



The **E15** Initiative

STRENGTHENING THE GLOBAL TRADE AND INVESTMENT SYSTEM  
FOR SUSTAINABLE DEVELOPMENT



## How Digital Trade is Transforming Globalisation

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**McKinsey&Company**

January 2016

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Digital Economy

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**Think Piece**

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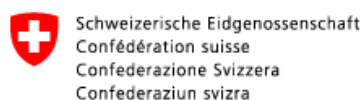
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# ABSTRACT

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The spread of digital technologies is transforming global flows of goods, services, money, and people. Digital trade represents an important, albeit hard-to-measure, component of these global flows. As digital trade grows, develops, and assumes new forms, it is both facilitating globalisation and transforming it. This paper examines three ways this transformation process is taking place: through cross-border flows of purely digital goods; by using "digital wrappers" to enable physical flows of goods—an essential component of the "Internet of Things"; and through the creation of online platforms for production, exchange, and consumption. Large and small companies, as well as individual entrepreneurs and consumers, in both developed economies and the emerging world will be increasingly affected by these developments, which constitute both an opportunity and a competitive challenge. For governments and policymakers, the rapid transformation of digital trade raises important issues that will need to be addressed, including lingering barriers to its growth, appropriate ways of measuring it, and questions about governance and data security.

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# LIST OF ABBREVIATIONS

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B2B	Business to business
B2C	Business to consumer
EU	European Union
IETF	Internet Engineering Task Force
IoT	Internet of Things
MOOCs	Massive Open Online Courses
OECD	Organisation for Economic Co-operation and Development
P2P	Peer to peer
R&D	Research and development
RFID	Radio-frequency identification
SMEs	Small- and medium-sized enterprises (SMEs)
UK	United Kingdom
US	United States
USITC	United States International Trade Commission
VoIP	Voice-over-the-Internet Protocol

# INTRODUCTION

The spread of digital technologies is transforming all types of global flows — those of goods, services, money, and people — and this transformation is only in its earliest stages. Already, more and more of people across the globe engage in instantaneous cross-border exchanges of digital goods, from books and music to design files that enable 3-D printing of physical objects. As the infrastructure that supports the Internet expands, barriers of distance and cost that once seemed insurmountable have begun to fall away.

Digital trade represents an important, albeit hard-to-measure, component of these global flows. As it grows, develops, and assumes new forms, it is both facilitating globalisation and transforming it. Digitisation lowers marginal production and distribution costs, while broadening access to global commerce. The cost of participating in trade is reduced not just for large companies, but also for individuals, small firms, and entrepreneurs. This is already spurring innovations in business models and spawning the emergence of micro-multinationals, micro-work, and micro-supply chains that are able to tap into global opportunities.

The Internet of Things (IoT) — the ability to monitor and manage objects in the physical world electronically — will enhance and accelerate these developments. Digitisation has already had a significant impact on trade by transforming logistics and supply chains; companies can readily track and collect information about a product, place, time, or transaction using sensors or other digital “wrappers,” to improve their operating efficiency and reduce costs. This process, too, is at an early stage, and we believe that its impact could be considerable over the next decade. Manufacturers and oil and gas companies, among others, have already begun to see the initial payoff from IoT technologies in their operations. From monitoring machines on the factory floor to tracking the progress of ships at sea or parcels being shipped across frontiers, digital technologies are helping companies get far more out of their physical assets.

The digitisation of global flows has been a key contributor to the explosive growth of cross-border data flows. Cross-border Internet traffic has increased 500-fold since 2000 — and with conservative assumptions will expand another eightfold by 2025. Together, these transformations will have broad implications for the future of globalisation. They will impact companies large and small, in emerging economies as well as in developed ones. Governments will be challenged to adapt their regulatory and taxation systems to deal with this upsurge in digitisation and digital trade. Policymakers will need to address sensitive issues around data security, privacy, and Internet governance. Trade agreements must be

updated to reflect the new realities of global commerce and expanded to address new forms of cross-border commerce and customs procedures.<sup>1</sup>

## THE SCOPE AND DYNAMISM OF DIGITAL TRADE

Measuring digital trade and its impact on globalisation is complex. There is as yet no accepted definition of what it is and no reliable data about its size (See Box: *Defining and measuring digital flows*).

We begin our analysis by looking first at the result of digital trade: the surge in cross-border flows of data and communication. Between 2002 and 2012, cross-border Internet traffic grew by 60 percent a year.<sup>2</sup> This reflects both an increase in the number of Internet users around the world and a sevenfold increase in cross-border Internet usage (Figure 1). By 2025, on conservative assumptions, we estimate cross-border Internet traffic could grow another eightfold.

A large part of the growth in the bits and bytes of data flowing around the world is from communication between individuals. As transmission costs have plummeted and speeds have soared, people and companies are using digital and mobile connections to share ideas, collaborate, and make social connections — both within countries and increasingly across borders. 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, or Instagram. 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 travel around the world. When US President Barack Obama was re-elected in 2012, his official victory photo was re-shared more than

1 This paper is drawn largely from three McKinsey Global Institute reports: *Global flows in a digital age: How trade, finance, people, and data connect the world economy*, April 2014; *The Internet of Things: Mapping value beyond the hype*, June 2015, and the forthcoming *Playing to Win: The new global competition for corporate profits*, September 2015

2 Data on cross-border Internet traffic is not available prior to 2007, although the volume of cross-border bandwidth is. We estimate cross-border traffic prior to 2007 using the ratio of traffic / bandwidth in 2007-13.

600,000 times and “liked” more than 7 million times — and more than two-thirds of those shares and likes came from outside the United States.<sup>3</sup> All of these exchanges generate cross-border flows of data.

Voice-over-the-Internet Protocol (VoIP) has generated a surge in global cross-border telephone calls. These have more than doubled over the past decade from 162 billion call minutes in 2002 to 570 billion call minutes in 2014. Since 2004, the number of call minutes on VoIP has increased by 24 percent a year, while traditional analogue call minutes have grown by less than 8 percent.

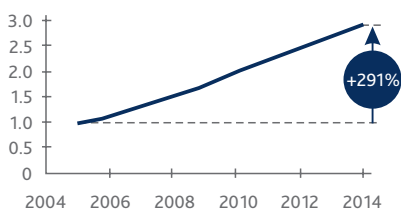
In addition to VoIP calls, cross-border computer-to-computer Skype calling has skyrocketed, similarly generating a torrent of cross-border data flows. By 2014, cross-border computer-to-computer Skype calling was at the level of 44 percent of traditional international calls. Over the past decade, Skype calling has more than doubled every two years, growing at 46 percent a year compared with 8 percent in the case of traditional calls. This amounts to a more than 700 percent increase in Skype call minutes since 2008.

But, the tsunami of data moving instantly across borders is not explained solely — or even primarily — by the new flows of global communication described above. While we cannot measure the exact share of Internet traffic that is due to emails, VOIP calls, and other forms of communication, we know that digitisation is enabling other types of global flows. In this paper we focus on three main ways digital technologies are transforming globalisation, beyond enabling communication and idea-sharing:

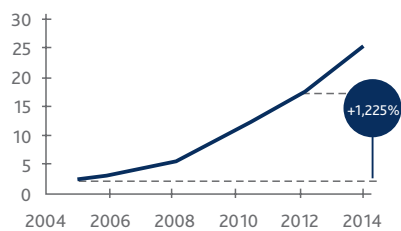
- First, through the creation of purely digital goods, such as books and movies, that can easily be transported and reproduced across the globe. Digitisation is even transforming some physical flows of people into virtual flows by enabling remote work, using tools for virtual collaboration.
- Second, digitisation enables 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. These sensors are critical enablers for the IoT.
- Third is the creation of online platforms for production, exchange, and consumption. These platforms range from e-commerce sites, including Amazon and Alibaba to the UK Government’s G-Cloud or Airbnb, which give individuals and small businesses global reach for their goods and services. Digital platforms are enabling whole new forms of cross-border exchanges, opening up new avenues of globalisation.

3 | Alex Dow, P.; 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.

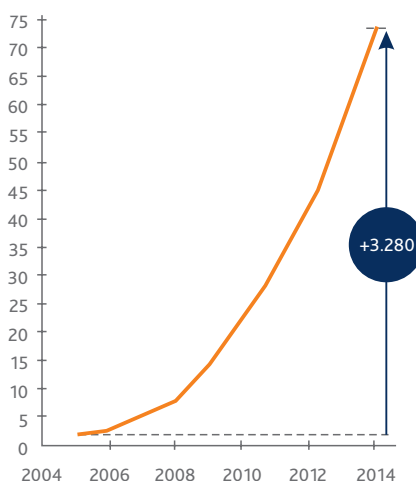
**Growth of Internet population**  
Billion Internet user



**Average cross-border Internet usage**  
Kilobits per second per person



**Growth of cross-border Internet traffic**  
Billion megabits per second



**FIGURE 1:**

Cross-border Internet traffic has surged

Source: Telegeography, McKinsey Global Institute analysis

## GLOBAL TRADE OF DIGITAL GOODS IS SOARING

One portion of the growth of cross-border data flows and Internet traffic is explained by trade in digital goods. While these are by no means a new phenomenon for the global economy, the range of goods that are purely digital and the proliferation of devices with which consumers can access digital content has turned a niche into a transformative global industry.

Today many goods that used to be traded in physical formats — such as books, magazines, and movies — are now shipped in digital format through the Internet with practically no distribution and transportation costs. Consumers can choose from a near-endless supply of games, movies, music, books, magazines, and newspapers from anywhere in the world. Although most digital goods are consumed in the country where they were produced, a growing share is to customers in foreign countries. For example, Netflix, which provides movies and television shows online, has become an increasingly international business. By the end of 2014, nearly one-third of its streaming customers lived outside the US, a testament to

the speed at which companies can establish a global footprint courtesy of digital technologies.<sup>6</sup>

The range of goods that can be traded digitally is expanding rapidly. In the future, consider how 3D printing technologies might alter the flow of physical goods. Rather than producing goods at scale in one location and shipping them around the world, firms might send digital design files across the Internet and then use 3D printers to produce the good in small batches locally. Replacement parts, medical prosthetics, and industrial components are already being produced this way. Over time, the range of goods to which this could be applied is expanding and may include more complex industrial parts. Shapeways is an example of a digital platform that enables designers around the world to upload designs for products, use 3-D printing

- 4 | Trends in Digitally-Enabled Trade in Services, U.S. Department of Commerce, Bureau of Economic Analysis, 2012
- 5 | OECD. "Measuring the Internet Economy," 2013, 22–23.
- 6 | Netflix 10-K filing, 2014

### BOX 1:

#### Defining and measuring digital trade flows

Digital trade is not easily defined or measured. The United States International Trade Commission (USITC) uses a narrow definition that identifies digital trade as the delivery of products and services over either fixed-line or wireless digital networks. It includes domestic commercial activity as well as international trade but excludes commerce in most physical goods, such as goods ordered online and physical goods that have a digital counterpart, such as books and software, music, and movies sold on CDs or DVDs. Another definition is broader as discussed in a study from the US Bureau of Economic Analysis, which looked at "digitally enabled" industries, such as finance, and counted all trade from those industries as part of digital trade, whether the trade was actually delivered digitally or not.<sup>4</sup> However, it is hard to identify what industries are digitally enabled. An Organisation for Economic Co-operation and Development (OECD) study discussed some of the issues of identifying digital industries.<sup>5</sup> For example, most existing industrial classification systems are too broad to identify relevant digital trade-related activities, and even when such categories can be identified, the corresponding datasets often are not available. While many scholars use the Bureau of Economic Analysis definition, the industries included in the scope vary.

Other researchers (including this paper) use cross-border data flows to measure the trend of digital trade. This reflects the direct exchange of digital goods, as well as digitally enabled exchanges of physical goods, services, finance, and even labour. This definition has drawbacks as well. One is the overestimation of data flows, owing to Internet hubs that may route data across many borders to connect two endpoints. In addition, cross-border Internet bandwidth is more accurately measured than actual Internet traffic. Finally, this measure suffers from the fact that exchanges involving video use far more bandwidth than simpler forms of communication and may distort our ability to identify the most economically valuable flows of data.

Digital trade also creates problems for national statisticians who measure a nation's imports and exports. Individual exchanges of goods enabled by e-commerce platforms may not be captured at all; for example, a transaction involving a customer in one country who buys a product on an e-commerce platform in another country that is then shipped directly by parcel service is often neither taxed nor measured. Measuring cross-border digital services can also be difficult. Take the case of a United States (US) company that wants to design a new logo, and uses a digital platform for freelancers to hire a graphic artist in India. The transaction will go through the freelance platform, so the firm doesn't pay the designer directly, and since freelancers work for multiple employers, their income from each employer is not large enough for the income tax code in the foreign countries to affect them.

to create the physical items, and manage logistics to end consumers in a range of countries. The creator of the product only needs to interact with the economy in a purely digital manner although the end-product is physical.

Even education has become a digital good that can be globally traded, through the rise of online training and educational courses. The growth of Massive Open Online Courses (MOOCs) may not entirely eliminate the need to travel to become a foreign student, but they 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 US. Furthermore, more than half of the 10 countries that send the most users to the site are in the emerging world — most prominent are India, South Africa, and Mexico.<sup>7</sup> Coursera, another online education provider started in the US, offers more than 600 free online courses in 12 languages. More than three-quarters of Coursera users come from countries other than the US, and almost one-third are from India, Brazil, Russia, and China.

As the volume of trade in digital goods has expanded, their value has grown, too – but is often not captured in statistics on trade. For example, user-generated content on blogs and on YouTube is driving very high volumes of Internet traffic both within countries and across borders, but very little of this content is paid for by consumers. As it does not involve a monetary transaction, the significant value that this content generates does not show up in economic or trade statistics but instead reveals itself as “consumer surplus.” Previous McKinsey research has shown that the surplus from the US and Europe alone is close to €250 billion (US\$266.4 billion) each year.<sup>8</sup>

## DIGITAL “WRAPPERS” ENABLE PHYSICAL FORMS OF TRADE

The second way that digitisation is transforming global trade 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.

Use of radio-frequency identification (RFID) technology to track the flow of physical goods is a prominent example of a digital wrapper that enables global trade flows. This type of sensor is a key component used in the IoT. 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. 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 goods trade flows.<sup>9</sup>

RFID use in logistics, in particular, has created enormous value by improving inventory management in long global supply chains, helping reduce inventory costs by up to 70 percent while improving the service offered.<sup>10</sup> 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 centres of Hewlett-Packard, GmbH, and BMW, found that the technology reduced losses in transit by between 11 and 14 percent.<sup>11</sup> In the package delivery business, an estimated 0.5 percent of packages are lost in transit in advanced economies and 3 percent are lost in developing countries. Using sensors, rather than bar codes that must be scanned, on packages to track them can reduce the number of lost packages by 30 percent.

IoT sensors can also further reduce the costs of global trade by increasing efficiency of shipping and transport. On average, shipping containers have only 20 percent utilisation rates because there are so many customers in so many locations. Tracking each container using IoT technologies could improve container utilisation by 10 to 25 percent, reducing annual spending on containers by nearly US\$13 billion in 2025. Improving efficiency of moving goods from the port to distribution warehouses and then stores by using IoT technologies can further reduce the end-to-end costs of global trade. Real-time routing in logistics and other digital-technology-based operations improvements in transport can lead to a 17 percent improvement in operating efficiency, potentially generating benefits of US\$253 billion to US\$460 billion in 2025. While the majority of this value is not cross-border, increased efficiency in getting goods from port to distribution warehouses and then to stores or end users can further reduce the end-to-end costs of global trade.

Digital wrappers have even greater potential value to enable trade in emerging economies that have less-developed 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

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

8 | Jacques Bughin and James Manyika, “The mobile Internet’s consumer dividend,” *The McKinsey Quarterly*, February 2014.

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

10 | 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 ENSM-SE CMP WP 2009/2, March 2009.

11 | Ibid.



significantly increased the efficiency of exports by decreasing turnaround times by 45 percent, greatly benefiting truck and cargo owners.<sup>12</sup>

Another example of digital wrappers are the online sites that provide information that help consumers make informed decisions. Customers have a growing ability to add reviews on e-commerce platforms to help others 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 increase sales.

## DIGITAL PLATFORMS ENABLE MANY TYPES OF CROSS-BORDER EXCHANGES

A third way that digital technologies are transforming globalisation is through the creation of online platforms that facilitate cross-border exchanges of goods, services, money, and even labour. Cross-border transactions were traditionally conducted only in large volumes by large companies and other organisations, such as government. But, the Internet has enabled a broad range of "micro" flows of small size — including individual purchases of a good, or micro-loans and micro-payments, and even micro-work through individual freelance contracts.

Consider how digital e-commerce platforms are transforming trade flows of goods. The global nature of the Internet cuts search costs and harmonises prices, improving producers' abilities to market to consumers around the world. The result has been an explosion in e-commerce. Global e-commerce sales reached over US\$1.3 trillion in 2014 — nearly 2 percent of global GDP.<sup>13</sup> While a majority of e-commerce sales are within a country, a growing share is cross-border. About 40 percent of Amazon's net sales in 2014 came from sales outside of North America.<sup>14</sup> Alibaba, the leading e-commerce platform in China that includes marketplaces for business to business (B2B); business to consumer (B2C); and peer to peer (P2P) e-commerce, posted gross merchandise value of US\$370 billion in 2014, larger than Amazon and eBay combined.<sup>15</sup>

Such platforms enable more and faster flows of trade in goods and allow smaller companies to participate in exporting and importing. On eBay, for instance, 97 percent of commercial sellers export goods to customers in foreign countries compared with less than 10 percent in the case of traditional small businesses in most countries (Figure 2). Conducting cross-border business on a digital platform like eBay can reduce transaction costs by 64 percent.<sup>16</sup> Thousands of Chinese small- and medium-sized enterprises (SMEs) now sell to overseas customers on B2B marketplaces that have millions of registered buyers. Etsy, a digital marketplace for artisanal goods, supported US\$2 billion in sales in 2014, more than one-third of which were international sales. Moreover, digital

platforms do not only help SMEs reach more geographies, but also help to sustain business. While only 15 percent of exporting businesses continue exporting after three years, according to the World Bank, eBay data demonstrates that 74 percent of SMEs that were exporting in 2011 were still exporting three years later.<sup>17</sup> Despite these advances, some barriers to cross-border e-commerce linger.

Online marketplaces are also being developed to facilitate service flows. For example, InnoCentive is an online platform that crowd sources innovation; today it has 300,000 registered solvers in nearly 200 countries.<sup>18</sup> One study of the platform found that it had enabled solutions to one-third of a sample of problems that large research and development (R&D) firms in a variety of industries, including pharmaceuticals, defence, and electronics, had been unable to solve.<sup>19</sup>

Financial flows have long been digitised, but now new platforms are enabling smaller, micro-financial flows between individuals and small businesses. 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 micro-lending, has enabled more than 1 million people in more than 190 countries to give money to another 1 million—most of them in the emerging world. Kickstarter, a crowd-funding platform that connects entrepreneurs to individuals interested in funding their creative projects, has attracted 5.8 million people from 214 countries, who have pledged US\$1 billion to fund 58,000 creative projects since 2009. GlobalGiving, an online global charity fundraising platform that some have called the "eBay of philanthropy," connects local projects with a global fundraising base and has raised more than US\$100 million to date from givers around the globe and in small amounts.

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

13 | "Retail Sales Worldwide Will Top \$22 Trillion This Year," eMarketer, December 3, 2014

14 | Amazon.com. Annual Report 2014, filed April 24, 2015.

15 | "Alibaba's Gross Merchandise Volume Continued to Grow," Market Realist, March 23, 2015

16 | Landel et al. There Goes Gravity-How eBay Reduces Trade Cost, World Bank, October 2012

17 | 2015 US Small Business Global Growth Report, eBay, 2015

18 | Innocentive.com.

19 | Lakhani, Karim R.; Lars Bo Jeppesen; Peter A. Lohse; and Jill A. Panetta. The Value of Openness in Scientific Problem Solving. HBS Working Paper Number: 07-050. Cambridge: Harvard University. Retrieved March 19, 2014, from <http://www.hbs.edu/faculty/Publication%20Files/07-050.pdf>

Even global labour markets are being transformed by online marketplaces. Online talent platforms, like UpWork and Freelancer.com, are one way to overcome immigration barriers, by bringing jobs to workers abroad rather than requiring them to immigrate. Freelancer.com and UpWork are the world's largest online labour marketplaces for freelance work, and together have nearly 27 million users worldwide, although they have been joined by many similar platforms. The vast majority of these platforms' users are companies in high-income countries hiring workers in low-income countries. For example, India is the largest destination for outsourced contracts, and the US is the largest spender. But, the virtual labour flows enabled by such platforms are rapidly spreading to new countries, such as the Philippines, and changing direction, with an increasing number of companies based in emerging markets hiring freelance talent in other countries.

The World Bank estimates that worldwide some 48 million freelancers find work through online platforms (Figure 3).

For individuals in developing countries, these platforms can be very good jobs that offer a significantly higher level of wages than they would otherwise have been able to earn. In India, for instance, the average wage paid to UpWork contractors is US\$14 per hour, compared with less than US\$3 an hour for data entry and administrative support jobs.<sup>20</sup> In Brazil, the average hourly wage of freelancers is US\$25 per hour, and in the US, it is US\$30 per hour.

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

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

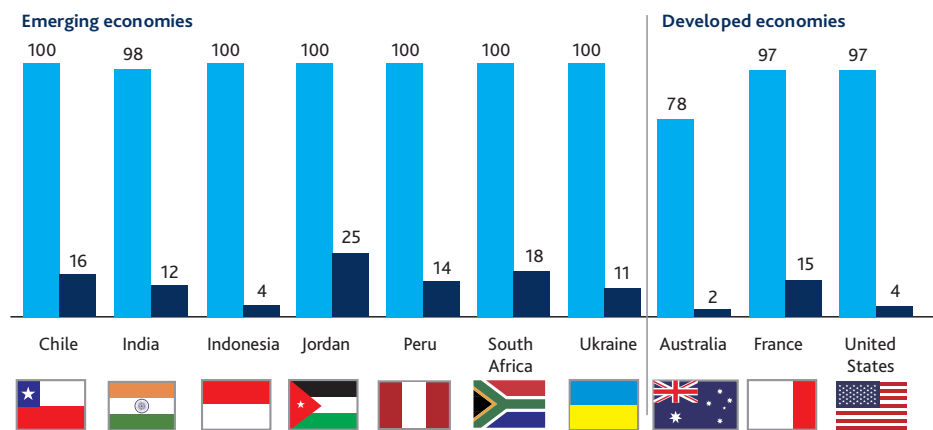
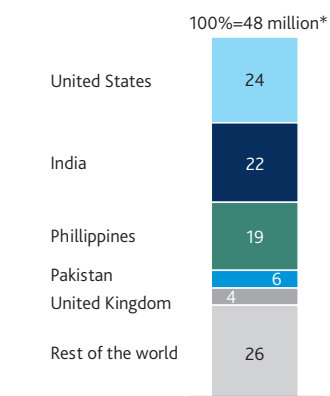


FIGURE 2:

Online platforms give business global reach

Online freelancers by country of source  
% of total



Online workers by country of source\*\*  
% of labor total

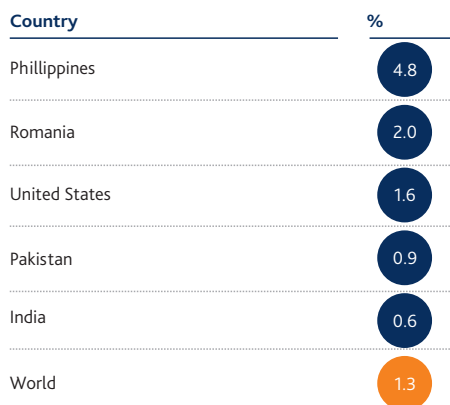


FIGURE 3:

Online freelance platforms enable digital flows of labour

\* Not all registered freelancers may be active  
\*\* This is the total number of registered freelancers so there may be double counting and inactive users

## BOX 2:

### Lingering barriers to cross-border e-commerce

Despite the undoubted advances made by digital platforms in enabling cross-border transactions, barriers remain. The growth of e-commerce provides a useful example. While e-commerce has experienced very strong growth — 21 percent in 2012 — cross-border e-commerce flows have lagged significantly. For example, the US had US\$384.8 billion in total e-commerce expenditures in 2013, but only US \$40.6 billion in cross-border expenditures — or 11 percent of total e-commerce.<sup>21</sup> The situation is similar in Europe, despite significant levels of economic integration within the region. In the United Kingdom (UK), 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 European Union (EU) countries. That holds true for the majority of EU countries, including the large markets of Germany, France, and the Netherlands.<sup>22</sup>

There are a number of reasons for the significant divergence between domestic and cross-border e-commerce. On the consumer side, language gaps and fear of fraud are important concerns; a survey of European e-commerce consumers found that nearly 60 percent of individuals found these two factors to be significant deterrents to cross-border e-commerce. On the supply side, policies and regulations can create obstacles. 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.<sup>23</sup>

Significant opportunities still exist to expand the use of digital platforms and further reduce such barriers to cross-border digital flows. The onus is on governments, trade organisations, and other international institutions to further facilitate the flow of goods, services, capital, and information data and communication around the globe.

## DIGITISATION'S IMPLICATIONS FOR GLOBALISATION

The rapid advance of digital trade in its various forms will continue to transform the nature of globalisation in the foreseeable future. The IoT alone is at an early stage; we recently examined 150 use cases in a range of settings, including cities and worksites, and estimated a potential economic impact on the global economy of as much as US\$11.1 trillion a year in 2025. While not all IoT applications relate to cross-border trade, some notable ones do. In shipping and package delivery, for example, emerging economies have significant potential to capture value, owing to their growing share of global trade.

Digital trade and the transformations that it brings will affect a broad range of stakeholders in different geographies, in developed economies, but also increasingly in emerging ones, as they acquire more sophisticated technical capacity to manage the opportunities it offers. Those likely to feel the impact include:

## MULTINATIONAL COMPANIES

Global trade has increased fivefold since 1980, and multinational companies have been the principal drivers of it. Their cross-border supply chains account for 60 percent of trade, and supply-chain intermediaries represent the largest and fastest-growing component of the corporate revenue pool. The biggest corporations, especially in North America and Europe, have been the major beneficiaries over the past 30 years; large firms with more than US\$1 billion in corporate revenue have accounted for more than 50 percent of global revenues and 67 percent of global profits. Relatively few firms have driven the majority of value creation: among the world's public companies, just 10 percent of firms account for 80 percent of corporate profits, and the top quintile takes 90 percent.

Going forward, these large companies are likely to face a far more competitive environment, in part owing to the growth of digital trade, which has allowed new technology giants to enter industries where they had not previously been viewed as

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

22 | Kool, Linda, Anne Fleur van Veenstra, Gudrun Rumpf, and Elena Chernovich. *Barriers to e-commerce and trustmarks inventory*, IntraSoft International, December 2012.

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

competitors, for example in hospitality (Airbnb); transportation (Uber); payments (PayPal); and retail (Amazon). With different marginal cost economics and new types of assets, such as data and algorithms, tech firms are able to bypass traditional value chains, reduce search costs and information asymmetries, and find new ways to source or deliver products and provide new services. In the process, they are upending the business models of established incumbents — and creating large amounts of consumer surplus. Often tech firms are able to provide free or low-cost products or services where traditional businesses charged fees. The digital disruption of value chains is most visible in consumer-facing industries, where traditional intermediaries have come under pressure or have been completely put out of business by tech firms and their digital platforms. In these cases, tech firms have been able to offer lower prices, create more variety, or offer more convenience (or do all three things), often creating a digital community experience at the same time.

As globalisation continues to spread, new competitors will also come from emerging markets. In 2000, only 20 of the global Fortune 500 companies were headquartered in an emerging market. Today, that figure is 130. Moreover, by 2025, MGI predicts that roughly half will be from emerging markets. Today's large multinational companies have generated tremendous growth and profits over the past 20 years by expanding to new geographies and establishing global supply chains; this also will be the case for the largest emerging market companies in the decades to come. This will raise competitive dynamics and intensity in virtually every industry.

## SMALL BUSINESSES AND ENTREPRENEURS

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Digitisation is opening the door to SMEs and even individual entrepreneurs to take part in cross-border commerce and exchanges, giving rise to a new era of “micro-multinationals.”

The example of eBay, discussed above, 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.<sup>24</sup> This may be even more valuable in emerging markets, where traditional transport and logistics costs are relatively high. 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.

Digitisation has also cut the fixed costs of starting a business for entrepreneurs, 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 virtually 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 through platforms, such as UpWork and Freelancer. 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. Today, even a brand-new company can truly be “born global.”

## INDIVIDUALS

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Digital platforms are enabling individuals to participate in globalisation directly as consumers, workers, students, and entrepreneurs. For consumers, digitisation is elevating choice to a new level and enabling individuals to find the highest quality, variety, and value in a global marketplace. Much of the value that has been created by the Internet is in the form of “consumer surplus” — or benefits to individuals that exceed the price paid. Indeed, much of the content, information, and entertainment available through the Internet is free to individuals. Other benefits are a wider variety of choices, more information about product differences, and the ability to find the lowest-priced item.

As workers, individuals can offer their services across borders and time zones and with more flexibility than ever before through online freelance marketplaces and using tools, such as web collaboration software and video conferencing. 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. Also, for workers in many parts of the world, the wages that can be earned through such platforms far exceed the averages for local companies.

Finally, the explosion of information and communication flows is benefitting consumers — and shaping globalisation — in ways that would have been difficult to imagine even a few years ago. Facebook, Skype, Twitter, Instagram, and mobile email have enabled people to connect across borders at nearly no cost and spread ideas and trends. The impact on social movements is profound, as seen in the Arab Spring and the “Occupy” movement that turned the slogan, “We are the 99 percent” into a global rallying cry. During the difficult negotiations over Greece's continued participation in the Euro, in July 2015, millions of Greece's supporters around the world took to Twitter, adopting the hashtag “#ThisIsACoup.” Today, globalisation is moving from an era in which flows of goods and finance were predominant to one in which flows of ideas and communications are the defining features.

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

## POLICYMAKERS

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The rise of digital global trade in new and diverse forms, and the growing business competition that accompanies it, create several sets of challenges for governments and policymakers. They include:

### Data security and privacy

User privacy and customer security concerns need to be addressed; but, we must ensure that national regulations on these issues do not balkanise the Internet. Digital identities, data ownership, and the “right to be forgotten” are important issues. So, too, are “informed consent” regulations that teach consumers about the risks of online data and identity sharing and that set ground rules to help Internet-based firms manage their liabilities when dealing with customer data. The security of data storage, which is often where data can be most vulnerable, is also an issue. Although companies will be at the forefront of cybersecurity, governments can provide transparency on hacking attacks, create incentives for improving security, and invest in basic research on cybersecurity initiatives, such as encryption standards. As the volume and importance of digital flows continues to grow, it is vital that policies governing these issues are harmonised across countries, recognising that countries may also have different preferences and priorities.

### Internet governance

Harmonising digital policies around the world and preventing “digital trade wars” and “digital protectionism” will be essential. A new global framework for Internet governance and openness is needed. Data localisation, foreign-language restrictions, and a myriad of different Internet rules threaten the free flow of ideas around the world and freedom of expression within countries, as well as the economic growth potential from digitisation. In the early days of the Internet, the task of governance was mostly one of technical coordination, and was well handled by organisations, such as the Internet Engineering Task Force (IETF). But, as web-based supply chains, digitisation, and e-commerce have taken off, cross-border data flows are rapidly becoming an important aspect of global trade in goods and services. Recommendations of international bodies to coordinate national policies and ensure consistency in countries around the world will be critical.

### Expanding trade statistics and trade agreements

Digitisation is enabling a proliferation in the volume and types of cross-border transactions and exchanges. This creates new challenges for national statistical agencies tasked with measuring such flows and for trade negotiators as they develop new bilateral and multilateral agreements. The shift in focus to services trade and non-tariff barriers in the latest round of trade talks is a welcome development. But, many

additional issues must be addressed, such as digitising customs procedures to enable the flow of micro-shipments of goods; additional focus on enabling cross-border e-commerce, and many newly developing areas of digital services trade.

### Closing the digital divide

Building digital infrastructure and ensuring low-cost broadband access to all citizens will be as important as building roads and ports, both within countries and between them. This is particularly true in developing countries that today have a smaller Internet economy and where individuals have less Internet access. The value of global trade is increasingly shifting toward ideas, knowledge, and innovation, rather than physical goods, which means that access to digital platforms and communication is ever more important. Lack of access to digital infrastructure will put both countries and individuals at risk of being left even further behind in economic terms.

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