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GLOBALIZATION IN TRANSITION: THE FUTURE OF TRADE AND VALUE CHAINS

JANUARY 2019

EXECUTIVE SUMMARY



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Susan Lund | Washington, DC
James Manyika | San Francisco
Jonathan Woetzel | Shanghai
Jacques Bughin | Brussels
Mekala Krishnan | Boston
Jeongmin Seong | Shanghai
Mac Muir | Atlanta

IN BRIEF

GLOBALIZATION IN TRANSITION: THE FUTURE OF TRADE AND VALUE CHAINS

Although trade tensions dominate the headlines, deeper changes in the nature of globalization have gone largely unnoticed. We analyze 23 industry value chains spanning 43 countries to understand how trade, production, and participation changed from 1995 to 2017. Grouping these value chains into six archetypes based on their trade intensity, input intensity, and country participation reveals diverging pathways. We see that globalization reached a turning point in the mid-2000s, although the changes were obscured by the Great Recession. Among our key findings:

- First, goods-producing value chains have become less trade-intensive. Output and trade both continue to grow in absolute terms, but a smaller share of the goods rolling off the world's assembly lines is now traded across borders. Between 2007 and 2017, exports declined from 28.1 to 22.5 percent of gross output in goods-producing value chains.
- Second, cross-border services are growing more than 60 percent faster than trade in goods, and they generate far more economic value than traditional trade statistics capture. We assess three uncaptured aspects (the value added services contribute to exported goods, the intangibles companies send to foreign affiliates, and free digital services made available to global users). National statistics attribute 23 percent of all trade to services, but including these three channels would increase their share to more than half.
- Third, less than 20 percent of goods trade is based on labor-cost arbitrage, and in many value chains, that share has been declining over the last decade. The fourth and related shift is that global value chains are becoming more knowledge-intensive and reliant on high-skill labor. Across all value chains, investment in intangible assets (such as R&D, brands, and IP) has more than doubled as a share of revenue, from 5.5 to 13.1 percent, since 2000.
- Finally, goods-producing value chains (particularly automotive as well as computers and electronics) are becoming more regionally concentrated, especially within Asia and Europe. Companies are increasingly establishing production in proximity to demand.
- Three forces explain these changes in value chains. First, emerging markets' share of global consumption has risen by roughly 50 percent over the past decade.

China and other developing countries are consuming more of what they produce and exporting a smaller share. Second, emerging economies are building more comprehensive domestic supply chains, reducing their reliance on imported intermediate inputs. Lower global trade intensity is a sign that these countries are reaching the next stage of economic development. Finally, global value chains are being reshaped by cross-border data flows and new technologies, including digital platforms, the Internet of Things, and automation and AI. In some scenarios, these technologies could further dampen goods trade while boosting trade in services over the next decade.

- Companies face more complex unknowns than ever before, making flexibility and resilience critical. With the costs and the risks of global operations shifting, companies need to decide where to compete along the value chain, consider new service offerings, and reassess their geographic footprint. Speed to market is becoming a key battleground, and many companies are localizing supply chains for better coordination. Rather than keeping suppliers at arm's length, companies can benefit from more collaborative relationships with those that are core to the business.
- The trends we identify may favor advanced economies, given their strengths in innovation and services as well as their highly skilled workforces. Developing countries with geographic proximity to large consumer markets may benefit as production moves closer to consumers; those with strengths in traded services also stand to gain. But the challenges are getting steeper for countries that missed out on the last wave of globalization. As automation reduces the importance of labor costs, the window is narrowing for low-income countries to use labor-intensive exports as a development strategy. Regional integration offers one possible solution, and digital technologies also hold possibilities for new development paths.

Even as policy makers focus on the trade opportunities of the future, unfinished business remains from the previous wave of globalization. Governments around the world will need to do more to support workers and local communities caught up in global industry shifts and technological change. By fully reckoning with the dislocations of the past, they may be able to make the next chapter of globalization more inclusive.

Globalization in transition

WE ANALYZED 23 VALUE CHAINS SPANNING 43 COUNTRIES AND ACCOUNTING FOR 96% OF GLOBAL TRADE. THEY REVEAL 5 STRUCTURAL SHIFTS:

1 Declining trade intensity in goods

2 Growing (and often unmeasured) trade in services

3 Less labor-cost arbitrage

4 More knowledge intensity

5 More intra-regional trade

Consumption in emerging markets up by 50% since 2007

Growing supply chains in China and other emerging markets

Next-gen technologies changing logistics, production, and products

KEY FORCES AFFECTING TRADE

-5.6 p.p.

decline in trade intensity in goods since 2007

60%

faster growth in services trade than in goods trade since 2007

18%

goods trade based on labor-cost arbitrage

New priorities for global companies

- Follow shifts in value creation within your industry
- Consider service offerings
- Assess the full costs and risks of location decisions
- Build flexibility and resilience into operations
- Prioritize speed to market and proximity to customers
- Build closer and more digital supplier relationships

The challenge for countries

- Build strong service sectors
- Prepare for automation—especially in labor-intensive value chains
- Deepen regional trade ties
- Invest in R&D and skills
- Modernize customs operations and trade agreements
- Look for new opportunities as value chains evolve



EXECUTIVE SUMMARY

Even as tariffs dominate the headlines, important structural changes in the nature of globalization have gone largely unnoticed. The global financial crisis and recession obscured some of the shifts. Now, ten years on, our analysis of the dynamics of global value chains in 23 industries reveals several transformations that have been hiding in plain sight.

To begin, although output and trade continue to increase in absolute terms, trade intensity (that is, the share of output that is traded) is declining within almost every goods-producing value chain. Flows of services and data now play a much bigger role in tying the global economy together. Not only is trade in services growing faster than trade in goods, but services are creating value far beyond what national accounts measure. Using alternative measures, we find that services already constitute more value in global trade than goods.

In addition, all global value chains are becoming more knowledge-intensive. Low-skill labor is becoming less important as factor of production. Contrary to popular perception, only about 18 percent of global goods trade is now driven by labor arbitrage.

Three factors explain these changes: growing demand in China and the rest of the developing world, which enables these countries to consume more of what they produce; the development of more comprehensive domestic supply chains in those countries, reducing their imports of intermediate goods; and the growing impact of new technologies. In the past, digital technologies had one clear effect: they accelerated trade by reducing transaction costs. Yet the next generation of technologies will have more complex, multidimensional effects. In some scenarios, they could dampen trade in goods while fueling further growth in services trade.

This report builds on previous McKinsey Global Institute research on global flows and digital globalization.¹ It analyzes 23 global value chains in both goods-producing and service industries, spanning 43 countries, and extends the World Input-Output Database to cover the years from 1995 to 2017. Together the value chains we highlight account for 96 percent of global trade, 69 percent of global output, and 68 percent of global employment. We also draw on dozens of interviews with industry experts, proprietary industry data, and national accounts data.

Our findings reveal that globalization is in the midst of a transformation. Yet the public debate about trade is often about recapturing the past rather than looking toward the future. The mix of countries, companies, and workers that stand to gain in the next era is changing. Understanding how the landscape is shifting will help policy makers and business leaders prepare for globalization's next chapter and the opportunities and challenges it will present.

¹ See *Digital globalization: The new era of global flows*, McKinsey Global Institute, February 2016; *Foreign Affairs*, April 2017; and *Global flows in a digital age: How trade, finance, people, and data connect the world economy*, McKinsey Global Institute, April 2014.

WE GROUP GLOBAL VALUE CHAINS INTO SIX ARCHETYPES, WITH DISTINCT CHARACTERISTICS AND TRADE PATTERNS

Global value chains reflect millions of decisions made by businesses regarding where to source inputs, where to establish production, and where to sell goods. These decisions shape the movement and volume of global flows of goods, services, finance, people, and data. The simplest value chains, in industries such as basic metals, involve a sequence of production steps that process inputs and raw commodities contributed by firms located in different countries. The most complex, such as those for electronics, automobiles, and aircraft, can involve hundreds of inputs from dozens of countries and subassembly of complex components.² Services are also delivered through value chains.³ Two-thirds of world trade is in intermediate inputs, not final goods and services, underscoring the scale and intricacy of these cross-border production networks.

We group industry value chains into six archetypes: four in goods-producing industries and two in services (Exhibit E1). We classify them by their factor inputs, trade intensity, and country participation. These groupings highlight important differences in dynamics.

- **Global innovations.** Industries including automotive, computers and electronics, and machinery have given rise to the most valuable, highly traded, and knowledge-intensive of all goods-producing value chains. They account for 13 percent of gross output but 35 percent of trade. They involve many sequential steps and intricate components that may require subassembly; in fact, just over half of all trade within these value chains is in intermediate goods rather than finished products. One-third of the workforce in these value chains is highly skilled, a share that is second only to knowledge-intensive services. Spending on R&D and intangible assets averages 30 percent of revenues, two to three times the figure in other value chains. Participation in these value chains is highly concentrated in a small set of advanced economies, although China's role is growing. On average, just 12 countries account for 75 percent of exports.
- **Labor-intensive goods.** These value chains, including textiles and apparel, toys, shoes, and furniture, are highly labor- and trade-intensive. More than two-thirds of income goes to labor, most of which is low-skill. Given their light weight, the products in these industries are highly tradable, and 28 percent of global output is exported. Production shifted to developing countries in the last wave of globalization, and those countries today account for 62 percent of trade, a larger share than in any other archetype. Although these value chains are synonymous in many minds with "globalization," they represent only 3 percent of global gross output and employ only 3 percent of the global workforce (100 million people). China is the largest producer, but new manufacturing technologies and changes in demand are likely to shift country participation in the future.
- **Regional processing.** Industries in this archetype include fabricated metals; rubber and plastics; glass, cement, and ceramics; and food and beverage. These value chains use relatively few intermediate goods. But with the exception of food and beverage, more than two-thirds of the output they produce becomes intermediate input feeding into other value chains, particularly global innovations. For instance, 82 percent of output in fabricated metal products and 74 percent of output in paper and printing are intermediate goods. The defining feature of regional processing is low tradability, due to the weight, bulk, or perishability of the goods produced. Production is therefore

² The literature on global value chains is extensive. See, for example, Marcel Timmer et al., *An anatomy of the global trade slowdown based on the WIOD 2016 release*, Groningen Growth and Development Centre, 2016; Koen De Backer and Sébastien Miroudot, *Mapping global value chains*, European Central Bank working paper number 1677, May 2014; *Global value chain development report 2017*, World Bank Group et al., 2017; *The changing nature of international production: Insights from trade in value added and related indicators*, Organisation for Economic Co-operation and Development (OECD), December 2018.

³ Richard Baldwin and Anthony J. Venables, "Spiders and snakes: Offshoring and agglomeration in the global economy," *Journal of International Economics*, December 2010, Volume 90, Number 2.

distributed around the world, with many countries (including developing economies) participating and a high share of intraregional trade (56 percent). However, trade is growing faster in these value chains than in the global innovations or labor-intensive goods archetypes. These value chains account for 9 percent of global gross output and employ 169 million people, or 5 percent of the global labor force. These value chains are often overlooked, given their relatively low value added per worker, but they are essential industries in all economies.

- **Resource-intensive goods.** This archetype includes agriculture, mining, energy, and basic metals. These value chains generate \$20 trillion of gross output annually, nearly as much as global innovations value chains. Much of this output goes to other value chains as intermediate input. In the case of mining and basic metals, all output is intermediate goods. Access to natural resources and proximity to storage and transportation infrastructure determine where production is located. Countries around the world participate; 19 countries account for 75 percent of resource-intensive goods exports. The top five countries make up a lower share of exports in this group than in any other, at just 29 percent. While agriculture employs almost 870 million people globally, the other value chains in this archetype employ only 49 million people in total, or 1.5 percent of the global workforce. Resource-intensive value chains contribute 11 percent of global value added, the highest share among all goods-producing value chains. Mining and energy have the highest value added per employee among all the value chains we studied.
- **Labor-intensive services.** These value chains include retail and wholesale, transportation and storage, and healthcare. Given the in-person nature of these services, trade intensity is low, but trade is growing faster than in any other archetype. Trade in transportation services, for example, has increased with the rise of goods trade, tourism, and business travel; rising trade in wholesale and retail reflects the global expansion of retailers such as Carrefour and Walmart. These value chains are the largest job creators after agriculture, employing more than 740 million people (23 percent of the global workforce), two-thirds of whom are in wholesale and retail trade. While often overlooked by policy makers, these sectors are an important part of the economy in all countries. Their value added per employee is the same as in labor-intensive manufacturing (roughly \$25,000), and they employ seven times as many people.
- **Knowledge-intensive services.** These high-value industries include professional services, financial intermediation, and IT services. More than half of the people employed in knowledge-intensive services have bachelor's degrees or above. Although they would seem to be inherently unconstrained by geography, these value chains have lower trade intensity than goods-producing industries, largely due to regulatory barriers. The trade flows that do occur span the entire globe since costs are not directly related to distance. Country participation is highly concentrated in advanced economies; just 21 percent of all exports in this category come from developing economies, the lowest share among all types of value chains. The high concentration among countries reflects the significant investment in a skilled workforce and intangible assets required to succeed in these value chains.

Exhibit E1

Global value chains are grouped into six archetypes based on their inputs, trade intensity, and country participation.



Arche-type	Global value chain	Labor intensity Labor compensation/ gross value added (%)	Knowledge intensity % of highly skilled labor ¹	Commodity intensity Commodity inputs as % of gross output	Regional trade % of total trade	Trade intensity Gross exports/gross output (%)	Country participation ² Number of countries representing 75% of total exports	Developing economy share of exports (%)	Gross output \$ trillion	Employment million
Global innovations	Chemicals	43	33	14	49	29	14	25	5.5	19
	Auto	58	28	7	59	29	13	30	4.5	29
	Computers and electronics	52	50	3	54	48	8	48	4.0	23
	Machinery and equipment	61	26	12	46	32	13	29	3.6	34
	Electrical machinery	60	31	18	52	30	14	45	2.4	16
	Transport equipment	61	28	8	35	38	12	26	1.5	10
	Average ³ or Total (% of global total)	56	33	10	49	34	12	34	21.5 (13)	131 (4)
Labor-intensive goods	Textiles and apparel	68	15	9	41	31	13	66	2.8	78
	Furniture and other manufacturing	65	23	10	42	25	17	58	2.5	23
	Average ³ or Total (% of global total)	67	19	9	41	28	15	62	5.3 (3)	101 (3)
Regional processing	Food and beverage	52	13	29	55	13	22	43	6.9	68
	Fabricated metal products	65	16	24	53	18	16	45	2.5	34
	Paper and printing	60	37	4	59	16	17	34	2.2	11
	Glass, cement, ceramics	59	15	18	56	10	16	51	2.0	33
	Rubber and plastics	60	16	6	57	23	16	42	1.8	23
	Average ³ or Total (% of global total)	59	19	16	56	16	17	43	15.3 (9)	169 (5)
Resource-intensive goods	Mining	40	22	72	31	30	16	73	6.0	21
	Agriculture	63	9	74	43	8	24	50	5.7	866
	Basic metals	57	15	70	46	20	21	42	4.5	24
	Energy	37	25	81	51	23	16	42	3.9	4
	Average ³ or Total (% of global total)	49	18	74	43	20	19	52	20.0 (12)	915 (28)
Labor-intensive services	Wholesale and retail trade	61	23	1	41	10	13	28	14.3	488
	Transport and storage	56	16	10	35	15	13	31	7.2	109
	Healthcare	83	36	1	41	1	8	49	6.5	145
	Average ³ or Total (% of global total)	67	25	4	39	9	11	36	28.0 (17)	742 (23)
Knowledge-intensive services	Professional services	68	56	1	38	10	13	18	10.9	52
	Financial intermediation	47	51	0.2	32	8	9	8	7.6	65
	IT services	67	56	0.3	26	18	13	37	2.1	36
	Average ³ or Total (% of global total)	61	54	1	32	12	12	21	20.6 (13)	153 (5)
Global average ³ or Total (% of global total covered by focus GVCs)		58	28	21	45	21	15	40	161 (69)	3,275 (68)

1 For the United States.

2 Based on the balance of payments (with the exceptions of wholesale and retail trade as well as healthcare, which are based on the World Input-Output Database).

3 Arithmetic average.

SOURCE: World Input-Output Database; IMF; WTO; UNCTAD; OECD; McKinsey Global Institute analysis

GLOBAL VALUE CHAINS ARE UNDERGOING FIVE STRUCTURAL SHIFTS

The 1990s and 2000s saw the expansion of complex value chains spanning the globe. But production networks are not immutable; they continue to evolve. We observe five major shifts in global value chains over the past decade.⁴ These shifts are occurring against a backdrop of policy uncertainty (see Box E1, “The impact of trade tensions on global value chains”).

1. Goods-producing value chains have grown less trade-intensive

Trade rose rapidly within nearly all global value chains from 1995 to 2007. More recently, trade intensity (that is, the ratio of gross exports to gross output) in almost all goods-producing value chains has fallen. Trade is still growing in absolute terms, but the share of output moving across the world’s borders has fallen from 28.1 percent in 2007 to 22.5 percent in 2017. Trade volume growth has also slowed. Between 1990 and 2007, global trade volumes grew 2.1 times faster than real GDP on average, but they have grown only 1.1 times faster than GDP since 2011.⁵ The decline in trade intensity is especially pronounced in the most complex and highly traded value chains (Exhibit E2). However, this trend does not signal that globalization is over. Rather, it reflects the development of China and other emerging economies, which are now consuming more of what they produce.

2. Services play a growing and undervalued role in global value chains

In 2017, gross trade in services totaled \$5.1 trillion, a figure dwarfed by the \$17.3 trillion global goods trade. But trade in services has grown more than 60 percent faster than goods trade over the past decade. Some subsectors, including telecom and IT services, business services, and intellectual property charges, are growing two to three times faster.

Yet the full role of services is obscured in traditional trade statistics. First, services create roughly one-third of the value that goes into traded manufactured goods.⁶ R&D, engineering, sales and marketing, finance, and human resources all enable goods to go to market. In addition, we find that imported services are substituting for domestic services in nearly all value chains. In the future, the distinction between goods and services will continue to blur as manufacturers increasingly introduce new types of leasing, subscription, and other “as a service” business models.⁷

⁴ Throughout this report, we refer primarily to nominal trade and GDP values reflecting current exchange rates in dollars. These values embody both quantity and prices.

⁵ Trade volumes are measured by trade in real prices. See *World trade statistical review 2018*, World Trade Organization, 2018.

⁶ Also see Sébastien Miroudot and Charles Cadestin, *Services in global value chains: From inputs to value-creating activities*, OECD Trade Policy Papers, number 197, March 2017; Aaditya Mattoo et al., *Trade in value added: Developing new measures of cross-border trade*, World Bank Group, 2013; Cecilia Heuser and Aaditya Mattoo, *Services trade and global value chains*, World Bank policy research working paper WPS8126, 2017.

⁷ “As a service” models replace one-time purchases of physical products with more distributed expenditures. See, for instance, Arul Elumalai, Irina Starikova, and Sid Tandon, “IT as a service: From build to consume,” *McKinsey Quarterly*, September 2016.

Exhibit E2

After increasing prior to 2007, trade intensity has since declined in almost all goods-producing global value chains.

Archetypes	Trade intensity, 2017 ¹	Change in trade intensity ¹ Percentage points		
		2000–07	2007–17	
Global innovations	Chemicals	27.4	7.8	-5.5
	Transport equipment	38.0	11.0	-6.2
	Auto	29.1	8.9	-7.9
	Electrical machinery	27.9	6.2	-8.3
	Machinery and equipment	29.5	7.3	-8.9
	Computers and electronics	43.8	13.0	-12.4
Labor-intensive goods	Furniture and other manufacturing	24.2	7.3	-0.8
	Textile and apparel	27.3	8.2	-10.3
Regional processing	Paper and printing	15.6	3.7	0.3
	Fabricated metal products	17.8	5.5	-0.6
	Rubber and plastics	22.8	7.6	-0.9
	Food and beverage	12.7	2.4	-0.9
	Glass, cement, ceramics	8.7	2.2	-3.2
Resource-intensive goods	Agriculture	8.4	0.6	-0.7
	Energy	20.6	7.4	-1.2
	Basic metals	19.6	5.1	-6.2
	Mining	25.0	11.4	-14.4
Labor-intensive services	Wholesale and retail trade	10.7	3.5	2.4
	Healthcare	0.5	0	0.1
	Transport and storage	14.6	1.7	-2.5
Knowledge-intensive services	IT services	18.4	5.6	4.9
	Professional services	9.8	2.3	0.1
	Financial intermediation	8.0	3.6	-0.8

¹ Trade intensity defined as gross exports as a percentage of gross output.

SOURCE: World Input-Output Database; McKinsey Global Institute analysis

Second, the intangible assets that multinational companies send to their affiliates around the world—including software, branding, design, operational processes, and other intellectual property developed at headquarters—represent tremendous value, but they often go

unpriced and untracked unless captured as intellectual property charges.⁸ Years of R&D go into developing pharmaceuticals and smartphones, for example, while design and branding enable companies such as Nike and Adidas to charge a premium for their products.⁹ However, trade statistics do not capture the use of intangible assets in production and sales around the world.

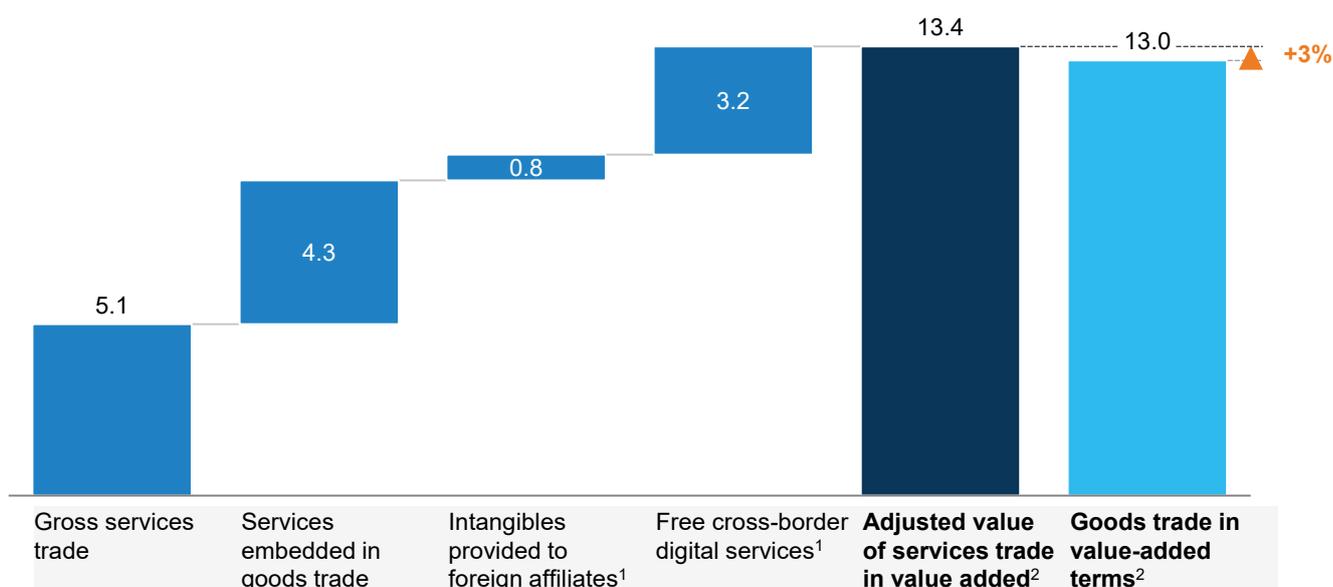
Finally, trade statistics do not track soaring cross-border flows of free digital services, including email, real-time mapping, video conferencing, and social media. Wikipedia, for instance, encompasses 40 million free articles in roughly 300 languages. Every day, users worldwide watch more than a billion hours of YouTube’s video content for free, and billions of people use Facebook and WeChat every month. These services undoubtedly create value for users, even without a monetary price.

We estimate that these three channels collectively produce up to \$8.3 trillion in value annually—a figure that would increase overall trade flows by \$4.0 trillion (or 20 percent) and reallocate another \$4.3 trillion currently counted as part of the flow of goods to services. If viewed this way, trade in services is already more valuable than trade in goods (Exhibit E3).¹⁰

Exhibit E3

Taking into account the undermeasured aspects of service flows, services account for more than half of value added in overall trade.

\$ trillion, 2017



1 Higher-end estimate.

2 In value-added terms. The value of services embedded in goods trade and the value of goods embedded in services trade have been removed.

NOTE: Services embedded in goods trade defined as services value added in goods trade. Estimate of intangibles provided to foreign affiliates based on company-level data on foreign affiliate economic profit and expenses, adjusted for the share of revenue associated with intangibles produced by headquarters country. Estimate of free cross-border digital services based on the number of foreign users of global websites and the implied value of digital services (such as social media and messaging services).

SOURCE: Capital IQ, WTO, IMF, World Input-Output Database, Alexa Web Information Service, McKinsey Global Institute analysis

⁸ Some trade in intangible assets is captured in trade statistics through intellectual property charges. These flows are sometimes driven by decisions of multinationals on where to put ownership of these assets based on tax considerations. See Thomas Tørsløv, Ludvig Wier, and Gabriel Zucman, *The missing profits of nations*, NBER working paper number 24701, June 2018, revised August 2018; and OECD/G20 Base Erosion and Profit Shifting (BEPS) Project, final report, OECD, May 2015.

⁹ Carol A. Corrado and Charles R. Hulten, *Internationalization of intangibles*, Measuring the Effects of Globalization, Washington, DC, February 28, 2013.

¹⁰ We remove the value of goods embedded in services trade and the value of services embedded in goods trade.

This perspective would also substantially shift the trade balance for some countries, most notably the United States. This exercise is not meant to argue for redefining national trade statistics. It simply underscores the underappreciated role of services, which will be increasingly important for how companies and countries participate in global value chains and trade in the future.

3. Trade based on labor-cost arbitrage is declining in some value chains

As global value chains expanded in the 1990s and early 2000s, many decisions about where to locate production were based on labor costs, particularly in industries producing labor-intensive goods and services. Yet counter to popular perceptions, today only 18 percent of goods trade is based on labor-cost arbitrage (defined as exports from countries whose GDP per capita is one-fifth or less than that of the importing country).¹¹ In other words, over 80 percent of today's global goods trade is not from a low-wage country to a high-wage country. Considerations other than low wages factor into company decisions about where to base production. These include access to skilled labor or natural resources, proximity to consumers, and the quality of infrastructure.

Moreover, the share of trade based on labor-cost arbitrage has been declining in some value chains, especially labor-intensive goods manufacturing (where it dropped from 55 percent in 2005 to 43 percent in 2017). This mainly reflects rising wages in developing countries. In the future, however, automation and AI may amplify this trend, transforming labor-intensive manufacturing into capital-intensive manufacturing. This shift will have important implications for how low-income countries participate in global value chains.

4. Global value chains are growing more knowledge-intensive

Intangibles are playing a bigger role in global value chains. In all value chains, capitalized spending on R&D and intangible assets such as brands, software, and intellectual property (IP) is growing as a share of revenue.¹² Overall, it rose from 5.4 percent of revenue in 2000 to 13.1 percent in 2016. This trend is most apparent in global innovations value chains. Companies in machinery and equipment spend 36 percent of revenue on R&D and intangibles, while those in pharmaceuticals and medical devices average 80 percent (Exhibit E4). The growing emphasis on knowledge and intangibles favors countries with highly skilled labor forces, strong innovation and R&D capabilities, and robust intellectual property protections.¹³

In many value chains, value creation is shifting to upstream activities, such as R&D and design, and to downstream activities, such as distribution, marketing, and after-sales services. The share of value generated by the actual production of goods is declining (in part because offshoring has lowered the price of many goods).¹⁴ This trend is pronounced in pharmaceuticals and consumer electronics, which have seen the rise of “virtual manufacturing” companies that focus on developing goods and outsource their production to contract manufacturers.

¹¹ If we vary the ratio of GDP per capita of the exporter and importer from 2 to 10, we find that labor-cost arbitrage ranges from 5 to 30 percent of overall global trade.

¹² See Jonathan Haskel and Stian Westlake, *Capitalism Without Capital: The Rise of the Intangible Economy*, Princeton, NJ: Princeton University Press, 2017.

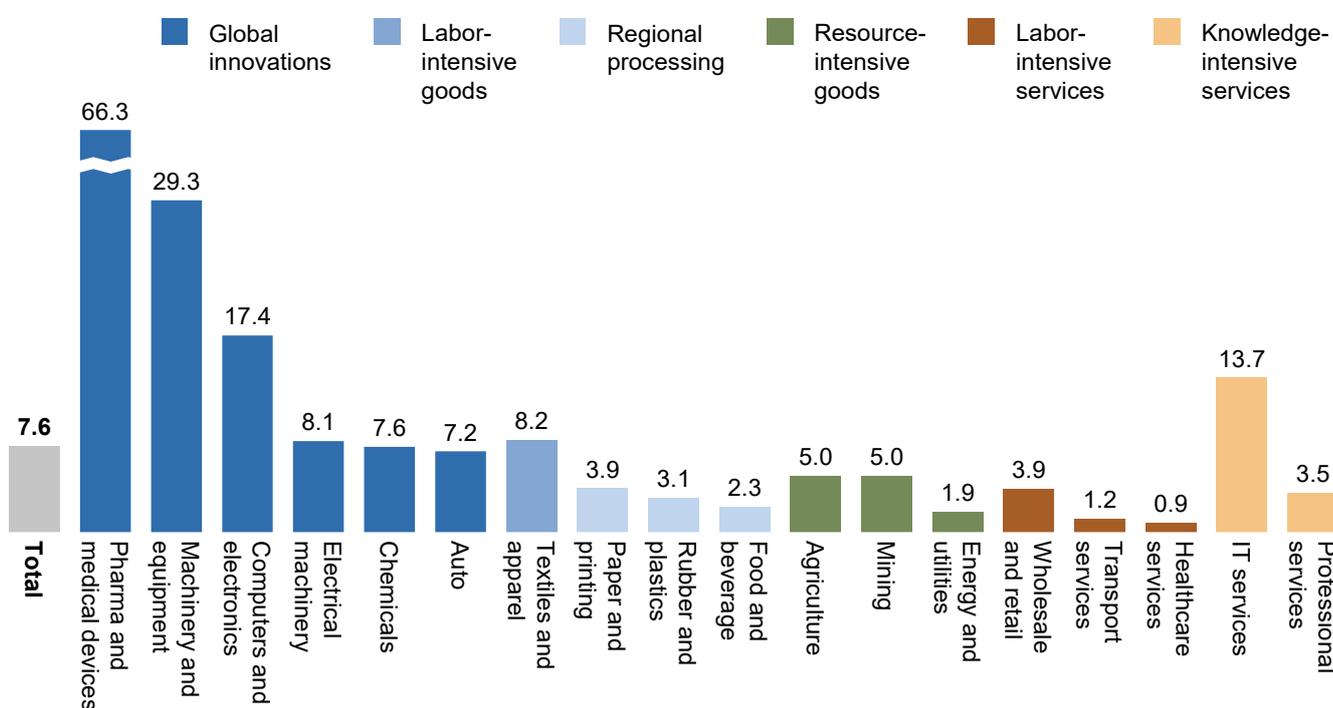
¹³ Some trade in intangible assets is captured in trade statistics through intellectual property royalties, which are influenced by tax considerations. But the creation (rather than final ownership location) of intangible assets takes place in countries with talent, legal protections, and innovation ecosystems.

¹⁴ See Mary Hallward-Driemeier and Gaurav Nayyar, *Trouble in the making? The future of manufacturing-led development*, World Bank, 2017.

Exhibit E4

All global value chains are becoming more knowledge-intensive.

Change in capitalized spending on intangibles as share of revenue¹
Percentage points, 2000–16



Capitalized spending on intangibles as % of revenue, 2016

13.1	80.0	36.4	25.4	16.4	14.9	12.2	16.6	9.8	11.5	7.1	9.1	5.0	3.9	8.9	4.1	4.2	18.9	10.3
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¹ Intangibles include brands, software, and other intellectual property, capitalized based on R&D and selling, general, and administrative (SG&A) expenses of ~24,500 nonfinancial companies (assuming depreciation rate of capitalized SG&A at 20% and capitalized R&D at 15%). Capitalized expenses as of 2000 estimated based on multiplier to annual expenses based on Taylor and Peters (2014), which uses different multipliers depending on company age.

SOURCE: McKinsey Corporate Performance Analytics; McKinsey Global Institute analysis

5. Value chains are becoming more regional and less global

Until recently, long-haul trade crisscrossing oceans was becoming more prevalent as transportation and communication costs fell and as global value chains expanded into China and other developing countries. The share of trade in goods between countries within the same region (as opposed to trade between more far-flung buyers and sellers) declined from 51 percent in 2000 to 45 percent in 2012.

That trend has begun to reverse in recent years. The intraregional share of global goods trade has increased by 2.7 percentage points since 2013, partially reflecting the rise of emerging-market consumption. This development is most noticeable for Asia and the EU-28 countries. Regionalization is most apparent in global innovations value chains, given their need to closely integrate many suppliers for just-in-time sequencing. This trend could accelerate in other value chains as well, as automation reduces the importance of labor costs and increases the importance of speed to market in company decisions about where to produce goods.

Box E1. The impact of trade tensions on global value chains

The general trend of the past 40 years has been toward lowering tariffs and nontariff barriers. But now the pendulum may be swinging in the other direction. As 2018 drew to a close, the United Kingdom's trading relationships were being renegotiated for a post-Brexit world, a revised NAFTA deal (rechristened USMCA) awaited ratification, and rounds of tariffs were clouding the future of US-China trade. Global value chains will respond to the changes in trade policy that ultimately emerge.

It is possible that the direct impact of the new US-China tariffs that were known as of early January 2019 could be relatively limited. China's exports to the United States amount to 4 percent of its GDP, while its imports equal about 1 percent.¹ Similarly, US exports to China are equivalent to 1 percent of its GDP, and its imports amount to 3 percent. According to the International Monetary Fund, a full-blown trade war could have a cumulative negative impact of 1.6 percent on China's GDP and 1.0 percent on US GDP by 2020.²

Yet tariffs could have a substantial impact on specific companies, value chains, and regions. As of 2016, there were around 500,000 foreign enterprises operating in China.³ Roughly 40 percent of China's exports are the products of foreign-owned enterprises and joint ventures between foreign and Chinese firms. The first two rounds of tariffs imposed by the United States on China amounted to \$250 billion of goods. Roughly half are on electronics or machinery—and foreign firms produce 87 percent of the electronics and 60 percent of machinery made in China. One possibility is that tariffs accelerate the movement of labor-intensive value chains from China to other developing countries.

Higher tariffs also affect firms in the United States, given that 29 percent of China's exports to the United States are intermediate goods used in

producing finished goods. As tariffs increase the cost of production in the United States, the effects can manifest as higher consumer prices and pressure on the bottom line for US manufacturers. Specific local economies dominated by export industries could be particularly vulnerable to the effects if tariffs escalate further.

In a volatile environment, companies need operational flexibility to be able to respond to policy shifts. Volvo and BMW recently canceled plans to export vehicles made in South Carolina to China in response to tariffs.⁴ Some manufacturers have similarly warned that they may reduce operations in the United Kingdom if Brexit leads to tariffs or customs delays that slow their supply chains. Others are finding workarounds. Columbia Sportswear, for example, designs products with a specific eye to minimizing tariff costs.⁵

In the September 2018 McKinsey Global Executive Survey, 33 percent of companies said that uncertainty over trade policy was their top concern, and 25 percent said recent tariff increases were their biggest worry. Nearly half of respondents stated that their companies will shift their global footprint in response, and one-quarter said they expect to invest more in local supply chains.

Arguably the biggest risk is the possibility of spillovers into foreign direct investment, immigration, and cross-border sharing of information and scientific data. Rolling back globalization in these broader ways could undermine global productivity growth and innovation. Previous MGI research has found that global flows of goods, services, finance, people, and data boosted world GDP by around 10 percent in a decade over a scenario in which those flows did not exist. While there were individual winners and losers in the last wave of globalization, as we discuss below, openness to both inflows and outflows of all kinds has real economic value.

¹ "Reimagining global ties: How China and the world can win together," McKinsey.com, December 2018. See also research report on China's role in the global economy forthcoming from MGI in early 2019.

² *World economic outlook: Challenges to steady growth*, International Monetary Fund (IMF), October 2018.

³ Data from China's National Bureau of Statistics.

⁴ Keith Naughton and Gabrielle Coppola, "Volvo rips up production plans in effort to dodge trade war tariffs," Bloomberg, November 8, 2018; and David Wren, "Trade tiff prompts changes at BMW's SC plant," *Post and Courier*, November 7, 2018.

⁵ Jim Tankersley, "A winter-coat heavyweight gives Trump's trade war the cold shoulder," *New York Times*, November 23, 2018.

ONE OF THE FORCES RESHAPING VALUE CHAINS IS A CHANGE IN THE GEOGRAPHY OF GLOBAL DEMAND

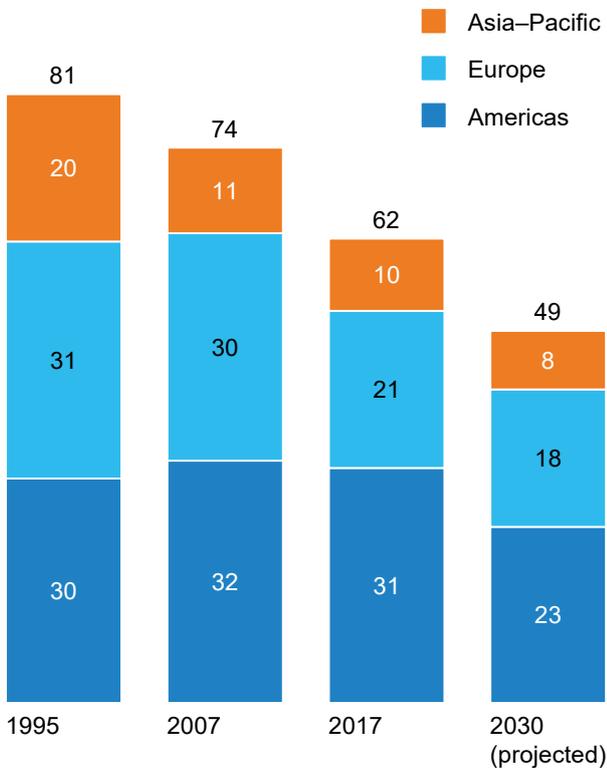
The map of global demand, once heavily tilted toward advanced economies, is being redrawn—and value chains are reconfiguring as companies decide how to compete in the many major consumer markets that are now dotted worldwide. According to current projections, emerging markets will consume almost two-thirds of the world’s manufactured goods by 2025, with products such as cars, building products, and machinery leading the way.¹⁵ By 2030, developing countries are projected to account for more than half of all global consumption (Exhibit E5). These nations continue to deepen their participation in global flows of goods, services, finance, people, and data.

Exhibit E5

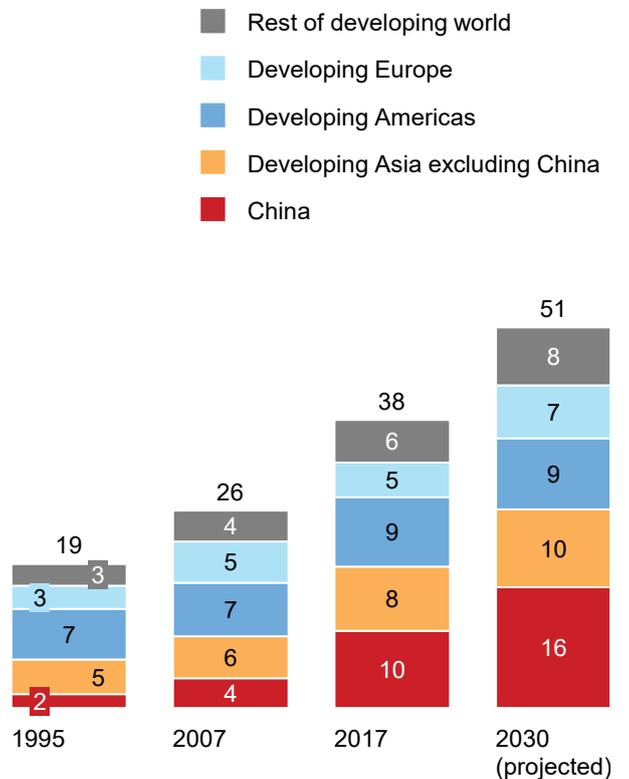
By 2030, developing countries, led by China and emerging Asia, could account for more than half of global consumption.

%

Advanced economies’ share of global consumption by region



Developing economies’ share of global consumption by region



NOTE: Figures may not sum to 100% because of rounding.

SOURCE: McKinsey Global Growth Model; McKinsey Global Institute analysis

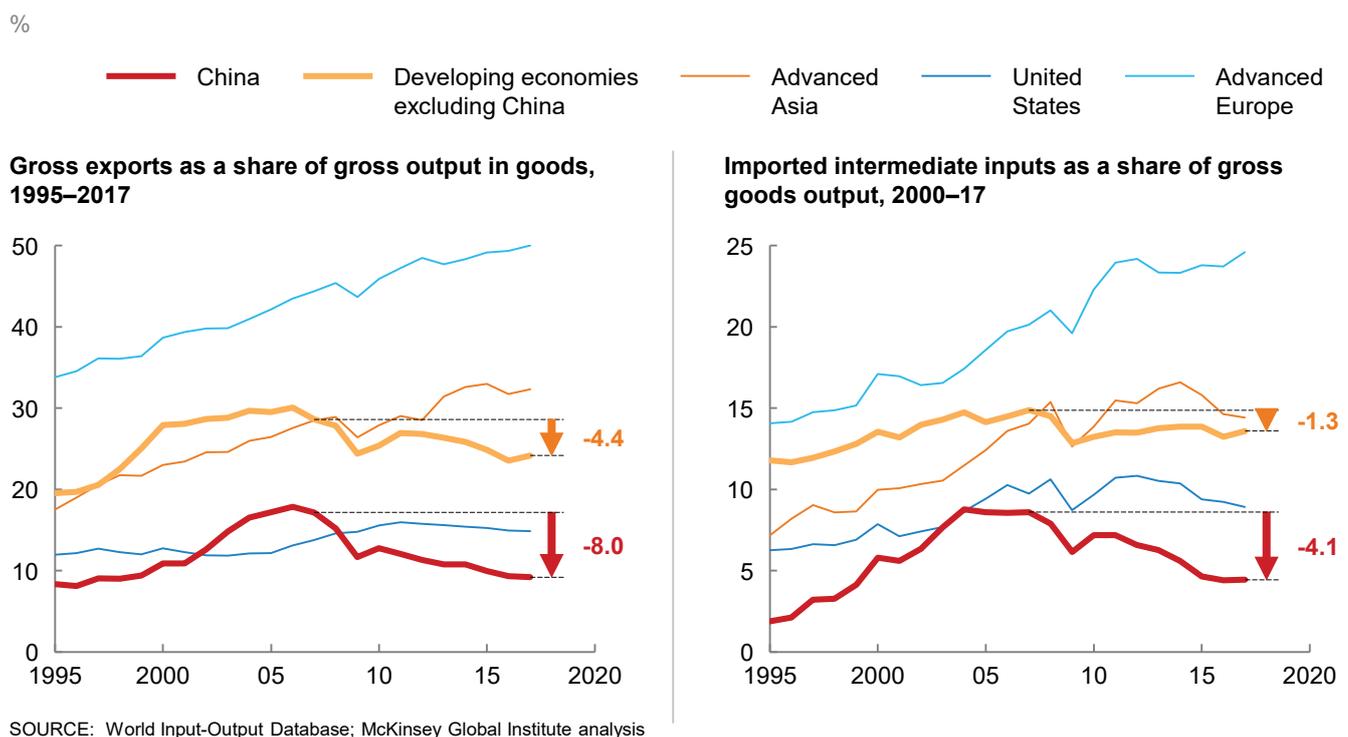
¹⁵ Matteo Mancini, Wiktor Namysl, Rafael Pardo, and Sree Ramaswamy, “Global growth, local roots: The shift toward emerging markets,” August 2017, McKinsey.com.

The biggest wave of growth has been happening in China, although there have been recent signs of slowing. Previous MGI research highlighted China's working-age population as one of the key global consumer segments; by 2030, they are projected to account for 12 cents of every \$1 of worldwide urban consumption.¹⁶ As it reaches the tipping point of having more millionaires than any other country in the world, China now represents roughly a third of the global market for luxury goods.¹⁷ In 2016, 40 percent more cars were sold in China than in all of Europe, and China also accounts for 40 percent of global textiles and apparel consumption.

As consumption grows, more of what gets made in China is now sold in China (Exhibit E6). This trend is contributing to the decline in trade intensity. Within the industry value chains we studied, China exported 17 percent of what it produced in 2007. By 2017, the share of exports was down to 9 percent. This is on a par with the share in the United States but is far lower than the shares in Germany (34 percent), South Korea (28 percent), and Japan (14 percent). This shift has been largely obscured because the country's output, imports, and exports have all been rising so dramatically in absolute terms. But overall, China is gradually rebalancing toward more domestic consumption.

Exhibit E6

Since 2007, trade intensity has fallen in China and other developing economies.



¹⁶ *Urban world: The global consumers to watch*, McKinsey Global Institute, April 2016.

¹⁷ *Chinese luxury consumers: The 1 trillion renminbi opportunity*, McKinsey & Company 2017 China Luxury Report, May 2017.

The rising middle class in other developing countries is also flexing new spending power. By 2030, the developing world outside of China is projected to account for 35 percent of global consumption, with countries including India, Indonesia, Thailand, Malaysia, and the Philippines leading the way. In 2002, India, for example, exported 35 percent of its final output in apparel, but by 2017, that share had fallen by half, to 17 percent, as Indian consumers stepped up purchases.

Growing demand in developing countries also offers an opportunity for exporters in advanced countries. Only 3 percent of exports from advanced economies went to China in 1995, but that share was up to 12 percent by 2017. The corresponding share going to other developing countries grew from 20 to 29 percent. In total, advanced economies' exports to developing countries grew from \$1 trillion in 1995 to \$4.2 trillion in 2017. In the automotive industry, Japan, Germany, and the United States send 42 percent of their car exports to China and the rest of the developing world. In knowledge-intensive services, 45 percent of all exports from advanced economies go to the developing world. The Asia–Pacific region is already a top strategic priority for many Western brands.

THE RISE OF DOMESTIC SUPPLY CHAINS IN CHINA AND OTHER EMERGING ECONOMIES HAS ALSO DECREASED GLOBAL TRADE INTENSITY

China's rapid growth has made it a major part of virtually every goods-producing global value chain. Overall, it now accounts for 20 percent of global gross output, up from just 4 percent in 1995. In textiles and apparel, electrical machinery, and glass, cement, and ceramics, it now produces nearly half of global output.

But as its economy has matured, China has moved beyond assembling imported inputs into final products. It now produces many intermediate goods and conducts more R&D in its own domestic supply chains. This is the second factor dampening global trade intensity in goods. In computers and electronics, for instance, Chinese companies are developing the kind of sophisticated smartphone chips that China once imported from advanced economies. Building more vertically integrated domestic industries enables China to capture more value added—and simultaneously bring jobs and economic development to its poorer inland provinces.

Other developing countries are beginning to exhibit the same structural shifts seen in China, although they are at earlier stages. In textiles and apparel, for instance, production networks spanning multiple stages are consolidating within individual countries such as Vietnam, Bangladesh, Malaysia, India, and Indonesia.

As a group, emerging Asia has become less reliant on imported intermediate inputs for the production of goods than the rest of the developing world (8.3 percent versus 15.1 percent in 2017). By contrast, in developing Europe, where economic growth has been slower, companies have continued to integrate into the supply chains of companies in Western Europe.

The decline in trade intensity reflects growing industrial maturity in emerging economies. Over time, their production capabilities and consumption are gradually converging with those of advanced economies. Declining trade intensity in goods does not mean globalization is over; rather, digital technologies and data flows are becoming the connective tissue of the global economy.¹⁸

¹⁸ See Susan Lund and Laura Tyson, "Globalization is not in retreat: Digital technology and the future of trade," *Foreign Affairs*, May 2018.

NEW TECHNOLOGIES ARE CHANGING COSTS ACROSS GLOBAL VALUE CHAINS

The explosive growth of cross-border data flows, highlighted in MGI's previous research on digital globalization, is ongoing. According to World Bank data, 45.8 percent of the world is now online, up from just 20 percent a decade ago. The number of cellular subscriptions worldwide now exceeds the planet's population. From 2005 to 2017, the amount of cross-border bandwidth in use grew 148 times larger. A torrent of communications and content travels along these digital pathways—and some of this traffic reflects companies interacting with foreign operations, suppliers, and customers.

Instant and low-cost digital communication has had one clear effect: lowering transaction costs and enabling more trade flows. But the impact of next-generation technologies on global flows of goods and services will not be as simple. Some advances, like digital platforms, blockchain, and the Internet of Things, will continue to reduce transaction and logistics costs.¹⁹ Others may reduce trade flows in some cases, either by changing the economics and location of production or by changing the actual goods and services demanded (Exhibit E7). The net impact is uncertain, but in some plausible scenarios, the next wave of technology could dampen global goods trade while continuing to fuel service flows.

Digital platforms, logistics technologies, and data-processing advances will continue to reduce cross-border transaction costs and enable all types of flows

In goods-producing value chains, logistics costs can be substantial. Companies often lose time and money to customs processing or delays in international payments. Three sets of technologies will continue to reduce these frictions in the years ahead.

Digital platforms can bring together far-flung participants, making cross-border search and coordination more efficient and enabling smaller businesses to participate. E-commerce marketplaces have already enabled significant cross-border flows by aggregating huge selections and making pricing and comparisons more transparent. Alibaba's AliResearch projects that cross-border B2C e-commerce sales will reach approximately \$1 trillion by 2020. B2B e-commerce could be five or six times as large. While many of those transactions may substitute for traditional offline trade flows, e-commerce could still spur some \$1.3 trillion to \$2.1 trillion in incremental trade by 2030, boosting trade in manufactured goods by 6 to 10 percent. Continued rapid growth in small-parcel trade would present a challenge for customs processing, however.

Logistics technologies also continue to improve. The Internet of Things (IoT) can make delivery services more efficient by tracking shipments in real time, and AI can route trucks based on current road conditions. Automated document processing can speed goods through customs. At ports, autonomous vehicles can unload, stack, and reload containers faster and with fewer errors. Blockchain shipping solutions can reduce transit times and speed payments. We calculate that new logistics technologies could reduce shipping and customs processing times by 16 to 28 percent. By removing some of the frictions that slow the movement of goods today, these technologies together could potentially boost overall trade by 6 to 11 percent by 2030.²⁰

¹⁹ *The future of world trade: How digital technologies are transforming global commerce*, World Trade Organization, 2018, focuses on the impact of technologies in reducing trade costs. It finds that global goods trade may grow by two percentage points relative to the baseline scenario as a result.

²⁰ The academic literature finds that a 1 percent reduction in trade costs can result in a 0.4 percent increase in trade flows. See Simeon Djankov, Caroline Freund, and Cong S. Pham, "Trading on time," *The Review of Economics and Statistics*, 2010, Volume 92, Number 1.

New technologies will have varying impacts on global flows.

NOT EXHAUSTIVE

				Impact on flows			
		Technology ¹	Example	Primary re-sources	Manu-factured goods	Ser-vices	Data
Reducing trans- action costs	Digital platforms	E-commerce	US consumer buys shoes from UK e-commerce site	—	▲	▲	▲
	Logistics techno- logies	Automated document processing	Paperless customs documentation processing in India reduces time for loading/unloading ships	▲	▲	▲	▲
		Internet of Things	IoT sensors track shipments from Brazil to Angola	▲	▲	▲	▲
		Next-gen transportation	New material enables shipping through Arctic route	▲	▲	—	—
		Autonomous vehicles	Autonomous vehicles move cargo in ports, airports, and warehouses	▲	▲	—	▲
	Data processing techno- logies	Blockchain	Blockchain enables automated cross-border insurance claims ²	—	—	▲	▲
		Cloud	An Australian company utilizes Google Cloud	—	—	▲	▲
Altering econo- mics of produc- tion	Additive manufac- turing	3-D printing	3-D printing of toys at home	—	▼	▲	▲
			3-D printing of hearing aids in Vietnam for global distribution	—	▲	—	—
	Automation	Advanced robotics	A company equips a new UK factory with robots to make appliance manufacturing viable	—	▼	—	—
			Bangladesh automates textiles production, boosting productivity to gain global market share	—	▲	—	—
	Artificial intelligence	Virtual assistants	A British retailer deploys virtual assistants for customer service calls, substituting for offshore labor in a call center	—	—	▼	▼
		Robotic process automation (RPA)	A Philippine company employs RPA in back office processing, reducing cost and increasing volume	—	—	▲	▲
Transfor- mation of existing products and creation of new products	Digital goods	Streaming movies/music	Drake's new album is streamed a billion times globally in one week	—	▼	▲	▲
	New goods	Renewable energy	China increases electricity generation from renewables, reducing coal and LNG imports	▼	—	—	—
		Electric vehicles	European consumers buy more EVs, requiring fewer imported parts and lower oil imports	▼	▼	—	—
		Telemedicine	A German doctor relies on 5G to perform remote robotic surgery on a patient in Turkey	—	—	▲	▲

1 We focus on a sample of currently available and deployed technologies that materially impact trade. This list is not exhaustive.
 2 Blockchain can also make logistics more efficient (eg, automating payments through blockchain-based smart contracts).

SOURCE: McKinsey Global Institute analysis

Automation and additive manufacturing change production processes and the relative importance of inputs

Previous MGI research has found that roughly half of the tasks that workers are paid to do could technically be automated, suggesting a profound shift in the importance of capital versus labor across industries.²¹ The growing adoption of automation and advanced robotics in manufacturing makes proximity to consumer markets, access to resources, workforce skills, and infrastructure quality assume more importance as companies decide where to produce goods. Companies are reconsidering location decisions as a result.

Service processes can also be automated by artificial intelligence (AI) and virtual agents. The addition of machine learning to these virtual assistants means they can perform a growing range of tasks. Companies in advanced economies are already automating some customer support services rather than offshoring them. This could reduce the \$160 billion global market for business process outsourcing (BPO), now one of the most heavily traded service sectors.

Additive manufacturing (3-D printing) could also influence future trade flows. Most experts believe it will not replace mass production over the next decade; its cost, speed, and quality are still limitations. But it is gaining traction for prototypes, replacement parts, toys, shoes, and medical devices. While 3-D printing could reduce trade in some specific products substantially, the drop is unlikely to amount to more than a few percentage points across overall trade in manufactured goods by 2030. In some cases, additive manufacturing could even spur trade by enabling customization.²²

Overall, we estimate that automation, AI, and additive manufacturing could reduce global goods trade by up to 10 percent by 2030, as compared to the baseline. However, this reflects only the direct impact of these technologies on enabling production closer to end consumers in advanced economies. It is also possible that these technologies could lead to nearshoring and regionalization of trade instead of reshoring in advanced economies. Moreover, developing countries could adopt these technologies to improve productivity and retain production, thereby sustaining trade.

New goods and services enabled by technology will impact trade flows

Technology can transform some products and services, altering the content and volume of trade flows in the process. For example, McKinsey's automotive practice estimates that electric vehicles will make up some 17 percent of total car sales globally by 2030, up from 1 percent in 2017. This could reduce trade in vehicle parts by up to 10 percent (since EVs have many fewer moving parts than traditional models) while also dampening oil imports.

The shift from physical to digital flows that started years ago with individual movies, albums, and games is now evolving once again as companies such as Netflix, Tencent Video, and Spotify popularize streaming and subscription models. Streaming now accounts for nearly 40 percent of global recorded music revenues. In 2018, Drake became the first artist to hit 50 billion streams globally, and his album *Scorpion* was streamed a billion times around the world in just one week. Cloud computing uses a similar pay-as-you-go or subscription model for storage and software, freeing users from making heavy capital investments in their own IT infrastructure.

²¹ *Jobs lost, jobs gained: Workforce transitions in a time of automation*, McKinsey Global Institute, December 2017.

²² Caroline Freund et al., *Is 3D printing a threat to global trade? The trade effects you didn't hear about*, World Bank Group, forthcoming.

The advent of ultra-fast 5G wireless networks opens new possibilities for delivering services. Remote surgery, for example, may become more viable as networks transmit sharp images without any delays and robots respond more precisely to remote manipulation. In industrial plants, 5G can support augmented and virtual reality–based maintenance from remote locations, creating new service and data flows.

GIVEN THE SHIFTS IN VALUE CHAINS, COMPANIES NEED TO REEVALUATE THEIR STRATEGIES FOR OPERATING GLOBALLY

Both the costs and the risks of global operations are shifting. The rising importance of knowledge and intangibles raises the stakes for cultivating digital capabilities and workforce skills. Automation in production reduces the value of labor-cost arbitrage and enables location decisions based on proximity to customers. Companies can capture significant efficiencies from new technologies in production and logistics, but they need end-to-end integration across their supplier networks to realize the full potential. Digital disrupters are turning up the pressure on incumbents in industry after industry, and they are expanding up and down the value chain. Several imperatives stand out for global companies in this landscape:

- **Reassess where to compete along the value chain.** Business leaders need to continuously monitor where value is moving in their industry and adapt accordingly.²³ Some companies, like Apple and many pharmaceutical firms, have narrowed their focus to R&D and distribution while outsourcing production. By contrast, many makers of consumer goods take a hyperlocal approach, with customized product portfolios for individual markets. Providers of “global-local” services, such as Airbnb and Uber, have recognized global brands but also extensive local operations that deliver in-person services. Network companies, most of which are knowledge-intensive service providers, create value through a geographically dispersed operating model and global reach. Regardless of the strategy, a key point is to maintain control, trust, and collaboration in all parts of the value chain. For some companies, this might mean bringing more operations in-house. Those that outsource need to re-evaluate supplier relationships and management (see below).
- **Consider how to capture value from services.** Across multiple value chains (including manufacturing), more value is coming from services, whether software, design, intellectual property, distribution, marketing, or after-sales services. Shifting to services can offer advantages: smoothing cyclical sales, providing higher-margin revenue streams, and enabling new sales or design ideas due to closer interaction with customers. At its extreme, entire business models shift from producing goods to delivering services (for example, from selling vehicles to offering transportation services, or from selling packaged software and servers to selling cloud subscriptions). To excel in services, companies need to gain insight into customer needs, invest in data and analytics, and develop the right subscription, per-use, or performance-based service contracts.

²³ See Pankaj Ghemawat, *The New Global Road Map: Enduring Strategies for Turbulent Times*, Boston, MA: Harvard Business Review Press, 2018; and Everett Grant and Julieta Young, *The double-edged sword of global integration: Robustness, fragility and contagion in the international firm network*, Globalization and Monetary Policy Institute working paper number 313, 2017.

- **Reconsider your operational footprint to reflect new risks.** One of the most important considerations is where to locate operations and invest in new capacity. The calculus that held in the past is different today. New automation technologies, changing factor costs, an expanding set of risks, and the need for speed and efficiency are all driving regionalization in many goods-producing value chains. As a result, it may make sense to place production in or near key consumer markets around the world. Before investing, companies should consider the full risk-adjusted, end-to-end landed costs of location decisions—and today many do not account for all of the variables. Using a dynamic, risk-adjusted scenario approach rather than a simple point forecast of demand or cost can inform better decisions about shaping an operational footprint.
- **Be flexible and resilient.** Today companies face a more complex set of unknowns as the postwar world order that held for decades seems to be giving way. There is a real chance that tariffs and nontariff barriers will continue to rise, reversing decades of trade liberalization. Tax codes are being reconsidered to account for flows of data and intangibles. Building agile operations can help firms prepare for these types of uncertainties. This can take many forms, such as using versatile common platforms to share components across product lines and multiple plants. In purchasing, companies have achieved flexibility through price hedging, long-term contracting, shaping customer demand to enable using substitutes, and building redundancies into supply chains.
- **Prioritize speed to market and proximity to customers.** Companies in all industries now have a wealth of real-time, granular sales and consumer behavior data at their disposal, but it takes manufacturing and distribution excellence to capitalize on these insights. Speed to market enables faster responses to what customers want and less product waste from forecasting errors. This does not necessarily require large-scale reshoring or full vertical integration in every major market. Companies can opt for postponement—that is, creating a largely standardized product at a distance and then finishing it with custom touches at a facility near the end market.
- **Build closer supplier relationships.** In the last era of globalization, the fragmentation of value chains and the trend toward offshoring led many companies into arm's-length relationships with suppliers across the globe. But that approach involved hidden risks and costs. It makes sense to identify which suppliers are core to the business, then solicit their ideas and deepen relationships with them. With a growing share of product value being provided by the supply chain, firms that genuinely collaborate can secure preferred customer status and benefit from new product ideas or process efficiencies bubbling up from suppliers. Large firms can also bring about systemic changes along the value chain, improving labor and environmental standards. Logistics and production technologies can transform supply chains, but optimizing what they can do requires end-to-end integration. Larger companies may need to help their small and medium-size suppliers upgrade and add digital capabilities to realize the full value.

THE ROAD AHEAD IS DIVERGING FOR DIFFERENT SETS OF COUNTRIES AND WORKERS

To understand the larger implications of these shifts in global value chains, we group countries into nine categories (Exhibit E8). We first divide them into two groups: advanced and developing. From there, we further segment them based on the global value chain archetype in which they run the largest trade surplus. While countries participate in multiple global value chains (as seen in the diversification metric), these groupings nevertheless offer a useful way to assess their exposure to ongoing structural shifts.

Exhibit E8

Each country's specialization and diversification in trade determines its exposure to trends in value chains.

Classification	Country	GDP per capita, 2017 \$ thousand	MGI Connected- ness Index, 2017 ¹	Global value chain archetype with largest trade surplus, 2017 Sector within this archetype with the largest trade surplus	Trade intensity (Exports + imports) ÷ GDP %	Diversification of exports Number of sectors accounting for 75% of exports	
		High (>20) Middle (8–20) Low middle (2–8) Low (<2)	Very high High Medium Low Very low	Global innovation Labor-intensive goods Regional processing Resource-intensive goods Services (all)			
Advanced	Innovation providers	Germany	High	Very high	Auto	83	10
		Ireland	High	Very high	Pharma	125	4
		Italy	High	High	Machinery and equipment	59	10
		Japan	High	High	Auto	33	7
		Netherlands	High	Very high	Chemicals	175	9
		Singapore	High	Very high	Computers	278	7
		South Korea	High	High	Computers and electronics	78	8
	Regional processors	Austria	High	Medium	Paper	96	11
		Finland	High	High	Paper	69	10
		Spain	High	High	Food and beverage	61	10
	Resource providers	Australia	High	High	Mining	40	5
		Canada	High	Very high	Oil and gas	61	10
		Norway	High	High	Oil and gas	64	7
		Saudi Arabia	High	Very high	Oil and gas	52	3
Service providers	France	High	Very high	Financial intermediation	59	9	
	Sweden	High	Very high	Telecom and IT	74	11	
	United Kingdom	High	Very high	Financial intermediation	55	10	
	United States	High	Very high	IP charges	25	10	
Developing	Innovation providers	Hungary	High	High	Auto	163	9
		Mexico	High	High	Auto	78	7
	Labor providers	China	High	Very high	Textiles and apparel	39	8
		India	Low middle	High	Furniture	33	9
		Turkey	High	Low	Textiles and apparel	50	9
		Vietnam	High	High	Textiles and apparel	202	5
	Regional processors	Argentina	High	Low	Food and beverage	24	6
		Indonesia	Low middle	Low	Food and beverage	36	8
		Malaysia	High	High	Food and beverage	136	8
		Poland	High	High	Food and beverage	97	12
		Thailand	High	High	Food and beverage	114	9
	Resource providers	Brazil	High	Low	Agriculture	22	8
		Colombia	Low middle	Low	Oil and gas	32	6
		Nigeria	Low middle	Low	Oil and gas	30	1
		Russia	High	High	Oil and gas	45	6
		South Africa	Low middle	Low	Basic metals	61	8
	Service providers	Costa Rica	High	Low	Business services	54	5
Kenya		Low middle	Low	Transport services	30	5	
Morocco		Low middle	Low	Telecom and IT	78	7	
Philippines		Low middle	Low	Business services	62	7	

1 Index based on flows of goods, services, finance, people, and data. For methodology, see *Digital globalization: The new era of global flows*, McKinsey Global Institute, February 2016.

NOTE: We group countries based on the industries in which they run the largest trade surplus, but most countries participate in multiple value chains. This grouping should not be viewed as a ranking.

SOURCE: IMF; WTO; UNCTAD; OECD; McKinsey Global Institute analysis

The specific challenges and opportunities differ for each of these groups. Yet a few priorities apply across the board. No matter where countries specialize today, strengthening service sectors and capabilities is an important opportunity for the future. Investment in R&D will be critical to competing in an increasingly knowledge-intensive global economy. All countries—and particularly those that are major producers of labor-intensive goods—need to prepare for the wider adoption of automation technologies. There is a great deal of unrealized potential in deepening regional trade ties in many parts of the world. Finally, every country can benefit from streamlining customs operations and modernizing trade agreements for a global economy in which flows of services, intellectual property, and data are increasingly vital.

Shifts in global value chains may favor some advanced economies

There is reason to believe many advanced economies may have already made it through the worst of the disruption stemming from the globalization of value chains. The structural shifts described in this research favor countries with skilled workforces, service capabilities, innovation ecosystems, and lucrative consumer markets—all of which line up with the comparative advantages of advanced economies. These countries will also benefit from the rise of consumers in developing countries if they can tap into export demand. These trends could be good news, especially for highly skilled workers and those in service industries.

Across advanced economies, however, outlooks and priorities vary. Those with strong service sectors and exports, such as the United States, the United Kingdom, France, and Sweden, should be able to capitalize on their existing strengths as trade grows in industries such as IT services, business services, healthcare, and education. In contrast, those that excel mainly in global innovations value chains, such as Germany, Japan, and South Korea, may find a more challenging environment ahead as China expands its capabilities and surpluses in these industries. Advanced economies that excel in regional processing value chains, such as Spain, Portugal, Austria, and Finland, will be more insulated from competition emanating from developing countries, given the lower tradability of those value chains. Indeed, these countries may offer an interesting model for the development of low-income countries. Resource producers, whether high-income or low-income, face a growing imperative to diversify their economies.

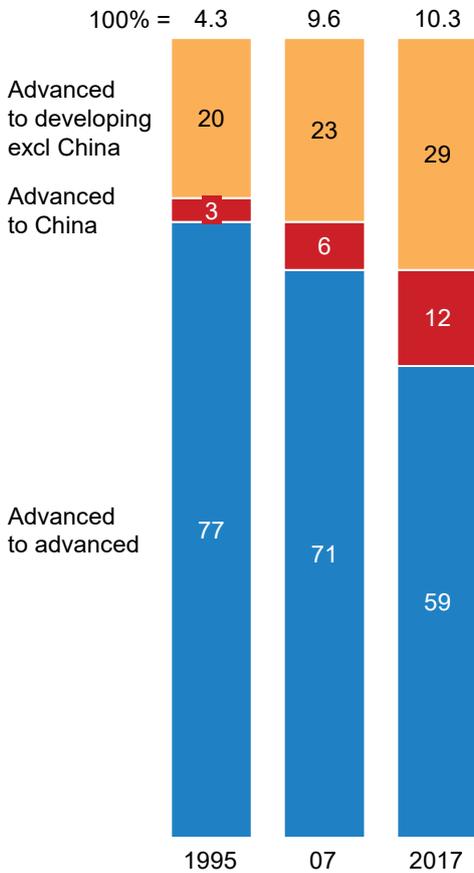
As global demand shifts to the developing world, new opportunities are opening for producers in advanced economies. The share of advanced-economy exports to developing economies increased from 23 percent in 1995 to more than 40 percent in 2017, with notable growth in machinery and equipment along with computers and electronics (Exhibit E9).

For all advanced economies, public and private R&D spending is essential to maintaining an edge in exports. Trade policies need to address issues surrounding cross-border digital flows (including data privacy, cybersecurity, and market access), nontariff barriers to services trade, and intellectual property protections.

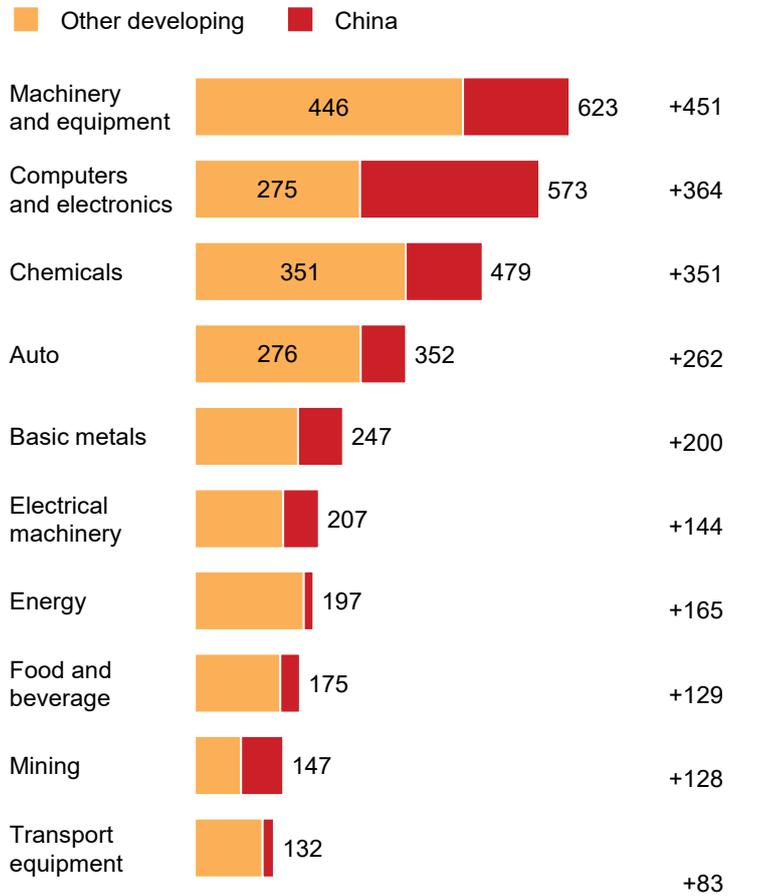
Exhibit E9

China and the developing world are an increasingly important source of demand for advanced economies.

Advanced economy exports by receiving region¹
%; \$ trillion



Top 10 categories of exports from advanced to developing countries, 2017
\$ billion



¹ Based on advanced economy reporting, goods and services.
NOTE: Figures may not sum to 100% because of rounding.

SOURCE: IMF; UNCTAD, OECD, WTO; McKinsey Global Institute analysis

Finally, governments in advanced economies must address the unfinished business of helping the communities and workers that bore disproportionate costs in the previous era of globalization (see Box E2, “The impact of trade on employment and wages”). This will require implementing bolder economic development in hard-hit communities, building more effective education-to-employment systems, and ensuring that social safety nets are up to the task when global forces change local economies.

Box E2. The impact of trade on employment and wages

The last wave of globalization was accompanied by rising incomes and prosperity for billions of people around the world. But many middle-class workers in advanced economies lost jobs or watched their wages stagnate.¹

Economists David Autor, David Dorn, and Gordon Hanson document that between 1990 and 2007, US manufacturing industries and communities that were more exposed to increased import competition from China experienced substantially larger reductions in manufacturing employment than their less exposed counterparts.² Contrary to the presumption that US labor markets are highly fluid, these authors also find that displaced manufacturing workers did not smoothly transition to new employment. Instead, job losses remained concentrated in local communities, and these shocks persisted for at least a decade.

A study by Daron Acemoglu et al. estimates that import growth from China between 1999 and 2011 led to the loss of 2.4 million out of the 5.8 million US manufacturing jobs lost over that period.³ They calculate that the impact of import competition on employment is about three times as large as the impact of robotics on employment (although technology could become the larger factor in the future).⁴

Similar patterns have been documented in a range of countries, including Spain, Norway, and Brazil. Yet the story played out differently in Germany, which faced

rising import competition from 1991 through 2008 from both Eastern Europe and China. German manufacturers sharply increased exports to both markets, resulting in a more modest trade deficit with China and a trade surplus with Eastern Europe. Employment gains from exports roughly offset German job losses from import competition from China; in the case of trade with Eastern Europe, German employment increased on net.⁵

Trade competition has also affected wages in advanced economies. The studies referenced above find more depressed wage growth in local labor markets that were more exposed to import competition, with the lowest-wage workers hit the hardest. In another study, Autor et al. find that workers whose 1991 industry was exposed to trade accumulated substantially lower earnings through 2007 than peers; they also experienced greater job churn and were more likely to rely on disability benefits. In contrast, high-income workers did not experience the same effects.⁶ Research on wages in other countries finds similar results.⁷

The rise and fall of companies and sectors has always accompanied the ongoing reallocation of resources across economies. While it ultimately raises overall productivity and living standards, the process creates winners, losers, and pain along the way. Those who support maintaining globalization will need to acknowledge and address the heavy costs borne by some individuals and communities.

¹ Branko Milanovic, *Global Inequality: A New Approach for the Age of Globalization*, Cambridge, MA: Harvard University Press, 2016.

² David H. Autor, David Dorn, and Gordon H. Hanson, "The China shock: Learning from labor market adjustment to large changes in trade," *Annual Review of Economics*, October 2016, Volume 8.

³ Daron Acemoglu et al., "Import competition and the great US employment sag of the 2000s," *Journal of Labor Economics*, January 2016, Volume 34, Number S1.

⁴ Daron Acemoglu and Pascual Restrepo, *Robots and jobs: Evidence from US labor markets*, NBER working paper number 23285, March 2017.

⁵ Wolfgang Dauth, Sebastian Findeisen, and Jens Suedekum, "The rise of the East and the Far East: German labor markets and trade integration," *Journal of the European Economic Association*, December 2014, Volume 12, Issue 6.

⁶ David H. Autor et al., "Trade adjustment: Worker-level evidence," *The Quarterly Journal of Economics*, November 2014, Volume 129, Issue 4.

⁷ Joao Paulo Pessoa, *International competition and labor market adjustment*, Center for Economic Performance, discussion paper number 1411, March 2016; and Damoun Ashournia, Jakob Munch, and Daniel Nguyen, *The impact of Chinese import penetration on Danish firms and workers*, IZA discussion paper number 8166, May 2014.

Developing countries with geographic proximity to large consumer markets or with tradable service expertise also stand to gain

In some middle-income countries, manufacturing workers may face disruptions in the years ahead as some production shifts to lower-wage countries and as automation technologies substitute for some types of labor. Higher levels of productivity and skills will be important for middle-income countries to set themselves apart; this includes keeping pace with technology advances in both manufacturing and logistics. China, for example, is steadily climbing into the higher-value global innovators group by embracing automation and AI. Developing specialized capabilities can help middle-income countries carve out new roles in specific industry value chains and attract more foreign direct investment. But low-skill workers in those countries may struggle to find a place in the new economy.

Historically, labor-intensive manufacturing for export has been the only successful path for low- and middle-income countries to rapidly climb the economic ladder. Now the window of opportunity may be narrowing as automation technologies erode the advantage of large low-wage workforces.²⁴ But the window is not closed yet. Developing economies such as Bangladesh, India, and Vietnam are managing to achieve solid growth in labor-intensive manufacturing exports, while China continues to develop more knowledge-intensive sectors. Countries pursuing this path will need to invest in transportation and logistics infrastructure and modern, technology-enabled factories that can compete globally. Regional processing value chains may be a promising avenue for diversification.

One subset of developing countries has a critical advantage: geographic proximity to major advanced economy consumer markets. As automation changes the balance of capital and labor, many multinationals are considering investing in new production capabilities closer to end consumer markets to tighten coordination of their supply chains and reduce shipping times. Mexico plays this type of “nearshoring” role for the United States; Turkey and a number of Eastern European countries are linked into value chains based in Western Europe; and Thailand, Malaysia, and Indonesia play the same role for higher-income Asia–Pacific countries. This trend may also lead China to rely more on neighboring countries for production.

Another set of developing countries that specialize in traded BPO and IT services, including the Philippines, Morocco, Costa Rica, and India, will have opportunities as services trade rises. But they will also be challenged, because the ongoing adoption of AI and virtual agents may reduce the market for offshore back-office services. These countries could move into higher-value offerings such as software and web development, graphic design, and data analysis.

Many countries in Africa, Latin America, and Central Asia have limited participation in global value chains, and they are also less connected to the rest of the world in flows of finance, people, and data. Their challenge is to find new openings and to create the necessary business environment, infrastructure, policy foundations, and human capital.

Recent MGI research has also emphasized the role of competition and productive large firms in creating a virtuous cycle of growth.²⁵ One pathway for the least connected countries may be regional integration. Existing trading blocs in Latin America and Africa could be deepened to create regional trade opportunities, particularly in industries such as food and beverage and regional processing. The digitization of the global economy sets higher hurdles for developing economies, but mobile apps, cloud computing, and digital finance also hold possibilities for leapfrog growth.



Global value chains are changing in fundamental ways as demand soars in the developing world, China and other developing economies build more comprehensive supply chains, and next-generation technologies come online. These shifts have implications for where and how companies compete. This period of transition is an opening for countries and regions to carve out new specializations and new roles in value chains, but policy makers will need to address the dislocations globalization can cause even as they prepare for the opportunities of the future.

²⁴ Dani Rodrick, *New technologies, global value chains, and the developing economies*, Pathways for Prosperity Commission Background Paper Series number 1, September 2018.

²⁵ *Outperformers: High-growth emerging economies and the companies that propel them*, McKinsey Global Institute, September 2018.



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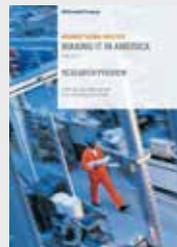
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