coming, enabled by digital technologies. In the new era, emerging economies will increasingly be the source of new talent pools, innovations, competition, and partnerships. Companies need to look globally for the right talent, suppliers, and innovation—and much of those could be in emerging markets. They can no longer make decisions on where they locate purely on the basis of cost.

Increasingly, successful companies need to be both global and granular in their strategy. Cities are becoming ever more powerful players in flows—yet many executives don't think at the city level. A McKinsey survey conducted in 2012 found that fewer than one in five executives made location decisions at the city, rather than the country, level, and 60 percent of those polled said they regarded cities as an "irrelevant unit of strategic planning."[155] Most forward-thinking companies have done well so far by focusing on developed economies combined with the megacities of emerging economies. Today, that combination will buy them exposure to 70 percent of the world's GDP.[156] By 2025, this combination is likely to account for only about one-third of global growth. Companies need to expand to new frontiers—most notably the rapidly growing small and medium-sized cities in the emerging world—to share fully in the global economic growth and growing flows.

154 Yuval Atsmon, Peter Child, Richard Dobbs, and Laxman Narasimhan, "Winning the $30 trillion decathlon: Going for gold in emerging markets," *McKinsey Quarterly*, August 2012.

155 *Relocating for growth*, a McKinsey Global Survey, was conducted in February 2012. The survey received responses from 2,962 executives representing the full range of regions, industries, and company sizes. To adjust for differences in response rates, McKinsey weighted the data by the contribution of each respondent's nation to global GDP.

156 *Urban world: Mapping the economic power of cities*, McKinsey Global Institute, March 2011.

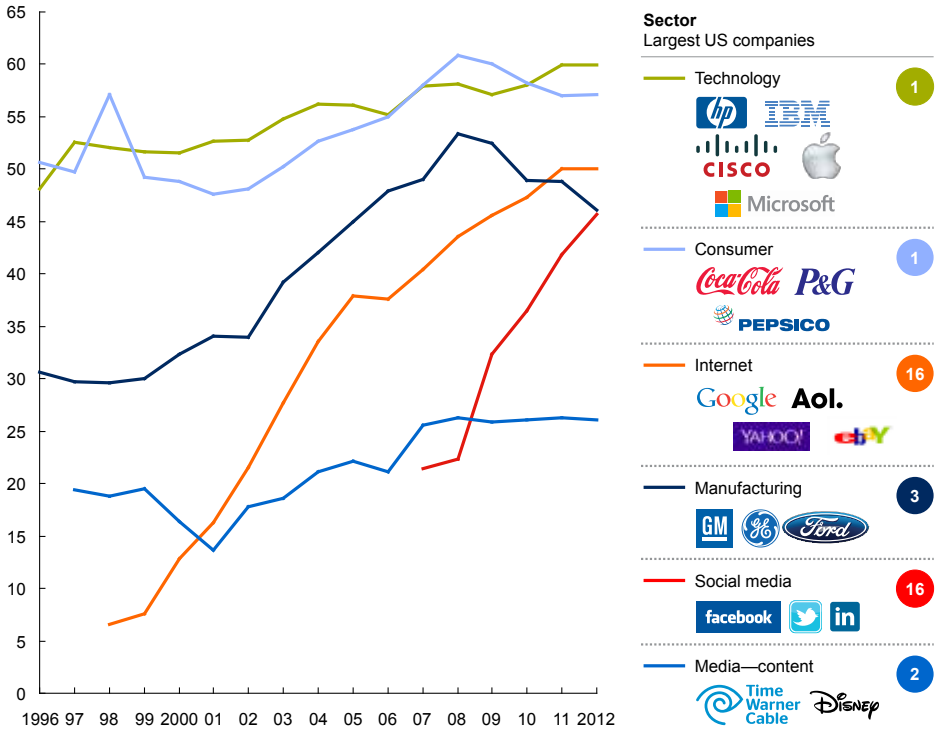
The increasing importance of digital technologies has not escaped anyone's attention. All business executives are well aware of the promise of rapid technological change, and the companies most directly involved in the Internet and social media revolution have been affected the most. Reflecting the rapid growth of knowledge-intensive sectors, Internet and social media businesses have been increasing their annual international revenue six to seven times as fast as more traditional sectors and are catching up or even overtaking those other sectors in terms of their foreign share of revenue (Exhibit 43).

Exhibit 43

Internet and social media companies have grown their international share of revenue the fastest

Share of revenue coming from outside the United States for largest US-based companies in each sector

% of total revenue



1 Base year is 1997 for media—content, 1998 for Internet, 2007 for social media.

SOURCE: Capital IQ; McKinsey Global Institute analysis

But, today, companies in every sector need to give their full attention to digital technologies and their impact on global flows of all kinds. Digital technology changes the rules of the game for many companies by enabling new business models—and new competitors. In the past, executives largely viewed technology as a way of cutting costs and boosting productivity. That remains the case, but digitization is shaking up the business landscape in much more fundamental ways: flows that were previously physical—from goods to people—can now increasingly be virtual; digital wrappers enable the monitoring and tracking of flows and production, helping to improve efficiency; and online platforms are not only creating new markets but are also enabling the full participation in the global economy of an unprecedented range of players. Above all, digital technology is dramatically accelerating the pace of change. We now discuss a number of imperatives for companies navigating the new landscape.

COMPETE FOR NEW OPPORTUNITIES IN EMERGING MARKETS

Greater connectedness, lower costs of trade, and reduced entry barriers are increasing the attractiveness of entering new markets in previously unexplored regions. But in order to tap these new opportunities, the majority of companies need to do more to structure themselves and operate in a genuinely global fashion. This entails building the right organizational structure and talent strategy, rethinking products and services, and conquering a broad array of other challenges that go beyond the scope of this report.[157]

To capture the opportunities and challenges that emerge from our research on global flows, businesses face three main imperatives.

Get to know the new competition

The expansion of global flows is opening up all companies to a whole new range of competitors, including companies from new geographies, new sectors, and new startups that can scale quickly. They need to get to know—and keep track of—the new competition. In which flows are they strong and in which are they weak? How is that changing? Which cities are building the infrastructure and skills they need to become important new waypoints? There are broadly three kinds of competition for large multinationals.

First, large companies from emerging markets are increasingly formidable global players. For instance, Bharti Airtel, the largest telecommunications company in India, has more than 260 million mobile customers around the world, more than the combined population of Germany, Japan, and Spain.[158] Lenovo is the largest PC seller in the world. Mumbai's Tata Sons is now the largest private-sector employer in the United Kingdom with more than 40,000 workers across Tata Steel, Jaguar Land Rover, Tata Consultancy Services, and TGB, a drinks branch that acquired British tea company Tetley. Two Mexican companies—Cemex and Bimbo—are the US market leaders for cement and bread, respectively.

Second, competition may come from companies from other sectors. Google now competes with credit card, telecom, and auto companies. Tesco is a player in finance and telecom as well as retail. China's Tencent and Alibaba are both examples of Internet firms that are looking to expand into banking services. New competitors can also show up at the intersection of sectors, such as between technology and healthcare. France Telecom's Orange is partnering with health-care providers to offer services that constantly monitor diabetics and cardiac patients remotely. Germany's T-Systems has linked with health-insurance provider Barmer to provide mobile systems that track and monitor exercise patterns.

157 For example, see *Urban world: The shifting global business landscape*, McKinsey Global Institute, October 2013; Yuval Atsmon, Peter Child, Richard Dobbs, and Laxman Narasimhan, "Winning the $30 trillion decathlon: Going for gold in emerging markets," *McKinsey Quarterly*, August 2012; Pankaj Ghemawat, "Developing global leaders," *McKinsey Quarterly*, June 2012.

158 *Annual report 2012–2013*, Bharti Airtel Limited, 2013; *Annual report 2012*, AT&T, 2013.

Third, many SMEs can now compete on a global stage. The increasing geographic reach and disaggregation of global supply chains have already created very large benefits to SMEs and entrepreneurs from all over the world. They have new opportunities to become suppliers, distributors, and retailers, serving large multinationals—and they can also source components from leading international companies to incorporate into their own products. Corning, for example, supplies its "Gorilla Glass" touch-screen display materials to 33 companies around the world that make 975 devices. Small companies not only have a growing ability to export and source internationally but also can take advantage of new online platforms to go anywhere in the world to tap into expertise they may not have in-house.

Advances in digitization and Internet connectivity have allowed small companies to expand globally in ways they never were able to before. A new company today can use developers from around the world, target consumers on a global scale through multiple app stores, and expand to hundreds of millions of customers in a matter of a few years if not months. This company could be located anywhere in the world where there is an Internet connection. For example, a new startup today could base all of its server capacity on Amazon Web Services and source manufacturing in China directly through Alibaba's business-to-business-to-customers online marketplace, bringing together exporters and importers from hundreds of countries. That would have been impossible even a decade ago.[159]

We are already seeing these developments help to loosen multinationals' grip on what has historically been a dominant share of trade flows. Although multinationals still account for the lion's share of FDI and trade flows, their share of flows is falling. In US exports, for example, their share has fallen from 71 percent in 1987 to 65 percent in 2012. Smaller outfits are catching up in physical flows and even faster online.

Balance cost and risk in location decisions

As the world becomes more connected, supply chains must also be more flexible and resilient to shocks. Toyota's experience after Japan was struck by a major earthquake and tsunami in 2011 highlights the vulnerability of supply chains to unforeseen events. Toyota's production capacity fell by 50 percent in Japan in the month following the tsunami, and this had a severe spillover impact on the company's North American manufacturing production, which declined to 30 percent of capacity, as downstream facilities had to wait for component parts from plants affected by the natural disaster.[160] Other car manufacturers that relied on Japanese suppliers were also hit, but companies that were able to draw on a more diversified supply chain were partly protected from the worst effects of this episode. Avoiding contagion in a globally connected world requires careful diversification of suppliers, which can have the added benefit of covering multiple time zones.

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

160 Toyota, *Toyota outlines timeline for restoring normal production*, press release, April 2011.

Building a robust supply chain also requires a shift in mindset on location decisions. Put simply, managers must stop making location decisions based on simple cost arbitrage. Hourly labor can account for as little as 10 percent of overall costs for many businesses today, and that may well shrink further because of technological advances that enable labor to be sourced more cost effectively. Rather than looking to offshore or reshore their supply chains based on cost alone, companies should focus on the "next shore" of location decisions: balancing economies of scale against the growing diversity of customer preferences, building supplier ecosystems that combine technical expertise with local insight, and developing talent to make the most of technological advances.[161]

For some businesses, the imperative to site supply close to the customer still applies. This is especially true for services, particularly those delivered face-to-face. But it can also be true for goods. Apparel giant Inditex and its Zara fashion brand, for example, have proven the value of locating production close to major markets. The company sources more than half of its products from Spain, Morocco, and Portugal to serve its 1,136 European stores—63 percent of all Zara stores worldwide. The company thereby benefits from a shorter, faster supply chain than its rivals and the ability to shift production quickly to replenish lines of sold-out stock, reducing the risk and need to be accurate in predicting next season's top sellers. Even though this configuration costs more than producing in a low-cost country such as China or Bangladesh, on a risk-adjusted basis it may not: Zara's flexibility of supply has been identified as vital to the company's success in quadrupling revenue since its 2001 initial public offering.

Adapt business models to local markets

Finally, many company business models will need to dramatically evolve. To succeed as a global business and reach the new niche markets enabled by global flows, companies have an opportunity to tailor their products and services to ever smaller sets of customers. This will be particularly important for reaching emerging-market consumers. For instance, companies may need to develop different products at lower price points, or package existing products in smaller quantities. In some markets, they may need to reduce their margin and earnings expectations to compete in what will be more competitive and volume-driven markets. This may be painful for companies accustomed to particular margin and earnings expectations, such as those publicly listed in developed economies.

Gaining deep knowledge of local markets—and competitors—is essential. Partnerships, joint ventures, and acquisitions often help foreign companies gain this expertise and may be more attractive in some situations. In a recent McKinsey survey, less than 40 percent of executives said that they were better than local competitors at understanding the operating environment and the needs of customers. Local partnerships can help overcome this knowledge deficit.[162]

161 Katy George, Sree Ramaswamy, and Lou Rassey, "Next-shoring: A CEO's guide," *McKinsey Quarterly*, January 2014.

162 Yuval Atsmon, Peter Child, Richard Dobbs, and Laxman Narasimhan, "Winning the $30 trillion decathlon: Going for gold in emerging markets," *McKinsey Quarterly*, August 2013.

CAPTURE THE OPPORTUNITY OF DIGITIZATION—AND MEET ITS CHALLENGES

Digitization offers a new wave of opportunities to use information to transform or enrich existing goods and services and to dramatically improve the efficiency of companies' operations. But digitization will also bring challenges in the form of concerns about data security and intellectual property and of new competition that disrupts established business models, often by making goods and services available for free.

Create digital platforms to facilitate global flows

There is a major opportunity for companies of all sizes to participate in global flows by creating platforms to enable production, exchange, distribution, and consumption across borders. The artisan who sells her product to an overseas customer through Etsy.com and the student in the developing world who accesses a world-class virtual education from Khan Academy are examples of new players in global flows. Companies and other players that find ways to connect the two sides of a potential market and unlock value can benefit enormously. For instance, Google's Consumer Barometer attempts to show the influence of online and offline information on consumers' purchasing behavior for more than 30 different product categories, including consumer goods, technology products, automobiles, leisure and entertainment, and finance and real estate. This consumer survey is available for nearly 40 advanced economies and emerging markets. Such information can be valuable to firms involved in marketing products, particularly as the Internet continues to change customer behavior.

Platforms to provide more transparency are also being used by public agencies. The World Bank's Procurement Innovation Challenge uses a crowdsourcing approach to identify best practices in public-sector procurement. In Europe, SAP, BASF, and Evonik have developed a Regional Demographic Location Risk indicator platform that provides transparency on regional risks and changes for prospective employers.[163] The platform lists indicators on human capital, labor productivity, and R&D performance for 260 regions in the EU. Another way that platforms can facilitate flows is by providing opportunities for more virtual collaboration across borders. An interesting example of this is Salesforce's Chatter product, which uses social technology to manage business processes and projects, and provide an integrated social network, on any end-user device. This product allows companies like Bayer Pharmaceuticals, one user of Chatter, to link geographically distant teams into virtual sales teams that provide faster customer service across functions and locations.

Address security and intellectual property issues

Beyond the challenge to the old ways of doing things are difficult and complex questions that companies need to address relating to data security. One study found that the number of compromised data records increased by 30 percent a year between 2005 and 2009 in the United States. Another study found that security compromises cost nearly $200 per record in detection, notification, and

163 Thusnelda Tivig, Katharina Frosch, and Stephan Kühntopf, *Mapping regional demographic change and regional demographic location risk in Europe*, Laboratory Demographic Change, series on sustainability and CSR, volume 2, May 2008.

remediation, as well as lost customers.[164] Finding the right balance between protecting intellectual property and being sufficiently open to flows of data that unlock innovation is another complex issue for companies. In the digital age—and the era of big data—we will see improved ways of generating and capturing data. But there needs to be an effective intellectual property system that will ensure that there are incentives to create valuable data and share it, without compromising companies' sensitive proprietary information.

RETHINK VALUE CHAINS AND FORGE NEW PARTNERSHIPS TO PARTICIPATE MORE FULLY IN FLOWS

For years, companies have focused on optimizing their supply chains for cost, seeking to procure components cheaply or exploit opportunities for global labor arbitrage. But the impact of digitization and new participants in flows will require companies to adjust their thinking. They need to adopt a "value" mindset to their global operations, recognizing that value can come from anywhere in the expanding global network of flows—in the form of a new innovation, a new market segment, access to a new resource, or even a new source of human capital. All of a company's suppliers, locations, and markets are potential new sources of value. Thinking this way, businesses will be better prepared to respond to how changes in global flows influence where value may be created along the value chain, which regions may play a role, and even how their value-chain partners may change.

One important part of a value-chain approach will be finding partners to address challenges and take advantage of global flows in new ways. New types of partnerships can enable companies to develop industry standards, create new products, and tackle shared challenges. We are already observing many examples of such partnerships among companies and suppliers, competitors, non-profits, and governments. Some companies already are working with universities and non-profit organizations to find technical and legal solutions for assuring privacy and cybersecurity in the field of big data and the Internet of Things.[165] Companies are using innovative partnerships to develop new products, reach new markets, and address skill gaps. In India, appliance maker Godrej partnered with microfinance groups and village councils to market, distribute, and provide financing for its ChotuKool line of portable refrigerators for rural consumers. In a number of emerging markets, global makers of consumer goods such as Unilever and Nestlé partner with an array of local logistics providers, using everything from barges to bicycle carts to get their products to markets. In Europe and the United States, biotech and pharmaceutical companies are entering new multidisciplinary research partnerships to analyze enormous open databases of clinical and genetic information, collaboratively develop new drugs and diagnostics, and conduct international trials.

164 *The leaking vault: Five years of data breaches*, Digital Forensics Association, July 2010; *2011 cost of breach study: United States*, Ponemon Institute, March 2012.

165 The Internet of Things refers to the capacity for objects and their virtual representations to be uniquely identified and tracked online. See Michael Chui, Markus Löffler, and Roger Roberts, "The Internet of Things," *McKinsey Quarterly*, March 2010.

In an era in which businesses will need to work even harder to find the skilled workers they need, opportunities to forge new partnerships with governments and educators are developing. Four out of ten respondents in a McKinsey survey reported that they currently couldn't find the talent they need. Yet in the same survey, one-third of employers said that they had never interacted with education providers. Educational institutions appear to be overconfident in how they are doing. More than 70 percent of those surveyed by McKinsey said their graduates were ready for the job market, but more than half of employers and young people themselves disagreed.[166] The message is getting through to many companies—around the world, global manufacturers are partnering with local educational institutions such as community colleges and trade schools to teach STEM skills (science, technology, engineering, and mathematics)—but this needs to become the norm for businesses.

Individuals—as consumers, entrepreneurs, and workers—can take advantage of global flows

The changing landscape of global flows is having a pervasive impact on individuals, too, in their roles as consumers, entrepreneurs, or workers. For consumers, the news is overwhelmingly positive, although, in our increasingly digital world, there is understandable caution about data privacy issues. Expanding global flows and digital technologies offer consumers unprecedented choice of goods and services to buy—and more cheaply than in the past. MGI research has found that the mobile Internet could create economic value of $20 trillion by 2025, and the vast majority of that value will be in the form of consumer surplus, or benefits to consumers that are not priced. For instance, only a fraction of the $1 trillion in estimated value of online search is likely to go to service providers, while the rest flows to people who use those tools.[167]

Individuals will increasingly have opportunities to become entrepreneurs, enabled by digital technology. As an illustration, an individual entrepreneur today can quickly download 3-D design software, create a new fashion or home product, and have it 3-D-printed and available for sale to a global market on an Internet portal such as Shapeways. Even a few years ago, that would not have been possible. Individual entrepreneurs have access to a wealth of information and cheap and easy ways to share ideas.

Online platforms offer a viable and cost-effective route to lifelong learning, which is becoming a necessity in a world in which the value of knowledge-intensive flows is growing faster than other flows. The global labor market today is one where there is a widening gulf in the employment prospects of those with the skills that companies need and those without them.

166 *Education to employment: Designing a system that works*, McKinsey Center for Government, 2013.

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

Educational opportunities will be more accessible and affordable than ever, driven by the phenomenal power of the Internet to disseminate knowledge at almost zero cost. The returns to education—especially in areas relevant to flows, such as languages, technology, and commerce—are set to reach new heights. Workers will need to develop the sophisticated, often specialized expertise that capitalizes on the trends in digitization, knowledge intensity, and international connectedness. For workers in the emerging world, there is a prospect that more fulfilling, better paid jobs may arrive in their countries through FDI or through virtual work platforms. Migration may become a less attractive—and less needed—option as their wages begin to converge with those of emerging economies, and technology facilitates virtual cross-border collaboration.

It is essential that individuals as workers embrace these new opportunities. Previous MGI research has found that the world could face a shortage of 40 million high-skilled workers. Moreover, up to 18 million of them could be in advanced economies, despite the fact that many governments are aggressively expanding college education.[168] On top of very large impending shortages of high-skilled workers, developing economies may experience a gap of 45 million workers with a medium level of skills by 2020. Industrialization is creating demand for people who have completed their secondary educations and have some vocational training, but there will simply not be enough of them. India alone could be dealing with a shortage of 13 million such workers. At the other end of the labor market are the low-skilled workers, and they face a steep uphill climb to make a living. MGI research suggests that as many as 95 million people with low skills may be unable to find a job by 2020, about two-thirds of them in developing economies.[169]

The challenge is not just the general level of skills but a mismatch between the skills people have and those that businesses need. A survey by the McKinsey Center for Government of more than 2,700 employers around the world found that 39 percent of employers say that skill shortage is a leading reason for entry-level vacancies, and more than a third said that a lack of skills is causing them significant business problems.[170] Young people need to understand the challenge lying ahead. One McKinsey survey found that fewer than half of the young people that it polled claimed to have even basic knowledge of average wages or the prevalence of job opportunities in their chosen field.[171]

168 *The world at work: Jobs, pay, and skills for 3.5 billion people*, McKinsey Global Institute, June 2012.

169 *An economy that works: Job creation and America's future*, McKinsey Global Institute, June 2011.

170 *Education to employment: Designing a system that works*, McKinsey Center for Government, 2013.

171 Ibid.

Governments need smart policies to capture the benefits of global flows

Policy makers need to adjust their thinking to the new world of global flows, in particular becoming much more thoughtful about the increasing dominance of knowledge-intensive goods and services, the torrent of data that is transforming cross-border activity, and the economic promise of digitization. Governments in developed and emerging economies face pressing questions. Taking into account factors such as the stage of their economies' development and where they boast comparative advantage, how should their economies participate in flows? Given evidence that the more open a country is to inflows and outflows alike, the greater the economic benefits, what can they do to enable participation through the right business environment, infrastructure, and talent? How can they ensure that the benefits of flows are shared fairly across society? What trade, investment, and immigration policies do they need? Is their economy in a position to capitalize on the growing trend toward digitization? In all aspects of policy they need to adopt a mindset that is more reflective of an increasingly interconnected global economy and encourages participation in global flows. Moreover, they have a shared imperative with business to plug gaps in data on global flows that currently hinder their ability to design smart policies to make the most of the opportunity of cross-border activity. Here are just a few of the key questions that policy makers should think about.

HOW SHOULD YOUR COUNTRY PARTICIPATE IN GLOBAL FLOWS?

All countries can benefit from active participation in flows and a central position in the network of flows. But there are potentially many ways to achieve higher participation and centrality. The right strategy for positioning will differ according to country-specific factors such as population size and stage of development and other factor endowments. Of which flows should your country be a net recipient or a net provider? Where do your comparative advantages lie? What opportunities exist to act as a waypoint or specialist? Overall, our research shows that the more participation in inflows and outflows, the greater the economic benefits are likely to be. Exporters and importers leverage their respective comparative advantages to increase productivity through specialization. Importers learn through access to new products and capabilities, implying, for example, that African nations could benefit from greater inflows of data and communication. Countries occupying central positions in flow networks can profit from smoothing frictions for others by becoming waypoints and facilitators of cross-border traffic. Whether these central positions relate to physical, cultural, or linguistic factors, serving as a gateway for flows can offer value. For example, the country of Estonia and the city of Vienna play important roles in linking Western Europe with Russian and Eastern European markets. Austrian banks were among the largest players in the Balkans in Central Eastern Europe after the enlargement of the EU because they could still build on links that were established more than a century previously.

DO YOU HAVE THE RIGHT INGREDIENTS TO PARTICIPATE IN GLOBAL FLOWS?

Governments need to play an active role as enabler of the private sector to participate in flows. They are likely to be most effective if they plan ahead to ensure that all the key enablers are in place, including human capital, the business environment, and infrastructure such as transport, logistics, and broadband telecommunications. It may be helpful for policy makers to establish corporate-like planning functions to identify what is necessary to encourage participation in flows. Options might include tailored and targeted efforts to attract FDI relevant to knowledge-intensive industries and/or action to support entrepreneurship and the international expansion of small and medium-sized enterprises. Other options include inviting private-sector participation in infrastructure.[172] Broad investment is also required in education, training, and human capital development so that all citizens can have the know-how to take advantage of unfettered flows.

HOW CAN YOU ENSURE THAT THE BENEFITS OF FLOWS ARE CAPTURED AND SHARED FAIRLY ACROSS SOCIETY?

Although participation in global flows benefits economic performance broadly, the level and speed of change implied by the shifts in global flows we have described in this report suggest that, in the short term at least, governments will probably need to play a role to smoothing transitions. There are clear distributional effects within societies as economies participate more openly in global flows and, despite the net benefits, many people could be disadvantaged.[173] Policy makers must decide how to ensure that the gains are shared, and how to support those who lose out from greater openness. Governments could support their retraining, for instance. However, despite the fact that there is a range of proven policies to help those people who lose their jobs as economies become more open, research suggests that most governments have a poor track record at managing such transitions.[174]

WHAT TRADE AND IMMIGRATION POLICIES DO YOU NEED?

The other major role government plays is as regulator. Policy can act as a barrier to flows, undermining their economic benefits, or it can encourage participation in them. Obstacles to flows include tariff barriers and non-tariff barriers, including regulatory tools such as safety standards and country-specific licensing arrangements. On average, applied tariffs have fallen from 30 percent in the mid-1980s to roughly 10 percent in 2010. But there are notable exceptions in some product categories, such as food and beverages, and also of some countries, such as Thailand and India, which continue to impose prohibitive tariffs.[175] More important, even as tariff barriers fall around the world and preferential trade agreements proliferate, tariffs are sometimes simply replaced by non-

172 *Infrastructure productivity: How to save $1 trillion a year*, McKinsey Global Institute and the McKinsey Infrastructure Practice, January 2013.

173 David Autor, David Dorn, and Gordon Hanson, "The China Syndrome: Local labor market effects of import competition in the United States," *American Economic Review*, volume 103, number 6, 2013.

174 Paul A. Samuelson, "Where Ricardo and Mill rebut and confirm arguments of mainstream economists supporting globalization," *Journal of Economic Perspectives*, volume 18, number 3, 2004.

175 *Manufacturing the future: The next era of global growth and innovation*, McKinsey Global Institute and the McKinsey Operations Practice, November 2012.

tariff barriers. Many industries with falling tariffs continue to see government interventions, sometimes with protectionist measures—for instance, in industries such as autos and steel, which governments tend to regard as national priorities for employment and competitiveness.

Non-tariff barriers are often more opaque and difficult to resolve because that requires consensus among many countries. For example, in Europe, licenses are not necessarily unified and do not necessarily apply across the borders of the Single Market. That means a new pharmaceutical drug can be approved in a single country but needs to obtain special recognition to be allowed in all European countries. Standardization is a key lever for removing such barriers. Harmonizing and unifying license-to-trade approval would reduce the bureaucratic burden of obtaining multiple approvals and therefore lessen friction and the cost of trade. Onerous customs procedures are another barrier. Standardizing, re-engineering, and even digitizing customs processes across borders could have a significant impact on increasing trade and reducing administrative costs. Common multilateral standards are far less common for services and information data and communication than for goods, despite the fact that many goods are produced by heavily regulated sectors that are therefore subject to high non-tariff barriers.

In some cases, there are direct policy restrictions such as caps on immigration—even that of high-skilled workers—that policy makers should examine carefully. Encouraging people flows by reducing or amending immigration rules could help to encourage flows of workers who bring with them talent, knowledge, and expertise that can improve the receiving economy's productivity. Although the politics surrounding immigration issues are undoubtedly contentious, there appears to be a valuable opportunity for most nations to benefit from increasing flows of migrants. This can be achieved through targeted policies to attract highly skilled individuals for knowledge-intensive industries, but can also be aimed at building the workforce available for local services such as elderly care.

IS YOUR COUNTRY PREPARED TO CAPITALIZE ON THE GROWING TREND TOWARD DIGITIZATION?

In a world in which data and communication flows are transforming all others, arguably the most important imperative for policy makers is to prepare their economies and business landscape to thrive in today's digital landscape. Building the right infrastructure to support rapid growth in the Internet and digitization is vital, of course, as is developing relevant skills through the education and vocational training systems. But so too is policy. Just as many governments all over the world have turned their backs on protectionism in goods trade and embraced a greater degree of openness to trade flows, so too should they make a similar shift in their approach to services and to digital technologies.

Much of current trade policy was created prior to, or without full understanding and knowledge of, the impact of digital or even services flows. It is therefore becoming increasingly out of date. As the impact of digital flows continues to grow, policy makers must develop their approach to embrace greater openness and connectedness to digital flows and make a concerted effort to become part of the global digital infrastructure. They should consider how they can

support global standards and avoid instituting policies that restrict data and communication flows, while at the same time balancing the very real risks to privacy and national security. Policy makers, like companies, need to engage in the issues of data security and intellectual property to ensure that they do not endanger security or distort market incentives and thereby discourage companies from participating in flows. Appropriate protection of intellectual property and balancing the enforcement of property rights with fair use improves the ease of doing business, enhances innovation, and reduces the risk to trade, driving participation. Dialogue and agreements between the United States and Japan on cross-border Internet policy can serve as one model of the types of policy frameworks that will be needed.

Governments can help lead their country's transition toward greater digitization through investment in supportive digital ecosystems that include the development of human and financial capital, digital infrastructure, and business environment. Measures could, for instance, include government-sponsored training programs, direct funding and indirect financial incentives for private-sector investment in digital sectors, investment in high-speed broadband, and development of ICT and innovation clusters. Governments can also act as role models by sharing data openly and operating and engaging with citizens through digital mediums.

HOW CAN YOU WORK MULTILATERALLY TO MITIGATE THE STRESSES OF INCREASED CONNECTEDNESS?

Connected policy is vital in a connected world. As global flows bind our world more tightly together, the need for internationally coordinated policy in certain arenas becomes ever more pressing. Connectedness creates a new level of interdependence between countries that share a reliance on common resources like the environment and global security. These resources can be materially damaged by the actions of a single country, so it is imperative that countries align to support and sustain them. The environment, for example, will bear the brunt of higher energy consumption from increased flows. Globally inclusive, multilateral arrangements must play a greater role in helping to protect and secure such resources against such a high-risk backdrop.

□ □ □

Global flows are transforming the world from a set of discrete, isolated markets to a global marketplace in which goods, services, capital, people, and data and communication move ever more seamlessly across borders. These flows are changing not only the way that countries trade but also the way that companies operate, individuals work and learn, and people communicate. The world's new web of interconnection is creating new opportunities for wealth creation, but this is not without its costs or risks. Businesses need to gear up for different forms of competition for market share, for resources, for talent, for jobs, and for position within the network of global flows. Those who spot potential new markets and move quickly to fill the gaps, or those who create platforms to enable greater cross-border traffic, can realize enormous economic rewards. For many individuals, the transition to greater openness creates new opportunities to market their skills and learn, but it creates stresses for others in the transition. They may be able to look to their governments for help but they also need to upgrade their skills. Governments can do more to enable openness to flows so that their economies can capitalize on their economic benefits, and they must improve their handling of the stresses of transition, multilaterally where possible. For all players in the new web of global flows, smart strategy and policy are possible only with a full understanding of the new patterns of global flows that are changing our world. It is our hope that this report has made a contribution to that end.

Technical appendix

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

1. Data sources and definitions
2. Statistical analysis of global flows and GDP growth
3. The McKinsey Global Institute Connectedness Index
4. Future scenarios of global flows
5. Cross-border flows by sector, region, and country

1. Data sources and definitions

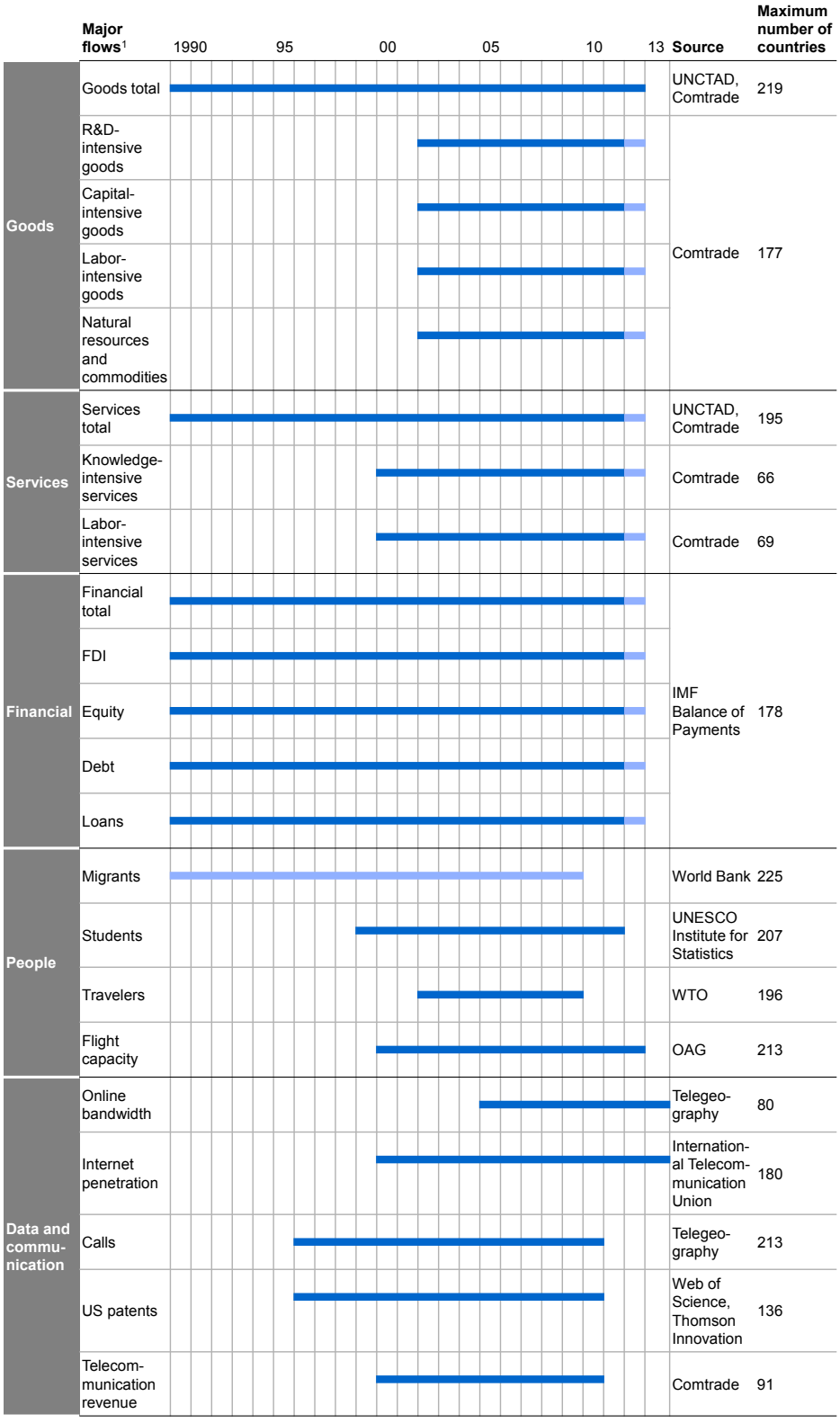
GLOBAL CROSS-BORDER FLOWS

We compiled a data set containing five categories of flows for up to 219 countries for 1960 to 2012 or longest available—in most cases, consistent data are only available starting in 1990 (Exhibit A1). This means that the number of countries included in different components of our analysis varies. The data set draws on multiple sources that we describe in more detail later in this section. For each 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. Total figures for flows used in this report refer to the broadest coverage available.

We used sub-categories of overall goods, services, and financial flows for specific analyses. For example, our analysis of knowledge-intensive flows includes only the knowledge-intensive sub-categories 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 commodity 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 base them on data from several sources. People flows and data and communication flows are not comprised of any one single aggregate flow. Instead, we analyzed several components within these flows such as international student flows and tourist arrivals for people flows, and cross-border Internet traffic and cross-border phone calls for data and communication flows.

Exhibit A1

The compiled dataset contains up to 219 countries and provides comprehensive coverage of the past decade



1 Not including flows that represent a small fraction within each flow category.

SOURCE: McKinsey Global Institute analysis

Goods flows

In this report, we analyzed the historical growth in the global flow of goods, its dispersion across countries and regions, and its transformation due to digitization and knowledge intensity. We also estimated scenarios of future growth in the flow of goods.

The primary source for goods data is the Comtrade database, which provides bilateral and non-bilateral data from 1962 onward. We analyzed more than 5,200 product codes between 2002 and 2011, and we divided the product codes into the five categories we list below. For all analyses requiring bilateral data at the product category level, as well as bilateral and non-bilateral data broken down by category prior to 2002, we used data from IHS Economics & Country Risk, which provides bilateral data from 1995 split into 127 product categories in both value and volume. For much of our product- or category-level analysis, data were available only until 2011. To estimate 2012 data, we calculated average compound growth rates over the preceding three years (2009–2011), and projected those rates to 2012.

We sub-divided goods flows into five categories of flows, each of which has a number of sub-groups. These categories were made using the same methodology as previous MGI reports, with the addition of a separate commodities category that includes metals and metal products, mining and oil and gas.[176]

R&D-intensive goods

- **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; and 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 semi-trailers, 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

176 *Trading myths: Addressing misconceptions about trade, jobs, and competitiveness*, McKinsey Global Institute, May 2012.

the production of mining and metal products, food, beverage, and tobacco products; and domestic appliances.

Capital-intensive goods

- **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, starches and starch products, as well as 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; manufacture of corrugated paper and paperboard and containers made out of those materials; and 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 goods

- **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 wearing apparel.** Includes the manufacture of fur and non-fur wearing 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 planning of wood; the manufacture of wood, cork, straw; and the manufacture of wood products including furniture, musical instruments, sports goods, and toys.

Natural resources

- **Agriculture, hunting, fishing and related activities.** Includes the growing of crops, farming of animals, and 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.

Commodities

- **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, of 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, refined petroleum products, and the processing of nuclear fuel.

Services flows

All non-bilateral services flows data come from the International Trade Centre's Trade Map. For bilateral data, we used the United Nations Services Trade data. We sub-divided services flows into four categories: knowledge-intensive, labor-intensive, capital-intensive, and public services. Each of these also has a number of sub-groups:[177]

Knowledge-intensive services

- **Insurance services.** Includes 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 reinsurance.

- **Financial services.** Includes the 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.** Includes the 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.[178]

Labor-intensive services

- **Transportation.** Includes 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.

- **Travel.** Includes 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.

177 The definitions used for the sub-groups are closely based on IMF Balance of Payments Manual definitions.

178 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 re-sale is recoded as value of merchanting service.

- **Construction services.** Includes 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.

- **Personal, cultural and recreational services.** Includes audio-visual and related services and other cultural services provided by residents to non-residents and vice versa.

Other services

- **Capital-intensive communications services.** Includes communications transactions between residents and non-residents (i.e., postal, courier, and telecommunication services).

- **Health, education, and public services.** Covers all services (e.g., spending by embassies and consulates) associated with government sectors or international and regional organizations and not classified under other items.

The coverage of services data is most effective at the aggregate level rather than broken into these four categories. Moreover, the bilateral trade data covers only around 60 percent of total services trade as indicated in the non-bilateral trade data sets. Throughout the report, we use the most complete data set available for the purposes of each analysis.

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 and deposits.** 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 IMF.

In addition to these financial inflows and outflows, we look at remittances, payments, and international aid. 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:

- **Remittances.** Our analysis of the long-term development of remittances draws on the McKinsey Remittances Pool database. We amend the analysis using data on bilateral remittances flows in 2010 to 2012 from the World Bank.
- **International aid.** We use net bilateral aid data from the World Bank.
- **Payments.** We use data compiled for the 2013 McKinsey Global Payments Map.[179]
- **Bilateral FDI.** Bilateral FDI flows are sourced from the OECD, ITC, Cepal, and national central banks and statistical offices.

People flows

Unlike goods, services, and financial flows, 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 and one approximation for people flows:

- **Migration.** While all other measures capture or approximate flows of people, our migration data are stock data, indicating foreign-born residents by country. We have data for both immigrants and emigrants by country. Our sources provide data every 10 years from 1960 to 2010, compiled by the World Bank.
- **Travelers.** Arrivals of non-resident visitors or tourists at national borders, drawn from the UN World Tourism Organisation.
- **Students.** International flows of mobile students at the tertiary level (ISCED 5 and 6) from the UNESCO Institute for Statistics.
- **Flight schedules.** This approximation of people flows provides the airline flight capacity by bilateral connection, provided by OAG (formerly the Official Airline Guide).

Data and communication flows

We looked primarily at three types of flows:

- **Online bandwidth.** These data capture cross-border connections of IP bandwidth from Telegeography, which provides data by region, country, and key routes from 2005 to 2013. Telegeography also provides data on cross-border traffic, but for a shorter period, from 2007 to 2013. We used these data to calculate the ratio of cross-border traffic-to-bandwidth ratios for 2007 to 2013. To estimate 2005 and 2006 cross-border traffic, we used a linear extrapolation of the traffic-to-bandwidth ratio to estimate values for 2005 and 2006. We applied these regional ratios to our country-level bandwidth data for 2005 and 2006 to estimate cross-border Internet traffic. For cross-border traffic forecasts from 2013 to 2017, we used Cisco's Visual Networking

179 For other analysis based on the McKinsey Global Payments Map, see for example, *Global payments trends: Challenges amid rebounding revenues*, McKinsey & Company, September 2013.

Index, which includes total IP traffic data by region (i.e., both domestic and international).

- **Internet penetration.** These data show the proportion of households in a country with an Internet connection.

- **Calls.** International call data included a split by technology, between time-division multiplexing (TDM) and VoIP. Telegeography provided call data from 1996 to 2011, but VoIP coverage goes back only to 2004.

In addition to bandwidth and calls, we used data on other types of data and communication flows including academic co-authorship (Chapters 1 and 3), patents (Chapter 3), and Twitter (Chapter 3):

- **Academic research.** Our research data captured levels of research output per country in three separate years: 1993, 2002, and 2012. We used data from Thomson Reuters' Web of Knowledge, which is primarily a bilateral data set showing all cross-border co-authorship collaborations on academic research papers produced by the 50 top research-producing countries.

- **Patents.** While dozens of countries have patent offices, we chose to look primarily at the world's three major patent offices: the United States Patent and Trademark Office, European Patent Office, and Japan Patent Office.

- **Twitter.** The data we used for Twitter followers and replies are from 2012. While only a small number of Twitter accounts include geographic information, Twtrland, a major provider of Twitter data, assigned countries to users with a statistical-based machine learning algorithm. Our data set consisted primarily of 30 base countries.

KNOWLEDGE-INTENSIVE FLOWS

We define knowledge-intensive flows as cross-border goods, services, financial, people, and data and communication 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 sub-categories of global flows as knowledge-intensive (Exhibit A2).

- **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 the 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).** We allocated services flows to the category knowledge-intensive services that require 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 linked the most 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 these revenues to 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 travelers spend (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.

Exhibit A2

A new prism through which to look at global flows is knowledge-intensive flows

Traditional flows	Goods	Services	Financial	People
2012 value of total flows (% knowledge-intensive)	▪ $17.5 trillion (48%)	▪ $4.4 trillion (47%)	▪ $4.9 trillion (47%)	▪ 200 million migrants ▪ 1.1 billion travelers ▪ $103 billion business travel spend
Knowledge-intensive **$12.6 trillion**	▪ R&D-intensive manufactured goods (e.g., high tech, electronics, pharmaceuticals)	▪ Business services ▪ Patents and royalties ▪ Telecommunica-tion revenue	▪ FDI	▪ Business travel
Other	▪ Commodities ▪ Labor-intensive goods ▪ Capital-intensive goods (e.g., steel)	▪ Construction ▪ Labor-intensive services ▪ Transportation	▪ Loans ▪ Equities ▪ Bonds	▪ Long-term migrants ▪ Tourism ▪ Short-term travelers ▪ Students
Data and communication[1]		▪ IP bandwidth (207 terabits per second[2]) ▪ Business calls (465 billion minutes) ▪ Residential calls (48 billion minutes)		

1 Data and communication flows include economic activity associated with each of the other four major flows.
2 Terabits per second is the standard data transfer volume.
SOURCE: McKinsey Global Institute analysis

COUNTRY CLASSIFICATIONS

For some analyses, we classify each of the 219 countries in our sample as either a developing economy or a developed economy. For the developed economies we use the terms *developed economies*, *mature economies*, and *advanced economies* interchangeably. For developing economies, we also use the terms *emerging markets* or *emerging economies*.

We also assigned each country to one of ten regions, six of which we define as emerging and four developed. This classification of countries and their assignment to regions follows the approach used in previous McKinsey Global Institute reports.[180] We define Singapore, Hong Kong, Taiwan, and Macao as developed economies despite the fact that they are located in emerging-market regions (Exhibit A3). We combine South Asia and Southeast Asia into Other Asia region in our analysis of interregional and intraregional trade in Chapter 3.

Exhibit A3

Classification of countries and cities into regions and development level

	Europe, Middle East, and Africa	Americas	Asia
Developed regions	**Western Europe** ▪ Austria ▪ Belgium ▪ Cyprus ▪ Denmark ▪ Finland ▪ France ▪ Germany ▪ Greece ▪ Iceland ▪ Ireland ▪ Italy ▪ Luxembourg ▪ Malta ▪ Netherlands ▪ Norway ▪ Portugal ▪ Spain ▪ Sweden ▪ Switzerland ▪ United Kingdom	**North America** ▪ Canada ▪ United States	**North East 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 20 other countries **Africa & Middle East** ▪ Algeria ▪ Angola ▪ Botswana ▪ Cameroon ▪ Egypt ▪ Ghana ▪ Iran ▪ Israel ▪ Jordan ▪ Kenya ▪ Kuwait ▪ Lebanon ▪ Mauritius ▪ Morocco ▪ Nigeria ▪ Saudi Arabia ▪ South Africa ▪ Tunisia ▪ United Arab Emirates Plus 42 other countries	**Latin America** ▪ Argentina ▪ Bolivia ▪ Brazil ▪ Chile ▪ Colombia ▪ Costa Rica ▪ Dominican Republic ▪ Ecuador ▪ Guatemala ▪ Jamaica ▪ Mexico ▪ Panama ▪ Uruguay ▪ Venezuela Plus 25 other countries	**China region** ▪ Hong Kong[1] ▪ Macao ▪ China ▪ Taiwan **South Asia[2]** ▪ India ▪ Pakistan ▪ Bangladesh ▪ Sri Lanka And 4 other countries **Southeast Asia[2]** ▪ Philippines ▪ Malaysia ▪ Cambodia ▪ Indonesia ▪ Thailand ▪ Vietnam ▪ Singapore[1] Plus 14 other countries

1 Classified as a developed city despite being located in a region classified as emerging.
2 Combined to form "Other Asia" in analysis regarding interregional vs. intraregional trade.
SOURCE: McKinsey Global Institute Financial Assets Database; McKinsey Global Institute analysis

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

2. Statistical analysis of global flows and GDP growth

In Chapter 1, we discuss why cross-border flows matter for macro-economic performance, in particular economic growth. This appendix describes our empirical test of the extent to which flows are correlated with country GDP growth as measure of economic growth.

ECONOMIC GROWTH THEORY BACKGROUND

According to the classical Solow growth model, economic growth is linked to factor accumulation of labor L and capital K. Assuming a traditional Cobb-Douglas production function of the form:

EQUATION 1

$$Y = A \times K^{\alpha} \times L^{\beta}$$

then the economic growth rate, or $log(Y)$, is simply the weighted sum of the growth in capital, $log(K)$, and of the growth in labor stock, $log(L)$, by factor shares. The growth in A, the residual in the production function, is an estimate of technological progress, among other factors. In reality, it captures all production factors beyond factor accumulation that also shift GDP.

This model used to fit well with early realities in the early 20th century when around two-thirds of the differences in countries' economic growth were explained by factor accumulation. Since then, the part explained by accumulation has been continually decreasing, implying that a major part of growth is left unexplained. Note, too, that Equation 1 implies decreasing marginal returns on accumulation, so that continuous GDP growth must come from continued growth in A—that is a shift in economic progress. The endogenous theory of growth, pioneered by P. Romer among others, deconstructs this all-encompassing factor A, linking it to innovation and to human capital. Innovation is a process by which new ideas are becoming industrialized and replace old vintages of capital; human capital shifts the productivity of labor by adopting better practices in the labor force. This theory helped explain part of the residual, A, especially since human capital appeared to be an important factor in explaining economic growth.[181]

Recent extensions to this model went on to look for other sources of increasing returns, for example the presence of positive externalities by which emerging economies could further catch up or converge to more advanced economies. One such externality affecting growth through a globalization channel is the economic progress embedded in imports of goods and services or inflows of FDI. Other economists explicitly added openness-to-trade as a key channel of economic growth, showing that higher connected countries may benefit from more robust growth.[182]

181 For an overview of different growth models see for example Barro and Sala-i-Martin, *Economic growth*, MIT Press, October 2003

182 See, among others, Axel Dreher, "Does globalization affect growth? Evidence from a new index of globalization," *Applied Economics*, volume 38, number 10, 2006.

A MORE ROBUST EMPIRICAL TEST OF GLOBAL FLOWS AFFECTING ECONOMIC GROWTH

Summarizing our discussion above, one can postulate that economic growth is linked to factor accumulation, to factor quality (e.g., human capital), and to other sources of positive externalities, possibly directly through global flows.

Our empirical test includes all of those variables as an extension to Equation 1 above, but we also provide a more complete and more robust estimation of economic growth drivers.

First, GDP and factors explaining GDP have continued to grow over time, meaning that none of these variables can be considered stationary. Taking those variables in growth level creates data stationarity, but the caveat is that the transformation may destroy any high-order relationship between GDP and explanatory variables. In our modeling we chose to alleviate this problem by using an error correction model (ECM). The ECM is the correct representation of the data process when data are non-stationary, and co-integrated in level. The ECM representation is validated by the data, proving the co-integration relationship between GDP and our explanatory variables. In passing this co-integration implies (Granger) causality, which is more than a simple correlation between growth drivers and GDP growth.

Second, the ECM representation allows us to differentiate between the short-term and long-term effect of the drivers of GDP growth. This is important if we want to distinguish between cyclical (short-term) and structural (long-term) effects. The ECM short-term to long-term effect provides an estimate of the speed of adjustment toward long-term structural factors. This also is important if one wishes to know the time it takes for any policy to produce structural change.

Third, though recent analysis has looked at the effect of global flow of economic growth, none seems to look at the full comprehensive set of flows, such as from trade to information flows. We are incorporating all those flows as explanatory variables in our model, recognizing as well that multicollinearity may make estimates of individual flow impacts non precise, and that a major flow driver such as digitization may not yet show significant impact in the regression analysis, as it is too recent a trend.

Fourth, global flows matter, but the network structure of those flows is likely to matter, too. As detailed, elements of the network structure are difficult to estimate, and we are therefore testing an extension of our model only on goods and services trade flows, not on any other flows, and thus on a subset of time and countries where data could have been collected.

Fifth, the data set used in the regression is extensive and up to date, covering around 105 countries (depending on the exact specification) for an average period of 15 years up to 2012. The data set thus contains far more countries than years, which is likely to generate country-specific effects in the data. To account for this, 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 in order to control for country time-invariant effects like the legal system or colonial history.

Our final model to estimate GDP growth takes the following form, adding a disturbance term ε, and noting by CV a vector of control variables, and by $Flow$ a vector of flow variables:

EQUATION 2

$$\Delta\log(\text{GDP})_{i,t} = \alpha + \beta_j \Delta\log\text{CV}_{i,t} + \beta_m \Delta\log\text{Flow}_{i,t} + \beta_l \log\text{GDP}_{i,t-1} + \beta_k \log\text{CV}_{i,t-1} + \beta_n \log\text{Flow}_{i,t-1} + \varepsilon_{i,t}$$

where

- The short-term effect is captured by the CV and $Flow$ variable denoted by subscript t, while the long-term effect is captured by the CV and $Flow$ variables denoted by subscript $t\text{-}1$
- $-1<\beta_l<0$ is the adjustment variable of the ECM
- i represents country i, t the current year, and $t\text{-}1$ the past year.

The set of control variables CV in the estimation are as follows:

- Human capital measured by average years of schooling by the adult population; the size of the labor force that comprises of people aged 15 years and older who constitute the economically active population; the real fixed financial stock, derived from accumulated real fixed investment by subtracting depreciation.
- Government consumption, which is the ratio of general government consumption to GDP.
- Political risk indicator, which is an index and captures both political risk and institutional quality, with a higher value indicating less risk.
- Convergence variable, which is calculated by the per capita GDP of country i relative to the world's average per capita GDP. This variable is used only as lagged value but not as difference.

The flow variables used in the estimation are goods, services, financial, and data and communication flows (Exhibit A4). We estimate the regression for inflows, outflows, and total flows separately. Goods, services, and financial flows are expressed as ratios of flow over GDP. Data and communication flows are approximated by call volume relative to both GDP and population size.

Exhibit A4

Dependent and independent variables used in regression analysis

Primary variables of interest

All variables measured by country

1,451 country-year observations

Dependent variable
Annual growth rate for real GDP

Independent variables	Immediate impact/Long-term impact		
	Expected sign of coefficient	Estimated sign of coefficient	Statistically significant? (90% level)
Goods flows	Positive/Positive	Positive/Positive	Yes/Yes
Services flows	Positive/Positive	Negative/Negative	Yes/Yes
Financial flows	Positive/Positive	Positive/Positive	Yes/No
Data and communication flows	Positive/Positive	Positive/Positive	Yes/Yes
Labor force	Positive/Positive	Positive/Positive	Yes/Yes (No)[1]
Years of schooling	Positive/Positive	Positive/Positive	Yes/No
Fixed capital stock	Positive/Positive	Positive/Positive	Yes/Yes
Government consumption	Ambiguous	Negative/Negative	Yes/No
Political and macroeconomic stability index	Positive/Positive	Positive/Positive	No/No
Convergence variable	Negative	NA/Positive	NA/Yes
Lag of real GDP growth rate	Negative	NA/Negative	NA/Yes

1 Coefficient is statistically significant when the regression includes data and communication flows adjusted by population, but insignificant when data and communication is adjusted by GDP.

SOURCE: McKinsey Global Institute analysis

CALCULATING SHORT-TERM VS. LONG-TERM ELASTICITY

An ECM model produces two sets of coefficients for every variable. One is the short-term elasticity or shock of the variable on the GDP growth, and the other is the long-term elasticity of the variable on the GDP growth. The short-term elasticity is the coefficient of β of the Δlog and means that a 1 percent increase in the flow or control variable leads to a β percent increase in the rate of GDP growth. The long-term elasticity is calculated by dividing the coefficient β of the lagged control or flow variable with the coefficient of the lagged GDP growth variable and multiplying this by (-1). The short-term elasticity provides the contemporaneous or simultaneous relationship between the explanatory variable and GDP growth. The long-term elasticity indicates the long-term relationship between the variable and GDP growth until the economy reaches a stable state. The period until the full change is realized is called the adjustment period and is the inverse of the β of the lagged dependent variable.

The signs we obtain on each of the flow variables is generally as expected, with the exception of service inflows (Exhibit A5). The coefficient on service inflows is negative in both the shock variable and in the long-term variable, while we would expect it to be positive. We believe this result is due to several factors. First, the service flow series is highly correlated with the goods flow variable. The resulting multi-collinearity in the data makes it difficult to disentangle the full effect. In addition, service inflows to a country are sometimes very high for countries with low income levels and poor macroeconomic conditions, since industries such as banking, accounting, construction, and law are not well-developed. Indeed, when we run the regression for emerging markets and developed economies separately, we find the negative coefficient on services flows stronger in emerging economies.

Exhibit A5

Cross-border flows mostly have a significant impact on countries' GDP growth rates, both in short term and long term

Immediate (IMM) and long-term (LT) elasticities by flow/ GDP regressed on GDP growth

Positive impact
Negative impact
Statistically insignificant at 10%

	Goods		Services		Financial		Data and communication[1]	
	IMM	LT	IMM	LT	IMM	LT	IMM	LT
All flows/GDP	0.212	0.330	-0.157	-0.158	0.036	0.114	0.008	0.062
Data and communication/ population; all other flows/GDP	0.185	0.193	-0.138	-0.059	0.035	0.098	0.014	0.063

	Goods + Services		Financial		Data and communication[1]	
	IMM	LT	IMM	LT	IMM	LT
All flows GDP	-0.011	0.046	0.037	0.249	0.005	0.116
Data and communication/ population; all other flows/GDP	-0.012	0.050	0.035	0.159	0.016	0.096

1 Data and communication are approximated by our most complete dataset on information flows capturing inflows and outflows of phone calls.
SOURCE: McKinsey Global Institute analysis

We estimate the total relationship of an increase of cross-border goods, service, financial, and data and communication flows by first applying the long-term growth rates by flow to the calculated long-term elasticity, and then summing the resulting basis-point contribution to GDP growth across flows. The long-term growth rates we use for growth in goods (1.0 percent compound annual growth rate), services (1.5 percent), goods and services jointly (1.2 percent) and financial flows (0.6 percent), all as a share of global GDP, are based on 30-year averages, while the growth rate for call volumes as a share of GDP (3.5 percent compound annual growth) and call volumes relative to population (4.8 percent) are based on ten-year averages, a more conservative approach given that growth rates have flattened in the recent decade.

We also have produced a range of estimates, testing different specification with and without goods and services flow pooled or not, or normalizing data and communication flows by GDP or by the population size of the respective country. Based on those sensitivities, we obtain results that suggest a contribution of flows to GDP growth of 0.4 to 0.6 percentage points, or a contribution of around $250 billion to $450 billion growth a year.

NETWORK CENTRALITY

In a separate analysis, we investigated the importance of a country's position in the network of trade for its GDP growth. More flows routes and connections with a greater number of neighbors should reflect a more diverse portfolio of imports. This broader portfolio benefits a country by enriching the consumption basket, enabling companies to source ideas and input from all over the world, and by reducing their dependence by taking advantage of the global competitive

landscape. 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 indicates 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: eigenvector centrality and the number of routes. We use both inbound and outbound metrics separately, drawing on data from CEPII.[183] The eigenvector centrality is the position in a network from calculating the eigenvector based on the positions of a country's neighbors. It is the 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. Both measures are calculated using Comtrade data for goods trade, which is the most complete and commonly used bilateral data sets compared with all other flows.

We use the same model specification in terms of control variables as we do for the combination of flows. Instead of modeling several flows together, we look at only goods flows, add an interaction term that is the product of the flow and the network variable, and include the network variable on its own:

EQUATION 3

$$\Delta \log GDP_{i,t} =$$
$$\alpha + \beta_j \Delta \log CV_{i,t} + \beta_k \log CV_{i,t-1} + \beta_l \log GDP_{i,t-1} + \beta_m \Delta \log Flow_{i,t} + \beta_n \log Flow_{i,t-1}$$
$$+ \boldsymbol{\beta m(\text{Centrality} \times \Delta \text{logFlow} i,t)} + \boldsymbol{\beta n(\text{Centrality} \times \text{logFlow}_{i,t-1})}$$
$$+ \boldsymbol{\beta_o \Delta \text{logCentrality}_{i,t}} + \boldsymbol{\beta_p \text{logCentrality}_{i,t-1}}$$
$$+ \varepsilon_{i,t}$$

We examine the effect of the network variables both for the inflow and the outflow of goods. As the measures for centrality were derived looking at the network for trade in goods only, we focus our analysis on this flow. The impact of centrality was significant for both short-term and long-term of goods inflows. The impact was less pronounced for outflows. This suggests that there is real value to importing a diverse basket of goods from a broad set of countries, likely as the information embedded in imported goods has real and tangible benefits to the importing country.

Combining the coefficients of the flow variable and the interaction term (centrality x flow), we can estimate the additional impact of growth in the flow of goods due to the position in the network. Our results suggest that the difference between the least connected country and the most connected country in our sample accounts for around 50 percent of the impact of goods flows on GDP growth. In other words, take two countries with the same growth of goods imports as a share of their GDP: the most connected country will experience a 40 percent greater impact on its GDP growth rate than the least connected country.

183 As described in L. De Benedictis, et al., *Network analysis of world trade using the BACI-CEPII data* set, CEPII working paper number 2013–24, August 2013.

3. The McKinsey Global Institute Connectedness Index

The McKinsey Global Institute Connectedness Index ranks countries on their connectedness to (goods, services, financial, people, and data and communication flows. To obtain a more granular picture, the index also ranks countries on their connectedness to each individual flow. While our index captures the relative connectedness of a country over time, it does not provide an accurate measure of global connectedness over time.

For goods, services, and financial flows, we consider total flows—both inflows and outflows—for each country. We include all goods and services. In the case of financial flows, we include FDI, equity, debt, and cross-border lending. For people flows, we consider countries' connectedness in terms the stock of foreign-born migrants resident in a given country, and that country's citizens living abroad. For data and communication, we use our estimate of cross-border Internet traffic.

Our 2012 index considers the un-weighted average of the three latest years of 2010, 2011, and 2012. In cases where countries report fewer than three years of data for the components of the index, we consider the average across available data. The index includes only the 130 countries that report at least one of these three years of data for each of the flows. The only exception we make is for Hong Kong, China. Telegeography, our source of data on cross-border data capacity, does not publish a figure specific to Hong Kong. As Hong Kong is highly connected to all other flows and is an interesting case study of a waypoint for flows, we decided to include it in our index with only four flows reported. Therefore, our index is a sample of 131 countries.

NORMALIZATION AND RANKING

We assess connectedness of each country on two dimensions: flow intensity and flow share.

Flow intensity assesses the importance of a flow to a country by calculating the ratio of flow to GDP or population. As illustration, the trade intensity in goods for Germany in 2012 is 75 percent—i.e., the value of goods imported and exported to and from Germany in 2012 is 75 percent of GDP. It is important to note that flows in goods and services are captured at their nominal value, while national accounts capture GDP as value added. This is why the ratio of trade to GDP can easily exceed 100 percent. The trade intensity of goods, services, and financial flows is calculated relative to GDP. For flows in people and cross-border Internet traffic we have chosen a different normalization. Intensity for these variables is more naturally linked to the size of a country's population—i.e., the number of migrants per 1,000 inhabitants and data flows per 1,000 inhabitants.

The flow share captures the importance of a given country to the total global flow. We define flow share as the ratio of a country's flow to the total global flow. The flow share for Germany for goods in 2012 is 7 percent—i.e., Germany accounts for 7 percent of global inflows and outflows of goods.

To combine these two measures of connectedness into an index and calculate composite trade intensity, we followed the methodology developed by Squalli and Wilson, originally in 2006:[184]

EQUATION 4

$$\text{Composite flow intensity} = \frac{n \times (\text{inflow} + \text{outflow})^2}{\text{GDP} \times \text{global flow}}$$

To smooth the distribution between countries we use the resulting figure to assign countries to a rank relative to all other countries.

The overall connectedness of a country is calculated by taking a simple average of the ranks in each flow, which determines its overall rank in our sample of 131 countries. We tested alternative measures of assigning an overall rank such as taking the median across all five flows, or using a weighting derived from our regression analysis assessing the relative importance of flows on GDP growth. The rank assigned by the index is broadly stable, with all top ten countries except Russia staying within three ranks no matter which methodology is used. Russia drops by seven ranks when moving from the un-weighted mean to the median methodology. Across the sample of 131 countries, 22 countries move by more than ten ranks when using the mean rather than another methodology while nine countries move more than 15 ranks depending on the methodology. The following countries proved the most volatile depending on methodology used (the value in parentheses indicates the number of ranks the country gained or lost when moving away from the mean methodology): Azerbaijan (16), Bahrain (-16), Croatia (-19), Hungary (-23), Jordan (17), Mauritius (20), Panama (-16), Slovak Republic (18), and Slovenia (-17).

CALCULATING CHANGE IN RANK OVER TIME

In our index, we also calculate the change in rank from 1995 to 2012. As before, we considered three-year averages across flows as the basis for our ranking. To calculate the change in rank over time, we adapted our methodology in two important ways. We take into account only four out of the five flows as data on cross-border Internet traffic are not available before 2005. We also consider only countries that have complete data across the remaining four flows across the period analyzed. This reduces our sample to 106 countries, 101 of which are also included in the 2012 Index calculated across five flows.

As before, we calculated ranks by flow relative to all other countries in the sample, calculating the overall rank based on the average percentile across all four flows. Our index therefore does not provide any indication as to the overall increase in connectedness, but is rather a measure of connectedness of individual countries relative to one another.

We chose 1995 as the comparison year for our calculation of rankings over time primarily for reasons of data availability. Data availability and reliability across the four flows improves significantly after the end of the Cold War. For people flows, we consider only data on migrants. As these data are available only at decade intervals, we calculated a three-year average by weighting 1990 figures as two-thirds of the total and 2000 figures as one-third.

184 Jay Squalli and Kenneth Wilson, *A new approach to measuring trade openness*, Economic Policy Research Unit, Zayed University, Dubai, working paper number 06–07, May 2006.

4. Future scenarios of global flows

To simulate possible states of the world in 2025, we considered three different scenarios: a pessimistic case of slowing trade growth, a middle case of continuing trade growth, and an optimistic case of accelerating trade growth. In each scenario, we make assumptions built on observed values for historical periods that we feel mirror the state of the world described in the scenario.

Because flows of goods and services are more stable over time, it made sense to calculate growth rates in trade intensity. We took as the starting point of each scenario the trade intensity in 2012—17.2 percent for goods and 6.1 percent for services. For financial flows, which are much more volatile, choosing a starting point and end point to calculate growth rates was likely to produce spurious results. Instead, we took a multi-year period and calculated the average annual level of flow intensity for all financial flows—i.e., the average level of net outflows of all financial flows (FDI, equity, debt, and loans) as a share of global GDP.

Across all three scenarios, we excluded commodities such as oil and gas from goods flows. For all commodities, we assumed that commodities maintained constant trade intensity—i.e., a constant value relative to global GDP.

Given the close two-way relationship of GDP growth and growth in flows, we adjusted our GDP assumptions across the three scenarios. Our analysis is broadly based on the 2025 GDP projection from IHS Economics & Country Risk. The implied nominal growth rate of GDP is 6.35 percent per annum for the period from 2012 to 2025. This compares with an actual GDP growth rate of 6.8 percent of nominal GDP over the period from 2000 to 2012. We adjust this implied growth rate of nominal GDP by scenario to simulate the negative feedback loop in which GDP and flows likely stand.

SCENARIO 1: SLOWDOWN AND PROTECTIONISM

For goods and services, we used the years from 1980 to 2000 because this period largely captures the long-term growth rate of these flows in the absence of the major forces of digitization and the rise of emerging markets. In these years, trade intensity of goods grew by an average of 0.4 percent per annum, rising from 33.5 percent to 36.2 percent. These figures are calculated for a balanced sample of 98 countries that provide data on both GDP data and goods flows for both 1980 and 2000. In the same period, the trade intensity for services grew by 0.8 percent from 7.9 percent to 9.3 percent, for a different balanced sample of 114 countries.

For financial flows, we used the period from 2008 to 2012 as the basis for this scenario. In these post-crisis years the volume of financial flows had fallen significantly, the world had become relatively less connected, a state of the world we want to simulate in this scenario. During this period, the average annual level of financial flows is 5.9 percent compared with 5.4 percent in 2012 alone and 21.4 percent in 2007. We assumed that GDP growth slows from the forecast 6.35 percent to 5.35 percent per annum The actual GDP growth between 1980 and 2000 was around 5.6 percent per annum.

SCENARIO 2: CONTINUED MOMENTUM

For goods and services, we intended to use a period from the late 1990s to 2012 because these years fully capture the forces of digitization and the rise of emerging markets. However, because of data limitations, we could do this only from 2002 onward as the required categorization in the data set does not exist prior to that date. Throughout this period, commodity price increases drove a significant amount of the rise in the value of trade. To control for this phenomenon, we excluded commodities when we calculated the growth rate of goods trade intensity. The trade intensity of goods between 2002 and 2012 grew at an average rate of 1.2 percent per annum from 33 to 37 percent. Trade intensity for services grew by 2.2 percent per annum from 9.7 percent to 12.1 percent in the same period. For financial flows, we used years in which these flows were not obviously inflated by equity bubbles (in 2000) or credit bubbles (2004 to 2007). We calculated the average annual intensity of financial flows for 1997, 1998, 1999, 2001, 2002, and 2003. In these six years, the average annual level of financial flows was 8.2 percent. We assumed that GDP growth achieves its forecast rate of 6.35 percent per annum compared with actual GDP growth between 1998 and 2012 of 6.34 percent per annum.

SCENARIO 3: GAINING MOMENTUM

Our underlying assumption for this scenario is that the world experiences growing momentum in global flows as emerging markets, digitization, and policy combine to encourage cross-border activity and a wider range of countries and actors participate. To derive the underlying inputs, we make a simple but bold assumption—that the change in connectedness between Scenario 1 and Scenario 2 is replicated to produce Scenario 3.

In this scenario, growth in the trade intensity for goods increases from 0.4 percent per annum in Scenario 1 and 1.2 percent per annum in Scenario 2 to 2.0 percent per annum. Services trade intensity increases from 0.8 percent per annum in Scenario 1 and 2.2 percent per annum to 3.5 percent per annum The assumed trade intensity for financial flows was 5.9 percent per annum in Scenario 1 and 8.2 percent per annum in Scenario 3. In Scenario 3, it is 10.5 percent per annum We assumed an annual GDP growth rate of 6.85 percent, exceeding the forecast rate of 6.35 percent by 0.5 percent per annum.

DIGITAL FLOWS

Because we do not have data for digital flows going back over the long term, we use a different approach to derive future scenarios. We considered three scenarios drawing in part on Cisco's Visual Networking Index, which projects total global IP traffic through 2017. Between 2012 and 2017, Cisco projects that global IP traffic will grow at a rate of 23 percent a year and reach 121,000 petabytes by 2017. The continued high levels of growth are expected to come from two primary sources. First, many more people globally are expected to come online, increasing from 2.3 billion in 2012 to around five billion by 2020. Second, the level of traffic per person is expected to continue climbing quickly, driven in large part by the growth in streaming video.

For the projection from 2017 onward, we use three scenarios:

- A lower bound with a linear growth assumption. The lower bound extends the growth trajectory from 2013 to 2017 forward in a linear fashion and produces a compound annual growth rate of 9.4 percent.

- An upper bound with an exponential growth assumption. The upper bound extends the growth trajectory from 2013 to 2017 forward in an exponential fashion and produces a compound annual growth rate of 22.4 percent.

- A base case that assumes a slowly declining growth rate through 2025. The base case assumes that the year-on-year growth rate declines by 2 percentage points per year from growth of 23 percent from 2013 to 2017. This decline in the year-on-year growth rate is similar to the trajectory of the previous four years. The implied compound annual growth rate in the base case is 13.5 percent. In this scenario, global IP traffic would reach 330,000 petabytes a month by 2017, or 7.6 times its level in 2012.

5. Cross-border flows by sector, region, and country

Exhibit A6

Goods flows by sector

	Agriculture	Chemicals	Food, beverages, and tobacco	Machinery and equipment	Manufactured products	Metals and metal products	Mining	Oil and gas	Other products	Pharma products	Textiles and apparel	Transportation equipment	Total
Value ($ billion)													
2002	172	357	264	1,873	677	357	35	406	111	165	416	770	5,602
2011	466	1,037	880	4,671	1,704	1,262	271	2,584	570	493	957	1,632	16,527
Growth (%)	11.7	12.6	14.3	10.7	10.8	15.1	25.7	22.8	19.9	13.0	9.7	8.7	12.8
Volume (kg) Growth (%)	3.5	2.7	4.1	0.3	3.0	3.6	3.8	5.3	5.3	3.6	1.3	0.9	2.6
Top 5 exporters, 2011	NLD USA GER CHN ESP	USA GER CHN BEL JPN	USA BRA GER FRA NLD	CHN GER USA JPN HKG	CHN GER USA JPN ITA	CHN GER USA JPN ITA	AUS BRA ZAF PER CAN	RUS SAU USA CAN NGA	USA HKG IND GBR CHN	GER CHE BEL USA IRL	CHN ITA HKG GER IND	GER JPN USA KOR CHN	CHN GER USA JPN FRA
Top 5 share %	36.5	40.1	35.9	51.2	40.1	38.0	60.3	39.5	42.3	52.3	54.4	51.1	36.4
Top 5 importers, 2011	USA GER JPN FRA GBR	USA CHN GER BEL FRA	USA CHN GER JPN NLD	CHN USA GER HKG JPN	USA CHN GER FRA GBR	USA CHN GER KOR ITA	CHN JPN KOR GER IND	USA CHN JPN KOR GER	IND USA HKG GBR BEL	USA GER BEL FRA GBR	USA GER JPN CHN HKG	USA GER FRA CHN CAN	USA CHN GER JPN FRA
Top 5 share %	25.0	46.7	32.4	43.6	38.3	35.6	70.3	41.3	57.1	42.3	41.3	42.6	39.1
Emerging markets' share of exports (%)													
2002	24.3	14.4	28.9	19.5	21.8	25.6	46.6	52.6	23.9	5.3	38.6	12.1	23.1
2011	36.8	28.6	46.8	33.9	38.0	38.7	53.1	67.1	38.5	12.7	59.2	25.6	40.8
Emerging markets' share of imports (%)													
2002	14.6	24.2	22.9	24.3	20.5	26.5	26.6	18.1	14.0	14.1	18.2	14.1	20.8
2011	30.4	38.4	41.4	39.1	36.4	41.7	59.4	32.8	34.5	24.5	29.0	33.6	36.5
Greenfield FDI ($ billion)													
2002	n/a	34	28	41	62	73	2	165	13	12	9	64	505
2011	n/a	39	33	78	78	69	3	99	8	13	17	82	520
Growth (%)	n/a	1.6	2.0	7.3	2.5	-0.6	3.8	-5.5	-4.5	0.1	6.8	2.8	0.3
Intermediate goods share (%)													
2002	12.5	87.7	41.1	37.8	68.7	91.8	99.1	70.8	70.4	23.4	37.0	23.2	48.5
2011	12.3	88.5	51.1	34.2	71.8	94.1	99.7	65.8	77.7	30.5	33.3	25.5	52.8

SOURCE: McKinsey Global Institute analysis

Exhibit A7
Services flows by sector

	Transportation	Travel	Communications services	Financial services	Computer and information services	Other business services	Personal, cultural, and recreational services	Total
Value ($ billion)								
2002	351	483	35	96	57	369	15	1,616
2011	866	1,052	102	313	240	1,095	35	4,268
Growth (%)	10.5	9.0	12.8	14.0	17.2	12.9	9.6	10
Top 5 exporters, 2011	USA GER FRA SGP DNK	USA ESP FRA CHN ITA	USA GBR ITA FRA NLD	USA GBR LUX CHE SGP	IRL IND GER USA GBF	USA GBR GER FRA CHN	GBR FRA LUX CAN ESP	USA GBR GER FRA CHN
Top 5 share %	30.7	33.7	41.3	68.0	57.0	38.9	45.8	36.7
Top 5 importers, 2011	USA CHN GER IND FRA	USA GER CHN GBR FRA	USA GER GBR ITA NLD	LUX USA GBR NLD FRA	USA GER GBR NLD FRA	USA GER FRA GBR IRL	FRA VEN GER CAN LUX	USA GER CHN FRA GBR
Top 5 share %	31.3	36.7	40.1	50.3	48.7	32.3	34.5	33.1
Emerging markets' share of exports (%)								
2002	19.9	29.6	23.7	3.7	23.3	14.4	31.5	19.7
2011	27.5	35.1	26.9	6.7	36.4	22.6	20.1	15.2
Emerging markets' share of imports (%)								
2002	28.5	22.6	17.6	13.5	15.6	20.7	26.9	23.8
2011	44.5	34.3	25.5	20.0	20.3	27.6	35.4	34.0
Greenfield FDI ($ billion)								
2002[1]	40	27	22	25	15	6	7	140
2011[2]	34	16	50	39	21	28	5	221
Growth (%)	-1.9	1.6	2.0	7.3	2.5	-0.6	3.8	5

1 FDI 2002 is the average of 2002–04.
2 FDI 2011 is the average of 2010–12.
SOURCE: McKinsey Global Institute analysis

Exhibit A8
Flows by region and country

	Goods flows				Services flows				Financial flows			
	Inflow		Outflow		Inflow		Outflow		Inflow		Outflow	
	2012 ($ billion)	10-year growth rate (%)	2012 ($ billion)	10-year growth rate (%)	2012 ($ billion)	10-year growth rate (%)	2012 ($ billion)	10-year growth rate (%)	2012 ($ billion)	10-year growth rate (%)	2012 ($ billion)	10-year growth rate (%)
Total	17,514	11%	17,514	11%	4,400	10%	4,400	10%	4,016	6%	4,016	6%
Developed	10,886	5%	10,042	8%	2,662	8%	3,219	8%	2,492	1%	2,479	2%
Emerging	6,628	14%	7,030	16%	1,543	15%	1,181	15%	1,404	22%	1,537	20%
United States and Canada	2,767	7%	1,946	8%	548	7%	720	7%	767	-1%	256	-3%
Canada	451	10%	437	6%	106	9%	79	9%	185	17%	121	9%
United States	2,316	4%	1,509	8%	442	7%	640	7%	581	-3%	135	-8%
Western Europe	5,276	8%	5,335	8%	1,525	8%	1,850	8%	1,021	-3%	1,439	0%
Belgium	438	7%	445	8%	92	10%	97	10%	-68		-67	
Denmark	92	6%	105	7%	58	9%	65	9%	9	-7%	34	6%
France	662	6%	554	6%	173	10%	212	10%	28	-16%	-48	
Finland	76	6%	72	5%	30	12%	30	12%	52	14%	32	4%
Germany	1,165	6%	1,407	9%	295	7%	262	7%	182	-1%	460	7%
Greece	62	5%	35	13%	16	5%	34	5%	61	11%	57	17%
Ireland	63	6%	118	3%	112	10%	116	10%	41	-12%	25	-16%
Italy	487	5%	493	7%	107	5%	104	5%	8	-15%	-13	
Netherlands	499	6%	552	10%	120	8%	134	8%	-86		-5	
Norway	87	10%	161	10%	49	11%	44	11%	47	3%	101	8%
Portugal	72	5%	57	8%	13	7%	25	7%	-7		-5	
Spain	324	7%	282	8%	90	9%	137	9%	44	-9%	56	-5%
Sweden	163	8%	172	8%	55	9%	76	9%	45	14%	63	12%
United Kingdom	683	4%	477	5%	180	5%	284	5%	-57		-95	
China region	2,600	15%	2,792	16%	392	15%	409	15%	486	29%	616	19%
China	1,818	19%	2,049	20%	281	20%	191	20%	334	21%	451	17%
Hong Kong, China	504	5%	443	8%	57	8%	123	8%	151		158	38%
Northeast Asia	1,403	11%	1,336	9%	285	7%	256	7%	330	28%	434	12%
Japan	885	4%	792	7%	177	5%	146	5%	298	34%	355	11%
South Korea	518	7%	545	13%	108	11%	111	11%	32	10%	79	16%
Latin America	1,120	13%	1,032	12%	229	13%	166	13%	345	16%	214	16%
Argentina	68	17%	79	12%	19	14%	15	14%	12		7	8%
Brazil	223	16%	239	15%	81	19%	40	19%	115	23%	59	25%
Chile	79	14%	77	16%	15	11%	13	11%	44	26%	34	29%
Mexico	371	5%	363	8%	29	5%	16	5%	87	16%	56	32%
Panama	69	11%	7	24%	4	11%	9	11%	7		3	
Venezuela	63	15%	85	14%	18	17%	2	17%	7	37%	15	11%
Eastern Europe and Central Asia	1,525	15%	1,623	16%	290	14%	302	14%	279	16%	268	19%
Czech Republic	139	10%	156	13%	19	12%	22	12%	12	2%	10	7%
Hungary	94	6%	103	12%	16	9%	20	9%	-9		-2	
Poland	191	9%	179	16%	32	13%	38	13%	23	12%	15	
Russia	316	19%	520	17%	106	16%	59	16%	110	42%	165	28%
Turkey	229	13%	139	15%	21	13%	43	13%	70	21%	23	10%
Ukraine	84	15%	69	14%	14	15%	19	15%	16	26%	2	-5%
Southeast Asia	1,215	13%	1,247	12%	287	11%	258	11%	192	28%	214	17%
Indonesia	192	16%	188	13%	34	7%	23	7%	41		16	14%
Malaysia	193	12%	227	9%	42	10%	38	10%	10	9%	18	5%
Philippines	65	12%	52	4%	14	10%	18	10%	11	27%	14	34%
Singapore	377	12%	406	13%	118	13%	112	13%	73	18%	112	16%
Thailand	237	11%	223	13%	53	12%	50	12%	38		30	28%
Vietnam	124	15%	124	22%	13	13%	10	13%	15	27%	19	
South Asia	511	13%	325	17%	148	19%	157	19%	123	29%	29	3%
India	436	13%	289	19%	128	20%	141	20%	113	29%	22	3%
Pakistan	44	12%	25	10%	8	14%	7	14%	-1	15%	-4	
Africa and Middle East	815	14%	1,159	16%	426	14%	218	14%	205		473	42%
Egypt	70	12%	28	20%	16	9%	22	9%	6	28%	-3	
Israel	73	9%	63	8%	21	7%	30	7%	2	-2%	9	7%
Kenya	0	12%	0		3	13%	5	13%	5		1	23%
Kuwait	0	17%	0		19	13%	10	13%	0	-19%	90	31%
Morocco	45	9%	21	11%	8	13%	14	13%	7		-3	
Mauritius	6	8%	2	3%	2	12%	3	12%	64		63	
Nigeria	36	16%	143	23%	22	16%	3	16%	25	37%	37	29%
Qatar	10	26%	131	32%	24	30%	10	30%	10	17%	62	
Saudi Arabia	130	14%	369	18%	73	14%	11	14%	12		135	31%
United Arab Emirates	0	13%	0		64	20%	15	20%	19	28%	3	21%
South Africa	102	13%	78	13%	18	12%	15	12%	24		6	29%
Australasia	282	13%	277	14%	75	12%	63	12%	148	12%	73	9%
Australia	244	15%	240	14%	64	13%	53	13%	141	12%	71	10%
New Zealand	38	10%	37	10%	11	9%	10	9%	8	21%	2	2%

SOURCE: McKinsey Global Institute analysis

Exhibit A9
Flows by region and country (CONTINUED)

	Short-term traveler flows				Migrant stock				Data flows			
	Inflow		Outflow		Immigrants		Emigrants		Internet traffic		GDP	Population
	2010 (million)	8-year growth rate (%)	2010 (million)	8-year growth rate (%)	2010 (thousand)	10-year growth rate (%)	2010 (thousand)	10-year growth rate (%)	2013 (Gbps)	8-year growth rate (%)	2012 ($ billion)	2012 (million)
Total	1,093	4%	1,093	4%	194,252	2%	194,252	2%	31,213	50%	71,918	7,023
Developed	534	2%	742	2%	106,676	2%	30,441	1%	24,741	47%	43,908	982
Emerging	567	5%	351	7%	87,576	1%	163,811	2%	6,473	66%	27,816	6,041
United States and Canada	76	2%	111	5%	47,344	2%	3,452	0%	5,839	41%	18,066	349
Canada	16	-3%	32	6%	7,044	2%	1,159	-1%	532	30%	1,821	35
United States	60	4%	78	4%	40,300	1%	2,293	0%	5,308	43%	16,245	314
Western Europe	377	1%	447	1%	45,866	3%	22,100	1%	16,620	49%	16,472	416
Belgium	11	1%	15	3%	1,389	5%	444	3%	182	48%	483	11
Denmark	4	1%	10	4%	477	3%	254	1%	421	37%	315	6
France	45	-1%	45	2%	6,613	1%	1,689	0%	2,484	47%	2,613	66
Finland	4	2%	7	4%	177	3%	323	-2%	230	49%	248	5
Germany	44	5%	132	-1%	9,785	-1%	3,404	-1%	4,191	55%	3,428	82
Greece	14	0%	5	3%	1,133	4%	1,170	1%	95	55%	249	11
Ireland	4	-5%	7	2%	892	9%	723	-4%	108	46%	211	5
Italy	42	1%	36	3%	4,382	8%	3,378	1%	774	57%	2,015	61
Netherlands	15	1%	36	0%	1,690	1%	970	2%	2,145	54%	771	17
Norway	4	1%	8	4%	467	5%	180	-1%	146	36%	500	5
Portugal	22	0%	6	5%	918	4%	2,152	5%	152	70%	212	11
Spain	48	0%	25	6%	6,900	15%	1,311	2%	691	45%	1,323	46
Sweden	5	4%	12	2%	1,188	2%	310	1%	818	54%	524	10
United Kingdom	28	2%	65	0%	6,812	3%	4,562	1%	3,451	42%	2,472	63
China region	178	5%	154	5%	2,574	-2%	9,039	3%	1,542	51%	8,534	1,358
China	134	4%	41	13%			8,238	4%	1,213	55%	8,227	1,351
Hong Kong, China	19	8%	89	3%	2,296	-1%	705	0%			263	7
Northeast Asia	17	7%	38	2%	2,688	2%	2,777	0%	1,191	39%	7,089	178
Japan	9	6%	24	0%	2,176	3%	742	-2%	952	41%	5,960	128
South Korea	8	7%	15	8%	511	-1%	2,036	1%	239	34%	1,130	50
Latin America	65	5%	45	6%	6,627	0%	32,099	2%	1,106	53%	5,813	609
Argentina	4	7%	6	9%	1,344	-1%	924	5%	159	52%	476	41
Brazil	5	4%	7	16%	670	0%	1,344	4%	392	63%	2,253	199
Chile	3	9%	3	7%	313	6%	601	2%	126	47%	270	17
Mexico	21		15	2%	722	4%	11,852	2%	161	46%	1,178	121
Panama	1	13%	0	6%	118	3%	138	-2%	47	60%	36	4
Venezuela	1	3%	2	6%	982	0%	511	4%	33	51%	381	30
Eastern Europe and Central Asia	202	4%	153	6%	28,243	-1%	46,308	0%	2,779	76%	4,911	511
Czech Republic	16	3%	15	3%	448	0%	362	-8%	239	67%	196	11
Hungary	8	0%	7	4%	284	0%	452	0%	342	68%	125	10
Poland	58	2%	13	7%	805	0%	3,067	-5%	283	55%	490	39
Russia	21	-1%	33	11%	11,793	0%	10,090	0%	610		2,015	144
Turkey	27	10%	6	11%	1,285	0%	4,240	4%	322		789	74
Ukraine	21	9%	13	-1%	4,932	-1%	6,002	0%	169		176	46
Southeast Asia	72	7%	51	8%	6,345	3%	13,069	2%	1,012	70%	2,295	620
Indonesia	6	4%	8	9%	84	-6%	2,321	2%	68		878	247
Malaysia	24	9%	8	9%	2,301	4%	1,478	2%	150		305	29
Philippines	3	7%	5	8%	222	-4%	4,237	3%	83	66%	250	97
Singapore	11	6%	19	6%	1,879	3%	281	0%	555	68%	275	5
Thailand	16	5%	5	7%	1,009	4%	784	1%	83		366	67
Vietnam	5	9%	3	25%			2,201	2%	69		156	89
South Asia	8	11%	12	8%	7,690	-3%	25,439	2%	287	84%	2,286	1,649
India	6	12%	9	10%	5,337	-2%	11,054	2%	233		1,842	1,237
Pakistan	0		1	4%			4,523	2%	39		225	179
Africa and Middle East	97	10%	67	7%	40,511	4%	38,930	4%	631	71%	4,559	1,306
Egypt	14	13%	2	0%	203	2%	3,565	5%	86		263	81
Israel	3	16%	4	2%	2,724	2%	933	3%	62	51%	258	8
Kenya	3	4%	1	12%	783	4%	441	2%	9		41	43
Kuwait	5	11%	3	9%	1,572	0%	249	-4%	11	65%	184	3
Morocco	5	10%	1	8%			3,014	6%	53	51%	96	33
Mauritius	1	4%	0	1%	38	0%	141	5%	2	49%	10	1
Nigeria	6	15%	1	4%	910	2%	953	4%	15		263	169
Qatar	0		1	9%	1,128	9%	9	7%	20	70%	192	2
Saudi Arabia	11	5%	6	2%	7,289	4%	169	-2%	103		711	28
United Arab Emirates	0		3	22%	3,293	4%	53	-3%	88		384	9
South Africa	11	7%	6	10%	1,863	6%	850	2%	23	69%	384	51
Australasia	8	3%	15	8%	6,365	3%	1,041	1%	206	50%	1,700	27
Australia	6	2%	12	9%	5,442	3%	429	-1%	166	49%	1,532	23
New Zealand	3	3%	3	5%	923	3%	611	2%	40	58%	167	4

SOURCE: McKinsey Global Institute analysis

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