

Chapter 3

FOSTERING THE DIGITAL TRANSFORMATION AMONG INDIVIDUALS, FIRMS AND IN THE GOVERNMENT

3. FOSTERING THE DIGITAL TRANSFORMATION

The Colombian government has developed digital strategies with the overall aim of promoting integration of its territory and communities; reducing social gaps; and improving access to public goods, social services and information. Colombia has made progress in the use of information and communication technologies (ICTs) in many areas, such as digital government and among businesses in some sectors. Nonetheless, low incomes and high inequality keep Internet access out of the reach of many people.

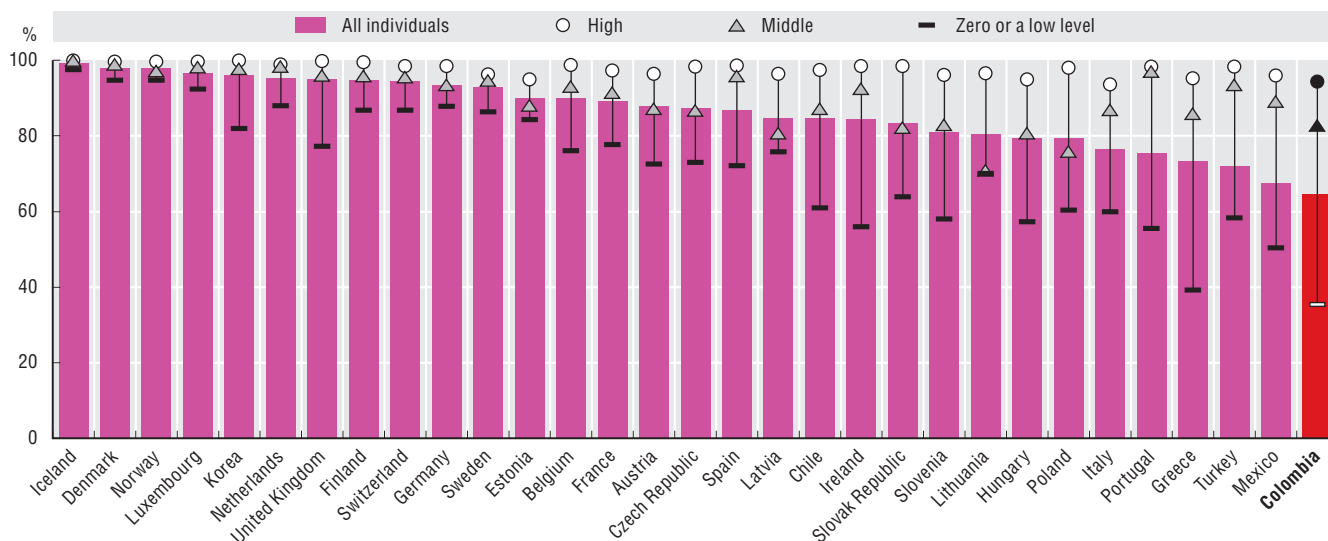
This chapter examines the usage of the Internet in Colombia. The first section looks at how Internet use by individuals and households is influenced by low incomes and inequality, and examines the government programmes aiming to overcome these barriers. The second section examines use of digital technology by firms, the factors that inhibit greater adoption and government policies to overcome these obstacles. The third section looks at how the government uses technology to provide services and increase transparency. The main conclusions and policy recommendations are presented in the final section.

There are wide disparities in Internet usage

For Colombia to achieve its goal of increasing the integration of its communities and territories through digital technologies, widespread use of such technologies is necessary. At present, Colombia is lagging behind in terms of Internet usage, with 64% of individuals using the Internet in 2017 (Figure 3.1). The relatively low rate of ICT use, however, is in line with other countries with similar gross domestic product (GDP) per capita (Figure 3.2). High inequality has left Colombia with a smaller middle class than in most OECD countries, putting Internet access at home out of the reach of many households (OECD, 2016b). As a result, many people are at risk of being left behind, with half of those without Internet access reporting high costs as the main barrier for not accessing the Internet (DANE, 2018a).

Figure 3.1. Colombian's use of Internet lags behind more advanced countries, 2017

Percentage of individuals using the Internet in the last 12 months, by education level



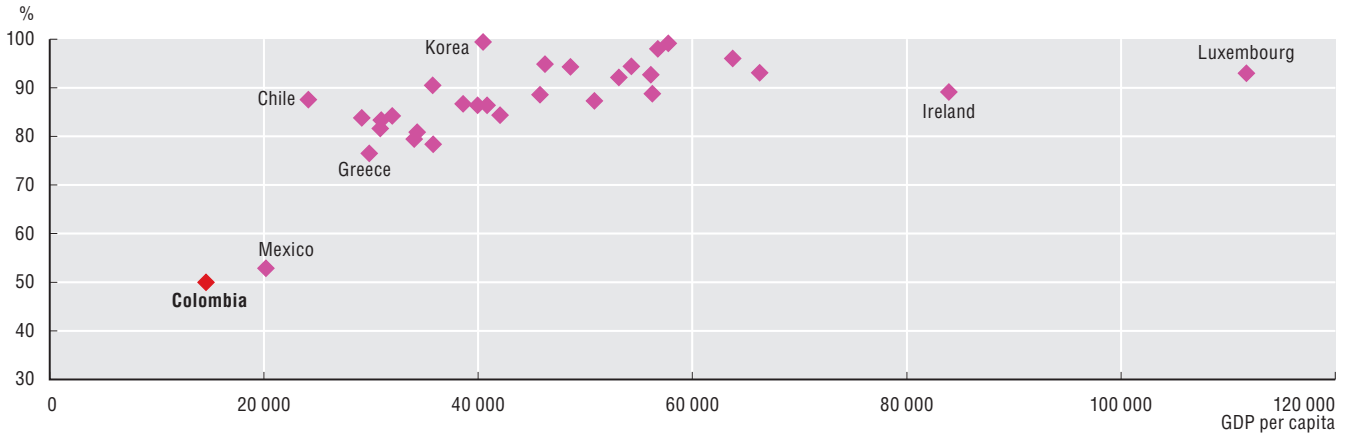
Note: Shows countries for which data are available.

Source: OECD (2018d), *ICT Access and Usage by Households and Individuals* (database), <http://oe.cd/hhind> (accessed in June 2019).

Large differences in Internet usage among social groups have the potential to prevent Colombia from achieving its aim of becoming a more equal society. Observed differences reflect the inequalities in the Colombian society, with education being the most important factor. Internet usage by the highly educated is nearing saturation levels, while usage by Colombia's large cohort with a lower education is below that of any OECD country (Figure 3.1). Income plays an important role in determining Internet usage, with Colombia showing a particularly wide gap between rich and poor (Figure 3.3). A rural-urban divide also exists, with only 37% of rural dwellers using the Internet, compared to 69% in urban areas (DANE, 2018a). Although age plays a role in Internet use, this gap is smaller in Colombia than in many OECD countries. In addition, Colombia benefits from a small gender gap in Internet use, which can be partially explained by policies to promote Internet use among under-represented groups.

Figure 3.2. Low home Internet usage is linked to low-income levels, 2017

Percentage of households with Internet access at home and GDP per capita (current prices, current PPPs)

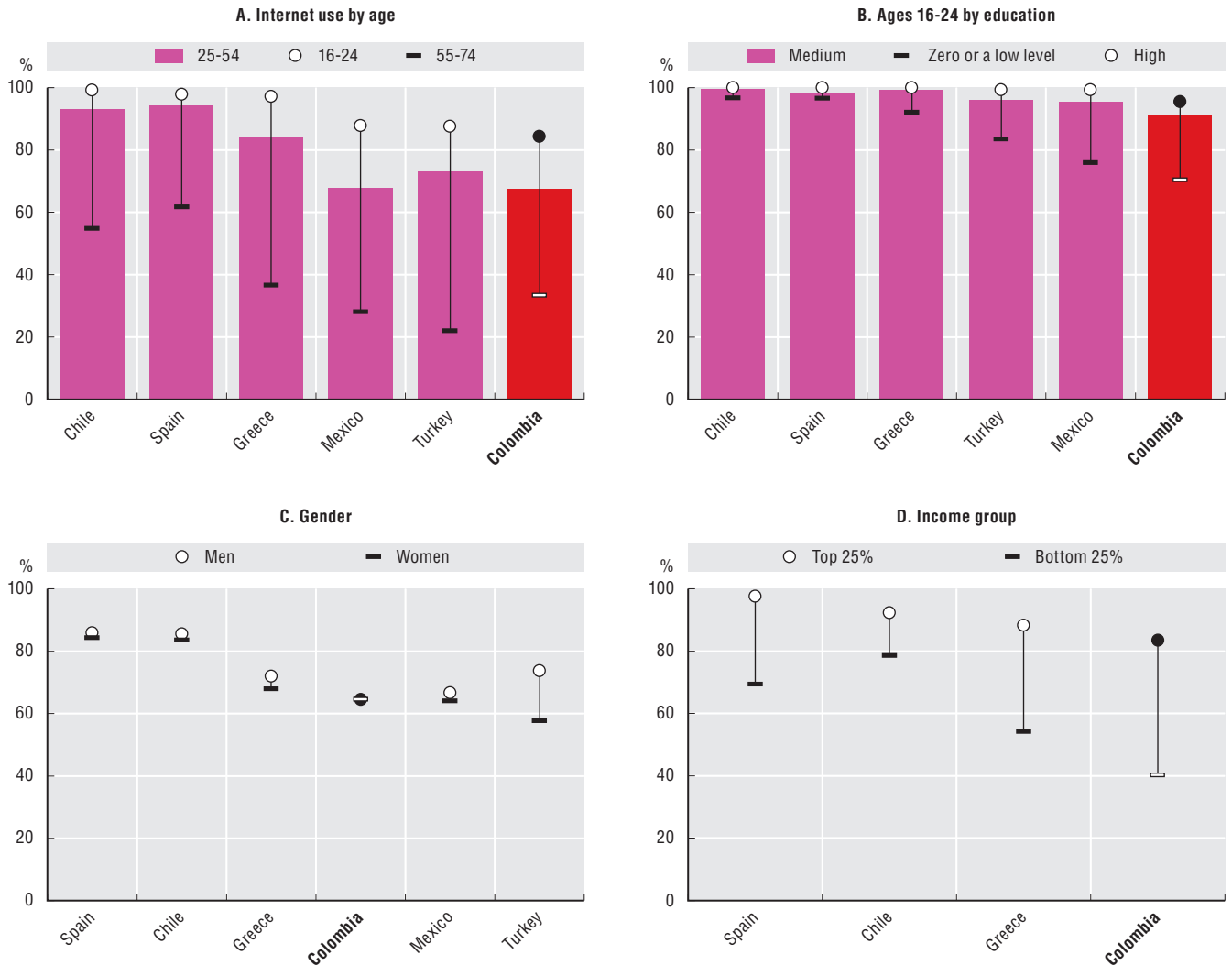


Notes: GDP = gross domestic product. Cross-country plot.

Sources: OECD calculations based on OECD (2018d), *ICT Access and Usage by Households and Individuals* (database), <http://oe.cd/hhind> and OECD (2018e), *National Accounts* (database), <https://doi.org/10.1787/na-data-en> (accessed in June 2019).

Figure 3.3. Internet use varies by group, 2017

Internet use in the past 12 months as a percentage of reference population



Source: OECD (2018d), *ICT Access and Usage by Households and Individuals* (database), <http://oe.cd/hhind> (accessed in June 2019).

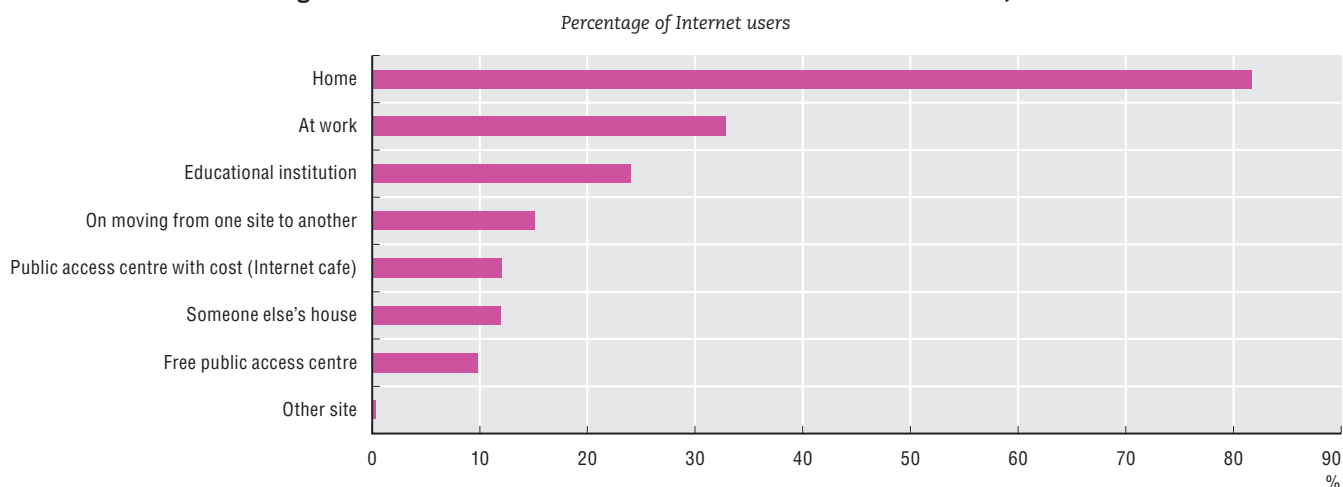
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Government policies aim to increase affordability and boost Internet adoption

Increasing Internet use across households, firms and government was an important goal of the Live Digital for the People (Vive Digital para la Gente) plan, which ran from 2014 to 2018 (MinTIC, 2014). This plan was an iteration of Colombia's overarching strategy to increase the use of digital technologies in order to reduce poverty and create jobs, as well as to develop digital solutions to the problems faced by the Colombian society. The main goals for 2014-18 were to increase government transparency and efficiency and to establish Colombia as a world leader in developing apps to help the poorest in society (MinTIC, 2014). The plan follows on from the previous Live Digital (Vive Digital) plan (2010-14), which focused on developing Internet infrastructure and increasing widespread usage, while The Digital Future is for All (El Futuro Digital es de Todos) will run from 2018 to 2022 (MinTIC, 2014, 2019).

As part of the Vive Digital plan (2010-14), the government aimed to foster universal access, including for rural remote areas, by building Internet centres in villages, such as the Puntos Vive Digital in urban areas and the smaller rural-based Kioscos Vive Digital (OECD, 2014). Almost 900 Vive Digital access points were created in Colombia's poorer communities. By giving the public access to ICTs for entertainment, training and online government services, the Vive Digital access points have also helped users to develop their skills and serve as useful locations for training programmes (OECD, 2018a). As a result, almost a tenth of all individuals accessing the Internet in 2017 did so via public telecentres, many of which are located in schools, although most accessed the Internet from the home (Figure 3.4). However, some digital services (such as online banking) are not available in such centres for security reasons.

Figure 3.4. Most Internet users access from their own home, 2017



Source: DANE (2018a), "Indicadores básicos de tenencia y uso de tecnologías de la información y comunicación: TIC em hogares y personas de 5 y más años de edad", https://www.dane.gov.co/files/investigaciones/boletines/tic/Anexos_TIC_hogares_2017.xlsx (accessed in February 2019).

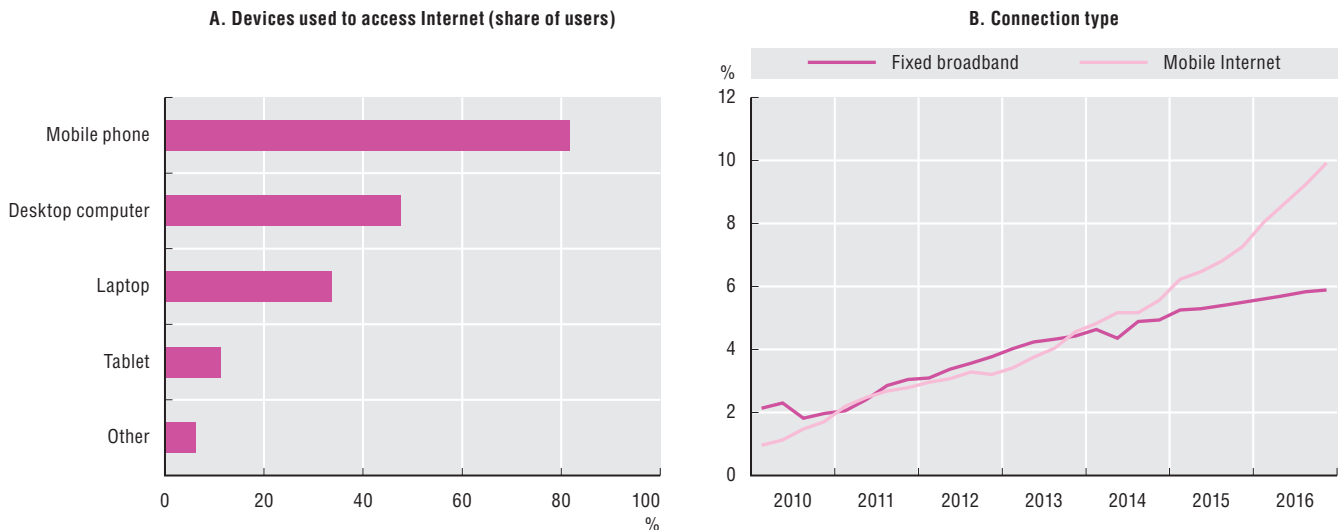
In order for such centres to continue to be effective, they must be appropriately funded to ensure that equipment and ICT infrastructure are maintained, and also that municipal staff receive appropriate training to use ICTs and to assist the public (OECD, 2018a). As accessing the Internet at home becomes more affordable and the use of mobile Internet more popular (see Chapter 2), the benefits from government-financed Internet centres will diminish, although they are likely to continue to play a role in promoting Internet usage in poorer communities. Indeed, the government plans to reduce the number of such access points by a quarter between 2019 and 2022 (and aims to provide universal access through new technologies in co-operation with the private sector) (MinTIC, 2019a). It is, therefore, important to better target existing resources towards areas and regions where Internet access is likely to remain limited or too costly while reducing public funding for Internet centres where usage has been declining in favour of access by market providers.

The government has also incentivised mobile access to the Internet, which has become the main connection channel in Colombia (Figure 3.5). The Internet Móvil Social para la Gente is a programme aimed to increase Internet usage of low-income and geographically isolated households that have

not used the Internet before by promoting mobile connections. The programme offers a subsidised smartphone, a 3 gigabyte (GB) to 4 GB data package for approximately USD 2, free off-peak access from 11 pm to 5 am, and free access to government services and educational content, in addition to some social media and messaging platforms. Users could also make use of publicly available Wi-Fi (MinTIC, 2016). As a result of this programme, only a fifth of mobile Internet users mainly used full-cost for access in early 2016: approximately 40% of mobile Internet users mainly connected through specified plans (which allow access to specific apps or sites, such as social media sites, for a period of time) while a quarter of them mainly used public Wi-Fi (A4AI, 2016, 2017). In addition, the government has removed value-added tax on lower cost smartphones (see Chapter 2).

Figure 3.5. Mobile Internet has become the main way to connect on line

Usage of devices to access the Internet, as a percentage of Internet users



Sources: DANE (2018a), “Indicadores básicos de tenencia y uso de tecnologías de la información y comunicación: TIC en hogares y personas de 5 y más años de edad”, https://www.dane.gov.co/files/investigaciones/boletines/tic/Anexos_TIC_hogares_2017.xlsx (accessed in February 2019); MinTIC (2019b), “Colombia TIC – Estadísticas: Servicio de Comunicaciones”, <https://colombiatic.mintic.gov.co/679/w3-propertyvalue-36342.html>.

Despite persistent differences in Internet use, there are signs that Colombia has been successful in reducing the digital divide since the introduction of the Vive Digital para la Gente plan (Figure 3.6). Since 2014, growth in Internet usage among more vulnerable groups, such as those with a low education, those in the bottom income quartile and those aged 55-74 has accelerated. Disparities have also been narrowing as the rate of usage by early-adopting groups is approaching the ceiling of 100%.

Internet users make little use of paid-for services

Greater use of the Internet by the Colombian population can help foster a more dynamic economy. The Internet can allow Colombian consumers to search for a wide range of goods and services (whether delivered on line or in a traditional manner), rather than rely on personal recommendations. In addition, it can allow services, both from the public and private sectors, to be delivered in a more efficient manner and promote formality in the economy (see below).

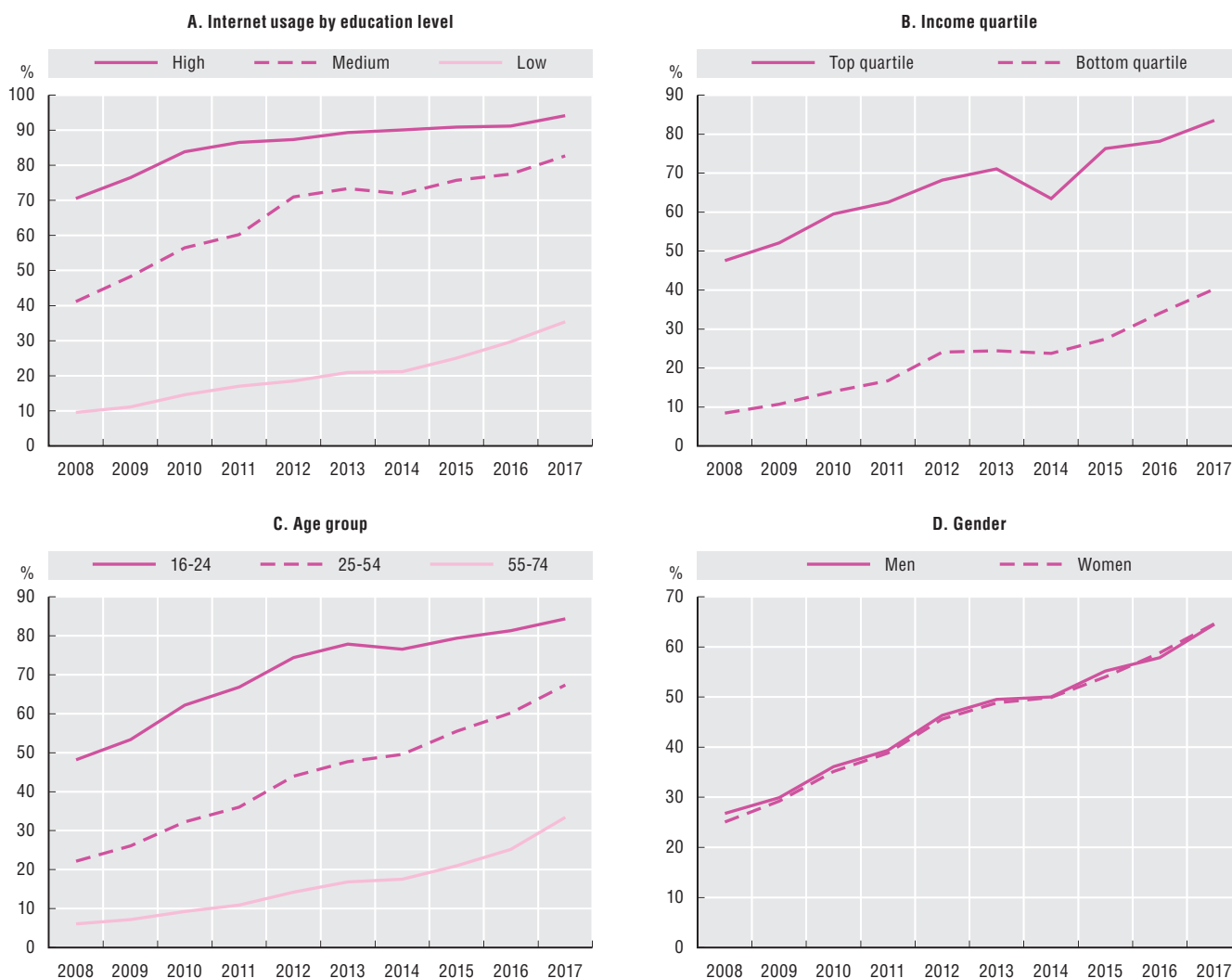
Against these opportunities, Internet users in Colombia tend to carry out simple activities online, e.g. e-mail and social media, while more sophisticated services such as e-commerce and e-banking are not so widespread (Figure 3.7). In general, the use of more sophisticated services is associated with higher levels of education attainment (OECD, 2017c). However, even highly educated individuals in Colombia make relatively little use of these activities (Figure 3.7).

Expansion of paid-for online services (such as online purchases) seems to be hampered by the relatively low level of financial development. Although 81% of the population had at least one financial product of some kind in 2018, only 68% of adults actively use their financial product and as few as 29% of adults have a credit card (Banca de las Oportunidades and Superintendencia Financiera de Colombia, 2019). As a result, Colombia lags behind several other Latin America and Caribbean countries, with the cost of

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financial services being the main deterrent. Only 37% of adults have made or received a digital payment (such as using a credit card, receiving wages directly into a bank account or transferring money over the Internet) while more traditional forms of payment, such as cash-on-delivery for goods, continue to be widely used (World Bank, 2018; Nielsen, 2016).

Figure 3.6. The digital divide shows signs of stabilising

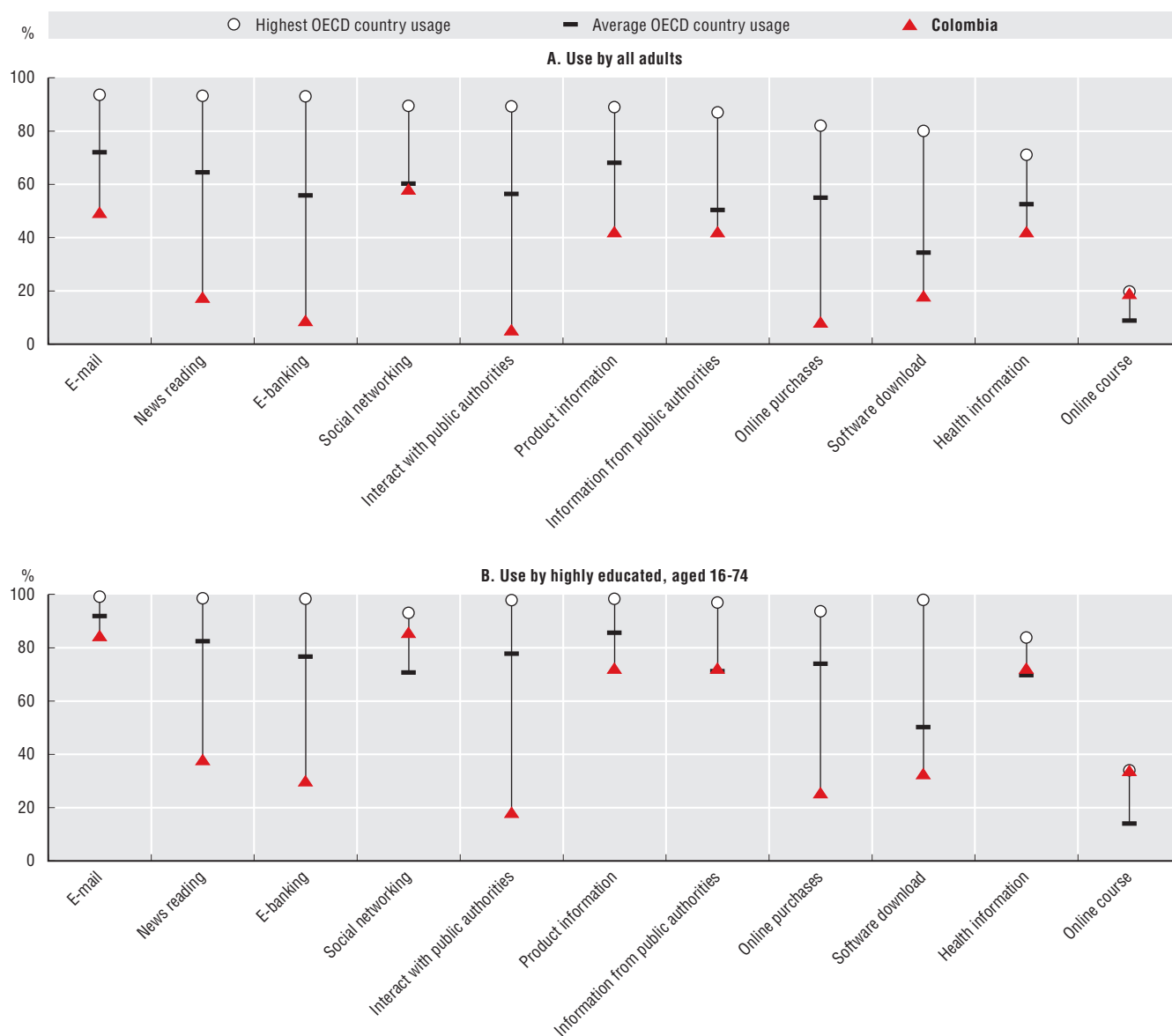


Source: OECD (2018d), *ICT Access and Usage by Households and Individuals* (database), <http://oe.cd/hhind> (accessed in June 2019).

The government has prioritised the promotion of formal financial products through the expansion of the physical banking network and by increasing the use of digital transactions. Electronic deposit accounts have been permitted since 2011 (Decree 4687 of 2011). Such accounts have a simplified opening procedure whereby customers only need an identity card and a registered mobile phone to open an account. As a result, the share of adults with an electronic deposit has been growing steadily, reaching 14% of adults by 2018, though this remains small relative to the share of adults (75%) with a traditional savings account (Banca de las Oportunidades and Superintendencia Financiera de Colombia, 2019). Further steps to promote e-banking were taken in 2014 (Law 1735 of 2014) by allowing the creation of companies which specialise in electronic deposits and payments (*sociedad especializada en depósitos y pagos electrónicos* [SEDPE]). SEDPEs allow customers to carry out financial transactions such as paying utility bills and making deposits, but are not permitted to offer loans, and in 2017 Celuplata became the first SEDPE to be granted a licence (MinHacienda, 2017).

Figure 3.7. Colombians lag behind in more sophisticated Internet activities

As a percentage of Internet users, 2017



Notes: Data for the highest OECD country and OECD country average include Colombia and OECD countries as of 2017, except Australia, Canada, Israel, Japan, Korea and the United States. Colombia uses a harmonised methodology for data on use of e-mail, social networking, interacting with public authorities and online purchases.

Source: OECD (2018d), *ICT Access and Usage by Households and Individuals* (database), <http://oe.cd/hhind> (accessed in June 2019).

Although such steps have been beneficial, further progress is needed. Exempting electronic payments from the tax on financial transfers (named for its rate of 4 *por mil* or 4 x 1 000) could help promote greater use of electronic banking and also boost formality in the economy (see Chapter 4).

A further obstacle to e-commerce uptake among individuals is a lack of trust in online retailers. According to some surveys, 70% of those making use of cash-on-delivery do so because they do not trust giving their bank details (with lack of a credit card being the second-most frequent reason) (Nielsen, 2016). Although low trust may be linked to a lack of familiarity of e-commerce among consumers, trust can also be undermined by incidents of online fraud (Gefen, 2000; Kim and Peterson, 2017). Indeed, the total number of recorded cybercrime incidents increased by 36% in 2018, when Colombia became the sixth largest target country of phishing attacks (Centro Cibernético Policial, 2017a, 2017b; RSA, 2018).

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In order to combat cybercrime, a law to counter the illegal appropriation of electronically stored confidential information has been in force since 2009 (Law 1273 of 2009). In addition, in 2010 a Police Cyber Centre (Centro Cibernético Policial) was established to investigate and support the prosecution of cybercrime, while in 2018 the Finance Superintendent was given a mandate (Circular Externa 007/2018) regarding cyber-risk management of financial institutions (Council of Europe, 2015). However, criminal judges may lack expertise in dealing with online fraud. Establishing a special department of the public prosecutor's office to deal with cybercrime could improve confidence among consumers in the security of e-commerce. In addition, considering cybersecurity in ICT infrastructure and critical activities would be a means to enhance consumer confidence in the digital economy and increase uptake of digital services.

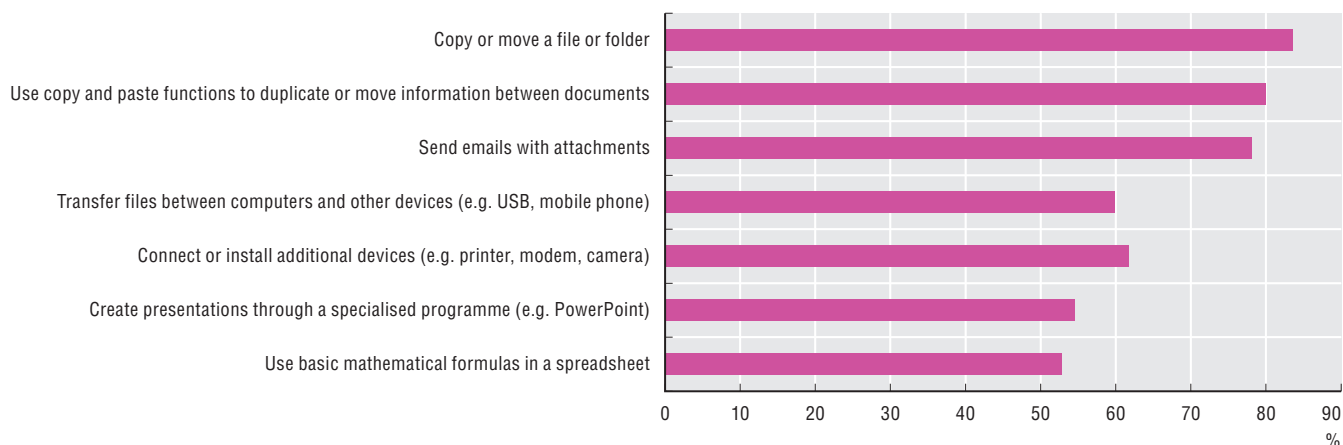
Consumers have also reported a high level of dissatisfaction with purchases they have made on line and 70% of individuals in Colombia are concerned that groceries purchased on line will not match their description (Meltzer and Pérez Marulanda, 2016; Nielsen, 2016). Dissatisfied consumers can make a civil complaint on line via the Superintendencia de Industria y Comercio (Superintendencia de Industria y Comercio). Creating a dedicated website for such complaints could improve consumers' awareness of the remedies available to them if they are unsatisfied with the level of service they have received. Publishing data on the number of complaints received, the time taken to resolve them and the proportion resolved in the consumer's favour or compliant with regulations, could increase consumers' confidence in such a system and therefore in e-commerce. In addition, the introduction of a quality mark programme for retailers that reach high standards in quality and in dealing with customer complaints could help boost consumers' trust in online firms.

Improving digital skills is necessary to increase usage of ICTs by individuals

Higher sophistication in ICT use will require better skills among users. Many computer users in Colombia lack some basic computer skills, with a quarter of them unable to send emails with attachments, and a third unable to connect additional devices such as printers (Figure 3.8).

Figure 3.8. Many computer users lack the skills to make full use of their computer

Those with skills as a percentage of computer users, 2016



Source: DANE (2018a), "Indicadores básicos de tenencia y uso de tecnologías de la información y comunicación: TIC em hogares y personas de 5 y más años de edad", https://www.dane.gov.co/files/investigaciones/boletines/tic/Anexos_TIC_hogares_2017.xlsx (accessed in February 2019).

Improving the digital skills of individuals is an important component of the Vive Digital and El Futuro Digital es de Todos plans, with government programmes in place to support the development of a wide range of skills, from software development (see Chapter 5) to basic digital literacy.

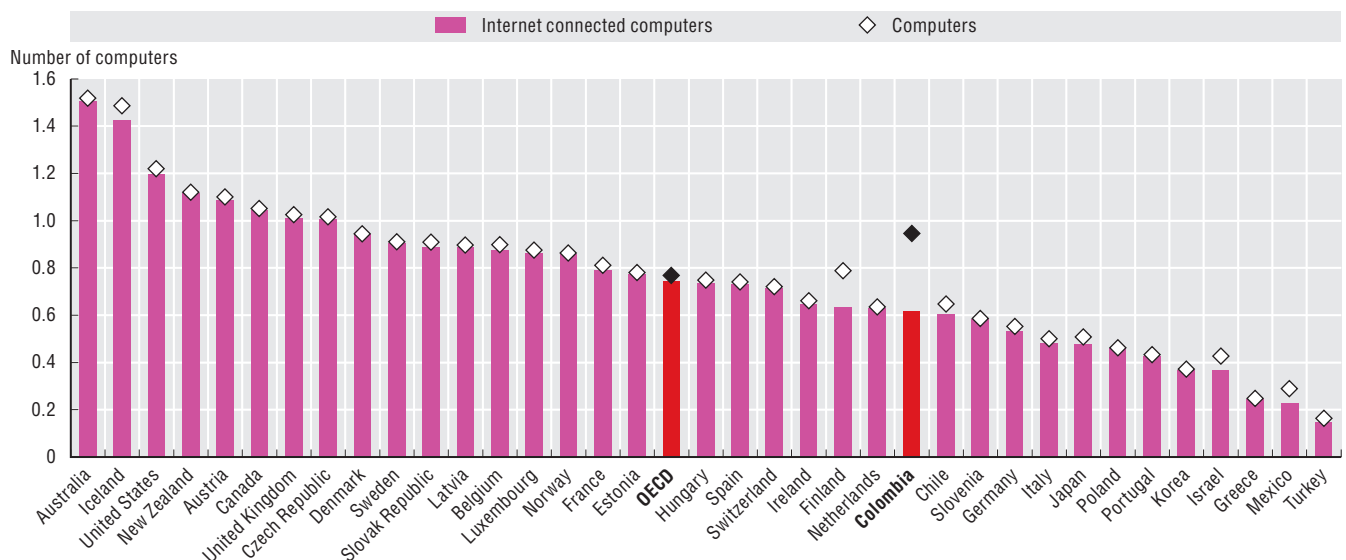
Numerous programmes have been put in place to improve basic digital skills among adults. In 2016, the Digital Citizens (Ciudadanía Digital) online training programme trained 1 392 000 people in digital literacy and ICT awareness, allowing them to be certified as "digital citizens". It covered topics such as online security, digital rights and aspects related to e-commerce (Ciudadanía Digital, 2018). Another

programme, Redvolución, made use of 50 000 volunteers to provide basic training to over 425 000 people (MinTIC, 2017c). Escuela TIC Familia was an ICT project that aims to help parents and teachers develop skills to look after children. In addition, some municipalities have established programmes to boost digital literacy of specific groups. For instance, Bogotá has 15 digital inclusion centres for women located in equal opportunities for women centres and the AdultICoProgram (in the city of Armenia) targets older people (UNESCO, 2017; Roseth et al., 2018).

While it may be beneficial to have programmes that target the needs of specific groups, many programmes seem to overlap, as is the case of other policy initiatives in Colombia (see Chapter 5). This feature can lead to poor accountability and make it hard to assess whether programmes have been effective. As the use of digital technology matures, and digital skills become a necessity on par with literacy and numeracy skills, it would be preferable to integrate such programmes with general adult education policies.

The use of computers has already been integrated into the education system for younger Colombians. Under the Computers to Educate (Computadores para Educar) programme, the Ministry of Information and Communication Technologies (Ministerio de Tecnologías de la Información y Comunicaciones [MinTIC]) and the Ministry of Education aim to provide schools with computers and train teachers how to use computers in their teaching. In addition to training almost 50 000 teachers by 2016, more than 150 000 parents have been trained under this programme. However, the programme's funding is linked to the royalties received from the extractive sector, and has been cut due to the fall in commodity prices (Radinger et al., 2018). Nevertheless, as part of the Sectoral Strategic Plan 2019-2022 (Plan Estratégico Sectorial 2019-2022), the government plans to increase the number teachers trained to deliver ICT-related courses (such as a new Code for Kids programme) and the number of computers available in schools (MinTIC, 2019a).

Figure 3.9. Colombia has a large number of computers per student



Source: OECD (2016b), PISA 2015 Results (Volume II): Policies and Practices for Successful Schools, <https://doi.org/10.1787/9789264267510-en>.

As a result of the Computers to Educate programme, Colombia has a large number of computers per student, higher even than advanced countries such as Denmark and Sweden. However, only two-thirds of these computers are connected to the Internet, bringing the number of Internet-connected computers per student below the OECD average, though far ahead of countries with a similar overall level of Internet penetration, such as Mexico and Turkey (Figure 3.9). In addition, schools in rural areas or with students from low-income households are less likely to be connected, thus widening the digital divide among young people (OECD, 2016a).

Participation in the Computadores para Educar programme has been found to be associated with a reduction in the drop-out and repetition rates and a higher rate of progression to tertiary education and

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better test results. However, such benefits are conditional on satisfactory training of teachers (Centro Nacional de Consultoría, 2015). In addition, teachers have been reluctant to make use of computers that are not connected to the Internet (Radinger et al., 2018).

The availability of computers in schools also has the advantage of increasing Internet accessibility for younger people, with a quarter of all users accessing the Internet via educational institutions (see Figure 3.4). However, despite the large availability of computers in schools, only a third of Colombian pupils are in a school that offers an extra-curricular club which focuses on computers and ICTs (compared to an OECD average of two-fifths) (OECD, 2016a). The experience of other OECD countries shows that greater use of extra-curricular activities can be useful to develop computer skills. For example, in 2004 Lithuania introduced an online “Bebras” (Beaver) competition for those aged 8-19 whereby contestants make use of computational thinking. The fact that this competition has spread to 35 other countries is proof of its success (Heintz et al., 2015).

Using ICTs to boost firm productivity and raise living standards

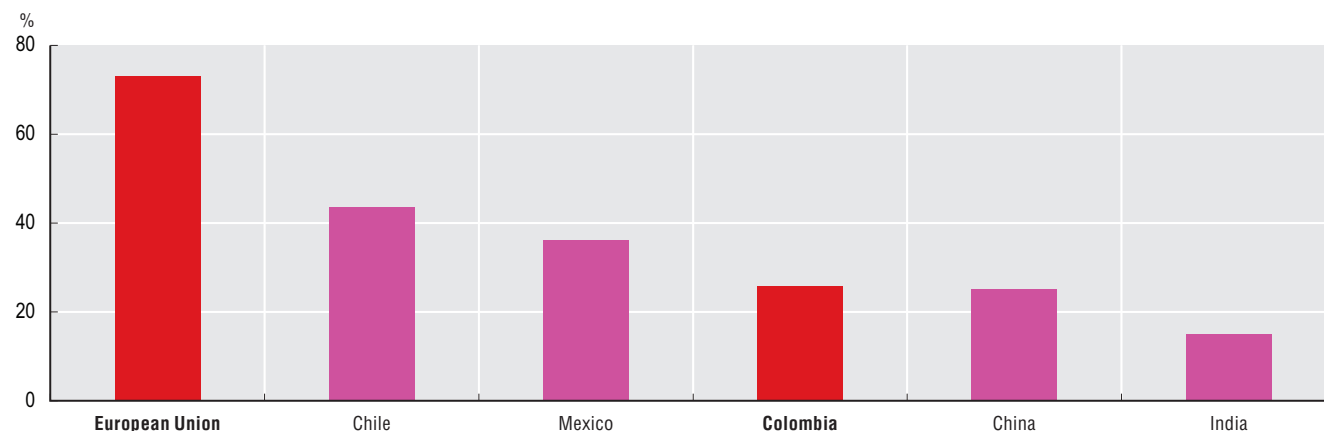
Colombian firms suffer from low productivity, leading to low wages and living standards. As part of the National Development Plan (Plan Nacional de Desarrollo [PND]), the government is promoting the use of ICTs in order to raise productivity within firms. However, ICTs can go beyond boosting individual firms to play a role in transforming the Colombian economy, as firms and consumers become less reliant on personal connections when seeking goods and services and access larger markets. Although ICT adoption is in line with other OECD countries for medium-sized firms, this conceals the fact that Colombia has a large number of micro-firms, i.e. less than ten employees, that are not reported in OECD statistics. Overall, there seems to be a lack of competitive pressures to spur the adoption of ICTs. In response, the Colombian government has introduced policies to promote usage of ICTs among firms.

Productivity is low and slowing

The Colombian economy is characterised by a large share of informal employment and family firms (see below) with low productivity (Figure 3.10) (OECD, 2017d). In addition, productivity growth has been persistently low (OECD, 2014, 2017d). Not only can greater use of ICTs raise the productivity of individual firms, but the Internet and ICTs more broadly can serve as a technology to improve communication and innovation across the economy and to spur productivity growth. Indeed, as part of MinTIC’s Vive Digital strategy, the government aimed to promote business use of ICTs among small and micro-firms to boost innovation and efficiency (OECD, 2014). Likewise, the PND 2018-2022 “Pacto por Colombia, Pacto por la Equidad” seeks to raise productivity through the adoption of new technologies among companies and in the public sector, to promote electronic commerce and to stimulate entrepreneurship and the cultural sector.

Figure 3.10. Productivity is low in Colombia

GDP per person employed, as a percentage of the United States, current PPPs, 2018

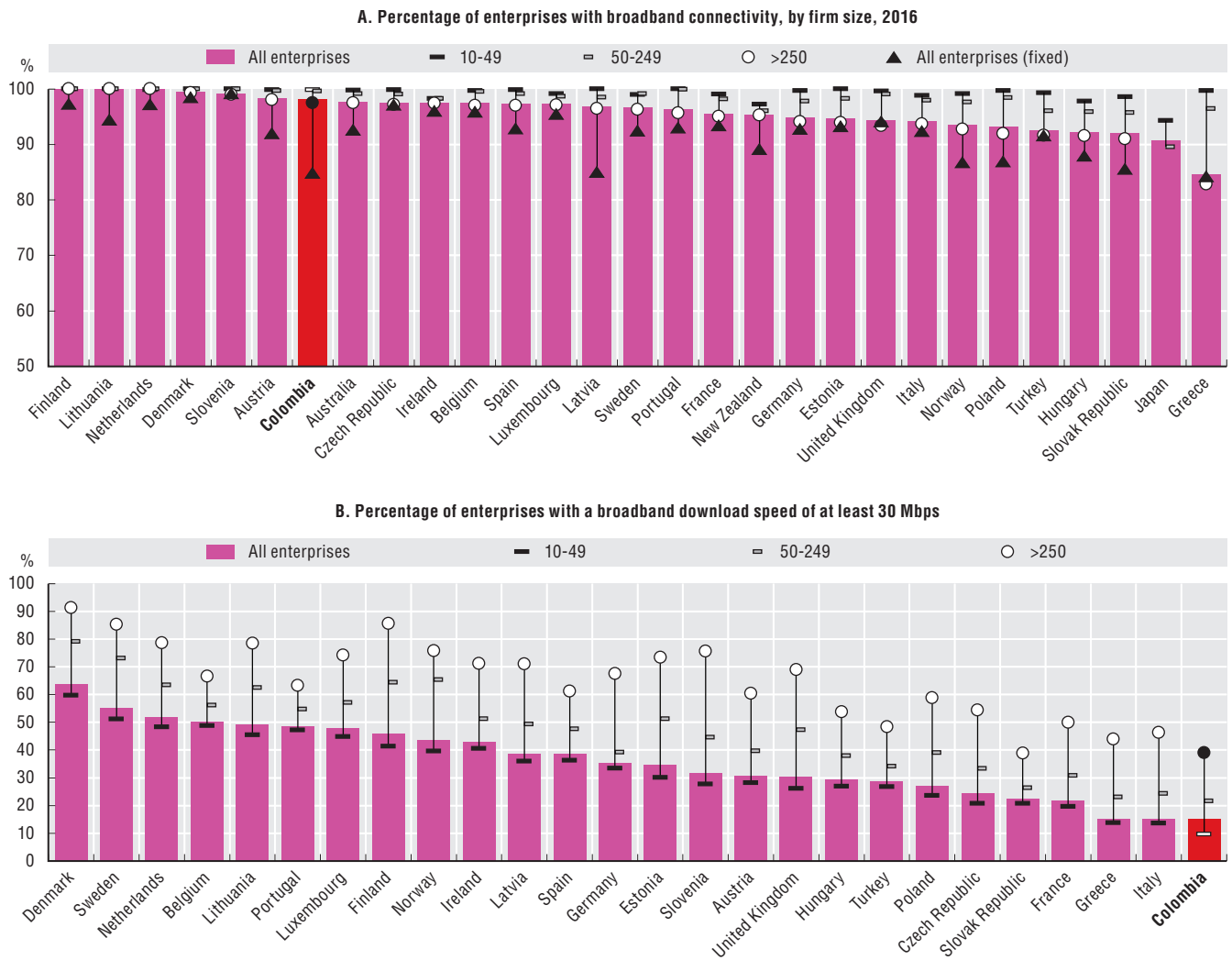


Source: OECD (2019a), Productivity Statistics Database, <https://doi.org/10.1787/ptvuy-data-en> (accessed in June 2019).

Colombian firms lag behind in their use of the Internet

While Internet connectivity among Colombian firms (with ten or more employees) is reasonably high by international standards, fixed broadband penetration remains low. As a result, firms generally have slow connection speeds, with only a minority of even larger firms having a connection speed greater than 30 megabits per second (Figure 3.11). Such comparisons are exacerbated by Colombia having a particularly large number of informal firms, which are not covered in international ICT statistics, and which tend to have even lower levels of connectivity (see below).

Figure 3.11. Most Colombian firms are connected to broadband, but speeds are slow



Notes: Except where otherwise stated, the sector coverage consists of all activities in manufacturing and non-financial market services. Only enterprises with ten or more employees are considered. For Australia and New Zealand industrial classification, ANZSIC06 division is used instead of ISIC Rev.4 division. For Australia, data include agriculture, forestry and fishing. For Japan, data refer to businesses with 100 or more employees instead of 10 or more; medium-sized enterprises have 100-299 employees and large ones 300 or more. For industrial classification, JSIC Rev.13 division is used instead of ISIC Rev.4. Fixed broadband refers to a wired or fixed wireless broadband connection.

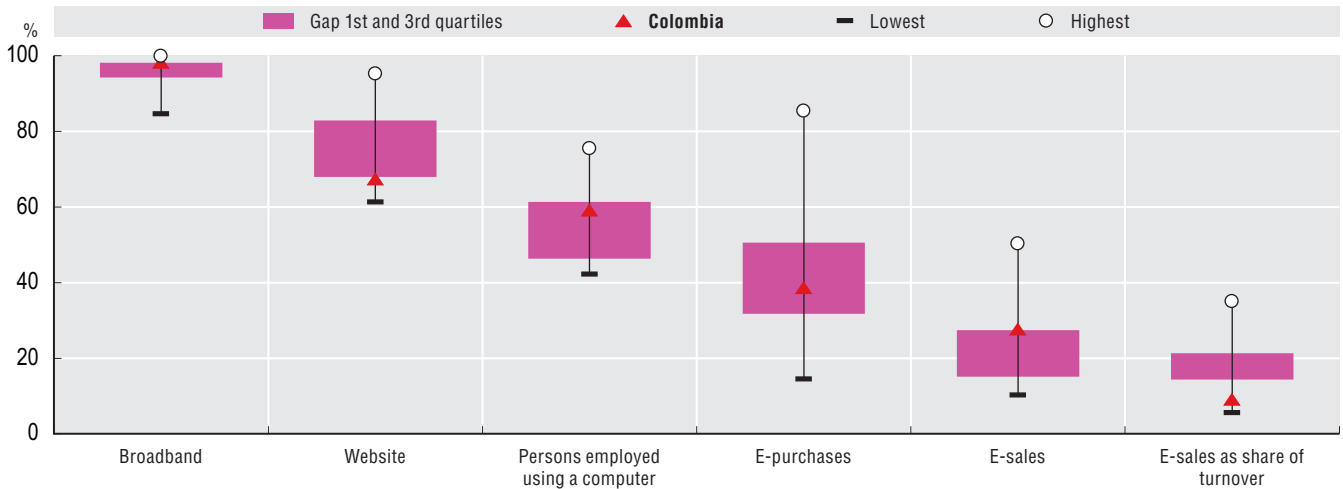
Source: OECD (2018c), *ICT Access and Usage by Businesses* (database), <http://oe.cd/bus> (accessed in June 2019).

Colombian firms lag behind those of other OECD countries, even for relatively unsophisticated Internet activities, such as use of a website (Figure 3.12). Although a relatively large share of firms receive orders over computer networks, including the Internet, e-commerce accounts for a small share of their turnover, even for larger firms (Figure 3.13).

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Figure 3.12. Colombian firms do not make advanced use of ICTs

As a percentage of enterprises, 2016

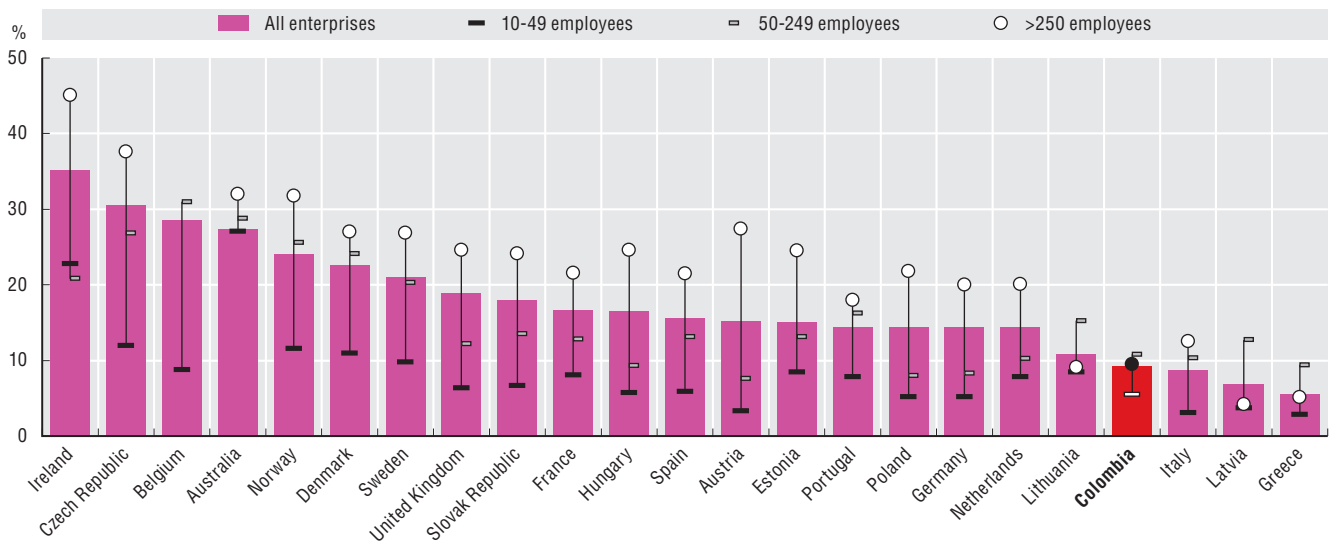


Notes: Except where otherwise stated, the sector coverage consists of all activities in manufacturing and non-financial market services. Only enterprises with ten or more employees are considered.

Source: OECD (2018c), *ICT Access and Usage by Businesses* (database), <http://oe.cd/bus> (accessed in June 2019).

Figure 3.13. A small share of firm turnover is due to online sales

Orders received over computer networks as a percentage of turnover, 2016



Notes: Except where otherwise stated, the sector coverage consists of all activities in manufacturing and non-financial market services. Only enterprises with ten or more employees are considered. For Australia and New Zealand industrial classification, ANZSIC06 division is used instead of ISIC Rev.4 division. For Australia, data include agriculture, forestry and fishing.

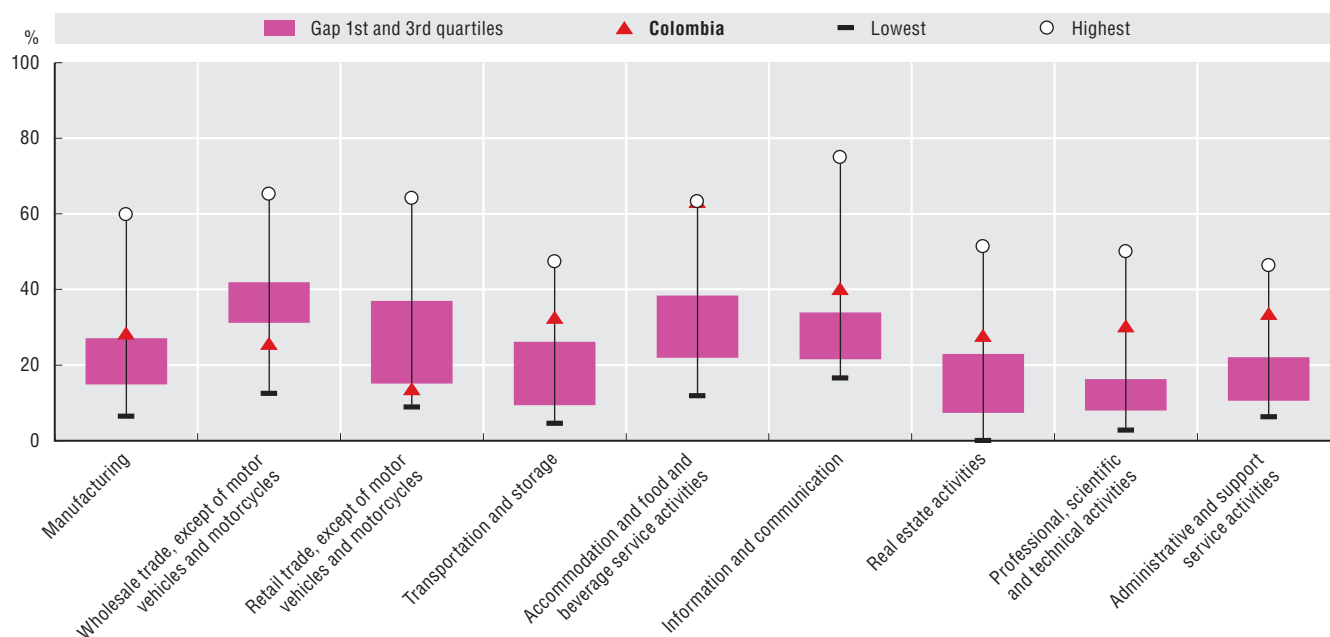
Source: OECD (2018c), *ICT Access and Usage by Businesses* (database), <http://oe.cd/bus> (accessed in June 2019).

Some sectors in Colombia have been more successful in adopting digital technologies. Tradable sectors, like accommodation and food, are leaders in terms of taking orders on line, in sharp contrast with more domestically oriented sectors, like retail, where most businesses do not engage in e-commerce (Figure 3.14).

Colombia ranks in the middle for the share of firms that place orders on line (e-purchases) and there is relatively little variation across sectors in the use of e-purchasing, suggesting that business to business online transactions are more advanced than sales to consumers (Figure 3.15). In addition, there is relatively little variation across sectors in the use of e-purchasing (in line with other countries), suggesting that the use of the Internet for business to business transactions is more mature than for business to consumer transactions (OECD, 2018c).

Figure 3.14. Several sectors are leaders for the ability to take orders on line

Businesses receiving orders over computer networks, as a percentage of enterprises with ten or more employees, 2016

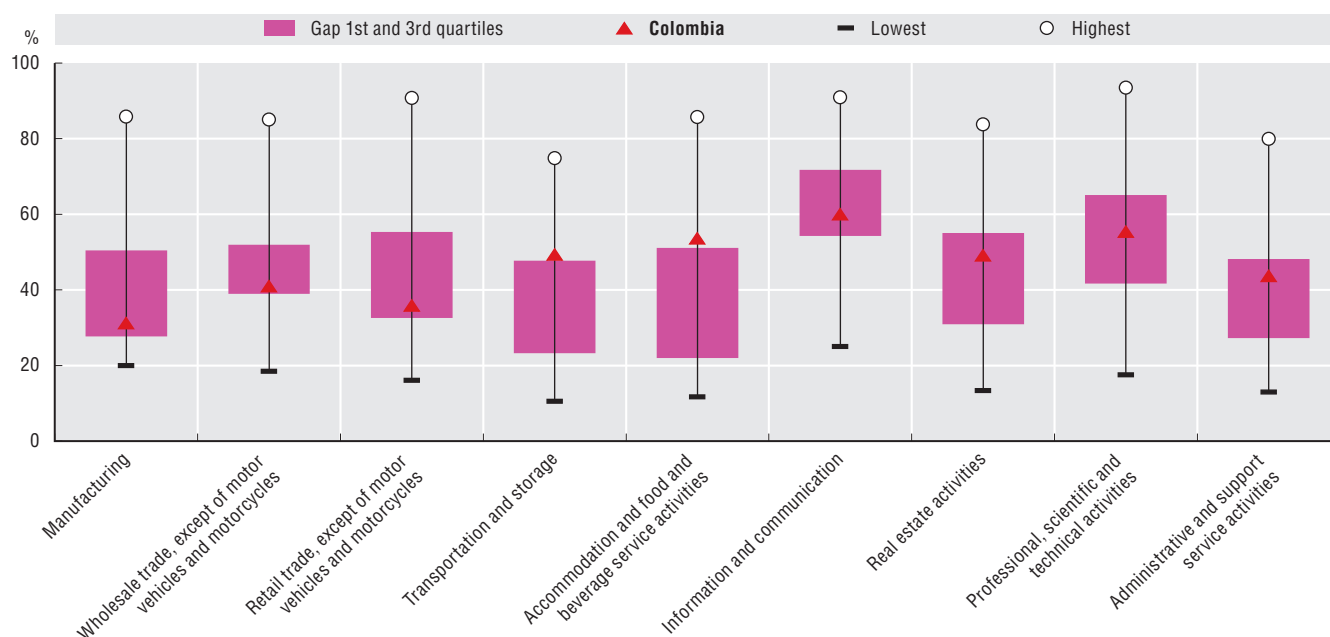


Notes: Except where otherwise stated, the sector coverage consists of all activities in manufacturing and non-financial market services. Only enterprises with ten or more employees are considered.

Source: OECD (2018c), *ICT Access and Usage by Businesses* (database), <http://oe.cd/bus> (accessed in June 2019).

Figure 3.15. There is relatively little variation in the share of firms making e-purchases

Businesses placing orders on line as a percentage of enterprises with ten or more employees, 2016



Notes: Except where otherwise stated, the sector coverage consists of all activities in manufacturing and non-financial market services. Only enterprises with ten or more employees are considered. For countries in the European Statistical System, data on e-purchases relate to 2015 instead of 2016.

Source: OECD (2018c), *ICT Access and Usage by Businesses* (database), <http://oe.cd/bus> (accessed in June 2019).

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Colombia also has a large share of micro- and informal firms with low-usage rates of ICTs. The usage of the Internet by micro-firms in many ways resembles that of households: while over 95% of firms with ten or more workers make use of Internet banking, less than a third of micro-firms do so (DANE, 2018b) (Figure 3.16). Therefore, policies that promote usage of the Internet among households, such as improving digital skills and financial inclusion (see above), are also likely to be of benefit to micro-firms.

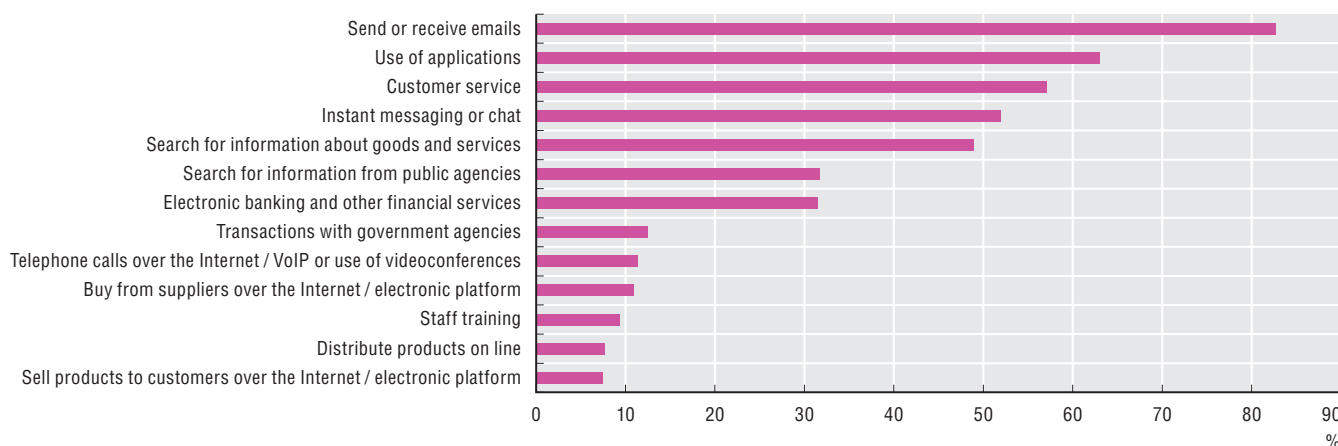
Adoption of ICTs is hindered by a lack of competitive pressures

Firms can be motivated to adopt new technologies, such as ICTs, in response to stronger competition from their rivals (Andrews, Nicoletti and Timiliotis, 2018). However, the particularly large dispersion of productivity between large and small firms in Colombia suggests inefficient allocation of resources, and a lack of competitive forces to push less productive firms out of the market (Brown et al., 2016; OECD, 2017d). Indeed, over 90% of micro-firms that do not make use of ICTs report a lack of necessity as the reason for not using them (DANE, 2017). Although Colombia has relatively few institutional restrictions on competition and the level of state control of the economy is in line with OECD countries, there are a number of non-regulatory barriers to competition (OECD, 2017d).

Poor infrastructure restricts the ability of productive firms to gain market share in nearby regions, and insulates less productive firms from competition. Although public investment has been steadily increasing since 2000, Colombia suffers high domestic transport costs. In addition, trucking services are provided by many one-truck firms with low productivity. The lack of integration into international markets (see Chapter 4), also insulates less productive firms, especially outside of the main cities (OECD, 2017d).

Figure 3.16. Internet activities carried out by micro-firms, 2016

As a percentage of micro-firms with Internet access



Note: VoIP = voice over Internet Protocol.

Source: DANE (2018b), “Indicadores básicos de tenencia y uso de tecnologías de la información y comunicación – TIC en microestablecimientos”, https://www.dane.gov.co/files/investigaciones/boletines/tic/Anexos_TIC_hogares_2017.xlsx (accessed in February 2019).

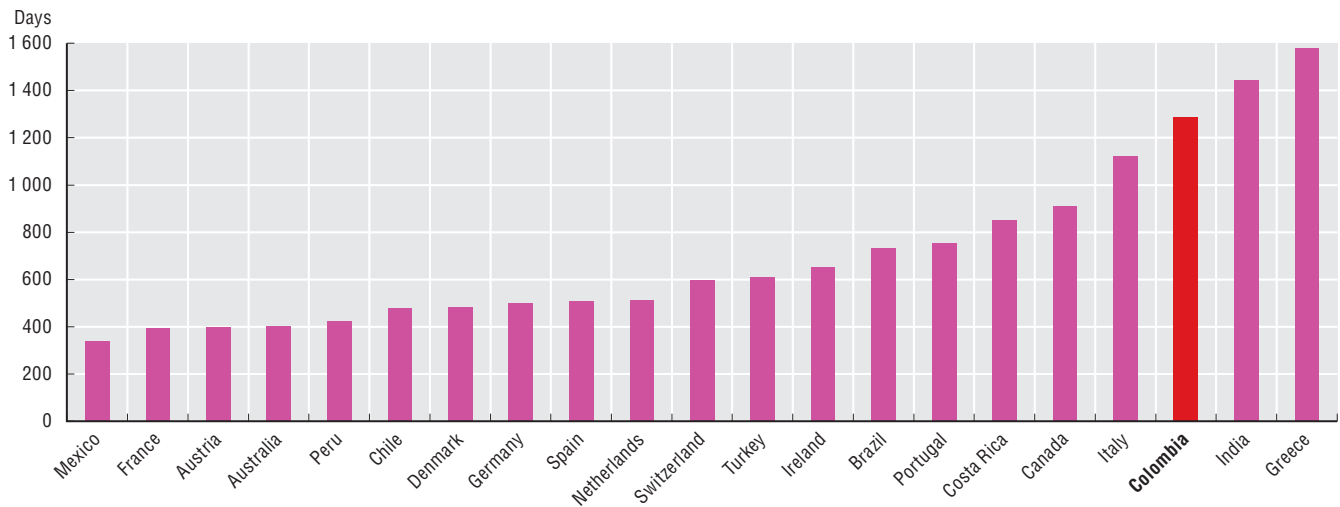
A relatively inefficient legal system and a tax code that favours family firms create incentives for entrepreneurs to rely on family structures when organising a firm (OECD, 2017d). The court system is very slow at resolving disputes compared to other OECD countries (Figure 3.17), which can lead to corruption and informality (OECD, 2017d). A lack of trust in the judicial process makes it difficult for minority shareholders to protect their rights (OECD, 2014). Therefore, entrepreneurs rely on granting positions of responsibility to trusted family members.

As a result, Colombia has a large share of family-controlled firms – 70% of firms in the manufacturing sector are family-controlled – and this can inhibit the adoption of ICTs (Lemos and Scur, 2018). Such firms are insulated from pressures by shareholders to maximise returns and to adopt the latest technologies and business practices. In addition, family firms rely on short-term finance from banks and suppliers as well as from family members and tend to be unwilling to cede control to external

investors, thus reducing the resources available to adopt new technologies (OECD, 2017d). Family firms also tend to lack the high-quality management that is needed for ICT uptake, as they have a smaller pool of potential managers to choose from (OECD, 2017d; Andrews, Nicoletti and Timiliotis, 2018). While the adoption of advanced technologies is linked to a firm's ability to manage such technologies, Colombia performs poorly for management quality relative to other countries (Katz, 2017; OECD, 2017d). Phasing out the preferential treatment of family firms in the tax code could boost adoption of ICTs.

Figure 3.17. The court system is slow to resolve disputes in Colombia

Time required to enforce a contract, 2018



Source: World Bank (2019), *Doing Business*, www.doingbusiness.org/en/data.

Linked to problems of family ownership, Colombia also has a large share of small and medium-sized enterprises (SMEs), which combined with micro-firms account for 80% of employment. Such firms have limited access to bank loans due to limited collateral, and Colombian SMEs face a higher interest rate spread (relative to large firms) than in any other OECD country (OECD, 2018b). As a result, such firms can lack the resources to invest in ICTs.

The high rate of informal employment (see Chapter 5) can also inhibit adoption of ICTs. Informal firms tend to be small, have low productivity, are typically run from a household, and lack access to credit, which can lead to low investment and low innovation (Oviedo et al., 2009; Stein et al., 2013). Bureaucracy can be a hindrance to the formalisation of firms, although in recent years progress has been made to reduce barriers to entry as procedures in setting up a business, registering property and paying taxes have been simplified (see below) and a new business formalisation policy was introduced in early 2019 (OECD, 2014, 2017d).

Finally, Colombian workers also lack many of the basic literacy, numeracy and digital skills that are necessary for greater adoption of ICTs (see Chapter 5).

Co-ordinating promotion efforts could improve results

Colombia has many programmes in place to promote the use of ICTs among firms. Some of these programmes are part of broader programmes to support the ICT sector, such as encouraging the development of apps and websites (see Chapter 5). There are also programmes targeting firms outside the ICT sector. However, dispersing efforts over a large number of firms, and a wide range of programmes, can limit their effectiveness.

The MiPyme Vive Digital plan promoted the use of ICTs among micro-enterprises and SMEs (MinTIC, 2017b). The plan included offering online courses, mentoring to entrepreneurs, support for firms conducting online commerce (for both business to business and business to consumers), incentives to produce custom applications and information campaigns to change attitudes towards ICTs (such

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as online payments). Since 2011, over 200 000 entrepreneurs have received training and 37 000 firms have implemented ICT solutions, for a total cost of COP 71 000 million (USD 23.6 million).¹ In this way the programme replicates some of the functions of other business development programmes. While the programme was successful in achieving its target of connecting over 70% of firms to the Internet by 2018, it fell short in other areas, with only 36% of firms having a website (compared to a target of 50%) and only 38% using social networks (against a target of 54%) (MinTIC, 2018a). The government is planning to support the development of digital payment tools, in order to promote wider use of digital technologies by businesses.

MinTIC has used information campaigns (such as the No Desaparezcas, Transfórmate campaign [<https://www.mintic.gov.co/transformate/>]) to inform micro-firms of the benefits of ICTs, including from the use of relatively simple tools, such as social media. It is questionable whether promoting more advanced technologies, such as for stock management, are beneficial to micro-firms in a weakly competitive environment, such as firms in Colombia's retail sector. Resources could be allocated more efficiently by targeting firms that can already make a business case for the use of ICTs (such as for booking an appointment or exporting crafts). In addition, rather than focusing training on owners of micro-firms, such people could be helped by general programmes targeted to the population as a whole, such as those already put in place by MinTIC.

An approach with better targeting of resources has been recently undertaken by MinTIC and the Ministry of Commerce, Industry and Tourism (Ministerio de Comercio, Industria y Turismo [MinCIT]) (through iNNPulsa Colombia) who collaborated in establishing the centres for business digital transformation (*centros de transformación digital empresarial* [CTDE]). The centres have a budget of COP 9.6 billion (approximately USD 3 million) to help almost 10 000 firms (MinTIC, 2017b). As part of this programme, firms receive a diagnosis of their business situation, a plan to bring digital technologies into their operations, and an evaluation of whether they have the hard and soft skills necessary for its implementation. MinTIC and iNNPulsa have planned to invest COP 8 billion (approximately USD 2.43 million) to finance the existing 14 CTDEs and to open 10 new ones, with the aim to increase coverage to 32 departments of the country by 2020.

Other agencies and ministries have also played a role in promoting use of ICTs by firms. The Colombian export promotion agency, ProColombia (see Chapter 4), has recently developed an online portal, ProColombia Market Place, to assist firms in exporting. MinCIT has created a plan to promote the use of information technology (IT) as part of the Productive Transformation Programme (Programa de Transformación Productiva) (now Productive Colombia [Colombia Productiva]). Most of these programmes seem small in scale. For example, the Fortalecimiento de Iniciativa Clúster Software y Servicios TI del Quindío, which aims to promote the more sophisticated use of ICTs in the coffee sector, has a budget of USD 44 600 and provides assistance to 30 companies only. Similarly, the Technology for Competitiveness (Tecnología para la Competitividad) programme promotes both the supply and demand of ICTs by subsidising the development of firm-specific software in the health sector, with a total contribution of USD 150 000, while Colombia Productiva and Fedesoft have established a platform (www.SoftWhere.com.co) to link firms and software providers. In order to avoid the fragmentation of these programmes, it would be preferable to pool the funding into a single agency or increase the co-ordination of programmes. In addition, concentrating assistance on firms which seek help would give laggard firms the incentive to adopt new technologies or risk losing market share to rivals.

Finally, reviewing regulations to ensure they are consistent with the digital transformation would further contribute to boosting use of digital technologies among firms. For instance, at present legal requirements discourage the use of online platforms in the tourist sector due to the necessity for each host to register their property with the commercial registry (Law 300 of 1996), though recent measures simplify registration (Decree 2063 of 2018). Similarly, despite recent changes, the legal requirement (Decree 2555 of 2010) that consumers sign hard copies of some application forms, e.g. for insurance, reduces online development of this sector.

The Colombian government is an advanced user of digital technology

Through use of ICTs the government aims to create a more open and transparent state and improve the delivery of its services. The Digital Government (Gobierno Digital) policy (outlined in Decree 1008 of 2018) serves as a firm basis to achieve these goals. However, the policy's full potential seems hampered

by limited co-operation among public institutions and the relatively low uptake of ICTs by the private sector and households. In addition, greater use of online procurement by all levels of government could be used to promote adoption of ICT by firms.

The Gobierno Digital policy aims to create an open, efficient state

The government's Gobierno Digital policy (which takes over from the previous Online Government Strategy) aims to use ICTs to both improve efficiency and to increase openness and public participation in government. The Colombian government is moving beyond the use of ICTs to improve routine internal processes and interactions with citizens (such as allowing online form filling) towards using digital technologies to provide new services (such as open access to data), referred to as “digital government” (OECD, 2017a). In addition, as changes driven by digitalisation affect many different government functions, Colombia has been taking a “whole-of-government” approach to its digital government strategy. The strategy was developed in co-ordination among several agencies, with MinTIC having the main responsibility for the formulation of the Gobierno Digital policy (OECD, 2017a; MinTIC, 2018a).

Up to 2018, four main components were included in the then Online Government Strategy:

1. “ICTs for services” aimed to improve procedures and digital public services to firms and households. It includes the Digital Citizen Services (Servicios Ciudadanos Digitales) initiative to facilitate the filing and accessing of key documents by citizens (such as birth certificates and medical history); while the No More Queueing (No Más Filas) e-services portal provides information on how to follow government procedures (OECD, 2017a).
2. “ICTs for open government” aimed to improve transparency and enable citizens to participate more fully in decision making. It includes the Open Data (Datos Abiertos) initiative to make government data publicly available and to facilitate the development of apps that use the data. In addition, the Crystal Urn (Urna de Cristal) initiative aims to create digital communication strategies, such as a portal (Redia Lab) that combines traditional media and digital means to promote dialogue with citizens (OECD, 2017a).
3. “ICTs for management” aimed to encourage the use of digital technology to improve decision making and managerial efficiency in the public sector. It includes several initiatives. One (Cofinanciación) provides financing to the private sector to create solutions to improve the efficiency of the public administration. In addition, the Territorial Platforms (Plataformas Territoriales) initiative gives technical assistance to municipalities and departments to help them implement the Gobierno Digital policy. The Excellence Route (Ruta de la Excelencia) project prioritises which government procedures and services should be available on line. The Online Government Excellence Programme (Programa para la Excelencia en Gobierno Electrónico) aims to promote an innovation culture within public sector management, while a Seal of Excellence (Sello de Excelencia) is awarded for online government services and procedures that reach a high standard (OECD, 2017a).
4. Finally, the “Information security and privacy” component aimed to protect information systems (OECD, 2017a).

Since 2018 these have been consolidated into two components: ICTs for the State, which focuses on the functioning of public entities and their use of ICTs, and ICTs for Society, which focuses on how citizens interact with the state, including accessing open data (MinTIC, 2018b). The aim of the modified policy is to: create and improve reliable and quality digital services; have safe and efficient processes by strengthening ICT management capabilities; take data-based decisions; empower citizens through the consolidation of an open state; and promote the development of smart territories and cities to solve social challenges and problems through the use of ICTs. To achieve this MinTIC has been developing initiatives such as a unique portal for the Colombian state (www.gov.co).

Although the majority of national level institutions consider the strategy a high priority or essential, most institutions found it difficult to align their development or institutional plan with the Gobierno Digital policy. MinTIC consulted some public institutions when developing the Gobierno Digital policy, but their participation was mainly limited to the implementation and evaluation stages (OECD, 2018a). Greater consultation may improve future iterations of the strategy. In addition, rather than performing operational roles, MinTIC should take a more strategic role, such as building skills in public institutions, providing money for digital government, and improving co-ordination mechanisms to ensure consistent use of ICTs across different levels and sectors of government (OECD, 2018a).

Colombia has moved beyond the provision of digital public services

At present, bureaucracy in Colombia can be slow and inefficient. It takes an average of 7.4 hours for citizens to complete a government transaction, the third longest duration in Latin America, and a quarter of transactions require three or more interactions with the government to be completed. Such inefficiencies can disproportionately affect those with low education, who find it difficult to navigate bureaucratic processes, and encourage people to pay bribes to expedite processes (Roseth et al., 2018).

The provision of digital public services can increase the efficiency of the public's interaction with government, and Colombia is advancing in its provision of such services. Colombia is currently developing an Online Citizen Folder (Carpeta Ciudadana Digital), which allow citizens to access documents such as medical, education and military records, and also help public entities to provide better services (MinTIC, 2017a). By 2017, however, only 15% of government transactions could be completed on line (compared to an EU average of 81%) (Roseth et al., 2018).

The use of digital public services by the public is also limited by the relatively low use of the Internet among households (see above). Although only 10% of people completed their last government transaction entirely on line, Colombia performs well relative to other Latin American countries with similar levels of broadband penetration. However, the demand for digital public services is likely to increase with Internet usage and educational attainment. Indeed, those who have already used digital public services are likely to do so again: the proportion of Internet users who completed their last transaction on line rises to 63% among advanced ICT users (based on a survey of mainly tertiary educated daily regular Internet users who were asked of their experience of digital public services), highlighting the potential for expansion (Roseth et al., 2018).

Some problems also exist with respect to the provision of digital public services, with 45% of people failing in their last attempt to complete a transaction online (Roseth et al., 2018). Although there is a high level of satisfaction with the digital public services provided by national level public institutions linked to culture, commerce, foreign affairs and communication, satisfaction with public institutions in justice, the interior and environment sectors lag behind. In addition, although municipalities account for 95% of government transactions, satisfaction with their digital services is also low (OECD, 2017a; Roseth et al., 2018). Digital identities could help improve the efficiency of digital transactions with the government by reducing duplication of data entry, and steps have been taken to introduce these (ANDI, 2018). In addition, the PND 2018-2022 aims to move all individuals' interactions with the government on line, unless a face-to-face interaction cannot be avoided.

Overall, Colombian institutions are ready for digital government but institutions tend to operate in silos and at different paces, which hampers an overall strategic approach (OECD, 2018a). Greater use of the interoperability framework and interoperable systems such as the Carpeta Ciudadana Digital would help to remove such barriers.

Colombia has also been advancing in promoting digital interaction with firms. All government entities must publish details of their procurement on an online public contracting information system, which consists of three main elements:

1. Secop I is an information portal that publishes contracts and procurement notices (OECD, 2016c). This allows firms to identify the needs of government entities and to offer their goods and services. However, procurement is frequently completed by direct contracts with suppliers rather than by tender. In 2018, 72% of total procurement spending was via Secop I.
2. Secop II is an evolution of Secop I. It is a transactional portal which allows for e-tendering and electronic submission of bids, along with other functions such as making complaints. Government entities are transitioning to Secop II and in 2018 it accounted for 26% of total procurement.
3. Virtual Shop (Tienda Virtual) is a platform linking government agencies with firms that have already reached a price framework agreement with Colombia Compra Eficiente (Colombia's central procurement body). This allows government entities to directly purchase relatively commonly bought items such as stationary and vehicles.

Use of the system is mandatory for central government, and over 13 000 state entities are registered (Colombia Compra Eficiente, 2019).

The Secop II transaction portal and Tienda Virtual have the potential to be a driving force in the digital transformation, especially in municipalities. The portal can help promote transparency in local level governance, encouraging the adoption of digital technologies by Colombian firms, and thus increase formality. Therefore, increased training of municipal staff, especially in more rural areas, to use the system (and making the interface user friendly) should be a priority for the government. In addition, further training should be provided to smaller local firms so that they can take advantage of the Tienda Virtual.

ICTs are supporting a more open state

Colombia has gone beyond the provision of digital public services and is using ICTs to create a more open and transparent state. The Transparency and Access to Information Law (2014) provides for a list of institutions that have an obligation to publish reports of their activities. The bulk of public institutions also have an ICT strategy in place to promote greater transparency, citizen participation and use of open data with the aim of building trust with the public (IMF, 2018; OECD, 2018a).

Several initiatives have been taken to improve open government. Urna de Cristal is an initiative to promote electronic citizen participation and government transparency, which makes use of a combination of traditional and digital media. This forum has received over 32 million submissions since 2011 and answered 160 000 questions. A Transparency Secretariat also exists to encourage citizens to report incidents related to corruption, e.g. parents are invited to send photos of the school meals of their children to ensure that they meet the required standards (OECD, 2018a). This secretariat complements the public contracting information system (above). Although perceptions of corruption may have increased since the introduction of transparency initiatives, this can be explained by greater public awareness of instances of corruption, rather than an increase in corruption itself (IMF, 2018).

As a result of such initiatives, there is evidence that the Gobierno Digital policy has increased trust in government, transparency in contracting and public sector integrity (OECD, 2017a). Colombia is among the world's top countries for e-participation, ranked 23rd in the world and mid-ranked relative to other OECD countries. Colombia performs well in terms of e-information (whereby the governments gives citizens information to make informed choices through ICTs) and also e-decision making, such as direct e-voting or rating options through social media. However, Colombia scores lower on e-consultation (whereby citizens are consulted on a policy or project through channels such as social media, online petitions and polls) (United Nations, 2018). Such use of e-decision making is perhaps inappropriate given the unequal access to the Internet of individuals (Figure 3.3). Indeed, public institutions consider the main barrier to greater digital participation to be the public's lack of access to technology, followed by their lack of knowledge or skills in the use of digital technologies (OECD, 2018a). Public participation also plays a role in contributing to high-quality digital services, as it is found that institutions with systems for petitions tend to have a higher level of quality and service satisfaction from users (OECD, 2017a).

Greater co-ordination among state agencies could also help Colombia further improve open government. For example, there are no clear links between the Transparency Secretariat and MinTIC's initiatives on open data (OECD, 2018a). In addition, the level of openness varies by level of government. Municipalities perform less well in terms of online transparency and open government, but perform better than national level institutions for digital participation, which is likely reflective of municipalities' role in local decision making. Open government could be further improved by ensuring that technical resources and implementation guides are made available, particularly for municipalities in less-developed regions (OECD, 2017a).

Colombia leads in the provision of open data

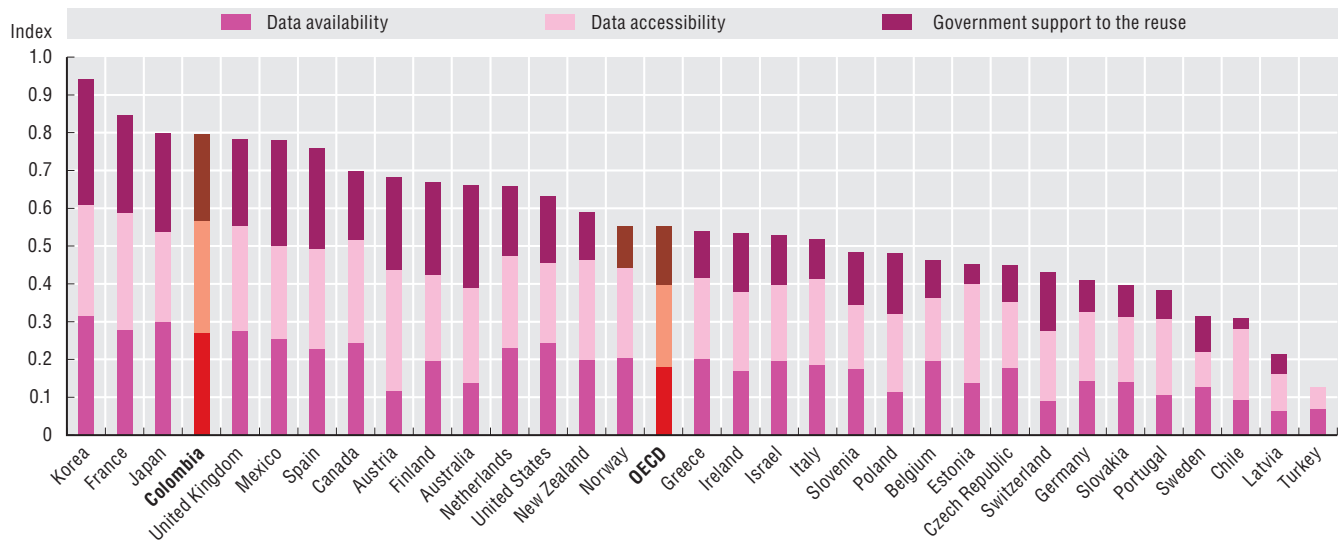
By making government data publicly available, the government boosts transparency and provides citizens with the information needed to influence policy in an informed manner. As part of the Datos Abiertos initiative, all government data of national level public institutions are required, by default, to be open. Indeed, Colombia has increased the number of open datasets available on an official open data portal (datos.gov.co), though a fee may be charged for data not available on line (OECD, 2018a; MinTIC, 2015). Such data are made accessible through the use of the machine-readable CSV format and the provision of metadata (OECD, 2015). Colombia has promoted the reuse of open data by the public through initiatives such as Datos a la U (targeted at university students), Máxima Velocidad (maximum speed in the participation of employees of public entities), rally Colombia (in which citizen

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overseers participate) and Datatón (in which members of the Senate participate) (OECD, 2018a). As a result, Colombia scores highly at the central government level for implementing International Open Data Charter Principles, which aim to promote the accessibility, availability and reuse of government data by both public and private users (Figures 3.18 and 3.19) (OECD, 2017b). The government plans to continue this policy by increasing the number of public entities with an open data project from 9% in 2018 to half by 2020 (MinTIC, 2019a).

Figure 3.18. Colombia is a leader in providing open data

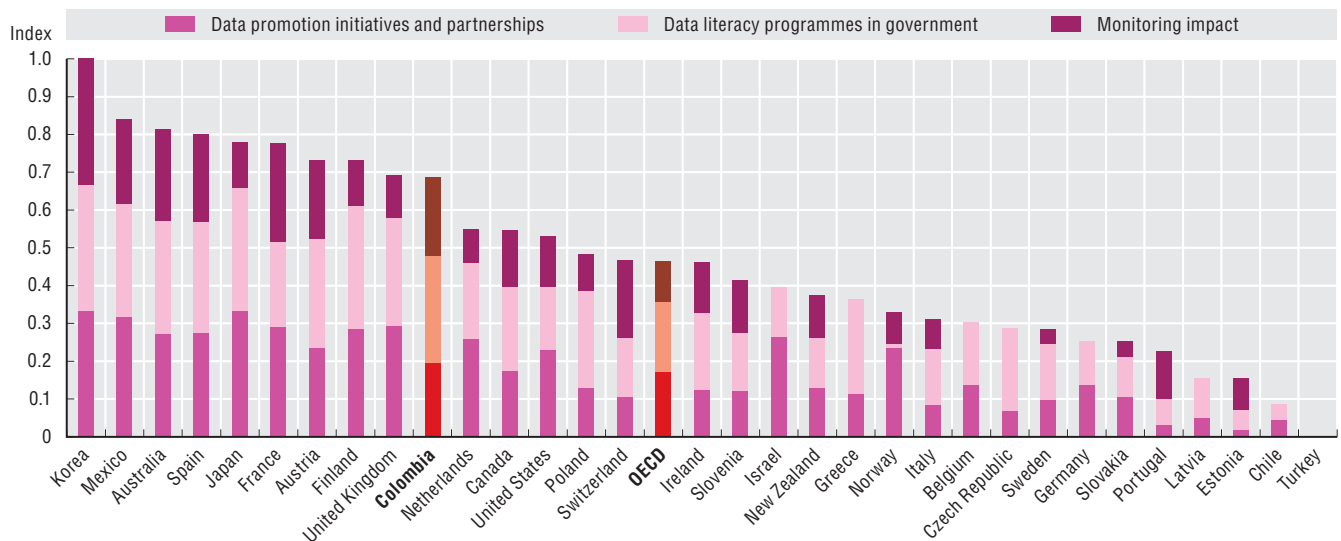
Open-Useful-Reusable Government Data Index (OURdata), 2017



Source: OECD (2019b), OECD Survey on Open Government Data, <https://www.oecd.org/gov/digital-government/open-government-data.htm> (accessed in April 2019).

Figure 3.19. Colombia promotes the reuse of government data

Open-Useful-Reusable Government Data Index (OURdata), government support for data reuse, 2017



Source: OECD Survey on Open Government Data, <https://www.oecd.org/gov/digital-government/open-government-data.htm>.

Despite this success, use of government data is hindered by a system of data governance that largely focuses on protecting security and privacy rather than facilitating data sharing and citizens' access and management of their own data. In addition, there is limited ability to leverage the expertise of

universities and the private sector, though attempts are being made to overcome this (see Chapter 5) (OECD, 2018a). Although the aim of open data is that all government data be published in an open format, achieving this may be unfeasible. Therefore, government should consult with potential end users – both citizens and other public institutions – in order to prioritise which data should be publicly available (OECD, 2018a).

Use of data has improved internal processes, but its full potential is yet to be harnessed

In addition to sharing data publicly, Colombia has a programme to promote the internal sharing of data to improve processes within the public administration. Colombia has taken a strategic approach to designing online services, with the development of an interoperability framework facilitating the sharing of information among institutions (United Nations, 2018; OECD, 2017c). The use of such data is beneficial as institutions that greatly made use of strategic data and data exchanges with other institutions were effective in improving their internal processes (OECD, 2017a).

Although almost half of national institutions use their own data to improve policies, very few use other institutions' data (OECD, 2018a). In particular, municipalities lag behind national level institutions and governorates in terms of data sharing within the public sector (OECD, 2017a). Only about 40% of municipalities exchange data with other institutions, compared to about two-thirds of national level institutions and governments, with this most commonly being done in response to an individual request (OECD, 2018a). In addition, only 61% of national entities are interoperable with other entities (Roseth et al., 2018). Following through with plans to develop an interoperability platform could help boost efficiency in data sharing. In addition, sharing public sector data would help improve transparency.

Despite government data being open by default, data management practices do not always facilitate data sharing. This could be improved by adopting a principle of openness by design. It is not common practice for institutions to document the information and data they have in the form of data catalogues. The use of such catalogues could help to avoid dataset duplication and could also highlight the potential of data (OECD, 2018a). Digital participation and collaboration could be further enhanced by setting ICT planning objectives within institutions, generalising ICT monitoring practices for the management of ICTs and ensuring the implementation of the online management policies that are part of the Gobierno Digital policy (OECD, 2017a). In addition, developing an appropriate regulatory framework for the data management practices based on the principles of openness by design and sharing by design could facilitate the sharing of data between government agencies (OECD, 2018a). In Spain, this has been done by allowing citizens the right to refuse to provide data to government agencies that are already held by another agency, thereby forcing agencies to share data. Meanwhile in Estonia, public agencies are not allowed to ask for data if they have already been provided to another agency.

Colombian institutions have begun to make use of more advanced data techniques to improve policies and services. While there have been several initiatives in data analytics and the Internet of Things (IoT), e.g. monitoring the risk of flooding, these techniques are not generally used (OECD, 2018a). The CAOBA Alliance, a partnership among the public, private and academic sectors, aims to promote the use of big data, while the Centre for IoT promotes the use of the IoT (see Chapter 5). However, such initiatives are generally limited to local issues, and are not part of an integrated programme (OECD, 2018a). In addition, a national Big Data Strategy has been developed (CONPES 3920) and pilot projects have been established to highlight applications of big data within public institutions (OECD, 2017c; DNP, 2018). However, only 41% of national level public institutions, 31% of governorates and as few as 7% of municipalities use data analytics to support decision making and design public policies (OECD, 2018a). The PND 2018-2022 instructs national level government entities to make greater use of such emerging technologies.

A lack of skills in relation to data management is an obstacle to the use of data within institutions, and interoperability with other institutions. To address this, MinTIC has created programmes to build skills within public institutions. In 2015 and 2016, eight new diploma courses aimed to improve civil servants' skills in relation to IT were introduced at the Cooperativa University. In addition, the Programme for Excellence of Digital Government (Programa para la Excelencia del Gobierno Digital) gives training to public servants at a national and regional level. Public institutions consider training to be the most useful resource to support the institution's technical capacities (OECD, 2018a).

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In January 2017, a data science team was established in the National Planning Department (Departamento Nacional de Planeación) to help the government use data to improve efficiency and support decision making. The team both conducts projects for government departments and co-operates with other public entities. Projects completed in 2018 include tools to help measure recidivism, measure the efficiency of the Colombian judiciary, map the distribution of income in rural Colombia and use satellite images to identify tertiary roads.

Better results could be achieved through better project management

Greater monitoring and evaluation of ICT projects, which at present are not standard activities for public institutions, could lead to better outcomes. However, most Colombian public institutions lack the resources (such as skilled staff) to increase the monitoring and evaluation of digital government initiatives. In addition, a third of Colombian institutions report that the lack of a perceived need is an obstacle to monitoring and evaluation of projects (OECD, 2017a).

The Gobierno Digital policy includes a monitoring system for its implementation, including a *Digital Government Index* introduced to rank public institutions, and opinion polls of users. However, the strategy focuses on the supply of digital services, rather than their impact (OECD, 2018a). In addition, public institutions have been reluctant to report data to central government that could negatively impact their ranking in terms of implementing the Gobierno Digital policy. Moving away from a system of ranking towards impact assessments could give institutions a greater incentive to report the data they have (OECD, 2017a). Although most Colombian institutions monitor and evaluate their digital interactions with vulnerable groups, this is mainly done through the use of questionnaires. Greater use of data could be useful to evaluate the use of services. For example, the United Kingdom analyses the number of data request forms to assess the impact of open data (OECD, 2018a). The use of open government data may also reduce the burden of filling out questionnaires for assessments in the future (OECD, 2017a).

To help institutions in their information management, the government has set out several implementation guides, such as for IT strategy and IT governance. OECD research has found that use of these guides is linked to more advanced planning of ICT projects and higher quality digital services (OECD, 2017a). However, use of the guides has been limited, especially by municipalities (OECD, 2017a). Therefore, their promotion among municipalities should be accompanied by mentoring and technical advice (OECD, 2018a). Indeed, the government plans to increase technical assistance to regional governments as part of the Plan Estratégico Sectorial 2019-2022 (MinTIC, 2019a).

There is also room for improvement in the procurement of ICTs. While there are multiple framework agreements with ICT suppliers (managed by Colombia Compra Eficiente, see above), there is no government-wide procurement strategy for the procurement of ICTs. Although the lack of a central procurement strategy allows different agencies and ministries greater flexibility in procuring ICTs, some ministries do not have the capacity to take effective procurement decisions. The lack of integrated digital government solutions is shown by only a quarter of national level institutions sharing ICT infrastructure (OECD, 2018a). Therefore, the government should take steps to centralise procurement in order to increase its purchasing bargaining power and prevent individual ministries from becoming dependent on some IT providers, who may take advantage of their position. In addition, a more centralised approach could allow government institutions to take advantage of shared ICT resources and limit their exposure to the maintenance of infrastructure for which they are not well suited.

Conclusions

The Colombian government has followed a balanced approach to promote the adoption of digital technologies through its Vive Digital plan. The government has tackled low Internet uptake by poorer households by making free-of-charge Internet access points available and providing discounted mobile Internet plans. This is allowing Colombia to converge with advanced OECD countries. Nevertheless, Colombians make little use of paid-for services, such as online retail. While the government has taken action to remove some of the obstacles that inhibit greater use of paid-for services (such as by promoting financial inclusion), consumers' trust in online retailers remains low.

Low business to consumer e-commerce can also be explained by low adoption of more advanced digital technologies by firms. Although use of the Internet among businesses is widespread, connection speeds are slow. The government has put in place several programmes to promote the use of digital technologies, but low competitive pressures reduce the incentive for firms to improve their production processes. Boosting competition, for instance by increasing international openness and improving efficiency in the judicial system – thereby reducing the reliance on trusted family members in firms – could lead to greater adoption of new technologies and boost productivity. The government has already used ICTs to increase competition by streamlining procedures to establish a new business and reducing red tape.

Indeed, the Colombian government has gone beyond using the Internet to improve routine procedures and aims to improve transparency and democracy through digital technologies. Although households still make relatively little use of online government services, this can be explained by limited diffusion of the Internet. Digital government services can be easily scaled up as Internet uptake increases and the demand for such services rises. The government is also committed to making government data publicly available, which can help promote informed debate regarding government policies. Greater use of other public institutions' data could also help branches of government to improve services and policies.

Box 3.1. Key recommendations for fostering digital technologies among households, firms and in government

Fostering digital technologies among households

- Concentrate funding for digital access *puntos* and kioscos in areas where they are used most.
- Improve development of pupils' computer skills through extra-curricular activities such as computer clubs and online competitions.
- Improve conditions for use of paid-for Internet services by:
 - ❖ continuing to promote financial inclusion
 - ❖ creating a dedicated website to deal with consumers' complaints related to e-commerce
 - ❖ increasing trust of online retailers by introducing a quality mark for retailers that reach high standards.
- Promote consumer trust of e-commerce by establishing a special department of the public prosecutor's office to deal with cybercrime.

Fostering digital technologies among firms

- Increase competitive pressures on firms to adopt ICTs by:
 - ❖ increasing international openness
 - ❖ phasing out favourable treatment of family firms in the tax code.
- Focus funding to promote ICTs and modern management approaches on firms that request assistance, allowing competitive pressures to encourage laggard firms to increase adoption.

Fostering the digital transformation in government

- Improve alignment of public institutions' development plans with the Gobierno Digital policy by involving institutions at an earlier stage of developing the strategy.
- Incentivise use of the Colombia Compra Eficiente portal in municipalities and continue investment in the Secop platform.
- Improve open government by ensuring that technical resources and assistance are made available, particularly for municipalities in poorer regions.
- Increase consultation with potential end users of open data about prioritising which data are made available.
- Improve data sharing among public institutions by adopting a principle of openness by design, and increase the use of data catalogues.
- Reduce ICT costs by adopting a government-wide strategy for the procurement of ICTs.

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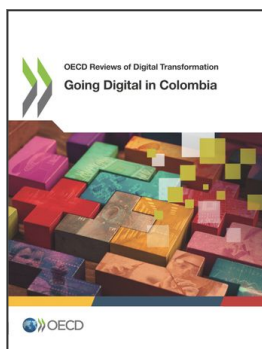
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Notes

Israel

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

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