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# DIGITAL COLOMBIA: MAXIMIZING THE GLOBAL INTERNET AND DATA FOR SUSTAINABLE AND INCLUSIVE GROWTH

Joshua P. Meltzer
Camila Pérez Marulanda

B | Global Economy and Development
at BROOKINGS



**Joshua P. Meltzer** is a senior fellow in the Global program and an adjunct professor at the Johns Hopkins School for Advanced International Studies.

**Camila Pérez Marulanda** is the director of macroeconomic analysis at Fedesarrollo.

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# DIGITAL COLOMBIA: MAXIMIZING THE GLOBAL INTERNET AND DATA FOR SUSTAINABLE AND INCLUSIVE GROWTH

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## EXECUTIVE SUMMARY

Colombia has experienced strong economic growth and reductions in poverty over the last decade. The government has also embarked on an ambitious plan to increase the uptake and use of digital technologies, expanding internet access, promoting the development of local online content, and emphasizing government use of the internet and data to improve service delivery, transparency, and governance. Despite the uncertainty generated by the results of the October 2, 2016, plebiscite, peace agreement with the Revolutionary Armed Forces of Colombia, or FARC as the group is known, is another reason for optimism about Colombia's economic and social prospects. However, challenges still loom. The commodity boom that fueled large increases in Colombia exports is over and unlikely to return, leaving Colombia with a commodity weighted economy. Income inequality remains one of the highest globally and poverty is still widespread.

As the internet goes global and data becomes an increasingly significant driver of economic growth, data flows are estimated to have contribute $7.8 trillion to global economic activity during the last decade—approximately 10 percent of global GDP.[1] Moreover, the internet economy could double for G-20 between 2010-2020, employing a further 32 million workers.[2]

The pervasive use and impact of the internet across economic sectors means that the internet and data are best understood as general purpose technologies (GPT)—technologies that have the potential to reshape economies and boost productivity. Other GPTs include railway, internal combustion engine, and electricity.[3] Deepening and broadening the capacity of government, business, and people to use these technologies will be a key determinant of economic prosperity. In fact, maximizing the use of the internet and data across Colombia's economy will provide a basis for sustainable and inclusive growth in the 21st century.

This report analyzes the ways that the internet and data flows are improving the productivity, efficiency, and competitiveness of the Colombian economy. For instance, businesses are using access to digital services such as cloud computing to reduce IT costs and thereby increase their competitiveness in domestic and global markets. Internet platforms are providing small and medium-sized enterprises in Colombia with access to consumers globally and providing an opportunity to expand participation by Colombians in international trade.

The internet is also increasing the importance of services in international trade. Trade in digitally deliverable services—services that can be provided online already represent over 12 percent of Colombia's total exports and this increases to over 17.5 percent once digital services embodied in goods exports are included. Businesses are also using the internet and data to provide digital services as part of more traditional goods offerings, thereby increasing their overall value. This includes using sensors and data analytics to trace agricultural products and improve the efficiency of mining and manufacturing operations.

The follow figure captures the opportunities for economic growth, jobs, social inclusion, and better government from an effective use of the internet and data flows.

The figure underscores how realizing the opportunities of the internet and data requires Colombia to establish a comprehensive enabling environment. This includes expanding internet access, lowering costs, and building a skills base that can maximize the opportunities of the internet for innovation and production. Colombia also needs to strengthen consumer trust in using the internet, such as by ensuring the security and privacy



of personal data and implementing regulatory protections for consumers engaged in online commerce. Competition in the telecommunications market is another important factor that affects internet cost and availability, and this extends to ensuring competition across the economy so that new online businesses can grow. A balanced set of intellectual property laws is also key—one that protects digital content and addresses online privacy while not overburdening internet service providers or stifling the innovative opportunities of the internet. In turn, success here can deliver a broad range of economic and social gains, including economic growth, more and better paying jobs, new opportunities to improve governance and government services, and broader levels of inclusion as the internet enables often marginalized communities in rural areas to engage more fully in their countries social and economic life.

Progress has been made on expanding digital access and use, including growing Colombia's content industry, and using the internet to improve the transparency of governance more broadly. Despite these gains Colombia still faces a number of challenges to creating a digital economy. In particular, Colombia needs to address the following limitations in its enabling environment:

- There is limited internet access, particularly in rural areas, high costs of internet services and mobile devices, as well as relatively slow internet speeds compared to the region.
- Not enough competition in various markets, including in the telecommunications market stifles innovation and the uptake of digital opportunities.
- Insufficient local online content reduces the usefulness of the internet for Colombians.
- There is a lack of consumer trust in making purchases online, in part reflecting a relatively underdeveloped e-commerce environment, including delays in having goods delivered or accepting returns and receiving damaged goods at rates higher than in other countries in the region.
- A patchwork of regulation supports e-commerce, including laws on electronic signatures and consumer protection online.
- Colombia's large informal economy is a broad structural constraint to expanding online transaction. For instance, low levels of financial inclusion—such as the lack of bank accounts and use of credit cards—leads to the use of cash on delivery, reducing the efficiency and attractiveness of online commerce for consumers and creating logistical challenges for businesses.
- Colombia's privacy laws have been modelled after the European Union, placing limits on the ability to transfer personal data outside of Colombia and thereby restricting how companies can use data for business purposes, including international trade.
- Colombia has failed to implement the full set of intellectual property laws needed to grow a digital economy, including intermediary liability protection.
- Access to capital, particularly for startups, is limited; regulations restrict the capacity for innovative financing options such as crowdfunding; and high levels of market concentration in the financial sector stifles innovation.
- Colombia lacks the skills needed to build a digital economy, including in information technology but also lacks the skills needed in different economic sectors to take advantage of the opportunities of the internet and data. The Colombian education system, while improving, is not addressing this challenge, and in the short term Colombia is having trouble attracting overseas talent.
- Regional disparities still exist with low levels of capacity in many government departments to promote digital technology.

Given these challenges, this paper proposes a comprehensive range of policy reforms. The main ones are as follows:

*Expand internet access and reduce costs*

- Expand internet access, particularly for micro, small, and medium enterprises (M-SMEs).
- Increase competition in Colombia, including in the telecommunications sector, which will require better enforcement of competition laws and clarification of regulatory jurisdiction between the Superintendency of Industry and Commerce and Communications Regulation Commission. This includes avoiding regulating internet platforms in ways that would limit competition.
- Consider building another internet exchange point to reduce cost and latency.
- Consider removing the 16 percent value-added tax (VAT) on smart phones[4] and the 4 percent tax on mobile services.

*Improve use of digital services*

- Educate business and government about new digital services such as cloud computing.
- Avoid data localization laws that would raise the costs of digital services for the economy.

*Strengthen Colombia's digital commerce environment*

- Build infrastructure to facilitate the movement of goods within Colombia and international trade.
- Update the regulatory environment, including laws on digital signatures and protection of consumers for online transactions.
- Develop mechanisms to improve trust in online commerce, such as trust marks.
- Review Colombia's application of its privacy law and its impact on digital commerce, including how to obtain consent for processing personal data and the conditions under which personal data can be transferred out of Colombia.
- The requirement to register databases should be repealed or made more flexible to better reflect how business uses and maintains such information.
- Ensure a balanced set of intellectual property laws, including implementation of intermediary liability protection and balanced use of copyright protection, which should be combined with more effective enforcement of existing intellectual property laws to address online piracy.

*Expand access to financial services and capital*

- Greater competition in the financial sector and lighter-touch regulation could unleash innovation and improve access to capital. This could require more bank licenses and lows fees for small clients.
- The regulation that limits companies to collecting finance from more than 19 people should be repealed as it is a barrier to crowdfunding.
- Increase the usury rate, which should increase financing available for higher risk (often small and medium enterprises) business.
- There should be more creative use of government funds and innovative financing to reduce risk and crowd-in private finance into supporting tech startups.

*Develop a digital trade policy*

As outlined in the report, the implications of the global internet and data flows for digital trade requires government trade policy to be aimed at maximizing these opportunities. This should include the following:

- Address regulatory barriers, such as the need for exchange declaration that hinder the ability for online platforms to process international payments and the Central Bank restriction on paying for imports in a foreign currency.
- Raise the de minimus duty above its current level of $200.
- Join the Trans-Pacific Partnership at the earliest opportunity.
- Improve customs administration to reduce the time it takes to move goods across the border. Colombia has made progress digitizing this process, but gaps remain. The country should also consider joining the World Trade Organization Trade Facilitation Agreement.
- Reduce barriers to imports of digital services.

*Strengthen Colombia's human capital*

- Work with all levels of government and business to map Colombia's skills needs for a digital Colombia, and assess the capacity of the education system to meet these needs over time.
- Align training with a skills maps and develop centers of excellence for each core area of expertise in the university system.
- Engage business in the design and teaching of courses.
- Expand programs for students to study overseas with a focus on getting access to the key skills Colombia needs to build a digital economy.

*Maximize government use of the internet and data*

As outlined in the paper, this has three components—improving services design and delivery; expanding democracy and building trust; and supporting growth of a digital Colombia. While the government has made significant progress here, additional steps could include:

- Expand Crystal Urn to make it interactive in real time and allow use of mobile phones or texting messaging.
- Use the internet and data to improve government responses to natural emergencies.
- Collect data to better design government services and target delivery to where need is highest, which could include giving citizens scope to contribute to design of government services using social networks.
- Support development of apps that increase government awareness of local issues and improve ability to respond, such as reporting crime and identifying where road repairs are needed.
- Improve access to government data and strengthen the capacity of regions to use government data to design solutions to local challenges in areas from health to education.
- Use the government procurement process to drive demand for local digital content and to align digital standards, e.g., online health apps.

## INTRODUCTION

As the internet goes global, data has become an increasingly significant driver of economic growth. In fact, the pervasive use and impact of the internet across the economy means that the internet and data are best understood as general purpose technologies akin to the railway, the internal combustion engine, and electricity—technologies that have the potential to reshape economies and boost productivity.[5] Deepening and broadening the capacity of government, business, and people to use these technologies will be a key determinant of economic prosperity. The pervasive impact of the internet and data on all economic sectors—industrial, manufacturing, agriculture, services, and government—underscores that building a digital Colombia can lay the foundation for more sustainable and inclusive growth going forward.

Colombia has experienced strong economic growth and reductions in poverty over the past decade. The government has also embarked on an ambitious plan to increase the uptake and use of digital technologies, expanding internet access, promoting the development of local online content, and emphasizing government use of the internet and data to improve service delivery, transparency, and governance. The recently concluded peace agreement with the Revolutionary Armed Forces of Colombia (FARC) is another reason for optimism about Colombia's economic and social prospects. However, challenges loom large. The commodity boom that fueled large increases in exports is over and unlikely to return, leaving Colombia with a commodity-weighted economy. Income inequality remains one of the highest globally, and poverty is still widespread.

As this report will show, the policies needed to build a digital Colombia will help address many of these key economic and social challenges, while developing the capacity for sustainable growth in a 21st century global economy.

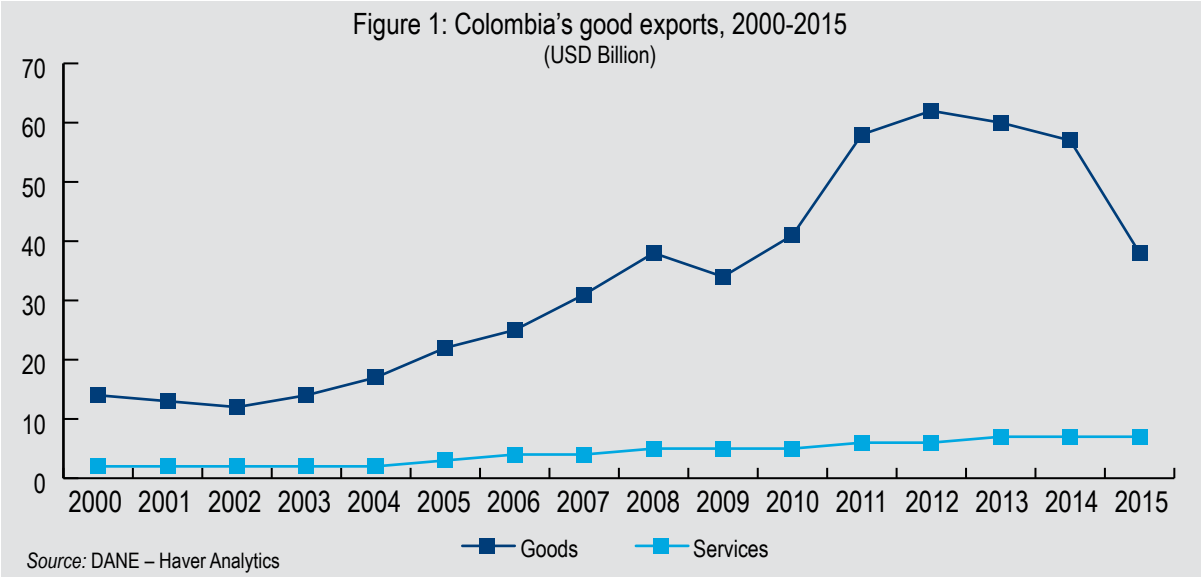
The paper is structured as follow. The introduction provides an overview of Colombia's economy and analyzes how the internet and data is affecting economic growth. Section 1 looks at Colombia's engagement in international trade, how the internet and data are transforming international trade and analyzes the opportunities for Colombian business to expand their participation in international trade. Sections 2-7 analyze the domestic challenges and opportunities for building a digital Colombia. Section 8 concludes with policy recommendations.

### Colombia's Economy

Colombia's economy is mostly based on services: Government, financial, transportation and retail, repairs, and tourism services make up 65 percent of the gross domestic product. Mining comprises 7.1 percent and agriculture 6.2 percent. Manufacturing constitutes 11 percent—down from 14 percent in 2000.

Over the past 10 years, a commodity price boom helped underpin strong levels of growth in Colombia, which also enabled reductions in poverty and improvements in overall welfare. Since 2006, real GDP has averaged 4.5 percent per year—2 percentage points higher than in the 1990s. Extreme poverty fell from 17.7 percent of the population in 2002 to 8.1 percent in 2014, meaning that 6.2 million fewer people were living in poverty.[6] Income inequality in Colombia remains high, but it has improved. The Gini coefficient, which measures levels of income inequality, fell 10 percent between 2006 and 2013.

During this period, Colombia's commodity exports boomed, largely as a result of Chinese demand and a steady flow of foreign direct investment that provided




the economy with some of the capital necessary to improve competitiveness.

As Figure 1 shows, one of the main areas where the commodity boom then collapse manifested itself was through changes in Colombia's goods exports.

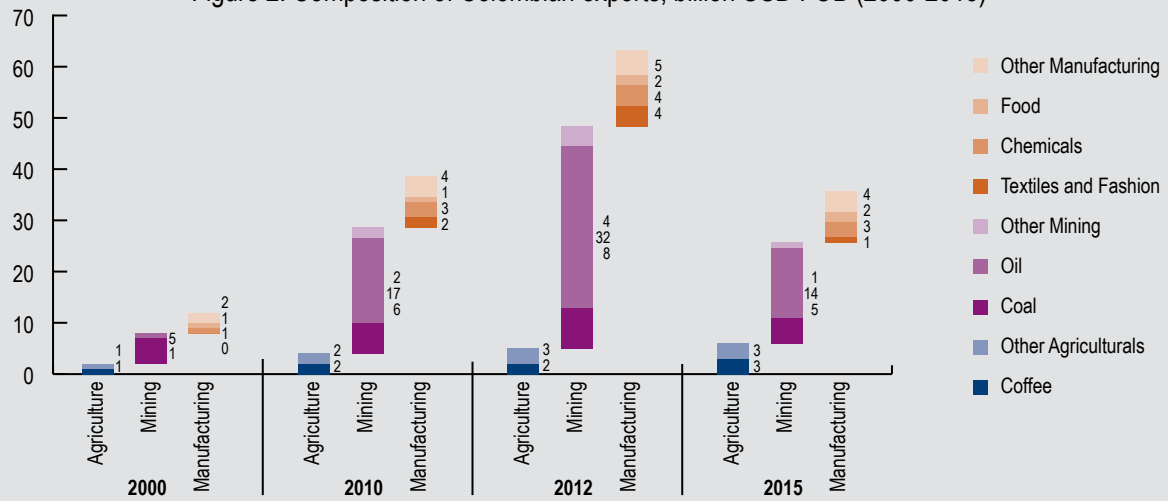
The decade of expansion was interrupted in mid-2014. The sharp decline in commodity prices was coupled with lower Chinese demand for Colombia's commodity exports. China's slowdown also negatively affected growth in other countries in Latin America, including key Colombian trade partners Venezuela and Ecuador, which in turn led to reduced demand for Colombia's manufactured exports.

Figure 2 shows the change in the composition of Colombia's exports since 2000. The most striking feature is the dramatic increase in oil exports until 2014 and then its decline after the collapse in oil prices in the fourth quarter of 2014 from a Brent price of $112 per barrel in June to $59 per barrel in December that year. Brent was trading at $46 per barrel in August 2016, and the U.S. Energy Information Agency estimates average oil prices in 2017 of $52 per barrel.

Coal is the other Colombian export that increased dramatically over the past 15 years, from around 7 percent of total exports in 2000 to 17 percent in 2009, declining to around 12 percent in 2016—also reflecting the fall in commodity prices. Meanwhile, manufactured exports declined from around 11 percent of exports to 6 percent in 2011.

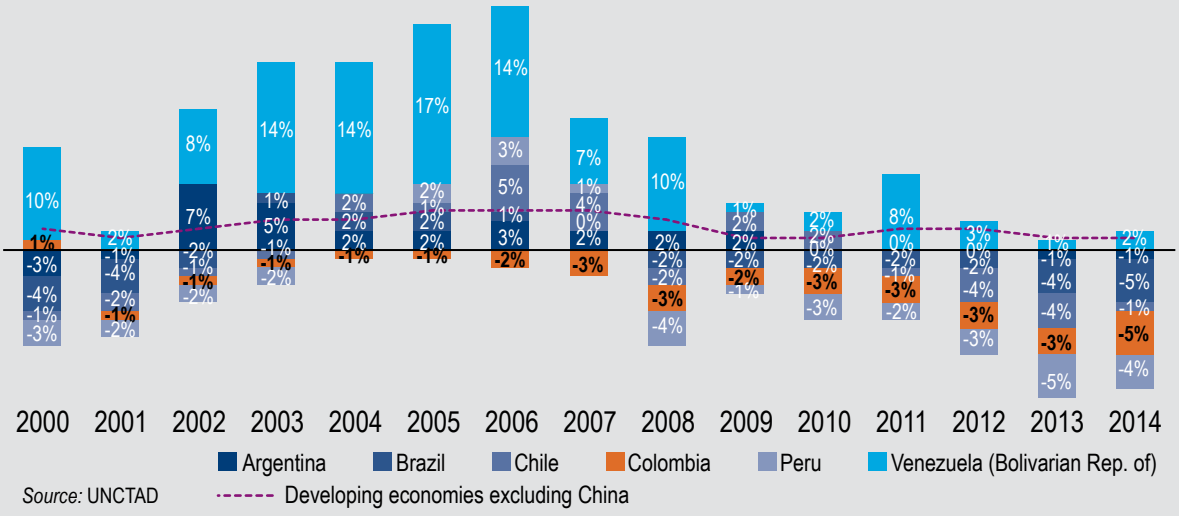
The growth in exports and then its reversal has also had implication for Colombia's current account deficit. Figure 3 shows changes in the current account for Colombia and other countries in Latin America as a percentage of GDP. The figure shows the improvement in Colombia's current account during the mining and energy price boom and its subsequent deterioration such that at 5 percent of GDP in 2104 it was larger than that of all other comparable developing economies and equal to that of Brazil.

Figure 2: Composition of Colombian exports, billion USD FOB (2000-2015)




*Source:* Banco de la República, Balance of Payments (2016)

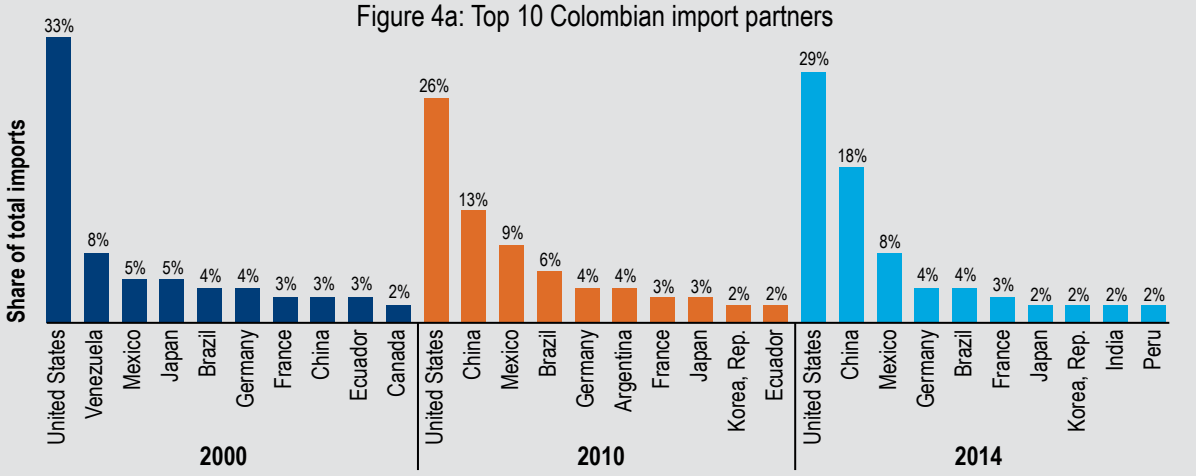
Figure 3: Current account as a percentage of GDP




*Source:* UNCTAD

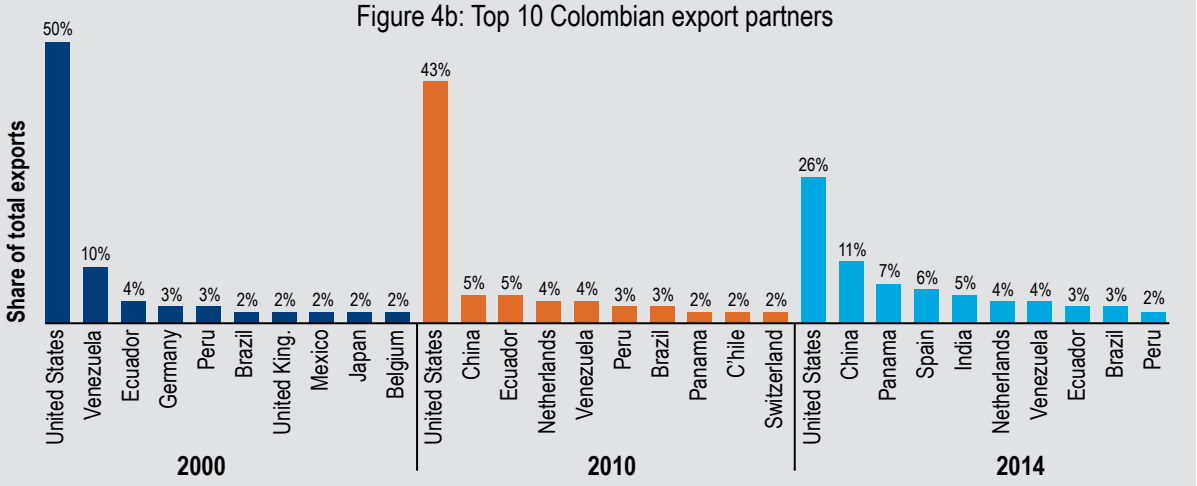
The increase in Chinese demand in particular for Colombian exports also altered the significance for Colombia of various export and import destinations. As shown in Figure 3, the United States has been and remains Colombia's most important destination for exports and source of imports. However, Colombia's trade with the United States has declined over the past 15 years, particularly as an export destination. In part this reflects the growing importance of trade with China, which was not among Colombia's top 10 export destinations in 2000 yet was the second most important export destination in 2014, taking 18 percent

Figure 4a: Top 10 Colombian import partners




*Source:* WITS

Figure 4b: Top 10 Colombian export partners




*Source:* WITS

of Colombia's exports. Figure 4 also reveal the importance for Colombia of regional trade; five of the top 10 export destinations in 2014 were in Central and South America.

## Colombia's Challenges and opportunities

As a result of the fall in commodity and energy prices, the central government's oil-related revenue declined from 4 percent of GDP in 2013 to 1 percent in 2015,

widening the public sector fiscal deficit to 3 percent of GDP. In 2015, the current account deficit widened to 6.5 percent of GDP. Headline inflation also trended up—from 4 percent in 2015 to 8.8 percent in July 2016. Real GDP growth slowed in 2015 to 3.1 percent, and the International Monetary Fund forecasts that in 2016 Colombia's economic growth will remain below potential.[7]

The drop in commodity prices and the unlikely return to such levels of global demand present significant challenges for the sustainability of Colombia's growth. At the same time, Colombia faces the challenge of still significant levels of poverty and very high levels of income inequality.

## How the internet and data are transforming economies

The impact of the internet and data on all economic sectors underscores that the majority of benefits of the internet arise from its use rather than its production. In Colombia, for instance, the information and communications technology (ICT) sector represents about 1.2 percent of GDP and less than 2 percent of the workforce.[8] In the United States, where the world's largest internet companies are based, the bulk of productivity growth still comes from using this information technology, not from its production.[9] A McKinsey Global Institute report found that 75 percent of the impact of the internet in 12 large developed and developed countries is gained by firms in traditional (non-IT) sectors.[10]

The following outlines how the internet and data flows are being used to reform and alter all economic sectors and to transform opportunities for international trade.

**How the internet creates markets?**

The internet overcomes market failures that otherwise prevent transactions occurring due to high transaction costs or asymmetric information. For example, a person with a spare room may want to rent it out a couple of weekends a year, but the cost of finding a renter, arranging insurance, and managing the risk of property damage has meant such a transaction does not happen. In other cases, transactions have not taken place because buyers have lacked information on the reliability of a seller or the product. The internet has overcome these barriers. It enables transactions that would otherwise not occur because the parties had no way of finding out about each other. The internet also closes the information gap by providing data on sellers and products, whether via search or using online ratings systems.

*Source:* March Rysman (2009);[11] World Bank Development Report 2016

### *The internet's impact on business*

How business uses the internet and data will be one of the key opportunities in a digital economy. Business-to-business e-commerce accounted for approximately 90 percent of the total $16.5 trillion of e-commerce in 2013.[12]

For instance, the internet and data allows increases in business efficiency and productivity through access to cost-effective business inputs such as online advertising and communication services, cloud computing, and access to critical knowledge and information on foreign markets.[13]

The internet also improves productivity through its impact on the internal workplace organization of firms where internet use makes people more productive by reducing the need for repetitive tasks, allowing workers to focus on higher value-added activity. The internet

and data are giving rise to a whole range of innovative business models that will also require different skills from its workers.[14]

As will be discussed below, many of the transformative benefits from the internet and data use will be felt by businesses in developing countries and in small and medium-sized enterprises (SMEs).

### *Cloud computing*

Cloud computing is an important development in the provision of cheaper and flexible IT and which relies on the internet and the ability to move data across-borders. Cloud computing provides businesses with the opportunity to access, scale, and use a pay-as-you-go option for software, platforms, and infrastructure. This reduces the need for huge upfront investments in information technology (IT) and the associated costs of maintaining often underutilized computing power.[15]

Access to cloud computing is of particular value for SMEs and businesses in developing countries as it allows businesses to avoid the large upfront capital costs associated with IT.[16] Cloud computing also gives small firms the ability to access the type of computational power that was previously available only to large corporations. Indeed, what cloud can do with respect to computation might be as transformative for developing countries as what mobile phones were for communities.[17]

Governments are also using cloud computing to improve the delivery of services, specifically access to health care and education in remote communities.

**Cloud computing in Ethiopia**

The Ethiopian government is putting all student and teacher data in the cloud, including syllabi and class materials, remotely managing 250,000 teacher laptops throughout the country. In the event a laptop is lost or illegally accessed, its contents can be wiped remotely.

### *Innovation*

The opportunities of the internet and data for innovation are economy wide and include developing new digital business processes or using data analysis to identify new ways of doing business, reducing costs, and better serving customers. Innovation from internet and data use can manifest itself in multiple ways. Take the opportunities from increased access to information—wherever it may be located globally—and the new avenues the internet creates for global collaboration in research and development (R&D) and design.

According to a 2015 Organization for Economic Cooperation and Development (OECD) report, big data has the potential to be a key driver of innovation, productivity growth, and economic competitiveness.

**Innovating in the Colombian automotive industry**

The *Programa de Transformación Productiva* has encouraged internet use in the car industry for auto parts production and car assembly. Supported by the national industrial association (ANDI) and the 14 biggest companies in the auto sector, a research center, CDTIA-TECNA, has been established in Palmira (Valle del Cauca). This center, the first of its kind in Latin America, is enabling innovations that will increase productivity in car manufacturing and implement digital production processes.

### *Big data*

The internet is increasingly generating voluminous amounts of data that when combined and analyzed are yielding new insights for business operations, government service delivery, better testing of pharmaceuticals and basic research, and much more. For instance, Facebook, Airbnb, Alibaba, Mercado Libre, and other global companies rely on the ability to collect data and transfer it globally to provide services to their customers. Big data can be analyzed to create new business opportunities and improve government delivery of services. For example, McKinsey estimates that big data could be used to reduce U.S. national health care expenditures by about 8 percent.[18]

**Big data and rice**

Rice production in Colombia is beginning to embrace the opportunities of internet and big data to improve production and efficiency. After a severe drought in the first months of 2016, some rice producers started working with Fedearroz, the rice producer's association in Colombia, and the International Center for Tropical Agriculture to develop strategies for using and sharing big data to make decisions on when to produce, how to produce, and how to use inputs more effectively.

### *The internet of things*

The internet of things is another area that will be a new source of data and where opportunities are only beginning to be realized. For example, the value of machine-to-machine internet of things is expected to grow from $44 billion in 2011 to $290 billion in 2017.[19] This includes in areas such as sensors in factories to increase the efficiency of operations and use of radio frequency identification technology to track goods and manage distribution centers. In addition, the internet of things is likely to largely be a business-to-business phenomenon—McKinsey estimates that approximately 70 percent of its value will arise from business-to-business use.[20]

**Digitizing Colombia's textile and clothing sector**

The PTP is also enhancing the production of smart textiles, for example with temperature sensors for sport clothing that can be relayed to a data center and provide the user with real-time information. The sector is also seeking to digitize its production chain, starting with cotton production through to e-commerce at the retail end.

The internet of things will generate a large amount of data. Collecting this data and turning it into knowledge will be a key feature of the internet of things.[21] Maximizing its opportunities will require the ability to move data across borders—to collect data in one country, aggregate it with data from other countries, and to analyze it in a third country (creating so-called big data).

The use of data by businesses to better understand customer needs and to improve the value of their products will be increasingly important. For example, Caterpillar collects real-time data analytics on grading accuracy, load quantities, and quality of work to help customers minimize fuel costs and downtime. Sensors that monitor tire pressure and utilization rates allow Caterpillar to determine when parts need to be replaced, thereby reducing maintenance costs.

The Colombian government is using the internet and data to monitor the mining sector's extraction process to better enforce fiscal and environmental regulation, and to ensure workers' health and safety in the mines.

The internet and data also are providing new ways for business to interact with customers and suppliers. For instance, retailers now use social media such as Facebook and Twitter to respond to customer service requests in real time, and GE Healthcare devices connect to the internet to provide real-time patient monitoring.

Business are also using the internet to digitize their assets and internal processes. This is the case in Colombia's coffee-producing sector. In the Cauca region, one of the main coffee producers in the country, a recently created technology park (Tecnicafé) is facilitating access to ICT and financing to small coffee producers. This initiative is further digitizing the coffee production chain using sensors and big data, which is also strengthening the cooperative model that small and subsistence producers use in the region. This process is seeking to reduce risks in coffee production and provide opportunities to create products with high value added.

### *Improving markets, creating markets*

Access to information online is a prosaic but important way that markets are becoming more efficient. From a development perspective it is giving small farmers the ability to better decide when to plant and when to sell, which helps them be better placed to negotiate with middlemen for the price of goods to market.

Take traditional fishermen in the municipality of Tumaco, on the Pacific Coast, an area with one of the highest levels of poverty that has been ravaged by the armed conflict, while also being home to protected indigenous and Afro-Colombian communities. The ICT Ministry and Telefonica Foundation have provided fishermen in Tumaco with tablets containing preinstalled apps on best practices in fishing and environmental education, as well as for monitoring ocean conditions indicating the best times to fish. The program is called Pescando con redes móviles (Fishing with mobile networks), and it has been applied in other communities in Latin America.

The internet has also created markets that would otherwise not exist because of transaction costs or lack of information. This includes two-sided or peer-to-peer platforms that connect sellers and buyers. For example, in Colombia, Tappsi connects taxi drivers and users in a more efficient way, as it reduces waiting times and the unsafety of using unregistered services. Rappi is revolutionizing delivery services in areas from food to pharmaceutical products and even cash. The company, which started in Bogotá and has expanded to other cities in the country, is one of the highest valued in the services market in Colombia. It is now exporting its services to Latin America.

The rapid success of these companies highlights the economies of scale of being online—the low marginal costs of adding additional consumers or users combined with reinforcing network effects means that online companies are scaling, often rapidly. For example, Airbnb has a higher valuation than Hilton, and Uber is worth more than Hertz. This raises competition issues that are discussed in more detail below.

By allowing existing assets to be used more intensively, internet-based businesses generate significant consumer and producer surplus. Companies also generate public goods as the information they provide, such as rental prices from Airbnb, can be used by any individuals looking to rent out their apartment.

In turn, this has disrupted industries from manufacturing, to retail, to tourism and finance. Consider the impact of Airbnb on the hotel sector, or the impact of Amazon on retail and of Uber on taxis.[22] In addition to

providing consumers with greater choice and lowering the cost of these services, these companies are injecting competition into often protected markets, driving economic efficiency.

The internet can be used to improve the labor market by streamlining job search capabilities and more effectively matching employers and employees than traditional methods. The USITC found that the internet had increased U.S. employment up to 1.8 percent.[23]

## Quantifying the economic potential of the internet and data

There is only limited data on the impact of the internet and data flows on economic growth and international trade. One reason is that the impact of the internet on economies and trade is a function of the digitization of economies broadly and the improvements in efficiency and productivity. Separating out the impact of the internet on trade (and GDP) is a complex task. Moreover, public trade data do not distinguish between whether goods and services are delivered offline or online.

According to a McKinsey Global Institute report, global flows of goods, foreign direct investment and data increased current GDP by 10 percent compared to what would have occurred in a world without any flows—equivalent to $7.8 trillion in 2014.[24] The Boston Consulting Group has estimated that the internet economy could double for G-20 between 2010-2020, employing a further 32 million workers (BCG 2012).

There are economic models that quantify the relationship among internet access, economic growth, and trade. A World Bank study found that a 10 percent increase in broadband penetration resulted in a 1.38 percent increase in growth in developing countries and a 1.21 percent increase in growth in developed countries.[25] This correlation is also positive—i.e., broadband use is driving economic growth. Moreover, the gains increase as broadband penetration expands within a country due to the even larger spillover and network effects.[26] As more people use the internet, the benefits from creating additional internet content, services, and apps increase due to network effects, which further increase user benefits, creating a virtuous cycle of economic growth.

In terms of the direct impact of the internet on trade, one study concludes that a 10 percent increase in internet access leads to a 0.2 percent increase in exports.[27] Other studies using more recent data find even stronger impacts of internet use on trade.[28]

Firms that use the internet are more productive.[29] For example, the productivity growth of Vietnamese firms using the internet for e-commerce was 3.6 percentage points higher in subsequent years.[30] In Mexico, firms that engage in e-commerce or have higher share of workers using the internet are more productive.[31] The USITC in 2014 calculated productivity gains from the internet using survey data from U.S. businesses and converting the results into an economic model. It found that the productivity gains from the internet have increased U.S. real GDP by 3.4 to 4.8 percent.[32]

The internet also affects labor productivity. It removes the need for routine jobs and gives those with higher skills opportunities to increase output. For example, the labor productivity of African firms that use the internet is 3.7 times that of nonusers, and their total factor productivity is 35 percent higher than similar firms that are less digitally intense.[33] A recent study of EU firms also found that engaging in e-commerce increases labor productivity—and that e-commerce had accounted for 17 percent of EU labor productivity growth between 2003 and 2010.[34]

The BCG e-Friction Index, which assesses factors that inhibit internet use (including price, availability, computer literacy, and access to online payments) and limits to access to information online, such as commitments to open data, ranked Colombia 56th out of 65 countries—Chile was 41st, and Peru was 60th. The main challenges identified by BCG were Colombia's lack of connectivity, infrastructure, and competition.

Such potential for the internet and data to increase productivity needs to be better understood given that since 2007, most countries have been experiencing low rates of growth in total factor productivity.[35] There are various explanations for why the impact of the internet and data on productivity has not been reflected in national productivity statistics. One reason is that the measurement of total factor productivity fails to capture the positive network externalities from IT investment and internet use.[36]

The internet can also benefit employment, although this subject is much debated. The internet is creating jobs in areas such as IT, services, information-related products, and software.[37]

The internet is also disrupting industries and in the process shifting employment patterns in some sectors. For example, as noted, hotels are being disrupted by Airbnb, taxis by Uber, and retail by Amazon. Yet, a McKinsey report finds that for every job destroyed by the internet, it has contributed to the creation of 2.6 jobs.[38]

The internet is also affecting the demand for certain skills. Demand for those with skills to manage information and exploit data is growing, while there is less demand for low- and middle-wage occupations and skills.[39] Such impacts on employment underscore the need for policies to help those who are marginalized by these developments.

## SECTION I: THE INTERNET AND INTERNATIONAL TRADE

The internet and global data flows are expanding the opportunities for business—particularly SMEs and businesses in developing countries—to engage in international trade. The impact of internet use on business productivity discussed above is increasing competitiveness and the capacity to compete domestically and in international markets. The internet and data flows are having other direct effects.

### Internet platforms and trade in lower-value goods

The global nature of the internet allows businesses, wherever they are situated, to connect with consumers and customers around the world to sell products and source supplies. For example, of the Colombian SMEs that use eBay, 100 percent of them export and 65 percent are exporting to 10 or more countries.[40]

While the internet enables the online transaction, the trade may be in a digital product or require the delivery of physical goods. In the latter case, more traditional trade barriers matter, such as tariffs, access to efficient delivery services and the costs of moving goods through customs.

The opportunity that internet platforms are providing for SMEs to go global has also meant growth in trade of low-value goods as consumers sell single products online. This is also presenting challenges for trade infrastructure better adapted to dealing in bulk. In this context, de minimis customs duties—the value of a good below which customs duties do not apply—if set at too low a level can make digital trade in low-value goods not commercially viable.

### Blurring the distinction between goods and services

The ability to deliver products online is blurring the distinction between goods and services. For one thing, goods are being traded online as services. Software previously distributed on a CD is now delivered and updated online (often via the cloud). This trend is also true for trade in books, movies, and music—where trade in the physical form has been replaced by increasing amounts of cross-border movement of digital content.

### The value of services in goods

The internet and data also mean that businesses are able to provide a host of services that add value to their more traditional goods offerings. This is a form of what McKinsey refers to as digital wrappers—where digitization is enhancing the value of trade in goods.[41] For example, apps and geolocation devices are changing the business models of car manufacturers, which need to conceive of their product more in terms of delivering transport solutions than simply as vehicles.[42]

**Komatsu**, a Japanese construction machinery firm, embeds sensors in its products to track parts and when they need to be replaced.

**John Deere**, which makes agriculture equipment, offers soil analysis services that rely on wireless transmission to data centers in the U.S. that analyze optimal fertilizer distribution.

### Global value chains

The internet and its ability to move data globally have also been an important driver of global value chains (GVCs).[43] This has included using data to manage globally dispersed production units,

enable global collaboration on design and R&D, and run transportation management systems that connect supply chains with logistics networks. Increasingly, this is enabling the disaggregation of not only goods production, but also of services as these are unbundled and outsourced.[44] Looking at trade in intermediate products as a proxy for the extent of GVC, about 56 percent of global trade in goods and 73 percent of services trade are intermediate products.[45]

Participation in global value chains can be a driver of productivity, growth, and jobs for developing countries. For instance, GVC participation allows firms to specialize by concentrating on providing a particular input or service and thereby to improve productivity. Once participating in a GVC, there are opportunities to upgrade skills and to expand the range of inputs provided. The role of foreign direct investment and multinational enterprises driving GVCs is another channel to access skills, innovation, and ideas. As a result, those developing countries with the fastest-growing GVC participation have GDP per capita growth rates 2 percent above average.[46]

The disaggregation of production has led to trade in tasks, where businesses provide inputs into global value chains. The broader phenomena of global value chains mean that building an entire industry from scratch is no longer necessary or even desirable. Instead, developing skills in particular areas provides the best way to develop expertise that can be exported and integrated into world-class production networks. For developing countries in particular, it offers opportunities to plug into global networks by developing discrete skills.[47]

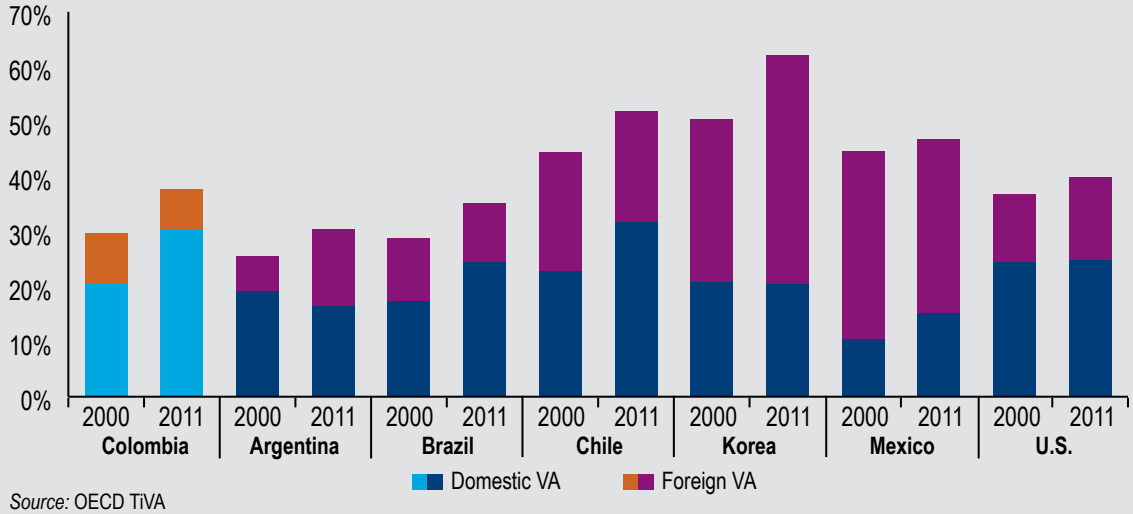
As a general observation, commodity-rich economies tend to participate in GVC at the upstream stage—exporting low value-added commodities that are used as inputs into the production of a range of other products. In turn, these countries have higher foreign value added in downstream exports since machinery and capital goods are imported and are crucial steps in the production chain. Hence, commodity exporting economies need to facilitate trade in order to develop more capital-intensive sectors that create higher value-added trade relations.

As Figure 5 shows, between 2000 and 2011, most countries in Latin America experienced declines in foreign value embedded in their exports while increasing the share of domestic value add, contrasting sharply, for instance, with the growth in foreign value added in South Korea's exports. This suggests that Latin American countries have become less integrated at the downstream end of GVCs—closest to the production of the final product—and instead are more involved upstream in GVCs through the provision of commodities and energy.

The level of integration and position of Colombia within GVCs is analyzed in Figure 6, which shows the share of Colombia's exports used by companies in third countries to produce other products for export, and the share of foreign inputs used in Colombia to produce goods for export. In 2011 over 30 percent of Colombia's exports were embodied in foreign exports. This reflects Colombia's high levels of commodity exports that are used to make further products for export. Colombia's share is similar to that of Chile, another commodity exporter, making Colombia one of the region's largest upstream exporters of intermediate products as a share of total exports.

In contrast, Figure 7 shows a relatively small (and falling) share of foreign value added is used by Colombian businesses to produce additional goods for exports. In 2011, only 7.6 percent of Colombia's exports contained foreign value add, down from 9.4 percent in 2000. This

Figure 5: Foreign and domestic value added embedded in exports, by country (1995-2001)




*Source:* OECD TiVA

Figure 6: Domestic value added in total exports

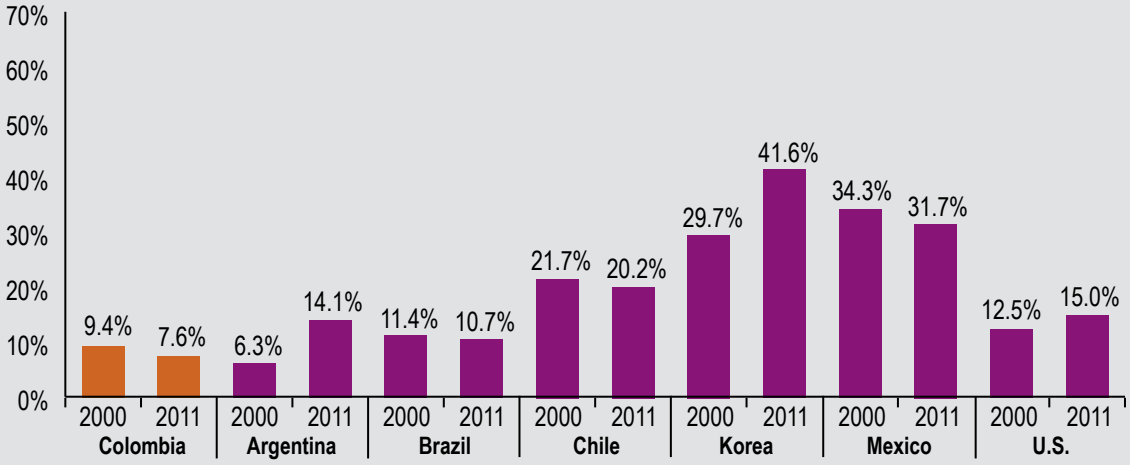



*Source:* OECD TiVA

is also the lowest share for the region, where even in Chile over 20 percent foreign value add is incorporated in its exports. These data underscore growth in importance of commodity and energy exports for Colombia as well as the decline in its manufacturing sector, where foreign inputs are most commonly used.

The internet and data will create opportunities to expand Colombia's participation in GVCs. Improving access to internet services and ensuring the free flow of data into and out of Colombia enables Colombia businesses to provide services online as an input into GVC—so-called trade in tasks. As noted, this could in-

Figure 7: Foreign Value Added in total exports




*Source:* OECD TiVA

clude greater participation by Colombia in back-office skills linked to larger U.S. and European companies. Such service exports are already being developed in Colombia—take Sitel, a top 100 outsourcing company that uses Colombia to provide customer service, sales, and technical support to local and international companies. Because participation in GVC is associated with greater use of information-intensive tasks, strengthening digital Colombia would provide scope to increase value-added services exports in areas such as content development and data analytics.[48]

## Digitally deliverable services

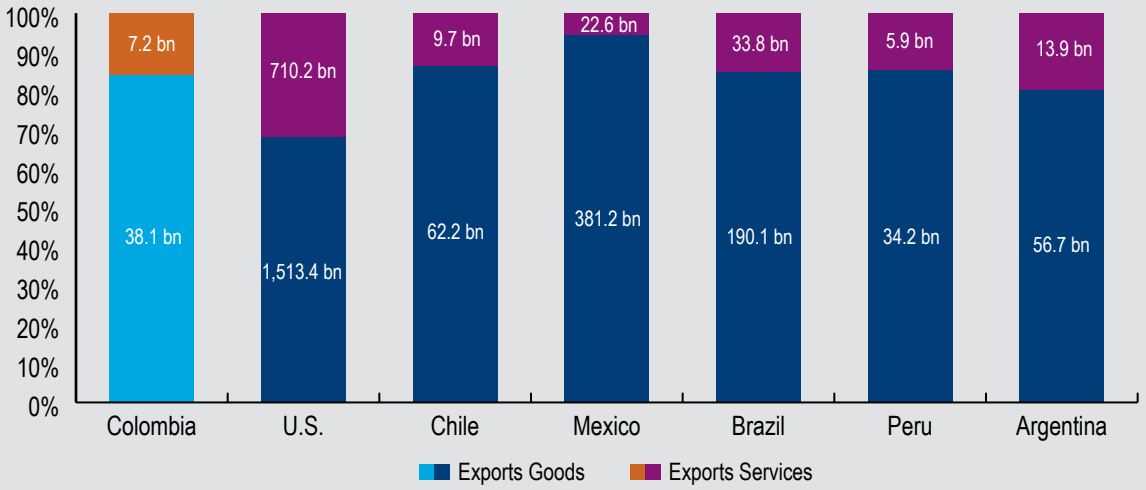
As discussed, one of the implications of the internet for economies is the growing value of digital services. From an international trade perspective, this manifests as increasing online trade in services and growth in the value of digital services incorporated into goods trade. As Figure 8 shows, Colombia's services share of total exports at around 15 percent is similar to other countries in the region but less than half that of the U.S.

This gross trade data fails to capture the value of services embodied in Colombia's goods exports. Figure 9 uses value-added trade data, which shows increases in the share of Colombia's services exports from 17 percent of total exports to over 28 percent.

Despite this increase, value-added services exports are low compared to other countries in Latin America and the U.S. For instance, valued-added services exports for Chile and Mexico are around 40 percent of total exports and are over 50 percent for the U.S. and Brazil.

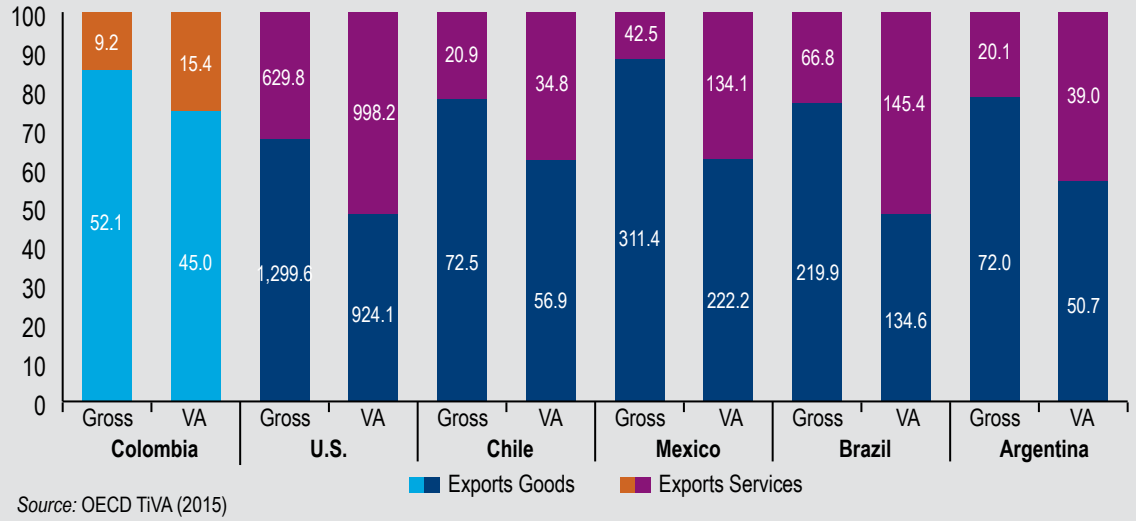
Colombia's reliance on commodity trade—which has lower levels of services value add than other sectors such as manufacturing—is one reason for Colombia's low services share in value-added trade, relative to other countries in the region. However, countries such as Chile are similar commodity exporters, which in part shows limited use of the internet and data in Colombia across the economy to add value to more traditional good producing sectors.

Figure 8: Gross exports of goods and services, compared to other countries (2015)




*Source:* World Bank, WDI

Figure 9: Value added exports as a share of total exports gross (2011, $ billion)




*Source:* OECD TiVA (2015)

It is also the case that the latest data on value-added trade from the OECD/TiVA data for 2011 came during the peak of the commodities boom. Recalculating the value-added data by excluding agricultural produce and mining results in the share of services in value-added trade increasing to 52 percent of Colombia's total exports.

These figures underscore the importance of services for Colombia's exports and the scope to increase the value of these exports by developing its services economy.

There is unfortunately a lack of data on the amount of trade in services that happens online. National

trade statistics do not collect data on whether international services are delivered online or in person. For instance, the export from Colombia of architecture services to the U.S. could be delivered online, the architect could visit the client in the U.S., or the U.S. client could visit the architect in Colombia. In fact, the architecture services might have been delivered using a combination of these modes of supply.

The following estimates Colombia's services trade that is digitally deliverable. These digitally deliverable services (DDS) are services "that may be, but are not necessarily, delivered digitally." This captures the potential for services to reduce trade costs by being delivered online and points to where there is the most potential for the internet to expand Colombia's services trade.

Estimates of DDS are an upper-end amount of trade that can be delivered digitally since the data do not necessarily specify the means through which services are provided or the goods that are purchased. The approach taken by the U.S. Bureau of Economic Analysis focuses on five categories of cross-border services trade that it considers could be provided online:

- Business, professional, and technical services such as computers and information services, legal, architectural, consulting, and advertising services.
- Royalties and license fees paid for the use of intellectual property.
- Financial services such as online banking and investment activities such as market research and buying and selling shares.
- Insurance services such as digital transmission of premiums and payments for claims online.
- Telecommunications services including video conferences, email, and internet access services.

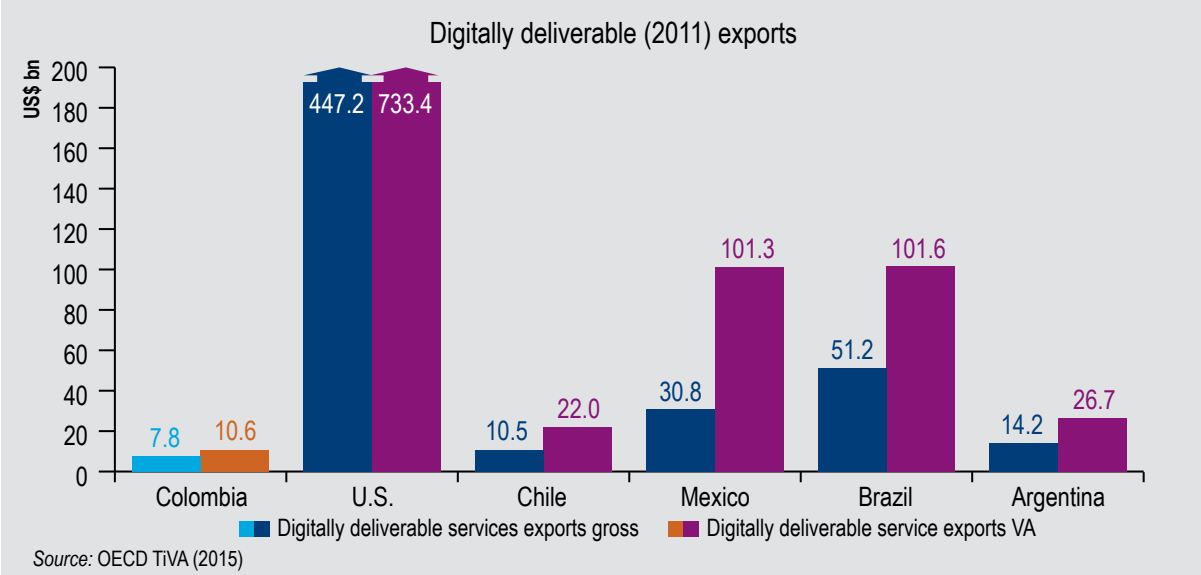
The following analysis is based on a survey on service exporting firms, the Quarterly Survey on International Trade in Services (MTCES) from DANE, which collects data for the following sectors:

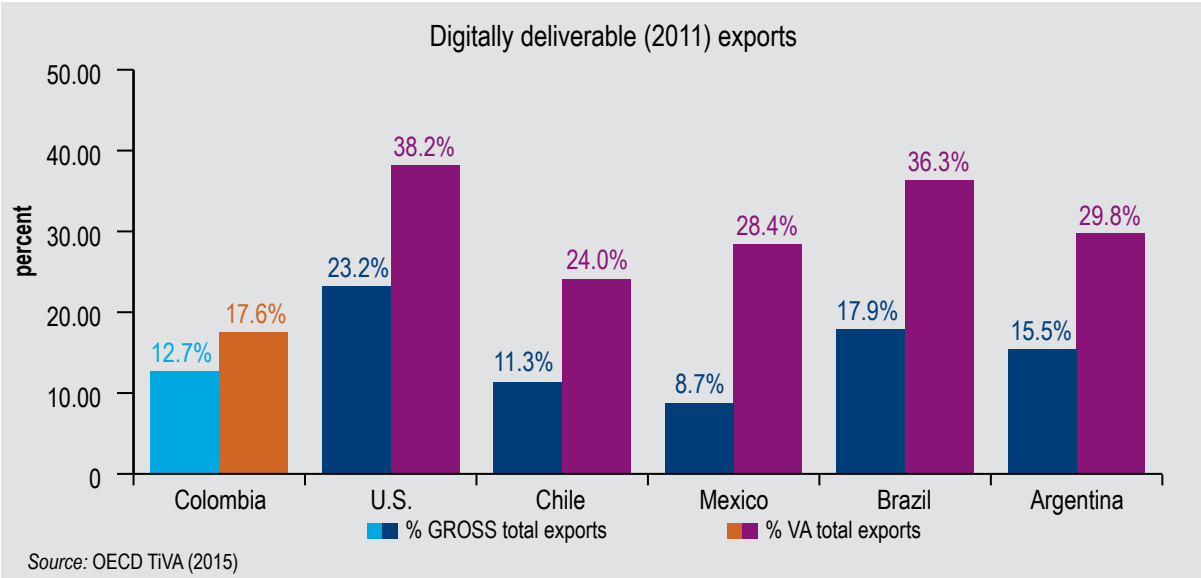
- Transport and postal services (i.e., e-commerce)
- Business services (i.e., management consulting services)
- ICT services (i.e., software services)
- Media and cultural services (i.e., Colombian music sold on Spotify)
- Intellectual property (i.e., royalties on the use of products and knowledge produced in Colombia)

Figure 10 shows Colombia's exports and imports of digitally deliverable services by sector. In 2015 DDS value-added service exports for Colombia and other countries in the region. For Colombia, in 2011 total value-added DDS was $10.6 billion, or 17.6 percent of total exports. While significant, the share of value-added DDS exports is smaller than in other Latin American countries and the United States. For instance, it was 24 percent of total exports in Chile, more than 28 percent of exports in Brazil, and more than 38 percent of total U.S. exports.

In terms of the composition of DDS trade, Figures 11 and 12 show that business services, closely followed by exports of ICT services, account for most of the Colombian digitally deliverable service exports. This includes exports of legal and consulting as well as software and other information services.[49] In the case of digitally deliverable services imports, payments of royalties and copyrights of intellectual property were the most important, reflecting use of intellectual property such as software, design, and patents. Business services and ICT services comprised the majority of DDS imports.

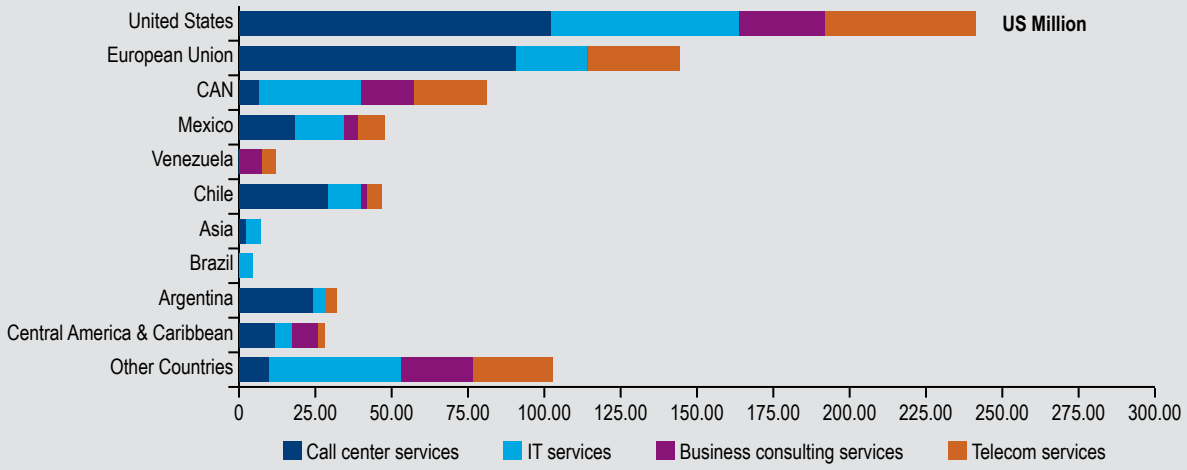
Figure 10: Digitally deliverable service gross and value-added trade in Colombia and comparison countries as a total value and share of total exports/imports



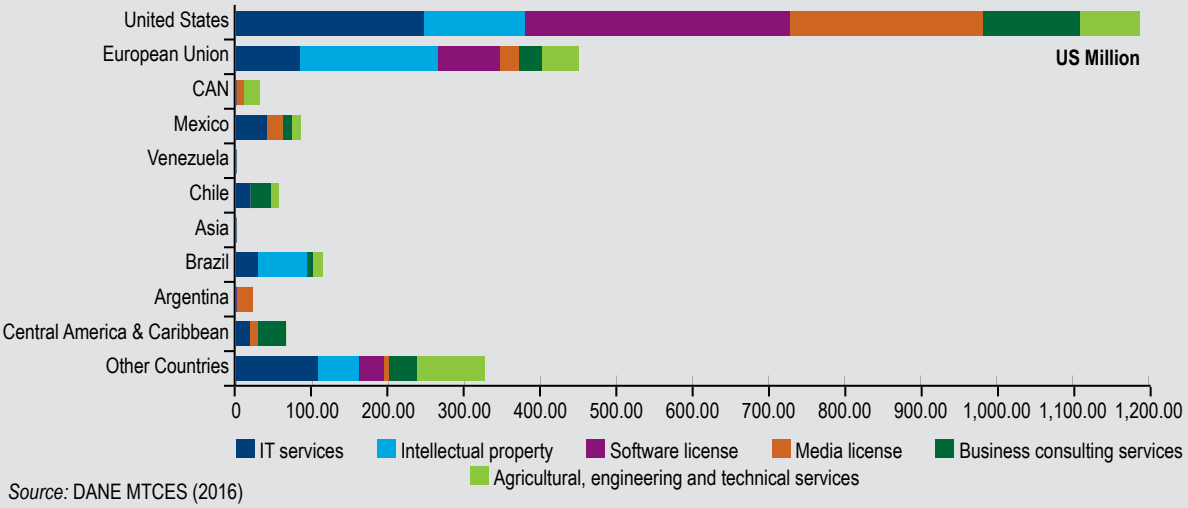

Figures 11 and 12 show DDS trade with Colombia's main trading partners: the United States, the European Union, the Andean Community of Nations (CAN), Mexico, Venezuela, Chile, Asia,[50] and Central America and the Caribbean (other countries are aggregated in a separate category). DDS trade with the U.S. dominates, reflecting Colombia's significant trade relationship with the U.S. and specifically the strength of U.S.-Colombia trade relations in digital services trade. Trade with the EU in DDS is the next most significant relationship, though well below the amount of DDS imports from the U.S.

Figure 11: Exports of digitally deliverable services with Colombia's main trading blocs (2015)




*Source:* DANE MTCES (2016)

Figure 12: Imports of digitally deliverable services with Colombia's main trading blocs (2015)

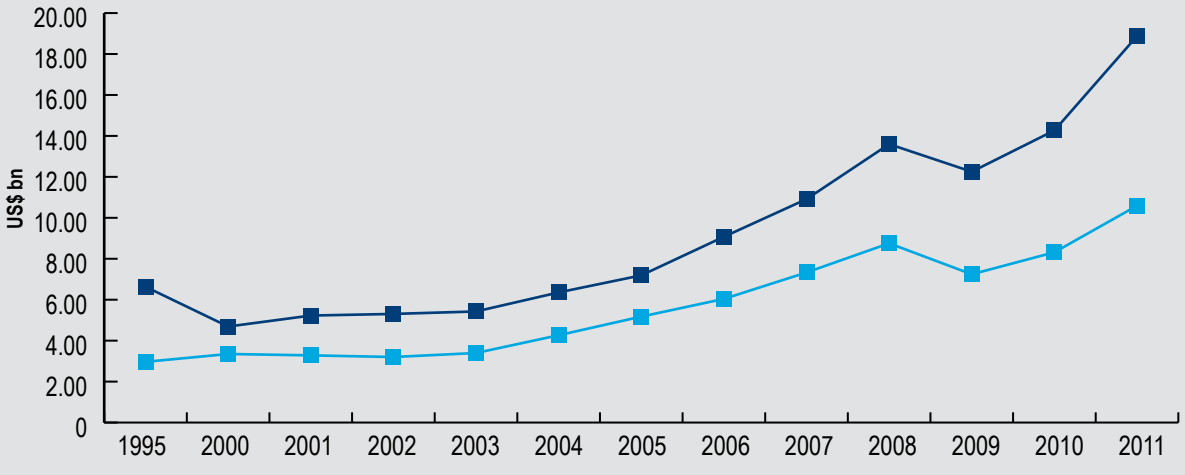



*Source:* DANE MTCES (2016)

Figure 13 shows the trend in value-added trade in DDS. This data shows growing exports and imports of DDS but a growing trade deficit in DDS trade for Colombia. Understanding the key role of DDS services as inputs for business productivity means that such a trend is consistent with a more sophisticated business environment in Colombia that is becoming increasing digital.

Colombia's efforts to create a digital economy will enable services to become increasingly important drivers of growth and trade. This will be through the provision of

Figure 13: Colombia´s growth in value-added DDS exports and imports (1995-2011)




*Source:* OECD-TiVA (2015)

online services that can be exported. In addition, greater digital access and use, combined with an associated upgrade in education and skills, should create opportunities for services to increase the value of more traditional goods exports such as in mining and agriculture. This section has looked at one part of this Colombian economy trend toward services from the perspective of DDS, but the opportunities are wider. For instance, it does not capture the economic importance of activities not recorded as a services trade, such as the internal movement of data within businesses or data-driven activities such as access to information or data analytics that enable commercial activity, including international trade.

## The importance of international trade agreements

The above analysis of the implications of the internet and data for trade highlights the potential for expanding Colombia's services trade. This will arise as Colombia increasingly engages in digital trade—whether as a result of government efforts to develop production of domestic content that are then traded online, or through the servicification of manufacturing. The result is that services market access commitments at the WTO and free trade agreements (FTAs) in other countries as well as restrictions in Colombia on the delivery of services, will increasingly matter.

This will require Colombia to shift its view of itself as an exporter of things—commodities mainly—to an exporter of ideas—services—whether embedded or part of more traditional goods exports, or in entirely new digital content.

To facilitate these opportunities will require that Colombia is part of regional and global efforts to reduce barriers to services trade and to strengthen international trade rules that support digital trade—such as the cross-border flow of data and no forced data localization—that will be important for Colombia.

Colombia has already made progress in this regard. It is part of the Trade in Services Agreement (TiSA), which once complete will further liberalize services

trade and include new commitments to support digital trade, including on data flows and data localization.

The Pacific Alliance—a trade agreement among Colombia, Chile, Peru, and Mexico—also has de-veloped commitments on digital trade. For instance, it includes commitments to provide for electronic signa-tures and consumer protection for online commerce. However, the Pacific Alliance rules on digital trade fail to address other key issues that are regulated in the TPP such as commitments on cross-border data flows and prevention of forced data localization.

Colombia is not a party to the TPP agreement—a 12-nation trade agreement that includes it. Already Chile and Peru are members as are the U.S., Mexico, Japan, Australia, Canada, and other dynamic markets in Asia such as Vietnam. Colombia already has trade agreements with many TPP countries (i.e., U.S., Japan) and therefore is well positioned to undertake the further reforms needed to reach the high TPP standards.

**Digital Trade in the Trans-Pacific Partnership Agreement**

The Trans-Pacific Partnership agreement includes the most cutting-edge commitments on digital trade. The main ones are as follows:

- A free and open market for trade digital products: this includes banning customs duties on digital products and requirement for non-discriminatory tax treatment of imported and locally produced digital products (Art 14.3).
- A commitment to the free data flows and prohibition of data localization requirements as a pre-condition for doing business in the country (Art 14.13).
- Balanced intellectual property rules including protecting source code (Art 14.17); commitments to intermediary liability modelled on the U.S Digital Millennium Copyright Act; and agreement to protect producers and consumer's technology choice by limiting the ability of governments to set technical standards that constitute de facto trade barriers (Art 14.4).
- The TPP requires the establishment of privacy rules while providing significant space for TPP parties to adopt top-down, bottom-up and sectoral approaches (Art 14.7, Art 14.8, 14.14).

## Trade law implications

The increasing importance of services in international trade has legal and policy consequences. Under the rules of the World Trade Organization (WTO), trade in goods and services are governed by different agreements—the General Agreement on Tariffs and Trade (GATT) and General Agreement on Trade in Services (GATS), respectively. While core non-discrimination principles of most-favored nation treatment and national treatment are contained in both the GATT and the GATS, each agreement contains other important differences. For instance, the scope of coverage in the GATS is a function of scheduled commitments (so-called positive list), and it allows for exceptions to the most-favored nation commitment and the national treatment requirement, which apply only to the specific liberalization commitments undertaken by the individual member. In contrast, the GATT most-favored nation and national treatment commitments apply to all rules, regulations, and taxes affecting trade in goods. In addition, the level of market access liberalization in the GATS is generally less than that for goods in the GATT.

The WTO case law in this area is still at the early stage of development.[51] The WTO panel in *U.S.—Gambling*

found that "mode 1" (cross-border services) under the GATS "encompasses all possible means of supplying services from the territory of one WTO Member into the territory of another WTO Member" and that a mode 1 commitment applies to supply of services "through all means of delivery, whether by mail, telephone, internet, etc." unless otherwise specified in a member's schedule. The panel cited "the principle of technological neutrality, which seems to be largely shared among WTO Members," based on a July 1999 interim progress report of the Work Program on Electronic Commerce group on services.[52] Neither party appealed this finding.

Two later cases have confirmed this view that GATS commitments also apply to services delivered electronically. In the decision in *China—Publications and Audiovisual*, the panel in 2009 considered China's 2001 GATS Mode 3 commitment on "sound recording distribution services," and found that it "extends to sound recordings distributed in non-physical form, through technologies such as the internet."[53] The panel's finding included not just internet-based distribution of sound recordings (e.g., sales of ringtones or songs via an online store) but also distribution via mobile telephone networks (e.g., sales through an app on a smartphone).[54, 55]

On appeal, the Appellate Body agreed that "the term 'product' is used to refer to both tangible and intangible goods, as well as services,"[56] and that "sound recording distribution services" refers to content in both physical and nonphysical form. The Appellate Body found that if a member includes a commitment on a sector or subsector in its GATS Schedule, it undertakes to liberalize the production, distribution, marketing, sale, and delivery of that service. As a result, in the absence of a specific limitation, a commitment on "sound recording distribution services" includes its distribution in electronic form.20 In effect, the Appellate Body found that all WTO members' GATS commitments on a service also include that service delivered electronically—even if electronic delivery did not exist in 1994 or whenever the commitment was made.

The form of delivery—be it as a good or as a service—also has consequences with respect to the collection of customs duties. Software delivered on a disk is subject to border duties, while the same software delivered online through digitized delivery can avoid such duties.

The U.S. and the EU have taken different approaches to the legal question of whether products delivered online are goods or services. In the Trans-Pacific Partnership (TPP agreement—a 12-nation trade agreement signed in 2016 that includes the U.S., Mexico, Canada, Peru, Chile, Japan, and other nations in the Asia Pacific) makes clear that a commitment on digital products does not reflect a particular view of whether digital products delivered online should be categorized as a good or a service. In contrast, in the EU-Colombia and Peru free trade agreement, delivery by electronic means is deemed a service.[57]

## SECTION II: BUILDING COLOMBIA'S DIGITAL ECONOMY

The key goals for Colombia, as expressed in its recent National Development Plan 2014-2018, are peace, education, and equity. According to the World Bank, making progress will require addressing a range of challenges:[58]

- Improve growth and the distribution of benefits between the cities and rural regions. Inequality has been caused by differences in productivity across the country, poor infrastructure in rural areas, and limited government capacity outside of the city.
- Successfully implement the peace agreement with the FARC. This decades long armed conflict has held back growth and development in the country. For instance, it has generated millions of internally displaced persons, of whom an estimated 50 percent are said to be living in extreme poverty. The recent peace agreement is a key development; successfully implemented, it should deliver a peace dividend as government capacity and resources are freed up and can be devoted toward addressing these challenges.
- Reduce reliance on commodity exports. The bust in commodity prices has highlighted the need for Colombia to diversify its economy. As noted, low oil prices are expected to endure. Moreover, Colombia's current proven oil and gas reserves are estimated to last seven to eight years and to peak in 2018. Colombia needs to transition to the new reality of lower oil prices and to build capacity and productivity across its economy.
- Reduce Colombia's tariff and nontariff barriers and improve competition. Liberalizing Colombia's economy and introducing more competition is needed to improve the efficiency and productivity of the economy.
- Improve government capacity. Delivery of health, education, housing, and other service areas should be better.

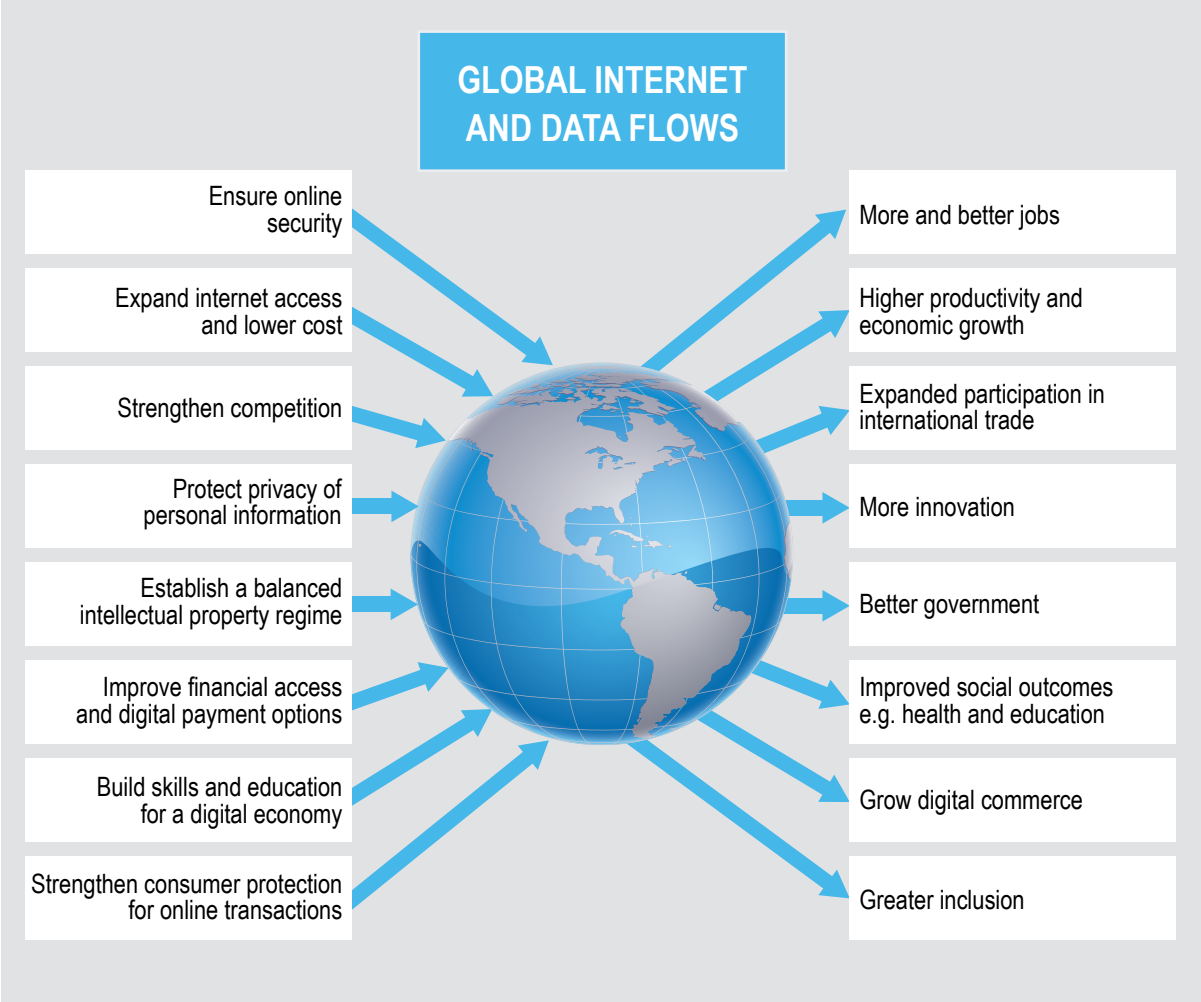
Many of the reforms needed to achieve the National Development Plan goals are consistent with many of the policy initiatives recommended in this report for building a digital Colombia.

Figure 14 captures the opportunities for economic growth, jobs, social inclusion, and better government from an effective use of the internet and data flows. The figure also underscores that in order to realize these opportunities requires Colombia to establish a comprehensive enabling environment. Expanding internet access, lowering costs, and building a skills base that can maximizing the opportunities of the internet for innovation and production. For instance, approximately 45 percent of Colombians consider the cost of access the main reason they do not use the internet. An additional 28 percent do not use the internet because they believe it is not necessary, and 15 percent do not use it because they cannot afford a device to connect to it.[59] This underscores the need to increase internet access, reduce costs, and boost the amount of online content that is relevant and useful for Colombians.

Colombia also needs regulation that strengthens consumer trust in using the internet by ensuring the security and privacy of personal data and extends consumer protection laws to the internet. Competition in the telecommunications market is another important factor that affects the cost and availability of the internet, but this extends to ensuring competition across the economy so that new online businesses can grow. A balanced set of intellectual property laws is also key—one that protects digital content and addresses online privacy while not overburdening internet service providers or stifling the innovative opportunities of the internet.

The government has shown a commitment to increase digitalization and to use the appropriation process to

Figure 14: Global internet and data flows




help drive the uptake of internet and data in Colombia. A lot remains to be done to develop a digital ecosystem in the country.

To fully achieve a digital Colombia will require action and engagement by government, businesses, and civil society. For instance, strengthening online security requires business to have in place appropriate IT protocols but also requires cooperation with government to leverage skills and expertise. Expanding internet access will often require public-private partnerships for building the infrastructure to reach remote communities. Improving financial access and digital payments options requires a regulatory environment that enables competition and innovation and avoids unnecessary barriers to international transfers of data and capital while relying on business to develop the most efficient and cost effective means of delivery. In all these cases, civil society often has the expertise and knowledge of local needs that can improve design and delivery of regulations and projects.

**Colombia's Plan Vive Digital**

Plan Vive Digital started in 2010 aimed at developing a digital economy. It supported adoption of high-speed internet and increased access to computers and other IT equipment. The second stage, Plan Vive Digital 2, is reflected in Colombia's National Development Plan 2014-2018 and aims to consolidate and expand opportunities for creating a digital Colombia. Its goals are to:

- Make Colombia a world leader in app development and IT social entrepreneurship, specifically targeting apps for agriculture, education, and health, to increase the use of IT by micro, small, and medium-sized enterprises (M-SMEs).
- Increase government transparency and efficiency through e-government. This allows optimizing public management and reducing the risk of gaming in public contracting. It also would empower citizens through systems that allow more transparent accountability on the part of the government.

Despite significant progress creating an enabling environment for a digital economy, much remains to be done. The following provides a detailed analysis of the opportunities and challenges.

## Internet access

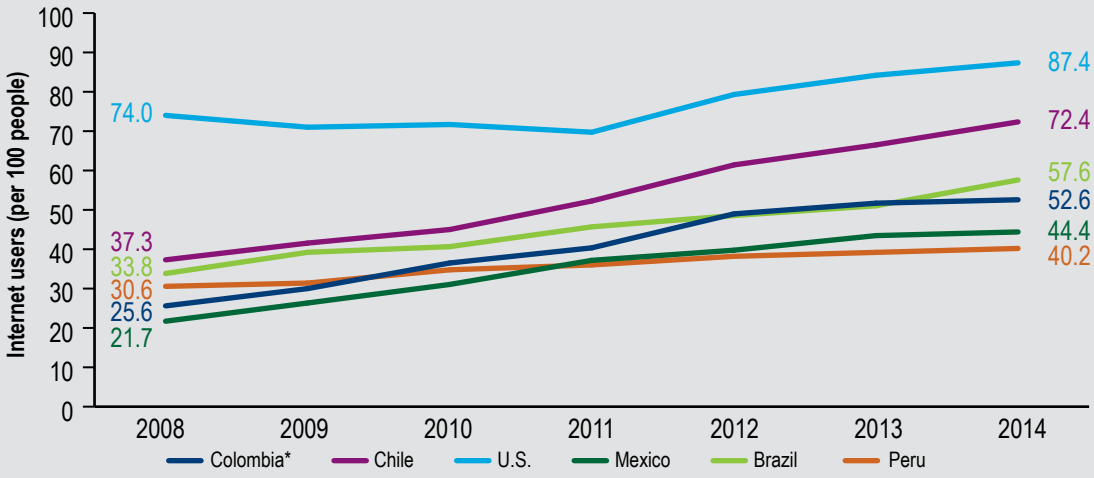
More than 3 billion people globally have access to the internet, and approximately 2 billion of them are in developing countries. The role of internet access as a development outcome is included in the post-2015 U.N. Sustainable Development Goals (SDGs). For instance, the goals of increasing access to resilient infrastructure, promoting inclusive and sustainable industrialization, and fostering innovation are all enabled by internet access. The SDGs also include the goal of providing universal and affordable access to the internet in least developed countries by 2020. Access to ICT is also seen as necessary to achieve other SDGs, including as a means for achieving the goals of gender equality and empowering women and girls.

Internet access is increasingly happening over mobile devices, making access to such devices inseparable from the challenge of expanding internet access. For instance, by 2018, 54 percent of mobile devices in the developing world will be "smart" compared with 93 percent of U.S. mobile devices.[60] Indeed, mobile phones are now the main way that people in developing countries get online. Challenges to expanding such internet access include the costs of internet-enabled smartphones and of mobile broadband plans.

In Colombia, smart devices are now the main way that people access the internet. However, internet access remains low compared to regional peers, and costs of internet access are too high. The following outlines the state of play in Colombia regarding internet access and cost.

The objective of Plan Vive Digital (2014-2018) is for internet access to reach 60 percent of Colombian households by 2018 (compared with 50 percent in 2014). By the end of this period 4G technologies are set to be present in all 1,123 Colombian municipalities. Furthermore, appropriations programs for promoting responsible use of the internet are intended to directly benefit 5 million citizens through the initiative *En TIC confío* on digital security for children and to reach the disabled population with 400,000 downloads of the ConverTIC software. ICT penetration in education has also been remarkable: After government delivery of 2 million computers and tablets, Colombia today has a ratio of four students per internet-enabled device. All of these strategies have increased ICT penetration. The challenge for Plan Vive Digital is to consolidate a digital environment by

Figure 15: Internet users per 100 people, Latin America and United States (2008-2014)




*Source:* World Bank, WDI (2015)

accelerating access to the internet and establishing an appropriate regulatory framework for the sector.

As shown in Figure 15 internet access in Colombia is higher than in Mexico or Peru. However, with internet penetration at less than 60 percent of the population, access is still considerably lower than in Chile (72 percent) or the United States (87 percent).

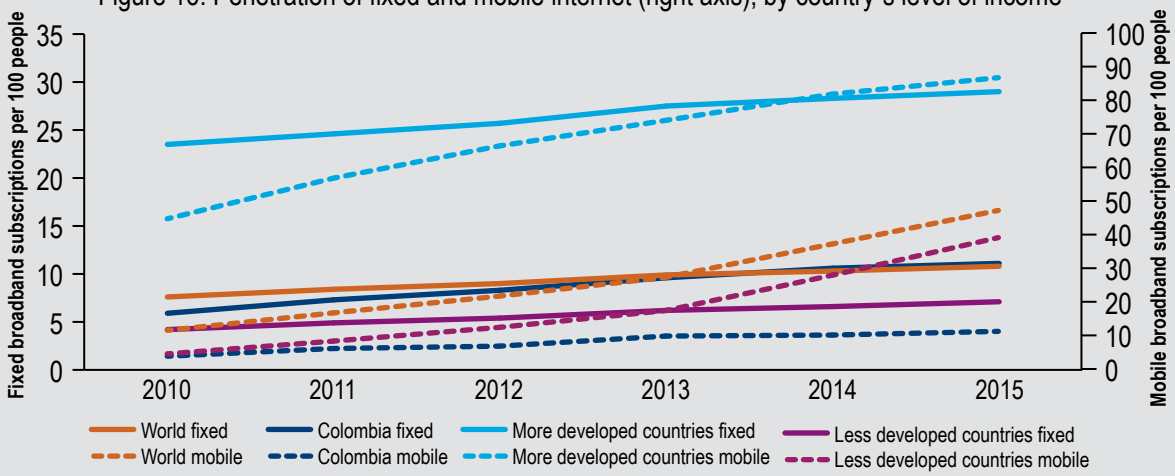
Internet access in Colombia is also unevenly distributed by income levels and between urban and rural areas. The bottom quintile accounts for 2.4 percent of national income, and the highest 57.6 percent (these represent a monthly income of $54.50 and $1,342.1, respectively). In the top quintile, 90 percent have internet access equivalent to levels of internet access in the developed world. In contrast, only 38 percent in the bottom quintile have internet access, which is comparable to countries with lower levels of development.

There is also a city/rural digital divide in Colombia. In 2014, 65 percent of urban households typically had internet access, compared with less than 10 percent in rural areas. Colombia's internet penetration in rural areas is similar to that of Brazil but higher than in Peru. In Chile, more than 20 percent of rural households had access to internet, and in Costa Rica, the share was above 40 percent.[61]

Digital penetration between regions also varies. For instance, in Bogotá 38 percent of homes have access to a desktop computer, 42 percent have access to a laptop, and 27 percent have access to a tablet, while in the Orinoco basin and the Amazon these figures are 16 percent, 26 percent, and 11 percent, respectively (DANE Quality of Life Survey). This difference also exists between Bogotá and less remote regions that still have a larger share of rural population such as Antioquia (30 percent, 29 percent, and 16 percent) and the Caribbean coast (17 percent, 18 percent, and 14 percent).

The government is taking a number of steps to address this regional disparity. For example, Kioscos Vive Digital

Figure 16: Penetration of fixed and mobile internet (right axis), by country´s level of income




*Source:* ITU & Ministry of ICT

provides high-speed internet access in remote areas (Box W) and *Computadores para educar* provides computers (with debatable success) to rural schools.

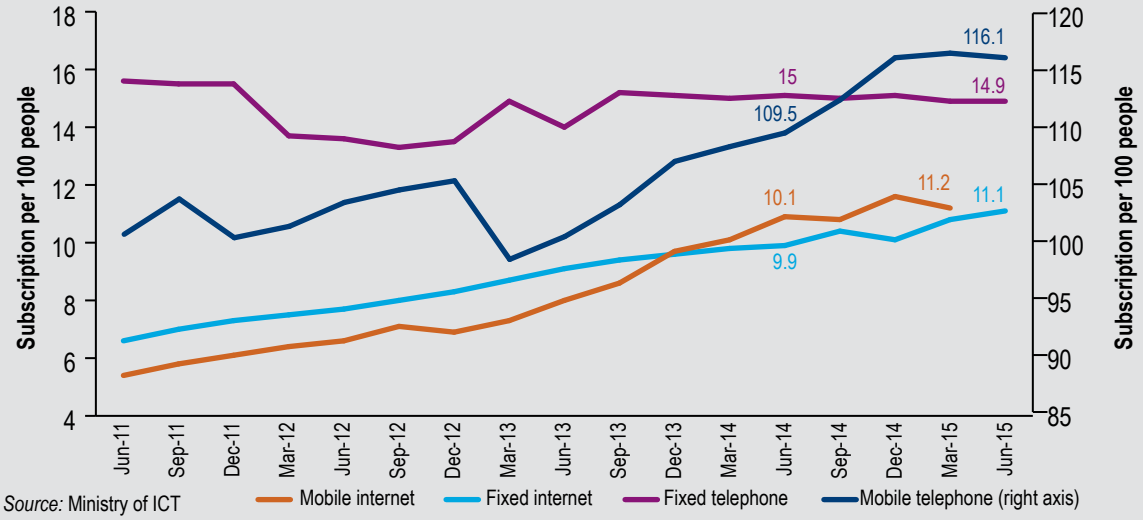
**Viva Digital Points**

Vive Digital Points provide free Wi-Fi in vulnerable urban areas where the population lacks internet access (Kioscos Vive Digital) or in remote rural areas where connectivity is otherwise very limited (Puntos Vive Digital). These centers provide high-speed internet connections, access to Wi-Fi, computers, televisions, and media equipment. Puntos Vive Digital and Puntos Vive Digital Plus tend to have more sophisticated and specialized equipment than Kioscos. This program has increased internet penetration in the country, as most of the 6,500 installed Kioscos are in highly rural parts of the most remote municipalities of the country, especially on the Pacific coast, the Orinoco basin, and the Amazon. The target is to reach 7,621 Kiosks by 2018.

The costs associated with expanding internet access remain high. Many Colombian municipalities are highly rural and have low population densities. These areas are generally difficult to access since they are isolated in rainforests or distant plateaus. In these municipalities, antennas are located close to the most populated centers, but rural access remains limited. The current version of Plan Vive Digital is looking to set up more satellite internet centers in remote rural Wi-Fi areas along the Pacific coast and in the Orinoco basin and the Amazon region to improve community access to services and institutions.

Figure 16 captures internet use by mobile and fixed line in Colombia and other countries. As can be seen, use of mobile internet, while the main way Colombians access the internet, is well below levels in less developed countries.

Figure 17: Penetration of the main telecommunication services in Colombia




*Source:* Ministry of ICT

### *How Colombians access the internet*

As Figure 17 shows, Colombia, like many developing countries, has seen an increase in mobile phone use, leapfrogging fixed-line technology. Internet access is also increasingly by means of mobile devices instead of over fixed lines, with mobile broadband now in wider use than fixed internet lines.

### *How do M-SMEs access the internet?*

Microenterprises account for more than 97 percent (2.5 million companies) of total enterprises in Colombia and are concentrated in the retail sector. Together with small and medium-sized enterprises, they comprise over 99 percent of Colombia's enterprise population. Furthermore, M-SMEs represent 95 percent of exporting companies and account for 5.6 percent of total annual exports: $2,891 million.[62] As the largest share of the Colombian companies by far, M-SMEs are of crucial importance to the economy, as they provide the main entrepreneurial opportunities for the more vulnerable segments of the populations.

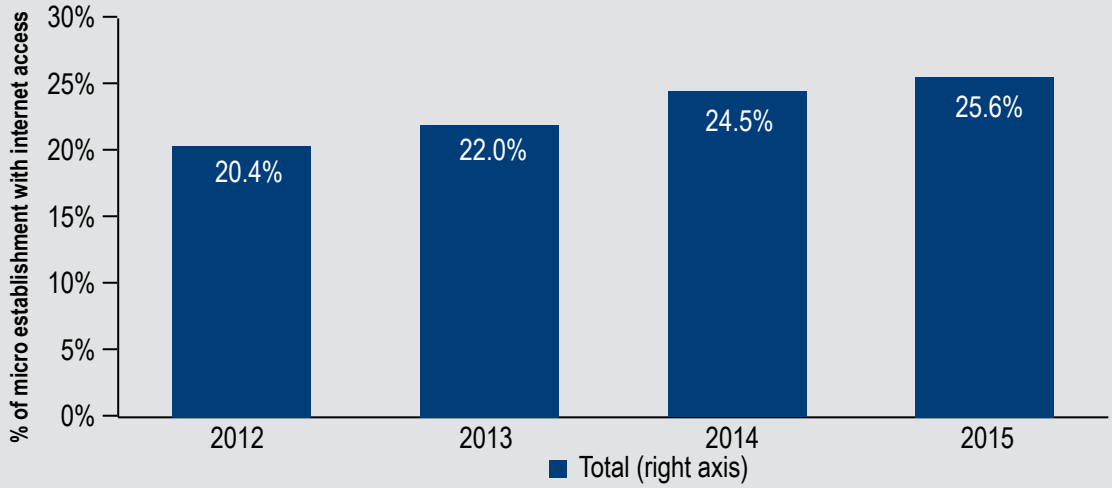
**Defining M-SMEs**

Colombia defines M-SMEs as companies that employ 10 people or less (micro), 11 to 50 (small), and 51 to 200 (medium). The total assets of companies are measured in number of monthly minimum wages: micro (less than 500 monthly minimum wages), small (501 and 5,000) and medium (5,001 and 30,000) (currently $117,000 for micro, $1.17 million for small, and $700 million for medium (MinCIT, 2016). These enterprises generate 67 percent of Colombia's employment and 28 percent of its GDP.

*Source:* MinCIT (2016); DANE

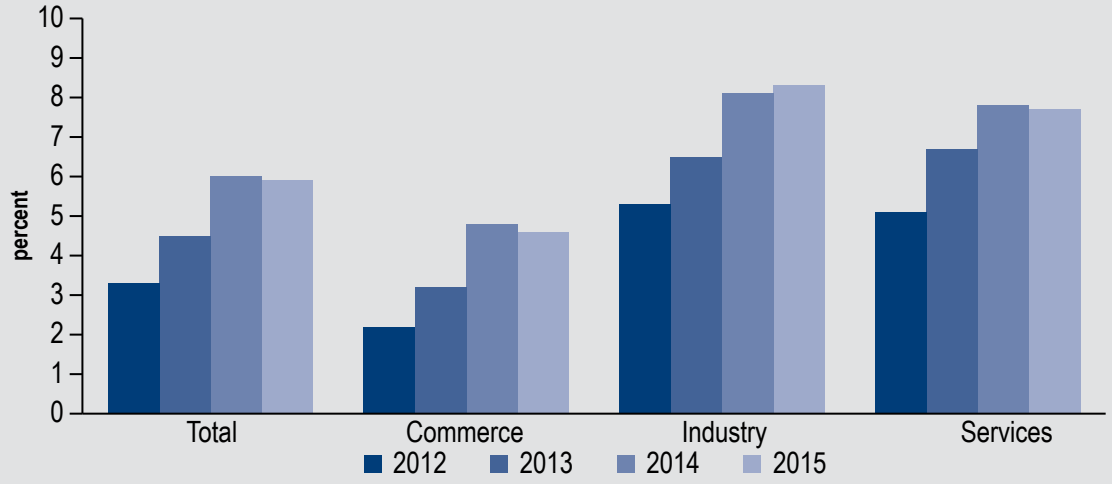
Increasing internet access for M-SME is a priority in the current version of Plan Vive Digital. The goal is to connect 61 percent of M-SMEs to the internet by 2018. In 2015, Figure 18 shows that 26 percent of micro-establishments had internet access (DANE). Of these businesses, 25 percent used desktops to access the internet, 8 percent used laptops, and 8 percent used tablets or similar devices (business can use more than one device).

Figure 18: Micro-establishments with internet access




*Source:* DANE—ICT Micro-establishments, calculations by Fedesarrollo

Figure 19: Micro-establishments with a website, or web presence



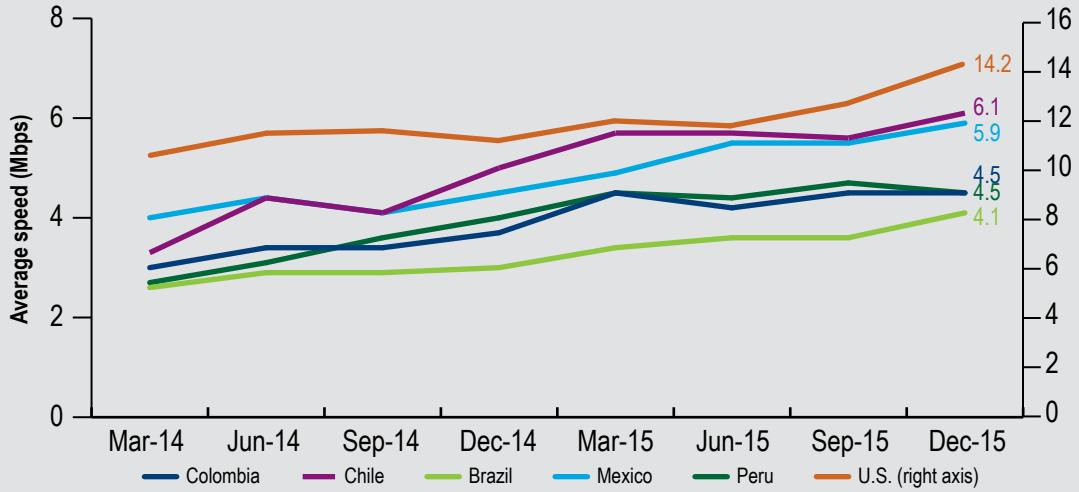

*Source:* DANE—ICT Micro-establishments, calculations by Fedesarrollo

As Figure 19 shows, micro-establishments with a web presence are concentrated in industry and service sectors. According to the 2010-2011 enterprise survey by the World Bank, 48 percent of all Colombian manufacturing businesses have a website and 99 percent use the internet. However, after large gains from 2012 to 2014, internet use by M-SMEs in 2015 remained flat.

## Internet speed

The capacity of Colombia's businesses and people to use the internet for the growing range of commercial, research, and government uses will increasingly require more speed and capacity. Figure 20 shows that the internet Colombians are accessing is also relatively slow. Broadband internet speed in Colombia is 4.5 megabits per second (Mbps), the

Figure 20: Average fixed broadband internet speed




*Source:* Akamai (2015)

same as Peru and only slightly above Brazil (see Figure 5). In contrast, broadband speed in Chile is 6.9 Mbps, or more than 50 percent faster, and it is 14.2 Mbps in the U.S.—over three times the speed in Colombia. Moreover, only about 30 percent of internet users in Colombia are accessing the internet at 4.5 Mbps, whereas in Peru, 40 percent have access to over 4 Mbps and in the U.S. over 75 percent have access to even higher internet speeds.[63]

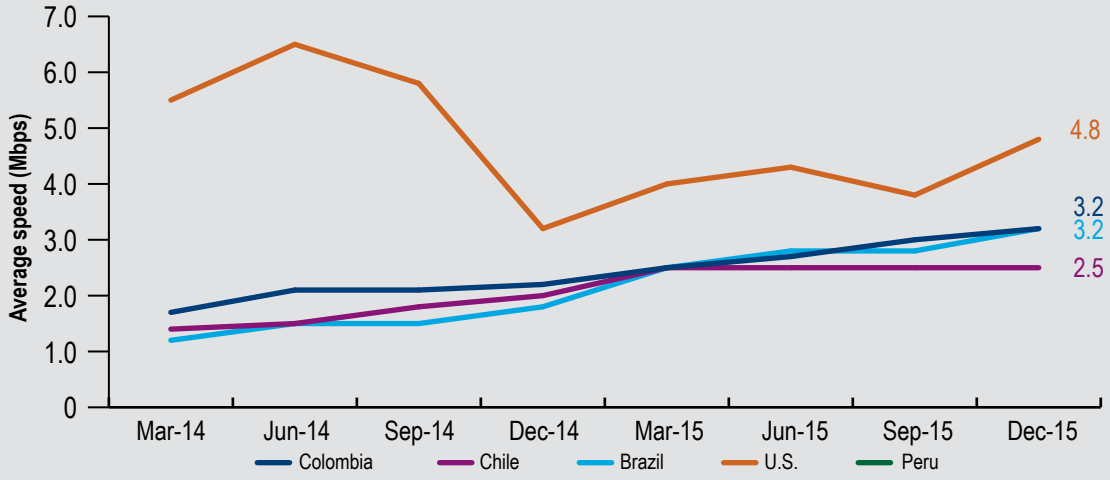
Currently, 456 municipalities (41 percent of total) have 4G coverage. The government's target is to reach 100 percent by 2018. According to the Superintendency of Industry and Trade (SIC), current speeds are sufficient for video downloads, online calls, and interactions beyond email.[64] This is supported by tying allocation of 4G spectrum to commitments for providing coverage in areas that are currently underserved.[65]

However, for Colombia to utilize the range of business and innovative opportunities of the internet and data to drive growth and trade, significantly faster broadband (fixed and mobile) and higher internet speeds will be required. Figure 21 shows that mobile broadband speed in Colombia is around that of Brazil but significantly lower than in the U.S for instance.

The introduction of 5G will expand the range of business activities and government services that have the potential to take place online. This will include the emerging internet of things, where 5G is vital to collect and analyze data from billions of devices, and to offer more and better services such as connected medicine— remote medicine connected with real-time diagnostics. Virtual reality, driverless cars, and advanced manufacturing will also rely on 5G networks.[66]

Going forward, 5G will require access to low- and high-frequency spectrum, in part depending on the applications that will be supported. For instance, manufactured internet of things concentrated in cities will likely require low-frequency spectrum in order to penetrate obstacles to reach devices, whereas virtual reality and telemedicine in remote locations will likely need medium to higher range frequencies. Higher

Figure 21: Average mobile broadband internet speed




*Source:* Akamai (2015)

frequencies in particular will require more cell towers to overcome difficulties penetrating objects.

To date, the Agencia Nacional del Espectro (ANE) has faced resistance installing cell towers in municipalities and local communities. Opposition arises from various concerns, most of it misinformed, such as fears that these towers negatively affect health or that they are physically unappealing. According to ANE, the argument on aesthetics is likely to change since technology reduces the size of antennas considerably. In terms of the health concerns, ANE has disseminated studies finding that antennas do not necessarily have negative impacts on health conditions. These concerns highlight the need for greater outreach and education in Colombia on cell towers, as more are built to support the extension of access and as internet use intensifies.

## The cost of internet access

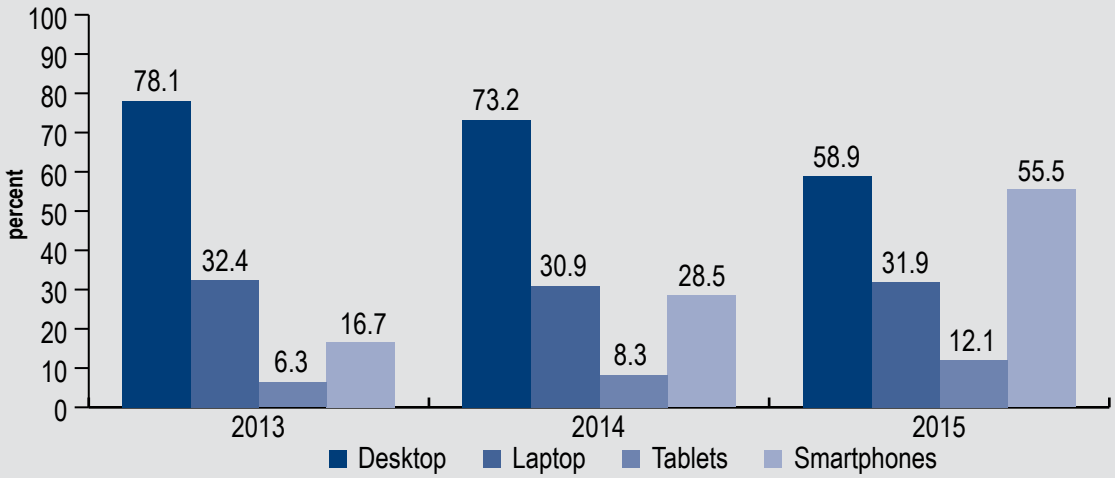
The high cost of internet access is another barrier to developing a digital economy. Average monthly fixed broadband prices are three times as high in developing countries as in developed countries, and mobile broadband prices are twice as expensive.[67]

As noted, 45 percent of Colombians consider the cost of access a main reason for not using the internet. internet service in Colombia is expensive compared to other OECD countries, including Mexico and Chile. For instance, in Colombia the monthly cost for a plan of 15 Mbps download speed with 33 gigabyte capacity is $173.60; comparable plans are $57.50 in Chile and $56.40 in Mexico.

## The cost of devices to access the internet

The cost of computers, tablets, and smartphones is another barrier to internet access. As shown in Figure 22, the use of smartphones as the main way to access internet has increased dramatically in the past two years. The increase in mobile devices to access the internet is explained by 93 percent growth in the use of tablets and

Figure 22: Devices used to access the internet




*Source:* DANE—Basic household ICT Indicators

230 percent growth in smartphones. During this period, the use of desktops to access the internet has declined by 25 percent, and laptop use has remained stagnant.

GSMA and Deloitte (2015)[68] outline that Colombia's total taxes and fees account for 30.4 percent of total revenue from mobile devices and services, made up of a value-added tax (VAT) and specific taxes on phones. In Chile, 15.8 percent of mobile tax revenue comes from import duties. In addition, there is a 5 percent tax on spectrum. At 31.9 percent, Colombia's mobile tax burden is below the 26-country average in the report, above that of Chile (25.1 percent) and Peru (19.7 percent), but below Brazil's tax burden (45.0 percent).

Most, if not all devices used to access the internet are imported. Colombia is a party to the WTO International Technology Agreement I and II and as a result, tariffs on computers, laptops, tablets, and smartphones are zero.

Depending on the cost of the product, however, devices might be subject to a local VAT. Currently, tablets and laptops used by low-income households (strata 1 and 2) to access the internet and for internet service are not subject to VAT.[69] Furthermore, tablets with a maximum value of 1,154,163 COP (around $640 with the average USD-COP rate for 2012) and laptops up to 2,254,644 COP (around $1,250) are exempt from VAT. Smartphones, however, face a 16 percent VAT. These price ranges include almost all tablets as well as the cheapest category of laptops available in Colombia (i.e., Acer, Lenovo, and some from Hewlett-Packard).

Internet services also face differential taxes: The 2012 tax reform introduced a 4 percent VAT (additional to the 16 percent that consumer paid already) for the use of mobile services, especially voice plans.

## Internet exchange points

Internet exchange points (IXPs) have a role to play in expanding internet access, reducing costs of internet access and incentivizing investment in IT infrastructure. For one, IXPs can minimize tromboning—exchanging

local internet service provider (ISP) traffic over international backbones (usually through the U.S.), which increases latency and the cost for local ISPs.[70] IXPs provide opportunities for local ISPs to aggregate local traffic and work with larger networks at lower cost. This also creates an incentive for local ISPs to build out the infrastructure needed to reach IXPs.[71] IXPs can also help countries implement social goals, such as complying with restrictions on access to socially harmful material (i.e., child pornography).

Colombia has only one IXP—NAP Colombia—which has 19 participants and 59 gigabyte capacity—small compared with NAP Brazil's 817 participants and capacity of 1.86 terabytes (PCH, 2016). Latency is also relatively low—estimated at 45 milliseconds (ms) from Bogotá to Miami—but this compares with latency of 3ms for local traffic. This challenge points to room for policy to incentivize more local hosting of content. For instance, 1,514 of 2,500 .com websites are hosted in the U.S. and only 255 in Colombia. There is also high latency from transferring traffic within Latin America such as Brazil (150ms) and Argentina (190ms), underscoring the need to improve interconnectivity within the continent.

Colombia's limited access to national internet exchange points means that internet access is often provided through the United States, which increases costs of internet service.[72] Even though data on costs of IXPs remain unavailable, both entrepreneurs and the OECD (2014) suggest a single IXP increases the costs of internet traffic as it is routed via the United States. This constitutes an additional barrier to digitalization, as firms have to engage in cross-border traffic and face restrictions on movements of data through foreign IXPs. Agreements with IXPs in the region or setting up further IXPs in Colombia should reduce these costs in internet traffic, in particular as demand grows for internet services and content.

## Competition in the telecom market

Ensuring a competitive business environment in Colombia is a cornerstone to building a digital economy. For one thing, competition creates incentives for companies to innovate, develop new online business models, and use the internet and data to improve business efficiency and productivity.[73]

The potentially disruptive nature of online businesses creates a strong incentive for incumbents to use their market power to prevent the emergence of these new businesses. In these cases, effective enforcement of competition law becomes necessary.

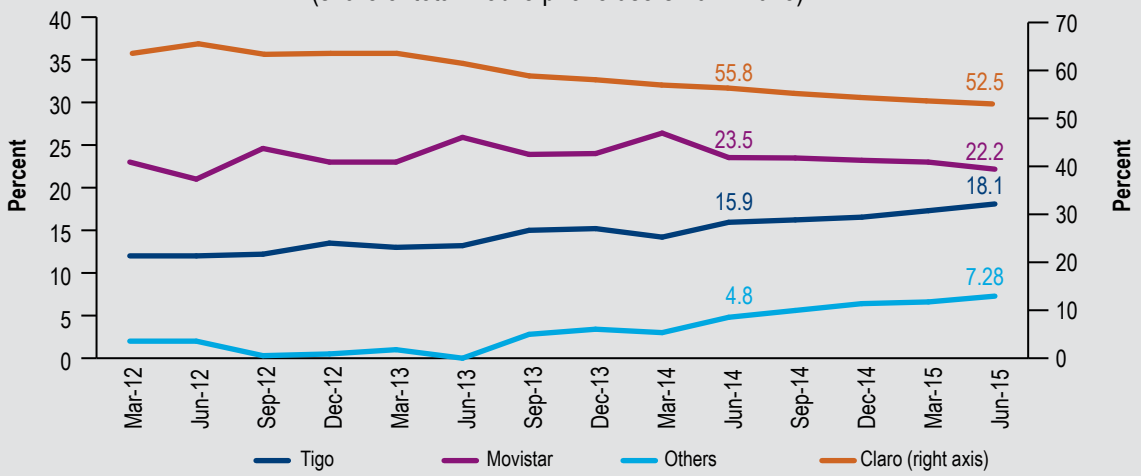
Competition is also specifically necessary in the telecom market to minimize actions of the incumbent provider (often a monopoly) to keep prices high and limit access to other providers. This is particularly problematic from a digital economy perspective where such actions undermine the expansion of internet access at reasonable cost. For instance, in those markets still dominated by monopoly telecom providers, internet prices are higher and access and speed are lower than in comparable markets.[74]

### *Colombia's competition laws*

Law 1340 of 2009 regulates general aspects of competition in Colombia and designates the SIC as the competition regulator. The SIC is in charge of supervising, enforcing, and taking administrative action to address violations of competition law.[75]

Colombia is also a party to various international agreements that require adoption and enforcement of competition laws. The Colombia-U.S. FTA requires both parties to "adopt or maintain national competition laws that proscribe anticompetitive business conduct[76] and to ensure that privately owned monopolies should

Figure 23: Market shares in the mobile telephone and broadband market
(share of total mobile phone users 2012-2015)




not operate in a manner that creates obstacles to trade and investment."[77]

Despite having appropriate laws in place, the SIC's capacity to effectively enforce effective competition into concentrated markets has been limited. For instance, there remains significant market concentration in the financial sector that is dominated by local banks, i.e., Bancolombia and Grupo Aval—and the concentration is increasing over time.[78]

### *Regulating Colombia's telecom market*

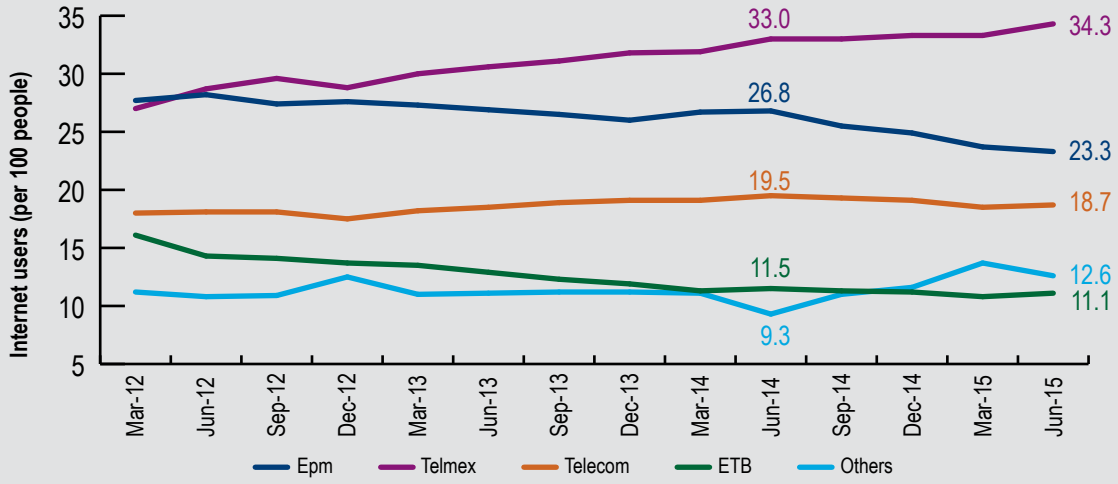
Vigorous competition in the mobile market and data markets is critical to favor the development of digital businesses in Colombia. Competition lowers prices, improves quality, and brings in innovative services.

Law 1341 of 2009 is the current framework of regulation for competition in the telecommunications sector in Colombia. The Comision de Regulacion de Comunicaciones (CRC) is the telecom regulator, responsible for ensuring competition in the telecom market. CRC's promotion of competition has been focused on *ex ante* measures such as bids for new channels or for spectrum by new market providers.

As shown in Figure 23, there are three main players in the mobile market in Colombia: Claro, Movistar, and Tigo. The share of the majority market player Claro has been declining from close to 60 percent of the mobile market in 2012 to over 52 percent today. Despite this positive trend, a recent SIC report found that the risk of concentration remains, although there is no dominant player today. In terms of the mobile internet market, Claro had 41 percent of mobile internet users in 2014, Movistar had 35 percent and Tigo 18 percent (SIC, 2016).[79]

The OECD has found that market concentration in the mobile internet market keeps prices high and reduces internet access. At the same time, the fixed broadband market shows less concentration (Figure 24).

Figure 24: Market shares in the fixed broadband market (2012-2015)




A further challenge is dominant internet providers at a local level. This occurs in certain regions of Colombia, in particular in Chocó, Antioquia, Caquetá, and Arauca.[80]

## Access to digital services

### *Access to the cloud*

There are multiple cloud computing options in Colombia, from Claro to Amazon EC2, Google, salesforce.com, and Microsoft. In 2010, 97 percent of large Colombian businesses were using cloud computing, yet cloud uptake by M-SMEs is a lot smaller. Total income generated by cloud computing represented 8 percent of Colombia's total information technology outsourcing income in 2013.[81]

Data on cloud computing are limited for both Colombia and Latin America.[82] According to the Pyramid Research index, Colombia ranks fourth in the region in terms of readiness for cloud computing, below Argentina, Mexico, and Brazil, and it is ahead of Chile and Peru. According to CEPAL (2013),[83] the best performer in the region is Brazil, where investment on human capital and research on the cloud are the highest and the country has proven to be an attractive market to host cloud services. A recent survey by ANDI (2016),[84] the business association, concluded that cloud computing is one of the most important steps needed to develop Colombia's digital economy.

According to the Colombian Chamber of Electronic Commerce,[85] the lack of cloud uptake is attributed to overregulation in the sector. The Colombian government has initiatives to promote cloud computing and is procuring cloud services using the *Colombia compra eficiente* portal. Yet CCCE found that government agencies are reluctant to allow further development of cloud computing as it is still perceived as unsafe. This hinders cloud activity in both private and public entities that limits the potential advantages of using the cloud for data transfers and the opportunities for e-commerce and financial technology (fintech). These issues are addressed in the

cybersecurity CONPES 3854 of 2016 drafted by the National Planning Department (DNP), where the need to create the skills and capacities in government to procure and use cloud services in a safe manner is addressed. This document outlines the fears in using the cloud and potential leakages of confidential information.

### *Big data*

The increasing amount of data that is available online has provided new opportunities to collect so-called big data. The ability to move data across borders is also allowing for the global combination of data sets. Using data analytics, this can be transformed into business insights that can reduce waste and increase efficiency, government targeting that can improve services and better respond to natural disasters, and medical research that can use large data sets to better understand how drugs work across populations.

The Colombian government is developing big data in various ways. For instance, Ministry of ICT's program *Ruta para la excelencia* the government has been encouraging a process of open data.

According to the DNP, 28 percent of Colombia's national government entities have adopted a big data strategy. The government has produced enough information to store on 14,382 DVDs.

However, there is a shortage of skills, particularly analysts able to develop the algorithms to maximize the opportunities of these new data sets. The government, the private sector, and academia have started carrying out initiatives to promote further research in big data in order to both create technical capacity in the country and identify opportunities for the use of it in all sectors.

## Internet content

That almost 30 percent of Colombians do not use the internet because they do not consider it useful underscores the importance of developing local content that can be relevant for Colombians. As noted, a lack of locally relevant content is another significant barrier to internet use.[86]

The challenge for Colombia is to encourage access to content globally while also creating an environment to support digital content producers. Content relevant for Colombia (and Latin America more broadly) is needed, but opportunities for the best content producers to go global should also be part of any strategy.

The costs of developing content are low, usually requiring a computer and internet access. However, even here there are challenges in terms of skills and giving budding developers the financial ability to devote some time to this endeavor.

It is also the case that while there is value in broadening Colombia's indigenous base of local IT skills, this should not be an absolute constraint on expanding the local content industry. For example, there is now a range of internet platforms such as TaskRabbit where entrepreneurs can pair with software developers in other countries to develop apps. Ensuring that Colombians are aware of these opportunities and getting them to think globally should also be part of any government program aimed at expanding local content.

The government could also use its procurement process to support content development. The government should identify its needs in such areas as health, education, and disaster response and use procurement as a key source of demand for developing apps of

specific need for Colombia. Some progress is being made here through Apps.co, which encourages content development. The government should create further opportunities in these sectors by increasing the availability of government data as a way to create new opportunities for content creators in the sector. The current administration in the United States has taken a similar approach since 2011 with the open data initiative, which also includes volunteer companies from the private sector, and programs such as the Presidential Innovation Fellows where content for health, education, energy, and public safety is encouraged.[87]

## SECTION III: COLOMBIA'S E-COMMERCE ENVIRONMENT

The development of e-commerce is a key part of a digital Colombia strategy. E-commerce includes business-to-business and business-to-consumer e-commerce. Putting products online reduces costs and boosts efficiency and competitiveness. Increasingly, commerce on internet platforms are also channels to engage in international trade.

Colombia's growing middle class, combined with increased internet penetration and lower costs of access, is a market waiting to embrace e-commerce. However, online commerce in Colombia is underdeveloped. This section explores the main supply and demand side barriers and challenges to increasing online transactions.

According to the Colombian Chamber of Electronic Commerce, e-commerce grew at an average annual rate of 35.7 percent between 2011 and 2014 and represented 0.9 percent of Colombia's GDP in 2014. E-commerce in Colombia is still low compared to other countries in the region. For instance, the UNCTAD B2C E-Commerce Index, which ranks levels of e-commerce based on internet use, secure servers, credit card penetration, and postal reliability, ranks Colombia 51st out of 137 countries, below Argentina, Mexico, Chile, and Brazil.[88]

About 76 percent of people between the ages of 18 and 55 who navigated the internet in the past year bought something online. Clothing and electronic products are the goods that Colombians buy online most frequently: Fashion represented 35 percent of product purchases in 2014 and electronics 28 percent. Travel has the highest share in services, representing 30 percent of online sales.

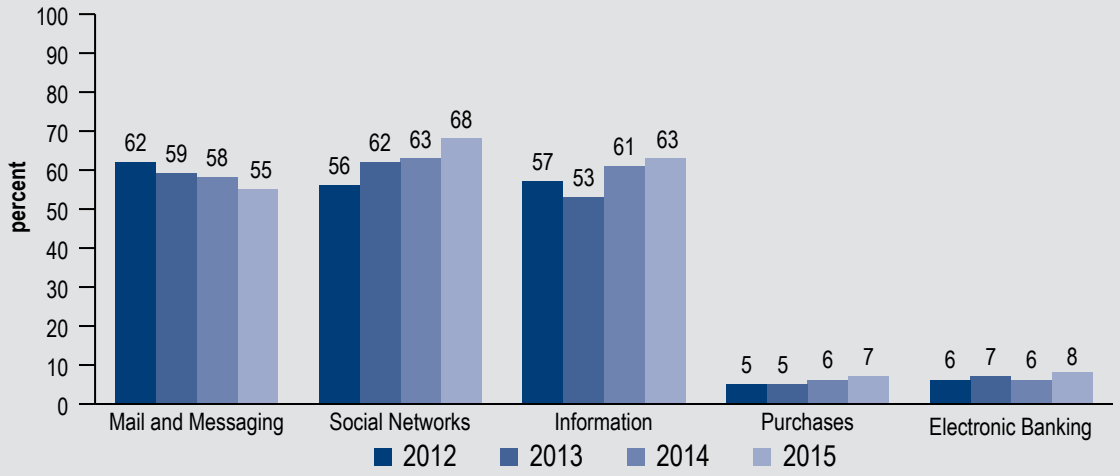
Figure 25 shows the different ways that Colombians are using the internet. The share of email use has declined while Colombians are increasingly using the internet to engage in social networking, access information, make online purchases, and conduct online banking. Much of this behavior underscores the growing potential of the internet for commercial gain. For instance, even though social networking is now the most significant internet use, it is also the case that these networks are increasingly important platforms for educating consumers about brands and keeping in touch with evolving consumer taste. Companies find that they often see sales increase after posting videos of their products on YouTube. Facebook and Instagram have become a key tool for keeping customers informed of new products and services. This is also true for access to information, where a lot of Colombia e-commerce activity involves searching and comparing prices of products online and then making the final purchase in person.

There are various barriers to e-commerce growth in Colombia. An important horizontal challenge outlined above is a lack of competition in some markets. This has allowed incumbent businesses to avoid having to innovate and develop digital strategies such as going online. For example, the largest retailers in the country have not adopted a digital strategy.[89] Instead, the key players in e-commerce in Colombia are SMEs. This contrasts with the U.S., where competition from online retailers forced the world's largest big box retailer, Walmart, to develop an online market.

### Consumer trust

If Colombia is looking to take full advantage of the opportunities of the digital economy, consumer trust is essential to enable online transactions.

Figure 25: Evolution of internet use in Colombia




*Source:* DANE—Basic household ICT Indicators

Consumer trust in online commerce is derived from the entirety of the online experience, in particular factors such as the ease in paying for the product, whether the product received was damaged or differed in quality or appearance to what was advertised online, the speed and cost of delivery, and the effectiveness of any after-sales services.[90] Failure in any one step in the chain can undermine trust in the entire business. The customer experience in online platforms becomes more important than at physical retailing. Other barriers include limited online payment option and poor logistics.[91]

There are also regulatory frameworks that affect trust and are needed to support online commerce and digital trade. The most important of these involves rules governing the formation of contracts online, access to dispute settlement that is timely and cost-effective, and protection of personal data.

The challenges with internet-enabled commerce are even more acute once the transaction is happening with businesses located in another country as the farther away a business is from its customer, the lower the levels of trust. Different consumer protection and contract laws between the country where the business is located and the country where the customer is located also increase the level of uncertainty for the consumer. Legal uncertainly over how to settle disputes over online exchanges is another critical challenge.

## The e-commerce experience

Consumer satisfaction with the e-commerce experience in Colombia is low.[92] For purchases made online in 2014, 41 percent of consumers were unsatisfied with the product they received. The share of unsatisfied customers in Colombia is slightly lower than in Mexico (45 percent) and compares poorly to 18 percent of unsatisfied consumers in the United States, 17 percent in the U.K., and 11 percent in Spain.[93]

The main difficulties reported by Colombian customers when buying online include products different than expected (34 percent), delays in deliveries (29 per-

cent), problems with clothes sizes (28 percent), difficulties returning the good (19 percent), problems with the online platform (18 percent), a damaged product (16 percent), and not receiving the product at all (13 percent).

In Colombia, fear of fraud also makes consumers skeptical about e-commerce: 59 percent of consumers are worried about credit card fraud when purchasing online. This compares negatively to Peru (42 percent), Mexico (37 percent), and the U.S. (10 percent).

Because of mistrust, e-commerce websites are usually subject to the ROPO effect (research online, purchase offline), where consumers are most likely to use websites to compare product prices before purchasing the product at a store. In fact, about 24 percent of people who go online in Colombia have never made an online purchase.

Furthermore, the processing of returns and reimbursements has proven complicated: It usually takes 30 business days for consumers to be reimbursed for their purchases, and return processes are uncertain. The process faces obvious complications and higher transaction costs when reimbursements happen in cash, since both companies and users have to go to local post offices and complete paperwork that could be more easily done online.

Online customers valued the acceptance of different forms of payments (51 percent) and the ease of returns (49 percent). Online purchases were paid mainly using credit cards (57 percent) and direct debit from a bank account (40 percent). Other forms of payment, such as cash on delivery, accounted for 1 percent of value of online transactions.[94]

## Logistics

Transportation costs in Colombia are high, and delivery services are not standardized. These difficulties sometimes cause delays in delivery times for online purchases. Furthermore, the absence of alternative methods of delivery such as lockers and postal boxes is also problematic for the sector.[95]

According to the World Bank Logistic Performance Index 2016, which aggregated indictors on infrastructure, customs, tracking, timeliness, and international shipment, Colombia ranked 97th out of 163 countries, well below Peru (72nd), Argentina (69th), Brazil (58th), and Mexico (57th). Colombia performed poorly across all metrics, and was particularly bad in terms of customs and international shipments.

## SECTION IV: THE REGULATORY ENVIRONMENT FOR A DIGITAL COLOMBIA

Colombia needs to update its regulation for e-commerce to create an enabling environment that can address the concerns outlined above and increase trust and security in digital interactions. The current regulatory framework is contained in two decrees. Decree 346 of 1982 regulates consumer protection and provides the framework through which retailers should relate to consumers, and defines the SIC as the supervisor of consumer welfare. Decree 1447 of 2000 regulates electronic signature and validates its use for private contracts. The decree gives an e-signature the same validity as a handwritten signature, as long as it is verifiable that the signature belongs to the individual who authorizes its use. These regulations are outdated, as they do not account for e-commerce services and online purchases. Both decrees address issues of non-ICT intermediated commerce and do not address use of personal data, the use of e-payments, or the attention to online consumers. Nor do they address contract formation online.

### Privacy of online personal information

The protection of personal data online is needed to ensure that consumers trust to engage in online commerce as commerce, advertising, and services that are tailored to the specific needs of online consumers increasingly rely on the collection or processing of personal data.

Much of the data provided online in an e-commerce transaction are personal or can be combined and processed to create individual profiles. These data are also increasingly valuable, and in some cases the value from the collection of the data is the basis on which "free" services such as email and social networking are provided. The global nature of the internet also means that the data can be quickly and easily transferred to third parties in other jurisdictions. This has raised new challenges for how personal data are used, disclosed, monetized, and protected. It has also brought to the fore the need to find a way to achieve privacy protection while avoiding increasing barriers to cross-border data flows, which can undermine the internet's economic and trade potential.

Currently, privacy protection is achieved at the country or regional level. Regulation of privacy was addressed (to some extent) at the OECD under the 1980 OECD Guidelines on the Protection of Privacy and Transborder Flows of Personal Data—reflecting an OECD consensus on how member countries should handle and protect personal data.[96]

That a lack of data privacy in one country can negatively affect another country's data privacy goals was recognized by the 1980 OECD guidelines, which allowed countries to restrict cross-border data flows to another country where this would circumvent its domestic privacy legislation. The underlying rational for restricting cross-border data flows remains the same, but the challenges have grown. When the OECD guidelines were agreed, data flows remained limited and were discrete, time-specific transfers between identifiable entities; today, in an era of e-commerce, data can be transferred rapidly and in real time to multiple entities in various countries. At the same time, the capacity of the internet to interconnect people and economies has made the free flow of data across borders increasingly valuable and a basis for growing international trade. As a result, domestic decisions about privacy protection and restrictions on cross-border flows have increasingly global and economically significant implications. The 2013 update to the OECD guidelines specifically recognizes the impact of cross-border data flows on

privacy as well as their economic and social benefits and calls on OECD member states to "support the development of international arrangements that promote interoperability among privacy frameworks that give practical effect to these guidelines."[97]

The EU has adopted the most comprehensive privacy laws, and their impact on digital trade is discussed below. The EU approach also highlights the challenges and limits of a regional approach to data privacy in a world of a global internet and cross-border data flows, as domestic efforts to achieve privacy goals can be circumvented when data are sent to other jurisdictions with lower levels of privacy protection.

The EU response is to make it illegal to transfer personal data outside the EU unless the importing country provides an adequate protection of privacy. In the absence of such protection, the EU allows data to be transferred internationally using contracts that effectively bind the recipient of personal data to providing privacy protection equivalent to what would be the case if the data had remained in the EU.

Such a requirement is not globally optimal for a number of reasons. The EU conception of privacy as a fundamental human right reflects its own history and cultural trajectory, which other countries might not share. Even where other countries consider privacy a human right, the EU privacy laws can still be balanced against other values, such as freedom of speech, in ways that lead to different levels of privacy protection than in the EU. Additionally, and as discussed, protecting privacy can have economic costs on how to achieve privacy protection, and economic development goals are likely to be approached differently by each country.

The following outlines the key approaches to data privacy in the EU, the U.S., and APEC, the Asia-Pacific Economic Cooperation. Colombia appears to have adopted a privacy regime based on the EU approach. However, it is important to analyze the differences and understand the implications for a digital Colombia.

## The EU Data Privacy Directive

The EU Data Protection Directive, adopted in 1995, governs personal data protection in the EU. Implementation is left to EU member states. In practice, member states vary widely in their enforcement. In March 2016, the EU adopted a new Data Privacy Regulation that will come into effect in April 2018.[98] Under EU law a regulation is directly applicable in member states, i.e., it does not require separate implementing legislation. One implication of the Data Privacy Regulation will be much more consistent enforcement of data privacy in the EU than is currently the case as well as much higher fines for breach.

The Data Protection Directive defines personal data as "any information relating to an identified or identifiable natural person," and defines an identifiable person as "one who can be identified, directly or indirectly, in particular by reference to an identification number or to one or more specific factors specific to his physical, physiological, mental, economic, cultural or social identity."[99]

The structure of the directive distinguishes between processor and controller. This is a structure now followed in most other privacy laws, including in the APEC privacy framework.

The EU directive defines a controller as ". . . the natural or legal person, public authority, agency or any other body which alone or jointly with others determines the purposes and means of the processing of personal data." It defines a processor as ". . . a natural or legal

person, public authority, agency or any other body which processes personal data on behalf of the controller."[100] An entity is a controller based on whether it determines the purpose and means of processing the data. An entity that processes data under instructions from the controller is likely to be a processor.

Under the directive, the obligations are on the controller to ensure that the principles relating to data quality are complied with and that the processing of data is lawful.[101] The controller is responsible and liable for processed data.[102] The rights of data subjects to information, access, rectification, and blocking of personal data are also obligations on the controller.[103] Only the controller is liable for breaches.[104] The Data Privacy Regulation extends obligations to the processor. It also raises fines for a breach to up to 4 percent of global revenue.

The key privacy principles for the protection of personal data in the EU are based on the OECD's guidelines and similar to those found in Colombia and other countries. The main ones are that personal information is processed fairly and lawfully; collected for specific, explicit, and legitimate purpose; and not further processed in a way incompatible with those purposes. Personal information should also be adequate, relevant, and not excessive in relation to the purposes for which it is collected; accurate and, where necessary, kept up to date; and kept in a form that permits identification of data subject for no longer than is necessary for the purpose for which the data were collected.

### *Processing personal data*

The condition under which personal data can be collected and processed has a direct impact on the capacity for business to use such information in innovative ways.

Under the EU directive, personal data can be collected and processed only where there has been prior consent that has been specific and informed. Under the regulation, this consent requirement is tightened and requires that consent be freely given, specific, informed, and an unambiguous indication of the individual's wishes, either by a statement or a clear affirmative action. This means that consent to processing personal data given in a document that includes other matters (e.g., website terms and conditions) must be clearly distinguishable from the consent to other matters.

### *International transfers of personal data*

The globalization of the internet and the ability to move personal data globally has required the EU directive to have an explicitly extraterritorial application. The directive applies to controllers located in the EU as well as outside the EU. The regulation extends this extraterritorial application to include controllers and processors located outside the EU and collecting personal data from people located in the EU.

From the perspective of the conditions under which personal data can cross borders, this is where the EU Data Privacy Directive (and Regulation) departs in significant ways from the U.S. approach and the APEC cross-border privacy rules.

Under the EU directive, data can be transferred outside the EU under various conditions. The main one is where the European Commission has found that the third country receiving the personal data provides an adequate level of protection.[105] This has been interpreted to mean that the third country provides essentially an equivalent level of privacy protection.[106]

In the absence of an adequacy decision, data can be transferred to a third country under so-called

derogations, the main ones being consent of the data subject, when the transfer is necessary for the performance of a contract between the data subject and the controller, or when it is necessary on important public interest grounds.[107] The directive also allows for a cross-border transfer pursuant to a contract between the controller and the processor that guarantees the same protection of the personal data as under the directive. A global conglomerate can transfer data among its units where it has implemented binding corporate rules (BCRs) that also ensure data protection consistent with the DPD.

There are however, real limits to BCRs and model contacts as a means for transferring personal data outside of the EU. For one, BCRs and contracts require an EU presence (this is made explicit for BCRs in the EU regulation).[108] This means that an SME that is a controller and is located outside the EU is unable to rely on BCRs or contracts to transfer data globally.

Contracts have also been unwieldy for multinational companies as they must be designed to deal with all possible data transfers and therefore are unable to respond to issues that might arise without being amended.

BCRs are relevant only for large companies moving data internally and therefore are usually not suitable for SMEs. BCRs are also costly and timely to negotiate, as they require a company to negotiate with a designated lead data protection authority regulator in the EU who then has to obtain agreement from other EU data protection authorities where the company operates. This has created delays that reduce the utility of BCRs.

### *Privacy in the U.S.*

The U.S. protection of privacy relies on around 20 sector-specific privacy laws in areas such as health and finance and more broadly on compliance by companies with their privacy policies, enforced by the Federal Trade Commission. There are also state-based privacy regimes.

Consent to collect and process personal information is required in most cases, but unless the information is sensitive (health, credit report, student data, minors), consent is deemed and opt-out rules apply.

The U.S. places no restriction on the international transfer of personal data. Instead, the U.S. relies on the principle of accountability—businesses are accountable for their failure to protect privacy including where personal data are transferred overseas. This requires businesses that collect the personal data to ensure that the personal data remain confidential and are processed according to what is agreed on in that company's privacy policy.

### *APEC cross-border privacy principles*

The economic forum Asia-Pacific Economic Cooperation (APEC) comprises 21 economies including the U.S., China, Japan, Chile, Peru, Australia, Vietnam, and South Korea. APEC has developed a system for transferring personal data among APEC economies. The system comprises an APEC privacy framework that is a set of voluntary principles for collection, processing, and transfer of personal data—similar to those in the EU, the U.S., and elsewhere. There is also an APEC Cross-border Privacy Enforcement Arrangement to facilitate cooperation in enforcement, sharing information regarding movement of personal data. In 2013, APEC finalized the APEC Cross-border Privacy Rules System (CBPR). For countries that join the CBPR system, it provides a means for businesses to certify they comply with the privacy principles, for independent evaluation of business certification that gives trust in transfers of

private data among entities participating in this system. Like the U.S. approach to international transfers of personal data, businesses certified under the CBPR system can transfer personal data to another certified business but remain accountable for the protection of those data. CBPR certification provides assurance that businesses are protecting data according the APEC privacy principles. So far, the U.S., Canada, Japan, and Mexico have joined APEC's CBPR system.

### *Argentina's Privacy Laws*

Argentina and Uruguay have received an adequacy finding from the EU.

Argentina's privacy laws are laid down in the constitution, the Personal Data Protection Act No. 25.326 and the regulation approved by Decree No. 1558/2001.

Argentina's constitution makes the protection of personal data a fundamental right. It provides for an expeditious remedy—habeas data—that gives any person the right to know the content and purposes of his or her personal data that are contained in public and private records. Where the information is false, there is a right to have the information deleted or corrected.

The Personal Data Protection Act widens the constitutional protection to include general data protection principles, rights of the data subject, and obligations of data controllers and data users. The regulation lays down rules implementing the data act. Argentina also has sectoral data privacy protection in laws regulating credit card transactions, banking, and health.

The National Directorate for the Protection of Personal Data is responsible for ensuring compliance with the Personal Data Protection Act. Civil and criminal penalties are possible in the event of a breach of the act.

Personal data can be transferred out of Argentina only to an entity or jurisdiction that provides privacy protection equivalent to what occurs in Argentina.

### *Mexico*

Mexico has not received (or sought) an adequacy finding from the EU but is a member of the APEC Cross-border Privacy Rules System The integration of Mexico into U.S. production networks has been a factor requiring the ability to transfer data seamlessly across borders.

Mexico's data protection law, *Ley Federal de Protección de Datos Personales en Posesión de los Particulares* (the Federal Law on the Protection of Personal Data held by Private Parties), entered into force in 2010. Regulations for the implementation of this law (Regulations to the Federal Law on the Protection of Personal Data held by Private Parties) were passed in 2011. There are also Private Notice Guidelines 2013 and Parameters for Self-Regulation regarding personal data (2014).

Mexico's privacy laws cover all personal data processed in Mexico, personal data processed outside of Mexico on behalf of a Mexican data controller, and a controller outside of Mexico using means located in Mexico to process the data. To process data requires provision of a privacy notice prior to processing. Provision of personal data to the processes is implied consent to the processing. More explicit and affirmative consent is required for the processing of financial data and sensitive personal data such as data pertaining to race or ethnicity.

Transfers of personal data to data processors do not require consent, but such processing must not be used for purposes other than as instructed by the data

controller and must be confidential. Personal data can be transferred outside of Mexico, but this must be made known in the privacy notice. International transfers also do not require consent when provided to a subsidiary, holding company, or affiliate under the common control of the data controller or where the company in the group provides the same level of privacy protection.

### *Colombia*

In Colombia, personal information, including health data and any information regarding youth, is protected under the habeas data law. Cross-border data flows are also regulated by the same framework: The country of destination must comply with Colombian regulations in order to allow cross-border data flows, unless there is a trade agreement that specifies the opposite. Intimate data and content related to children is considered private, and additional restrictions on such issues are being discussed. Personal data are protected in Colombia under Article 15 of the Colombian Constitution; Law 1266/08, which regulates the collection and transfer of personal data; Law 1581 of 2012, which contains comprehensive personal data protection regulations; and Decree 1377 of 2013, which regulates data protection by governmental entities and bodies with privacy implications.

The Superintendency of Industry and Trade regulates data protection unless there is financial data, in which case the Finance Superintendency of Colombia has authority.

Collection of personal data requires data controllers to publish a privacy policy and to comply with the policies and standards for processing the data. Consent to processing personal data requires prior, express, and informed consent (with some exceptions). Moreover, the consent cannot be for a broad range of processing but must be limited to the purposes for processing.

Cross-border transfers of personal data are prohibited unless the third country has the same data protection standards as Colombia. What constitutes adequacy is still to be determined by the SIC. Data can be transferred across borders where there is consent. Consent is not required where a data transmission agreement exists between the data controller and the processor.

Since November 2015 the SIC has issued a mandate (expiring November 8, 2016) asking data operators (registered in the local chambers of commerce) and government organizations to register their databases.[109]

Despite this, policies demanding data localization in Colombia have been qualified as “mild” along with the policies of Brazil, Argentina, and Peru. Chilean and Mexican policies, in contrast, do not require data localization.[110]

### *Key privacy issues*

The capacity for business to collect, process, and transfer personal data out of Colombia will affect the capacity of businesses in Colombia to innovate and maximize the opportunities of the global internet. Colombia’s privacy laws present a number of costs for businesses in this regard.

Consent is a cornerstone of any privacy regime; however, there are meaningful differences in how consent is collected. Requiring express consent appears based on the EU approach to privacy but is a burden on companies to establish. This compares with the approach taken in the U.S. and Mexico, for instance, which require provision of a privacy policy prior to collecting

the personal data, after which use of the online service is deemed consent to the privacy policy. In Colombia, with higher levels of illiteracy, it is also unclear how meaningful consent (even express consent) is.

International transfers of data: The Colombian approach here is also based on the EU approach to privacy, requiring third countries to have the same level of privacy protection as Colombia. Determining whether the protection afforded by another country is the same as Colombia is complex and resource-intensive. Moreover, SIC has yet to articulate how it would make such a determination and what standards it would apply. The limits to such an approach are evident in the EU, where only a few countries (Andorra, Argentina, Canada, Israel, New Zealand, Uruguay) have received adequacy findings. The capacity to transfer personal data in and out of Colombia with relative ease is particularly important given that data centers are not located in Colombia. Whether for cloud computing, search, or more specific business applications, the capacity to do business in Colombia that requires collecting personal data will store and likely process this personal data in another jurisdiction. This will be true for both domestic and international business in Colombia. Costs imposed on the movement of such data will reduce the attractiveness of such business opportunities in Colombia.

Database registry: This also has the potential to raises costs for businesses that are collecting personal data into databases—an inevitable consequence from using the internet to collect personal data. There do not appear to be other privacy regimes that require the provision of such information. This creates three challenges that do not take into account the ways businesses create and use databases: (1) changes in databases, (2) possession of databases may change fast due to security purposes and (3) data is shared and is not held in the form of a single database which increases the costs of location. The net result is that the rule creates large compliance costs for companies, a further disincentive to collecting and using data in Colombia.

## Intellectual property and digital trade

The digitization of Colombia's economy will require a balanced set of intellectual property (IP) laws. Copyright protection with effective enforcement is needed to protect the creation of new content such as apps, movies, and games. Access to big data analytics can spur innovation in products as well as in business processes, which will require a cost-effective system for registering patents and protecting commercially valuable business information. The broader question of how intellectual property can develop innovation systems in Colombia is beyond the scope of this paper and has been addressed in previous research.[111]

Furthermore, the impact of the internet and cross-border data flows on trade will increasingly rely on effective IP rights in the importing country. For instance, online trade in content such as software, designs, and video is often a trade in a license to use the content, which will require domestic IP laws that can protect such licenses. Businesses using internet platforms to sell their products need to be able to protect their brand name and domain name using trademark law and effective mechanisms for resolving disputes over domain name.

At the same time, maximizing the opportunities of the internet will require access to online information and services. In this regard, IP rights that are too strong and fail to provide room for legitimate access to and use of information can stifle innovation—particularly the type of information and data innovation that will happen online. As the OECD has noted, IP policy "can

discourage innovation if pursued too strongly or too weakly." For example, "in an era of routine copying of text, data and images, copyright law may hinder the emergence of new kinds of internet-based firms. It may also make scientists and other researchers reluctant to use text- and data-mining techniques".[112] Finding the right balance between IP protection that encourages innovation and maintaining competition and the diffusion of ideas over the internet is important.

Initial research shows that when a country adopts balanced copyright rules and other limitations such as fair use, companies in these countries generate higher revenue, create more jobs, and spend more on R&D, when compared to countries with more closed lists of copyright exception.[113, 114]

The U.S. has managed this balance with appropriate exceptions for copyright infringement. Colombia's FTA with the U.S. allows for copyright law exceptions when it comes to circumventing technological protection measures, but these are limited in scope to acts such as access by nonprofit libraries for the sole purpose of making acquisition decisions.[115]

In contrast, the Trans-Pacific Partnership expands on the importance of balance and requires parties to "achieve an appropriate balance in its copyright and related rights systems," through limitations and exceptions including those for the digital environmental for purposes such as "criticism; comment; news reporting; teaching, scholarship, research, and other similar purposes."[116] This is a step beyond the Colombia-U.S. FTA and explicitly recognizes the importance of a balanced IP system to encourage innovation and use in the digital economy.

Colombia has comprehensive IP laws that are based on the WTO's Agreement on Trade-Related Aspects of Intellectual Property Rights, the Andean FTA, and its FTAs with the U.S. and the EU. Colombia is also a member of the so-called internet treaties—World Intellectual Property Organization Copyright Treaty and the World Intellectual Property Organization's Performances and Phonograms Treaty.

### *Intermediary liability*

The issue of intermediary liability—whether internet service providers should be liable for hosting or transferring content posted by users—is another key regulatory pillar. Lawmakers in the U.S., for example, made a series of deliberate regulatory choices that led to the rise of the modern internet. The Communications Decency Act of 1996 exempted intermediaries (e.g., Prodigy, eBay, YouTube, Facebook, Twitter) for the speech of their users. The Digital Millennium Copyright Act of 1998 created a separate safe harbor for intermediaries when they are made aware of copyright-infringing content posted by their users and they take it down.

The U.S. has now included appropriate protections on intermediary liability in the intellectual property context—modeled on existing national safe harbors—as part of several bilateral free trade agreements, including the Colombia-U.S. FTA and the TPP.[117] There are also intermediary liability provision in the EU-Colombia and Peru FTA that are similar to those in Colombia's FTA with the U.S., but which provide more flexibility in terms of implementation.

Colombia's FTA with the U.S. requires it to implement laws providing for intermediary liability. Colombia has agreed to establish legal incentives for service providers to cooperate with copyright owners in deterring the unauthorized storage and transmission of copyrighted materials.[118]

**Intermediary liability in Chile**

The Chile-U.S. FTA includes intermediary liability obligations similar to the Colombia-U.S. FTA. Chile implemented this obligation using a notice and take-down scheme that requires right holders to notify internet service providers of potentially infringing content. The ISP is deemed to have notice of hosting offending content and is required to act pursuant to a court order.

*Source:* Law No. 20.435

As noted, Colombia has failed to implement an intermediary liability law to date. There was an unsuccessful attempt in 2011 to implement an ISP liability bill known as *Ley Lleras*, which included a range of provisions that went beyond the FTA, such as allowing ISPs to deactivate users' internet access for alleged copyright infringement. The provisions were ultimately rejected by the Colombian Congress.

## Colombia's broader business environment

The business environment in Colombia has evolved positively in the past decade but shows mixed results, according to the World Bank's ease of doing business index. On the one hand, the report shows progress in modernizing tax collection and enforcing contracts. On the other hand, the business sector needs to be encouraged to become more digitalized. In the 2016 Doing Business index, Colombia lost two positions in particular due to a deterioration in the indicators for starting a business, access to electricity, protection of minority investors, registering property, and resolving insolvency. These figures offset the results obtained in tax collection and trading across borders. In terms of the internet, the most important concern would be access to electricity as the lack of it creates a strong barrier to digitalization.

The National Association of Industrialists surveyed the level of digitalization of Colombia's manufacturing and the willingness to improve it in the near future. According to the survey, leaders of 56.3 percent of the companies in the sample were not familiar with the so-called fourth industrial revolution but 78.5 percent consider the use of technology as important in the company's processes. Nevertheless, only 25.4 percent are implementing digital strategies in order to be 100 percent digital within five to10 years. The main concern regarding the use of digital technologies by these companies was the responsible use of ICT, followed by competition and data protection laws.

Furthermore, in Telefonica's most recent Index on Digital Life, Colombia scores second in the Latin America ranking (Chile was first), leading on digital openness (internet freedom and digital public services) and digital trust (digital adoption and cybersecurity). Regarding digital entrepreneurship and finance, the country is in second place. However, innovation is still an area for improvement, and the adoptions of ICT technologies by companies as well as software expenditure are low. These factors are all measured relative to GDP on a purchasing power parity basis.[119]

## SECTION V: ACCESS TO FINANCE

This section will discuss the role of the financial sector in two crucial areas for the digital economy: access to financial products and online payments, and access to financing and venture capital for tech companies and IT startups.

### Access to financial products and online payments

Access to international payments mechanisms underpin all forms of digital commerce and trade. For instance, payments allow consumers to purchase goods and services from online retailers and for companies to purchase from suppliers.

To complete an online transaction requires international payment options. One way is to use a credit card. Another is to use intermediary payment systems such as PayPal or Verisign that facilitate payments among non-merchants that cannot accept conventional credit card payments.[120]

Credit cards and e-wallet services such as PayPal, Apple Pay, and Verisign offer convenient, cost-effective ways of paying for online transactions. Other innovative payment mechanisms are also being developed, such as Square, which facilitates electronic payment via mobiles for M-SMEs. Safricom uses tools such as M-Pesa that allows mobile phone users in Africa to make payments. Unlike bank transfers or cash, consumers and businesses achieve more efficient deliveries, less leakage, and greater security due the ability to stop payment in case of fraud or non-receipt of the goods or services. For vendors, the ability to receive payment almost immediately can expedite the delivery process and help manage cash flows. Safe and reliable digital payment mechanisms are also important for building trust in using the internet for international trade.

There are, however, limits on the ability of consumers to use international payments mechanisms.[121] For instance, access to a bank account and credit card are generally minimal requirements, but in many developing countries such access is limited (Mann et al. 2000, 63). According to the World Bank, up to 2.5 billion people do not have access to banks or credit cards.[122]

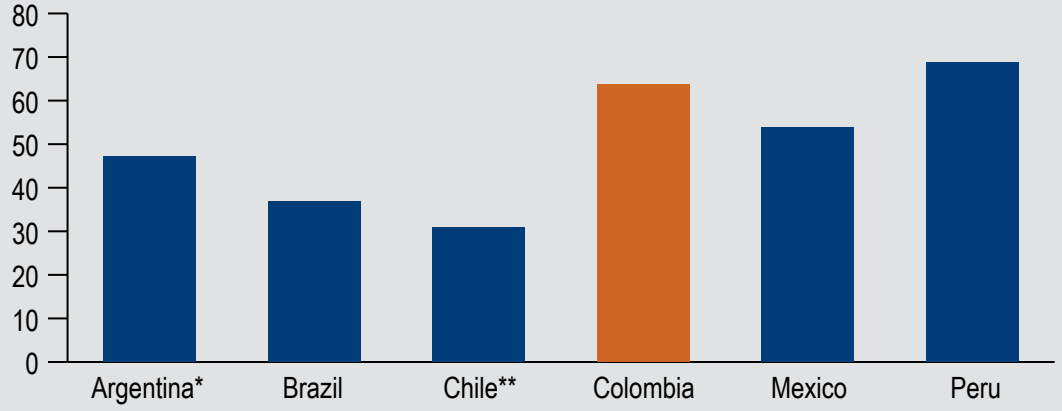
An underlying challenge for Colombia in expanding access to finance is the size of its informal economy—those people and businesses that are not regulated or protected by the state. This includes the self-employed in businesses that are not registered and firms that avoid paying taxes or registering their workers.[123] Informality leads to a preference for cash in purchases, even in e-commerce, to avoid taxes and other fees.

As shown in Figure 26, although labor informality in Colombia is reducing,[124] it is well above Argentina, Chile, and Brazil, where penetration of financial services is higher. Informality is also highest among M-SMEs—it is estimated that only 10 percent of micro-establishments in Colombia have access to financial products.[125] This is a particular problem for Colombia given that M-SMEs account for more than 95 percent of total companies in the country.

Partly as a result of this informality, but also reflecting high levels of poverty, only 38 percent of Colombia's adult population had an account at a financial institution in 2014, up slightly from 30 percent in 2011 (Figure 27). Still, this compares poorly with other countries in the region. For example, financial inclusion is over 68 percent in Brazil and 63 percent in Chile. Only Peru, at 29 percent, has lower levels of inclusion.

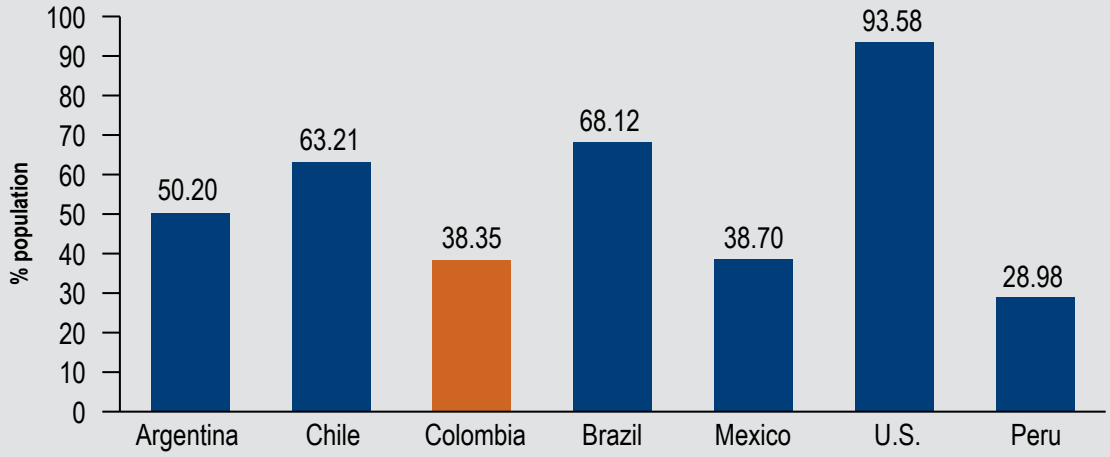
Moreover, Figure 28 shows that in Colombia only 30 percent of adults have access to a debit card and 14

Figure 26: Informal labor as a share of the nonagricultural labor force (2013)




* Data for Argentina correspond to the annual figure for 2011.
** Data for Chile were reported by the country's labor statistics office.
*Source:* DANE—World Bank, World Development Indicators, and International Labor Organization

Figure 27: Account at a financial institution (percent of population of age 15+)

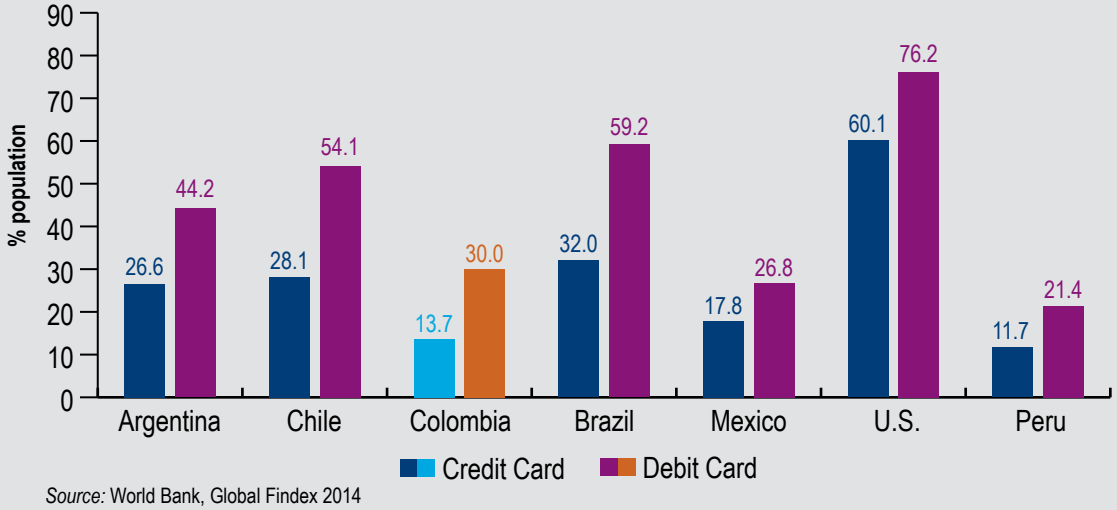



*Source:* World Bank, Global Findex (2014)

percent have access to a credit card. This compares to over 54 percent in Chile and 59 percent in Brazil.

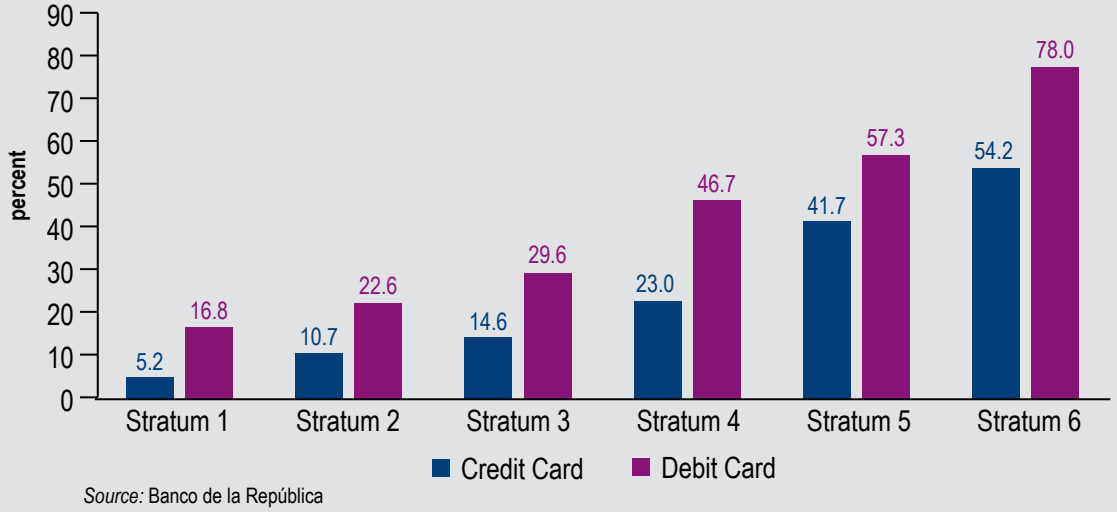
However, these financial inclusion challenges vary significantly by income. For example, credit and debit card penetration at higher income levels are similar to those of the United States (Figure 29). The share drops at lower income levels: the poorest three strata,[126] accounting for the largest proportion of total population, show the lowest penetration levels.

Figure 28: Credit and debit card penetration (percent of population of age 15+)




*Source:* World Bank, Global Findex 2014

Figure 29: Use of credit and debit cards by income level (socio-economic strata), 2015

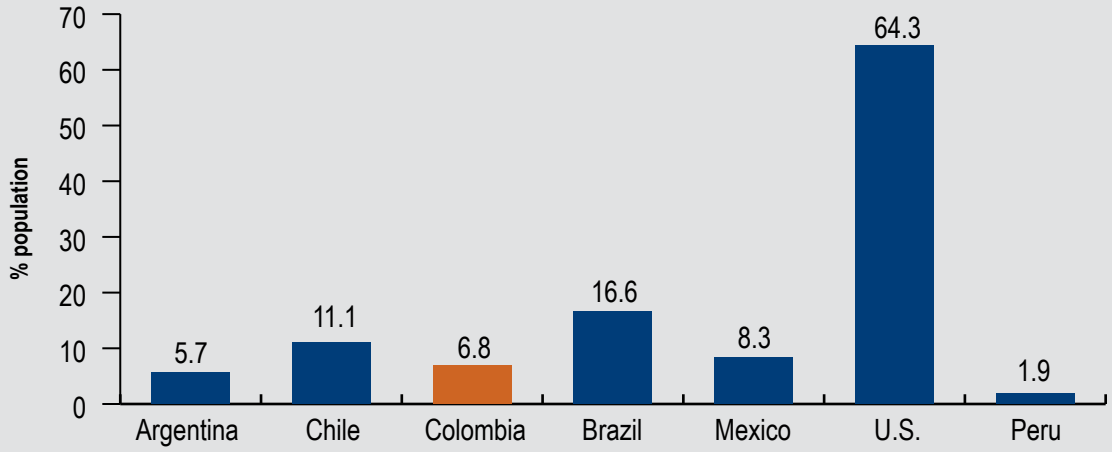



*Source:* Banco de la República

Limited access to financial services and payment options helps explain why only 6.8 percent of Colombia's adult population uses electronic payments for e-commerce and online payments (Figure 30). Despite consistent increases in card penetration, the use of cash has also increased (by 5.5 percent in 2015).[127]

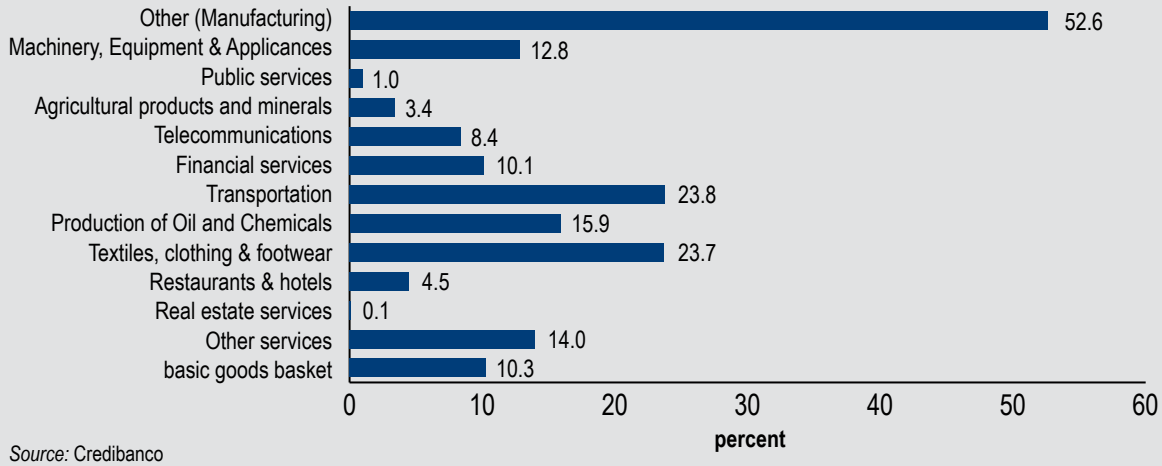
Figure 31 shows use of all forms of electronic payments using credit and debit cards across sectors. The leading segments are other manufacturing goods (53 percent), transport (24 percent), clothing and footwear (24 percent).[128] This result is consistent with previous figures on e-commerce where fashion is a strong

Figure 30: Use of electronic payments (for e-payments) (percent age 15+)




*Source:* World Bank, Global Findex (2014)

Figure 31: Penetration of electronic payments by sector, share of electronic payments in total payments as percent of personal consumer expenditure (2015)




*Source:* Credibanco

category. The share of electronic payments in public services is one of the lowest (1 percent); however, payment of utilities and local taxes account for the highest share in the value of electronic payments through payment processing networks.[129]

Colombia has adopted measures aimed at reducing regulatory burdens on the financial sector with the aim of encouraging the expansion of access to financial services and to engage in online commerce. For example, the Financial Inclusion Law (1735 of 2014) allows for the creation of nonbank deposit entities known as Societies

Specialized in Deposits and Electronic Payments. These SEDPEs are intended to give access to individuals to a savings account, and facilitate safe, quick, and cheap money transfers. The scheme has the potential to help individuals who do not necessarily own credit or debit cards to carry out online purchases. SEDPEs are allowed to have lower capital requirements than credit institutions, and transactions are exempt from the financial transactions tax. Moreover, the law allows mobile phone operators to obtain financial licenses from the financial superintendence to operate as SEDPEs. However, to date no SEDPEs have been created.

There has been some innovation in Colombia as companies seek to respond to consumer needs. For instance, companies such as Efecty, from Servientrega (the largest postal provider) carry out cash transfers and facilitate cash-on-delivery transactions. However, financial innovation remains low—particularly in fintech—in part reflecting the challenges outlined, such as limited financial inclusion and high informality.

Concentration in the financial sector and lack of competition also seem to have stifled innovation. In 2013 the five largest banks in Colombia represented 63.4 percent of total assets (a growing trend since 1997),[130] compared with 47.9 percent of assets in the U.S.[131]

Where electronic payment is not an option, retailers have been forced to develop ways to accept cash for online transaction using cash on delivery and other cash-based platforms such as Western Union or Efecty. For instance, Falabella, a department store that accounts for 5 percent of online sales in Colombia, receives cash on delivery for half of its sales online.

Expanding financial inclusion also faces cultural barriers. The use of credit and debit cards has been perceived as risky due to problems such as fraud and reimbursement delays (also outlined as a challenge for e-commerce) and creates a higher liability for victims of petty theft. Furthermore, according to a survey by the Colombian Central Bank (2015), 95 percent of people prefer using cash for everyday transactions as it is perceived to be easier, faster, and safer than e-payments. Furthermore, fees and charges to money withdrawal and transactions between businesses are an additional barrier.

## Access to venture capital for technology startups

Access to capital has been another crucial limitation for IT companies in the sector. Venture capital remains limited in Colombia, with funding restricted to a few incubators such as Endeavor, or government programs such as Apps.co. This incubator program has allowed the creation of 2,000 successful apps and has helped 65,000 IT entrepreneurs. The goal is to reach 90,000 entrepreneurs by 2018.[132] However, this is insufficient, and startups usually must apply for financing abroad. Limited access to seed capital also constrains the ability of companies (particularly startups) to take good ideas into a testing, development, and operational phase.

Investors and banks are also reluctant to take risks with IT companies. This reflects a lack of financial experience in this sector. In addition, there is not a culture of failure in Colombia, which can make investors reluctant to take risks. Moreover, it means that entrepreneurs that have “failed” can find it difficult to attract financing for a new venture. In contrast, in the U.S., failure in the startup/technology world is often seen as valuable experience. Finally, the lack of many examples of success in the internet sector in Colombia also limit confidence in the sector.

Venture capital investment in Colombia was $665 million in 2014, the fourth highest in the region after Brazil ($4.6 billion), Mexico, and Chile. On average, 15 percent of venture capital in Latin America is dedicated to the IT sector (Colcapital & EY, 2015). In 2014 there were 43 active capital funds, of which four dedicated their investments to venture capital in technology. Most of the capital of these funds comes from pension administrators who typically manage low-risk portfolios, while foreign investors account for 19 percent of total capital investment. Therefore, venture capital still represents a small share of total investment in Colombia—only 3 percent of all capital commitments in the country.

## Regulatory barriers

Regulations that limit the ability to raise capital (including to finance the development of innovative payment solutions) are a barrier to developing a digital Colombia. Some of the regulation was adopted to prevent fraudulent financial schemes (responding to the country's challenges combating drug trafficking and associated money laundering) There are restrictions on the types of institutions that are allowed to operate in financial markets, lend, and use resources from the public. There are also restrictions on liquidity and assets that pose barriers to entry for smaller players in particular that might otherwise access financing through innovative means. For example, peer-to-peer (P2P) lending in Colombia is effectively banned because it is prohibited for a company to collect resources from more than 19 people.

In many countries, fintech startups have helped increase financial inclusion. These types of financial players started to develop during the past decade in the United Kingdom and became particularly relevant in developed countries since the crash of Lehman Brothers in 2008. This has occurred to a lesser extent in Colombia, where fintech companies have flourished, but they are still restricted to credit from friends and family, due to the prohibition on P2P. These companies use online platforms and artificial intelligence to ease financial transactions (PayU) and online loan disbursement with alternative credit scoring analysis (Lineru).

Caps on interest rates limit access to credit for innovative projects. The financial superintendence periodically determines a cap on all interest rates in the economy known as the usury rate. This accounts for half the value of current ordinary credit rates in the country. This regulation automatically excludes the riskiest businesses, particularly those that lack a credit history (Fedesarrollo and USAID, 2012). The usury rate is not a limitation on individuals who are already part of the financial system, but excluding risky borrowers makes it even more challenging for small companies and startups to access capital. This in turn creates a challenge for micro-lenders, even the regulated balance-sheet firms that voluntarily supply the microcredit market.

Another regulatory challenge has been the restrictions from the Banco de la República, Colombia's central bank, on importing products in a foreign currency. The value of the products purchased must be declared at the central bank, thus creating a bureaucratic difficulty to engaging in international e-commerce. These restrictions are barriers to using internet platforms to engaging in digital trade.[133] For instance, this regulation restricted the ability of PayPal to provide online payment options in Colombia, as all operations had to bear the transaction cost of operating through a foreign exchange intermediary.

Protection of customer information is also an obstacle for digital financial services. The habeas data law

determines that private information may be used as long as the individual has provided express consent to use the personal data. In particular, this law considers financial data a semiprivate form of data, where financial entities can access data from credit bureaus only with authorization from individuals to examine their credit history. For potential financial startups in the fintech market, this creates a classic Catch-22 situation as limitations for initial credit scoring since information from credit bureaus remains unavailable until the company has further experience in the market.

## SECTION VI: SKILLS, TRAINING, AND EDUCATION

Currently, only 1 percent of the Colombian workforce is directly employed in the ICT sector. While this can be expected to grow as the economy goes digital, the main source of job growth for Colombia from a digital economy will be driven by the uptake of the internet and data use across its non-IT sectors such as mining, agriculture, and services.

Ensuring that Colombia has the skills to build and take advantage of a digital economy will require policies that put in place a comprehensive approach to building ICT and related skills, including skills upgrading, at schools, universities, and technical colleges.[134]

Investing in training and education is a medium-long-term investment in the Colombian economy. In parallel, Colombia needs to ensure that the right mix of skills exists now. This will require opportunities for retraining as well as incentives to encourage those who can fill skills gaps to come and work in Colombia. This could include preferential tax rates for foreign companies that invest in particular sectors and a skilled visa program directed at professionals in the ICT sector.

As use of the internet and data penetrates and expands across the Colombian economy, the demand for skills will change. Demand for those with IT skills such as in programming and data analytics will increase in areas from health care to manufacturing to agriculture. However, these will not be the only beneficiaries from a digital Colombia. More intensive use of the internet will require a range of skills, including simpler ICT skills such as using spreadsheets and transacting online. Other, less basic, skills will also be required, such as the ability to use social networking sites to brand and interact with customers. In addition, there will be increased need for those with management skills who can utilize IT in the cloud and other online services in the most efficient way. Entrepreneurial skills that can leverage the network effects of two-sided markets to access a global consumer and build new companies are also crucial to digitalization.[135]

At the same time, jobs that involve repetitive work will be most susceptible to being replaced. The ability to increasingly outsource services may also see some jobs go overseas, but Colombia could position itself as a destination for such jobs.

Education and training will be crucial to equip students with the skills that will increasingly be in demand in a digital economy and to retrain those who lose their jobs.

Lack of high-skilled workers has been identified as a significant challenge for Colombia to take advantage of the opportunities of the internet and data.[136] This includes a lack of technical, engineering, and software skills as well as a lack of managerial and entrepreneurial skills. In recognition of this, Plan Vive Digital 2 has outlined the need to bring more IT technicians and human capital to the sector in order to close the current gap in demand for IT services. According to Plan Vive Digital, the gap in IT professionals dropped from 94,431 in 2014 to 53,000 in 2016 and is set to reduce to 35,000 by 2018.

At the same time, improvement is needed in the capacity of Colombia's education system to prepare students for a digital Colombia. Colombia's overall rank in the WEF Networked Readiness Index 2016 is 68th out of 139 countries with a 4.1 score of a possible 7.0. However, in some areas, such as access to skills, Colombia shows room for significant improvement. For instance, it ranks 102nd in terms of quality of education and 117th for the quality of its math and science education.

The Colombian government has already developed programs to address the skills gap. The government program Talento TI (IT Talent) consists of scholarships for students who have been accepted in IT careers and related degrees at both the university and college levels. This program is looking to motivate students to engage in technology-related studies in order to develop high-quality employment in the sector.

Colombia *Computadores para educar* (Computers for Education) aims to bring ICT to schools by equipping all public schools with computers, training teachers to integrate ICT into their courses, and training parents to use ICT. The program is complemented with an ICT certificate for teachers (Digital Teacher Initiative), also included under the ICT appropriation strategy of the Ministry of ICT—with the aim of reaching 25,000 fully certified teachers and counselors by 2017 (DNP, Sinergiapp, 2016).

Expanding internet access in Colombia can also support government efforts to upgrade the country's education system. For instance, access to massive open online courses can be used to reach students in remote areas. Such online courses can also supplement classes taught in advanced education institutions.

The effect of ICT in education has not yet proven completely useful since it has not focused on innovative strategies to improve education in areas beyond computing or in creating the skills that a modern economy demands. The Network Readiness Index report shows that even economies that are more developed and more digitalized than Colombia's have been unable to fully take advantage of the opportunities of the internet and data because education has not responded to global challenges. Moreover, Colombia's programs—*Computadores para educar* and *Escuela nueva* (New Schooling),[137, 138] have so far shown uncertain gains.

Colombia could also experiment with alternative models of education such as *Escuela nueva*, which teaches foundational skills such as cooperation and problem solving in rural schools in Colombia, and in many other countries that have followed.[139] Education policies have focused on creating access to ICT rather than integrating these into teacher training and curriculum guidelines.

The internet can also be part of the solution to Colombia's skills gap. The internet can be used to reach remote communities and provide access to online courses. Plan Vive Digital is looking to encourage IT startups directed at improving education by creating apps, games, or new devices to improve teaching methodologies, boost the capacities of teachers, and help students to perform better. These initiatives are targeted and incubated by Apps.co, according to Plan Vive Digital 2.

Colombia also needs to devote more attention to expanding opportunities for collaboration with the private sector in raising skill levels. Investment in capacity building in the private sector remains limited, as companies carry out innovation processes internally and have little interactions with research institutes and universities.[140] The private sector's share of R&D spending is 25 percent, while in Asia-Pacific countries this share typically exceeds 60 percent. This expenditure is further concentrated in large private firms owned by nationals.[141] Nevertheless, through initiatives such as the Caoba (for big data analytics) and the internet of things labs set up by the Ministry of ICT, the country's top-ranked universities and private sector companies have started to address this issue. Yet, government remains the largest promoter of skill development and ICT training in the country.

Other important policies carried out by the government include programs and scholarships offered for R&D by

Colciencias. The program that is specifically enhancing the IT sector is ScienTI. More than 40 percent of the resources have been directed to improving IT skills for workers in sectors ranging from public health to engineering, agricultural research, and social sciences. This program shows awareness on increasing the set of skills necessary for a digital Colombia.

## SECTION VII: DIGITAL GOVERNANCE

Colombia has made significant progress over the past decades in growing its economy and reducing poverty, but challenges remains if it is to sustain growth rates, increase prosperity, and achieve security. Many of the central challenges, such as reducing income inequality, improving productivity and competitiveness across the economy, and increasing education and skills, will require government leadership.

The internet and data can build the capacity of the Colombian government to govern and address these challenges. It can be used to increase the efficiency of the public sector and its effectiveness, particularly in terms of service delivery.[141] In fact, used optimally, the internet and data can strengthen the ability of the government to address many of its key economic and social goals of peace, equity, and education as reflected in the National Development Plan 2014-2018. This includes deploying enhanced evidence-based decisionmaking to mobilize actors across Colombian society in policy design and delivery, with increased transparency and consultation that draws guidance from citizens and institutions and thereby builds broad support for the government's overall aims.[95] In addition, the internet can be used to increase transparency and improve trust in government, which is necessary if the central government and departments are to be effective.

Colombia has already shown leadership in terms of using the internet and data to strengthen governance. Led by the Ministry of ICT, the E-Government Institutional Framework contains three strategic pillars: regulatory, policy guidelines, and monitoring and evaluation. This includes establishing common guidelines related to the use of ICT across the government, encouraging use of technology to improve governance, and developing an online platform for monitoring and evaluating compliance.

Colombia's e-government policies are reflected in national laws and regulation. They were incorporated into the 2010-2014 National Development Plan and have been taken forward in the National Development Plan (2014-2018), which incorporates various tools for expanding use of the internet and data with a focus on increasing the productivity and technical capacity at a country level. This includes support for developing big data as a tool to improve public policy decisionmaking. For instance, the National Planning Department aims to use big data to analyze the provision of social benefits in the Sisbén program for lower income families, with the aim of harmonizing the data and improving the targeting of social expenditures in social programs so that government subsidies and benefits are provided to those who most need them. The DNP plans to use analysis of Google Trends data to predict macroeconomic behavior.[142]

Plan Vive Digital is another focus of the state's e-government goals regarding expansion of internet access and creating the incentives to develop a digital economy.

The target of Plan Vive Digital 2 is to lead digitalization from the central government as a key stakeholder and driver of economic activity. In this regard, Vive Digital conceives of government as both a user and driver of ICT use more broadly—key roles elaborated on below. Vive Digital includes improving understanding across the public sector of the role of the internet and data through government workshops to 4,000 public servants by 2018, bringing digital administration to 24 government entities and digitizing all 120 national government agencies.

Plan Vive Digital 2 also envisions using the internet to improve government interaction with citizens. In this respect, the government aims to digitize the relationship with citizens via transparency strategies like Urna

de Cristal. This strategy encourages territorial entities, as well as companies and citizens, to interact online with government entities.

While much has already been achieved in terms of maximizing the opportunities of the internet and data, further attention in the following areas would yield results.

## Service design, delivery, and evaluation

The internet provides the opportunity to improve the design and targeting of government services. Using social networking platforms for instance, governments can interact on a timely and regular basis to better understand citizen needs, develop more targeted services, and evaluate outcomes, making even real time adjustments in order to improve outcomes.[143] Progress here means a more efficient and effective public service that will also build broader citizen engagement and trust in their government.

Colombia has made a lot of progress providing government services online.[144] It has a one-stop online portal—*Portal del estado Colombiano*—for information on government services and through which some services are provided. Colombia also has an open data program (*Datos abiertos*) that is making government data available online that the private sector, as well as academics, civil society, and researchers, can capitalize on.

However, challenges remain. For one, most government services are provided at the local level, where internet access, education, and implementation of e-government remain undeveloped. The Colombian government seems to understand this deficit and has developed the Territorial Online Government program in response.

## Expanding democracy and building trust

The internet presents a range of ways for the Colombian government to increase transparency and strengthen its democratic legitimacy. Engaging people through more effective service delivery and outreach will also build trust in government.

For example, platforms such as the *Portal de transparencia económico* (economic transparency portal), which provides information on government spending, support greater government transparency. The Crystal Urn is also a key platform for engaging with citizens.

**Crystal Urn**

*Urna de Cristal* is a key Colombian government initiative to engage citizens and increase government accountability using the internet. The Crystal Urn is a multichannel accountability platform that embraces online and offline forms of outreach—appropriate given that large segments of the population still do not have internet access. The Crystal Urn includes online events and discussions, including with the president.

Using the internet and data analytics to improve the capacity of the government to respond to natural disasters in a timely and effective manner is important in its own right. Done well, it can also build trust and increased engagement with the government. For example, Chile saw that effective use of the internet to respond to natural disasters such as the 2010 earthquake led to increased following of government tweets.

Engaging citizens by using the mobile internet is also a key area to focus on given the increasing use of these devices in Colombia to access the internet. And while the government is taking steps in this regard, this

should be a focus for the government's digital governance strategy.

Challenges still exist at the subnational level across the e–government agenda. As an overarching matter, the central government could work with the departments to map out a coherent vision of how to improve digital governance, including needs that the government could address. This includes getting commitments at the subnational level to the central government's vision for a digital Colombia.

## Supporting internet and data growth and development

The Colombian government's development of digital governance is an opportunity to use government procurement to drive demand for particular content and services that can help the development of a digital Colombia. As discussed, the Ministry of ICT can create the incentives to promote a digital ecosystem, as well as spending public resources on infrastructure for such an ecosystem. The government cannot force private businesses and individuals to digitize, but it can lead by example: providing open government data, digitizing the relationship with citizens, educating the use of digital technologies, and investing in businesses and key areas where the economy has a potential to contribute to a digital Colombia.

This means that where possible, the government should align its procurement with its broader goals for a digital Colombia. In this regard, the key tools for the government are regulation and purchasing power to drive demand and align actors' incentives.[145]

## SECTION VIII: POLICY RECOMMENDATIONS

The following policy recommendations are focused on expanding and deepening digital Colombia:

### Expand internet access and reduce cost

Boosting the number of Colombia businesses and people using the internet has three components to it: increasing penetration via either fixed lines or Wi-Fi networks; reducing the cost of the internet; and lowering the cost of the devices used to access the internet.

- Increase competition. Competition, which remains unfinished business in the telecommunications market, has proven to be a key driver of expanding internet access and reducing costs. This is an economy-wide challenge and requires empowering SIC to enforce competition laws with appropriate penalties for breach and strengthening the technical capacity of SIC to undertake competition analysis and address regulatory overlap between the itself and the CRC. Part of the challenge reflects convergence of telecom markets and other economic sectors as a new range of businesses use the internet to provide services in areas ranging from transportation to retail. These developments point to the need for reform in how Colombia approaches regulation of competition in its economy broadly.
- Consider building additional IXPs in Colombia and working with other IXPs in Latin America to reduce cost and latency of internet use within Latin America.
- Only Joshua P. Meltzer supports the idea of removing or reducing the 16 percent VAT on smart phones in order to reduce the cost of such devices, which are increasingly the main way that Colombians are accessing the internet. Both authors agree that removing the additional 4 percent VAT on mobile services with the aim of reducing the cost of internet services will be important. Any tax reform would of course need to take account of Colombia's broader fiscal situation—an issue that is beyond the scope of this report. Such tax reforms would be particularly effective when coupled with increased competition in the telecommunications market.
- Remove restrictions on phone re-exports (Decree 2025 of 2015). This policy was introduced to reduce phone theft but has had the effect of increasing costs of services associated with smartphones such as repairs, which need to be done in Colombia. Or phones are disposed of in Colombia instead of being exported in order to be recycled.
- Avoid regulation of over-the-top (OTTs) service providers that would undermine competitiveness in the telecommunications markets and more broadly in Colombia. As outlined, Colombia lacks competition in a number of economic sectors. New digital business models, often provided using OTT services, have the potential to disrupt and introduce competition into these sectors. Colombia should avoid regulation that would restrict such outcomes.
- Implement an education campaign to address concerns (often regional) about the health effects of antennas needed to expand Wi-Fi service.
- Increase Colombia's internet speed, which is relatively low. Part of this will involve expanding access to 4G networks—where ANE has already made some progress. It is crucial that 4G access is expanded and broadband is capable of performing the types of enhanced applications required for a digital economy—whether cloud computing, big data analytics, or richer data and graphics.
- Target expansion of internet access to M-SMEs, given their economic importance in Colombia. This could include using the telecommunications

fund known as FONTIC (*Fondo para las tecnologías de información y las comunicaciones*). It should also include a government- and industry-led education campaign that ties internet use with export promotion centered around how M-SMEs can use the internet and data to export and access digital imports to improve their productivity.

## Improve use of digital services

Colombia businesses' use of digital services such as cloud computing remains low. Part of the challenge is a lack of information and understanding as to what the cloud is, how it works, and whether it can be used to improve business and government efficiency.

- Foster government and private sector education on cloud computing.
- Avoid data localization requirements that will unnecessarily raise the cost of cloud computing in Colombia.
- Expand training and skills development related to cloud computing and big data.
- Create incentives for private investment in R+D. These efforts may start to work jointly with current public investment in research; however, this process must be further catalyzed by the private sector. Further steps should be taken in this direction.

## Strengthen Colombia's digital commerce

Much of Colombian consumer dissatisfaction with online commerce reflects a poor e-commerce experience being provided by existing digital businesses. Where this stems from poor business operations, such as delivery of the wrong or damaged goods or delays with returns, there is nothing directly the government can do. More broadly, however, some of the business practices are the product of not enough competition that could drive better business practices.

There is a role for the government in strengthening the enabling environment for digital commerce. It should include the following:

- Improve infrastructure to reduce cost and time of moving goods within Colombia and in getting products sold online to the ports and airports for export.
- Update regulations to ensure protection of consumers for online commerce.
- Clarify the role of electronic signatures in online contract formation.
- As a mechanism for helping consumers, determine which companies and products they can trust, consider expanding use of the eConfianza (eTrust) label developed by the Latin-American Institute of e-Commerce.

## Build an enabling environment for digital engagement by citizens and business

In order to build a broad-based digital Colombia in which people and businesses increasingly interact and transact online will require appropriate privacy protection, a balanced set of IP laws, and an environment that encourages foreign direct investment. Often in all of these regulatory areas there are competing demands that will need to be balanced in order to create an optimal regulatory environment. As analyzed above, for instance, privacy rules require appropriate levels of protection while at the same time not imposing unnecessary restrictions on cross-border data flows. Similar for IP protection, ensuring copyright is protected is needed to encourage the production of digital content without unduly limiting access to online information.

### *Privacy Protection*

The protection of personal data online affects the willingness of consumers and businesses to engage in digital commerce. In this regard, having in place data privacy protection can reinforce and expand the economic opportunities of digital commerce as more people are willing to live digital lives. However, and as outlined above, the U.S. and the EU have adopted different approaches to privacy protection, and this split is also reflected across the region. As Colombia develops its approach to privacy regulation, it should consider reforms that ensure privacy protection but which also minimize negative impacts on developing Colombia's digital economic and digital trade environment.

- *Consent:* Require companies to provide data subjects with a privacy policy that protects personal data consistent with Colombia's privacy principles. Consent to the collection and processing of personal data collected subject to such a privacy policy should be required. In addition, effective enforcement is needed for failure of companies to comply with the commitments in their privacy policies.
- *International transfers of data*: Allow for international transfers of personal data out of Colombia to entities that offer the same level of protection of personal data as provided in Colombia. Consider providing the entity transferring the data the flexibility to enforce such requirements while making clear that Colombia's data controller/processor remain accountable and liable for any failure by third parties to protect personal data collected in Colombia, irrespective of where the breach happens.
- *Database registry*: Repeal or increase flexibility of requirements to register databases and transfer these between companies when needed.

APEC is introducing certificates for companies that comply with the APEC cross-border privacy principles. Such companies are then deemed to be protecting personal data consistent with the APEC privacy rules. Colombia is not a party to APEC. However, Colombia could issue certificates to companies that can demonstrate best practice for privacy protection. That may provide a basis for docking with the APEC privacy system.

### *Balanced intellectual property protections*

As analyzed, intellectual property rights are needed to encourage development and trade in a digital content. While Colombia has in place a comprehensive set of IP laws, there are some gaps and more is also needed on the enforcement side.

- Improve enforcement of IP laws to address high levels of IP piracy: This includes copyright piracy of digital content, such as pirate websites, which can discourage innovation and content development in Colombia, undermining the opportunities of the internet for creating digital content.
- Introduce intermediary liability protection: The absence of such protection raises the costs for all internet platforms operating in Colombia, and such a law is also required under the U.S.-Colombia FTA. While large ISPs can likely manage this for a while, the short-term impact will be on SMEs that are currently exposed to liability for hosting copyright-infringing material.
- Maximize Colombia-U.S. FTA Article 16.12 to advance collaboration with the U.S. on common goals in science, technology, and innovation and to support partnerships between public and private actors. Colciencias is the contact point for such activity. This will require active engagement by Colombia, including a specific sense of what it wants to gain from such collaboration and in which areas. Some work is already underway in Colombia on developing technology transfer offices. This work is being led by key univer-

sities such as Universidad de los Andes and Universidad Nacional. The focus here, however, is on improving links with industry. This work could be better supported in terms of resources and expanded to include developing links with government and industry outside of Colombia with a focus on the US. Properly structured, this work could form the basis for Colombian government utilization of the U.S. commitment in the Colombia-U.S. FTA to support collaboration between the two countries.

## Expand access to financial services and capital

The internet and data have created opportunities to expand access to financial services. In addition, online payment options are needed to expand use of online commerce in Colombia. As outlined above, there are a number of challenges, including high informality and low levels of financial inclusion. A predominance of large domestic incumbents in the financial sector has stifled financial innovation.

- Increase competition in the financial sector: This could include more bank licenses and lighter-touch regulation in areas where innovation can be encouraged without increasing systemic credit risks. In addition, financial costs and fees, especially for small clients, should be reduced. The recently approved law that limits charges on small savings accounts is a step in the right direction.
- Make easier cross-border payment systems. This will require more streamlined ways for business to report purchases of foreign currency to the central bank, as well as allowing e-wallets to do this. Blockchain provides an interesting opportunity to do this, as long as the currency used is appropriately regulated.

Access to capital is another barrier for local businesses seeking to take advantage of the internet and data flows to develop innovative companies. The lack of fintech is a related constraint; in other countries, the development of financial platforms such as crowdsourcing have created new channels for financing digital companies.

- Repeal the regulation limiting companies to collecting finance from more than 19 people. (Decree 1981 of 1988).
- Consider repealing or increasing the cap on interest rates (usury rate).
- Support funding of digital companies: There is a role for the government here, which could include co-funding arrangements and use of government financial support to reduce overall project risk and increase the attractiveness of digital economy investments for private capital. For instance, the Innpulsa platform by Bancóldex uses its own financial products to leverage private capital for investments in Colombia, providing a basis for learning how to use public funds to crowd-in private sector capital to build a digital Colombia.

Colombia's approach to privacy has negatively affected the scope for innovation in the financial sector. In particular, the requirements for express consent to collect and process personal information—which includes that information used to determine credit scores—has been a barrier to startups in the fintech space to collecting the data needed to target financial services to the under-served market. See above for proposed privacy law reforms.

## Trade policy recommendations

As discussed, there are various implications of the internet and data flows for Colombia's engagement in international trade. The main ones are opportunities to participate in global value chains, the increasing importance of services trade—DDS and valued-added DDS—and the need to access digital services to improve domestic productivity and competitiveness. In

addition, internet platforms provide new opportunities for businesses in Colombia, including M-SMEs, to engage in digital trade.

- Allow for online declarations of electronic transactions: This law was enacted to combat money laundering but has become a barrier to the ability to process electronic commerce that involves an international payment.
- Revoke central bank regulations that restrict the ability to pay for imported products in a foreign currency and require the value of such products to be declared at the Central Bank: These regulations have become another barrier to Colombians' use of internet platforms to engage in international trade.
- Consider raising the de minimis customs duty: Colombia applies a de minimis level of $200, below which customs duties are not applied to imports. This is a relatively low rate. For instance, it is $3000 in Argentina and Mexico and $1000 in Chile. As outlined, digital platforms enable international trade in low-value goods, but application of a de minimis level that is too low can make such transactions uneconomic.
- Join the TPP at the earliest opportunity: Colombia has been negotiating a number of FTAs, including with the U.S. and the EU. And as outlined, the TPP includes the most advanced digital trade commitments. Once the TPP comes into force it will be open to accession by other countries. Colombia has already expressed interest in joining, and it should be a priority for the Colombia Trade Ministry to pursue this with the aim of having Colombia included in the first batch of acceding countries.
- Improve customs administration: Reducing the cost and time of moving goods through customs will increase the competitiveness of Colombian companies engaging in digital trade. Colombia has been working to reform its customs processes and performs well in most areas compared to the region. However, further reforms are needed. For instance, Colombia still performs below average in areas such as automating customs. In 2013 WTO members agreed the Trade Facilitation Agreement (TFA). Colombia should consider joining the WTO TFA. This would help consolidate and drive further customs reform. Furthermore, the flexibilities built into the TFA mean that Colombia can determine which commitments to accept over time, including so-called category C commitments, which requires capacity building before coming into force. The WTO TFA includes commitments aimed at reducing the cost and time of moving goods through customs such as harmonizing and simplifying trade documents, automating trade and customs processes, ensuring the availability of customs information online, streamlining border procedures, and providing advance rulings on customs matters. For upper-middle-income economies (which include Colombia), the TFA is estimated to reduce trade costs by 10.4 percent.[100] In the region, Brazil, Peru, and Mexico have joined, as has the U.S. Moreover, the WTO TFA will not come into effect until two thirds of WTO members have accepted the agreement.
- Reduce barriers to services imports—particularly DDS: Colombia should use its participation in the TiSA negotiations to push for reductions in barriers to digitally delivered services that it can export online. At the same time, many of the DDS are business services that can improve Colombian business competitiveness. Colombia should use the TiSA negotiations to also agree on reductions to DDS imports in its domestic barriers.

## Human capital development

Colombia has a skills gap that needs to be addressed in order to fully develop a digital economy. Two elements are needed here: develop the training to allow people to learn new skills and ensure a domestic skill base exists to utilize the opportunities of the internet and data.

- Develop a comprehensive mapping of skills needed in a digital Colombia: This should include not only skills held by IT professionals, but also skills in digital communications, digital media and advertising, and entrepreneurship. This process should work closely with industry and regional governments.

- Think long term and holistically about Colombia's skill needs: Increasingly, the capacity for problem solving and analytical skills that can be applied across a range of digital issues will be needed. Such skills can be gained in a variety of courses, from engineering to law, business studies, and liberal arts. Determine whether the education system is equipping students with the range of needed skills.

- Align education and training capacity and opportunities with the above skills mapping: This could include developing centers of excellence in the university system that are linked with the government's longer-term strategic goals in terms of building a digital Colombia. Programs to attract tech skills as well as corporate excellence skills are also needed (OECD Medellin). Access to online courses offered from top universities globally should be considered as a way to strengthen teaching capacity.

- Expand government support for top students to study overseas: These grants or loans, conditional on the recipients returning to Colombia, can build on the experiences of ICETEX (the Colombian Institute of Educational Credit and Technical Studies Abroad), the National Planning Department, and the central bank. The Ministry of ICT could lead this initiative for the ICT/IT sectors.

- Attract overseas skills to fill immediate gaps: Development of a government program could include, where necessary, tax incentives, and other subsidies.

## Maximize government use of the internet and data

The internet and data provide opportunities for the Colombian government to improve its levels of governance and legitimacy as well as increase trust in the government. Success in this area will also support the delivery of government services online, and better services delivery is a good way to improve citizen engagement with the government—creating a virtuous cycle. Finally, the government can use its purchasing power to drive demand for a digital Colombia.

The government is already making good progress across all of these areas. The following are recommendations that build on the work underway.

- Improve government response to key challenges: Using the internet and data analysis to improve response to natural disasters, for example, will build confidence in the government and should lead to increased online engagement.

- Expand Crystal Urn: Making Crystal Urn interactive in real time will provide opportunities for those who do not have internet access to participate via mobile phone hotlines or text messaging.

- Encourage transparency initiatives that can be accessed on mobile apps: This could include apps that allow citizens to let government departments know of potholes, or poor public transport service. For instance, the Bogotá government has launched an app that allows people to report crime. Such an approach should be expanded to other government services. Given limited internet access, particularly in regional areas, other such digital platforms need to enable feedback from citizens using phones, cameras, and other devices.

- Assess most-needed government services: Data analysis can play a role in assessing which gov-

ernment services are most needed and in targeting and prioritizing delivery where the greatest impact can be made.

- Use the internet to target government services: Based on citizen needs, government services can be tailored to ensure they are responsive, timely, and targeted. Use of social network sites such as Twitter provide opportunities for citizens to participate in the design of government services and provide real-time feedback on service quality; at the same time, it provides opportunities for the government to respond.
- Strengthen the capacity of citizens in regional areas to use government data to help develop local solutions.
- Drive demand for a digital Colombia: Using the government procurement mechanism to drive demand could include developing apps with Colombia content and aligning standards across Colombia, e.g., in areas of digital health and education. For instance, the government procurement process should be used to develop standards and best practices and to drive demand for internet and data in areas such as cloud computing, app development, and digital services. The government could also develop public-private partnerships for the development of apps. Such activity will improve services and increase use of and familiarity with apps, which in turn should support increased demand for apps.
- Develop public-private partnerships to achieve broader government goals for a digital Colombia.

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