

DIGITAL ECONOMY FOR LATIN AMERICA AND THE CARIBBEAN

Country Diagnostic:



Ecuador

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Digital Economy for Latin America and the Caribbean Country Diagnostic: Ecuador

January 2024

DDT



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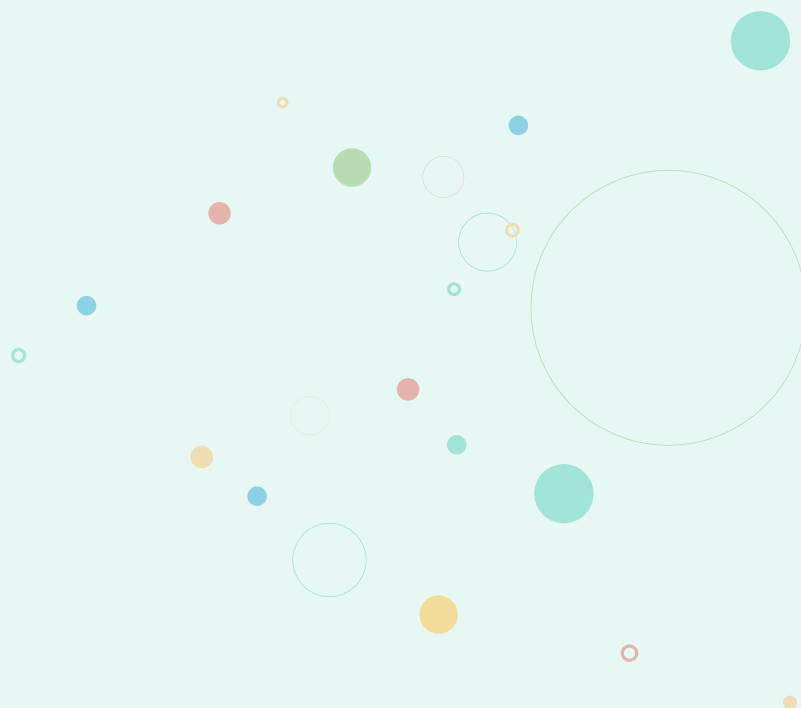
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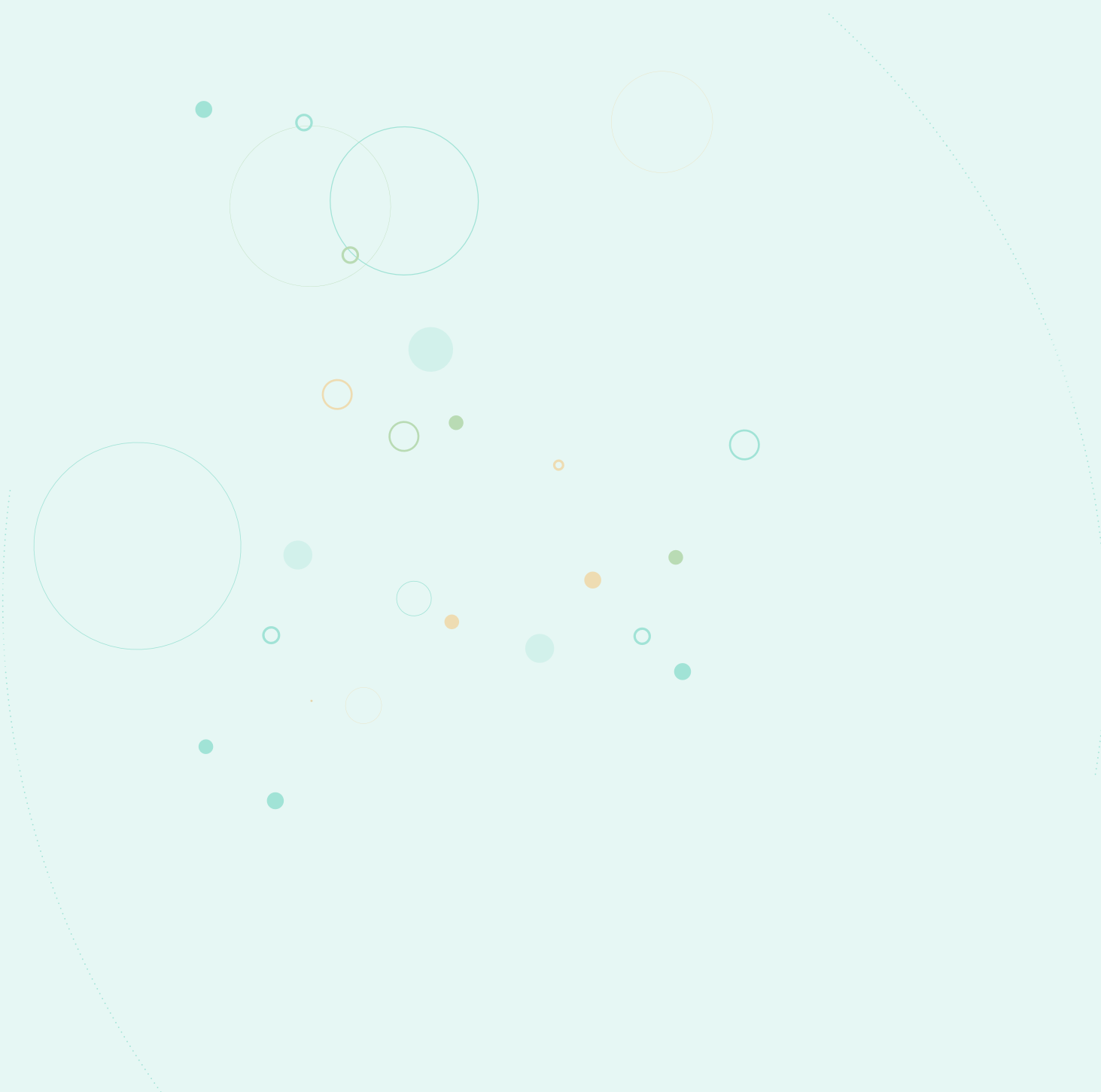


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ABBREVIATIONS

ARCOTEL	Agencia de Regulación y Control de las Telecomunicaciones (Telecommunications and Regulation Control Agency)
ASOBANCA	Asociación De Bancos Del Ecuador (Bank Association of Ecuador)
BCE	Banco Central del Ecuador (Central Bank of Ecuador)
CCE	Compensación de Cámaras Especializadas (Specialized Compensation System)
CDD	Customer Due Diligence
CECE	Cámara Ecuatoriana de Comercio Electrónico (Chamber of E-Commerce)
CERT	Computer Emergency Response Team
CMM	Cybersecurity Capacity Maturity Model
CNC	Consejo Nacional de Ciberseguridad (National Cybersecurity Committee)
CNT	Corporación Nacional de Telecomunicaciones (National Telecommunications Corporation)
CoE	Council of Europe
COIP	Código Orgánico Integral Penal (Comprehensive Organic Criminal Code)
COMF	Comprehensive Organic Monetary and Financial Code (Código Orgánico Monetario y Financiero)
DEA	Digital Economy Assessment
DFS	Digital Financial Services
DIGERCIC	Dirección General de Registro Civil, Identificación y Cedulación (General Directorate of Civil Registry, Identification, and Certification)
DINARP	Dirección Nacional de Registros Públicos (National Directorate of Public Registries)
EcuCERT	Equipo de Respuesta a Emergencias Informáticas de Ecuador (Ecuadorian Computer Emergency Response Team)
EGDI	Electronic Government Development Index (United Nations)
EPS	Economía Popular y Solidaria (Popular and Solidarity Economy)
ESPOL	Escuela Superior Politécnica del Litoral (Polytechnic School of the Coast)
G2P	Government-to-Person
GDPR	General Data Protection Regulation
GEI	Global Entrepreneurship Index
GNI	Gross National Income
GoE	Government of Ecuador
ICD	Infraestructuras Críticas Digitales (Critical Digital Infrastructure)
ICT	Information and Communications Technology
IDB	Inter-American Development Bank
INEC	Instituto Nacional de Estadística y Censos 9National Institute of Statistics and Censuses)
INEVAL	Instituto Nacional de Evaluación Educativa (National Institute of Educational Evaluation)
IP	Internet Protocol
IPO	Initial Public Offering
ITU	International Telecommunication Union
IXP	Internet Exchange Point
JPRF	Junta de Política y Regulación Financiera (Financial Policy and Regulation Board)
JPRM	Junta de Política y Regulación Monetaria (Monetary Policy and Regulation Board)

JPRMF	Junta de Política y Regulación Monetaria y Financiera (Monetary and Financial Regulation and Policy Board)
KYC	Know Your Customer
LAC	Latin America and the Caribbean
LOPDP	Ley Orgánica de Protección de Datos Personales (Organic Law on the Protection of Personal Data)
LORCPM	Ley Orgánica de Regulación y Control del Poder de Mercado (Organic Law on Regulation and Control of Market Power)
LOT	Ley Orgánica de Telecomunicaciones (Organic Law on Telecommunications)
LOTAIP	Ley Orgánica de Transparencia y Acceso a Información Pública (Organic Law on Transparency and Access to Public Information)
LOTDA	Ley Orgánica para la Transformación Digital y Audiovisual (Organic Law on Digital and Audiovisual Transformation)
M&A	Mergers and Acquisitions
MIES	Ministerio de Inclusión Económica y Social (Ministry of Economic and Social Inclusion)
MINEDUC	Ministerio de Educación (Ministry of Education)
MINTEL	Ministerio de Telecomunicaciones y de la Sociedad de la Información (Ministry of Telecommunications and Society Information)
MSME	Micro, Small, and Medium-Sized Enterprise
MTO	Money Transfer Operators
NCS	National Cybersecurity Strategy
NFIS	National Financial Inclusion Strategy
NPI	Non-Pharmaceutical Interventions
PND	Plan Nacional de Desarrollo (National Development Plan)
PPP	Public-Private Partnership
SaaS	Software as a Service
SB	Superintendencia de Bancos (Superintendency of Banks)
SCI	Sistema de Cobros Interbancarios (Interbank Billing System)
SCPM	Superintendencia de Control del Poder de Mercado (Superintendency of Market Power Control)
SENESCYT	Secretaría Nacional de Educación Superior, Ciencia, Tecnología e Innovación (National Secretariat of Higher Education, Science, Technology, and Innovation)
SEPS	Superintendencia de Economía Popular y Solidaria (Superintendency of the Popular and Solidarity Economy)
SFPS	Sector Financiero Popular y Solidario (Popular and Solidarity Financial Sector)
SIGEF	Sistema Integrado de Gestión Financiera (Integrated Financial Management System)
SME	Small and Medium-Sized Enterprise (Pequeñas y Medianas Empresas)
SOCE	Sistema Oficial de Contratación Pública (Official Public Procurement System)
SPD	Superintendencia de Protección de Datos (Data Protection Authority)
SPI	Sistema de Pago Interbancario (Interbank Payment System)
SRI	Servicio de Rentas Internas (Internal Revenue Service)
Supercias	Superintendencia de Compañías (Superintendency of Companies)
TVET	Technical and Vocational Education and Training
UAFE	Unidad de Análisis Financiero y Económico (Financial and Economic Analysis Unit)
VAT	Value Added Tax

EXECUTIVE SUMMARY

Ecuador has made significant progress on the adoption of digital technologies over the past decade.

Sixty percent of households now have access to the internet, a 28-percentage point increase from 2014. The share of individuals making or receiving digital payments has nearly doubled over the same time period, from 25 percent in 2014 to 47 percent in 2021. An uptake in digital businesses has also been seen in the fintech sector, with 27 percent of the country's digital firms operating in this space compared to 18 percent in the large economies of Latin America and the Caribbean.

Despite these advances, millions of Ecuadorians, particularly those in rural areas, continue to be excluded from the digital economy because of affordability constraints, uneven infrastructure, and gaps in digital skills.

Just 38 percent of Ecuadorians in rural areas have access to the internet compared to 70 percent in urban areas. Ecuador's low score on the World Economic Forum's Digital Skills Index (98th out of 141 countries) indicates that many Ecuadorians lack the required skills to participate in and benefit from the digital economy. Structural issues, such as the dominance of state-owned companies in providing fixed-line and broadband services and regulatory barriers for fintech companies, also contribute to higher costs and lower access to digital technologies compared to neighboring countries.

Accelerating the adoption of digital technologies and addressing inequities in digital access can help Ecuador achieve its development goals.

The promotion of digital technologies can assist Ecuador in addressing its most persistent development challenges, including

low productivity growth, weak labor markets, and income inequalities. For example, recent empirical evidence from Ecuador suggests that firm-level adoption of digital technologies can increase productivity. Digital technologies can also be leveraged to improve access to education, financial inclusion, and targeting and delivery mechanisms for social protection programs.

This report provides recommendations to support the effective implementation of Ecuador's Digital Transformation Agenda 2022–2025.

Universal internet access and digital transformation can help the country promote productivity and competitiveness in the non-extractive sectors, foster sustainable growth, create better jobs, and bridge inequalities, particularly the urban-rural divide as concerns the indigenous populations. The government's commitment to digital transformation to address its development challenges is evident in the newly passed agenda, which includes digital infrastructure as axis number one. This report provides Ecuadorian authorities with recommendations for implementing the agenda across six pillars: digital infrastructure, digital public platforms, digital financial services, digital businesses, digital skills, and the trust environment. Key recommendations include legal and regulatory reforms to address affordability barriers to internet access, foster fintech and e-commerce ecosystems, and enhance cybersecurity. Ecuador's digital transformation will also require investments in fixed and mobile infrastructure and international bandwidth, as well as in digital public platforms, to improve user experience and interoperability. Guiding student progress in digital skills from primary to higher education and digitizing government payments are also key reform areas.

OVERVIEW

The widespread adoption of digital technologies is transforming how individuals, businesses, and governments interact and at the same time creating new opportunities to address longstanding development challenges. By 2025, the contribution of the digital economy to global GDP is expected to reach 25 percent, up from 15.5 percent in 2016. The rapid and extensive adoption of digital technologies, alongside increased connectivity, the exponential growth of data and computing power, and deep cultural changes among individuals and organizations, is driving the development of the digital economy.

Ecuador has made significant progress on the adoption of digital technologies in recent years. Sixty percent of households now have access to the internet, a 28-percentage point increase from 2014. The share of individuals making or receiving digital payments has nearly doubled over the same period, from 25 percent in 2014 to 47 percent in 2021. An uptake in the number of digital businesses has also been seen in the fintech sector, with 27 percent of the country's digital firms operating in this space compared to 18 percent for other large economies in Latin America and the Caribbean (LAC).¹

The Government of Ecuador's (GoE) Digital Transformation Agenda 2022–2025² recognizes the potential of adopting digital technologies to accelerate productivity growth, boost competitiveness, and reduce inequality and has prioritized efforts to bolster digital technology adoption among businesses, individuals, and the public sector. Led by the Ministry of Telecommunications (*Ministerio de Telecomunicaciones y de la Sociedad de la Información* [MINTEL]), the Digital Transformation Agenda is an essential first step in enabling the public sector to play a pivotal role in the digital transformation of the economy as a key user of digital technologies to deliver products and services; as coordinator and facilitator of initiatives from stakeholders in the private sector, civil society, and academia; and as a regulator of the functions and activities associated with the digital economy. In addition, the newly adopted National Cybersecurity Strategy 2022–2025 (NCS) is an important step in strengthening the country's capacities to identify and proactively mitigate the downside risks of the widespread adoption of digital technologies.³

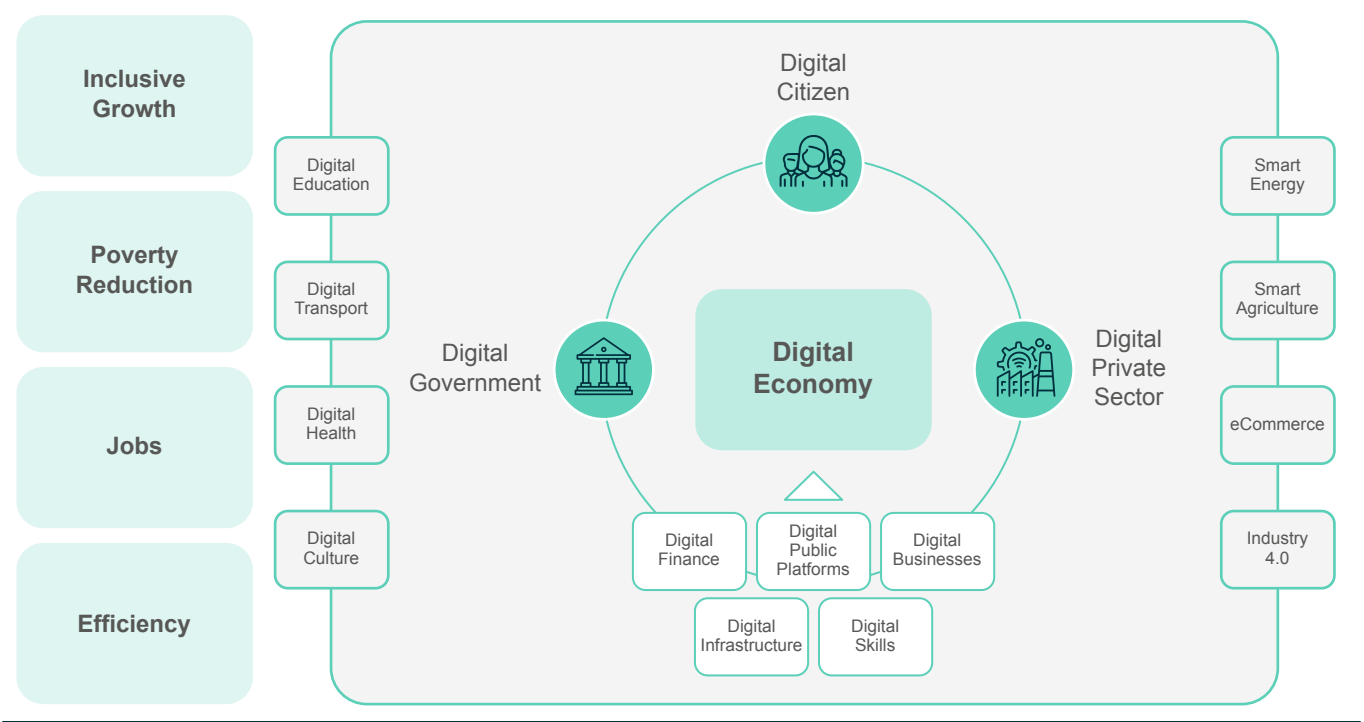
Despite the GoE's efforts, however, millions of Ecuadorians continue to be excluded from the digital economy because of affordability constraints, uneven infrastructure, and gaps in digital skills. Just 38 percent of Ecuadorians in rural areas have access to the internet compared to 70 percent in urban areas. Moreover, the activities for which the internet is used in Ecuador, mainly communications and social media, are limited and may not necessarily contribute to overall social and economic development. The relatively narrow scope of internet use could be influenced by the insufficient digital skills levels throughout the country, as Ecuador's low ranking on the World Economic Forum's Digital Skills Index (98th out of 141 countries) indicates that many Ecuadorians lack the required skills to participate in and benefit from the digital economy. The shortage of digital skills, combined with the low sophistication of internet usage, makes it challenging to leverage technology for purposes that could potentially enhance the country's development. Additionally, structural issues, such as the dominance of the state-owned company in providing fixed-line and broadband services, along with the lack of a stable regulatory environment, lead to high costs and lower access to services compared to neighboring countries.

Promoting the widespread adoption of digital technologies can help Ecuador address many of its persistent development challenges. Anemic productivity growth, weak labor market performance, and large income inequalities pose significant development challenges for Ecuador. The COVID-19 crisis worsened these issues, with the country experiencing a 7 percent contraction in GDP and an almost 8-percentage point increase in poverty rates from 2019 to 2020.⁴ Ecuador's persistent inequality was also exacerbated by the pandemic, as the country registered a Gini coefficient of 0.47 in 2020, a 3-percentage point increase compared to 2017.⁵ Evidence of inequalities can also be seen in the rural-urban digital divide, with a 32-percentage point gap in access to the internet in favor of urban households. Moreover, as the World Bank's Systematic Country Diagnostic highlights, Ecuador's overreliance on the extractive industry limits growth in more sophisticated sectors: high-technology exports as a share of total manufactured exports were 5.3 percent in 2018, below LAC (8.6 percent) and OECD (15.1 percent) averages.⁶

Initiatives by the GoE to promote the adoption of digital technologies can help Ecuador boost productivity, create more and better jobs, and reduce spatial inequality. As a recent study of the Inter-American Development Bank (IDB) shows, information and communications technology (ICT) capital (the value of computer equipment and software) in Ecuadorian firms has a positive impact on firm output.⁷ Widespread adoption of digital technologies can also create more and better job opportunities for individuals. For instance, a 2018 multi-country LAC study revealed that lower-skilled workers can benefit from the adoption of these productivity-enhancing technologies.⁸ With adequate coordination, digital technologies can be leveraged to expand access to education, increase financial inclusion, and improve the targeting and delivery mechanisms for social protection programs.

This report is based on the World Bank’s Digital Economy Assessment (DEA) methodology, which analyzes the current state of, challenges to, and opportunities for the development of six foundational elements for a digital economy. By examining the international experiences of digital businesses and public sector institutions, the DEA has identified a set of foundational elements that play a critical role in the digital transformation of economies. In line with this methodology, the report provides a comprehensive overview of Ecuador’s digital economy development across six pillars or foundational elements: (i) digital infrastructure; (ii) digital public platforms; (iii) digital financial services (DFS); (iv) digital businesses (v) digital skills; and (vi) trust environment.

Figure R.1. The Digital Economy: Shared Prosperity and Reduced Poverty



Source: World Bank (2020a).

The assessment finds that despite recent progress, there is scope for Ecuador to accelerate its transition to the digital economy.

To that end, there are six policy priorities for the development of a productive, inclusive, and sustainable digital economy in Ecuador:

- 1. Invest in fixed and mobile infrastructure and international bandwidth in remote areas and leverage regulatory tools to lower internet prices.** Limited access to the internet is influenced by inadequate digital infrastructure and unaffordable fixed internet. The country can prioritize drafting an action plan to establish programs that incentivize infrastructure investments in the middle and last miles (fixed and mobile) in sparsely populated and low-income areas. In addition, individuals in Ecuador pay 5.1 percent of their average monthly gross national income (GNI) per capita for a fixed broadband basket, above regional peers. To address the issue of affordability, the country could routinely conduct market analyses to promote competition along the digital supply chain by promoting infrastructure sharing and lowering market entry barriers.
- 2. Change the simplification and digitalization strategies of government services from a retail to a wholesale approach through a holistic digital transformation framework.** The Gob.EC platform provides information on more than 7,000 services from 240 central and local government institutions. Of these, at least 3,900 can be started online. However, few are end-to-end digital solutions. For MINTEL to simplify and transform central government services using digital technologies, a wholesale approach is necessary to ensure that functional components are reused for a wide range of services. This requires the development of an appropriate framework that includes digital government architecture, a digital service model, whole-of-government standards, and a technical blueprint to scale up the Gob.EC. platform as the backbone of the approach.
- 3. Expand the adoption of DFS by promoting the market entry and growth of fintech companies, investing in fast and interoperable payment infrastructures, and digitizing government payments.** The recently passed Fintech Law holds promise to improve innovation and competition in Ecuador's retail financial sector, though development of the regulatory framework is key to ensuring a level playing field among providers, functional institutional arrangements among regulators, and adequate consumer protections. Moreover, continued implementation of the Pago Seguro program by the Ministry of Economic and Social Inclusion (*Ministerio de Inclusión Económica y Social* [MIES]) is critical to promoting financial inclusion among vulnerable populations through the adoption of digital technologies.
- 4. Update digital market regulations for new digital business models (e.g., ride-sharing platforms, e-commerce, and online consumer protection) and identify ways to increase the availability of (international) venture capital financing for digital start-ups in Ecuador.** Funding for Ecuadorian businesses is limited and concentrated at early-stage investments, with only 40 percent of digital businesses receiving formal funding. To ensure access to funding, the country could conduct an in-depth assessment of the availability of venture capital financing for digital start-ups in Ecuador, with a focus on attracting more investment from international/regional venture capital funds. There is also a need to develop a pipeline of investment-ready digital businesses that can grow and attract investments beyond early-stage financing. This requires that the enabling regulatory environment be improved. Ecuador should therefore update digital market regulations, such as ride-sharing platforms, e-commerce, and online consumer protection, as the country has an incomplete regulatory framework that leaves room for ambiguous and inconsistent enforcement.

5. **Create a comprehensive framework to guide and measure student progress in digital skills from primary to higher education.** The GoE has developed the Digital Agenda 2021–2025 to advance the process of digital skills development in the education sector. However, this, as well as other frameworks that have been developed, lacks specificity and policy instruments to guide and measure students' development of digital skills. The Ministry of Education (*Ministerio de Educación* [MINEDUC]) could take the lead in developing more specific instruments to promote student acquisition of digital skills from the foundational level to higher education.

6. **Strengthen the country's incident response management and protection of critical information infrastructures through the implementation of the national strategy.** Ecuador's newly adopted NCS establishes the roadmap and strategic pillars to enhance national cybersecurity capacities. However, an action plan for the NCS has not yet been drafted. Furthermore, the specifics and legalities of the cybersecurity governance structure, such as the determination of the roles and responsibilities of the key stakeholders, will require the adoption of legal and regulatory frameworks to clearly define the legal mandates that oversee NCS implementation. In this regard, aligning with international best practices as the strategy is implemented and refined is essential.

The findings of the report are organized into six chapters, in addition to the Introduction, each dealing with a pillar of the digital economy. Policy recommendations are presented in the form of sequenced action plans that can inform relevant efforts by national authorities, the private sector, and development partners. The section below summarizes the main findings on each digital economy pillar. For a summary of the key policy recommendations to accelerate digital transformation in Ecuador across all six digital economy pillars, refer to [Table R.4](#).



DIGITAL INFRASTRUCTURE:

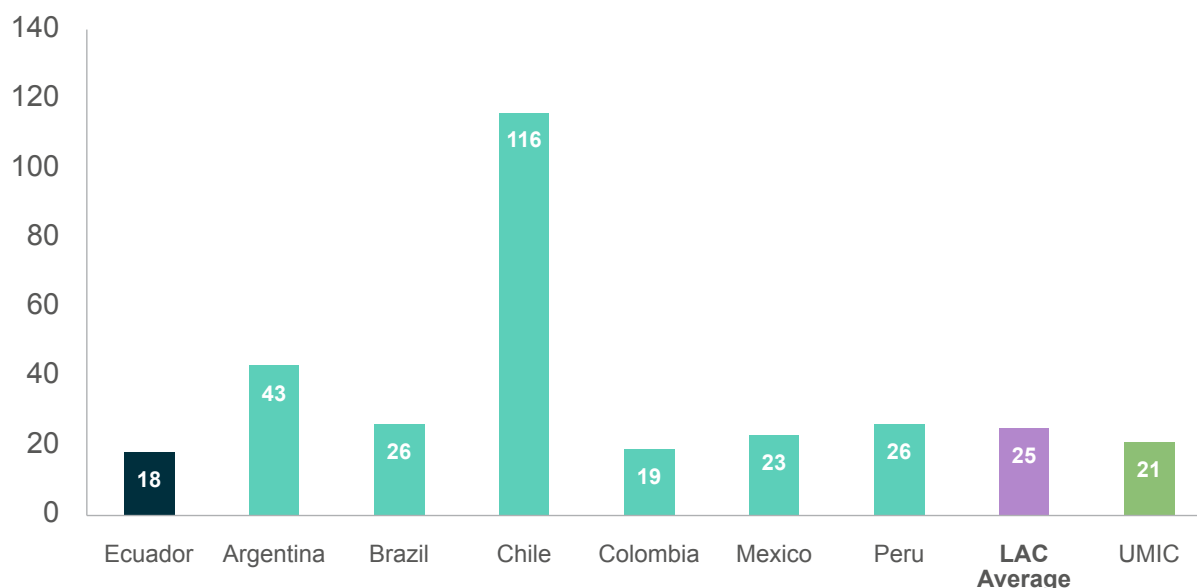
Closing the Digital Gap Through Adequate Digital Infrastructure

Providing universal and affordable access to high-speed connectivity will help Ecuador to address its high and persistent inequality. Internet access is a crucial driver of productivity growth, and its importance will continue to increase as the economy advances on its digital transformation path. The expansion of digital infrastructure is needed to close the digital gap and reach the unconnected, who are often from among the most vulnerable segments of the population. Moreover, affordable and reliable internet access in rural areas is important to decrease the country's high socioeconomic inequality and promote the inclusive availability of digital public services.

Despite the sufficient supply of internet coverage in Ecuador, penetration is low. Internet coverage of mobile broadband networks reaches 96 percent of the population, but only 71 percent of Ecuadorians take advantage of it and only 63 percent own a mobile device.

Ecuador's current digital infrastructure does not allow for an increase in service quality, data-intensive services, or new users. Ecuador's international bandwidth capacity is limited to only 0.24 terabytes per second (Tbps). This is partially due to limited digital infrastructure: although Ecuador has over 60,000 kilometers of optical fiber networks, it has only two optical fiber cables in development and three in operation. Limited international connectivity constrains progress in the middle-mile segment, and the country's average consumption per internet user is over 10 times lower than the regional average. In addition to limited international bandwidth capacity, infrastructure to ensure quality service is lacking. Limited expansion of internet exchange points (IXPs) and data centers puts Ecuador 59th in the *Cloudscene* ranking, which is based on data center density. Both IXPs and data centers are required to improve the quality of connectivity, reduce latency, and as a result, increase the broadband speed and cost of data traffic.⁹

Figure R.2. International Bandwidth Used, Mbps per 100 Inhabitants, 2021



Source: "World Bank Open Data," 2021, <https://data.worldbank.org/>; and TeleGeography, 2021, <https://www2.telegeography.com/>.

The affordability of data and devices constitutes an obstacle to digital inclusion. Prices of mobile services' fixed and mobile data, smartphones, and other technologies are consistently high. For instance, the prices of mobile services in Ecuador are more than 2 percent of the average individual GNI, making them unaffordable for many individuals. Furthermore, fixed and mobile data prices are often among the highest when compared to the relevant benchmarks. Ecuadorians pay 5.1 percent of their average monthly GNI per capita for a fixed broadband basket, while Mexicans pay 2.4 percent, Chileans 2.5 percent, Colombians 4.4 percent, and Argentinians 4.8 percent.¹⁰ Smartphone prices are also relatively high. On average, acquiring the cheapest smartphone in Ecuador requires the biggest percentage of per capita GNI (20.0 percent) in comparison to relevant peers: Argentina (16.8 percent), Colombia (13.4 percent), Mexico (6.1 percent), and Chile (5.0 percent).¹¹ High prices make it particularly difficult for low-income individuals to access these technologies. For instance, as seen in [Figure R.3](#), the lowest quintile of income pays between 10 and 25 percent of their income for a set of mobile or fixed data services compared to less than 5 percent among the highest quintile. The high prices of data and devices only limit the uptake of digital technologies in Ecuador.

To improve access to and usage of digital technologies, government entities in Ecuador must coordinate efforts to promote competitive pricing and appropriate digital infrastructure. Competitive prices across the whole value chain of the telecom sector are a prerequisite to meeting the demand for data. Competitive prices of fixed and mobile sectors are also essential to increasing this coverage. To meet this demand, entities such as the Telecommunications and Regulation Control Agency (*Agencia de Regulación y Control de las Telecomunicaciones* [ARCOTEL], the country's ICT regulator) can promote infrastructure sharing and favor potential market entries to ensure greater competition along the digital supply chain.

New investments in fixed and mobile infrastructure and international internet bandwidth are essential to promoting a competitive environment and increasing the quality of digital services. Fixed networks require the expansion of the digital backbone and an upgrading to faster technologies, such as fiber. Thus, greater optical fiber penetration, as well as efficient IXPs and data centers, will be essential inputs in an effective and competitive digital ecosystem. Furthermore, mobile sector upgrades are required, specifically the consolidation of 4G technology and the rollout of 5G networks. Lastly, to promote international bandwidth access, entities such as MINTEL should invest in deploying submarine and terrestrial optic cables.

Ecuador has a solid regulatory framework, but proper enforcement continues to be a challenge. Effective ex ante policy interventions are essential to ensuring competition and to providing the institutional capacity to implement regulatory tools that may attract new players to the industry. The country has a sound regulatory framework, with robust provisions for ARCOTEL. However, its enforcement must be improved to deliver the desired effects.



DIGITAL PUBLIC PLATFORMS:

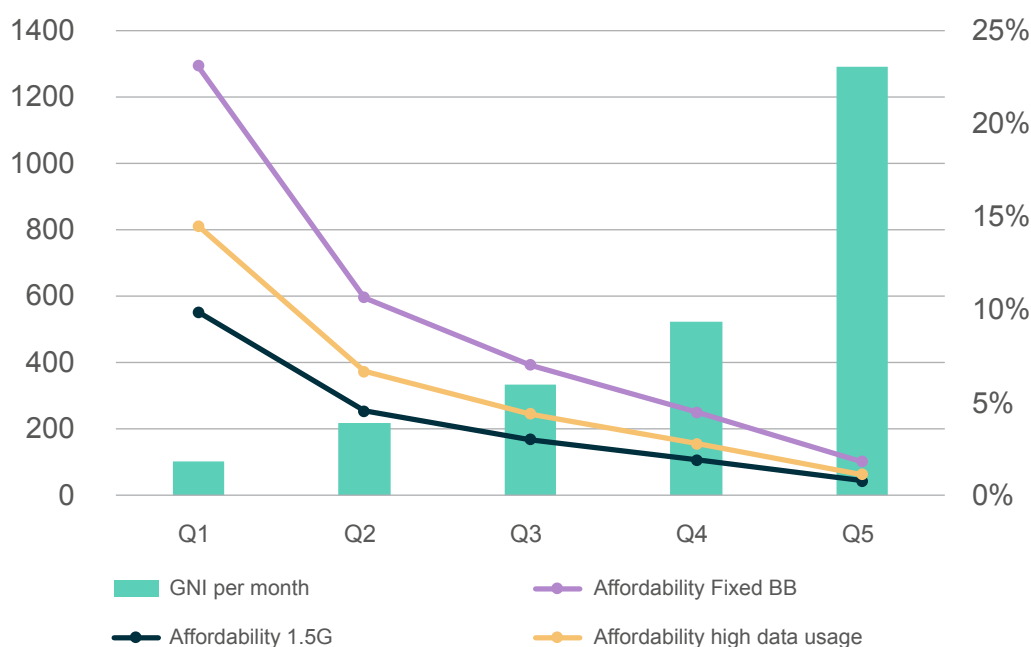
From Fragmented and Underused, to Integrated and Widely Adopted

Digital public platforms are electronic tools to exchange goods, services, or information between producers and users. They facilitate the flow of information and transactions to enable producers and users to create value by interacting with each other.

Digital public platforms can transform the way governments interact with citizens and businesses and optimize public value by reducing costs and improving productivity. They also enable new service delivery models and improve the management of public resources while providing timely feedback for the design and implementation of public services and policies.

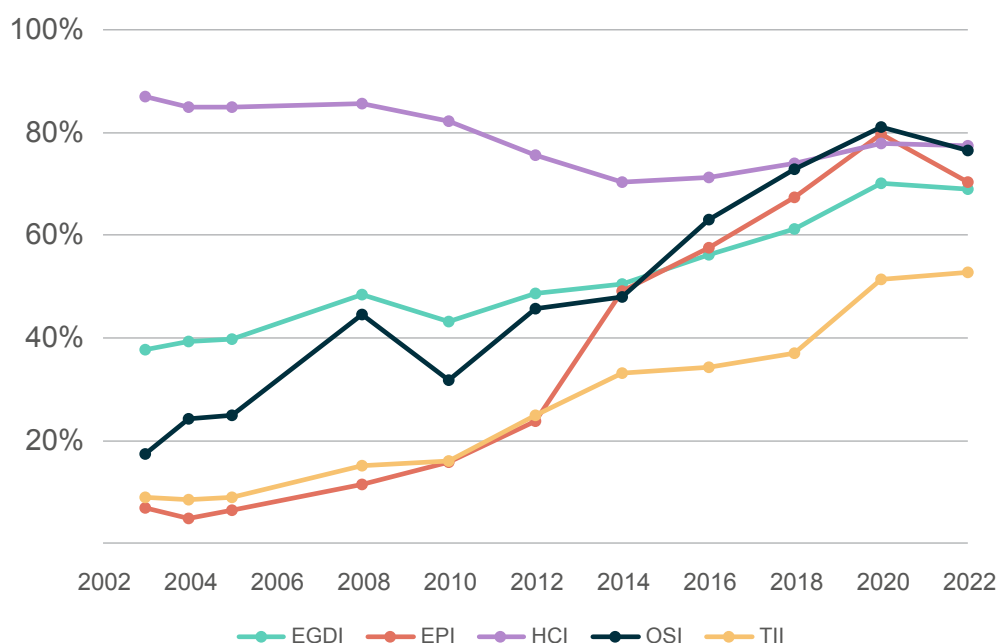
Ecuador's digital government performance is moderate compared to other countries in LAC, ranking 13th out of 33 countries in the region and 84th out of 193 economies according to the UN's Electronic Government Development Index (EGDI) for 2022. Between 2012 and 2022, Ecuador gained 17 places overall on the EGDI (Figure R.4) but lost 14 places in the Telecommunications Infrastructure Index. Telecommunications infrastructure has been and remains the primary obstacle to improving digital government functioning in Ecuador. Looking at the other sub-indices, the Online Services Index has doubled its contribution and is now on a par with the Human Capital Index, which remains the top contributor.

Figure R.3. Data Affordability by Income Quintile: Monthly per Capita GNI (\$, Left Axis) and Share of Monthly per Capita GNI (Right Axis)



Source: ITU, "ITU Services Become More Affordable Worldwide in 2022," <https://www.itu.int/itu-d/reports/statistics/2022/11/24/ff22-affordability-of-ict-services/>.

Figure R.4. E-Government Development Index and Its Sub-Indices 2012–2022, Ecuador



Source: Authors' elaboration with data from UN (2022).

Notes: Components of EGDI include: (i) OSI = Online Services Index; (ii) TII = Telecommunications Infrastructure Index; (iii) HCI = Human Capital Index; and (iv) EPI = E-Participation Index. The delta shows the difference between 2020 and 2022.

The analysis was structured using three dimensions: foundational elements, transversal solutions, and service presentation, made up of 10 thematic areas and 42 key aspects.¹² Each aspect was analyzed using three criteria: (i) *regulation*, which considers the existence of regulations that frame and enable its development; (ii) *availability*, which analyzes whether the evaluated aspect is available for adoption by any government entity; and (iii) *adoption*, which considers the level of implementation in accordance with the objectives and expected results of each aspect analyzed. Based on these criteria, the maturity of each aspect was classified as: (a) robust, when the observed strengths outweigh the weaknesses, and the gap between the proposed objectives and the expected results is not significant; (b) partial, for aspects that, having achieved some strength are not sufficiently developed to achieve the proposed objectives, and for which opportunities for improvement have been identified; and (c) basic, when the challenges and opportunities for improvement are significant and deserve immediate attention (see [Table R.1](#) for a full summary).

In terms of the foundational elements for digital government, Ecuador has a governing body and an extensive regulatory framework, but challenges remain in the implementation. Although MINTEL has clearly assigned powers, public implementation of the regulatory framework is decentralized and lacks a clear roadmap. In addition, although the GoE's strategy has provisions for the acquisition of infrastructure, there is no standardization, for example, no digital architecture that integrates policies for data storage, data center management, cloud services, and so forth.

Low usage levels of digital services indicate a pressing need to incorporate the dimension of adoption into any design initiative. Less than 1 percent of internet users use it to carry out procedures with public entities or government agencies. Although there are GoE projects that promote the use of government services online, such as *Puntos del Encuentro*, there are a number of issues, such as the low ratings of apps (the Gob. EC app has a rating of 1.6/5 in the app store) and high bounce rates (for www.gob.ec, at least seven out of 10 view just one page and leave the website).

Table R.1. Summary of the Analysis of Digital Public Platforms in Ecuador (1 of 2)

Dimension	Area	Aspect	Regulation	Existence	Adoption
Foundational Elements	Governance	Organization	Robust	Robust	Essential
		Competencies	Robust	N/A	N/A
		Resources	N/A	N/A	N/A
		Strategy	Robust	Robust	Essential
	Infrastructure	Connectivity	Essential	Essential	Essential
		Cloud	Essential	Essential	Essential
		Platforms	Essential	Essential	Essential
	Identity and Trust	Authentication	Partial	Partial	Partial
		Signature	Robust	Robust	Partial
		Privacy	Robust	Partial	Partial
		Cybersecurity	Partial	Partial	Partial
Transversal Solutions	Integration	Digital government architecture	Essential	Essential	Essential
		Interoperability	Robust	Partial	Essential
		Registries	Robust	Partial	Essential
		Shared services	Robust	Partial	Essential
	Data	Infrastructure	Essential	Essential	Essential
		Architecture	Essential	Essential	Essential
		Standards	Essential	Essential	Essential
		Exploitation	Essential	Essential	Essential
	Cross Systems	Electronic records	Partial	Partial	Partial
		Financial systems	Essential	Essential	Essential
		Tax system	Essential	Essential	Essential
		Human resource system	Essential	Essential	Essential
		Asset system	Essential	Essential	Essential
		Procurement system	Essential	Essential	Essential

Table R.1. Summary of the Analysis of Digital Public Platforms in Ecuador (2 of 2)

Dimension	Area	Aspect	Regulation	Existence	Adoption
Service Delivery	Digital Services	Catalogue	Robust	Robust	Partial
		Simplification and digitization	Robust	Robust	Partial
		Chains/One-stop shops	Robust	Partial	Partial
		Institutions involvement	Partial	Essential	Essential
	Transparency and Openness	Public information	Partial	Partial	Partial
		Government and open data	Partial	Partial	Partial
		Participation and collaboration	Partial	Partial	Partial
		Civic tech	Essential	Essential	Essential
	Service Delivery	Unified portal	Robust	Partial	Partial
		Accessibility and usability	Partial	Partial	Partial
		Omnicanality	Essential	Essential	Essential
		Citizen folder	Partial	Partial	Essential
	Adoption	Key performance indicators	Partial	Partial	Partial
		Skills and change management	Essential	Essential	Essential
		Use	Essential	Essential	Essential
		Satisfaction	Essential	Essential	Essential

Source: Authors' elaboration.

The GoE has made progress on integrating digital public platforms, particularly registries and other shared services, but a more comprehensive digital architecture is needed for an integrated approach. MINTEL has made software services for shared procedures available to government institutions, such as form designer, payment gateway, mailbox, and electronic signature. However, the duality of interoperability platforms must be resolved, as MINTEL's Government Services Bus and the National System of Public Registries (*Sistema Nacional de Registros Públicos* [SINARP]) platform of the National Directorate of Public Records (*Dirección Nacional de Registros Públicos* [DINARP]) currently offer roughly 40 exchange services each and are in need of an established framework to guide institutions in their interoperability efforts.

The creation of the Gob.EC platform and issuance of technical standards to improve and automate processes has helped to simplify public service procedures. However, the lack of a comprehensive model or solution makes it difficult for citizens to complete the actions from start to finish. About 3,900 procedures can be started online, and 1,500 have been digitized. Still, a high number do not have end-to-end solutions, and citizens are required to interact with different platforms or to send emails. In terms of one-stop shops, only the Foreign Trade Window has been implemented, meaning that there are still 20 institutions and 143 forms that do not fully interoperate with each other.

Ecuador has cross-cutting systems that have improved public management, but they are disjointed from the national digital strategy. The development of these programs, such as the integrated financial management system, the Official Public Procurement System, and the National Public Procurement Service, has not arisen from a comprehensive digital government architecture. Moreover, some of these and other public service systems are at various levels of obsolescence. For example, legacy computer systems for financial management, taxes, and customs require modernization to address functional weaknesses, hardware obsolescence, and the limited interoperability and data mining capabilities. The Official State Procurement System and QUIPUX, a web software used for the management of digital and physical documents, benefit from regular improvements in functionality, and MINTEL could take a more active role in guiding the integration of procedures and information in the government back office.

Data management considerations are present in planning, but a holistic approach to managing new and legacy administrative data remains a challenge. Strengthening data sharing and analytics mechanisms requires a 360-degree vision of the data to consolidate the infrastructure, architecture, policy, models, and standards for its secure and effective management.



DIGITAL FINANCIAL SERVICES:

Unlocking the Potential of DFS for Financial Inclusion and Economic Resilience

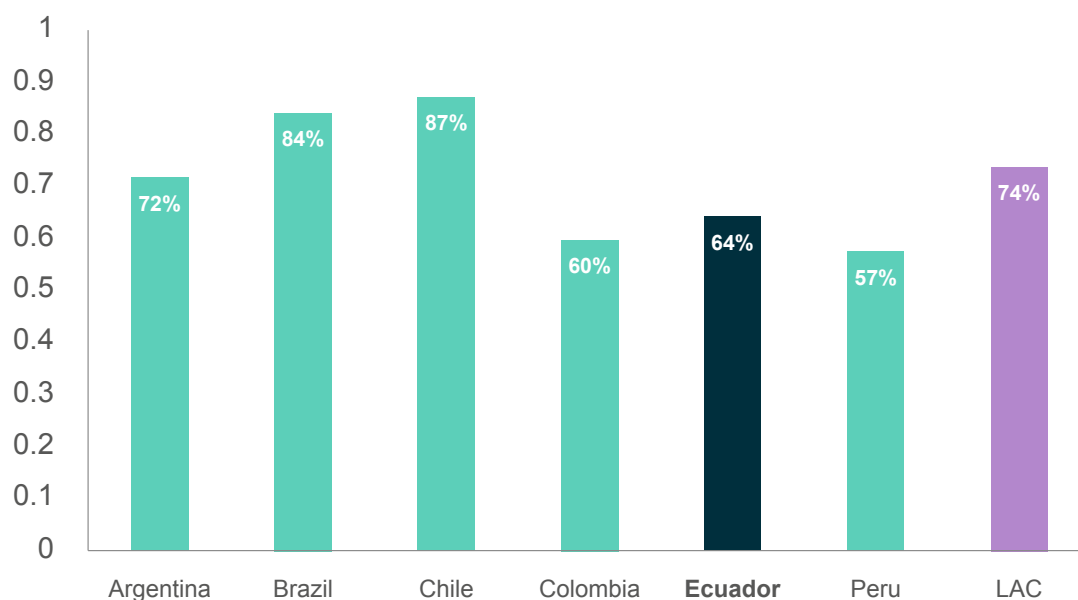
DFS are a critical enabler of the digital economy and can help to overcome the cost, accessibility, and product design barriers that have historically driven financial exclusion. The G20 High-Level Principles for Digital Financial Inclusion define DFS as financial products and services, including payments, transfers, savings, credit, insurance, securities, financial planning, and account statements. They are delivered via digital/electronic technology, such as e-money (initiated either online or on a mobile phone), payment cards, and regular bank accounts. Digital payments often serve as the entry point and “rails” for a DFS ecosystem and enable consumers to easily make and receive payments with friends, family, retailers, service providers, and government authorities. Greater uptake and usage of DFS helps foster the growth of digital businesses by ensuring convenient, fast, safe, and transparent payments.

Universal access to DFS can also facilitate greater use of digital public platforms, including the rapid and efficient delivery of social transfer payments via digital channels.

Despite important progress on financial inclusion, DFS adoption remains low and its growth has been unequal. In Ecuador, the newly banked population during the COVID-19 pandemic increased by 15 percent in rural areas, and the share of women with a new bank account increased by 19 percent. New mobile wallet users grew by 61 percent, with a particular incidence among rural residents, young adults, and adults with low levels of education. However, over 30 percent of the population still has no account ([Figure R.5](#)). An even lower share of adults uses digital products, channels, or payment mechanisms, with only 16 percent of the population having made a digital merchant payment (below the regional average of 41 percent). In fact, Ecuador is one of the five countries in LAC that still does not have mobile money accounts. Moreover, there are important gaps in access to accounts by women, young adults, adults in rural areas, adults out of the labor force, and low-income segments. For example, while 71 percent of male adults have an account, only 58 percent of women do, and though 68 percent of older adults have an account, only 55 percent of young adults do. The main reason cited for not having an account is the cost of financial services, with over half of adults without an account pointing to this explanation, followed by distance to an access point as the second most cited reason.

Financial institutions, particularly banks, are expanding the use of digital channels and the supply of certain DFS. Over 40 percent of transactions in the banking sector in 2021 were done using digital channels compared to 37 percent through physical means. Banks have also pushed forward the deployment of electronic wallets and digital payments. The cooperative sector, key for financial inclusion, has also expanded the usage of digital channels thanks to partnerships between smaller and larger institutions, but it is lagging in terms of the supply of DFS. According to the Report of Transactions carried out through Banking channels 2019 – 2022 by ASOBANCA, of the 929 million transactions that were carried out in 2022, 49.1% were carried out through digital channels. The number of transactions carried out through digital channels in 2022 reached 456 million, which is 63.3% (177 million more) higher than in 2021 and 336.1% higher than 2019 (352 million). The growth is mainly due to the increase in the number of transactions through mobile channels (applications).

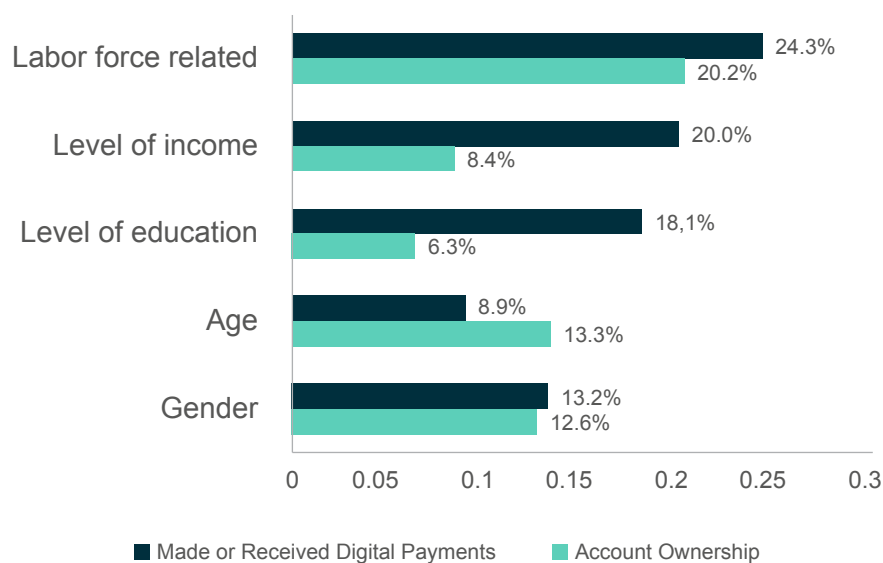
Figure R.5. Account Ownership in LAC, Selected Countries



Source: Demirgüç-Kunt *et al.* (2022).

Note: Mexico was not included in the 2021 Global Findex Database.

Figure R.6. Gaps in Account Ownership and Having Made or Received Digital Payments by Gender, Age, Level of Income, and Education



Source: Demirgüç-Kunt *et al.* (2022).

Note: The gap for the labor force is the difference in the level of uptake of accounts or digital payments between people in or out of the labor force; the gap in the level of income, the difference between people in the bottom 40 percent and upper 60 percent of the income curve; the gap in the level of education, between adults with secondary education or more and primary education or less; the gap in age, between young people (15–24 years old) and older people (25+ years old); and the gap in gender, between males and females.

The GoE can take concrete measures to expand access points and channels to promote financial inclusion. Important steps include building a sector-wide dataset with information on access points. Moreover, regulatory frameworks can be modified to create a level playing field for banking agents, as agents are low-cost points of contact between financial institutions and their customers.

Improving the digital payments ecosystem appears to be a priority for the government beyond just the financial sector authorities that could be channeled through the National Financial Inclusion Strategy (NFIS). MINTEL, along with the Ministry of Production, International Trade, Investments, and Fisheries, designed the E-Commerce National Strategy (2020), and more recently, a Digital Transformation Agenda (2022–2025). Both documents highlight the importance of facilitating digital payments. The E-Commerce National Strategy in particular includes specific actions to support the expansion of digital payments for e-commerce. However, many of these actions have not been implemented. In the Digital Transformation Agenda, digital payment interoperability is explicitly mentioned. The upcoming NFIS presents an opportunity to articulate and push forward these plans and ensure that the needed public-private sector coordination is in place for their implementation. In the Digital Transformation Agenda 2022 – 2025, MINTEL established Electronic Commerce as a pillar, highlighting the importance of digital payments as a driver of electronic commerce, and “proposed updating the National Electronic Commerce Strategy where plans, programs and projects are proposed that promote the value chain of Electronic Commerce” to promote digital transformation in all productive sectors.

The recently passed Fintech Law holds promise to improve innovation and competition in Ecuador’s retail financial sector, but the development of a new regulatory framework is key to ensuring a level playing field among providers, functional institutional arrangements among regulators, and adequate consumer protections. The current legal and regulatory framework is fragmented and generates uncertainty. For example, there is a long-standing claim of an unlevel playing field in the credit market due to the existence of different frameworks for banks and credit cooperatives, despite the progressive and continued alignment of these frameworks. The new Fintech Law allows the entrance of disruptive business models, overlaps with and contravenes existing regulations, and, without a proper regulatory framework, may further propagate this unlevel playing field and also leave consumers unprotected. For instance, there are mobile wallets on the market that receive customer funds managed by auxiliary payment service providers that are not tied to existing financial institutions’ accounts.

To move toward a cohesive framework through the newly passed Fintech Law, the Financial Policy and Regulation Board (*Junta de Política y Regulación Financiera* [JPRF]) and other entities can align with international standards and practices. International practices should be enacted in the implementation of the Fintech Law. Another important step is aligning the framework for know-your-customer (KYC)/customer-due-diligence (CDD) with international standards to simplify the procedures for opening accounts by clearly identifying low-risk segments. This approach would help increase the supply of products targeting low-income populations by removing certain regulatory barriers and streamlining processes.

There is a need to develop the data infrastructure to monitor financial inclusion. Building and publicizing financial sector data would facilitate the monitoring and evaluation of progress in financial inclusion and DFS in a comprehensive manner. Including data on the unserved or underserved identified as priority segments in the NFIS (e.g., women and rural populations, including indigenous and afro-descendants) is key to understanding the constraints on their ability to access financial services. The infrastructure would also need to include data on the provision of payments and financing instruments by non-bank providers acting as auxiliary financial companies, and possibly encompass associated services (market-access information) that are bundled with payment and financing.

Promoting interoperability between payment processors and providers would enhance competition in the payments market. The vertical concentration in the card market exacerbates the lack of interoperability. Modernizing the current payment system infrastructure and enabling new fintech providers to participate in it would also help to promote the desired interoperability.

The digital transformation of large-volume payments, such as remittances and government transfers, could be a leverage to further develop the DFS environment. International remittances received in 2020 represented 3.4 percent of Ecuador’s GDP, but most remittances are delivered in cash. The digitalization of remittances presents the country with an important opportunity to expand DFS and improve financial inclusion among recipients. Ecuador should put the necessary mechanisms in place, guided by best international practices, and employ the incentives needed to obtain broad private sector commitment to this goal. The evaluation and analysis of international remittances will be taken into consideration with the purpose of proposing a project for the digitalization of remittances through coordinated multi-sector work.



DIGITAL BUSINESSES:

Revitalizing Ecuador's Digital Business Environment for Greater Productivity

Digital businesses are a crucial way for Ecuador to unlock opportunities for sustainable and inclusive economic growth. In addition to their own contributions to productivity growth and competitiveness, both start-up and established digital enterprises are key enablers of growth by supplying digital solutions that support the digital transformation of traditional (offline) businesses. Digital businesses supply new or improved digital technologies and services, facilitate access to larger and more dynamic markets for local firms, and generate strong network and demonstration effects that promote the adoption of innovative business models and digital technologies by offline companies.

Although Ecuador's digital business landscape has been evolving, with bright spots in fintech, it has not reached its potential, and fewer new businesses have emerged in recent years. Relative to the size of

its economy and population, Ecuador has slightly fewer digital businesses than global trends would suggest. Currently, Ecuadorian digital firms are mostly operating in the fintech, marketing tech, e-commerce, mobility tech, security tech, and software and software-as-a-service (SaaS) subsectors (see [Figure R.7](#)). Compared to larger countries in the LAC region, digital businesses in Ecuador are less likely to operate in entertainment and business management tech, e-commerce, and digital media.

Among Ecuadorian digital businesses, the formal funding rate is low and concentrated at early-stage investments. About 40 percent of digital businesses in Ecuador have reported some formal funding, such as from governments, banks, or venture capital or private equity funds, as opposed to informal sources like personal networks or savings. This share of formal funding is lower than in benchmarking countries. Among those Ecuadorian digital firms that have received formal funding, 43 percent received pre-seed/seed funding (see [Figure R.8](#)).

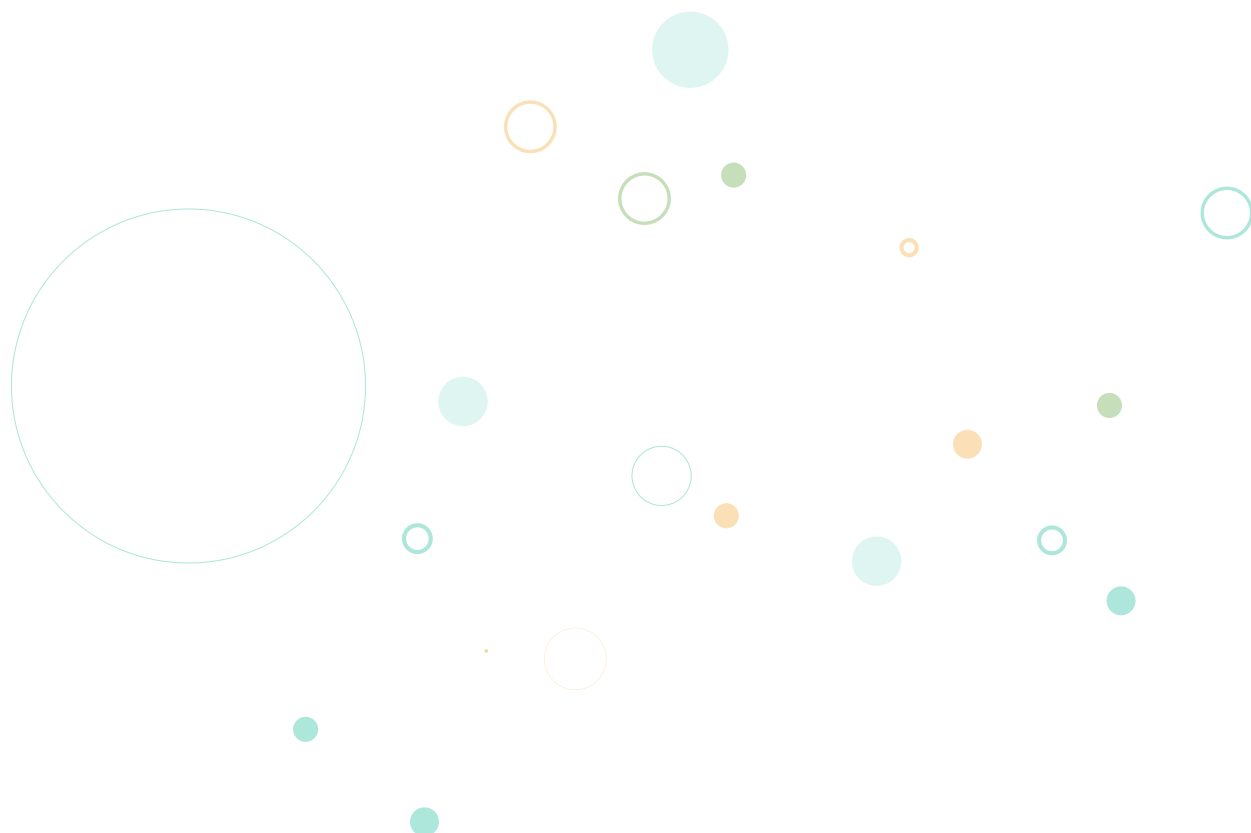
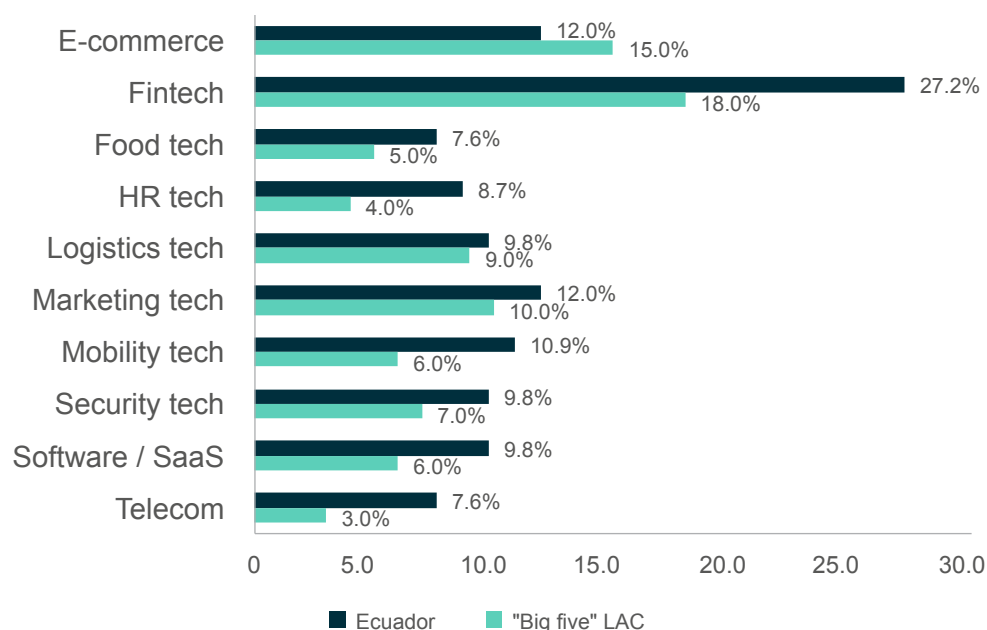


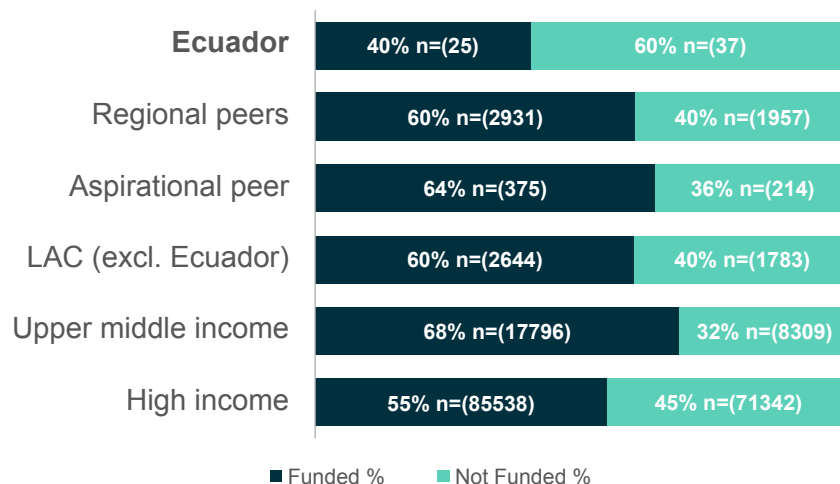
Figure R.7. Top 10 Digital Business Subsectors by % of Digital Businesses: Ecuador vs LAC Region (“Big Five”)



Source: FCI Digital Business Database (see Zhu *et al.* 2022).

Notes: Figure shows subsectors that are among the top 10 in Ecuador but not in other LAC countries. The “big five” in LAC are Argentina, Brazil, Chile, Colombia, and Mexico. “Financial” software includes investing and decentralized finance platforms; “social/platform” software refers to social networking applications; “application” software refers to programs designed for a specific task, such as spreadsheet or word processing software; and “business/productivity” software refers to programs that increase productivity at work.

Figure R.8. Share of Digital Businesses with Formal Investment



Source: FCI Digital Business Database.

Notes: Because the database does not distinguish the funding information of multinational firms by their operating location, the analysis uses only firms headquartered and operating in the country to avoid overcounting funding raised by multilateral companies. Formal investment information comes from the latest investment reported by firms or through web scraping, indicating that informal investments (e.g., friends and families) are likely under-reported. Other capitalization includes the following: bonds, capitalization, corporate, corporate asset purchase, corporate licensing, joint venture, secondary transaction – open market, secondary transaction – private, spin-off, share repurchase, equity, and bridge round (in between rounds). Latest investment type: The database records the latest funding for each firm so this captures at most the most recent funding per firm rather than multiple deals per firm over the years.

Ecuadorian digital firms are, on average, older than benchmarking groups. This indicates that promising start-ups may not obtain later-stage funding (such as foreign venture capital) that would allow them to scale and grow or it implies the lack of an investment-ready pipeline of digital firms. Meanwhile, the country's entrepreneurship support ecosystem is growing but still developing, with most enablers concentrated in the capital, Quito (e.g., co-working spaces, incubators, and accelerators). An in-depth assessment of the availability of venture capital financing for digital start-ups in Ecuador is therefore recommended, with a focus on attracting more international/regional venture capital funds to invest in the country.

To improve the enabling environment for digital businesses, digital market regulations need to be updated, especially in terms of ride-sharing platforms, e-commerce, and online consumer protection. Ecuador's digital market regulations have basic provisions in place but need to be updated to account for the specifics of digital businesses. Ecuador has a law that establishes the legal validity of electronic documents and signatures, paving the way for digital business models and e-commerce. However, in specific digital business areas, such as ride- and accommodation sharing, the legal provisions remain incomplete and ambiguous. For ride-sharing, for instance, the Transport Law was amended in 2021 to take advantage of the benefits of this technological innovation. However, the law left it up to municipalities to regulate ride-sharing at the local level through municipal bylaws, which to date have not been issued. Thus, it is important that municipalities pass additional legislation to clarify the legal status of ride-sharing platforms as per the Transport Law.

Concerning online consumer protection, the e-commerce law covers key provisions, but shortcomings remain in its effective implementation. Ecuador's regulations on e-commerce ensure that the

rights of consumers are guaranteed in accordance with the Consumer Protection Law, but their effective implementation remains problematic, as in the case of non-traditional e-commerce platforms like social networks (e.g., Facebook Marketplace or *Mercado Libre*) and messaging service providers. Thus, updating e-commerce or consumer protection legislation to address issues related to online business is an important step. This includes clarifying the responsibilities of e-commerce platforms in relation to consumers and merchants; establishing a system to effectively address online consumer complaints (e.g., through an online dispute-resolution system); and reviewing necessary updates to the Competition Law and enforcement practices to respond to challenges in the digital economy (e.g., the market power of digital platforms, updated merger thresholds to avert "killer acquisitions").

To avoid hampering the development of digital businesses, it is essential to review the current system of taxing digital services. Ecuadorian regulations state that all individuals and legal entities that initiate or carry out economic activities in the country must register in the Registry of Taxpayers, making them subject to taxes (such as income, value added, or remittance taxes). Introduced in 2020, the digital service tax charges a 12 percent rate mainly through credit or debit card issuers that withhold the tax at the time of purchase and is paid by residents or permanent corporations of non-residents in Ecuador. This digital service tax has raised concerns over its uneven application and potential burden on the digital economy. Possible actions to address these concerns include (i) assessing international good practices on implementing digital service taxes through online platforms rather than debit/credit card issuers, (ii) analyzing the possibility of proportional taxation of early-stage start-ups in order to boost digital firms, and (iii) performing an economic analysis (e.g., cost-benefit or distributional analysis) of the tax and its potential impact on consumers and digital businesses.

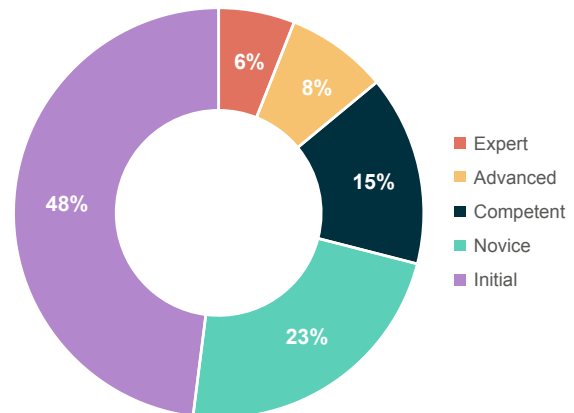


DIGITAL SKILLS: Building Advanced Digital Skills for the Future of Work

Digital technology is changing the nature of jobs and demanding a new set of skills for workers in Ecuador and elsewhere. According to UNESCO's [Digital Literacy Global Framework](#), digital skills can be defined as the individual capacity to access, manage, understand, integrate, communicate, evaluate, and create information safely and appropriately. Individuals differ in their level of proficiency in these competencies: at the higher end of the digital skills continuum, individuals can deploy digital technologies, develop new applications, and come up with solutions to new challenges. To ensure the widespread adoption of digital technologies across Ecuador's 24 provinces, it is critical that MINEDUC and the [Secretariat of Higher Education, Science, Technology and Innovation](#) (*Secretaría de Educación Superior, Ciencia, Tecnología e Innovación* [SENESCYT]) foster individual acquisition of digital skills through education and training, both formal and informal.

Closing the existing demand-supply digital skills gap in Ecuador is essential, as low levels of innovation could be holding back businesses' growth capacity. Demand for trained professionals in digital technologies has been growing since 2010 but is seldom met. Among the factors that limit the number of skilled professionals with a technical background are the lack of complementary subjects such as English and the low graduation rates in science, technology, engineering, and math (STEM) careers. The GoE and MINEDUC have prioritized digital skills development through the Digital Education Agenda 2021–2025. Yet, despite important efforts, Ecuador ranks below regional peers in the development of ICT skills and digital maturity, with 71 percent of Ecuadorian companies having low levels of the latter (see Figure R.9).

Figure R.9. Digital Maturity of Ecuadorian Businesses



Source: IDB (2022).

Although technical and digital skills programs within higher education meet high-quality standards, the supply is limited, and demand is highly concentrated in Quito and Guayaquil. The government has developed digital skills programs in primary and high school, such as *Conectando al Futuro* and *Escuelas que Inspiran*. However, at the higher education level, the supply is very limited. An insufficient supply of STEM and digital skills programs, such as those provided by the *Escuela Superior Politécnica del Litoral* (ESPOL), puts pressure on Ecuadorian firms—which struggle to find trained professionals—and may hinder their digital transformation efforts. Ecuador's government could do more to foster the design and scale of programs for skills adaptability, upskilling, and reskilling, as such training will become a critical attribute for both workers and job seekers and can potentially reduce the existing demand-supply digital skills gap.

Ecuador's curriculum and national framework for digital skills lack specificity and the policy instruments needed to guide and measure students' development of digital skills. MINEDUC has made important steps by including competencies and contents related to ICT in the National Curriculum, some of which are aligned with UNESCO's Digital Literacy Global Framework and the European Union's DigComp 2.1. Even though the ministry's Digital Education Agenda and the National Curriculum serve as important frameworks, neither outlines how students can progress through the digital skills continuum from primary to higher education. To move toward a more comprehensive strategy to improve the country's overall digital skills, having a framework and specific policy instruments will be key. MINEDUC, in coordination with other government entities, can create a more comprehensive framework that specifies the digital skills students should acquire at different educational levels, including practical activities that allow them to apply those skills in real-world scenarios. Furthermore, more specific instruments and monitoring tools can be developed in coordination with the National Institute of Educational Evaluation (Instituto Nacional de *Evaluación Educativa* [INEVAL]) to better understand the progress made on the main objectives of the Digital Education Agenda and Ecuador's National Curriculum.

Low levels of digital connectivity and limited access to devices act as barriers to Ecuadorians' acquisition of digital skills. At the school level, only 40 percent of institutions have connectivity, though the government's aim is that 65 percent of public schools will have internet connectivity by 2025. Although increasing access to connectivity and improving technological infrastructure could increase computer usage and proficiency, it would not necessarily increase education or socioeconomic outcomes. Training in the use of digital tools, software designed to help students develop skills at their own rate of progress, technology-enabled social psychology, and a combination of online and in-person instruction could strengthen education outcomes and open space for all students to engage with new technologies. Alternative

solutions—such as training and hybrid education systems—can also be developed to strengthen education and training in digital skills.

Improving technological infrastructure and increasing the quality of and access to internet connectivity are important ways to boost computer usage and proficiency. MINTEL and MINEDUC could collaboratively increase access to and usage of hardware and educational software to reduce disparities in ICT development and digital skills. In the process, they can ensure that both hardware and software at schools are in optimal condition to enhance the learning experience. At the same time, improving training programs for all teachers and students so that they can effectively use the devices provided for the teaching-learning process will be important.

Teacher training, both in basic and higher education, is required to close learning gaps and guide students in the process of digital skills development. Ecuador has almost 160,000 teachers in basic education, most of whom are over 45 years old and have not been part of a training program in digital skills. To strengthen professional development, it will be important to equip teachers with the digital tools for a hybrid learning environment. The virtual training platform *Mecapacito* can be a valuable resource to strengthen and scale up professional development programs if the platform is regularly updated and the monitoring process is improved to ensure that teachers are equipped with tools and strategies relevant to their day-to-day professional activities.

Coordination between the government, academia, and the private sector is critical to reducing the demand-supply skills gap. The Ecuadorian government can offer incentives for the private sector to scale up successful programs and to develop contextualized products for digital skills, such as *Puntos del Encuentro* and EPICO. The government can also collaborate with academia and the private sector to develop digital skills products that meet the needs of different industries.

Table R.2. International Digital Skills Frameworks and Ecuador's National Curriculum

Competence	Description	Framework		
		UNESCO	DigComp	Ecuador's Curriculum
Devices and software operations	Identify and use hardware tools and technologies. Identify the data, information, and digital content needed to operate software and technologies.	X		
Information and data literacy	Articulate information needs, as well as locate and retrieve digital data, information, and content. Judge the relevance of the source and content. Store, manage, and organize digital data and information.	X	X	X O.CN.B.5.6
Communication and collaboration	Interact, communicate, and collaborate through digital technologies while being aware of cultural and generational diversity. Participate in society through public and private digital services.	X	X	X O.CN.B.5.7 CE.CN.B.5.5
Digital content creation	Create digital content. Improve and integrate information into an existing body of knowledge while understanding copyright and licenses. Know how to give understandable instructions for a computer system.	X	X	X CE.ECA.5.4 O.M.5.2.
Safety	Protect devices, content, personal data, and privacy in digital environments. Protect physical and psychological health and be aware of digital technologies for social well-being and social inclusion.	X	X	
Problem solving	Identify needs and resolve conceptual problems in digital environments. Use digital tools to innovate processes and products.	X	X	
Career-related competencies	Operate specialized digital technologies to understand, analyze, and evaluate specialized data, information, and digital content for a particular field.	X	X	

Source: Original elaboration with data from UNESCO (2018).

Ecuador has strengthened its monitoring and evaluation process through large-scale system-level assessments conducted by INEVAL to obtain data at a national level for decision making. However, the government has not yet implemented evaluations or large-scale examinations to understand progress in digital skills and certify students as they move from one level of the digital skills framework to the next. In this regard, it is important that the country develop monitoring and evaluation tools in collaboration with INEVAL to periodically measure progress and identify good practices and areas where digital skills policies can be strengthened.



TRUST ENVIRONMENT:

Ecuador's Path Toward the Implementation of a National Strategy

The regulation of data exchanges is indispensable to enabling the kind of interactions and data flows necessary to sustain a growing digital economy while at the same time ensuring that personal data are collected, processed, and stored fairly and lawfully. The World Bank's 2021 *World Development Report* categorizes data policies and regulations as enablers and safeguards. Enablers are policies and regulations that facilitate the use of data as a necessary condition for the digital economy, such as through data-sharing models that underpin e-commerce transactions and public and private intent data. On the other hand, safeguards

encompass policies and regulations that protect personal and non-personal data and prevent data abuse, cyber-crime, and other misuse. As Ecuador's digital economy advances and becomes more inclusive, strengthening data enablers and safeguards is instrumental to building a trust environment for the growth of electronic transactions and data flows (Table R.3).

Ecuador's trust environment has moved in the right direction with the establishment of a key data protection framework and cybersecurity strategy, but there is room for improvement. The country has established key enablers and safeguards to support digital transactions and data flows, specifically the comprehensive data protection framework outlined in the Organic Law on the Protection of Personal Data (*Ley Orgánica de Protección de Datos Personales* [LOPD]). However, concerns about the LOPD's lack of a data protection authority to monitor and enforce its provisions among both public and private sector organizations continues to be an ongoing concern. In addition to the legal framework, the country's newly adopted NCS provides a roadmap and strategic pillars to enhance national cybersecurity capacities. However, it also faces obstacles, as its success depends on the development of its action plan, the establishment of a national governance structure to lead the NCS implementation process, and the allocation of sufficient resources to ensure that NCS activities are adequately resourced.

Table R.3. Summary of Key Safeguards and Enablers for Ecuador and Selected Benchmark Countries

Dimension Country	Enablers				Safeguards		
	E-commerce/ e-transactions law	Digital ID system for online authentication	Open data act/policy	Data portability rights	Personal data protection law	National cybersecurity strategy/plan	Regulation of non-personal government data
Ecuador	YES	X	YES	YES	YES	YES	NO
El Salvador	YES	NO	YES	NO	NO	NO	NO
Costa Rica	YES	YES	YES	NO	YES	YES	YES
Colombia	YES	YES	YES	YES	YES	YES	YES
Mexico	YES	NO	YES	YES	YES	YES	NO
Dominican Republic	YES	YES	YES	NO	YES	YES	NO

Source: Framework from World Bank (2021d). For Colombia, Mexico, and the Dominican Republic, data from World Bank (2021d); for Ecuador, El Salvador, and Costa Rica, data are based on original analysis.

Several steps can be taken to address the shortcomings in Ecuador's data protection framework and cybersecurity strategy. First, there is a need to refine the LOPDP framework with secondary legislation and to establish a data protection authority, such as a superintendency of data protection. This will be crucial to strengthening current data protection provisions and the oversight and enforcement of data protection legislation within the public and private sectors. Second, there is a need to develop an NCS action plan and to allocate sufficient resources for its implementation.

The cybersecurity governance structure is broadly defined in the NCS, but some changes are required to ensure proper oversight and implementation. The establishment of legal instruments for the governance structure is vital to adequately implement cybersecurity strategies and policies. Ecuador's national-level Computer Emergency Response Team (CERT) [*Equipo de Respuesta a Emergencias Informáticas de Ecuador*, or EcuCERT]) needs a robust legal mandate as well as the necessary human, technical, and financial resources to manage the national-level incident response management cycle. It is essential to ensure that the cybersecurity governance structure becomes operational and functions in an inclusive and coordinated manner with regard to the different government entities involved.

In addition to managing the national-level incident response team, the legal and regulatory framework in Ecuador needs to address other significant issues, such as the protection of critical information infrastructures and cyber crisis management. Ecuador should identify and regulate critical information infrastructures in the public and private sectors to reach an

adequate level of cyber resilience. Moreover, establishing a national cyber crisis management framework and organizing regular national cyber drills can define the roles and responsibilities and specific procedures and protocols in the event of a major cyber crisis. This can further boost the country's level of cyber resilience and capacity.

Ecuador faces challenges in building cybersecurity knowledge and capabilities in all sectors. For instance, the curricula of primary and secondary schools does not cover any cybersecurity-related courses; the only relevant training is delivered through awareness-raising campaigns. There are also challenges at the tertiary level, as the academic offering for cybersecurity education, though growing, is not keeping pace with the country's current demands.

It is essential to allocate further resources to fight cybercrime and provide cybercrime and digital evidence training to government staff, among law enforcement at EcuCERT, and throughout the judiciary system. Building cybersecurity knowledge and capabilities in all sectors is one of Ecuador's main strategic medium- to long-term challenges. Establishing a nationally coordinated cybersecurity awareness-raising effort, with support from the private sector and civil society organizations, is an important step. Ecuador should ensure that competent authorities, together with the private sector and academia, provide technical assistance and resources to enhance the cybersecurity posture of the private sector, including micro, small, and medium-sized enterprises. Ecuador should also establish a skills and knowledge development program for public servants to strengthen cybersecurity capabilities in the public sector and mitigate the negative impact of cyberattacks.

Table R.4. Key Policy Recommendations to Accelerate the Digital Transformation in Ecuador
(1 of 2)

Pillar	Short-Term Policy Priorities	Medium-Term Policy Priorities and Structural Reform
Digital Infrastructure	<ul style="list-style-type: none"> » Develop a focused action plan to bridge the digital divide, including an investment program to incentivize investments in infrastructure in the middle and last miles (fixed and mobile) in sparsely populated and low-income areas. » Routinely conduct market analyses to boost competition along the digital supply chain by promoting infrastructure sharing and lowering market entry barriers. 	<ul style="list-style-type: none"> » Secure more international bandwidth through new deployments of submarine and terrestrial cables. » Ensure the establishment and operation of IXPs and data centers. » Complete the regulatory actions identified by regulatory action plans and develop secondary regulations per the Organic Telecommunications Law (<i>Ley Orgánica de Telecomunicaciones</i>) and the Organic Law on Regulation and Control of Market Power (<i>Ley Orgánica de Regulación y Control del Poder de Mercado</i>). An incomplete regulatory framework and its ineffective implementation hinders the digital uptake.
Digital Public Platforms	<ul style="list-style-type: none"> » Simplify planning instruments and develop a roadmap with clear stages, deadlines, and financing. » Develop a digital government architecture in all its layers. » Prepare a strategy for standardized modeling of digital services by scaling the Gob.EC platform, significantly accelerating the digitization process, reducing costs, improving the user experience, and increasing interoperability. » Incorporate by default the digital take-up dimension into the very design of any digital government initiative. 	<ul style="list-style-type: none"> » Develop digital government infrastructure policies and promote the definition of framework agreements for the efficient and policy-aligned acquisition of this type of service by the state. » Move toward a unified authentication across government digital services. » Consolidate a holistic approach and an agreed strategy for data management for the government.
Digital Financial Services	<ul style="list-style-type: none"> » Continue efforts to enact an NFIS and include it on the Digital Transformation Agenda. » Enact a regulatory framework for the Fintech Law following best international practices and a consensual approach. » Align the framework for simplified KYC/CDD with international standards and clearly identify low-risk segments to facilitate the implementation of these regulations by the industry. » Strengthen the legal framework for crowdfunding companies so that their operational and market conduct is regulated and supervised by a financial authority, and enact the corresponding regulatory framework. 	<ul style="list-style-type: none"> » Continue to address gaps in the consumer protection regulatory framework, ensuring a level playing field. » Build a consolidated database of the entire financial sector to monitor progress on financial inclusion and DFS. » Modernize the payment system infrastructure and enable real-time retail payments. » Create an enabling regulatory and supervisory framework for non-bank specialized credit providers (including factoring companies) and digital credit. » Develop a legal and regulatory framework to facilitate the use of movable collateral and create a national registry to enable its use.

Table R.4. Key Policy Recommendations to Accelerate the Digital Transformation in Ecuador
(2 of 2)

Pillar	Short-Term Policy Priorities	Medium-Term Policy Priorities and Structural Reforms
Digital Businesses	<ul style="list-style-type: none"> » Enact additional legislation to clarify the legal status of the operation of ride-sharing platforms as per the Transport Law. This can be done by working with municipalities to issue guidelines or pass national regulations. » Assess possibilities to improve the digital services of the value added tax to avoid double taxation and ensure the smooth quarterly updating of taxed services. 	<ul style="list-style-type: none"> » Raise awareness of electronic transactions and mainstream their use throughout the government (especially for business-to-government and citizen-to-government transactions). » Modify laws such as the Commerce Law so that banking services can be provided entirely through digital channels.
Digital Skills	<ul style="list-style-type: none"> » Adjust the new Digital Education Agenda by specifying how students can develop digital skills, considering proficiency levels (foundational, intermediate, advanced, and highly specialized) from school to higher education. » Constantly update the virtual training platform <i>Mecapacito</i> and its monitoring process to ensure that teachers are equipped with tools and strategies relevant to their day-to-day professional activities. » Foster public-private collaboration to strengthen the supply of digital skills programs. 	<ul style="list-style-type: none"> » Ensure that both hardware and software at schools are in optimal condition to enhance the learning experience. At the same time, improve training programs for all teachers and students so that they can effectively use the devices provided for the teaching-learning process. » Develop monitoring and evaluation tools in collaboration with INEVAL to periodically measure progress, and identify good practices and areas where digital skills policies can be strengthened.
Trust Environment	<ul style="list-style-type: none"> » Prepare an action plan for the implementation of the NCS. » Ensure that EcuCERT has a mandate to operate as the national-level incident response management authority. » Ensure that the cybersecurity governance structure becomes operational and functions in an inclusive and coordinated manner. » Establish a critical information infrastructure protection framework to ensure that national critical information infrastructure sectors and assets owned both by the public and private sectors are adequately protected. » Establish a mandatory incident response and information-sharing framework. 	<ul style="list-style-type: none"> » Adopt secondary regulations for implementation of the data protection framework and establishment of a data protection authority. » Refine the data protection framework, mainly the LOPDP. Enhance the cybersecurity education offering at the tertiary level and create more affordable cybersecurity professional training opportunities.

1. INTRODUCTION



Adopting digital technologies to boost productivity, promote more and better jobs, and reduce inequality

The widespread adoption of digital technologies is transforming how individuals, businesses, and governments interact and at the same time creating new opportunities to address long-standing development challenges. Digital technologies—defined as electronic tools, systems, devices, and resources that generate, store, or process data—have already begun to transform the way most people around the world learn, work, shop, socialize, and access information. These technologies are disrupting business models and economic structures and, in many cases, driving significant productivity gains.¹³ For policy makers in emerging markets, digital technologies also offer new pathways to tackle long-standing development challenges and can support better access to public services for citizens.

By 2025, the contribution of the digital economy to global GDP is expected to reach roughly 25 percent, up from 15.5 percent in 2016.¹⁴ The concept of the digital economy as discussed in this report refers to all economic activity resulting from the use of information technology to create, adapt, market, or consume goods and services.¹⁵ Data and digital technologies are the cornerstone of the digital economy, as they enable the growing interconnectedness of people, organizations, and machines through billions of daily online transactions.¹⁶

The impact of digital technologies on economic growth is mediated through the three main mechanisms of inclusion, efficiency, and innovation. As argued in the World Bank's *World Development Report 2016: Digital Dividends*, the widespread adoption and use of digital technologies can facilitate the integration of firms into the world economy by enabling more businesses to trade new products and services to new destinations. For instance, firms selling their goods online

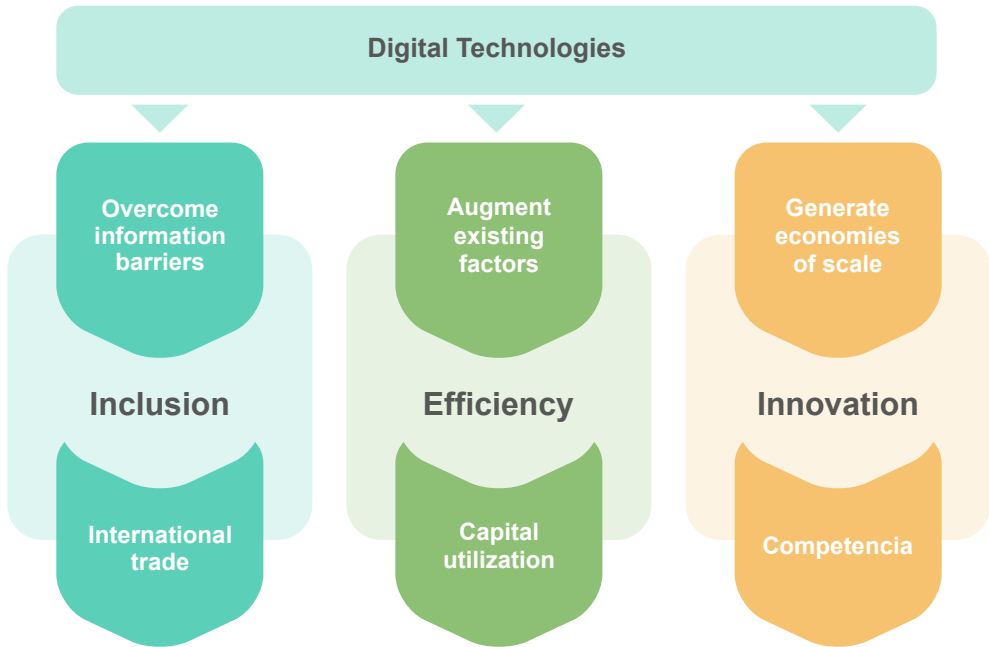
through e-commerce platforms tend to be smaller and younger, and to export more products to different destinations, than firms selling exclusively offline.¹⁷ The digital transformation of business processes and systems can raise efficiency by allowing firms to make better use of their capital and labor.¹⁸ Moreover, digital technology can enhance innovation by enabling firms to exploit scale effects through online platforms and services that compete with conventional business models in retail, transport, and banking, among others. Together, these mechanisms contribute to economic growth by expanding trade, increasing capital and labor utilization, and intensifying competition (see [Figure 1.1](#)).¹⁹

In Ecuador, the Digital Transformation Agenda (2022–2025) is the government's roadmap for the adoption of digital technologies and innovation. The country's Ministry of Telecommunications (*Ministerio de Telecomunicaciones y de la Sociedad de la Información* [MINTEL]) took an important step toward the promotion of digital technologies with the newly passed Digital Transformation Agenda 2022–2025.²⁰ The policy's objective is to establish a multisectoral framework that highlights actions items to (i) support the digital transformation process in Ecuador, (ii) define governance structures for digital transformation, and (iii) incorporate the transversality of information and communications technologies (ICT). Given that the strategy has only recently been passed, it is too early to gauge its implementation. However, it encompasses key areas that align with the important pillars of the World Bank's Digital Economy for Latin America and the Caribbean (DE4LAC) initiative, as it prioritizes: digital infrastructure; culture and digital inclusion; the digital economy; emerging technologies for sustainable development; digital government; interoperability and data processing; and digital security and trust (see [Table 1.1](#)). Additionally, Ecuador reached a notable achievement in enhancing its trust environment with its newly adopted National Cybersecurity Strategy 2022–2025 (NCS), which establishes a roadmap and strategic pillars to enhance the country's cybersecurity capacities in different domains.²¹

The Government of Ecuador (GoE) has prioritized digital transformation to promote economic and social development across key pillars of the country’s digital economy. For example, the Ministry of Economic and Social Inclusion (*Ministerio de Inclusión Económica y Social* [MIES]) has been working on the digital transformation of social protection government-to-person (G2P) payments through the *Pago Seguro* program, accelerating the shift from cash-based to account-based payments. In addition, there are ongoing efforts to promote

financial inclusion through the expansion of digital financial services (DFS); for example, the National Financial Inclusion Strategy (NFIS) is currently being revised by the Financial Policy and Regulation Board (*Junta de Política y Regulación Financiera* [JPRF]). The Ministry of Education (*Ministerio de Educación* [MINEDUC]) is also leading the *Conectando al Futuro* project, which aims to bridge the digital gap in schools by providing internet services, connectivity, and tablets to both students and teachers to improve the teaching and learning process.

Figure 1.1. Mechanisms of Digital Technologies and Growth



Source: Adapted from World Bank (2016).

Table 1.1. Alignment Across Pillars Between Ecuador’s Digital Transformation Agenda 2022–2025 and DE4LAC

Digital Transformation Agenda 2022–2025	DE4LAC
Digital infrastructure	Digital Infrastructure
Culture and digital inclusion	Digital Skills
Digital economy	Digital Businesses; Digital Financial Services
Emerging technologies for sustainable development	Digital Businesses
Digital government	Digital Public Platforms
Interoperability and data processing	Trust Environment
Digital security and trust	Trust Environment

Source: Authors’ elaboration, based on Ecuador’s Digital Transformation Agenda (MINTEL 2022b) and DE4LAC assessments.

In recent years, Ecuador has made remarkable improvements in its digital transformation efforts. Between 2014 and 2022, the share of households with access to the internet increased by 28 percentage points (from 32 to 60 percent). Similarly, the share of individuals who use the internet also increased by 24 percentage points (from 46 to 70 percent) during the same period. Ecuador's fintech subsector has grown in the past five years, with 27 percent of the country's digital firms operating in this space compared to 18 percent for the large economies in Latin America and the Caribbean (LAC).²² The successful scaling of fintech start-ups, such as Payphone and Tipti, may promote the adoption of digital technologies in other industries if properly leveraged.

Despite this progress, however, Ecuador has yet to unlock the full potential of digital transformation to support economic and social development, particularly among indigenous and lower socioeconomic groups and within the educational system. Technologies can leverage economic and social development through lower information and search costs, easier access to markets, increased labor productivity, wider access to financial services, and the empowerment of women.²³ For instance, a study in Ecuador shows that text messages sent to potato farmers increased the knowledge and self-reported adoption of integrated soil management practices.²⁴ However, disparities in internet connectivity in the country limit the potential development benefits of digitalization. As an example, the vast majority of indigenous communities in Ecuador live in rural areas (87.5 percent). Given that individuals in rural areas experience a 32-percentage point lag compared to urban areas in internet access and a 28-percentage point lag in internet usage, the rural-urban gap leaves indigenous communities at a disadvantage. Disparities in the adoption of digital technologies also impact financial inclusion, especially among those in lower socioeconomic groups. Although only 16 percent of the population make or receive digital payments, there is a 20-percentage point gap between those in the highest and lowest income groups.²⁵ Furthermore, low access to the internet and electronic devices limits digital skills adoption, with only 40 percent of schools having access to the internet. As will be detailed in the following sections, adoption of digital technologies can help Ecuador address its most pressing development challenges.

Anemic Productivity Growth, Weak Labor Market Performance, and Large Income Inequalities Pose Significant Development Challenges for Ecuador.

Anemic productivity growth, weak labor market performance, and large income inequalities pose significant development challenges for Ecuador. The COVID-19 crisis worsened these issues, as GDP contracted by 7 percent²⁶ and poverty rates increased by almost 8 percentage points from 2019 to 2020.²⁷ Although there has been some progress, with recent GDP growth of 3.2 percent in the third quarter of 2022,²⁸ the country still has much work to do to catch up to regional peers. As the World Bank's Systematic Country Diagnostic highlights, Ecuador's economy depends heavily on the extractive sector, in that oil or oil-related activities accounted for half of its exports and a third of its fiscal revenues during the boom years (2003–14).²⁹ Overreliance on the extractive industry limits growth in more sophisticated sectors: high-technology exports as a share of total manufactured exports were 5.3 percent in 2018, below LAC (8.6 percent) and OECD (15.1 percent) averages.³⁰ A last development challenge is Ecuador's persistent inequality, with the country registering a Gini coefficient of 0.47 in 2020, a 3-percentage point increase with respect to 2017.³¹ Inequality is particularly evident in the rural-urban digital divide: 60 percent of households have access to fixed internet across the country, but in rural areas the percentage drops to 38 percent.³² [Figure 1.2](#) provides a theory of change linking the provision of digital infrastructure, the adoption of digital technologies by the government and the private sector, and the configuration of a trusted environment to achieving key economic and social development outcomes in Ecuador.

Initiatives by the GoE to promote universal access to the internet and other innovative technologies can help Ecuador boost productivity and promote business development. Total factor productivity in Ecuador has remained low and its growth path has mirrored commodity price cycles.³³ Promoting productivity and competitiveness in the non-extractive sectors is critical to supporting the country's long-term transition to other sectors, and digital technologies can play an important role in this transition. A recent study by the Inter-American Development Bank (IDB) shows that ICT capital (the value of computer equipment and software) in Ecuadorian firms has a positive and statistically significant effect on firm output as compared to non-ICT capital (the value of property, plant, and equipment other than computers and software).³⁴ Thus, prioritizing firms' adoption of technology, alongside complementary investments in digital skills and organizational capacity, is essential to improving the efficiency of firms' productive processes.³⁵ Digital technologies can also enable firms—with support from academia and the public sector—to harness a rapidly increasing amount of data in order to effectively access new markets and sources of knowledge, streamline

the production of goods and services, and drive innovation. DFS, spearheaded by the growing fintech subsector in Ecuador, can also bring down financing costs for micro, small, and medium-sized enterprises (MSMEs) and promote more efficient and convenient payments—a cornerstone of the e-commerce and platform-based business models. However, Ecuadorian companies have yet to take advantage of digital technologies, as 71 percent of them have low levels of digital maturity according to IDB's "Chequeo Digital" index.³⁶

Promoting innovative MSMEs and entrepreneurship is also a key to addressing low productivity. Although the fintech industry is growing, Ecuador's digital business environment and adoption of digital technologies among different sectors is still in its early stages. Ecuador has a low number of digital businesses relative to the size of its economy, with a digital business density score that lags behind regional peers like Belize, Brazil, Chile, Honduras, Jamaica, and Uruguay. Funding for Ecuadorian businesses is also low and concentrated at early-stage investments, as only 40 percent of digital firms in Ecuador receive formal funding,³⁷ lower than benchmarking groups, such as LAC or regional peers.³⁸ Prioritizing the growth of digital businesses can lead to digital uptake in other sectors, because a favorable environment for digital businesses can enable market regulations that allow digital firms to enter markets, scale, and engage in fair competition. This is because the entire digital business ecosystem depends on a broader set of digital market regulations that determine trustworthiness and digital market size (e.g., through regional/international regulatory harmonization). For instance, Ecuador lacks regulations that target the relationship between online sellers and platforms (online supplier protection). Passing this type of regulation would be key to promoting the growth of many more digital businesses by creating an environment of confidence for suppliers that may directly impact commercial relations.

Widespread adoption of digital technologies can help promote more and better jobs. Access to technologies, such as smartphones and laptops, can provide more individuals with access to new job opportunities or income sources. A 2018 multi-country LAC study showed that lower-skilled workers benefit from the adoption of productivity-enhancing digital technologies (e.g., supplier and customer relations, recruiting and training, production planning and processes, product pricing, etc.).³⁹ However, access to technology is not enough; economies also require a digitally capable workforce to build robust digital-intensive sectors and competitive

markets. In this sense, Ecuador has a lot of room for improvement, as technical and digital skills are low, with the country ranking below regional peers on the ICT Development Index of the International Telecommunication Union (ITU) and on its Digital Skills indicator. Furthermore, most digital skills programs at the tertiary level are concentrated in the two largest cities, Quito and Guayaquil. Improving the current benchmark of digital skills countrywide could catalyze access to new job opportunities. Between 2010 and 2017, labor demand for workers with technical backgrounds grew almost 36 percent in Ecuador, with the country's most highly demanded jobs requiring digital skills: digital marketing specialist, digital manager, software developers, and e-commerce directors. Ensuring widespread digital skills programs across Ecuador can help ensure that supply for technical jobs keeps up with demand and also provide Ecuadorians with access to more and better jobs.

Digital technologies can be leveraged to improve the delivery and efficiency of public services, including programs to empower marginalized communities and reduce Ecuador's high and persistent inequality. Social assistance programs in Ecuador contributed to a 12 percent reduction in poverty, 24 percent decline in the poverty gap, and 3.5 percent fall in inequality between 2007 and 2014.⁴⁰ Digital solutions are a great tool to enhance the efficiency of public services and bridge inequality. For instance, social programs can often face transactional and operational challenges, such as the inability to identify citizens or complex bureaucratic procedures, all of which can lead to suppressed uptake.⁴¹ In this regard, digital transformation of social program payments, as Ecuador is doing with the G2P payments through the ongoing *Pago Seguro* program, could help lower leakages in social protection programs, improve financial inclusion and financial resiliency, and reduce disparities in access to basic services. Despite these efforts, however, Ecuador has much room for improvement in digital payments, as only 13 percent of the population has used a mobile phone or the internet to buy something online (compared to 27 percent in LAC), 14 percent to send money (28 percent in LAC), and 17 percent to pay bills (34 percent in LAC). In addition, Ecuador is one of the few countries in LAC without mobile money accounts. Leveraging digital payments to increase the efficiency of social assistance programs is difficult if the general population does not adopt this technology. Thus, ensuring access to these technologies throughout the country through adequate digital infrastructure can help close the digital divide, support income distribution, and foster economic inclusion.

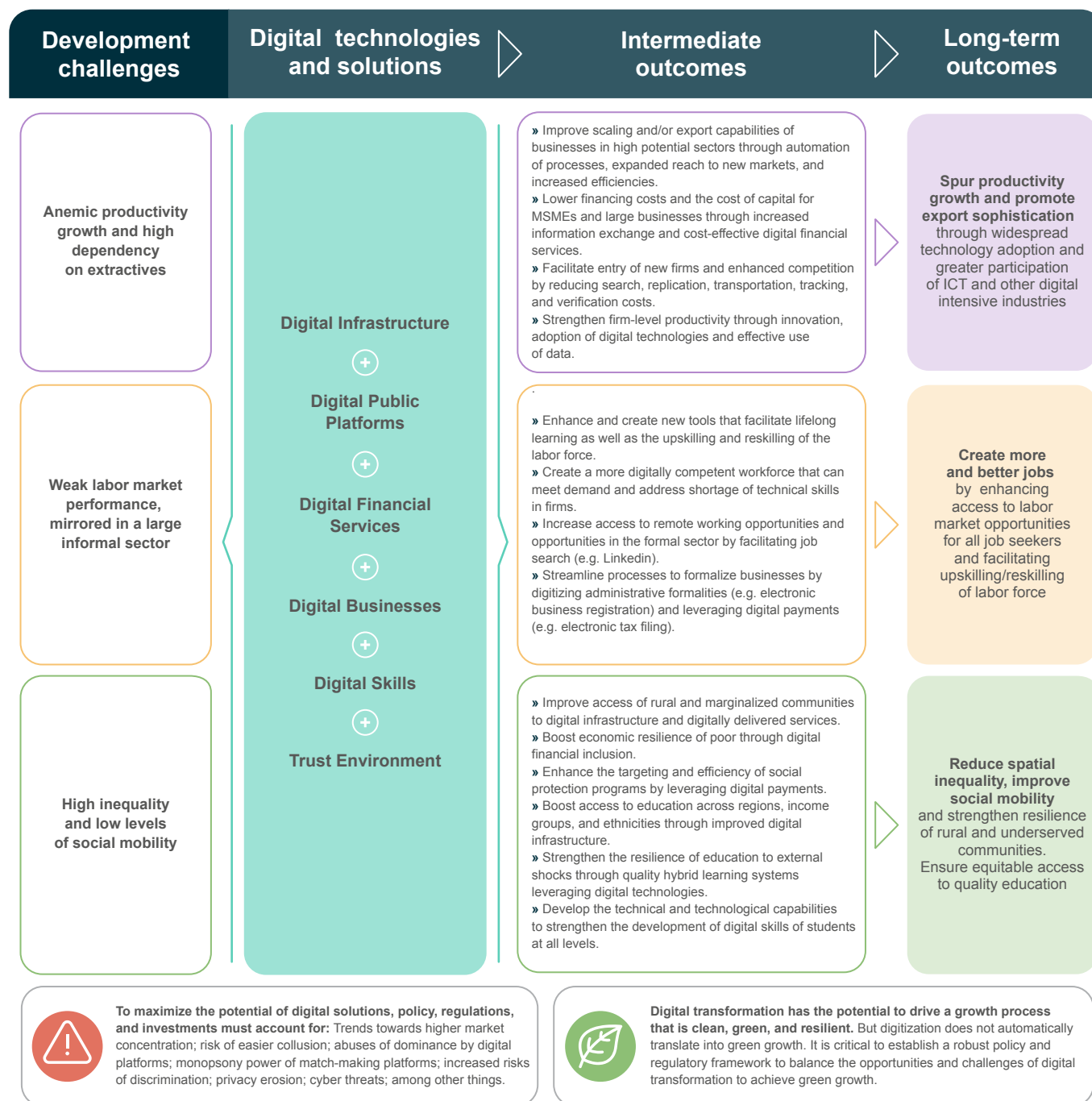
Strengthening Key Enablers for the Development of a Well-functioning Digital Economy Can Help Ecuador Address its Key Development Challenges.

Strengthening critical enablers of the development of a well-functioning digital economy can help Ecuador address its key development challenges. Universal access to the internet and other technologies can support efforts to close Ecuador's digital divide and, in consequence, promote business development, boost productivity by creating more skilled jobs, and reduce poverty. Thus, digital transformation efforts can spur the following areas of Ecuador's economy: (i) productivity growth, (ii) development of more and better jobs, and (iii) improved income distribution and economic inclusion ([Figure 1.2](#)).

This report provides a cross-cutting diagnostic of Ecuador's digital economy and offers policy recommendations to help the country address its digital divide and accelerate the pace of digital transformation. The analyses that follow are based on quantitative and qualitative assessments carried out with government entities, as well as extensive consultations with key public and private sector stakeholders in the country. The report is based on the World Bank's Digital Economy Assessment (DEA) methodology, which, by examining the international experiences of digital businesses and public sector institutions, has identified a set of foundational elements that play a critical role in the digital transformation of economies, including the availability of internet or broadband that brings people online, the ability to identify and authenticate people digitally, and the ability to pay or transact digitally. Digital economies further energize when there is a sizable tech-savvy workforce and an ecosystem that supports digitally intensive firms in entering the market or scaling up. Once those foundations are in place, a wide array of use cases can emerge that denote all the ways by which a digital economy may take shape, serving people, businesses, and government in a process typically referred to as digital transformation. The private sector is the main driver of use cases, offering major platforms and applications, including e-commerce, ride-sharing, gamification, and others. The government may also develop new government platforms, applications, and services to automate its functions, improving its efficiency and effectiveness. This diagnostic, which is broadly aligned with Ecuador's Digital Transformation Agenda 2022–2025, thus provides a comprehensive overview of Ecuador's digital economy development across the six pillars or foundational elements outlined in the DEA: digital infrastructure, digital public platforms, digital financial services, digital businesses, digital skills, and trust environment.

- » **Digital Infrastructure:** This refers to the facilities that are involved in the effort to collect, exchange, store, process, and distribute data across first-mile (international links), middle-mile (backbone), and last-mile (access) networks. Digital infrastructure provides the way for people, businesses, and governments to get online and link with local and global digital services, thus connecting them to the global digital economy. Aside from connectivity, digital infrastructure encompasses the Internet of Things (IoT) (such as mobile devices, computers, sensors, voice-activated devices, geospatial instruments, and machine-to-machine and vehicle-to-vehicle communications) and data repositories (such as data centers and clouds). It also includes all the active and passive infrastructure necessary to develop the digital economy downstream.
- » **Digital Public Platforms:** Digital public platforms developed for the public sector or as a public good—either by government agencies, in partnership with private companies, or through a hybrid model—can help deliver more and better services to individuals. The development of digital public platforms underpins the expansion of e-government services and can support the efficiency of core government systems. Digital public platforms can also boost accountability, including by providing new channels for public engagement and feedback and reducing opportunities for corruption. Likewise, they can provide a foundational layer to catalyze private sector innovation and new markets.
- » **Digital Financial Services:** DFS provide individuals and households with convenient and affordable channels by which to pay as well as to save and borrow. Firms can leverage DFS to more easily transact with their customers and suppliers and to build digital credit histories and seek financing. Governments can use DFS to increase efficiency and accountability in various payment streams, including for the disbursement of social transfers and receipt of tax payments. Digital payments are often the entry point for DFS and provide the infrastructure, or “rails,” through which additional products and use cases can be developed, as has been demonstrated by the evolution of M-PESA in Kenya and Alipay in China. Digital payments and financial services are critical to financial inclusion and key enablers of e-commerce and digitally enabled business models.

Figure 1.2. Digital Transformation in Ecuador: Theory of Change



Source: Authors' elaboration.

- » **Digital Businesses:** Digital businesses can be divided into two categories, each with its distinct characteristics: (i) digital start-ups, which refer to early-stage ventures that create new digital solutions or business models as part of their core products or services, and (ii) established digital businesses, which are the digitally intensive businesses that have managed to scale up and consolidate their position in local or international markets and include medium and large platform-based and data-driven firms. Digital businesses, and the adoption of digital technologies among less technology-intensive firms, represent a unique opportunity for Ecuador to nurture and scale MSMEs, boost entrepreneurship, increase efficiency, generate more and better jobs, foster economic integration, and promote the integration of lagging populations and regions. Digital businesses thrive when other key enablers, such as digital infrastructure, skills, payments, and a trust environment, are set in place.
- » **Digital Skills:** Economies require a digitally savvy workforce in order to build robust digital-intensive sectors and competitive markets. Digital skills encompass foundational, technology, and business skills for building or running a digital start-up or running a digitally intensive business. Greater digital literacy further enhances the adoption and use of digital products and services among governments and the larger population.
- » **Trust Environment:** The rapid growth of the digital economy goes hand in hand with a rapid rise in cyber threats and increasing concerns about personal data protection. Therefore, the capacity of both the public and private sectors for cybersecurity and data protection needs to evolve quickly to meet current and future threats. This pillar assesses the presence of a governance framework that balances data enablers and safeguards and supports digital transformation while protecting individuals, businesses, and institutions from cybersecurity risks.

Multiple cross-cutting themes impact these foundational elements, affecting the country's capacity to create an enabling institutional and policy environment. The Digital Economy Framework addresses three cross-cutting themes: developing regulatory frameworks to foster competition and contribute to the World Bank's Maximizing Finance for Development (MFD) agenda; managing the risks of the widespread adoption of digital technologies; and generating opportunities to empower vulnerable populations. The diagnostic emphasizes inclusive, equitable, and sustainable access to digital opportunities as a means to improve household welfare, particularly for poor populations.

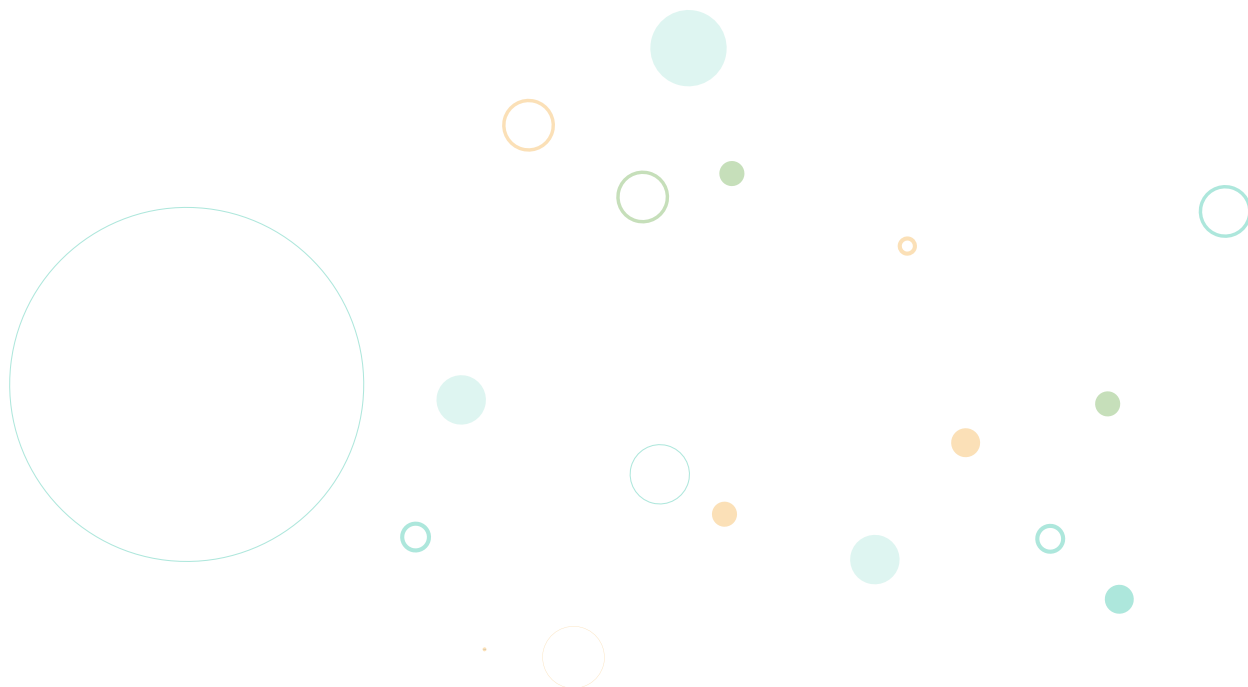
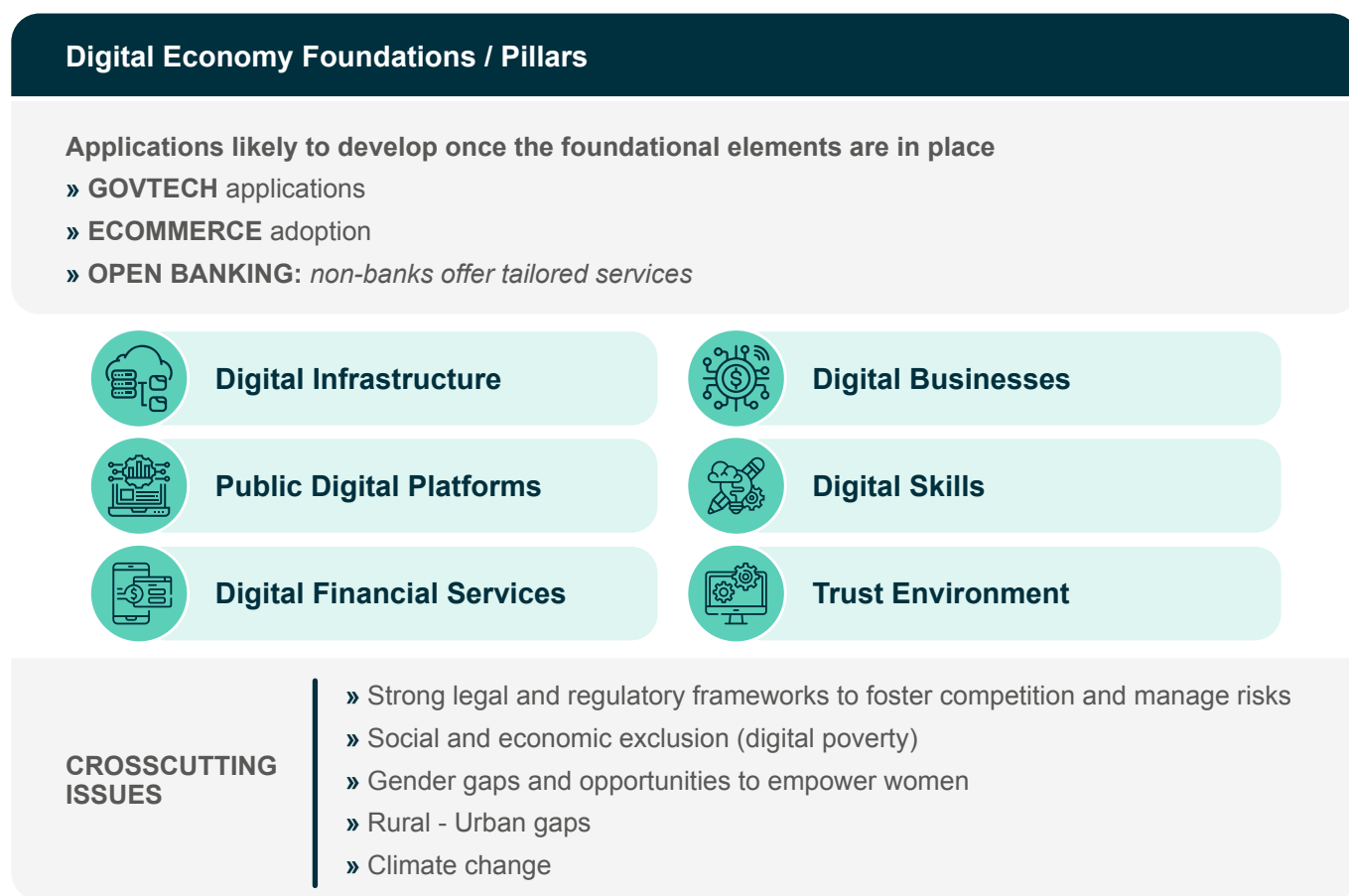


Figure 1.3. Pillars of the Digital Economy



Source: Authors, based on World Bank (2020a).

The diagnostic includes practical and actionable recommendations in the form of a sequenced action plan that can inform relevant government efforts to promote widespread digital transformation within government, businesses, and society at large. The report takes stock of existing digital transformation initiatives in Ecuador and identifies key constraints and priority areas, proposing a mix of possible policy reforms, investments, and capacity-building interventions to harness the economic and social benefits of widespread digital technology adoption and to effectively mitigate the associated risks, particularly in the critical areas of a digital economy.

The remainder of the report is organized as follows. Chapter 2 discusses the accessibility, quality, and resilience of digital infrastructure in Ecuador, as well as the

availability and affordability of connectivity, which is essential to bringing more people online. Chapter 3 looks at the presence and use of digital public platforms that can support better digital exchanges and transactions, enhance the access to and transparency of public services, and improve public service efficiency. Chapter 4 examines the current state of DFS in the country, while Chapter 5 assesses digital entrepreneurship and established digital businesses. Chapter 6 examines the demand for, as well as the attainment and coverage of, digital skills in Ecuador, a key enabler of the uptake of digital services and the application of digitally enabled solutions, and finally, Chapter 7 looks at the legal and regulatory framework for cybersecurity and data protection, describing the challenges and opportunities in creating a trust environment conducive to the further adoption of digital technologies.

2. DIGITAL INFRASTRUCTURE



Closing the Digital Gap Through Adequate Digital Infrastructure



KEY MESSAGES

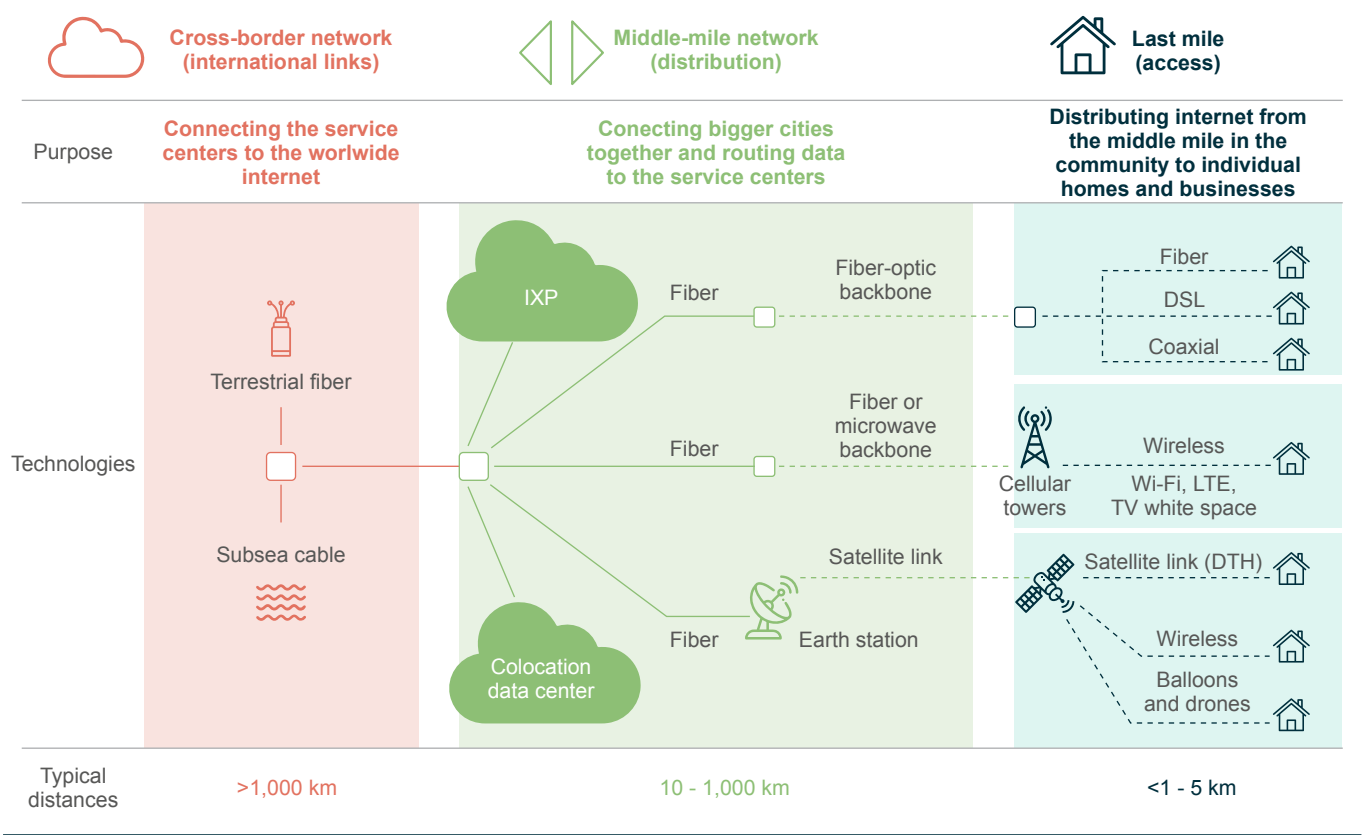
- » **The high price for international connectivity is a constraint to Ecuador's digital uptake.** It is essential to increase international interconnectivity to foster Ecuador's digital competitiveness, including in the data center market.
- » **The limited optical fiber backbone represents an obstacle to universal access to the internet.** Half of the population do not have access to fixed internet, with rural areas facing significant connectivity challenges.
- » **Data and digital device affordability are bottlenecks to digital inclusion.** Prices for fixed and mobile services are above the level of 2 percent of the average individual gross national income.
- » **New investments in fixed and mobile infrastructure would increase the quality of digital services.** Fixed networks require the expansion of the digital backbone and an upgrade to faster technologies such as fiber. Moreover, the mobile sector requires the consolidation of 4G technology and the rollout of 5G networks.
- » **There are opportunities to strengthen current sector governance to improve legal certainty and the market's trust in institutions,** among other measures, by boosting the independence of the sectoral regulator, the Telecommunications and Regulation Control Agency.
- » **Although Ecuador has a solid primary regulatory framework, its implementation needs to be bolstered** to improve market outcomes through safeguarding competition, lowering market entry barriers, and promoting investments.

2.1. The Importance of Digital Infrastructure: Promoting Socioeconomic Development by Closing the Digital Gap

Digital infrastructure refers to all the facilities playing a role in the data value chain, which are aimed at collecting, exchanging, storing, processing, and distributing data.⁴² Digital infrastructure is divided into three segments in which public and private actors operate: cross-border (international links), middle-mile (backbone and backhaul), and last-mile (access) networks.⁴³ An efficient and effective regulatory framework for data management, ensuring a smooth data flow within the supply chain, is a key element of a digital ecosystem. This regulatory framework should ensure reliability in the system in order to build an effective digital environment.

The digital gap between urban and rural areas in Ecuador constrains its socioeconomic development. A nationwide, efficient, updated, and fit-for-purpose digital infrastructure is essential to closing the digital gap between urban and rural areas in Ecuador. Closing inequalities in the usage of digital technologies and promoting access to digital devices create opportunities to enhance social and economic development. In 2022, 70 percent of Ecuador’s population were internet users,⁴⁴ but penetration levels between urban and rural areas were significantly different: 78 percent in urban areas and 50 percent in rural areas.⁴⁵ Sixty percent of households have access to fixed internet across the country, but in rural areas the percentage drops to 38 percent.⁴⁶ In 2019, internet users reported that the most common place to stay connected was their household, at 86 percent, with the workplace a distant second at 6 percent and educational institutions even lower at 0.4 percent.⁴⁷

Figure 2.1. Data Infrastructure Supply Chain



Source: World Bank (2021d).

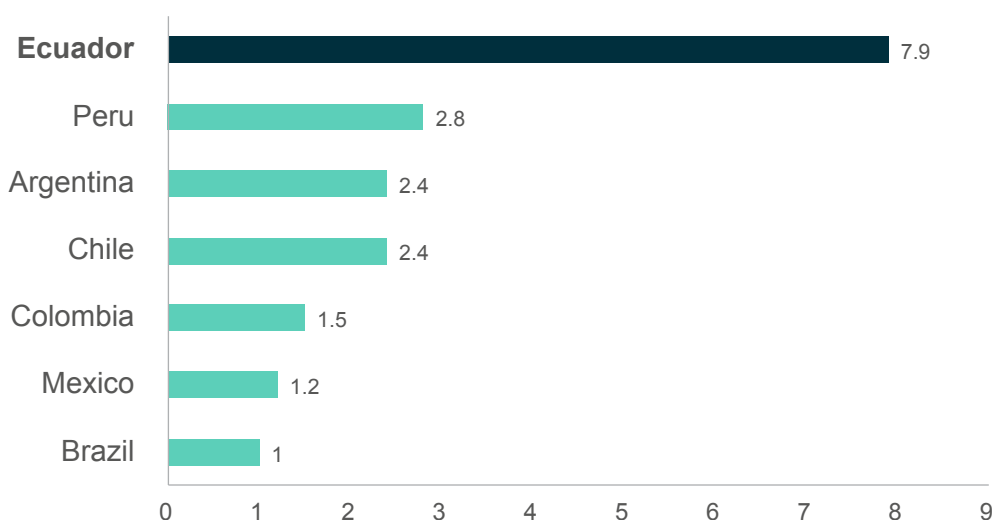
Universal access to the internet will support Ecuador in closing the digital divide and in consequence, in promoting business development and boosting productivity by creating more skilled jobs and reducing poverty. High-quality connectivity opens markets and generates opportunities for business and workforce development, such as online training and knowledge sharing. Access to an affordable and reliable internet connection is an essential input for platform and online business models (see [Chapter 5](#)). Universal internet service is also crucial to expanding education beyond physical capacity, enabling online learning (see [Chapter 4](#)) and e-health services.

By reducing the digital gap, Ecuador can overcome barriers to entering markets and increasing employability, contributing to an increase in labor productivity. This chapter assesses the status quo of Ecuador's digital infrastructure. It discusses first-mile, middle-mile, and last-mile connectivity from both the demand and supply perspectives. The chapter also highlights the strengths and weaknesses of the local digital infrastructure and provides policy recommendations to support this key enabler for a dynamic digital economy.

2.2. Current State of Digital Infrastructure: Affordability and Inadequate Digital Infrastructure as Barriers to Closing the Digital Gap

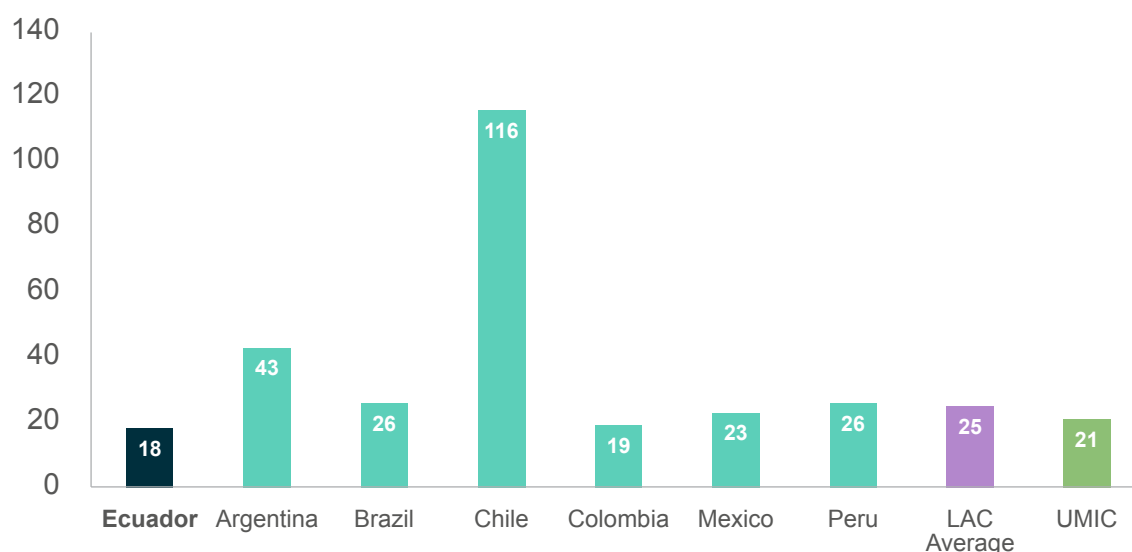
Internet coverage of mobile broadband networks reaches 96 percent of the Ecuadorian population, but only 71 percent of Ecuadorians take advantage of it. From the supply side, this gap can be explained by structural factors in the telecom industry that negatively impact the affordability of data and devices. For instance, internet protocol (IP) transit prices (first mile) are the highest among relevant peers in the region.⁴⁸ A median price that Ecuador paid for accessing the wholesale network in 2021 was US\$7.9/Mbit. Its peers paid significantly lower prices for equivalent services (Figure 2.2). Currently, two optical fiber cables are in development and three are in operation; the first cable under construction will connect the Galapagos Islands with the continental area by 2024, and the second will connect the country with Panama, Colombia, and the United States. Despite such investments, a combination of sub-sea and terrestrial cables may be needed to encourage competition, increase connectivity, and in consequence, positively impact job creation and economic growth.

Figure 2.2. Weighted Median IP Transit Cost, 2021 Second Quarter, 10GigE, \$/Mbit



Source: TeleGeography, 2021, <https://www2.telegeography.com/>.

Figure 2.3. International Bandwidth Used, Mbps Per 100 Inhabitants, 2021



Source: "World Bank Open Data," 2021, <https://data.worldbank.org/>; and TeleGeography, 2021, <https://www2.telegeography.com/>.

Limited international subsea cables landing in Ecuador and high prices for IP traffic reduce bandwidth capacity and service affordability for final users. In 2021, Ecuador used 0.24 Terabytes per second (Tbps) of international bandwidth.⁴⁹ Current capacity does not allow for an increase in service quality (measured by the data transmission rate), the provision of such data-intensive services as the cloud, big data analytics, and blockchain, or the addition of new users. Providing international bandwidth to all households in Ecuador with a guaranteed connection of 10 Megabits per second (Mbps) would require the country to almost triple current international bandwidth (to 0.6 Tbps). Increasing the connection speed to 20 Mbps for current internet subscribers would require expanding the current international internet bandwidth more than five times to 1.24 Tbps (see Figure 2.4).

Ecuador is boosting its international connectivity through the construction of submarine cable networks. Ecuador is connected to international connectivity through three submarine cables (Pacific Caribbean Cable System, South America-1, and South Pacific Cable System), and one more is planned to land in the country by 2025 (Carnivale Submarine Network-1). The Galapagos Cable System is also planned to connect the continent with the Galapagos Islands by 2024. In addition to submarine cable networks in Ecuador, there is terrestrial connectivity with Peru and Colombia through the country shore.⁵⁰

Figure 2.4. Relation Between International Internet Bandwidth and the Various Guaranteed Internet Download Speeds

Guaranteed download speed	Total International Internet bandwidth, Gbps
10 Mbps	620
20 Mbps	1.240
30 Mbps	1.860
40 Mbps	2.481
50 Mbps	3.101
60 Mbps	3.721
70 Mbps	4.341
80 Mbps	4.961
90 Mbps	5.581
100 Mbps	6.201

Source: World Bank analysis with data from TeleGeography, <https://www2.telegeography.com/>; and ITU, "Data and Analytics: Taking the Pulse of the Information Society," 2022, <https://www.itu.int/itu-d/sites/statistics/>. Note: Estimated for contention ratio 10:1; estimated for current number of fixed internet subscriptions in Ecuador.

The lack of a comprehensive regulatory framework to lay, protect, and operate submarine cables may impact the competitive environment and affect incentives to invest in this market. Ecuador regulates the concession-granting process to operate a submarine cable;⁵¹ however, regulatory instruments to protect the cables from other marine activities (particularly close to

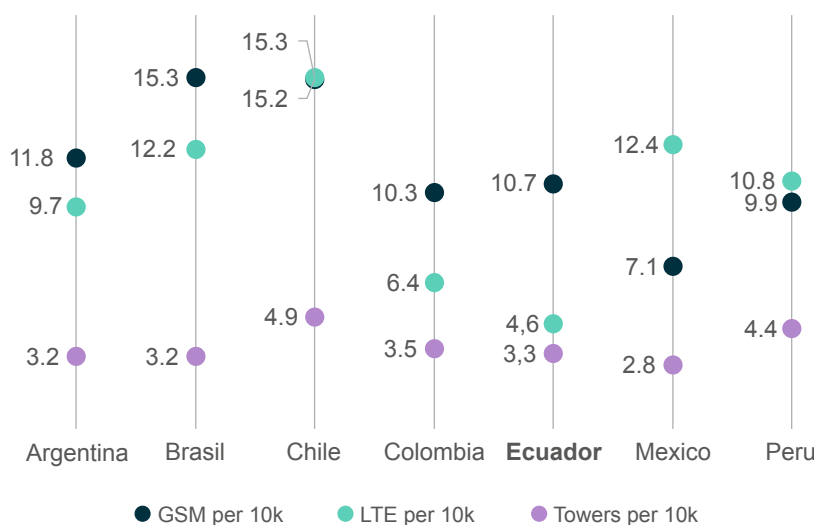
the landing point) could be strengthened. The lack of a holistic regulatory framework could diminish the incentives for investments.⁵²

Constrained international interconnectivity impacts the limited progress in the middle-mile segment in Ecuador, which is important to overcoming connectivity challenges, such as exchange, storage, and data processing.

At the national level, there are over 60,000 kilometers of optical fiber networks.⁵³ However, advancement on the fixed networks front would require the further expansion of digital backbone infrastructure and the core and access networks, including the rollout of faster technologies, such as fiber to the home (FTTH), and the upgrade of community antenna television (CATV) networks. Ecuador currently operates three internet exchange points (IXPs) and six data centers (four in Quito, one in Manta, and one in Guayaquil).⁵⁴ Limited expansion of IXPs and data centers puts Ecuador 59th in the *Cloudscene* ranking, which is based on data center density.⁵⁵ Efficient IXPs and data centers improve the quality of connectivity, reduce latency, and in consequence, increase the broadband speed and cost of data traffic. A recent study illustrates that with an increase of 100 percent in the number of IXPs per 10 million inhabitants, the speed of fixed broadband download (Kbps) is expected to grow by 14 percent.⁵⁶ However, as demand for cloud and data storage increases, the urgency to develop new digital infrastructure also grows.

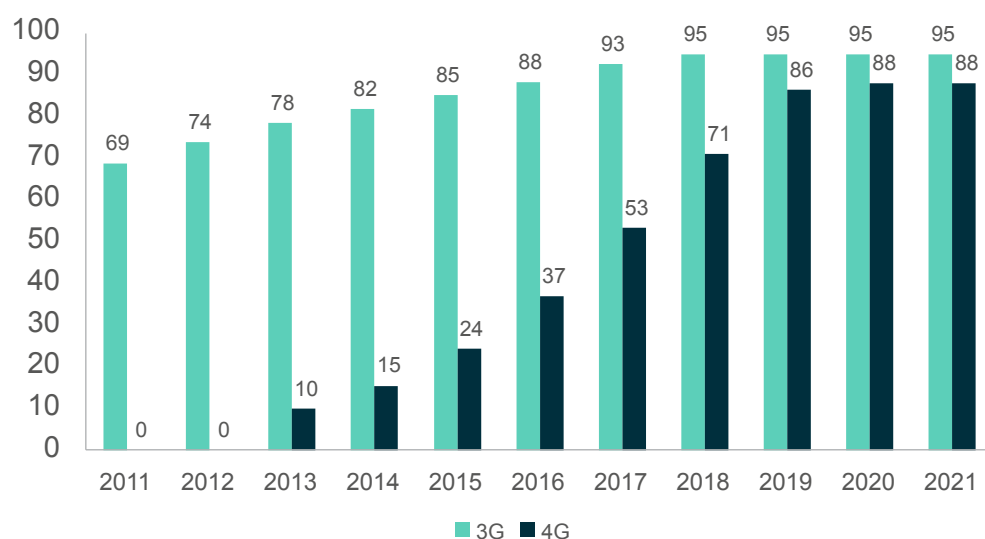
The mobile sector is strengthening 4G networks, but significant investments may be needed soon for the development of 5G. The number of mobile towers per capita in Ecuador is below the Latin American average, and this is more evident for 4G technology (Figure 2.5). 4G coverage is increasing rapidly and almost reaches 3G levels. Despite this achievement in the deployment of 4G infrastructure, market penetration must be a priority. Although 4G coverage was 93 percent by 2021, market penetration was slightly beyond 50 percent (Figure 2.6).⁵⁷ For 3G, network coverage was 95 percent and market penetration was around 30 percent (Figure 2.7).⁵⁸ Ecuador's mobile market penetration is behind its LAC peers,⁵⁹ and mobile investments have declined since 2017.⁶⁰ Moreover, the Telecommunications and Regulation Control Agency (*Agencia de Regulación y Control de las Telecomunicaciones* [ARCOTEL]) was expected to initiate the implementation of 5G in 2021, but the migration process is taking longer than expected. Ecuador has not, to date, allocated spectrum for 5G or licensed service provisions. Challenges to the adoption of 5G technology have at least three sources: most importantly, the country's limited allocation of spectrum—in 2020, Ecuador was third to the last in LAC in the amount of spectrum assigned;⁶¹ second, the acute need for network densification, as 5G requires the installation of antennas every two blocks in areas of high concentration, while 4G antennas are deployed every 200 square kilometers; and lastly, the technology upgrade needed for end users' devices. Moving forward, the transition will require the further upgrade of a set of 4G radio bases to 5G.⁶²

Figure 2.5. Mobile Towers and Cell Density Per 10,000 Inhabitants (2021)



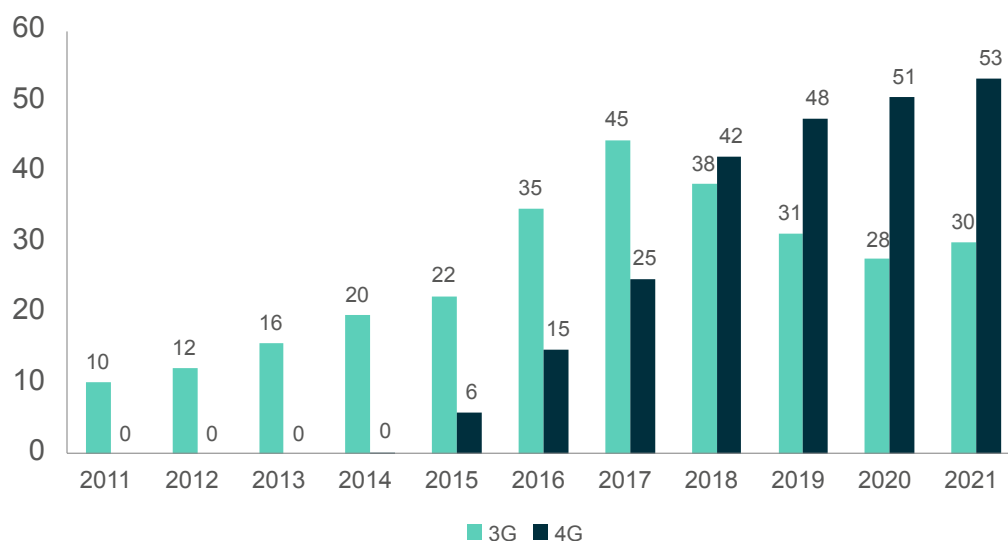
Source: TowerXchange, <https://www.towerxchange.com/>; World Bank, <https://data.worldbank.org/>; and OpenCellID, <https://opencellid.org/#zoom=16&lat=37.77889&lon=-122.41942>.

Figure 2.6. 3G and 4G Mobile Population Coverage in Ecuador



Source: World Bank, 2021, <https://data.worldbank.org/>; and TeleGeography, 2021, <https://www2.telegeography.com/>.

Figure 2.7. 3G and 4G Market Penetration, % of Market Population



Source: World Bank, 2021, <https://data.worldbank.org/>; and TeleGeography, 2021, <https://www2.telegeography.com/>.

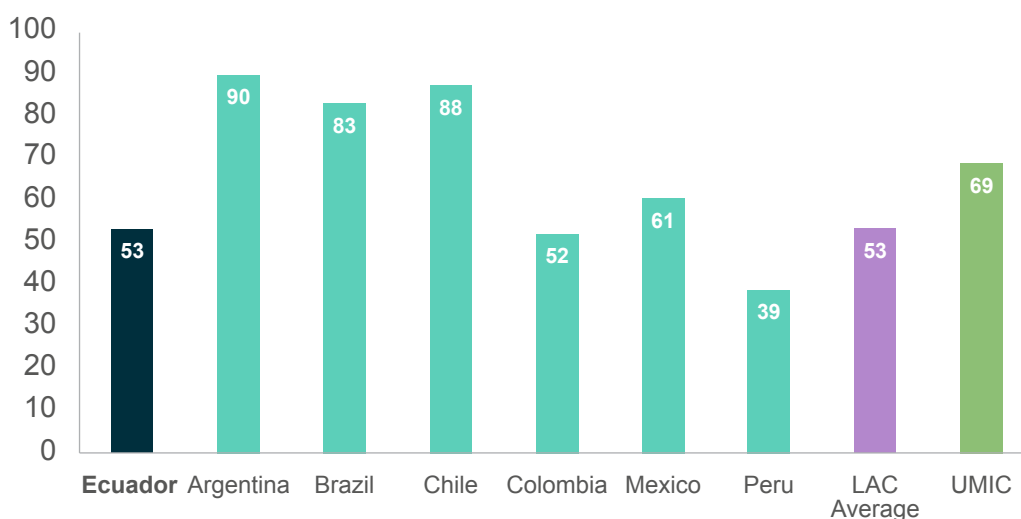
License-based obligations for mobile operators and universal service are policy options available to policy makers to close the digital divide. Effective public policies and increased financing could make a business case for connecting rural areas (low-density populated areas) feasible. So far, such areas remain unserved or underserved. Closing the digital divide could be implemented in stages, prioritizing engagement in selected provinces. For instance, eight provinces (and their corresponding regions) are among the lowest with regard to income per capita, poverty rate, and urbanization rate

and are therefore designated as “lower socioeconomic provinces”: Bolívar (Sierra), Cotopaxi (Sierra), Esmeraldas (Costa), Los Ríos (Costa), Morona Santiago (Amazonia), Napo (Amazonia), Orellana (Amazonia), and Sucumbios (Amazonia).⁶³ Developing a focused action plan for closing the digital divide and launching a practical dialogue with operators about the modalities to accomplish that could be a pragmatic way to move forward that would consolidate all the existing initiatives in this area.

Ecuador's investment in fixed infrastructure (0.49 percent of gross national income [GNI]) is above the LAC average (0.44 percent) and median (0.33 percent), but significantly larger investments are needed to meet future demand for broadband connections. By 2021 Ecuador had reached 53 percent of households with fixed internet access, which is behind the top performers in Latin America. However, a quantitative increase in the penetration of fixed broadband is not sufficient. A qualitative or technological upgrade of the current networks is also important as it would enable the provision of higher quality services. For that to

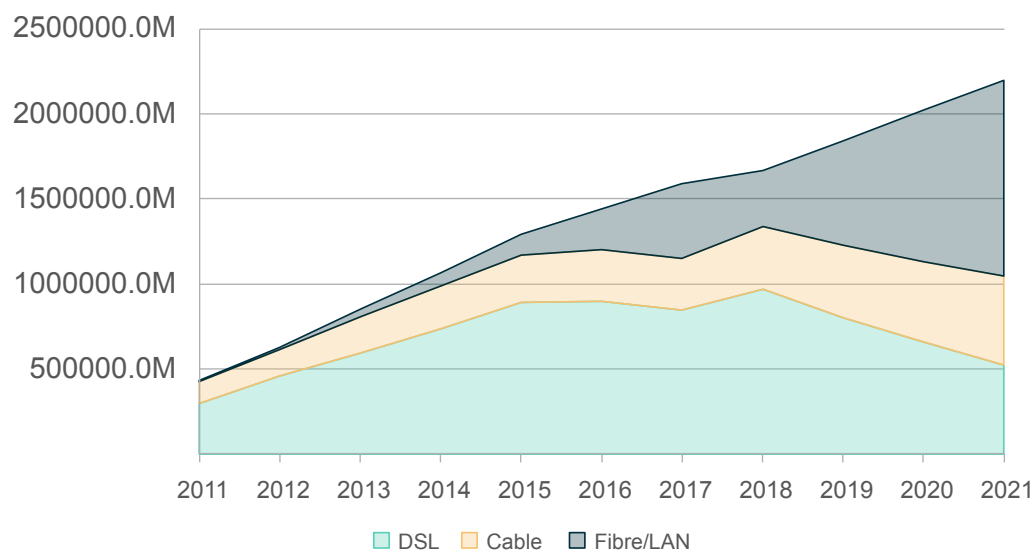
materialize, upgrades from DSL and slow cable connections are essential. The presence of future proof optical fiber infrastructure (often new deployments) is growing at a fast rate, but a substantial share of DSL and slow cable access points are still in place and would need to be upgraded. In addition, high tariffs for end users are one of the major barriers to fixed broadband penetration growth. The fixed broadband basket as a percentage of GNI per consumer in 2021 was 5.1 percent, slightly more expensive in relative terms than the Latin American average but far from its regional peers.⁶⁴

Figure 2.8. Fixed Household Broadband Penetration in Ecuador Versus Peers, %



Source: ITU, 2021, <https://datahub.itu.int/>.

Figure 2.9. Fixed Coverage by Technology



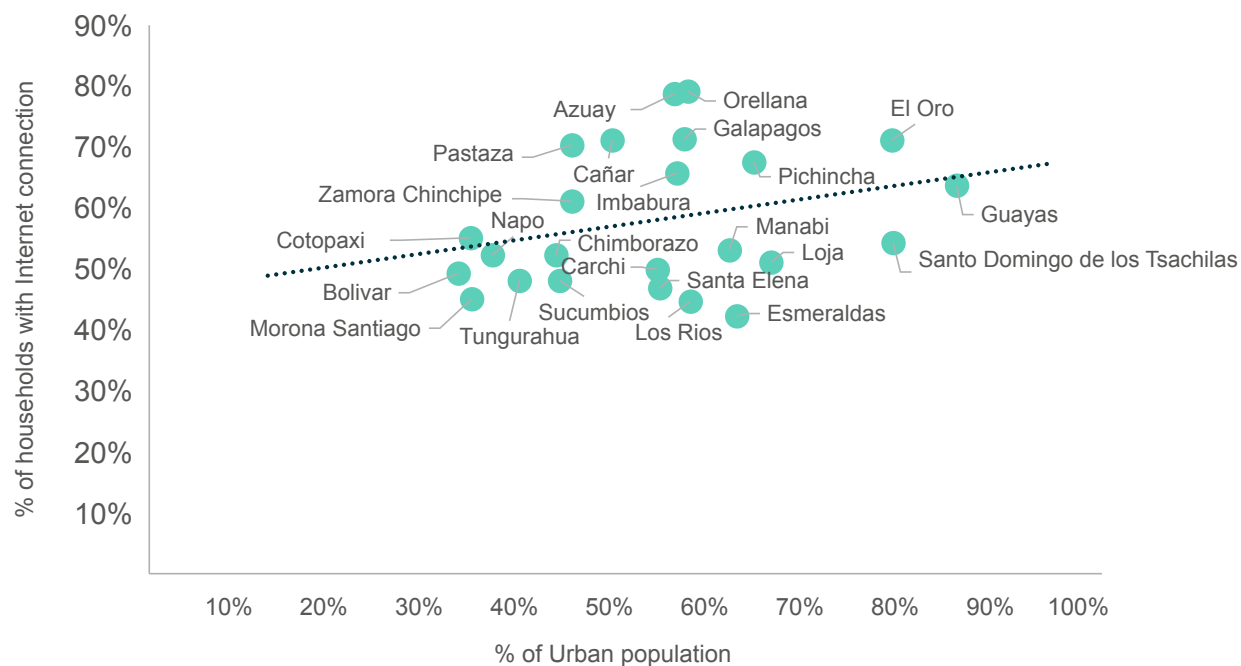
Source: TeleGeography, <https://www2.telegeography.com/>.

Ecuador's share of rural population (36 percent) is almost two times higher than in the LAC region as a whole (19 percent), meaning that the development of telecommunications infrastructure is likely to require more resources and may take longer. The proportion of urban and rural populations determines the overall unit costs of providing telecom services, where non-urban inhabitants represent relatively higher unit costs. As such, a higher rural proportion will tend to result in higher overall costs for universal coverage and access. Currently, fixed broadband household penetration in rural areas remains low, with a 21 percent penetration in comparison to a 56 percent penetration in urban areas. According to the ICT survey of the National Institute of Statistics and Censuses (*Instituto Nacional de Estadística y Censos* [INEC]), rural internet access increased by 5.6 points from 2018 to 2019, while in urban areas it increased by 8.4 percent. A possible alternative to expand the telecommunications network in the middle mile is public and private coordination in deploying infrastructure in low population density areas, for example, by upgrading the electricity grid and other

facilities to enhance data transmission and promoting public-private partnership (PPP) projects to develop infrastructure. Moreover, the GoE can design a series of initiatives to incentivize private investments by reducing the costs, such as introducing a partial tax exemption or reduction for investments in rural areas, eliminating legal barriers for investments, establishing competitive loans, and so forth.

Only 35 percent of rural households have access to fixed internet, which is provided by small or informal operators.⁶⁵ The digital gap affects the whole country and every province, independently of the urbanization levels (see Figure 2.10). For example, in Orellana and Azuay, less than 60 percent of the population lives in urban areas but close to 80 percent of households have an internet connection. In contrast, Guayas and El Oro report a high concentration in urban areas (between 70 and 80 percent) but lower connectivity. Connectivity is also inversely correlated with poverty, which in recent years (before the COVID-19 pandemic) had decreased across the country, favoring digital uptake.⁶⁶

Figure 2.10. Correlation between Urbanization and the Availability of Internet to Households in Ecuador

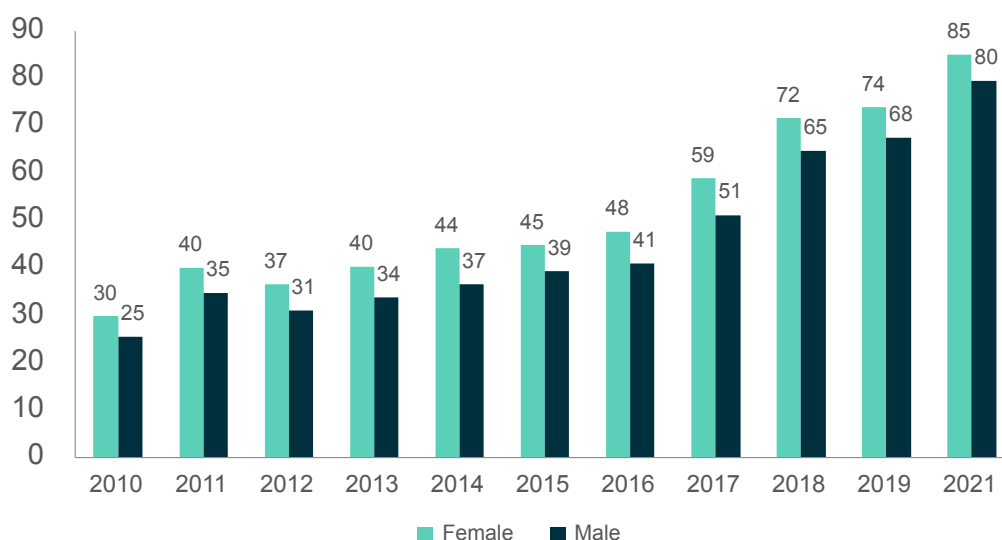


Source: INEC, 2020, <https://www.ecuadorencifras.gob.ec/institucional/home/>.

Ecuador does not face a substantial gender gap in digital use, but there is a gap and it persists. Although Ecuador is progressing on the adoption and usage of digital means, it is crucial to enhance efforts to reduce the persistent digital gender divide. Historically, the gender gap in Ecuador has been relatively low (Figure 2.11 and Figure 2.12), but it is critical to monitor the situation

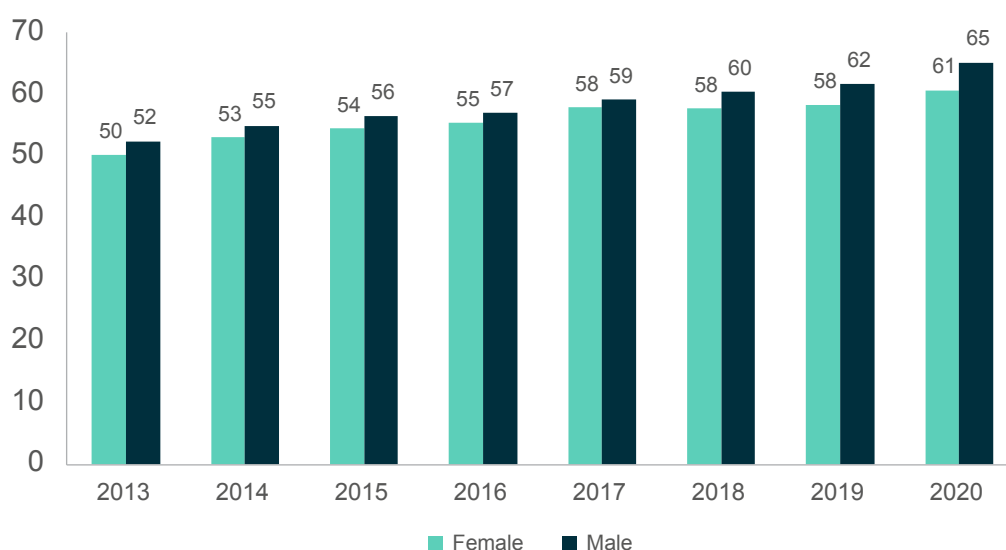
and to close the current gap as it adds bottlenecks to overall gender equalities.⁶⁷ Women generally face more challenges than men in accessing the internet. Social norms, formal education, digital skills, safety, and privacy may create larger barriers. For instance, mobile device penetration is lower among women.⁶⁸

Figure 2.11. Male and Female Internet Users



Source: GSMA, <https://www.gsma.com/>.

Figure 2.12. Male and Female Mobile Phone Owners as a % of Male and Female Population



Source: GSMA, <https://www.gsma.com/>.

Digital inequalities faced by individuals, households, public institutions, and businesses impact negatively on their social and economic development. The limited availability of internet impacts countless social and economic activities—it affects online classes for students and their performance, to name just one example.⁶⁹ The business environment is also impacted by the limited uptake of fixed broadband, as it creates bottlenecks to accessing international markets and hinders firms' digital transformation by limiting the technical feasibility of platform-enabled business models (see [chapter 5](#)).

Data and Device Affordability

The affordability of data and devices can impede the uptake of both digital infrastructure and digital services. According to the World Bank's High Frequency Phone Surveys, 71 percent of the unconnected in Ecuador mentioned internet prices as the main obstacle to being online. For those who are connected, internet quality is the main concern. The Alliance for Affordable Internet (A4AI) has set a target for the price of fixed and mobile 5G broadband of below 2 percent of the average monthly income by 2026. Ecuador will require a leap to meet this target, as all the data bundles reported are currently above the 2 percent threshold (see Table 2.1).⁷⁰

Fixed and mobile data prices in Ecuador are often among the highest when compared to relevant benchmarks. Ecuadorians pay 5.1 percent of their average monthly GNI per capita for a fixed broadband basket, while Mexicans pay 2.4 percent, Chileans 2.5 percent, Colombians 4.4 percent, and Argentinians 4.8 percent.⁷¹ For mobile services, Ecuadorians pay 3.4 percent of their GNI per capita in a bundle basket of high consumption of voice and data, while Mexicans pay 1.4 percent, Chileans 0.7 percent, Colombians 1.4 percent, and Argentinians 4.0 percent. In addition, low-income users spend a significantly larger share of their income to cover the cost of data bundles. [Figure 2.13](#) illustrates that the lowest quintile of income pays between 10 and 25 percent of their income for a set of mobile or fixed data services compared to less than 5 percent among the highest quintile.

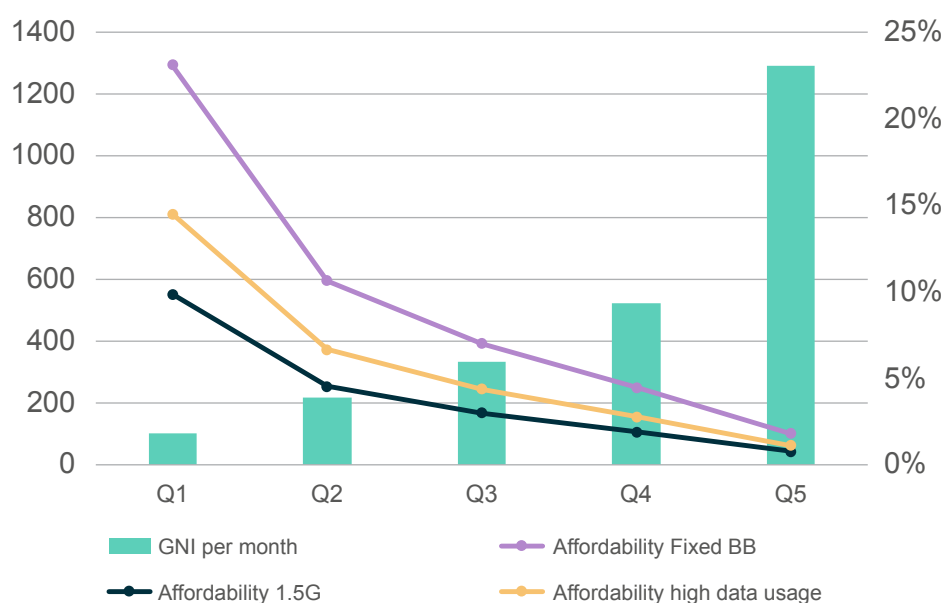
Smartphone prices in Ecuador are more expensive than in benchmark countries, which also limits data and connectivity usage. According to A4AI, on average, acquiring the cheapest smartphone in Ecuador requires the biggest percentage of per capita GNI (20.0 percent) in comparison to relevant peers: Argentina (16.8 percent), Colombia (13.4 percent), Mexico (6.1 percent), and Chile (5.0 percent) (See [Figure 2.14](#)). Moreover, the price of the cheapest smartphone in Ecuador is almost the same amount (98 percent) of the monthly per capita GNI of the poorest segment of the population and 45 percent of the income of the second poorest segment ([Figure 2.15](#)).

Table 2.1. Data Prices as a Share of Average Monthly Income in 2021, %

Data bundle	Fixed-broadband basket (5GB)	Data-only mobile-broadband basket (2GB)	Mobile-cellular low-usage basket (70 min + 20 SMS)	Mobile data and voice low-consumption basket (70 min + 20 SMS + 500 MB)	Mobile data and voice high-consumption basket (140 min + 70 SMS + 2 GB)
% of per capita GNI	5.08	2.17	2.84	2.46	3.19

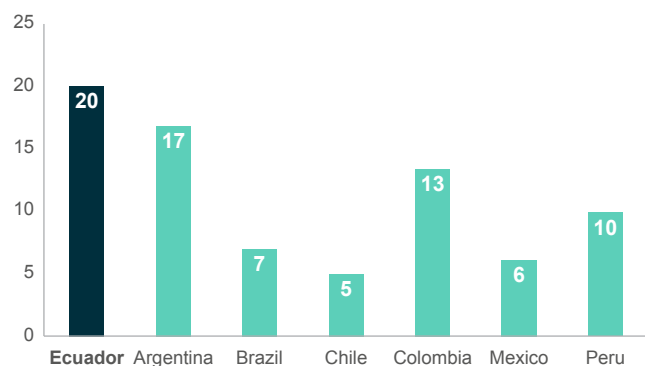
Source: ITU, "Ecuador", 2021, <https://datahub.itu.int/data/?e=ECU>.

Figure 2.13. Data Affordability by Income Quintile. Monthly Per Capita GNI (\$, left axis) and Share of Monthly per Capita GNI (Right Axis)



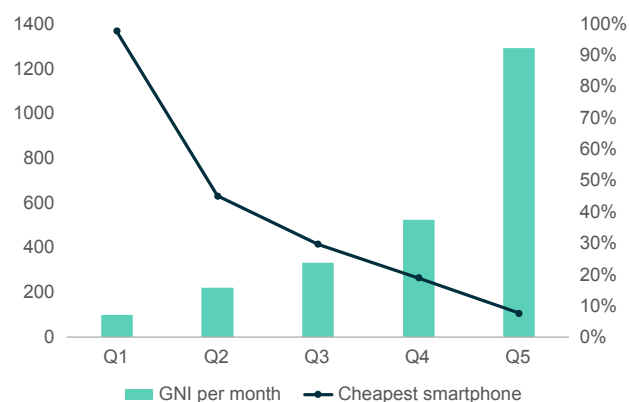
Source: ITU (2021).

Figure 2.14. Price of the Cheapest Smartphone, % of GNI 2022



Source: A4AI (2022).

Figure 2.15. Affordability of the Cheapest Smartphone by Income Quintile



Source: A4AI (2022).

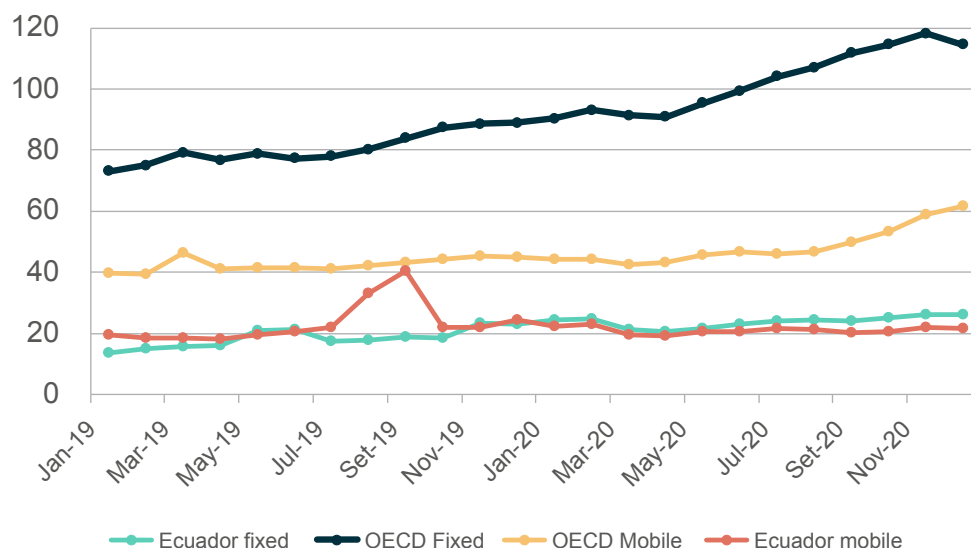
Service Quality

The quality of service for fixed networks, measured by the speed of data transmission, is an area where improvement is needed to expand the consumption of online services. Many of the current online products and services (for instance, remote education—see [chapter 6](#)) require a certain quality of internet connection to be accessed efficiently, creating further requirements beyond access to the internet, such as a fast and reliable internet connection. In Ecuador, there is a room to improve the average broadband speed (currently around 20 Mbps), which is currently substantially lower than that of OECD countries (higher than 100 Mbps). According to the 2020 Global Speed Test Index, which reports the global average of download and upload speeds, Ecuador is ranked 104th, with an average fixed broadband download speed of 28 Mbps and an upload speed of 24 Mbps.⁷² As Ecuador modernizes its infrastructure, internet quality will become better. For instance, the quality of mobile download speeds are expected to increase through the government's goal to expand 4G connections from 58 to 92 percent by 2025.⁷³

Although Ecuador experienced an upward trend in connection speed and quality during the COVID-19 pandemic, with little to no gap between urban and rural areas, there is still room for improvement. Fixed Speedtest results recorded a similar average internet speed between urban and rural areas, suggesting that the gap is relatively small ([Table 2.2](#)). However, in both cases, the data transmission speed ([Figure 2.16](#)) is considered low in comparison to international trends.⁷⁴

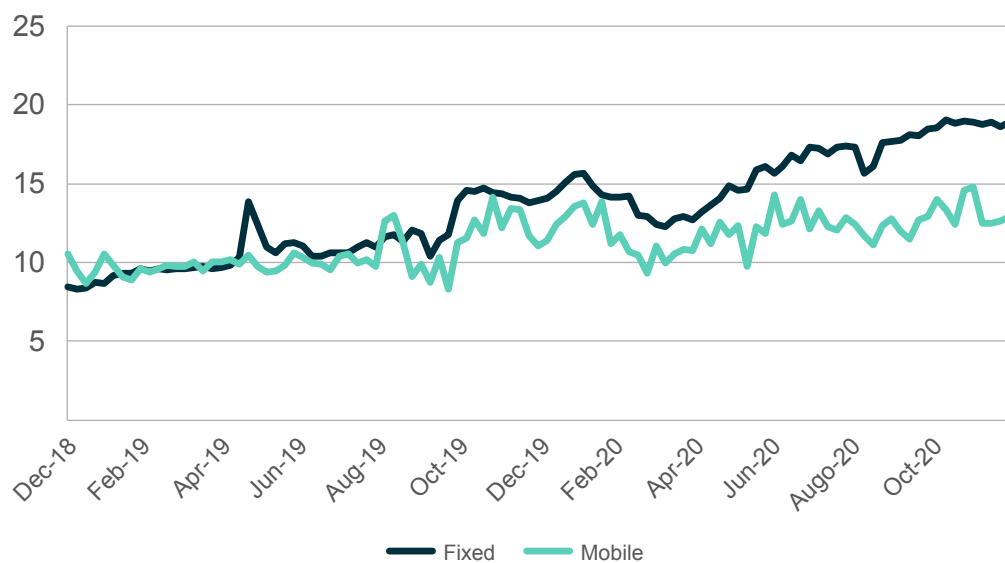
Citizens with better connectivity moved less than average during the lockdown. Internet speed played a role in the adherence of Ecuadorians to movement restrictions imposed by the government to contain the spread of COVID-19. A study conducted by the World Bank and the University of Greenwich for the purpose of this report found that users with a faster internet connection were moving less during the lockdown than the rest of the population, after controlling for income factors.⁷⁵ Better internet connectivity is therefore associated with higher compliance with restriction measures that were key in limiting exposure to COVID-19 and consequently, the number of infections and deaths (see [Box 2.1](#)). The findings suggest that limited connectivity can exacerbate vulnerability in the face of health shocks.

Figure 2.16. Average Fixed and Mobile Download Speed in Ecuador and OECD Countries, Mbps 2019–2020



Source: Speedtest Global Index by Ookla, <https://www.speedtest.net/global-index>.

Figure 2.17. Median Fixed and Mobile Speed Recorded, Mbps

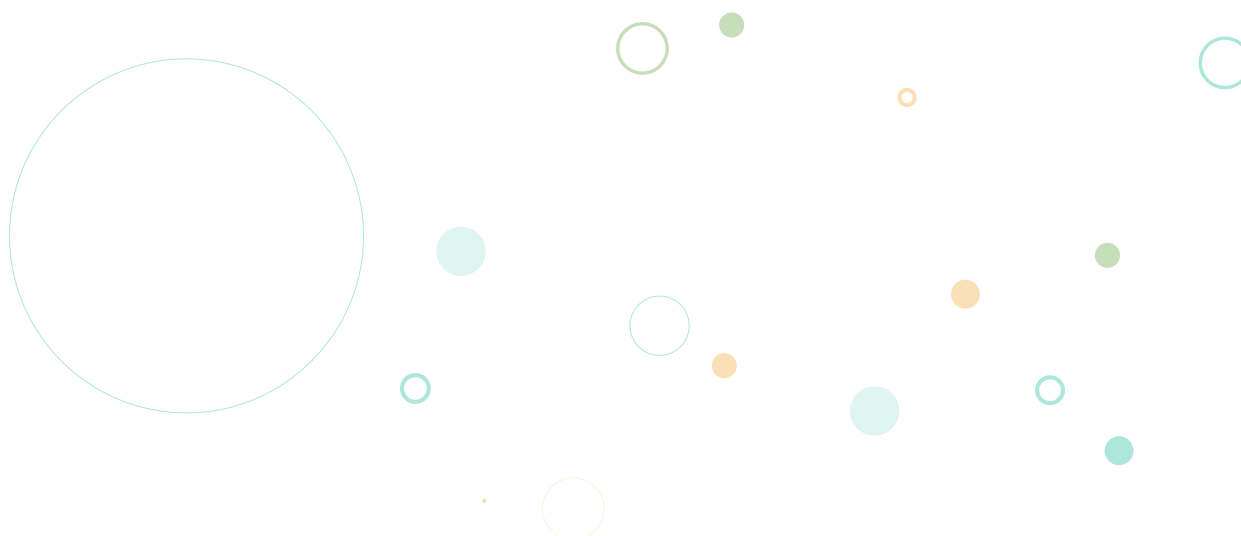


Source: Ookla, <https://www.speedtest.net/>.

Table 2.2. Internet Speed in Urban and Rural Areas

	Fixed		Mobile	
	Urban	Rural	Urban	Rural
N° of tests	17,233,912	3,683,161	599,099	94,425
Mean, Mbps	22.2	20.9	21.3	26.2
Median, Mbps	14.3	10.6	10.9	9.5

Source: World Bank analysis, based on Ookla Speedtest Intelligence data, <https://www.speedtest.net/>.



BOX 2.1. Impact of Non-Pharmaceutical Interventions During the COVID-19 Pandemic and the Role of Digital Infrastructure in Ecuador (1 of 2)

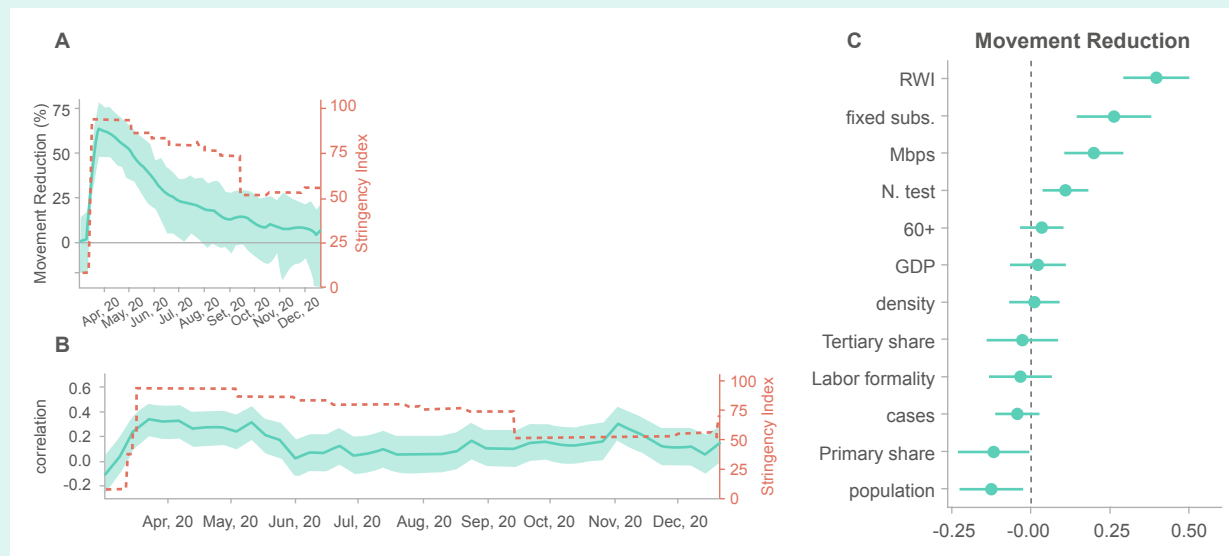
Non-pharmaceutical interventions (NPIs) in Ecuador during the COVID-19 pandemic forced the performance of economic, educational, and social activities online and consequently, encouraged the use of digital platforms for education and teleworking.⁷⁶ The quality of the digital infrastructure, among other factors, influences the ability to carry out activities remotely and thus adherence to these kinds of NPIs.⁷⁷

A recent study by Gozzi, Comini, and Perra (2023) examines the link between individuals' mobility, income, and available internet speed using large-scale datasets, such as Movement Range Maps (mobility), the Facebook Relative Wealth Index (income),⁷⁸ and Ookla geolocalized speed tests (internet speed). In Ecuador in March 2020, mobility dropped sharply, reaching a maximum average reduction of 64 percent in early April (see [Figure A](#)).

Afterward, mobility inverts the trend and approaches the pre-pandemic baseline by late 2020. The study shows that the reduction was not homogeneous across analyzed regions in Colombia, El Salvador, and Ecuador. More reliable digital infrastructure had an inverse relation on mobility. Indeed, [Figure B](#) shows a significant correlation between the reduction in movement following NPIs and internet speed in different municipalities. [Figure B](#) also shows the Stringency Index,⁷⁹ a measure of the strictness of policies implemented to curb COVID-19.

Correlation between mobility reduction and digital infrastructure quality is stronger when stricter measures to fight COVID-19 are in place. Adherence to NPIs⁸⁰ and digital infrastructure quality⁸¹ are known to correlate with wealth. Hence, the analysis focused also on their partial correlation, using the Relative Wealth Index as a control.⁸² The partial correlation computed during the period of maximum movement reduction remains (Pearson partial $p=0.29$, 95% CI [0.14, 0.43]). The research also investigated to what extent municipalities reduced mobility according to a set of features, including socioeconomic status (i.e., Relative Wealth Index, GDP per capita), fixed download speed from Ookla, number of COVID-19 cases reported, and demographic indicators (population, density, and fraction of 60+). The regression model shows a coefficient of determination R^2 of 0.34. To further investigate the link between the response to NPIs and its drivers, [Figure C](#) reports the importance of different regressors for the prediction of the independent variable (i.e., maximum mobility reduction). The average download speed of the municipality is the second most important regressor, behind the Relative Wealth Index, as higher download speed is strongly associated with more significant mobility reduction. To conclude, the study found evidence that access to a better digital infrastructure was linked to higher adherence to NPIs in Ecuador during the first COVID-19 wave. Additionally, these effects remain visible after controlling for other socioeconomic factors. The findings suggest that limited connectivity can intensify vulnerability in the face of health shocks.

BOX 2.1. Impact of Non-Pharmaceutical Interventions During the COVID-19 Pandemic and the Role of Digital Infrastructure in Ecuador (2 of 2)



Source: Gozzi, Comini, and Perra (2023).

Competitive Environment

Digital uptake in Ecuador could be fostered through more efficient regulation and higher competition in markets. Public policy design and implementation, as well as regulatory governance, play an important role in delivering universal high-quality connectivity.⁸³ High data prices in Ecuador may be influenced by several structural conditions, a limited supply of international bandwidth and providers, and low levels of competition due to regulatory barriers and concentration levels across the data supply chain.

There are relatively high concentration levels in Ecuador across multiple segments of the telecommunications market, which is likely to affect the competitive environment and sector development. The incumbent operator, the National Telecommunications Corporation (*Corporación Nacional de Telecomunicaciones* [CNT]), is a state-owned firm that holds 80 percent of the market share in the fixed telephony service, while also offering mobile services.⁸⁴ The fixed broadband market, in contrast, is less concentrated, with CNT having 37 percent of the market share. Mobile markets have high concentration levels, with three mobile network operators in Ecuador: Conecel (Claro) with 52 percent of the market share, Otecel (Movistar) with 17 percent, and CNT with 31 percent,⁸⁵ resulting in a Herfindahl-Hirschman Index (HHI) index score for the country of 3,935 for the fourth quarter of 2021.⁸⁶ In previous years, Ecuador had scored higher on the HHI in comparison to the average for South American countries and concentration was close to LAC peers, such as Uruguay, Nicaragua, Mexico, and Honduras.⁸⁷

BOX 2.2. Major Decisions are Due and Will Impact Development of the Telecom Sector in Ecuador

An upcoming competition-related challenge is the potential sale of Otecel, a subsidiary of Movistar (Telefonica group) in Ecuador, for mobile services. In 2019, Movistar announced that it would be selling its LAC subsidiaries, except for Brazil,⁸⁸ and the Superintendency of Market Power Control (*Superintendencia de Control del Poder de Mercado* [SCPM]) will be the leading agency dealing with the merger or acquisition. The analysis of any acquisition will be critical, and proposals from three buyers are in place: the first has been made by one of the two existing mobile network operators: Claro or

CNT. The second option is represented by an external party with no current assets in Ecuador, and the last is an entity with fixed assets locally (local telephony or cable TV operator). Each option will have its implications with respect to competition. Therefore, institutional coordination between ARCOTEL and the SCPM will be critical to reviewing the acquisition and assessing the potential conditions and remedies.

Source: The World Bank, based on the information from BNAméricas.

Sector Governance, Policy and Regulatory Environment

Ecuador has an established governance model with no gaps in mandates to formulate sectoral policies and regulations. MINTEL is the governing body for the telecom sector, as well as for ICTs and information security. ARCOTEL regulates the telecom sector and is the radio spectrum resource in the country with the objective of enhancing sector development. And the Superintendency of Market Power Control (*Superintendencia de Control del Poder de Mercado* [SCPM]) is the competition authority in Ecuador. The primary legislative framework of the sector is the Organic Law on Telecommunications (*Ley Orgánica de Telecomunicaciones* [LOT]) and the Organic Law on Regulation and Control of Market Power (*Ley Orgánica de Regulación y Control del Poder de Mercado* [LORCPM]). The LORCPM establishes the SCPM's functions, including its leading role in mergers and acquisitions in the sector.

There are opportunities to strengthen specific elements of current sector governance to improve legal certainty and the market's trust in institutions. One of the best opportunities would be strengthening the independence of ARCOTEL and enhancing coordination among the institutions involved in sector governance with regard to the quality of the regulatory process. In terms of independence, ARCOTEL is a legally separate body from MINTEL, but its financial independence is limited as the institution does not have the autonomy to set and collect its own budget. Similarly, as two of

ARCOTEL's three board members are appointed by the government,⁸⁹ its decision-making independence may be constrained in relation to state-owned market players such as CNT, which undercuts market trust. It may be beneficial to consider further detaching ARCOTEL's governance structure from the influence of the executive branch. In terms of coordination among institutions, there are three main bodies involved in the regulatory process: the President of the Republic (through the adoption of the LORCPM), MINTEL, and ARCOTEL. Tight coordination between all these bodies is essential to ensure sector benefits from a high-quality and consistent regulatory approach that is well aligned with primary legislation adopted by the National Assembly.

Despite the strong primary regulatory framework in Ecuador, its elaboration through secondary legislation is limited. For 10 years, the ITU's ICT Regulatory Tracker ranked Ecuador as a good performer in the adoption of regulatory tools in the sector. However, not much improvement on that front has emerged since. The lack of secondary legislation, indented by the LOT and LORCPM, may be holding Ecuador back from improving its advance (see [Figure 2.18](#)), for instance, in the fields of radio-electrical spectrum tariffs, licensing, access to networks, interconnection, infrastructure sharing, universal service, and market analysis regulations. At the time of this writing, ARCOTEL was working to bridge the gaps; for example, at the end of 2022, it issued regulations on tariffs and market analyses. The bylaw reforms the calculation formula for the tariff on spectrum usage, and it involves a progressive cost reduction of up to 83 percent for mobile operators. This measure will substantially lower the operational expenses of mobile operators and may result in increased investments.

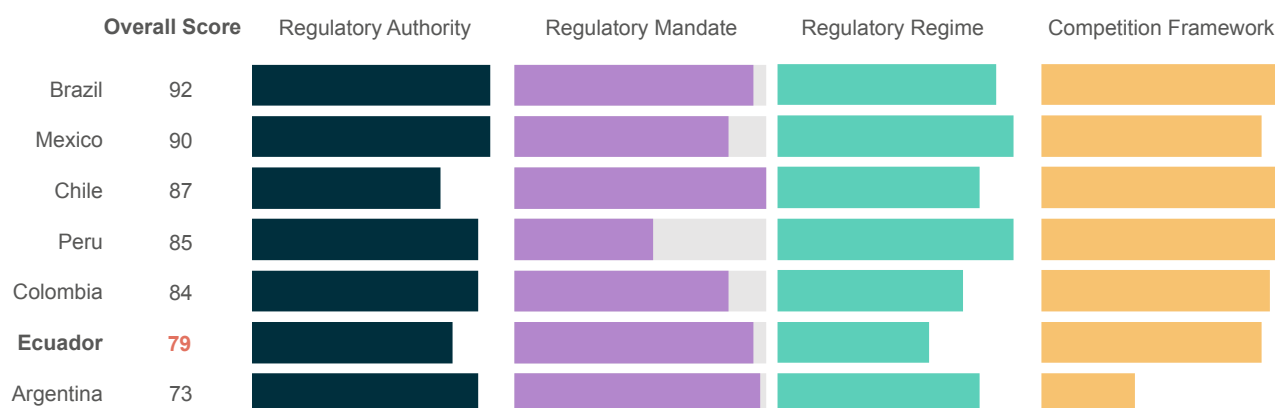
Ecuador has a robust competition framework that includes ex ante and ex post safeguards, but implementation on the ex ante side is lagging. ARCOTEL and the SCPM have shared responsibilities with the enforcement of competition policy in the telecom sector; both can investigate and impose sanctions for abuse of market power and anticompetitive practices. The regulatory framework includes provisions to avoid an overlap of sanctions. The LOT and its General Regulation establish a relatively comprehensive and modern competition framework for ARCOTEL (ex ante obligations) that would issue regulations according to market studies. The LOT also sets out that ARCOTEL should carry out market studies every two years, identifying operators with significant market power and imposing the relevant obligations.⁹⁰ However, at the time of this writing, no market studies had been conducted. ARCOTEL may find it beneficial to consider certain symmetrical regulatory instruments to reduce investment costs for all participants, such as infrastructure sharing, including cross-sectoral infrastructure sharing (e.g., with the electricity sector). Currently there is limited practice of infrastructure sharing in the mobile market, often present only among firms within the same consortium (e.g., there is an agreement between Movistar and its subsidiary firm Tuenti).

Ecuador seems to apply differentiated spectrum policies for operators in the telecom sector that may require an ex post regulatory assessment in the future. Analysis of Ecuador's spectrum policies suggest that the public incumbent (CNT) is not subject to the

same spectrum fee scheme as the remaining two privately owned operators (Claro and Movistar) and may be exempt from spectrum fees altogether. Moreover, before that was granted, CNT enjoyed a favored status in the allocation of 4G spectrum and license, allowing it to become a credible competitor to Claro and Movistar in recent years. However, this policy may require reconsideration as it undercuts the trust of market participants in sectoral institutions, and moving forward, it is likely to lead to a deterioration in market outcomes through a decline in investments from current and potential new investors.

The mobile spectrum assigned in Ecuador (280 MHz) is low compared to other LAC countries⁹¹ (400 MHz on average), which may have impacts on the technological development of mobile network operators. As in many other countries in the region, 3G base stations are the most numerous (see [Figure 2.6](#)). The spectrum available for the gradual replacement of 3G technology may be sufficient for the current operators, but the introduction of 5G will need additional spectrum resources. In the medium term, Ecuador would need to replace 3G base stations with 4G technology and launch a strategy for 5G that should include agreements on major issues, such as a spectrum licensing approach and schedule, coverage requirements, and investment commitments. In this respect, Ecuador is behind LAC's top performers in which allocations for 5G spectrum bands have already been made.⁹²

Figure 2.18. ITU's ICT Regulatory Tracker Index, 2020



Source: ITU, ICT Regulatory Tracker, "Ecuador", <https://app.gen5.digital/tracker/country-cards/Ecuador>.

Table 2.3. Digital Infrastructure: Key Challenges and Opportunities

Strengths	Areas for Improvement
<ul style="list-style-type: none"> » Good 3G/4G network coverage. » Established sectoral institutions and strong primary regulatory framework for ex ante and ex post regulation. » Relatively high level of investments in fixed networks as percentage of GDP. 	<ul style="list-style-type: none"> » Create space for additional international connectivity subsea cables. » Develop the last-mile optical fiber network. » Strengthen the regulatory independence of ARCOTEL, strengthen inter-institutional coordination, and ensure the quality of the regulatory process. » Complete the regulatory framework to lay and protect the operations of submarine cables. » Take advantage of infrastructure-sharing models to enhance investments in data transmission projects.
Opportunities	Challenges
<ul style="list-style-type: none"> » Release additional spectrum and assign spectrum to 5G technologies. » Take advantage of the established institutions and regulatory instruments to enhance market outcomes. » Incentivize private infrastructure investments through dedicated measures to bridge the digital divide. 	<ul style="list-style-type: none"> » Affordability of data and digital devices. » Low internet connection quality due to pre-existing legacy infrastructure. » Sizable rural population and digital divide between urban and rural areas.

2.3. Recommendations: Investing in Fixed and Mobile Infrastructure and International Bandwidth and Leveraging Regulatory Tools to Lower Internet Prices

The lack of economic (affordability) and physical (infrastructure) access to digital services represents an obstacle to achieving digital inclusion and economic development objectives in Ecuador. Price levels in the supply chain of the telecom sector are a bottleneck to reducing the digital divide, particularly evident between urban and rural areas. It is urgent to promote the development of infrastructure in rural areas to ensure that no one is left behind and that everyone has equitable access to digital opportunities.

Effective implementation of regulatory measures is crucial to stimulate competition in the telecom sector and to expand the limits of commercial viability.

The completeness of the regulatory framework and its implementation by regulatory authorities have the potential to improve the competitive environment ex ante, and/or to impose remedies when negative market conditions or behaviors are observed.

Market penetration of mobile and fixed services needs to be expanded to low-populated areas and low-income households. Provinces with more rural populations tend to report a lower number of households with internet access. Targeted measures should be identified and put in place to close the gap and promote digital inclusion.

PPP projects and infrastructure-sharing models for laying digital infrastructure in the middle mile should be enhanced, particularly in low-populated areas. Cost-sharing schemes for the development of telecommunications infrastructure in areas where low density makes private investments unattractive could align incentives and reduce the digital divide.

International trends suggest that the demand for data is increasing exponentially, and competitive prices along the telecom sector supply chain are needed to promote universal and affordable connectivity. Stronger competition in the provision of international bandwidth, as well as efficient IXPs and data centers, is needed to decrease supply costs and final user tariffs.

An active policy to increase the spectrum available in Ecuador is essential. Ecuador has a limited availability of spectrum in comparison to the rest of the LAC region. The country should support the replacement of 3G technology and the gradual adoption of 5G. These actions require additional spectrum.

Table 2.4. Digital Infrastructure: Policy Recommendations (1 of 2)

Reform Area	Recommendation	Responsible Entity	Timing	Is Legal Change Required?
International connectivity The lack of competitive prices for international connectivity constrains economic and physical access to digital services in Ecuador.	Seek increasing international bandwidth through new deployments of submarine and terrestrial cables. PRIORITY	MINTEL	Medium term	No
	Monitor market development and the competitive environment in the international segment of the market, e.g., increase statistical capacity, conduct market research, and assess potential risks to competition.	ARCOTEL	Medium term	No
	Draft and publish regulatory instruments to lay and protect submarine cables in the offshore and the continental platform.	ARCOTEL	Medium term	Yes
Domestic connectivity The limited progress in the deployment of optical fiber backbone and unused spectrum is an obstacle to universal access to and usage of the internet.	Develop a focused action plan to bridge the digital divide, including an investment program to incentivize investments in infrastructure in the middle and last miles (fixed and mobile) in sparsely populated and low-income areas. PRIORITY	MINTEL	Short term	No
	Develop a strategy and action plan for 5G that includes a national approach to 5G rollout, e.g., a licensing approach and schedule, coverage and other requirements, and regulatory instruments to facilitate this goal.	ARCOTEL, MINTEL	Short term	No
	Auction 5G spectrum.	ARCOTEL	Medium Term	Yes

Table 2.4. Digital Infrastructure: Policy Recommendations (2 of 2)

Reform Area	Recommendation	Responsible Entity	Timing	Is Legal Change Required?
	Routinely conduct market analysis to promote competition along the digital supply chain by promoting infrastructure sharing and lowering market entry barriers. PRIORITY	ARCOTEL	Short and medium term	No
	Lower market entry barriers and facilitate investments through symmetrical regulatory measures such as infrastructure sharing.	MINTEL, ARCOTEL	Short and medium term	Yes
	Ensure the establishment and operation of IXPs and data centers. PRIORITY	MINTEL, ARCOTEL	Medium term	No
Governance framework and regulatory efficiency In Ecuador, there are opportunities to strengthen the market's trust in sector institutions and increase the efficiency of the regulatory process.	Strengthen the independence of ARCOTEL by increasing its financial autonomy and further detaching its governance structure from the influence of the executive branch.	MINTEL, National Assembly	Medium term	Yes
	Complete the regulatory actions identified by Regulatory Action plans and develop secondary regulations per the LOT and LORCPM. An incomplete regulatory framework and its ineffective implementation hinder the digital uptake. PRIORITY	ARCOTEL	Short and medium term	No

3. DIGITAL PUBLIC PLATFORMS



From fragmented and Underused, to Integrated and Widely Adopted



KEY MESSAGES

- » **Ecuador lags behind most of its middle-income peers in digital government and risks falling further behind.** It ranks 13th out of 33 countries in the region and 84th out of 193 economies globally, according to the 2022 edition of the UN E-Government Development Index, having lost scores and positions compared to 2020, both in the index and in its sub-indices.
- » **The GoE has prioritized digital public platforms in its main government policies.** Digital government is one of the key themes of the National Development Plan, which integrates an extensive set of planning instruments, such as the Digital Transformation Agenda 2022–2025 and the Digital Transformation Policy 2022–2025. The new Organic Law on Digital Transformation is an opportunity to simplify these instruments and draw up a concrete roadmap for the country's institutions.
- » **There are relevant advances that could be promoted to accelerate the development of digital government.** The Gob.EC platform and initiatives in digital identity, electronic signature, and digital participation, as well as the existence of some transversal government systems, such as an integrated financial management system and the Official Public Procurement System, are a foundation from which strategies could evolve. However, it is essential to articulate the different efforts under a comprehensive approach and to strengthen technical and financial capacities.
- » **MINTEL has the challenge of ensuring its leadership has an active role in implementing the goals that can make a significant leap in the government's digital transformation.** Establishing a digital government architecture in all its layers, defining the digital procedures model, promoting the reuse of cross-cutting technological solutions and shared services, and consolidating a single interoperability platform will help the GoE to maximize its actions.
- » **Low usage levels of digital services indicate a pressing need to promote adoption of these services as part of the design of any initiative.** Among users, less than 1 percent have used the internet to carry out procedures with public entities or government agencies.

3.1. The Importance of Digital Public Platforms: Improving End-to-end Public Services for all Ecuadorians

Digital public platforms are critical to a digital economy. Digital public platforms, which can be provided by government or through hybrid models in partnership with the private sector, serve as a foundation for multiple public and private sector organizations to build new services and solutions. The development of digital public platforms is, therefore, an important lever for the digital transformation of the entire economy. To achieve maximum efficiency, public platforms must operate within an interoperability framework that allows for the exchange of information.

Digital platforms help governments fulfill their core mission of delivering effective services by making the best possible use of public resources. In the current environment of post-COVID-19 economic recovery and increased demand, governments are looking for new, sustainable ways to deliver public services. Effective digital public platforms offer ways to optimize public value by reducing costs and improving productivity. They make it possible to explore new service delivery models and improve the management of public resources. When devised following integrated, whole-of-government approaches and user-centered design, digital technologies are used to improve efficiency and effectiveness in public management, to combat fraud and corruption by increasing security and the traceability of transactions, and to improve civic participation and accountability.⁹³

Digital transformation is not limited to the adoption of new technologies but requires also a thorough review of organizational structures, governance frameworks, work processes, and organizational culture and mindset. It means moving from the digital-by-default approach to a broader vision of potential relationships and business models that redefine services. Digital public platforms provide a new channel for governments, individuals, and businesses to interact, while web and mobile sites, apps, and software provide the interfaces through which these interactions occur. These applications can be created to provide digital services to citizens and businesses in all sectors.

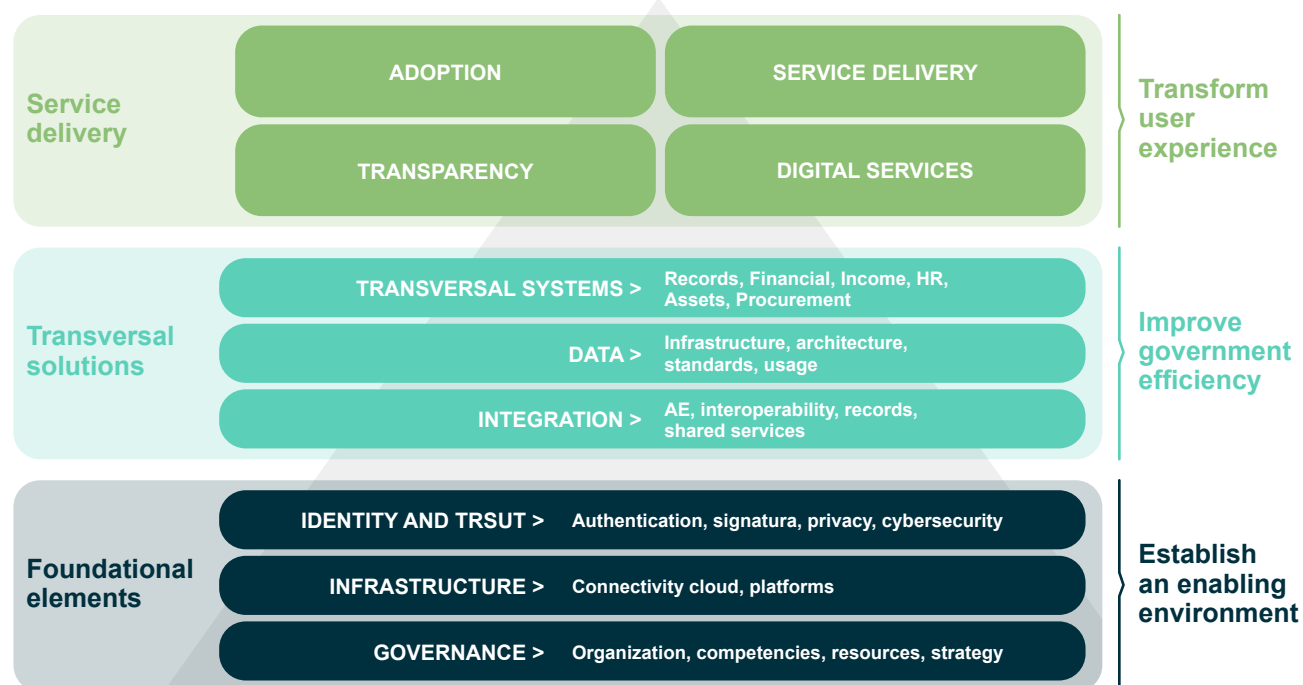
In addition, they can support CivicTech innovations that provide user-friendly mechanisms for public engagement and feedback, as well as data-sharing services that improve transparency and foster business innovation. Similarly, digital platforms provide the resources to digitally manage government administrative operations and government-to-government services. For all this, a building block approach is necessary as detailed in [Figure 3.1](#).

Meeting end-user expectations requires promoting a user-centric culture when creating digital platforms, designing policies, and delivering services.

The final objective of digital transformation in the public sector is to improve service quality, promote transparent and efficient interactions, and promote trust in government. Therefore, administrations need to reimagine how digital public platforms can be used to achieve these goals, while improving resilience, accountability, and the end-user experience of consuming public services. Users expect seamless service delivery, including for all those services for which the government has direct or indirect control or responsibility. At the same time, the integration of digital public platforms can help the government collect data from multiple systems across public institutions to achieve a holistic view of users based on their individual needs and circumstances, enabling a better delivery of efficient, satisfactory, proactive, and personalized services.

Digital public platforms are a high-level priority for the GoE as highlighted in the National Development Plan (*Plan Nacional de Desarrollo [PND]*).⁹⁴ The Plan for the Creation of Opportunities (*Plan de Creación de Oportunidades*) 2021–2025 considers digital government one of the key issues to generate trust, making it necessary to strengthen capacities for the provision of quality services and to promote mechanisms for transparency and access to timely information for citizens. For this, the GoE has set a country goal to increase its United Nations E-Government Development Index (EGDI) score from 0.7015 in 2020 to 0.7600 in 2024. The PND also establishes other commitments linked to digital public platforms that are being operationalized in projects, such as the Single Investment Window, new public financial management systems, and the modernization of tax and customs administrations, that need to be aligned with the integrated vision of a digital government.

Figure 3.1. Building Block Approach to Digital Public Platforms



Source: Authors' elaboration.

The vision of digital public platforms is operationalized in an extensive set of digital transformation planning instruments, some still under development. The 2022–2025 Digital Transformation Agenda was approved in July 2022, developed in seven axes. Just four months later, the 2022–2025 Digital Transformation Policy was issued, doubling the axes of the Agenda. Their implementation strategies will be guided by a series of national plans, such as the Electronic Government Plan and the Information Society Plan, which must be updated, since their most recent versions are for 2021. Each lead state entity is also expected to generate a digital transformation plan, and these in turn can motivate the development of institutional digital transformation plans for the entities that make up each sector.

The GoE has established e-government and interoperability as two axes of equal importance in the Digital Transformation Policy and Agenda. In accordance with these instruments, through e-government the GoE seeks to reduce “the communication gap” between the state and citizens through ICT. Interoperability, in addition to integrating electronic government actions, is an axis in itself. Digital public platforms are developed through a series of actions contained under the pillars of:

simplification of procedures, participation through electronic means, IT governance, digital identity, interoperability services, personal data, and open data, with some differences between what was determined in the Agenda and the Policy, as reflected in [Table 3.1](#).

The GoE enacted the Organic Law on Digital and Audiovisual Transformation (*Ley Orgánica para la Transformación Digital y Audiovisual [LOTDA]*),⁹⁵ which influenced the planning instruments issued in the second semester of 2022. This law, sanctioned at the beginning of 2023, introduces a “Comprehensive Digital Agenda of Ecuador” to be prepared periodically. The concept of digital government is extended to the strategic use of digital technologies and data in public administration as an integral part of the modernization strategies of governments to create public value. Among its general objectives, the law establishes the simplification and digital transformation of administrative procedures, guaranteeing the provision of digital services by public administration entities “progressively and when appropriate.” In addition, decree no. 813, published officially in the Gazette on July 11, 2023, is the secondary regulation that accompanies the LOTDA.⁹⁶

MINTEL, the authority responsible for digital transformation, digital government, and the simplification of procedures, faces the challenge of redoubling efforts in digital public platform initiatives. In its Institutional Strategic Plan, MINTEL established a series of goals for 2025 that include achieving a score of 0.76 in the EGDI (as in the PND), simplifying 76 percent of the critical procedures of the Central Public Administration (*Administración Pública Central* [APC]) and publishing 350 open datasets through the adoption of digital tools. The plan is to accomplish this through new functionalities in www.gob.ec and its app, the citizen folder, and the deployment of transversal and reusable solutions, such as Gob.EC's payment gateway, BuzónEC (notifications), FirmaEC, and authentication (digital identity), among others, actions and goals for which the Subsecretary of Electronic Government and Civil Registry is responsible.

To achieve the proposed objectives, the GoE must intensify its strategy to support institutions in simplifying and digitalizing services and in reusing enabled solutions as shared digital assets. For MINTEL, this means taking a leap from issuing guidelines, verifying their compliance, and giving specific advice on demand to deploying teams that work hand in hand with other institutions to adopt digital technologies. Therefore, it is necessary to guarantee that the Subsecretary of Electronic Government and Civil Registry has sufficient technical and financial capacity to carry out these actions, since resource constraints are currently one of the main barriers.

Table 3.1. Digital Public Platforms for Digital Transformation Planning

Axes	Pillars	Agenda	Policy	Strategies	Law
Electronic government	Simplification of procedures	Strengthen the regulatory framework, implement plans, improve quality and foster adoption, create citizen service solutions, promote electronic signatures, standardize data for interoperability, and promote interoperability for simplification.	Improve quality	Electronic government plan <i>being updated</i>	Included in the axis, and general objective of LOTDA
	Participation by electronic means	Promote platforms and encourage their use by society.	To promote it	Institutional digital transformation plans <i>to be built</i>	Included in the axis
	IT governance	Establish IT governance in the APC institutions and implement transversal systems and purchases based on economies of scale.	---		Included in the axis
	Digital identity	Introduce digital identity for the authentication of citizenship in carrying out procedures.	---		Included in the axis
Interoperability and data processing	Interoperability services	Strengthen the regulatory framework and its interoperability platform, encourage its use by entities, and support the development of new transversal business models.	New technology architecture to leverage interoperability	<i>Updated</i> Information Society Plan Institutional digital transformation plans <i>to be built</i>	Included in the axis
	Personal information	Generate mechanisms for the proper treatment of personal information and promote their use within the regulatory framework.	Manage data processing in analytical processes to provide data services		Included in the axis
	Open data	Strengthen the regulatory framework and its publication and reuse.	---		Included in the axis

Source: Authors' elaboration, based on the planning instruments of Ecuador.

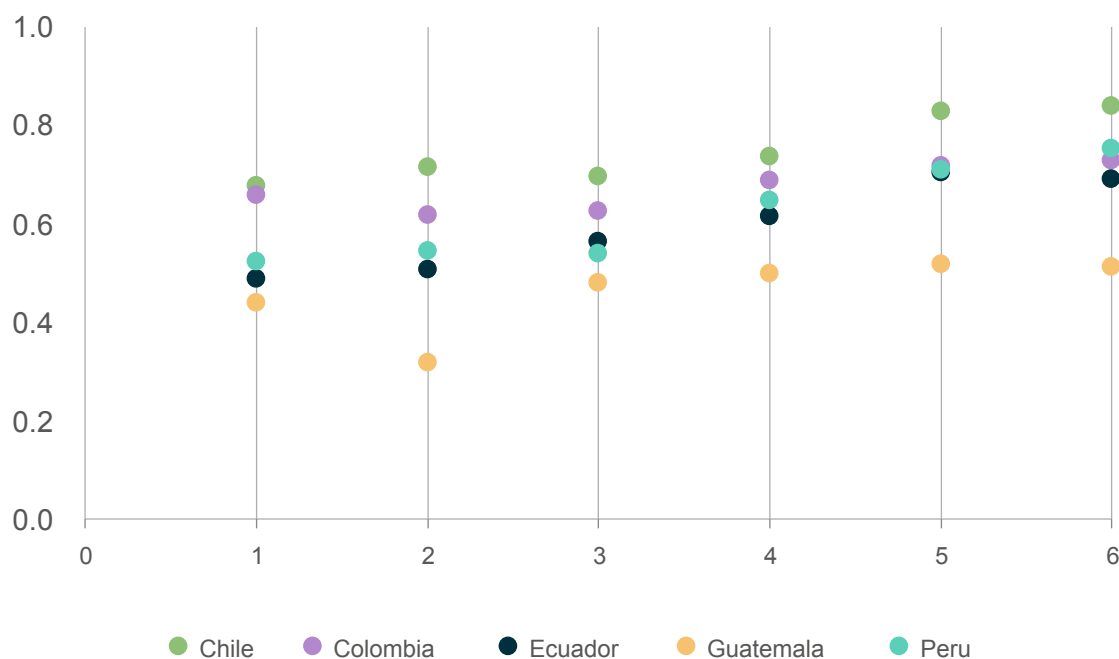
3.2. Current State of Digital Public Platforms: Fragmented and Underused Digital Public Platforms

Despite some progress in the past decade, Ecuador has had a moderate performance in digital government with respect to other countries in LAC (Figure 3.2). Ecuador ranks 13th out of 33 countries in the region, and 84th out 193 economies globally, according to the UN EGDI for 2022,⁹⁷ having lost points and ranking relative to previous years, both in the global index and in its sub-indices. Telecommunications infrastructure is the main obstacle to improving the functioning of digital government (Figure 3.3). However, even having lost 14 places in infrastructure between 2012 and 2022 (Telecommunications Infrastructure Index), Ecuador improved 17 positions in the global index. It is worth noting that over the years, the Online Services Index has doubled its contribution to the global index and is now on par with the Human Capital Index, historically the greatest contributor as reflected in Figure 3.4.

Performance in online services is driven by e-participation. E-participation is a weighted sub-index of online services (35 percent weight), as well as an independent index in which Ecuador was fifth regionally and 41st globally in 2022. In contrast, for the provision of digital services, the component of the sub-index with the greatest weight (45 percent), Ecuador obtained the lowest score.

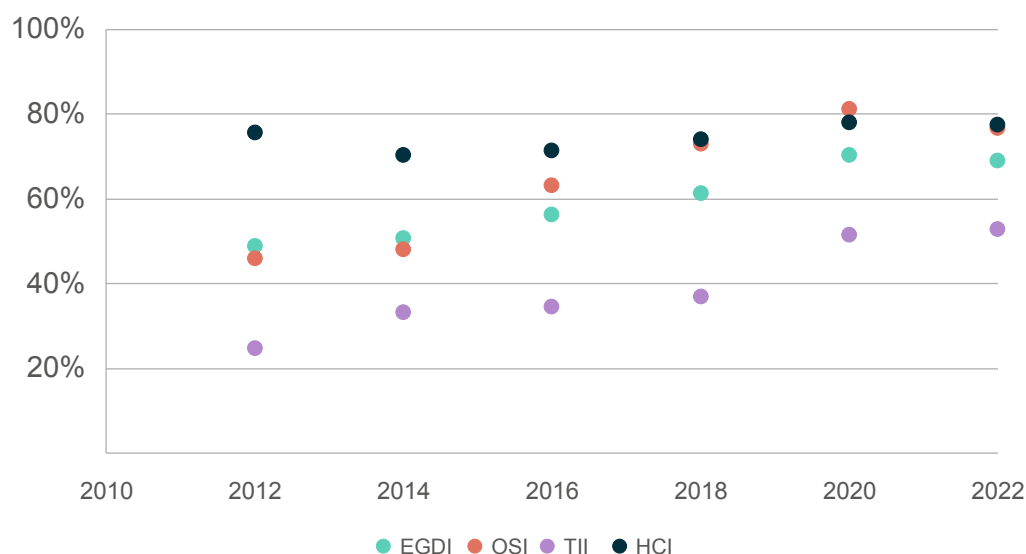
The World Bank Governance Team analyzed the maturity of Ecuador's digital public platforms in the context of the digital economy. This analysis took advantage of the DEA framework, which has been implemented in countries in Africa and LAC and which helps map the strengths and opportunities of the digital ecosystem by identifying challenges and growth opportunities. The diagnosis of public platforms is mainly based on data collected through documentary research, covering publications related to digital government issues in Ecuador, government websites, reports from international organizations, and international indices. Virtual interviews with relevant stakeholders complemented the diagnosis and helped refine the recommendations.

Figure 3.2. EGDI Ranking 2012–2022, Ecuador vs. Regional Peers



Source: Authors' elaboration with data from UN (2022).

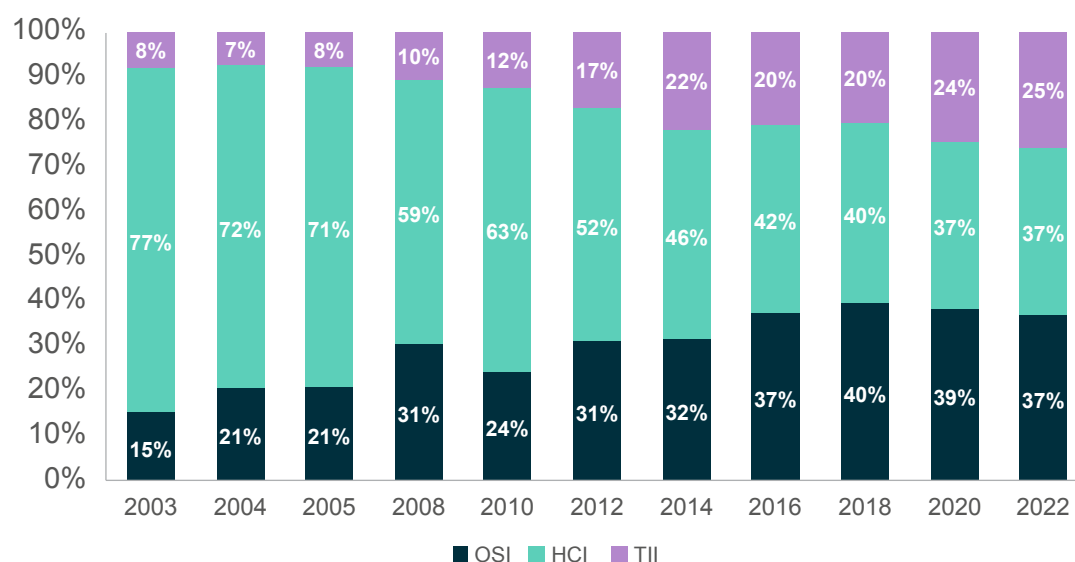
Figure 3.3. Electronic Government Development Index and its Sub-Indices 2012–2022, Ecuador



Source: Authors' elaboration, with data from UN (2022). The delta shows the difference between 2020 and 2022.

Note: Components of EGDI include: (i) OSI = Online Services Index; (ii) TII = Telecommunications Infrastructure Index; and (iii) HCI = Human Capital Index.

Figure 3.4. Contribution of Each Sub-index to the EGDI Total 2003–2022, Ecuador



Source: Authors' elaboration with data from UN (2022).

Note: OSI = Online Services Index; TII = Telecommunications Infrastructure Index; and HCI = Human Capital Index.

The analysis is structured using three dimensions: foundational elements, transversal solutions, and service presentation, made up of 10 thematic areas and 42 key aspects.⁹⁸ Each aspect is analyzed using three criteria: (i) *regulation*, which considers the existence of regulations that frame and enable its development; (ii) *availability*, which analyzes whether the evaluated aspect is available for adoption by any government entity; and (iii) *adoption*, which considers the level of implementation in accordance with the objectives and expected results of each aspect analyzed. Based on

these criteria, the maturity of each aspect is classified as: (a) robust, when the observed strengths outweigh the weaknesses, and the gap between the proposed objectives and the expected results is not significant; (b) partial, for aspects that, having achieved some strength, are not sufficiently developed to achieve the proposed objectives, and for which opportunities for improvement have been identified; and (c) basic, when the challenges and opportunities for improvement are significant and deserve immediate attention.

Foundational Elements

GOVERNANCE (organization, competencies, resources, strategy). There is a governing body and an extensive regulatory framework, with some implementation and articulation challenges. The existence of an agency (MINTEL, through the Undersecretary of Electronic Government and Civil Registry) with clearly assigned authority is the first step in accelerating the development of digital government in Ecuador. The governance model focuses the rector's efforts on formulating, updating, and verifying compliance using an extensive legal, technical, and planning regulatory framework and the development and maintenance of technological assets for the digital transformation of procedures.⁹⁹ Public institutions currently implement the framework in a decentralized manner, without a roadmap or established milestones and deadlines. This can lead to uneven progress in different areas, such as in simplifying procedures by adopting digital technologies and in articulating with the transversal systems of public administration and the government's flagship initiatives, leading to reprocessing and higher costs.

INFRASTRUCTURE (connectivity, cloud, platforms). The GoE requires a digital government technology infrastructure strategy that comprehensively addresses the development of common standards. The government has established some provisions that are associated mainly with the acquisition of infrastructure: the contracting of telecommunications services, including cloud, must be done with a public company,¹⁰⁰ for example, and MINTEL must evaluate the technical feasibility of e-government projects. However, beyond the way in which they are contracted, digital architectures should integrate policies for data storage, data center management, and cloud services, among others. This standardization will reduce the gaps in technology implementation between institutions as a result of their different starting points, thereby diminishing the possibility of inequities in the delivery of and access to public services.

IDENTIFICATION AND TRUST (authentication, signature, privacy, cybersecurity). Progress in terms of identification and trust has been achieved, such as the digital ID pilot and FirmaEC, a signature verification system. In Ecuador there are 10 certification entities accredited by ARCOTEL, and the use of electronic signatures has been driven by the need to authenticate signatures in various specialized systems and more recently, in electronic invoicing.¹⁰¹ Additionally, MINTEL

has made available the FirmaEC system, which allows people to use the signature they have acquired and to verify the validity of an electronic signature on a document. In 2022, the General Directorate of Civil Registry, Identification, and Certification (*Dirección General de Registro Civil, Identificación y Cedulación* [DIGERCIC]), attached to MINTEL, piloted the "digital identification" service in 2022. This digital document is the virtual representation of the most recent physical ID card, having the same legal validity.^{xcix} To obtain a digital ID, the citizen must enroll in the Gob.EC platform through the mobile application and complete an identity verification process, an initiative with the potential to create unified ID authentication in digital government services. The Organic Law on the Protection of Personal Data (*Ley Orgánica de Protección de Datos Personales* [LOPD]) was approved in 2021, with a sanctioning regime that entered into force on May 26, 2023: the Superintendency of Personal Data Protection, a control and surveillance authority created by the Law. In 2021, the National Cybersecurity Policy was also issued, renewed the following year with the presentation of the NCS¹⁰² (see [Chapter 7](#)).

Transversal Solutions

INTEGRATION (architecture, interoperability, registries, shared services). The integration of solutions is a key aspect in the digital transformation of the GoE. This integration allows the optimization of procedures and investments and the elimination of effort duplication and information silos, thus improving the efficiency, effectiveness, and quality of government services. Within this framework, a proper architecture makes it possible to establish a standardized reference framework for the design and implementation of digital government in all its layers: (i) interoperability enables the integration of different systems and processes from different government entities, which improves collaboration and information exchange; (ii) the records are fundamental to guarantee the quality, consistency, and reliability of the data shared between different systems and processes; and (iii) the shared services promote component reuse, which eliminates development time and reduces operations and maintenance cost and effort. In the context of the GoE, integration is essential to improving the effectiveness of government and the quality of life of citizens. The implementation of a digital government architecture, together with interoperability, registries, and shared services, will allow for better collaboration between different government entities and greater effectiveness in both the design and delivery of digital services.

The evaluation found that there had been some progress in terms of integration, particularly in registries and shared services. The National System of Public Registries (*Sistema Nacional de Registros Públicos* [SINARP]) and the citizen information file of the National Directorate of Public Records (*Dirección Nacional de Registros Públicos* [DINARP]), which is attached to MINTEL, are GoE assets to enhance interoperability and facilitate the government's digital transformation. Moreover, MINTEL has made available to other institutions some shared services that are needed to digitize various other procedures, including a form designer, payment gateway, mailbox (notifications), and electronic signature software.¹⁰³ However, an integrated digital government architecture is required at all layers, and the gaps in the transversal systems and the missing shared services must be identified, for example, promoting the use of data and analytics, among others. In addition, the duality of interoperability platforms needs to be addressed, as the MINTEL Government Services Bus and the SINARP platform currently offer around 40 exchange services each, and a specific framework should be established to promote institutional interoperability and enhance procedures that support digital services.

DATA (infrastructure, architecture, standards, exploitation). Data management considerations are present in planning, but a holistic approach to managing new and legacy administrative data remains a challenge.¹⁰⁴ The Digital Transformation Policy and Agenda highlight the need to strengthen and deepen data sharing and analytics mechanisms. However, to have a 360-degree vision of the data, it is necessary to identify the different dimensions and classifications of data and to consolidate the infrastructure, architecture, policy, models, and standards for its secure and effective management.

CROSS-CUTTING SYSTEMS (electronic records; financial, tax, human resource, asset, and procurement systems). Transversal and administrative government systems are a key element of digital public platforms. Administrative systems are used to manage government operations, and although not directly seen by citizens, they ensure the delivery of public services upstream. These systems consist of processes in key cross-cutting areas, including budget management, accounting, customs, revenue and asset management, procurement, and payroll administration, among others. The digital overhaul of government systems has played a key role in the initial stages of the digital transformation path of many countries.

Ecuador has transversal systems that have improved public management, but these are disjointed from the national digital strategy. Incorporating the digital transformation of these systems in their initial stages

made it possible to inform the decision-making process. However, this occurred in isolation within the different institutions, that is, without a comprehensive architecture, and in some cases the systems are now substantially outdated and require modernization. For example, the computer systems for financial management (*Sistema Integrado de Gestión Financiera* [SIGEF]),¹⁰⁵ taxes, and customs, due to functional weaknesses, technological obsolescence, and limited interoperability and data mining capabilities, are currently undergoing modernization by means of critical government investments, projects in which MINTEL could take a more active role. There is also an Official Public Procurement System (*Sistema Oficial de Contratación Pública* [SOCE]),¹⁰⁶ developed by the National Public Procurement Service (*Servicio Nacional de Contratación Pública* [SERCOP]), which benefits from regular improvements in functionality and the free software QUIPUX¹⁰⁷ managed by MINTEL. Although developed for managing the correspondence of digital and physical documents, QUIPUX is also used by institutions for various types of applications in cases where there are no electronic files.

Service Delivery

DIGITAL SERVICES (catalog, simplification and digitization, one-stop shops, institutional involvement). Having multiple planning and regulatory instruments to simplify and digitalize services poses coordination and execution challenges. There have been previous initiatives, such as the issuance of the Organic Law on the Optimization and Efficiency of Procedures in 2018, the creation of the Gob.EC platform (www.gob.ec), the development of a registration and single information system for administrative procedures (catalog), and the introduction of different technical standards to survey, prioritize, eliminate, improve, and simplify processes and procedures, with various complexities in their implementation.¹⁰⁸ On the one hand, the Ministry of Labor is the governing authority over the continual improvement of the various processes, and entities can send the ministry an annual technical report on the procedures to be improved, which may include automation. On the other hand, agencies are instructed to prepare annual simplification plans in which they must prioritize at least 20 percent of their procedures,¹⁰⁹ which may include their digitization, to be approved by MINTEL, the governing authority for procedure simplification. These two efforts—the *improvement of* processes and services, which might involve automation, and the *simplification of* procedures, which might involve their digital transformation—have independent governance and work structures, methodologies, and guidelines that should be coordinated at a

higher level to ensure a more comprehensive and uniform view of public service delivery.¹¹⁰

Ecuador has made significant efforts to ensure that various procedures can be carried out online, but without a comprehensive model or solution, citizens face challenges in completing actions from start to finish. Regarding digital transformation, Gob.EC provides access to information on approximately 7,000 procedures from 240 central and local government institutions, of which at least 3,900 can be started online. Using this platform, MINTEL can support institutions in digitalizing a service request, including payment and signature, if required, as well as service delivery, a mechanism through which 1,500 procedures have become digitalized. However, there is no one single model for digital procedures, as there are different standards that must be followed when designing a digital government service, and many do not have comprehensive, end-to-end solutions—the citizen must interact with different platforms or send emails. In terms of one-stop shops, only the Foreign Trade Window has been implemented, meaning that there are still 20 institutions and 143 forms that do not interoperate with each other. The Investment one-stop shop is in the development stage, and a project planned in 2019 within the framework of the National Investment Attraction and Facilitation System and the implementation of the digital one-stop shop has yet to start. Again, although MINTEL is the governing authority in charge of simplifying government procedures through digital transformation, it participates only tangentially in these projects since it does not have the capacity to assume active leadership, and plans to address these chain-of-command issues have yet to be identified.

TRANSPARENCY AND OPENNESS (public information, government and open data, participation, civitech). The GoE has a long tradition of open access to public information and citizen participation, leveraged by digital technologies. Nineteen years after the approval of the Organic Law on Transparency and Access to Public Information (*Ley Orgánica de Transparencia y Acceso a Información Pública*), Ecuador updated the norm in 2023, expanding the catalog of active transparency and strengthening the role of the Ombudsman's Office as a governing body.¹¹¹ The country joined the Open Government Alliance in 2018, seven years after its creation, and its second plan is currently being executed under the Secretariat of Public Administration of the Presidency of the Republic.¹¹² This plan contains 15 commitments, four of which are digital related: (i) the judicial open data portal, (ii) the unified transparency portal, (iii) the national policy for the digital transformation of health, and (iv) the digital citizen participation policy. MINTEL participates in the first three and leads the initiative in citizen participation. In 2019, the Dialogue 2.0 platform was created through which citizens can

propose ideas and be part of the development of public policies, particularly issues related to digital and open government, making it necessary to expand the involvement of all types of sectors. This is a challenge that MINTEL should address through its open government plan. In terms of open data, although goals have been set for the publication of datasets, the total available potential data and effective ways to use and reuse that data have not been clarified.

SERVICE DELIVERY (unified portal, accessibility, omnicanality, citizen folder). Ecuador has unified the Gob.EC portal and app to provide digital services, but it does not have an omnichannel service model. Between 2018 and 2020, the Gob.EC platform, the Gob.EC app, and the citizen folder were created, a repository through which citizens can access digital documents, such as a driver's license and a digital ID, the virtual form of physical documents with the same legal validity as the paper variant. However, there are no service guidelines for non-digital channels or strategies to achieve a homogeneous and consistent experience between channels or even within the same channel, a gap that could be addressed through the explicit definition of a digital procedures model. Moreover, although there is an Organic Law on Disabilities that establishes guidelines on the accessibility of public sector websites, there is no evidence that this is being monitored.

ADOPTION (key performance indicators, skills and change management, use and satisfaction). Given the low levels of use, it is important to incorporate adoption by default into the design of any digital government initiative. Although the GoE has projects, such as Puntos del Encuentro, formerly Community Infocenters, that aim to promote the use of government services online, greater efforts are still required if digital services are to be used by the population. According to data from the INEC, in 2022, 30 percent of Ecuadorians were offline in the previous 12 months, and among internet users, less than 1 percent used it to carry out procedures with public or government entities.¹¹³ Although this might have increased at the end of the year because of specific incentives, such as the new digital ID that led to more than half a million downloads of the Gob.EC app, users still assign a low rating to the service (1.6/5 in the app store). In the case of www.gob.ec, although it is clear that strategies to reach users have worked, with around 2 million monthly visits, the bounce rate is very high, exceeding 70 percent (at least seven out of 10 people view just one page and leave the website). Additionally, neither the Vice Ministry of Public Service of the Ministry of Labor nor MINTEL has identified a transversal change management strategy (often profound) for public administration or a policy to provide officials with the digital talent needed to enable them to promote the digital development of their institutions.

Table 3.2. Summary of Results of the Ecuador Analysis (1 of 2)

Dimension	Area	Aspect	Regulation	Existence	Adoption
Foundational Elements	Governance	Organization	Robust	Robust	Essential
		Competencies	Robust	N/A	N/A
		Resources	N/A	N/A	N/A
		Strategy	Robust	Robust	Essential
	Infrastructure	Connectivity	Essential	Essential	Essential
		Cloud	Essential	Essential	Essential
		Platforms	Essential	Essential	Essential
	Identity and Trust	Authentication	Partial	Partial	Partial
		Signature	Robust	Robust	Partial
		Privacy	Robust	Partial	Partial
		Cybersecurity	Partial	Partial	Partial
Transversal Solutions	Integration	Digital government architecture	Essential	Essential	Essential
		Interoperability	Robust	Partial	Essential
		Registries	Robust	Partial	Essential
		Shared services	Robust	Partial	Essential
	Data	Infrastructure	Essential	Essential	Essential
		Architecture	Essential	Essential	Essential
		Standards	Essential	Essential	Essential
		Exploitation	Essential	Essential	Essential
	Cross Systems	Electronic records	Partial	Partial	Partial
		Financial systems	Essential	Essential	Essential
		Tax system	Essential	Essential	Essential
		Human resource system	Essential	Essential	Essential
		Asset system	Essential	Essential	Essential
		Procurement system	Essential	Essential	Essential

Table 3.2. Summary of Results of the Ecuador Analysis (2 of 2)

Dimension	Area	Aspect	Regulation	Existence	Adoption
Service Delivery	Digital Services	Catalogue	Robust	Robust	Partial
		Simplification and digitization	Robust	Robust	Partial
		Chains/one-stop shops	Robust	Partial	Partial
		Institutional involvement	Partial	Essential	Essential
	Transparency and Openness	Public information	Partial	Partial	Partial
		Government and open data	Partial	Partial	Partial
		Participation and collaboration	Partial	Partial	Partial
		Civic tech	Essential	Essential	Essential
	Service Delivery	Unified portal	Robust	Partial	Partial
		Accessibility and usability	Partial	Partial	Partial
		Omnicanality	Essential	Essential	Essential
		Citizen folder	Partial	Partial	Essential
	Adoption	Key performance indicators	Partial	Partial	Partial
		Skills and change management	Essential	Essential	Essential
		Use	Essential	Essential	Essential
		Satisfaction	Essential	Essential	Essential



Table 3.3. Key Public Digital Platforms: Key Challenges and Opportunities

Strengths	Areas for Improvement
<ul style="list-style-type: none"> » Existence of an authority/rectory. » Planning that covers all aspects of the different dimensions. » Advances in digital identity and e-signature. » Long tradition of active transparency policies and citizen participation. 	<ul style="list-style-type: none"> » Alignment of strategies to improve processes and services and simplify procedures. » Digital procedures model. » Consolidation of a single interoperability platform and holistic approach to data. » Omnichannel service. » Adoption of digital services.
Opportunities	Challenges
<ul style="list-style-type: none"> » Simplify the planning instruments when preparing the “Comprehensive Digital Agenda.” » Implement regulations related to the LOTDA (decree no. 813) to establish a specific roadmap for institutions. » Take advantage of the existence of some shared services and move toward unified authentication in government digital services. » Implement the Open Government Plan. 	<ul style="list-style-type: none"> » Generate a digital government architecture in all its layers. » Help leadership to evolve, strengthening comprehensive support for institutions. » Appoint the Superintendent of Personal Data Protection.

Source: Authors' elaboration, based on World Bank, “Digital Economy Assessment for Latin America and the Caribbean: The Case of Ecuador” (2022, Unpublished).

3.3. Recommendations: Toward a Whole-of-government Approach to Digital Public Platforms

The GoE made a commitment to increase its score by 9 percent in the UN EGDI but faces setbacks in achieving this goal. The PND and other policy instruments reiterate the need to increase Ecuador's score from 0.7015 in 2020 to 0.7600 in 2024. However, the country fell short in the midpoint measurement in 2022, with a result of 0.6889.

This situation reveals an urgent need to intensify efforts to make progress, with the governing authority playing a lead role. For this, three recommendations are identified:

- » **The governance model could be strengthened in the short term, ensuring that the government authority plays an important role in implementing a whole-of-government approach and reinforcing its operations with technical and financial resources.** Defining guidelines, verifying their compliance, and providing some centralized solutions with low adoption rates have not been sufficient.

The region's leading countries have managed to accelerate these processes by becoming directly involved in strategy execution, deploying coordination teams to the institutions. The Undersecretary of Electronic Government and Civil Registry should be granted the technical and financial capacity to carry out these types of actions.

- » **The currently decentralized and fragmented approach should be modified, moving toward a whole-of-government approach.** The diagnosis and prioritization of procedures, and general compliance with the various provisions, fall on each institution. This represents a weakness, both for the optimization of technological investments and for the identification, classification, and prioritization of digital chains through which interoperability and simplification are deepened, leading to greater public value. It is essential that the governing authority unify and accelerate its strategy to include such actions as: (1) prioritizing goals and deadlines, (2) providing a practical roadmap with concrete results, (3) incorporating by default the dimension of adoption into the design itself, and (4) promoting implementation within the GoE at all levels and sectors.

- » **To ensure an accelerated digital transformation, a model of ongoing procedures could be developed.** The digital transformation of government entities has transitioned from a traditional approach of digitizing thousands of procedures one by one to a more efficient method that classifies, standardizes, and models procedures based on typology.

For the GoE, this implies optimizing procedures not as a sequential process, but as a joint and symbiotic action. It also means clearly defining a digital government architecture and developing all the shared solutions and services that need to be offered centrally for its implementation.

Table 3.4. Digital Public Platforms: Policy Recommendations (1 of 2)

Reform Area	Recommendation	Responsible Entity	Timing	Is Legal Change Required?
Foundational elements The model under which governance is executed is insufficient to accelerate the government's digital transformation. An exhaustive review of the current planning regulations and instruments should be carried out that should lead to a synthesis of objectives and priorities, promote the adoption of digital government, and allow for the identification and mainstreaming of high-impact projects, quick wins, and an approved budget.	Simplify planning instruments and develop a roadmap with clear stages, deadlines, and financing. PRIORITY	MINTEL	Short term	Yes (LOTDA Regulation and Technical Standards)
	Develop digital government infrastructure policies and promote the definition of framework agreements for the efficient and policy-aligned acquisition of this type of services by the state.	MINTEL	Medium term	No
	Move toward a unified authentication process across government digital services.	MINTEL	Medium term	No
Transversal solutions Ecuador would benefit from a digital government architecture that organizes aspects related to infrastructure, security, systems and solutions, data, and processes. In this way, investments are made more efficient through the reuse of shared services, integration with transversal systems, and elimination of duplication of solutions, and data are promoted as an asset under a holistic approach. In addition, all public institutions can work on their own digital transformation in an articulated manner based on unified models.	Develop a digital government architecture in all its layers. PRIORITY	MINTEL	Short term	Yes (LOTDA Regulation and Technical Standards)
	Consolidate a holistic approach and an agreed strategy for data management for the government.	MINTEL	Medium term	No

Table 3.4. Digital Public Platforms: Policy Recommendations (2 of 2)

Reform Area	Recommendation	Responsible Entity	Timing	Is Legal Change Required?
Service Delivery The country faces important challenges in terms of the satisfaction of citizens and companies with public services. Although there is a partial development of e-participation and open government mechanisms, the absence of an integrated plan for the implementation of digital services has produced uneven and insufficient development in the provision and use of those services.	Prepare a strategy for a standardized modeling of digital services by scaling the Gob.EC platform, significantly accelerating the digitization process, reducing costs, improving the user experience, and increasing interoperability. PRIORITY	MINTEL	Short term	Yes (LOTDA Regulation and Technical Standards)
	Expand the tools and experiences of digital participation with all sectors.	MINTEL	Medium term	No
	Incorporate by default the digital take-up dimension into the very design of any digital government initiative. PRIORITY	MINTEL	Short term	Yes (LOTDA Regulation and Technical Standards)

4. DIGITAL FINANCIAL SERVICES



Unlocking the Potential of DFS for Financial Inclusion and Economic Resilience



KEY MESSAGES (1 OF 2)

- » **Ecuador has made important progress on financial inclusion in the past decade thanks to the expansion of physical outlets and regulatory reforms, but gaps remain and growth has been unequal.** Account ownership has increased by 27 percentage points in the past decade, but one-third of the population still does not have an account. Digital payments and the use of electronic channels have increased as well but remain modest. There are also important gaps in access to accounts by women, young adults, adults in rural areas, adults out of the labor force, and low-income segments.
- » **Financial institutions, particularly banks, are expanding the use of digital channels and the supply of certain DFS.** Over 40 percent of banking sector transactions in 2021 were done digitally compared to 37 percent physically. Banks have pushed forward the deployment of electronic wallets and digital payments. The cooperative sector, key for financial inclusion, has also expanded the use of digital channels thanks to partnerships between smaller and larger institutions, but it is lagging in terms of the supply of DFS.
- » **The legal and regulatory framework is fragmented and generates uncertainty, but the new Fintech Law opens the possibility of enhancing market competition and facilitating innovation.** There are six main financial authorities authorizing, regulating, and supervising financial institutions. The new Fintech Law allows the entrance of disruptive business models, such as electronic deposit and payment institutions and digital credit providers, and also requires financial authorities to facilitate innovation. However, many of its provisions overlap with or contravene existing regulations and may create an unlevel playing field.
- » **The supply of products targeting low-income segments could be greatly boosted by removing certain regulatory barriers.** A comprehensive and effective tiered approach to “know your customer” and “consumer due diligence” is missing, and the prices of a wide range of transactions are controlled by regulatory ceilings.
- » **Promoting interoperability between payment processors and providers would enhance competition in the payments market.** The vertical concentration in the card market enhances the lack of interoperability. Enabling new fintech providers to participate in the payment system infrastructure and modernizing the current infrastructure would also help to promote the desired interoperability.
- » **Building and publicizing financial sector data would facilitate the monitoring and evaluation of progress in financial inclusion and DFS in a comprehensive manner.**



KEY MESSAGES (2 OF 2)

- » **Accelerating digital government payments and remittance delivery through bank accounts is an opportunity for DFS expansion.** The country is currently implementing the *Pago Seguro* project, which aims to deliver the Bono de Desarrollo Humano social protection payments directly into financial institutions' accounts, with the goal of raising direct deposits from the current 35 to 90 percent by the end of 2023.

4.1. The Importance of Digital Financial Services: A Cornerstone for Financial Inclusion and Economic Resilience

Digital financial services (DFS) play a critical role in the development and growth of the digital economy. DFS are defined as financial products and services, including payments, transfers, savings, credit, insurance, and securities, among others, delivered via digital/electronic technology, focused on lower-income segments or underserved segments of the population.¹¹⁴ DFS include established instruments (for example, debit and credit cards) offered primarily by banks, as well as new solutions built on cloud computing, digital platforms, and distributed ledger technologies, spanning mobile payments, crypto-assets, and peer-to-peer applications. Powered by fintech, they have the potential to increase the transparency, speed, and security of transactions and to lower the costs of financial services by maximizing economies of scale.¹¹⁵ The digital economy requires individuals and firms to initiate and close economic transactions digitally, which is essential to expanding access to and usage of DFS.

DFS also contribute to a country's development by promoting productivity gains as well as financial inclusion. DFS enable financial institutions to provide more tailored financial services to underserved segments, particularly low-income populations, contributing to their economic and financial inclusion. Financial inclusion, powered by DFS, is critical for poverty reduction and economic growth as access to and use of basic financial services by low-income people and small firms increases resilience, facilitates consumption, and opens economic opportunities.¹¹⁶ Worldwide progress in financial inclusion powered by DFS has materialized through the expansion of digital payments and mobile money. For example, in developing economies, the share of adults making or receiving digital payments grew from 35 to 57

percent between 2014 and 2021. In Sub-Saharan Africa, 33 percent of adults had a mobile money account, a majority of the total share of adults with accounts (55 percent).¹¹⁷

DFS can also support the development of a more sustainable and resilient economy. DFS can provide individuals and firms with access to financial instruments that can help them to mitigate climate-related shocks or to participate in climate adaptation strategies toward a more sustainable economy. Many countries have committed to the Paris Agreement and to inclusive green finance in the context of the Alliance for Financial Inclusion and have implemented measures to facilitate green financing.¹¹⁸ DFS' important role in this topic has materialized through a variety of measures, such as digital cash transfers to disaster-affected areas, subsidies or guarantees for credit to invest in adaptation, and guidance and incentives for inclusive green finance fintech innovation.¹¹⁹

DFS provide a significant opportunity to broaden access to affordable financial services, something that, in Ecuador, became even more visible during the pandemic. The COVID-19 pandemic pushed many citizens worldwide to use digital products and channels. According to Global Findex data 2022, about 40 percent of adults in developing economies, excluding China, who made a digital merchant payment did so for the first time after the start of the pandemic.¹²⁰ In Ecuador, the newly banked population during the COVID-19 pandemic increased by 15 percent in rural areas, and the share of women with a new bank account also increased by 19 percent (although it is below the share of newly banked men). New mobile wallet users grew by 61 percent,¹²¹ with a particular incidence among rural residents, young adults, and adults with low levels of education.¹²² However, over 30 percent of the population still has no account, and an even lower share of adults uses digital products, channels, or payment mechanisms.¹²³

4.2. Current State of Digital Financial Services: Financial Sector Growth with Limited DFS Adoption

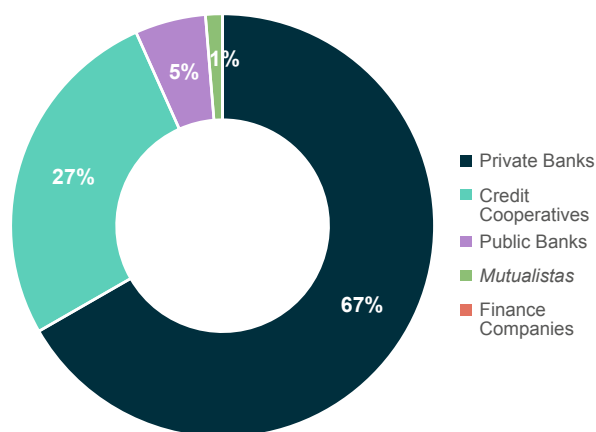
Financial Sector Structure

The financial sector in Ecuador is shallow but mostly healthy. The ratio of bank deposits to GDP or credit to GDP is roughly 35 percent, below the regional median (above 45 percent).¹²⁴ Private banks hold 65 percent of the total credit portfolio, followed by credit cooperatives with 27 percent (see Figure 4.1). Deposits and credits are growing at healthy rates, surpassing pre-pandemic levels. Measures have been taken to continue improving the sustainability of large cooperatives¹²⁵ by improving their regulations on capital requirements and requesting them to establish reserve requirements, and there are ongoing plans to close regulatory gaps on nonperforming loan (NPL) classification and provisioning for banks and large cooperatives.¹²⁶

There are over 500 financial service providers in Ecuador, with banks and the largest credit cooperatives playing the main roles in financial intermediation (see Figure 4.2). There are 24 banks, over 400 credit cooperatives, and numerous small community-based financial institutions. Three public sector banks represent 5 percent of the total credit portfolio, and there is a second-tier lending institution (National Corporation of Popular and Solidarity Finance [*Corporación Nacional*

de Finanzas Populares y Solidarias, or CONAFIPS]). Two of them are planning to merge (the National Financial Corporation [*Corporación Financiera Nacional*] and BanEcuador, (the National Bank of Ecuador), given their high levels of NPLs after the pandemic, and re-focus their business model on providing small loans mainly to agricultural producers and on second-tier lending to banks. These institutions have begun to address their issues regarding the quality of their loan portfolios, though further reforms are needed in terms of their business models and corporate governance frameworks.¹²⁷ In addition, there are 28 insurance companies and two stock markets where DFS can be offered.

Figure 4.1. Share of Credit Portfolio by Type of Financial Provider



Source: Author's elaboration, based on [data from the Central Bank of Ecuador](#), as of June 2022.

Figure 4.2. Financial Institutions in Ecuador

Private Financial Sector	Popular and Solidarity Financial Sector (SFPS)	Public Sector Banks	Insurance and Stock Market Intermediaries
<ul style="list-style-type: none"> » Private banks (niche or with broad activities) - 24 » Financial service businesses: exchange bureaus - 2 and general warehouses - 4, second-tier mortgage market development corporation » Auxiliary financial companies - 81 	<ul style="list-style-type: none"> » Credit cooperatives - 459 » <i>Mutualistas</i> 4 » Savings and credit associations, community banks, and others - n.a. » Auxiliary financial companies - n.a. 	<ul style="list-style-type: none"> » BanEcuador » Corporación Financiera Nacional » Banco de Desarrollo » Banco del Instituto de la Seguridad Social » CONAFIPS 	<ul style="list-style-type: none"> » Insurance companies - 29 » Reinsurance and insurance intermediaries - n.a. » Quito and Guayaquil Stock Markets » Authorized stock market intermediaries, fund managers, etc. - n.a.

Source: Author's elaboration, based on public information.

Notes: 1. Insurance companies and institutions participating in the stock market are not considered part of the financial sector by the legal framework. See art. 6 COMF. 2. "n.a." means not available.

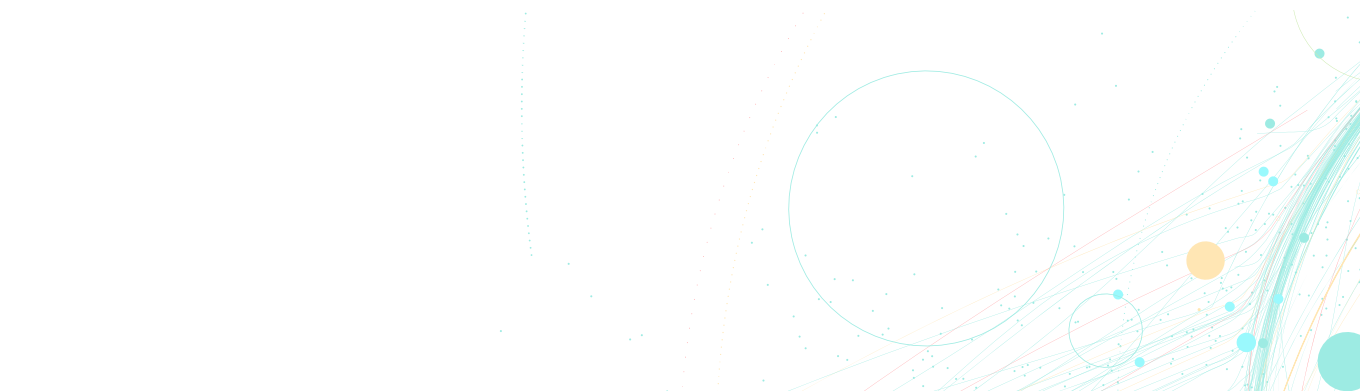
The main DFS providers in Ecuador include banks, auxiliary financial companies, credit cooperatives, *mutualistas*, and insurance companies.¹²⁸ Banks, credit cooperatives, and *mutualistas*¹²⁹ use digital channels to deliver traditional financial products, such as payments, transactional accounts, savings, and credit. They rely on their own teams to develop innovative products or channels or on developments provided by auxiliary financial companies (see [Box 4.1](#)). The level of adoption of digital channels varies widely between banks and the Popular and Solidarity Financial Sector (*Sector Financiero Popular y Solidario* [SFPS]). Only two banks do not have internet as a channel, while 13 institutions do not have mobile.¹³⁰ Data on credit cooperatives were available only for segments 1 and 2.¹³¹ Thirty-eight percent of these institutions are in the process of implementing digital channels, while only 15 percent have already adopted them. It is likely that SFPS institutions in segments 3, 4, and 5 present even lower levels of digital transformation.¹³² There are no data publicly available on auxiliary financial companies, and very few insurance companies are actively using digital channels to sell products to their customers.

There are no specialized financial service providers, and information on fintech companies is scarce, although their number has grown over the past five years. Unlike in peer economies, including Peru, Colombia and Bolivia, the regulatory framework in Ecuador does not currently enable activities of specialized payment or credit-only financial service providers (see [chapter 7](#)). Roughly 23 fintech companies are working on the payments and lending verticals, acting as auxiliary financial service providers. Several others provide services to financial institutions (data analytics, biometric ID, cloud services) or investment services.¹³³ Most fintech companies are at the seed stage.¹³⁴ Fintech institutions have reported that it is very difficult for a fintech company to grow beyond that stage because of the market structure and legal constraints, such as not having specialized licenses to operate by themselves.¹³⁵ Ecuador lacks a fintech chamber, and there is no official information on the market (collected by financial authorities, for example).

Table 4.1. DFS Providers, Products, and Channels

Institutions	Main Products	Digital Channels and Electronic Payment Mechanisms
Banks	Payments, basic accounts, checking and saving accounts, microcredit, credit to SMEs	Internet banking, checks, debit and credit cards, mobile banking, QR codes, and banking wallets
Credit cooperatives, <i>mutualistas</i>	Payments	Internet banking and mobile banking
Insurance companies	Life and non-life insurance	Internet and mobile channels
Auxiliary financial companies	Remittances, payments, prepaid cards	Internet and mobile channels
Fintech companies	E-wallets, escrow wallets, digital loans, crowdlending platforms, credit scores	Internet and mobile channels, QR codes

Source: Author's elaboration, based on public information.

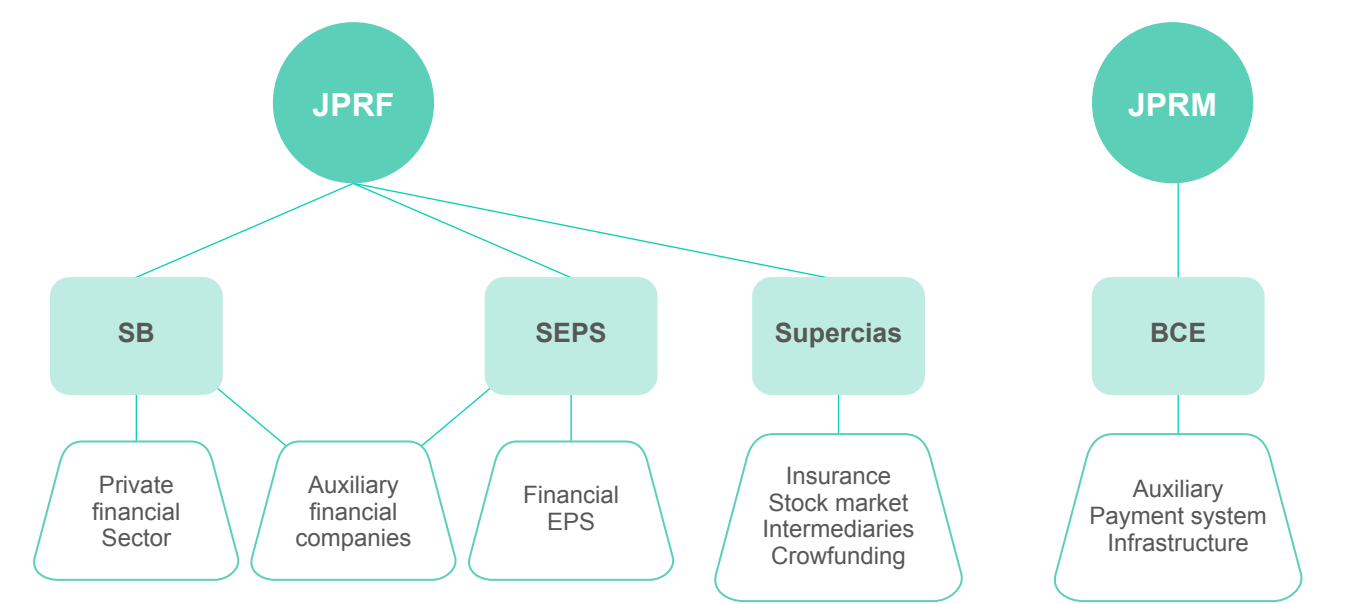


There are two overarching bodies responsible for policy and regulatory design and four financial authorities with regulatory and supervisory powers. The Monetary Policy and Regulation Board (*Junta de Política y Regulación Monetaria* [JPRM]) and the JPRF are responsible for the policies and regulations in monetary and financial matters, respectively. The Central Bank of Ecuador (*Banco Central del Ecuador* [BCE]) is responsible for monetary policy, the stability of the financial sector, and the efficient, sustainable, and secure functioning of payment systems and payment methods. Its functions include controlling payment methods, supervising and maintaining oversight of auxiliary payment systems, and promoting its own efficiency, interoperability, and innovation.¹³⁶ The Superintendency of Banks (*Superintendencia de Bancos* [SB]) is responsible for the regulation and supervision of private financial sector providers and public sector banks, while the Superintendency of the Popular and Solidarity Economy (*Superintendencia de Economía Popular y Solidaria* [SEPS]) is responsible for the regulation and supervision of entities in the popular

and solidarity financial sectors. The Superintendency of Companies (*Superintendencia de Compañías* [Supercias]) is responsible for the regulation and supervision of the stock market and insurance companies. It is also responsible for the registry of companies, and as such, for the registry and corporate governance issues regarding crowdfunding companies (see figure 4.3).

Ecuador lacks granular information on the entire financial sector, including auxiliary financial companies. Information is reported under non-standardized formats to the respective financial authority, and there are no efforts to consolidate these datasets to have a comprehensive understanding of the supply of financial services. Information on auxiliary financial companies is captured for supervisory purposes but is not made public. Remittance companies, for example, are a type of auxiliary payment service provider whose information is not publicly available, making it difficult to understand the size of the market, identify the main players, and locate their access points.

Figure 4.3. Financial Authorities and Regulated Financial Institutions in Ecuador



Source: Author's elaboration, based on publicly available information.

BOX 4.1. Auxiliary Financial Companies and Innovation

Auxiliary financial companies and auxiliary payment system companies are third parties that provide transactional or banking software or undertake specialized functions, such as payments, ATMs, and point-of-sale networks, among others. These third parties need to be authorized by the BCE if they play the role of or connect with payment system infrastructure and need to be authorized by the SB or SEPS to support the provision of financial services by banks, credit cooperatives, or *mutualistas*.

Traditional auxiliary companies, such as Banred or Coonecta (providers of electronic transfers, e-wallets, and ATM networks, among others), have pushed innovation among traditional providers. There are numerous auxiliary financial providers,

but as of 2021, there were only 51 authorized by the BCE. There has been a recent wave of innovation in the fintech space, particularly in the areas of payments and lending, challenging regulators with new types of products and services. Fintech companies need to make an agreement with financial institutions and get an authorization as auxiliary financial companies to be able to operate in the country. The lack of a framework enabling some of these companies to provide services directly to the consumer increases the cost of financial services and reduces incentives for innovation in the market.

Source: Author's elaboration, based on the Organic Monetary and Financial Code (*Código Orgánico Monetario y Financiero*), provisions 162 and 163; publicly available information from [Banred](#), [Coonecta](#), [Buentrip Hub](#), y [BCE](#).

DFS Uptake and Ecosystem

Account ownership has increased remarkably over the past decade, though one-third of the population in Ecuador does not yet have access to financial services. Sixty-four percent of adults in Ecuador have an account at a financial institution. This percentage has grown over the past decade (by 27 percentage points) but is still below the average of the region (74 percent, see [Figure 4.4](#)). The uptake of DFS in Ecuador, specifically electronic payments, is still very low when compared to the region. Forty-seven percent of adults in Ecuador have made or received digital payments in the previous year, which means 17 percent of adults with an account have not used digital payments, a percentage that is lower than the average for the region. Only 13 percent of the population have used a mobile phone or the internet to buy something online (versus 27 percent in LAC), 14 percent to send money (28 percent in LAC), and 17 percent to pay bills (34 percent in LAC).

Ecuador is one of the few countries in LAC without mobile money accounts,¹³⁷ and the uptake level of electronic payment mechanisms or digital channels is low. Ecuador is one of the five countries in LAC that still does not have mobile money accounts. Access to and usage of traditional electronic payment instruments,

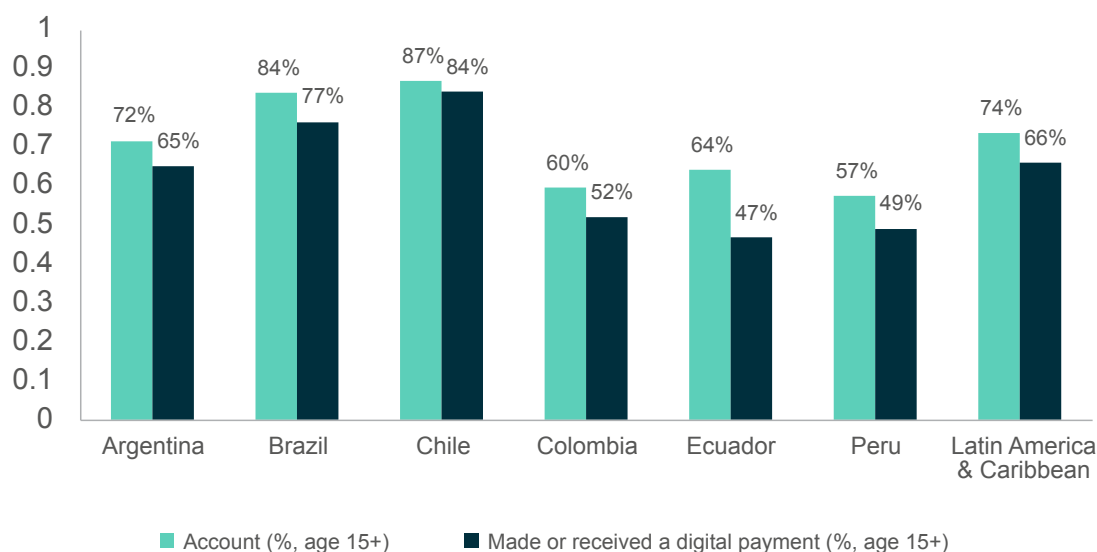
such as debit or credit cards, are still issues, since only 39 percent out of the 64 percent of adults with accounts have a card and an even lower percentage (19) use them, below the regional average of 43 percent.¹³⁸ Around one-third of the population with accounts use their mobile phones to check their account balance or make payments, buy things, or send money. Only 16 percent of the population has made a digital merchant payment (below the regional average of 41 percent).¹³⁹

Access to financial services is lower for key demographic segments, and these gaps are wider for lower-income segments and adults with lower levels of education. There are important gaps in access to accounts by women, young adults, adults in rural areas, adults out of the labor force, and low-income segments. While 71 percent of male adults have an account, only 58 percent of women do, and though 68 percent of older adults have an account, only 55 percent of young adults do. Thirty-three percent of the banked population in urban areas used transfer services during the pandemic compared to only 21 percent in rural areas.¹⁴⁰ These gaps are wider when looking at access to or usage of DFS. For example, the gap in account ownership is 8 percentage points for people in the bottom 40 percent of income (a significant improvement of 30 percentage points in 2017), while the gap in having made or received digital payments is 16 percentage points (see [Figure 4.5](#)). The same happens when comparing access to accounts

and having made or received digital payments for adults with primary education or less compared to adults with secondary education or more. These wider gaps might echo the barriers in access to the internet or electronic

channels (in good condition) by lower-income segments and the lack of digital skills to handle digital transactions by adults with primary education or less.

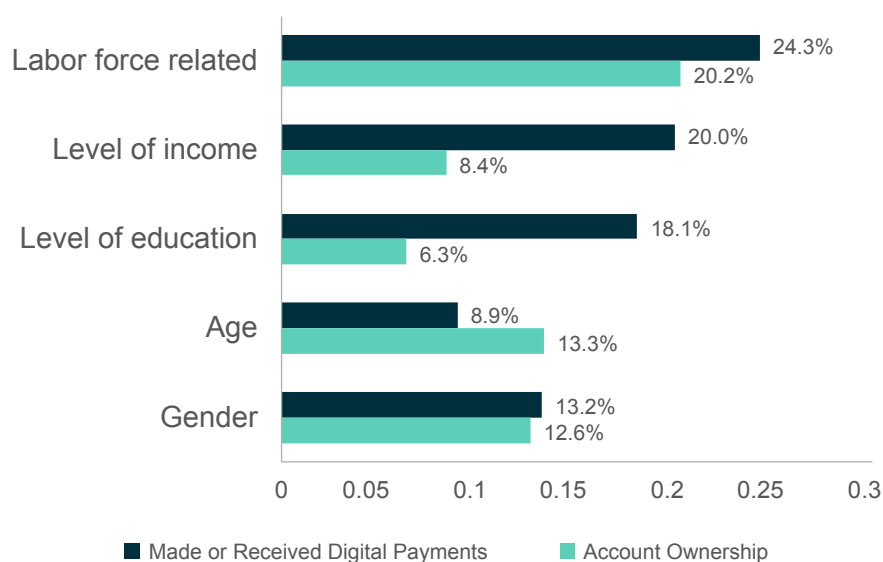
Figure 4.4. Account Ownership and Having Made or Received Digital Payments in LAC, selected countries



Source: Demirgüç-Kunt et al. (2022).

Note: Mexico was not included in the 2021 Global Findex Database.

Figure 4.5. Gaps in Account Ownership and Having Made or Received Digital Payments by Gender, Age, Level of Income, and Education



Source: Demirgüç-Kunt et al. (2022).

Note: The gap in the labor force is the difference in the level of uptake of accounts or digital payments between people in or out of the labor force; the gap in the level of income, the difference between people in the bottom 40 percent and upper 60 percent of the income curve; the gap in the level of education, between adults with secondary education or more and primary education or less; the gap in age, between young people (15–24 years old) and older people (25+ years old); and the gap in gender, between males and females.

The main reasons for not having an account include the high costs of financial services, excessive distance to access points, and the ability to access an account through someone else in the family. Over half of the adults without an account report not having one because it is too expensive, followed by the lack of sufficient funds. Around 40 percent point to the long distance to access points as an important constraint, and roughly the same share of the population say that it is because someone else in their family has one.

Access points have grown by 19 percent over the past four years, led by the increase in the number of branches and agents. There are over 33,300 access points (branches, ATMs, and agents), and banks have 88 percent of the total number mainly due to their number of agents. However, access points in the SFPS have grown the most (53 percent between 2019 and 2022), led by the growth in agents (*corresponsales solidarios*), followed by ATMs. There has also been a significant growth in the number of branches, pushed forward by the increase in the number of bank branches (39 percent between 2019 and 2022). There are no national-level data on access points, thus this analysis might have overestimated by double counting the actual number of ATMs and agents for those that are shared between banks and credit cooperatives.¹⁴¹

The availability of access points in the country is still measured by cantons (*cantones*), so the real distance to an access point for individual customers is not considered. Georeferenced data would be ideal, or at least data presented at the level of *parroquias* (or parishes, a smaller administrative unit than *cantones*), and would provide a better understanding of

how far access points are from financial customers. Although most cantons have access points,¹⁴² an analysis in 2020 showed that only 50 percent of *parroquias* had at least one.¹⁴³ This proportion might have changed due to the increase in access points in the country in the past few years, but that information is unknown because the financial authorities do not consolidate data on access point availability or measure their availability by *parroquias*. This gap in information does not allow them either to identify underserved areas or to design efficient policies to promote the expansion of access points.

Information on agents is also incomplete, their regulatory framework creates an unlevel playing field, and the largest state-owned retail bank does not leverage them. Agents are very important for the expansion of DFS because they provide a low-cost point of contact between financial institutions and their customers. In Ecuador, there are banking agents (regulated by the SB and the largest in number), “solidarity agents” for institutions from the SFPS (regulated by the SEPS), and a third type of agent that is regulated under a different framework (as payment auxiliary providers that focus only on payment-related services), such as in the case of *Facilito* or *Servipagos* (regulated both by the BCE and the SB or SEPS).¹⁴⁴ These three parallel frameworks create an unlevel playing field and silos in the information available. As an example, these payment auxiliary providers are not included in the number of agents presented above. In addition, it should be noted that only five out of the 24 banks have banking agents; in fact, agents are provided by only a very small number of banks, and the largest retail public bank, BanEcuador, does not have them—only branches and ATMs.

BOX 4.2. Payphone in Ecuador

Payphone is a mobile platform for payments. It enables customers to send money, request money, pay for public services, and use QR codes as electronic payment mechanisms. In order to conduct transactions, customers need to link the digital wallet provided by Payphone to their debit or credit network-branded cards or get a pre-paid card offered by Payphone. Their business model allows customers to make transfers at no cost; they are charged only when they withdraw money from the

system (cash out or transfer to another bank or credit cooperative account). The company started its operations in 2016 and is a subsidiary of Pro-dubanco. It currently has over 350,000 users and 32,000 merchants receiving payments. The average balance of individuals in the digital wallet is between US\$65 and US\$85, and the average transaction size is also US\$85.

Source: Author's elaboration, based on a conversation with Payphone.

The use of digital channels increased significantly during the pandemic, particularly through mobile channels. The BCE estimates that electronic payments have grown 25 percent per year on average in the past couple of years.¹⁴⁵ Banking sector customers have seen an increase in the supply of digital channels for their transactions: over 40 percent of transactions in the banking sector in 2021 were done using digital channels compared to 37 percent through physical means, with the majority done by women and millennials (particularly using the mobile channel). Popular and Solidarity Economy (*Economía Popular y Solidaria* [EPS]) institutions increased their supply of digital channels thanks to partnerships between smaller and larger institutions.¹⁴⁶

The supply of transactional accounts does not meet customer needs. Transactional accounts are important as the first gateway to a broader range of financial services, including DFS. In Ecuador, they are provided by banks, *mutualistas*, and credit cooperatives, mostly under the framework of basic accounts. These accounts were regulated over 10 years ago as current accounts, with simplified customer due diligence (CDD), transactional limits, and maximum tariffs set by the regulatory framework. These features, plus other regulatory requirements, such as having a maximum of two accounts in the financial system, disincentivize their supply.¹⁴⁷ The number or volume of these accounts is not publicly available, but data from 2019 indicate there was very little uptake (only 5 percent of adults had this type of account).

A few recent private sector initiatives provide mobile platforms to facilitate payments and access to accounts following a customer-centric design, although they do not target underserved segments.

A few banks have created mobile platforms, such as Deuna, Peigo, or Payphone (see [Box 4.2](#)),¹⁴⁸ to facilitate electronic payments, and some even have interoperable payments between mobile wallets and regular bank accounts. These products require having a smartphone, power, available data,¹⁴⁹ a bank account (in the case of Deuna), or a debit or credit card (in the case of Payphone), all of which might limit their use by lower-income segments.¹⁵⁰ There was a concerted effort to develop mobile wallets by financial institutions, leveraging interoperable platforms developed by two of the biggest transactional networks, but these products have not led to a wide uptake so far (see [Box 4.3](#)). None of these initiatives is clearly targeting (with an intentional approach) underserved segments, such as women or indigenous populations.

DFS initiatives targeting low-income segments and MSMEs have grown slowly, without a clear regulatory framework in place. There are players in the market offering services, such as companies that provide products similar to digital loans or services enabling their provision, crowdfunding platforms, or payment platforms using cryptocurrencies, but their operations seem still to be small (see [Box 4.4](#)). All of these companies lack a clear framework enabling them to provide DFS. In the lending space, for example, although credit underwriting can be done outside the financial sector, interviewed players have decided to focus their business model on services that are complementary to the ones provided by the regulated players. They can consider operating independently in the future if the regulatory framework provides them with more certainty and when they have become stronger players. Crowdfunding companies operating in the market¹⁵¹ have not yet gotten a license from

BOX 4.3. Interoperable Platforms for Mobile Wallets: BIMO and BICCO

BIMO and BICO are mobile wallets tied to simplified accounts that are designed only for individuals and can be offered by banks and credit cooperatives and provided through electronic platforms that allow for their interoperability. The platforms were developed by Banred and Coonecta, the biggest and oldest financial service auxiliary companies working for the banking sector and for institutions from the SFPS, respectively. The supply of these services was enabled by specific regulations enacted by the Monetary and Financial Regulation and Policy Board (*Junta de Política y Regulación*

Monetaria y Financiera [JPRMF]) in 2018. Their uptake is very low, and consumers seem to prefer other digital wallets and channels. The market structure and applicable regulations do not promote competition for this type of product, and the business model envisioned for its supply dampens the incentives for financial institutions to promote it by themselves, since they have to sell it using a white label name (Bimo or Bicco).

Source: Author's elaboration, based on World Bank (2020c) and Angulo (2022). NFIS Diagnostic for Ecuador.

the Supercias because there is no regulatory framework for this purpose. A cryptocurrency exchange has been operating in the market since 2018 and reports information to the Financial and Economic Analysis Unit (Unidad de Análisis Financiero y Económico [UAFE]).¹⁵² It has over 60,000 clients and has facilitated international remittances (for example from Venezuela) or payments to exporters selling goods to Russia.

Enabling Environment for DFS

There are ongoing efforts to promote the expansion of DFS through national policies, such as the NFIS, which is being revised by the JPRF. The JPRF is updating the draft NFIS designed in 2019–20 by a broad range of stakeholders, with the support of the World Bank. The NFIS has a policy pillar focused on the expansion of DFS and specific commitments to achieve this goal (see [Box 4.5](#)). Due to political and legal changes and demands from the pandemic, the NFIS was not submitted for approval to the executive authority in 2020. The new Comprehensive Organic Monetary and Financial Code (*Código Orgánico Monetario y Financiero* [COMF]) has empowered the JPRF to design policies and regulations to promote financial inclusion, in

coordination with public and private sector stakeholders,¹⁵³ and following this mandate is now getting consensus on a slightly modified version of the strategy drafted in 2019, with the aim of approving it in 2023. The new role of the JPRF in financial inclusion is expected to be reflected in the new draft NFIS, through adjustments in its governance mechanism.

In addition, MINTEL, together with the Ministry of Production, International Trade, Investments, and Fisheries, designed the E-Commerce National Strategy (2020) and more recently, the Digital Transformation Agenda (2022–2025). Both documents highlight the importance of facilitating digital payments. Key objectives of the e-commerce strategy include promoting the interoperability of payment systems and the use of electronic payments and financial inclusion, and the strategy involves specific activities to support the expansion of digital payments for e-commerce (see [action line 4](#), E-Commerce National Strategy). Unfortunately, many of these activities have not been implemented. The Digital Transformation Agenda prepared by MINTEL identified the promotion of e-commerce as a key means of advancing the digital economy. Among the e-commerce objectives, the promotion of safe, easy-to-use, and low-cost electronic payment systems, as well as digital payment interoperability, is explicitly mentioned.

BOX 4.4. Activities of Fintech Providers in the Lending Space

The Radar tech start-up (BuenTrip Hub 2022) includes 10 companies working in the lending space (crowdfunding platforms also), most of which provide services to support lending underwriting for financial institutions. Four of these 10 companies report using alternative data and technologies such as artificial intelligence to provide business intelligence and scoring tools to regulated providers. At least one of them, in another country, directly provides credit to low-income segments, but given the regulatory uncertainty in Ecuador, decided to continue with its role as lending enabler for

regulated providers. Three out of the 10 report providing salary advances. In at least one of these cases, the activity is not presented as a loan but as a service for a fee and thus is not subject to interest rate regulations, which might indicate regulatory arbitrage. The type of customer targeted by interviewed providers belongs to low-income segments or MSMEs. It seems important to create an enabling environment for these players without overregulating them.

Source: Author's elaboration, based on BuenTrip Hub interviews with fintech companies in October 2022.

BOX 4.5. Main Commitments to Expand DFS Included in the 2019 NFIS Draft

The draft NFIS developed in 2019–20 presents four policy pillars, including “Supply of Digital Financial Products and Services.” This policy area has five actions that showcase the country’s priorities on financial inclusion:

- i. Design a legal and regulatory framework for payment service providers (including new licensing for specialized non-banks and remittances companies). Analyze the feasibility of including e-money issuers as well. Assess their access to BCE payment system infrastructure.
- ii. Revamp the legal and regulatory framework for leasing, factoring, and crowdfunding companies and introduce reporting requirements to financial authorities over their activities.
- iii. Modify the regulatory framework for basic accounts to improve the simplified CDD process, addressing issues faced by underserved segments, their high costs, and the use of digital channels or digital payment mechanisms linked to them.

- iv. Promote the supply of basic accounts by full-service providers.
- v. Develop a regulatory framework for micro-insurance and mass insurance.

The strategy identified as priority segments women, migrants, and populations living in rural areas, including people from indigenous ethnic groups, afro-descendants, and *montubios*. These priority segments are identified to guide the implementation of NFIS actions as the main populations whose needs are going to be addressed.

The updated version of the NFIS also highlights the importance of green financing for financial authorities in Ecuador and its recent progress during 2022, with both the SB and SEPS issuing regulations to evaluate environmental and social risks in regulated financial providers. They have committed to continue this effort by building a green taxonomy to support green financing in the future.

Source: Author’s elaboration, based on the 2019 NFIS draft.

Inter-institutional coordination within financial sector authorities and between a broader range of public and private sector institutions is a challenge. There are six authorities involved in the authorization, regulation, and supervision of financial institutions (including insurance companies or crowdfunding platforms). Each authority manages its data infrastructure following a siloed approach, and there are no institutional mechanisms enabling them to coordinate initiatives or exchange knowledge. The NFIS governance mechanism can partially solve this issue by pushing them to build financial inclusion infrastructure at the national level and also by agreeing on common steps to be taken to achieve this goal. The financial private sector is represented through various networks, most of them well-organized. They created working groups in 2018–19 to discuss opportunities to improve the ecosystem with financial authorities. More recently, they launched an initiative to promote innovation in the private sector called *Cluster Financiero*, with more than 90 members, including financial institutions and tech companies. Coordination with a broader range of public stakeholders only happens at a bilateral

level, and that only occasionally. In the case of the e-commerce strategy, for example, the financial authorities and MINTEL have not articulated any specific actions. The NFIS governance mechanism clearly presents an opportunity to institutionalize collaboration between the public and private sectors to support financial inclusion and the expansion of DFS.

There is no mechanism to support innovation in the financial sector. Many authorities worldwide have implemented mechanisms to facilitate innovation, such as innovation hubs or offices, regulatory sandboxes, and regulatory accelerators (or RegTech Labs), to respond to fintech developments.¹⁵⁴ Given the complex legal and regulatory environment, the various authorizations required, and the numerous authorities that require reporting from financial institutions, establishing an innovation hub in Ecuador would support fintech firms in their efforts to navigate the ecosystem’s complexities. It would also provide a window for regulators to better understand new developments and to exchange lessons and experiences in dealing with new providers.¹⁵⁵

Legal, Regulatory, and Supervisory Framework

The regulatory framework is fragmented and not activity-based, running the risk of producing an unlevel playing field. In recent years, Ecuador's authorities have taken measures to ensure a more level playing field between banks and large credit cooperatives, including with respect to credit risk management regulations. Nevertheless, the lack of a regulatory framework for payment agents generates an unlevel playing field between payment aggregators and banking agents (or solidarity agents) because payment aggregators are regulated as auxiliary financial companies for payments. The activities of remittance companies and payment aggregators, for example, are regulated under the same framework as a transactional switch, despite the distinct difference in their activities.

The supply of financial services is distorted by regulations and caps on fees applicable to a wide range of products and services. Services categorized as “basic services” are mandated to be provided free of cost, and these include opening accounts, enrolling in mobile platforms, cashing in accounts, reviewing the account or mobile wallet balance or movement, maintaining the account, withdrawing through branches and ATMs owned by the financial provider, making domestic transfers delivered through the provider's branches and ATMs, and obtaining statements, among others. Other services, such as withdrawing from ATMs or agents, providing a printed copy of a voucher, or issuing a card, are subject to caps in the fee that can be charged.¹⁵⁶ Authorities sometimes use caps on fees as a policy lever to promote DFS.

Specialized payment service providers and e-money issuers are not regulated. Payment services can be undertaken by banks, cooperatives, and some auxiliary financial companies in the payment space (payment aggregators, collection of public service fees, among others). There is no regulatory framework for entities providing payment services only nor a license for non-bank payment service providers. There is also no regulatory framework for e-money issuers (including non-bank e-money issuers). National Assembly approval of the Fintech Law in December 2022 has opened the possibility of regulating these players, although under a limited regime (entities specialized in deposits and electronic payments). The lack of a framework has led to unsupervised and potentially risky activities. For example, there are mobile wallets in the market that receive customers' funds managed by auxiliary payment service providers that are not tied to the accounts of existing financial institutions. Although there are mechanisms to deposit these funds into regulated financial providers, the money is not

segregated into different accounts, creating the risk of a potential loss of funds that are not protected by a deposit insurance scheme.

The lack of guidance and uniform standards for new payment mechanisms could lead to an inefficient payments market. New payment mechanisms such as QR codes need a certain level of standardization and guidance to avoid closed-loop systems and/or undue privilege for specific payment arrangements due to a lack of interoperability or obsolete architecture. QR codes are being introduced in the market without consideration for their interoperability or even minimum criteria for their standardization.

The BCE and the Internal Revenue Service (*Servicio de Rentas Internas* [SRI]) have issued some measures to promote the expansion of digital payments in the country. Beginning in early 2022, the BCE prohibited the use of cash for public service payments (water, electricity, public phones, and trash) below US\$76, except when paying in person at the respective public entities.¹⁵⁷ Additionally, receiving electronic transfers through the Interbank Payment System (*Sistema de Pago Interbancario* [SPI]) was included as a basic service, meaning that financial institutions could not charge customers for receiving interbank payments.¹⁵⁸ In July 2022, the SRI modified its regulations regarding tax withholding in digital payments, creating a specific framework for payment aggregators and e-commerce platforms. These regulations exempt financial institutions, card issuers, payment aggregators, and e-commerce platforms from withholding obligations for payments in the context of third-party transactions.¹⁵⁹

The country also lacks a framework for digital credit. The provision of credit alone is not a regulated activity in Ecuador. Traditional factoring providers and commercial lenders are currently partnering with fintech companies to improve their underwriting methodologies and reach new (bottom of the pyramid) segments. Financial authorities should monitor them closely to identify when they reach a certain size, as these have implications for stability and over-indebtedness or could create social risks. Furthermore, financial authorities should create a framework to enable fintech providers to offer digital credit or lending products, but with adequate risk protection and market conduct regulations. There are heightened market conduct risks identified in digital lending activities, such as the opaqueness of fintech business models and consumers' unfamiliarity with these instruments, which might lead to fraud or misconduct on the part of fintech providers and enablers, consumer over-indebtedness due to poor product quality or unreliable technology, data breaches or cyber fraud, and discriminatory or biased outcomes based on the use of inadequate algorithms, among other concerns.¹⁶⁰ The Fintech Law has opened

a window to regulate them, but it only covers credit-only providers leveraging technologies.

Lending activities are distorted by the limits on interest rates. The JPRF has the power to set interest rate caps for the different types of credit portfolios defined in the regulations. These caps are revised every six months (see Table 4.2). The industry argues that these caps, particularly for microcredit and consumer loans, prevent them from providing services to underserved clients.

The legal framework for crowdfunding activities was enacted in 2020 but its regulatory framework is pending. The Entrepreneurship and Innovation Law (2020) regulated the operations of crowdfunding companies and specifically grants the *Supercias* the power to register them. But this law does not assign specific authority to regulate and supervise these entities, nor does it contemplate the possibility of transacting other types of financing instruments on these platforms, such as negotiable invoices. The regulations to request a license and regulate the activities of these companies, as well as the oversight framework, are not yet in place.

As noted above, a Fintech Law was recently approved by the National Assembly in December 2022. This law created four new types of entities. Two of them are part of the private financial sector: (i) financial technology service providers, which include digital credit providers, neo banks, technology-based financial advisors, and others as determined by the JPRF, and ii) electronic payment and deposit-taking institutions, such as non-bank e-money providers or payment service providers. For those in the first group (excluding those in the area of payments), the JPRF is the entity responsible for regulating, and the BCE for oversight. Those in the second group will be regulated by the JPRM, but their licensing would be regulated by the JPRF, with oversight from the BCE, which is required to share information with

the SB, SEPS, or *Supercias*, if their supervision or sanction is needed. The two other groups of institutions belong to the capital markets and to the insurance market: (iii) auxiliary service technology providers for the capital markets and (iv) insurance technology-based services. The law also mandates that the different financial authorities (except the SEPS) implement a regulatory sandbox and enables both the BCE and SB to do so for institutions under their oversight or supervision. It should be noted that neither the industry nor any financial authorities were consulted when the law was drafted. Although a more in-depth assessment is needed on the implications of the law, it does raise some concerns in terms of consistency with the existing regulatory framework, a level-playing field, and the implications for enabling fintech players to enter the market. See [Box 4.6](#) for a more detailed analysis of the law's selected provisions.

Cybersecurity is a topic of concern for financial regulators, but regulations must keep pace for proper compliance, reporting, and assessment. Ecuador's Computer Emergency Response Team (CERT) (*Equipo de Respuesta a Emergencias Informáticas de Ecuador* [EcuCERT]), managed by ARCOTEL, has been acting as a national CERT without a legal mandate. In the financial sector, the SB and the Bank Association of Ecuador (*Asociación de Bancos del Ecuador* [ASOBANCA]) have explored the possibility of creating a sectoral CERT, but this initiative has not yet been carried out. Although banks and financial institutions are advanced in terms of cybersecurity, particularly large and transnational banks, problems arise when the regulator does not keep pace and cybersecurity is not yet integrated into the sectoral regulatory framework. Regulators may consider issuing directives to monitor cybersecurity compliance and to mandate incident reporting obligations and cyber risk assessments, among other measures (for more information, see [Chapter 7](#)).

Table 4.2. Limits on Interest Rates by Type of Credit Portfolio

Productive			Microcredit			Mortgages	Social and Public Interest Mortgages	Consumer	Education (and social education)	Public Investments
C	B	P	R	AS	AA					
8.86	9.89	11.26	28.23	24.89	22.05	10.40	4.99	16.77	9.50 / 7.50	9.33

Source: Author's elaboration, based on Res. JPRF-F-2022-031.

Notes: C = corporates; B = enterprises; P = SMEs; R = retail; AS = simple accumulation; and AA = wider accumulation. All of these are subcategories for the different types of loans.

The consumer protection framework is fragmented and incomplete, although there have been recent efforts to strengthen it, particularly regarding transparency and fair treatment issues. Consumer protection should be the same for all financial service clients and not linked to the type of provider. In Ecuador, the banking sector, the EPS sector, and insurance providers are under different frameworks, and remittance or credit-only providers lack one altogether. Although each financial product requires different provisions to protect customers, they should not be differentiated based on institution type. In addition, the regulatory framework presents some gaps in key consumer protection areas.¹⁶¹ The National Assembly enacted a law in early 2022 to protect financial customers and prevent undue charges and non-requested services by introducing reforms to the COMF¹⁶² (see [Box 4.7](#)).¹⁶³ This new law is being implemented through specific regulations by the SB and SEPS and requires financial authorities to implement mechanisms enabling safe and secure transactions through digital channels.

Conflict resolution mechanisms have been strengthened in recent years, but there is room for improvement. Internal and external dispute resolution (EDR) mechanisms can be accessed through digital channels, have standardized rules, and are publicized by financial authorities and providers, but challenges remain. For example, EPS financial institutions were not required to report information from their internal resolution mechanisms until recently. In addition, they are managed in completely different ways by the different financial authorities (SB, SEPS, and Supercias), which requires customers to learn about this process for each one. The EDR mechanism for banks is the “Defensor del

Cliente,” and for institutions under the SEPS it is managed by the financial authority. The 2022 Consumer Protection Law requires financial authorities to protect financial service users and clients, solve conflicts by means of administrative procedures, and supervise actions in this regard. Financial authorities have the obligation to annually report on efforts to strengthen financial consumer protection and conflict resolution mechanisms to the National Assembly, potentially incentivizing them to supervise and assess the impact of these mechanisms more carefully.¹⁶⁴

A tiered approach for know your customer (KYC)/CDD is missing, and simplified requirements are only applicable to basic accounts. New regulations were issued between 2020 and 2022 by the UAFE, SB, and SEPS.¹⁶⁵ These regulatory frameworks include the possibility of having a simplified due diligence process only for certain specific situations. In the case of the SB, a simplified due diligence process is allowed only for retail customers of simplified accounts. For the SEPS, the regulatory framework is more flexible, allowing for simplified due diligence in cases linked to the socioeconomic profile of the customer, or when the specific products do not imply risks related to anti-money laundering or the financing of terrorism. Financial institutions tend to be risk-averse to implementing these types of regulatory allowances, so it would be better if financial authorities in Ecuador clearly define these low-risk socioeconomic sectors or products through a National Risk Assessment or similar analysis and provide guidance to financial providers on the implementation of these rules. Digital and remote onboarding are allowed and have been deployed by providers directly or in partnership with financial auxiliary companies.

BOX 4.6. A Brief Analysis of Selected Provisions of the Fintech Law

- » Fintech companies are required to be incorporated in Ecuador or to be authorized as subsidiaries of foreign companies. This requirement is not clear and could prevent the entrance of fintech companies that are not regulated in other countries.
- » There is a provision regulating digital crowdfunding providers as auxiliary technology service providers in the capital markets, and it is not clear how these entities are different from the ones regulated in the Entrepreneurship and Innovation Law (2020) (see paragraph 33).
- » There is a provision requiring each financial authority to create a separate regulatory sandbox, which might be inefficient and not cost-effective. These provisions do not include the SEPS.
- » The role of the SB, SEPS, and BCE is not clear regarding the oversight or supervision of electronic payments and deposit-taking institutions.

Source: Author's elaboration, based on the Fintech Law of Ecuador published in December 2022.

BOX 4.7. New Protections Laid Out in the Consumer Protection Law 2022

The new law introduced effective customer protections, particularly for the following situations:

- » Forbidden clauses against customers' rights.
- » Data protection breaches.
- » Denial of access to customer and credit information through physical and digital channels. It also grants the customer the right to request the rectification of inaccurate or mistaken information without costs.
- » Judicial or extrajudicial mechanisms to collect debts threatening a customer's dignity and privacy.

- » Unilateral changes in the contract terms and conditions.
- » Lack of coverage by deposit insurance as prescribed by law.
- » Failure to provide information or documentation regarding contract negotiation, execution, or termination.

The new law also requires financial institutions to publicize their standardized contracts for the different products they offer on their websites.

Source: Author's elaboration, based on the [2022 Law to Protect Financial Customers and Prevent Undue Charges](#).

There are no regulations promoting open banking, and using electronic signatures to close retail financial transactions is very costly. Open banking is a new way to promote the entrance of new players and increase the customization of financial services by mandating or enabling the sharing of transactional financial data between providers in the financial system. In Latin America, Mexico, Brazil, and Colombia have taken steps to promote open banking. In Ecuador, one of the main problems voiced by fintech providers is the availability of data only in silos and the impossibility of leveraging financial transactional data from customers to improve or increase the supply of financial services. Another issue constraining the operations of DFS providers is the high costs of using electronic firms, given the need to use certified businesses for specific transactions such as closing a contract remotely.

The supervisory capacity of financial authorities for DFS needs to be strengthened. Financial authorities need to build capacities to face the new DFS risks. Operations in the regulated financial sector in Ecuador are still following a traditional approach, and DFS are mostly reflected in the use of digital channels and the progressive disruption in the payment ecosystem by aggregators. However, many innovative initiatives are happening outside the regulatory space, and financial authorities should build capacities to support their growth and to identify any potential risks involved.

Payment Infrastructure

The main retail payment infrastructures in Ecuador are the SPI, the interbank billing system (*Sistema de Cobros Interbancarios [SCI]*), and the specialized compensation system (*Compensación de Cámaras Especializadas [CCE]*). The payment system infrastructure managed by the BCE (National Payment System, handling both gross and retail payments) and private sector providers (as auxiliary payment systems) also handle retail payments. The BCE sets requirements for the operations, authorizations, and registry and even sets the applicable tariffs for participating in the payment systems. The SPI is managed by the BCE and allows for the participation of most supervised institutions (banks, *mutualistas*, and 379 credit cooperatives).¹⁶⁶ Most transactions at the SPI (volume and value) are made by banks, and the SPI also facilitates government payments.¹⁶⁷ The BCE wants to implement upgrades to the SPI to facilitate real-time payments. The SPI currently follows a deferred liquidation mechanism, taking one day (maximum) to deposit the client fund in the respective account. The SCI allows entities specialized in processing bills to debit the account of the payee at the respective financial institution. The CCE liquidates operations compensated in the auxiliary payment infrastructure, such as card processors or payment aggregators. Most countries are promoting the deployment of fast payment system infrastructure to facilitate digital payments. This can be an opportunity for Ecuador in its own journey to promote digital payments.

Auxiliary payment systems are a broad category of players that include payment system operators and payment service providers and are usually subject to different regulations. Auxiliary payment systems are defined as a set of policies, rules, instruments, processes, and services to transfer money and issue remittances to compensate payments between the participants. These include payment aggregation, compensation, payment gateways, transactional switches, public services collection, and remittances.¹⁶⁸ Despite the absence of a specialized framework, in December 2020, the BCE issued a supervisory framework for these companies, an important step toward enhancing the regulation and supervision of payment systems.¹⁶⁹ However, this framework also covers players that provide direct services to customers, such as billing networks (or payment agents) and remittance providers.

The vertical concentration in the card market has limited the expansion of digital payments in Ecuador. The card market is dominated by banks (or auxiliary payment systems owned by banks). The issuance or acquirers' market is also mainly owned by a few banks. Points of sale are only offered by a few companies (Datafast, Medianet, Banco del Austro, and Bancosol). The new regulation on auxiliary payment infrastructure maintains the issuance and acquirer's business as the prerogative of banks. Costs in the card market are high due to this lack of competition and to the entry barriers faced by other actors.

Interoperability between payment processors needs to be promoted. There is interoperability in the SPI, in which both banks and credit cooperatives participate. However, the regulatory framework does not have specific operational guidelines for payment processors (since they are regulated as auxiliary payment systems), nor does it include regulation to promote non-discriminatory access. Interoperability between these systems almost does not exist (except for bilateral arrangements), affecting, for example, operations at the level of points of sale and ATMs. The market power of a payment processor was recently challenged by another player with bilateral interoperability arrangements through an administrative process submitted to the competition authority. The issue raised was an excessive and unjustified increase in prices, and the competition authority ruled in favor of the entity submitting the case.¹⁷⁰ The BCE is receiving support from the IDB in addressing interoperability issues.

Credit Infrastructure

Since 2018, there have been three private credit bureaus and a credit registry managed by the SB working in the country, as well as some fintech providers working with alternative data. In 2018, a new law allowed the operation of private credit bureaus and revamped the functioning of the credit registry under the SB. These institutions gathered positive and negative information, although their database is incomplete and not updated daily. Due to their low technical capacity, small SFPS providers (segment 1) report information on a weekly basis to the SEPS, which in turn shares it with the credit registry under the SB. The SB provides information to credit bureaus, which offer a diversity of products, including credit scores, and capture data from non-regulated actors such as credit retailers. Efforts to access alternative data sources (e.g., telecommunications companies or basic services) have been unsuccessful, and data hosted by government databases are difficult to access. The lack of regulation to support the LOPDP is also constraining the use of alternative data sources due to legal uncertainty.

Executive Decree 33 (May 2021) mandated the elimination of all records regarding past due debts¹⁷¹ below US\$1,000 from the credit bureaus. This included consolidated past due loans¹⁷² below US\$1,000 from banks and credit cooperatives in segments 1 and 2, and below US\$500 from credit cooperatives and others in segments 3, 4, and 5. According to the SB, over 2 million users (individuals and firms) have benefited from this measure, which was also applicable to all records regarding past due debts in other types of credit institutions below US\$100. This measure additionally applied to all existing records up to May 24, 2021.¹⁷³ According to the SB, 26 percent of these individuals and firms requested new loans, 99 percent of which were requested by individuals.¹⁷⁴

Ecuador lacks a secured transaction framework to facilitate the use of movable collaterals to ease access to finance, including digital financing instruments. There is no legal and regulatory framework to support the use of movable collaterals for loans. Even though the country has certain regulations to allow the use of certain instruments such as leasing or factoring,

these are very old frameworks that do not facilitate the expansion of these services or enable the use of a wide range of movable collaterals as financing tools. There is no collateral registry at the national level enabling the verification of assets and their encumbrances through a single electronic database. The framework for the repayment of lenders leveraging collaterals does not prioritize the repayment of their debts, nor can they use alternative mechanisms to solve these disputes or sell the guarantee to get a repayment of the debt.¹⁷⁵

Leveraging Recurrent Payments to Increase DFS Usage

REMITTANCES

Ecuador receives an important flow of remittances, but most are delivered in cash, presenting the country with an important opportunity to improve financial inclusion among recipients. International remittances received in 2022 represented 4.1 percent of the GDP.¹⁷⁶ The main three sending countries are Spain, the United States, and Italy, and the average fee for sending a remittance ranges from US\$4 in Italy to US\$10 in Spain for US\$200.¹⁷⁷ Global Findex data indicate that 21 percent of the population receive domestic remittances, but only 10 percent do so through a financial institution account, 2 percent through a money transfer service, and 5 percent using cash only. Although this data refer to domestic remittances, it can provide an idea of the predominance of cash for these types of transactions and the low usage of money transfer operators (MTOs). This low usage seems to be related to the high prices for receiving remittances through a bank account, frictions between MTOs and financial institutions that prevent them from arranging bilateral agreements for this purpose, and the bad quality of service by financial institutions (long lines or additional costs for using cards for their withdrawal).¹⁷⁸ Remittance companies (MTOs) are defined as auxiliary payment systems and not as payment service providers, which might be an important constraint in providing more quality services and introducing innovation into the market.¹⁷⁹

G2P PAYMENTS

Since 2020, the government has been working on the digital transformation of social protection G2P payments through the *Pago Seguro* program, but the majority of beneficiaries still receive payments in cash. MIES has been working to accelerate the shift from cash-based to account-based payments for the biggest government transfer programs (*Bono de Desarrollo Humano* and *Bono de Desarrollo Variable*). However, the share of beneficiaries using account-based payments has increased only marginally. As of March 2023, over 35 percent of beneficiaries received their grant through accounts, and 65 percent received cash via over-the-counter payments in more than 300 financial institutions. High levels of financial exclusion (particularly for rural populations and women), low financial literacy among recipients, and a dearth of access points in rural areas remain significant barriers in the Ecuadorian context. Additionally, political instability and high levels of rotation among the relevant MIES staff have slowed down progress, together with some regulatory measures (such as the elimination of fees for interbank payments). Despite the context, MIES is launching a massive communication strategy at the national level, coordinated with the private sector, to promote account-based payments, aiming to have over 1.4 million beneficiaries with G2P payments deposited into accounts by 2025. Having an account does not necessarily lead to the use of DFS or even electronic payment mechanisms, but negotiations with financial providers have introduced the option of receiving the transfer through a debit or prepaid card.¹⁸⁰

The digital transformation of other types of large-volume flows could be explored. There are large volume flows in the economy that could be leveraged to increase financial inclusion. For example, 26 percent of the population receive wages but only 12 percent did so through a financial institution account, and 11 percent in cash only. Working with private sector companies to digitize these flows, or introducing incentives for digital payments, could be an opportunity to increase account access and usage. Data on government payment recipients, including pension recipients, also highlight an opportunity to further expand financial inclusion.¹⁸¹

Table 4.3. Digital Financial Services: Key Challenges and Opportunities

Strengths	Areas for Improvement
<ul style="list-style-type: none"> » The strong public and private sector commitment to financial inclusion. » Ongoing efforts to promote the usage of digital payments. » Recent important growth in account ownership. » Recent growth and development of fintech initiatives. » All types of full-service providers offering digital channels. 	<ul style="list-style-type: none"> » Lack of an enabling framework for payment services providers, including e-money issuers and payment system operators. » Lack of interoperability of payment system infrastructure. » Lack of an enabling framework for credit-only providers, digital credit, and crowdfunding. » Lack of an adequate regulatory framework for agents. » Incomplete and ineffective consumer protection framework. » Limited availability of data generated by the government and other alternative data sources. » Lack of an enabling framework for the use of movable collaterals.
Opportunities	Challenges
<ul style="list-style-type: none"> » Enact a regulatory framework for the Fintech Law to enable the development of non-bank fintech players in the market. » Enact a regulatory framework for crowdfunding, aligning it as much as possible with best international practices. » Build sector-wide financial inclusion data, prioritizing the collection of data on underserved segments. » Collect data on services provided by fintech companies. » Leverage geolocation data on access points to identify unserved and underserved areas. » Promote the digital transformation of large volume flows. » Continue with the implementation of <i>Pago Seguro</i>, aligning it with the best international practices. » Promote the digital transformation of remittance flows. » Create an innovation hub to support the entrance of new fintech providers and a better understanding of industry initiatives. » Revamp the framework for simplified CDD and work with the industry on its implementation. 	<ul style="list-style-type: none"> » Some regulatory barriers in the Fintech Law, such as the prohibition on foreigners owning fintech firms or foreign fintech firms operating in the market. » Achieving a consensus with regulators and among financial authorities on the best approach to building an enabling regulatory framework for fintech companies. » Limited regulatory and supervisory capacity on DFS among financial authorities. » High level of rotation of staff in some public sector agencies, which delays the progress of different initiatives. » Banks' market power. » Lack of information regarding business models.

Notes: Opportunities are identified based on the impact of the suggested measure and the potential time needed to implement it. Longer-term reforms are placed in "Areas for Improvement."

4.3. Recommendations: Enabling Fintech Growth, Investing in Interoperable Payment Infrastructure, and Digitizing Government Payments to Promote DFS Adoption

regulatory framework, data infrastructure, payments and transactional accounts, financing instruments, access points and channels, and the digitization of large-volume payments. It also highlights when a recommendation could be considered a quick win for the country.

Table 4.4. presents the main recommendations in seven priority areas: market-level support, general legal and

Table 4.4. Digital Financial Services: Policy Recommendations (1 of 4)

Reform area	Recommendation	Responsible Entity	Timing	Is Legal Change Required?
Market-level support	Continue efforts to enact the NFIS, and articulate these efforts in the Digital Transformation Agenda. PRIORITY	JPRF	Short term	No
	Create an innovation hub/regulatory sandbox to support the entrance of new fintech providers and a better understanding by regulators of the ecosystem.	JPRF	Short term	No
	Promote the development of a fintech chamber.	JPRF	Short term	No
General legal and regulatory framework	Enact a regulatory framework for the Fintech Law following the best international practices and a consensual approach. PRIORITY	JPRF, JPRM	Short term	No
	Align the framework for simplified KYC/CDD with international standards and clearly identify low-risk segments to facilitate the implementation of these regulations by the industry. PRIORITY	JPRF, Financial Intelligence Unit	Short term	No
	Continue addressing gaps in the consumer protection regulatory framework, ensuring a level playing field. PRIORITY	JPRF and JPRM	Medium term	No
	Standardize rules for the functioning of internal and external dispute resolution mechanisms between the different financial authorities.	JPRF	Medium term	No
	Consolidate the reforms to the data protection framework and create a roadmap to promote open banking.	Superintendency of Data Protection (agency to be established) ¹⁸²	Medium term	Maybe

Table 4.4. Digital Financial Services: Policy Recommendations (2 of 4)

Reform area	Recommendation	Responsible Entity	Timing	Is Legal Change Required?
	Allow the use of digital signatures instead of certified electronic signatures for certain financial transactions.			
Data infrastructure	Build a consolidated database of the entire financial sector to monitor progress in financial inclusion and DFS. PRIORITY	JPRF and JPRM	Medium term	No
	Gather data on the provision of payments and financing instruments by non-bank providers acting as auxiliary financial companies.	JPRF, JPRM	Medium term	No
Payments and transactional accounts	Create an enabling regulatory and supervisory framework for non-bank payments by specialized financial services providers (payment service providers and e-money issuers).	JPRM and JPRF	Medium term	No
	Revamp the regulatory framework for basic accounts and work with the industry on expanding their supply.	JPRF	Short term	No
	Modernize the payment system infrastructure and enable real-time retail payments. PRIORITY	JPRM and BCE	Long term	No
	Align the regulation and oversight of payment system operators with international standards.	JPRM and BCE	Medium term	No
	Promote interoperability between auxiliary payment system managers.	JPRM and BCE	Medium term	No
	Assess the impact of tax authority mandates (income tax and value added tax retention) in the expansion of electronic payment mechanisms.	BCE and SRI	Medium term	No
	Create a specialized regulatory and supervisory framework for remittance providers.	JPRF and JPRM	Medium term	Yes
	Assess potential incentives to increase the disbursement of remittances through financial institutions' accounts.	BCE and JPRM	Medium term	No

Table 4.4. Digital Financial Services: Policy Recommendations (3 of 4)

Reform area	Recommendation	Responsible Entity	Timing	Is Legal Change Required?
Financing instruments	Create an enabling regulatory and supervisory framework for non-bank specialized credit providers (including factoring companies) and digital credit. PRIORITY	JPRF	Medium term	Yes
	Strengthen the legal framework for crowdfunding companies so that their operational and market conduct is regulated and supervised by a financial authority, and enact the corresponding regulatory framework. PRIORITY	JPRF/Supercias	Medium to short term	Yes / No
	Refine the methodology of calculation for interest rate caps further to continue reducing barriers for financial providers to reaching underserved segments.	JPRM	Medium term	No
	Modernize the credit infrastructure and facilitate access to government databases. PRIORITY	JPRF and National Directorate of the Public Data Registry (<i>Dirección Nacional de Registro de Datos Públicos</i> [DINARDAP])	Mediano y largo plazo	No
	Develop a legal and regulatory framework to facilitate the use of movable collaterals and create a national registry to enable its use. PRIORITY	DINARDAP	Long term	Yes?
Access points and channels	Build a sector-wide dataset with information on access points (by type of access point) at least at the level of <i>parroquia</i> . Include access points deployed by auxiliary payment system companies. PRIORITY	JPRF, SB, SEPS	Short term	No
	Modify the regulatory framework for agents, focusing on creating a level playing field for banking agents, solidary agents, and outlets of auxiliary payment system companies.	JPRF	Medium term	No
	Issue standards to promote the interoperability of QR codes.	JPRM, BCE	Short term	No

Table 4.4. Digital Financial Services: Policy Recommendations (3 of 4)

Reform area	Recommendation	Responsible Entity	Timing	Is Legal Change Required?
Digitizing large-volume payments	Develop a monitoring and evaluation system for the implementation of <i>Pago Seguro</i> to ensure the effectiveness of its implementation.	MIES	Short term	No
	Include awareness raising and financial and digital education programs to facilitate beneficiaries' transition from cash to accounts-based payments.	MIES	Short term	No
	Work with financial service providers to incentivize the supply of basic accounts for MIES beneficiaries.	MIES	Medium term	No
	Identify other relevant large-volume flows (such as wage payments) and design a roadmap for their digitization.	BCE	Medium term	No

5. DIGITAL BUSINESSES



Revitalizing Ecuador's Digital Business Environment for Greater Productivity



KEY MESSAGES

- » **In a global comparison, Ecuador has not reached its potential regarding the number of digital businesses relative to the size of the country's economy.** Digital businesses are an important driver of digital transformation for the wider economy, as they provide digital solutions for both consumers and traditional businesses. Cross-country benchmarking shows that Ecuador is slightly underperforming in its number of digital businesses relative to GDP and population. Compared to regional and economic benchmark countries, fewer new digital businesses have emerged in Ecuador in recent years, particularly dropping after 2016. This decrease in digital business dynamism is paired with an underperformance in investment flows (venture capital/private equity).
- » **Ecuadorian digital firms are operating mainly in the fintech, marketing tech, e-commerce, mobility tech, security tech, and software and software-as-a-service (SaaS) subsectors.** When comparing the subsector distribution of digital firms with the LAC region overall, it shows that firms in Ecuador are more likely to operate in fintech but are lagging behind in entertainment tech and business management tech, e-commerce, and digital media. About one in five digital businesses in Ecuador follow platform-based or data-driven business models, a share similar to that observed among regional peers.
- » **The Ecuadorian digital business landscape is multinational, with a third of digital businesses operating in Ecuador headquartered abroad.** Meanwhile, a third of investors in digital businesses headquartered in Ecuador are domestic while the rest are mostly from the United States (25 percent), Spain (10 percent), and other LAC countries (Colombia, Chile, Argentina, and Mexico).
- » **Digital businesses face a range of constraints that most other businesses experience in Ecuador, including political and policy uncertainty and a lack of market contestability.** The Ecuadorian entrepreneurship support ecosystem is growing but nascent, with most enablers concentrated in the capital Quito (e.g., co-working spaces, incubators, and accelerators).
- » **Ecuador's digital market regulations have basic provisions in place but need to be updated to account for the specifics of digital businesses.** Ecuador has a law in place that establishes the legal validity of electronic documents and signatures, paving the way for digital business models and e-commerce. However, in specific digital business areas, such as ride-sharing and accommodation sharing, legal provisions are incomplete and ambiguous. Concerning online consumer protection, the e-commerce law covers key provisions, but shortcomings remain in its effective implementation. Regarding the country's digital service tax, there is a risk of double taxation that may put digital services at a disadvantage and therefore may need to be refined. Lastly, Ecuador has not yet responded to the specific challenges that digital businesses pose to competition law.

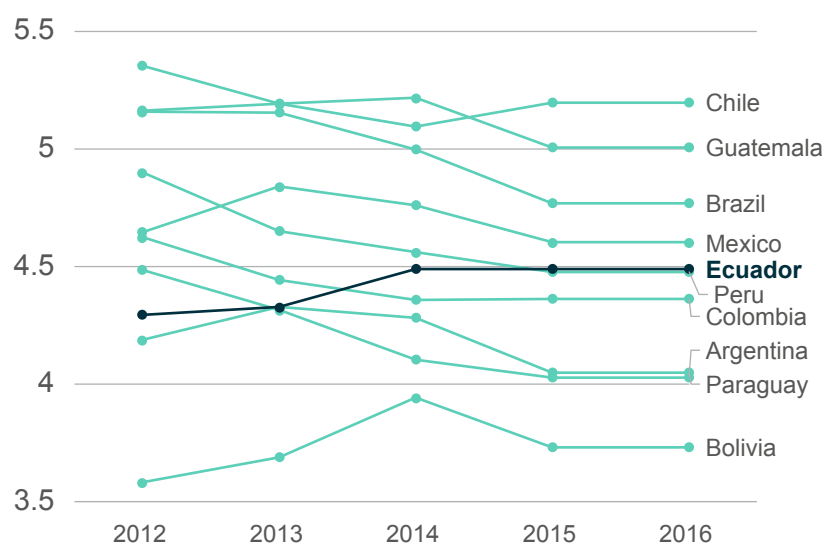
5.1. The Importance of Digital Businesses: Better Jobs and Higher Productivity Through Digital Businesses

Digital businesses are a crucial way for Ecuador to unlock opportunities for sustainable and inclusive economic growth, including job creation. Digital businesses can be divided into two categories: digital start-ups and established digital firms. Digital start-ups refer to early-stage ventures that create new digital solutions or business models as part of their core products or services. Established digital businesses are mainly mid-sized and large platform-based and data-driven firms that have passed the initial start-up stage, having rapidly acquired suppliers, contractors, and consumers.¹⁸³ While digital businesses include both digital start-ups and established digital businesses, the definition excludes *digitalized* traditional firms, which use digital technologies for their non-digital offerings. Digital businesses are a key driver of the digital transformation of Ecuador's wider economy, for example, by providing fit-for-purpose digital solutions for companies, and are particularly important for Ecuador's mostly young and small private sector firms struggling to grow to become engines of sustainable and inclusive growth.¹⁸⁴

The adoption and use of digital technologies by firms in Ecuador overall are in line with the country's income per capita, with a relatively small gap between small and larger firms in the level of adoption.¹⁸⁵ Although recent data on the adoption of digital technologies are scarce, the 2016 Digital Adoption Index of the World Bank suggests that businesses in Ecuador use digital technologies in line with peer countries, whereas digital adoption overall is lagging (e.g., adoption by people).¹⁸⁶ Similarly, the latest data (2016) from the World Economic Forum show that Ecuador scores a 4.5 on the firm-level technology absorption index, slightly above the regional average of 4.3 (Figure 5.1). The index is based on survey data on the extent to which businesses adopt new technologies, measured on a scale from 1 (not at all) to 7 (extensively).¹⁸⁷

The promotion of innovative MSMEs and entrepreneurship is a key component in addressing the issues of low productivity and competitiveness. In 2018, multi-country LAC data demonstrated that lower-skilled workers benefit from the adoption of productivity-enhancing digital technologies, for example, in such areas as supplier and customer relations, recruiting and training of employees, production planning and processes, product pricing, and related business tasks, as well as in better decision making by employees.¹⁸⁸ Thus, digital businesses could offer Ecuador a path to more and better employment opportunities.

Figure 5.1. Firm-Level Technology Absorption Index, Ecuador and Selected Peers



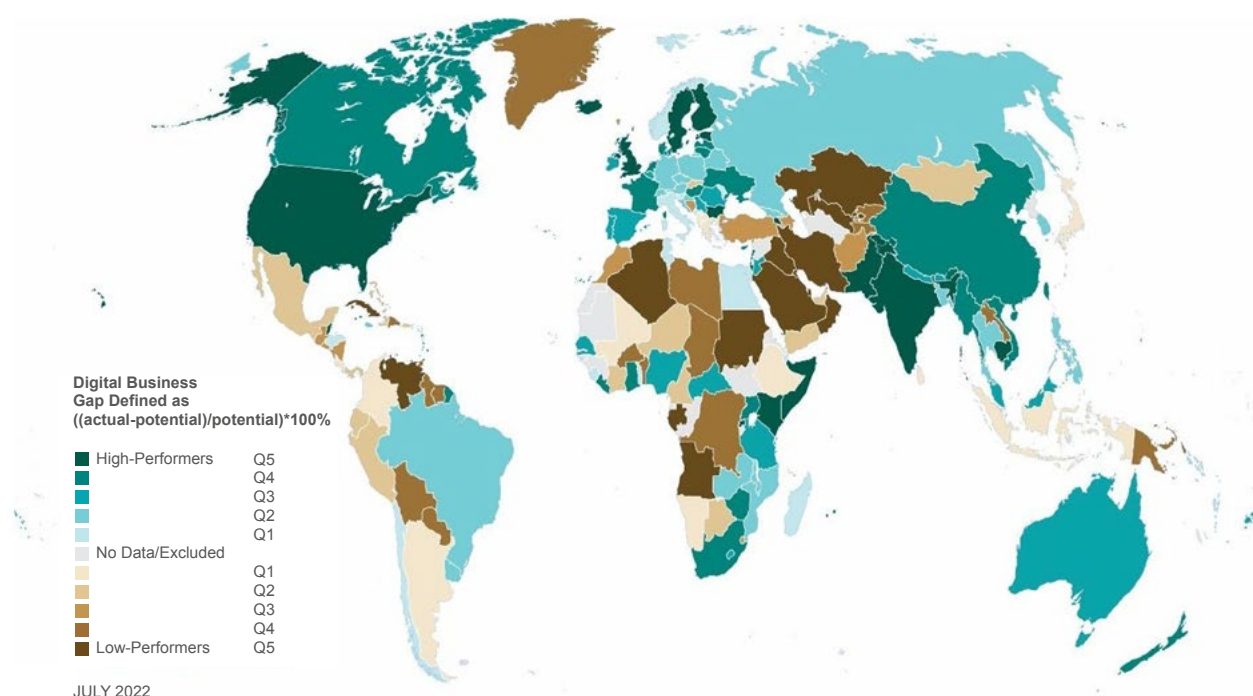
Source: Baller, Dutta, and Lanvin (2016).

5.2. Current State of Digital Businesses: Insufficient Funding Opportunities and Nascent Digital Business Ecosystem

Analysis of a novel World Bank digital business database reveals that Ecuador has not reached its potential in digital business density compared to global trends (see [Annex 2](#) for more information on the database). It is difficult to identify the exact number of digital firms operating in Ecuador. The quantitative analysis of digital businesses in this chapter builds on information on 92 digital businesses currently operating in Ecuador that are included in the digital business database of the World Bank's Finance, Competitiveness and Innovation (FCI) Global Practice. Out of these 92 companies, 58 are headquartered in the country.¹⁸⁹ It is a firm-level database of 200,000 digital businesses in 190 countries that was created using three different proprietary data sources (CB Insights, Pitchbook, and Briter Bridges).¹⁹⁰ Although the number of digital businesses in the database is a conservative estimate of the universe of digital firms, it provides unique insights for cross-country comparisons of digital business density.

In global comparison, Ecuador has a small number of digital businesses relative to the size of its economy (GDP and population). As the number of digital businesses is highly correlated with GDP and population, a country's digital business performance can be identified by comparing it to what global trends would predict based on its population and market size (i.e., "digital business gap"). As the world map in Figure 5.2 shows, Ecuador is slightly underperforming in its number of digital businesses relative to GDP and population. It scores below regional peers like Belize, Brazil, Chile, Honduras, Jamaica, and Uruguay while performing better than others like Bolivia, Cuba, Dominican Republic, Paraguay, and Venezuela.¹⁹¹ Countries in LAC with scores similar to Ecuador's are Puerto Rico, Mexico, the Bahamas, Panama, Haiti, and Peru.¹⁹² Although in the LAC region Ecuador is in the mid-range of countries, it has a substantial gap with globally leading countries with a high density of digital businesses, such as Estonia, Kenya, India, Israel, and the United Kingdom.¹⁹³ Compared to countries with similar levels of GDP per capita, Ecuador has a lower number of digital businesses than Armenia, Georgia, Jordan, Republic of Serbia, South Africa, and Thailand.

Figure 5.2. Digital Business Density Across Countries



Source: Zhu et al. (2022).

Notes: The world map plots all countries that have at least one digital business. Gray means that the database does not register any digital businesses in the country, which could be due either to weak digital business development or weak data collection capacity. The digital business gap is derived by regressing the number of digital businesses against GDP and population (all included in the log) and estimating the potential number of digital businesses (i.e., fitted values of the regression). The gap expresses how much higher or lower the actual number of digital businesses is relative to the country's potential, expressed as a percentage of the potential (i.e., $\text{gap} = (\text{actual} - \text{potential}) / \text{potential}$). Robustness checks with internet access, GDP/per capita, and inclusion of square terms for GDP and population lead to similar results in country ranking, mainly because many of these indicators are highly correlated. The project team also substituted the number of digital businesses with (1) total investment in digital businesses, and (2) the number of digital businesses reaching the IPO/M&A stage to proxy the firm size and quality (not just quantity). There are substantial overlaps in the top 20 countries across these three indicators.

Although Ecuadorian digital businesses are, on average, older than those in other benchmarking countries (Figure 5.3), other matrices of the performance of the digital business ecosystem, such as total funding raised and number of investors, are smaller. As Table 5.1 shows, digital businesses operating in Ecuador were, on average (median), founded in the year

2012—earlier than in peer countries but later than the median founding year in high-income countries (2010). The mean total amount of financing raised by digital firms in Ecuador is nearly US\$10 million. Ecuadorian digital businesses that raise investment on average have fewer than two investors, although some cases have up to seven investors.

Table 5.1. Digital Business Landscape in Ecuador and Benchmarking Groups

	Ecuador	Regional Peer Countries	Aspirational Peer Countries	LAC (excl. Ecuador)	Upper-Middle-Income Average	High-Income Country Average
Average founding year	2008 (n=29)	2011 (n=2044)	2013 (n=187)	2010 (n=1572)	2010 (n=10571)	2007 (n=55851)
Median founding year	2012 (n=20)	2013 (n= 2,602)	2016 (n=188)	2014 (n=1,344)	2014 (n=7,722)	2010 (n=54,060)
Average total investment per firm (million USD)	10.3 (n=11)	47.4 (n=1817)	3.35 (n=234)	51.4 (n=1494)	48.1 (n=10134)	22.2 (n=67029)
Average number of active investors per firm	1.4 (n=23)	2.0 (n=3100)	1.7 (n=435)	2 (n=2758)	2.4 (n=17854)	2.7 (n=106088)
Most prevalent latest funding round	Pre-seed/seed (n=28)	Pre-seed/seed (n=3104)	Pre-seed/seed (n=375)	Pre-seed/seed (n=2601)	Pre-seed/seed (n=17984)	Pre-seed/seed (n=85889)

Source: World Bank, FCI Digital Business Database (for details see Zhu *et al.* 2022).

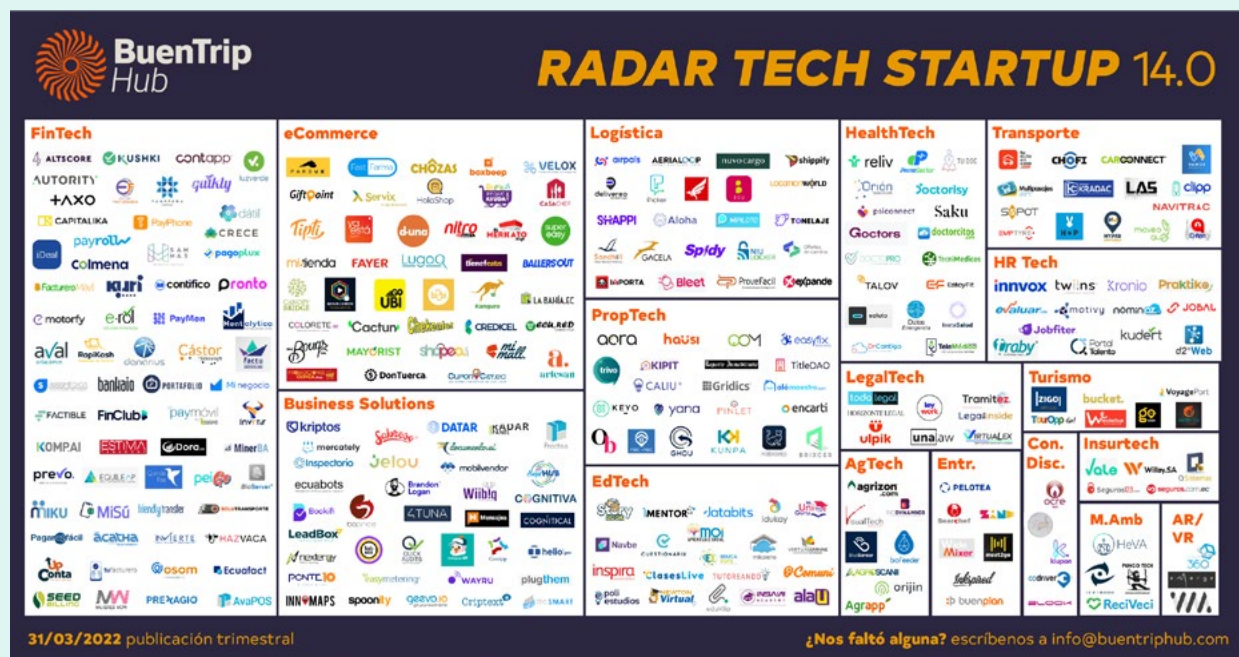
Note: Regional peer countries are Argentina, Brazil, Chile, Colombia, Mexico, and Peru. Aspirational peers are Estonia and Romania. LAC (excluding Ecuador) includes LAC countries that are not high income. Upper-middle- and high-income averages include countries across all regions.

BOX 5.1. Example of Private Initiatives to Map the Ecuadorian Tech Start-up Landscape: BuenTrip Hub's Radar Tech Start-up

In 2017, Buentrip Hub, an accelerator focused on tech start-ups, started mapping tech start-ups in Ecuador. The radar initially included start-ups that had gone through the hub's acceleration program but has since expanded using an application model and an initiative to verify listed start-ups. The radar can be used as a tool for potential investors, intermediate organizations, and policy makers.

As of 2022, the radar was on its 15th edition and is updated each quarter. The radar maps a total of

298 start-ups, 43 of which have women as founders. Fintech is the most represented sector, with 21 percent, followed by e-commerce (14 percent), business solutions (12 percent), and logistics (8 percent). The majority are based in Quito (54 percent), followed by Guayaquil (17 percent) and Cuenca, with other regions having a significantly smaller presence. As many as 201 start-ups say they are post-revenue, 75 pre-revenue, and 14 pre-product. Finally, 134 start-ups report having closed.



Source: BuenTrip Hub's Radar Tech Startup 15.0, <https://www.buentriphub.com/blog/2022/3/31/radar-tech-startup-14>.

The higher average age of Ecuadorian businesses may be due to the lower number of new digital business entrants in Ecuador in recent years. Almost half of Ecuadorian digital businesses were founded before 2011 (Figure 5.3). Fewer new digital businesses have emerged more recently, particularly dropping after 2016, while other regional and economic comparators generally saw a peak in new digital businesses between 2014 and 2017 (Figure 5.3). The lack of new entrants in recent years and the lower digital business intensity in Ecuador suggest that the older age of digital firms there may be

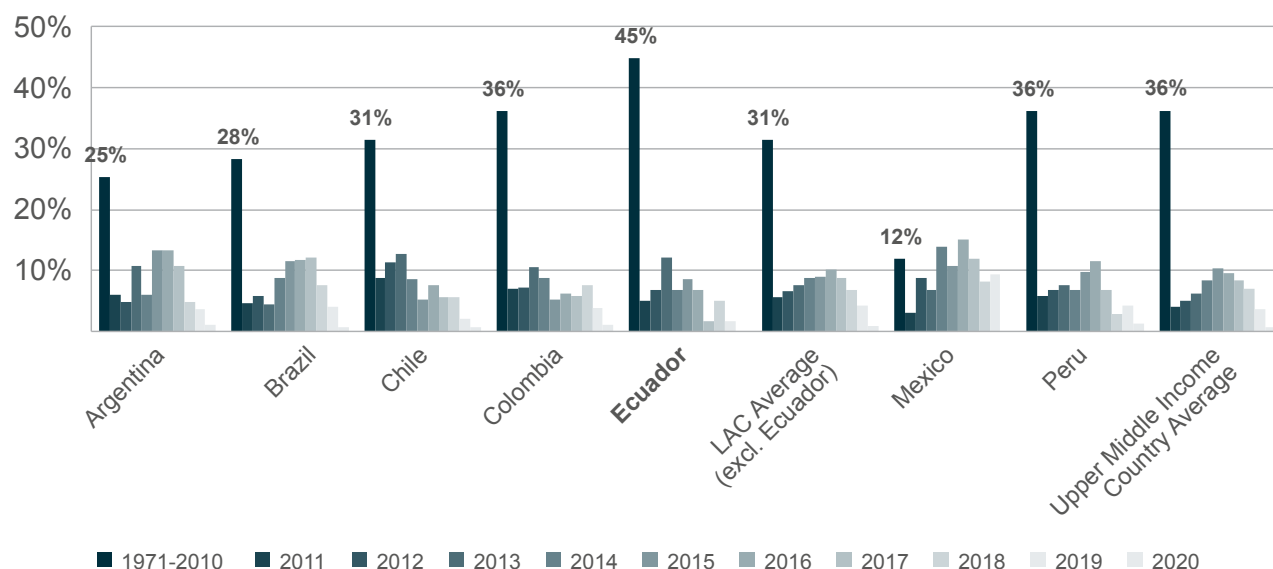
a sign of Ecuador's slowdown in digital business development of late rather than its digital business maturity.¹⁹⁴

Ecuadorian digital firms are mostly operating in the fintech, marketing tech, e-commerce, mobility tech, security tech, and software and software-as-a-service (SaaS) subsectors. Figure 5.4 presents the distribution of digital firms by subsector based on a 44-digit subsector typology used in the FCI Digital Business Database. The largest number of digital firms operating in Ecuador is concentrated in fintech, including firms that

provide financial software, consumer finance, and specialized finance and other financial services (see an example in [Box 5.2](#)). Digital subsectors related to online commerce, such as e-commerce and logistics tech, are

also among the top subsectors. Business-to-business service firms, including marketing solutions, software development, security tech, and human resource tech, are also common.

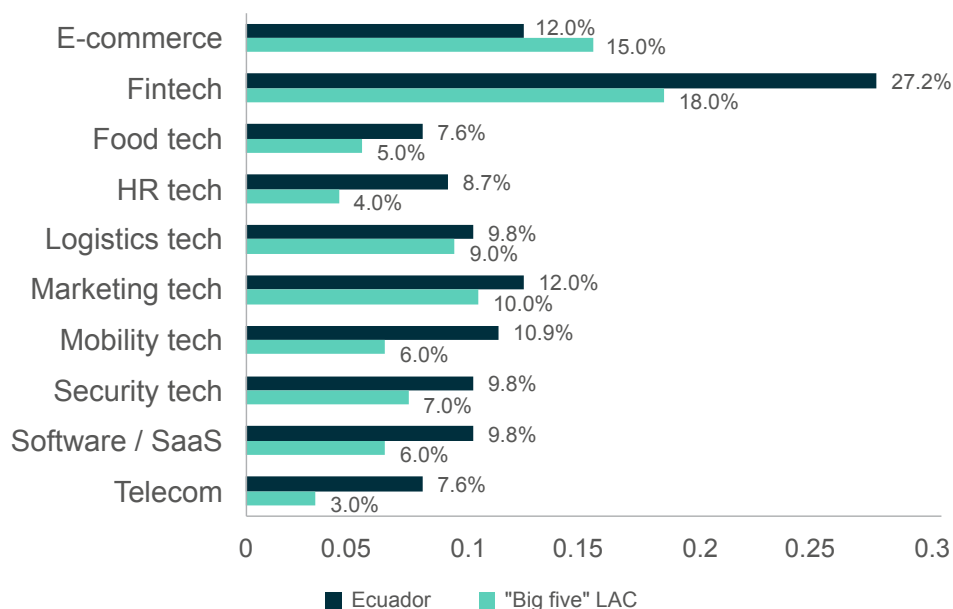
Figure 5.3. Digital Businesses by Founding Years



Source: World Bank staff, from FCI Digital Business Database.

Note: The FCI Digital Business Database has firm-level information from 1970 to 2020 across all benchmarking countries and groups.

Figure 5.4. Top 10 Digital Business Subsectors by % of Digital Businesses: Ecuador vs LAC region (“Big Five”)



Source: FCI Digital Business Database (see Zhu *et al.* 2022).

Notes: Subsectors are among the top 10 in Ecuador but not in other LAC countries. The “big five” in LAC are Argentina, Brazil, Chile, Colombia, and Mexico.

Compared to the LAC region overall, firms in Ecuador are more likely to be operating in fintech and less likely in entertainment tech and business management tech. As Table 5.2 shows, 27 percent of digital firms in Ecuador operate in fintech, while in the LAC region the share is only 19 percent—pointing to a relative overperformance in this subsector. Other subsectors that are more likely to be found in Ecuador than in the region overall are mobility tech, human resource tech, telecom, and software and SaaS. However, there are fewer firms in such subsectors as entertainment tech, business management tech, e-commerce, digital media, and utilities tech.

The Ecuadorian digital business landscape is multinational. A third of the digital businesses operating in Ecuador are headquartered outside the country. Based on the number of firms, the United States, Spain, and other LAC countries (Colombia, Chile, Argentina, and Mexico) are top origin countries of digital business foreign direct investment (Figure 5.5), indicating that regional proximity and language compatibility may be factors for overseas digital businesses in entering the Ecuadorian market.¹⁹⁵ As Figure 5.6 shows, social networks and web services are digital subsectors only offered by foreign digital businesses in Ecuador. However, digital subsectors offered by local digital firms are insurance tech, digital media, entertainment tech, civic tech, and reality tech.¹⁹⁶ A large number of digital subsectors, such as fintech and e-commerce solutions, are offered by both local and foreign firms.¹⁹⁷

Table 5.2. Digital Business Subsectors in Ecuador with the Largest Differences from the LAC Region

Digital Business Subsector	Ecuador (n=92)	Big Five in LAC (n=5,015)	Difference (percentage points)	
Fintech	27%	18%	9 pp	Overperformance by Ecuador relative to the LAC region
Mobility tech	11%	6%	5 pp	
Telecom	8%	3%	5 pp	
Human resource tech	9%	4%	4 pp	
Software and SaaS	10%	6%	3 pp	
Utilities tech	0%	2%	-2 pp	Underperformance by Ecuador relative to the LAC region
Digital media	3%	5%	-2 pp	
E-commerce	12%	15%	-3 pp	
Business management tech	8%	11%	-4 pp	
Entertainment tech	2%	6%	-4 pp	

Source: "Digital Business Indicators," <https://www.worldbank.org/en/research/brief/digital-business-indicators>.

Note: The "Big five" in LAC are Argentina, Brazil, Chile, Colombia and Mexico. This table shows the 10 digital subsectors that digital businesses operating in Ecuador and the five LAC countries engage in, indicating the largest absolute differences between them. Values may not sum up due to rounding.

BOX 5.2. Payphone and Tipti



PAYPHONE

The fintech start-up Payphone started operations in 2015 in Cuenca, Ecuador, and has since expanded to El Salvador, Nicaragua, and Panama. Payphone is a digital platform that makes it possible to send and receive payments through a smartphone application. It offers two types of service: business and personal, depending on user needs. After seven years, Payphone has established itself as a success story, with an increasing regional footprint. The company has 350,000 active users and has transformed digital payments in Ecuador, emphasizing the security and functionality of electronic payments.

Payphone can facilitate the daily operations of small businesses and professionals, allowing them to monitor account status, receive credit card payments, and utilize different payment methods: links, QR, or online buttons at no cost. However, if the user decides to make a transfer or to use it on a prepaid credit card, the cost is a small percentage of the total amount. Other characteristics include free installation, no monthly or annual usage fees, free transactions, replacement of the point-of-sale service with a QR code, and compliance with established security certification.

Source: Interview with PayPhone representatives and proprietary PayPhone materials.



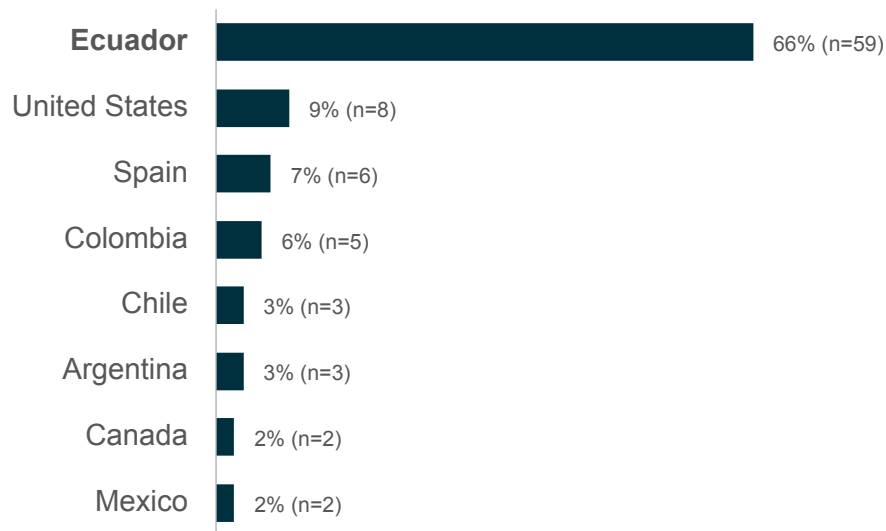
TIPTI

Tipti is an Ecuadorian e-commerce business launched in 2017 that provides a digital platform for users to purchase from supermarkets and specialized stores through its app or website. Although not offering products themselves, Tipti connects users with supermarkets and offers home delivery services. For this purpose, Tipti has a staff of workers (“shoppers”) who handle, prepare, and deliver orders to the corresponding address.

As of 2022, Tipti offered its services in more than 12 cities in the country and had 250,000 customers. Its platform supports 2.1 million devices simultaneously and is able to successfully manage around 1 million orders. In 2021, the company expanded its business to Panama. In addition to Tipti, there are several other home delivery companies in Ecuador, including Super Easy, Tipti’s main competitor. Super Easy offers a similar platform with immediate delivery, in contrast to Tipti, which offers scheduled delivery.

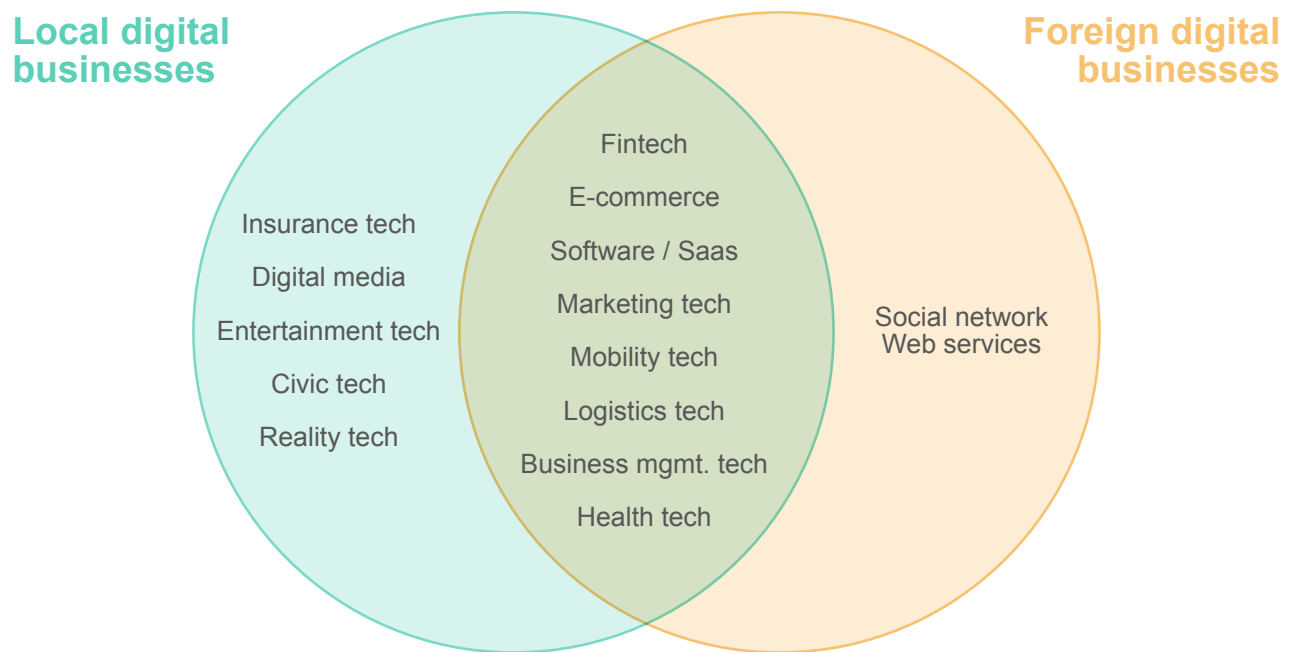
Source: Interview with Tipti representatives and proprietary Tipti materials. Available at: <http://tipti.com.ec/>.

Figure 5.5. Location of Headquarters of Digital Businesses Operating in Ecuador



Source: FCI Digital Business Database (see Zhu *et al.* 2022).

Figure 5.6. Subsectors of Local and Foreign Digital Firms Operating in Ecuador*



Source: FCI Digital Business Database (see Zhu *et al.* 2022).

Note: * Local digital firms are those that are headquartered in Ecuador, and foreign digital firms are those operating in Ecuador but headquartered abroad. The common subsectors in the middle refer only to the subsectors that appear in the top 10 of both groups.

Among Ecuadorian digital firms, the formal funding rate is low and concentrated at early-stage investments. Roughly 40 percent of digital businesses in Ecuador have reported some formal funding, such as from governments, banks, or venture capital/private equity funds, as opposed to informal sources like personal networks or savings.¹⁹⁸ As Figure 5.7 shows, this share of formal funding is lower than in any of the benchmarking groups. Among those Ecuadorian digital firms that did receive formal funding, 43 percent received pre-seed/seed funding in their latest funding round, including angel investments and incubator/accelerator funds, and 35 percent reached early-stage venture capital funding (Series A-C) (Figure 5.8). Examples of digital businesses that have raised pre-seed/seed funding are the online tourism platform GoRaymi and business-to-business management software developer Mensajea. The private equity funding rate is low, and debt financing is not yet seen among digital businesses (Figure 5.8). Considering that Ecuadorian digital firms are, on average, older than those in benchmarking groups and that investments are still concentrated in the early stage, it seems clear that Ecuador has room to improve in developing a pipeline of investment-ready digital businesses that can scale and

grow and in promoting capital market development beyond early-stage financing. Overall, the low formal funding rate reflects the nascent stage of the development of Ecuador's capital markets, as the business environment is lacking many preconditions.

Digital businesses in Ecuador receive investments from a variety of countries. Investments are primarily from Ecuador, but two-thirds are from abroad, demonstrating that outstanding Ecuadorian firms can attract international financing. Figure 5.9 shows that a third of those investing in digital businesses headquartered in Ecuador are from Ecuador, followed by the United States (25 percent) and Spain (10 percent), both of which were also top origin countries of digital business foreign direct investments (see Figure 5.5). Most non-Ecuadorian investors in the list are from series A and B venture capital deals in Kushki, showcasing that outstanding Ecuadorian firms can harness the interest of international investors. A couple stand out as re-occurring investors of early venture capital deals for Ecuadorian digital firms. These include BuenTrip Ventures and Kruger Labs, which, respectively, participated in four and two early venture capital funding rounds between 2015 and 2020.

Figure 5.7. Share of Digital Businesses with Formal Investment*

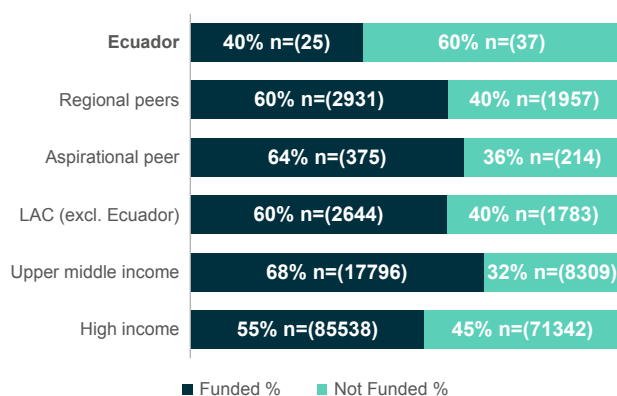
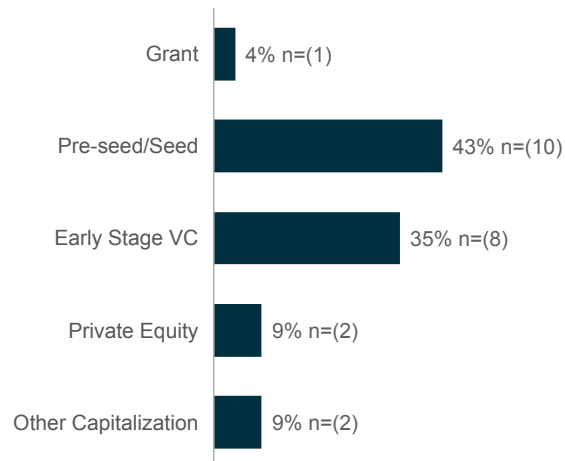


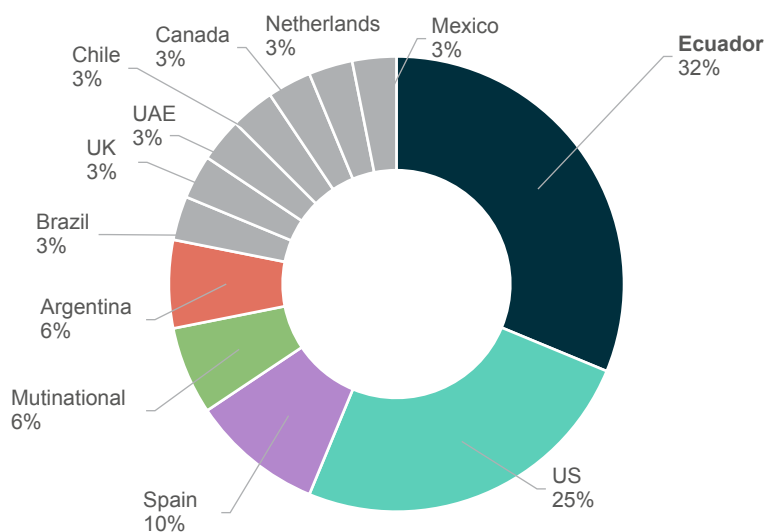
Figure 5.8. Latest Investment Type of Ecuadorian Digital Businesses**



Source: FCI Digital Business Database (see Zhu et al. 2022).

Notes: Because the database does not distinguish the funding information of multinational firms by their operating location, the analysis only uses firms headquartered and operating in the country to avoid overcounting the funding raised by multilateral companies. * Formal investment information comes from the latest investment reported by the firms or through web scrapping, indicating that informal investments (e.g., friends and families) are likely under-reported. Other capitalization includes the following funding categories: bonds, capitalization, corporate, corporate asset purchase, corporate licensing, joint venture, secondary transaction – open market, secondary transaction – private, spin-off, share repurchase, equity, and bridge round (in between rounds). **Latest investment type: The database records the latest funding for each firm, so this captures at best the most recent funding per firm rather than multiple deals per firm over the years.

Figure 5.9. Nationality of Investors in Digital Businesses Headquartered in Ecuador



Source: FCI Digital Business Database (see Zhu et al. 2022).

Note: Because the database does not distinguish the funding information of multinational firms by their operating location, the analysis only uses firms headquartered and operating in the country to avoid overcounting investors in multilateral companies.

Exit options have so far been limited for Ecuadorian digital businesses, indicating the limited maturity of the country's digital business pipeline. Exit stages (mergers and acquisitions [M&A], buyouts, initial public offerings [IPOs]) signal the maturity and proof of concept of digital firms and their services. Only 10 percent of Ecuadorian digital firms reach exit stage, which is lower than across benchmarking groups (Figure 5.10).¹⁹⁹ All exits were through M&A or majority buyouts, while no IPOs have yet been recorded in the database (Figure 5.11). In addition, many acquirers of Ecuadorian digital businesses are headquartered outside the country. Although this allows acquired firms to benefit from foreign capital and expertise, it may also lead to a loss of human capital and to threats of “killer acquisitions” by larger and better-funded digital businesses in other countries.²⁰⁰ Examples of Ecuadorian digital businesses that have reached exit stage are *Acredita BIC*, a telecom company providing data centers that was acquired by Equifax

(United States); *Urbano Express*, a logistics solutions provider acquired by Abraaj group (United Arab Emirates); and *DeliYami*, a food delivery platform acquired first by FoodPanda (Germany) and then HelloFood (United States).

About one in five digital businesses in Ecuador follow platform-based or data-driven business models, a share similar to that observed in regional peers. This is higher than global frontiers and peers in Europe and Central Asia, where markets are more mature and tend to have more diverse types of digital business models (Figure 5.12). Over half of platform or data businesses operating in Ecuador are foreign firms, while in Argentina, Chile, and Peru, there is a higher proportion of domestic ownership (Figure 5.13). Given that foreign platform or data-driven firms can leverage their network effects and economies of scope to increase market share, they likely compete with local firms in Ecuador.

Figure 5.10. Share of Digital Businesses Reaching Exit Stage

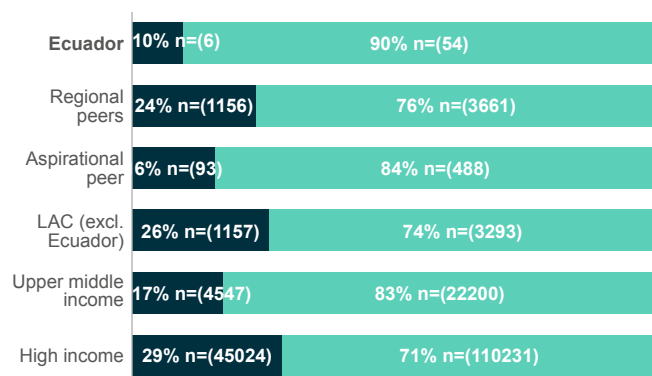
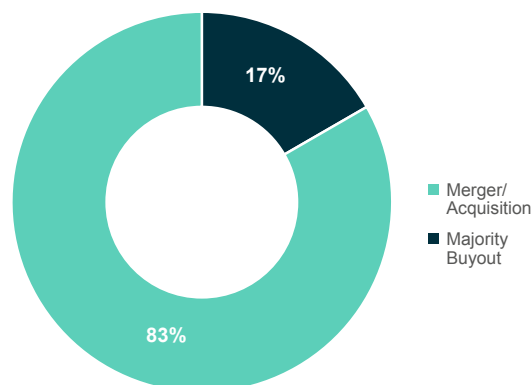


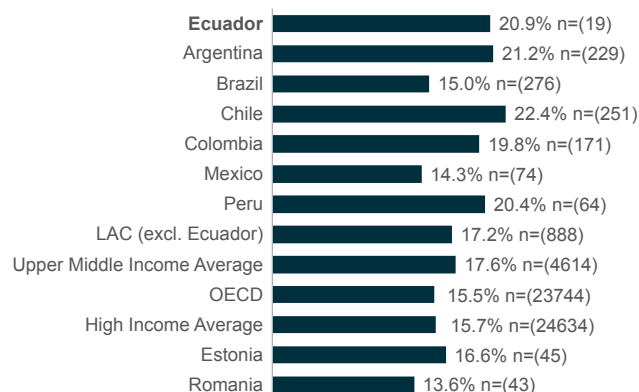
Figure 5.11. Exit Types of Ecuadorian Digital Businesses Reaching Exit Stage



Source: FCI Digital Business Database (see Zhu *et al.* 2022).

Note: Because the database does not distinguish the exit information of multinational firms by their operating location, the analysis only uses firms headquartered and operating in the country to avoid overcounting exit rounds by multilateral companies. The time period covered by the Digital Business Database is 1970–2020.

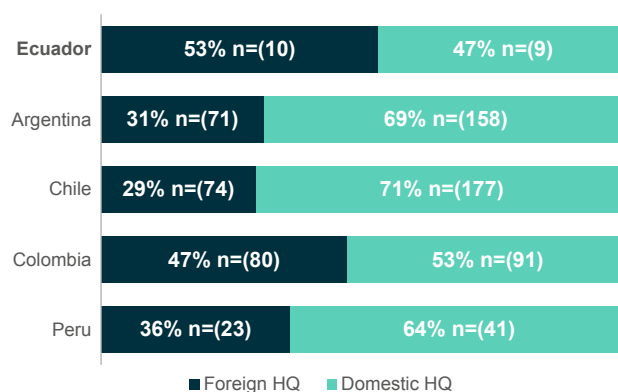
Figure 5.12. Platform-based or Data-Driven Businesses (%)



Source: Authors' elaboration using the FCI Digital Business Database (see Zhu *et al.* 2022).

Note: Platform-based is defined as firms that facilitate interactions across a large number of participants. A platform business does not own the means of production, but rather creates and facilitates the means of connection. The role of the platform business is to provide a governance structure and a set of standards and protocols that facilitate interactions at scale so that network effects can be unleashed. Data-driven firms systematically and methodically collect or aggregate large datasets and use advanced analytics (such as artificial intelligence, big data, and blockchain) to create value, leveraging data as a key element of their business model. Data-driven businesses can also help traditional industries upgrade through "servicification" to optimize production processes, increase sales, streamline decision making, and even re-think revenue models.

Figure 5.13. Domestic vs Foreign Ownership of Platform-Based or Data-Driven Businesses (%)



Source: Authors' elaboration using the FCI Digital Business Database (see Zhu *et al.* 2022).

Note: The analysis only uses countries with 10 or more platform-based or data-driven digital businesses operating in the country.

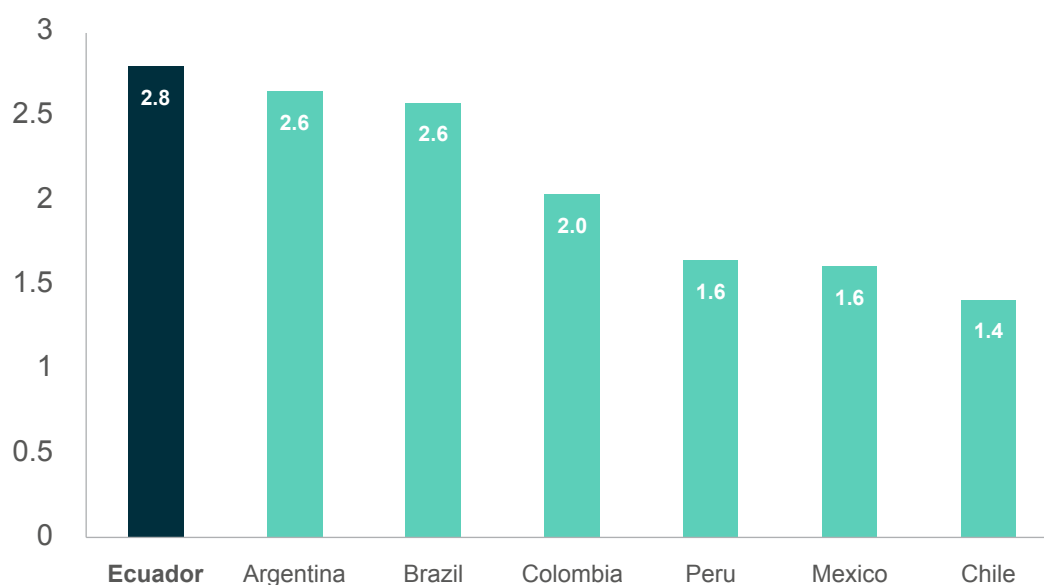
Policy, Regulatory, and Institutional Environment

Digital businesses face a range of constraints that most other businesses experience in Ecuador, including political and policy uncertainty and the lack of market contestability. The 2017 Enterprise Survey of the World Bank sheds light on the biggest obstacles experienced by private sector firms in Ecuador.²⁰¹ About a quarter of surveyed firms state political instability as their top concern—substantially higher than the LAC average of 10 percent.²⁰² The other top challenges include competition from the informal sector (16 percent) and access to finance (11 percent). Similarly, product market regulation (PMR) data collected by the OECD and the World Bank suggest that potential entrants into Ecuadorian markets face considerable regulatory restrictions that reduce contestability.²⁰³ Of the peer countries with PMR data, incumbent firms and potential entrants into Ecuadorian product markets face the most regulatory restrictions (Figure 5.14). Although general market conditions

are not specific to digital businesses, they are crucial to the general business environment in which digital businesses operate.

There are shortcomings in the policy environment for entrepreneurship, but the state of the skills supply and entrepreneurial education appears more positive. Although not specific to *digital* entrepreneurship, the 2019 Global Entrepreneurship Index (GEI),²⁰⁴ a global perception-based ranking of entrepreneurship ecosystems, ranks Ecuador 105th out of 137 economies, behind such peers as Colombia, Peru, Mexico, Argentina, Bolivia, and Guatemala (Figure 5.15). Of the 14 GEI sub-scores, high growth, risk acceptance, and internationalization are the lowest scoring categories, whereas start-up skills are rated highest for Ecuador. Similarly, the Global Entrepreneurship Monitor sees gaps in government policies (taxes and bureaucracy) relative to global averages and country income-group peers, whereas Ecuador is overperforming in entrepreneurial education post school stager.²⁰⁵

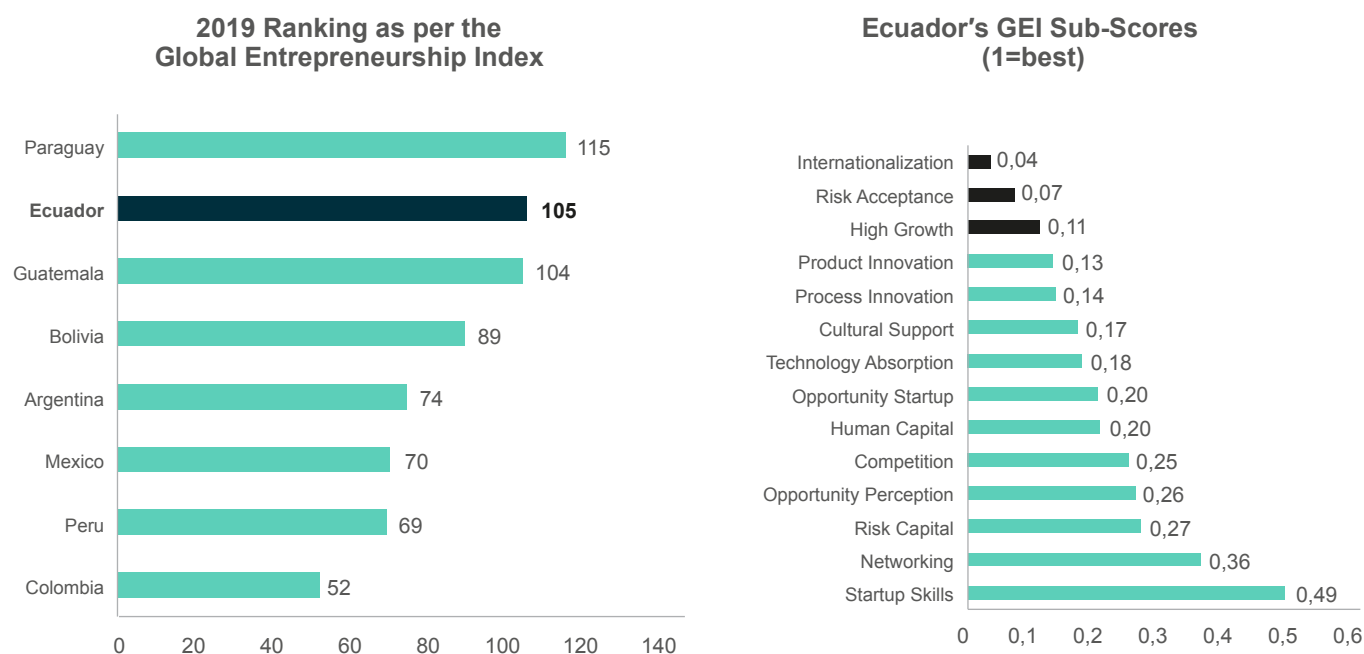
Figure 5.14. OECD Economy-Wide Product Market Regulation Indicator 2018



Source: OECD, "Product Market Regulation 2018, <https://stats.oecd.org/Index.aspx?DataSetCode=PMR2018>.

Note: The index scale ranges from 0 to 6, from most to least competition-friendly regulation.

Figure 5.15. Ranking as per the Global Entrepreneurship Index, Ecuador and Selected Peers, 2019



Source: GEDI (2019).

Public Support Programs and Private Sector Enablers

The Ecuadorian entrepreneurship support ecosystem is growing but nascent, with most enablers concentrated in Quito. The country's capital sees a variety of co-working spaces, incubators, and accelerators, even though overall, the support infrastructure is still at an early stage. A range of public-private initiatives aim to support entrepreneurs, from traditional entrepreneurs to tech or digital start-ups. For example, the ConQuito Economic Promotion Corporation is a private, non-profit organization that promotes the productive development of Quito through programs, projects, and services that promote the generation of ventures, business development, and linkages to markets. The Alliance for Entrepreneurship and Innovation of Ecuador is another initiative of public, private, and academic actors that seeks to promote entrepreneurship and innovation. The network consists of 98 private, 12 public, and 10 academic stakeholders that coordinate activities and make resources available for entrepreneurs. In addition, there are a few private incubators and accelerators, such as Buentrip Hub or IMPAQTO, which play an important role in the growing ecosystem by offering co-working spaces,

connecting entrepreneurs to financing, and providing entrepreneurship advice. Overall, however, the number of entrepreneurship support organizations is limited.

Ecuador's recently passed Digital Transformation Agenda 2022–2025²⁰⁶ through MINTEL aims to promote entrepreneurship and foster a culture of innovation using digital technologies. The policy focuses on seven areas and emphasizes supporting mechanisms for companies and enterprises in the IT and technology-based industries. Specific to entrepreneurship, the Agenda formulates the goal of promoting technology-based ventures and MSMEs through incubators, accelerators, and business networks. Given that the Agenda has only recently been passed, it is too early to gauge its implementation and the specific programs that will support digital businesses.

A conducive environment for digital businesses goes beyond entrepreneurship support schemes and includes also digital market regulations that allow digital firms to enter markets, scale, and engage in fair competition. Although digital start-ups may require entrepreneurship support organizations like incubators and accelerators and adequate venture capital/private equity financing, the entire digital business ecosystem depends on a broader set of digital market regulations that determine trustworthiness and digital

market size (e.g., through regional/international regulatory harmonization). This is particularly important given the need for digital business models to scale, for example, through network effects. The sections below discuss six policy and regulatory areas that are critical for digital businesses in Ecuador: electronic transactions, licensing and registration requirements, open data and data sharing, online consumer and supplier protection, taxation of digital businesses, and digital competition policy.

Electronic Transactions

Ecuador's Law on Electronic Commerce, Signatures and Data Messages (*Ley de Comercio Electrónico, Firmas y Mensajes de Datos*) establishes the legality of electronic signatures and certification services in line with international good practices. The country's Electronic Transaction Law was first published in 2002 and clearly states that documents and signatures cannot be dismissed solely on the grounds that they are electronic. It follows the UN Commission on International Trade Law's Model Law on Electronic Commerce, thus aligning with international practices. The law states that an electronic signature contains a person's data in electronic form in a data message that is a certificate verifying the link between the signature and a specific person through a process that confirms his or her identity.²⁰⁷ As Ecuador follows a two-tiered approach to electronic transactions, in certain cases, a qualified electronic signature may be required, including for documents that serve as evidence in court proceedings or commercial agreements between corporate entities. Any person or company can obtain and use electronic signatures in the country. The law was amended in 2020 and 2021 to update some concepts, including adapting to the context of the pandemic.²⁰⁸

Electronic signature certificates may be issued by any legal entity authorized by the National Telecommunications Council,²⁰⁹ currently ARCOTEL, a state institution that acts as root certification authority. Under Ecuadorian law, both public and private entities can act as a certification authority and may provide and manage the certification service through a third party contractually bound to them upon registration with ARCOTEL.²¹⁰ At present, there are 10 entities authorized to provide electronic certificates, seven of which are private establishments.²¹¹

Although the e-transaction law simplified a range of commercial, legal, and administrative processes in Ecuador through the adoption of digital technologies, the potential of electronic signatures has not yet been fully utilized. Although electronic signatures and documents are legally recognized, they are not commonly recognized in all industries, sometimes due to a lack of awareness or sectoral laws. For example, to receive credit from a commercial bank the borrower needs to sign a promissory note for which electronic signature is not allowed according to current laws.²¹² Another example is the use of e-signatures in different notarial acts, as notaries prefer not to accept them for affidavits, contracts, or other documents despite the fact that e-notarization is allowed by the Judiciary Council.²¹³ This appears to be due to low awareness of e-notarization on the side of both notaries public and the users of such services.

Licensing and Registration Requirements for Digital Businesses

Although bureaucratic bottlenecks to registering a business have contributed to business informality in Ecuador overall, there are no specific hurdles for digital businesses.²¹⁴ Ecuadorian law allows the establishment of all types of licit businesses and does not rule out registering a business at a residential address—which may be a more attractive choice for digital start-ups. Moreover, an online platform provided by the Superintendency of Companies (*Superintendencia de Compañías y Valores*)²¹⁵ simplified the process of registering a business. Some businesses can be established entirely online, as electronic signatures and digital documents are accepted for data validation in the process of incorporation.²¹⁶ However, companies such as limited or stock corporations must complete parts of the process in person, as handwritten signatures are required by the public notary to legally exist (see the section above on electronic transactions). On the other hand, the Entrepreneurship and Innovation Law introduced simplified joint stock companies (*sociedades anónimas simplificadas*) that can be created entirely online and may be an attractive option for new digital businesses.

Concerning the new business model of ride-sharing, an incomplete regulatory framework in Ecuador leaves room for ambiguous and inconsistent enforcement, possibly at the expense of drivers. Ride-sharing, which connects drivers and riders through a digital platform, is common in Ecuador. To take advantage of the benefits of this technology in optimizing transportation, the Transport Law was amended in 2021. However, the law left it up to municipalities to regulate ride-sharing at the local level through municipal bylaws, and they, so far, have not issued such guidelines. Thus, according to the Transit Police, ride-sharing platforms operate in a legal grey area and may be sanctioned under the Penal Code, since drivers typically operate without a license or authorization from the Transport Authority. Transit Police may impose substantial charges on drivers, even as ride-sharing platforms are not directly accountable under the present legal framework.²¹⁷ Ride-sharing platforms require only a driver's license and vehicle registration to register drivers but are not required to carry out background checks or to request passenger transport licenses. Moreover, drivers are not eligible for any labor protection as they are not considered employees.

Similarly, Ecuador does not have a regulation specific to accommodation sharing through online platforms, despite the frequent use of these services. Such short-term rentals, typically offered by non-professional hosts through online platforms, have gained global popularity, including in Ecuador. A draft regulation on accommodation sharing has been discussed in Ecuador since at least 2019, with the most recent legislative proposal presented by the Ministry of Tourism in 2022.²¹⁸ The regulation was meant to control the use of accommodation services in private housing—that is, including those provided through digital platforms—by requiring a tourism registration form and an operating license and requiring the homeowner to inform the authorities.²¹⁹ The draft has faced criticism for being overly burdensome and has not yet been passed, leaving this new business model operating in a legal vacuum.²²⁰

Open Data and Data Sharing

Ecuador has an open data policy for information classified as public that seeks to promote research, social control, entrepreneurship, and innovation in society.²²¹ The open data policy is mandatory for all entities at the central public administration level and encourages the publication, use, and reuse of open data through the application of standards that promote interoperability. The government has set up an open data portal (www.datosabiertos.gob.ec) for this purpose. Building on the International Open Data Charter, the policy establishes a set of principles, including open by default, timely and comprehensive publication, accessibility and usability, and comparability and interoperability. The policy confirms compliance with the Organic Law on Transparency and Access to Public Information as well as with the LOPDP.

Although the LOPDP (see Chapter 7) introduced provisions on the transfer of personal data across borders, its implementation has yet to be fully carried out. The LOPDP, passed in 2021, allows the international transfer of personal data, conditional on the level of data protection in the target jurisdiction and on legal requirements. Details of implementation have not been finalized yet as the law stipulates a period of two years to fully implement its provisions by issuing corresponding regulations and creating a data protection superintendency that will develop guidelines.²²² However, Ecuador's data protection authority [*Superintendencia de Protección de Datos* (SPD)] is expected to maintain an online database with a list of countries that have an adequate level of personal data protection.²²³ In the event that personal data are to be transferred to countries excluded from the list, data processors must ensure a sufficient level of protection at least equivalent to Ecuador's, but details of these procedures and institutional responsibilities have not yet been finalized.²²⁴ Although there are special provisions on the processing of sensitive personal data in general, there are no specific provisions for their international transfer. Finally, the law states that in cases not contemplated in the regulation of personal data transfers, the SPD must authorize the case and register it in the National Registry of Personal Data Protection—giving the SPD the mandate to resolve any legal ambiguity.²²⁵

Online Consumer and Supplier Protection

Ecuador's regulation on electronic commerce ensures that the rights of consumers of e-commerce are guaranteed as per the Consumer Protection Law.

The Electronic Commerce Law considers e-commerce to be any commercial transaction carried out through any electronic information network, giving also full validity and binding force to electronic and telematic contracting. In addition to affirming the applicability of the Consumer Protection Law in e-commerce, the law clarifies the rights of consumers. These include the right to access all available information on a good or service without restrictions, to receive information by paper or non-electronic means, to object later to previous consent, to choose whether to accept to be part of any mail lists,²²⁶ y a ser informados de todos los derechos y obligaciones and to be informed of all rights and obligations as per the Consumer Protection Law and its regulations. Furthermore, the law stipulates that sellers must promptly and efficiently deliver a service, indicate the price, flaws, and hidden defects of their product, and repair or replace the item if necessary, among other provisos.²²⁷

Although key provisions for online consumer protection are in place, their effective implementation remains a challenge, as in the case of non-traditional e-commerce platforms like social networks and messaging service providers. In practice, consumer complaints are difficult to resolve as they need to be addressed to the Ombudsman of Ecuador or directly to a judge. The Ombudsman has a chatbot on their website to submit complaints digitally. However, according to the same authority, most complaints are made in person and only about 1 percent correspond to online transactions. Given the typically low value of e-commerce transactions, it is unlikely that consumers choose to complain in person to the Ombudsman or take a legal route, creating an enforcement challenge for online consumer protection. In addition, a significant share of e-commerce in Ecuador takes place through social networks like Facebook marketplace, which are not regulated as e-commerce platforms.²²⁸ Although the laws clearly define terms like seller/vendor, manufacturer, or importer, there is no legal definition of the role of online platforms.

Ecuador does not yet have any regulations that target the relationship between online sellers and platforms (online supplier protection). Selling online provides a range of benefits for vendors, including greater market access and use of business software (e.g.,

automatic invoicing and accounting). However, MSMEs may become highly dependent on online platforms and are often vulnerable to any changes in terms and conditions, decisions about the delisting of products and accounts, or offers of competing products. Although a growing number of countries have passed laws to protect online suppliers and regulate their relationship with online platforms, for example, the regulation on platform-to-business relations of the European Union (EU), Ecuador has not yet passed or drafted any such legislation. Doing so would benefit the country by creating an environment of confidence for suppliers that may directly impact commercial relations.

Taxation of Digital Businesses

Ecuadorian regulations state that all individuals and legal entities (either national or foreign) that initiate or carry out economic activities in the country must register in a Registry of Taxpayers.²²⁹ This registry, administered by Ecuador's SRI, identifies all taxpayers in the country. In this way, all firms doing business in Ecuador are subject to several taxes, such as income tax, value added tax (VAT), or remittances tax, without any special treatment for digital businesses.

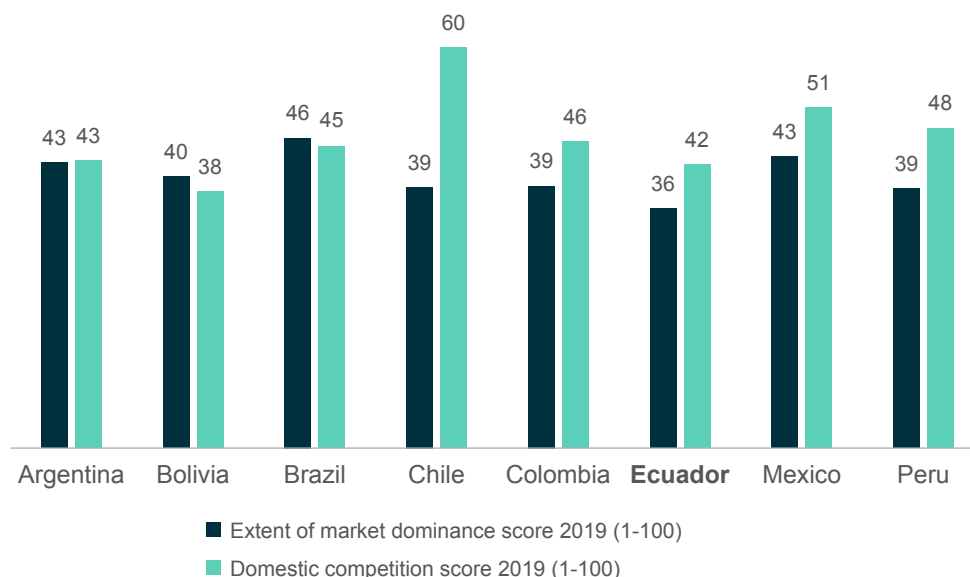
The digital service tax, introduced in 2020, has raised concerns over its uneven application and potential burden on the digital economy.²³⁰ The newly created VAT on digital services is paid by residents in Ecuador or permanent corporations of non-residents according to a database created and updated quarterly by the SRI. Among the services that are taxed are online shopping, lodging, education, video games, delivery services, transportation, and others. The 12 percent rate is charged mainly through credit or debit card issuers, which withhold the tax at the time of purchase. The SRI also has a mechanism whereby the supplier registers directly with the SRI, but in practice it is a service that is being charged entirely by local financial institutions. The tax is controversial as users report complaints about excessive VAT charges on services that should not be considered digital²³¹ and taxes being directed to consumers rather than the businesses providing the services. The decision on classifying taxable digital services lies with the SRI and its internal database, called the Annex on International Currency Movement and Other Internal Regulations, a process that could lead to the insufficient capture of digital services.

Digital Competition Policy

Beyond digital businesses, Ecuador has ample room to boost the effectiveness of competition policies across sectors. Ecuadorian markets have relatively lower levels of competition compared to peers. The latest data from Bertelsmann Stiftung's Transformation Index point to the relatively low development of the foundations of market-based competition—that is, regulatory interventions that enable competition—in Ecuador compared to regional peers Argentina, Colombia, Mexico, and Peru and the average LAC and OECD country.²³² Similarly, competition policy and law to avert anticompetitive business behaviors also appear to be weaker than in Colombia and Peru and the average OECD country. This is also supported by the 2019 World Economic Forum's Global Competitiveness Report,²³³ which points to a weaker degree of domestic competition in Ecuadorian markets compared to all regional peers except Bolivia (Figure 5.16). In addition, commercial activities are dominated by relatively fewer firm groups in Ecuador than in all regional peer countries (Figure 5.16).

Ecuador has not yet responded to the specific challenges that digital businesses pose to competition. Competition issues are becoming increasingly important in the case of digital businesses, given the tendency of digital business models to create winners-take-most dynamics (e.g., online platforms as “natural” monopolies) and internationalized competition due to “scale without mass.”²³⁴ Meanwhile, digital firms challenge the existing practices of competition authorities. For example, price-based competition tools are not directly applicable to digital business models that often provide nominally free services. Similarly, “killer acquisitions” of digital start-ups by big tech often fall under existing M&A thresholds but have large implications for competition on digital markets. Ecuador's LORCPM was issued in 2011 and has not yet responded to the challenges related to digital competition. However, recognizing the complications of enforcing competition policy on digital platforms that are not based in Ecuador but offer digital services in the country, the SCPM has launched a study to respond to the problem.²³⁵

Figure 5.16. Domestic Competition and Extent of Market Dominance Scores 2019, 1–100 (best)



Source: Authors' elaboration based on World Economic Forum, “Global Competitiveness Index 4.0 Dataset,” 2019, https://www3.weforum.org/docs/WEF_GCI_4.0_2019_Dataset.xlsx.

Note: Scores vary from 1 (not at all competitive) to 100 (extremely competitive).

M&A thresholds have not yet been adapted to ensure better oversight over digital “killer acquisitions.”

Generally speaking, the SCPM controls and regulates all transactions, such as mergers of companies or economic operators,²³⁶ that are treated as concentration operations that must be reported to the Superintendency.²³⁷ When an act is considered a concentration agreement, authorization is mandatory in order to proceed. The economic threshold is reached in cases when the combined annual turnover of the undertakings in Ecuador in the year preceding the transaction exceeds an amount fixed by the Regulation Board, which modified the previous threshold through Resolution No. 009 of September 25, 2015. The turnover threshold is defined in Table 5.3 below.

In a special report released in 2018, the SCPM made recommendations on reducing market entry barriers for ride-sharing companies.²³⁸ After assessing the competition dynamics around the ride-sharing and personal transport market in the capital, the competition authority concluded that digital businesses face barriers that limit competition. Based on this, the SCPM made several recommendations, including legally approving ride-sharing companies nationwide and requiring them to register. However, as the section above describes, it is unclear to what extent this special report has achieved its intended effect.

Table 5.3. Merger Notification Thresholds

Type	Amount of Unified Basic Remuneration (RBU)	Amount in USD
Mergers involving institutions of the financial system and the stock exchange market	3.2 million	1.36 billion
Concentrations involving insurance and reinsurance entities	214,000	90.9 million
Concentrations involving economic operators that are not detailed in paragraphs (a) and (b) above	200,000	85 million

Source: Resolution No. 009 of September 25, 2015.

Note: The unified basic remuneration in 2022 is US\$425 and changes annually.

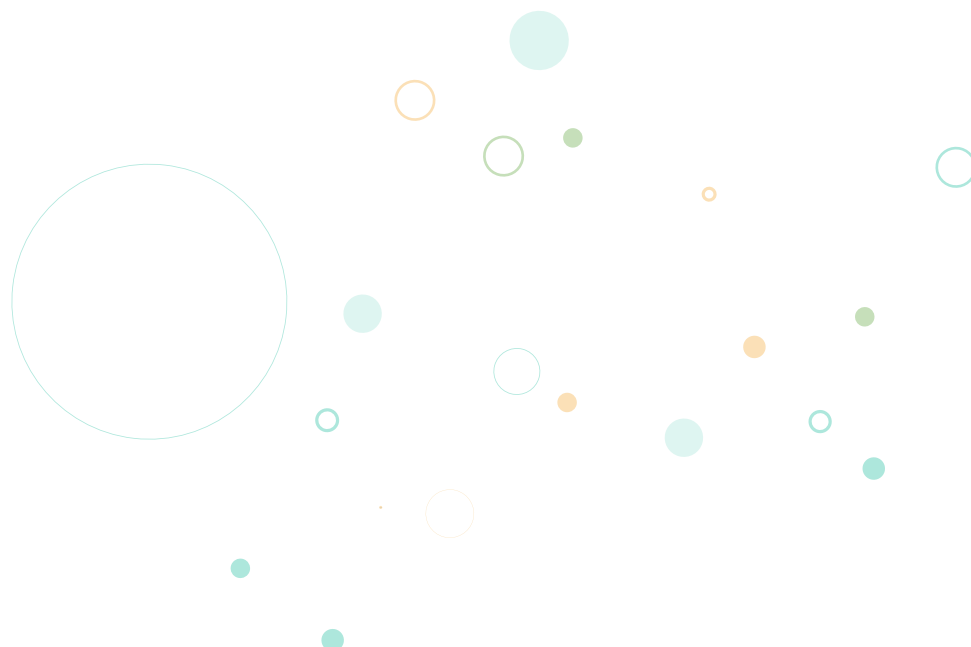


Table 5.4. Digital Businesses: Key Challenges and Opportunities

Strengths	Areas for Improvement
<ul style="list-style-type: none"> » There are a relatively large number of digital businesses in such subsectors as fintech, mobility tech, and telecom. » The Law on Electronic Commerce, Signatures, and Data Messages is in line with international practices and provides a general framework for the use of electronic signatures. » A law on personal data protection, the LOPDP, was recently approved. » The national policy for digital transformation provides strategic guidelines on creating digital capabilities and boosting digital uptake among government, firms, and individuals. » The Consumer Protection Law establishes procedures to help consumers protect their rights (generally applicable to online activities as well). 	<ul style="list-style-type: none"> » The support ecosystem for digital entrepreneurship is nascent, with only a few accelerators and incubators, mainly concentrated in the capital. » The LOPDP is yet to be fully implemented. » There is a lack of enforcement of the Consumer Protection Law for complaints related to e-commerce (including provisions to protect online suppliers). » Regulation of new business models, such as ride- and accommodation sharing, is also absent.
Opportunities	Challenges
<ul style="list-style-type: none"> » Ecuador has a relatively large number of digital businesses operating in fintech, which is a key enabler for other digital industries. » It would be useful to increase the formal funding rate of digital businesses by attracting regional and international investors. 	<ul style="list-style-type: none"> » The lack of clarity in implementing existing regulations and the lack of regulations for emerging digital sectors could further increase policy uncertainty for digital businesses.

5.3. Recommendations: Assessing the Availability of Venture Capital Financing and Updating Market Regulations to Promote Ecuador's Digital Business environment

The digital business diagnostics identified three key challenges that need to be addressed:

The low rate of new digital business creation in recent years and the low share of digital businesses with formal investment. This analysis suggests a decrease in digital business dynamism in Ecuador in recent years, paired with an underperformance in investment flows. In response, the government should systematically boost digital entrepreneurship, including through

institutional support and the creation of favorable conditions to attract more regional/international venture capital and/or private equity funding to increase formal funding flows.

The need to update regulations to account for the specifics of digital business models. Ecuador has foundational regulations in place that allow digital business models to operate, including the e-transaction and e-commerce laws. However, several emerging digital business models, such as ride-sharing and accommodation-sharing, currently operate in a legal grey area with incomplete or unclear regulations. The government could consider passing regulations and amending current provisions to increase legal clarity, which would be beneficial to the growth of new digital business models.

The need to strengthen implementation of existing digital market regulations. Although regulations in such areas as online consumer protection or e-transactions are in place, their implementation needs to be improved. For example, provisions that were enabled through the e-transaction laws are not consistently used by the government and in other related laws (e.g., use of e-signatures). Concerning consumer protection, there is a need to clarify the responsibilities of e-commerce

platforms (especially online marketplaces) relative to consumers and merchants, and to establish a system to effectively address online consumer complaints (e.g., through an online dispute resolution system). Similarly, in competition law, implementation has yet to respond to the specific challenges in the digital economy, such as the market power of digital platforms and the non-price-based competition tools in “nominally free” areas of the digital economy.

Table 5.5. Digital Businesses: Policy Recommendations (1 of 3)

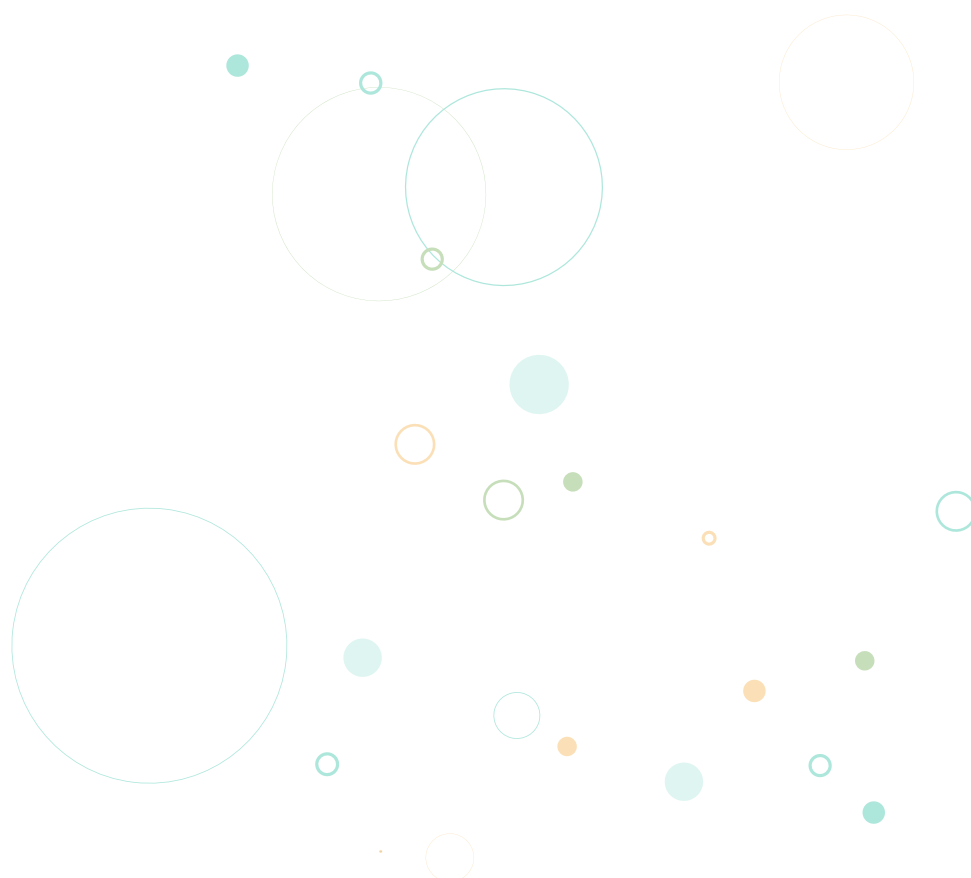
Reform area	Recommendation	Responsible Entity	Timing	Is Legal Change Required?
Business climate and regulatory environment	Issue additional legislation to clarify the legal status of the operation of ride-sharing platforms as per the Transport Law. This can be done by working with municipalities to issue guidelines or pass national regulations.	The National Transit Authority (<i>Agencia Nacional de Tránsito</i> [ANT]), municipalities, and the National Assembly of Ecuador	Short term	Yes
	Assess the possibilities to improve the VAT on digital services to avoid double taxation and ensure the smooth quarterly updating of taxed services.	SRI	Short term	Yes/No
	Assess international good practices in implementing digital service taxes via online platforms rather than debit/credit card issuers.	SRI	Short term	
	Analyze the possibility of implementing proportional taxation to early-stage start-ups in order to boost digital businesses.	SRI	Short term	
	Perform an economic analysis (e.g., cost-benefit and distributional) of the tax and its potential impact on consumers and digital businesses.	SRI	Short term	

Table 5.5. Digital Businesses: Policy Recommendations (2 of 3)

Reform area	Recommendation	Responsible Entity	Timing	Is Legal Change Required?
	<p>Update e-commerce or consumer protection legislation to address issues related to online consumer protection. This includes:</p> <ul style="list-style-type: none"> » Clarifying the responsibilities of e-commerce platforms (especially online marketplaces) vis-à-vis consumers and merchants. » Establishing a system to effectively address online consumer complaints (e.g., through an online dispute resolution system). 	Ministry of Production, Foreign Trade, Investment and Fisheries, National Assembly of Ecuador, Ombudsman of Ecuador	Medium term	Yes
	Review the necessary updates to the competition law and enforcement practices to respond to challenges in the digital economy (e.g., market power of digital platforms, updated merger thresholds to avert “killer acquisitions”).	The Regulation Board on Competence and the SCPM	Medium term	No
Social protections, business climate, and regulatory environment	Clarify the employment status of ride-sharing and delivery drivers and the implications for labor rights and social protection.	ANT, municipalities, and the National Assembly of Ecuador	Short term	Yes
Institutional coordination/governance	<p>Designate a public institution to coordinate entrepreneurship and innovation policy that is also tasked with acting as the single point of contact for start-ups and fostering a supportive ecosystem. The latter especially includes adopting international good practices, such as:</p> <ul style="list-style-type: none"> » Including universities in programs with businesses to promote entrepreneurship. » Attracting more regional/international venture capital/private equity funding to increase formal funding flows. 	To be determined (e.g., Ministry of Production, Foreign Trade, Investment and Fisheries)	Medium term	No

Table 5.5. Digital Businesses: Policy Recommendations (3 of 3)

Reform area	Recommendation	Responsible Entity	Timing	Is Legal Change Required?
Institutional capacity building and awareness raising	<p>Raise awareness of electronic transactions and mainstream their use throughout the government (especially for business-to-government and citizen-to-government transactions).</p> <p>Modify other laws, such as the Commerce Law, so that banking services can be provided entirely through digital channels.</p> <p>PRIORITY</p>	Whole-of-government approach led by MINTEL	Medium term	No/Yes
Further analytics	<p>Conduct an in-depth assessment of the availability of venture capital financing for digital start-ups in Ecuador, especially of ways to attract more international/regional venture capital funds to invest in Ecuador that would bring in capital, experience with international scaling strategies, and entrepreneurship networks.</p>	Ministry of Production, Foreign Trade, Investment and Fisheries	Medium term	No



6. DIGITAL SKILLS



Building Advanced Digital Skills for the Future of Work



KEY MESSAGES

- » **Digital skills are critical to strengthening firms' digital maturity.** Currently, 71 percent of Ecuadorian companies have low levels of digital maturity. Thus, closing the existing demand-supply digital skills gap and investing in innovation are critical factors in boosting firms' digital progress.
- » **According to the ITU, Ecuador ranks below regional peers (Argentina, Brazil, Chile, Colombia, Mexico, and Peru) in the development of ICTs as well as in the skills index.** MINTEL and MINEDUC could collaboratively increase access to and usage of hardware and educational software to reduce disparities in ICT development and digital skills.
- » **Low levels of digital connectivity and access to devices present a barrier for Ecuadorians to acquiring digital skills.** Improving technological infrastructure and increasing quality and access to internet connectivity, which is currently at 40 percent at the school level, is important to increasing computer usage and proficiency.
- » **MINEDUC's frameworks lack specificity and policy instruments to guide and measure students' development of digital skills.** MINEDUC could take the lead in developing more specific instruments to guide student acquisition of digital skills from the foundational level at school to the highly specialized level in higher education.
- » **Although technical and digital skills programs within higher education meet high-quality standards, the supply is limited and demand is highly concentrated in Quito and Guayaquil.** An insufficient supply of STEM [science, technology, engineering, and math] and digital skills programs such as the ones provided by ESPOL puts pressure on Ecuadorian firms—which struggle to find trained professionals—and may hinder their digital transformation efforts.
- » **Coordination between government, academia, and the private sector is critical to strengthening digital learning programs.** The GoE can offer incentives for the private sector to scale successful programs, such as [Puntos del Encuentro](#), [ESPOL](#) and [EPICO](#), and to develop contextualized products for digital skills.

6.1. The Importance of Digital Skills: Encouraging Better Jobs and Higher Employability Through Digital Skills Development

Digital technology is changing the nature of jobs and demanding a new set of skills for workers in Ecuador and elsewhere. According to [UNESCO's Digital Literacy Global Framework](#), digital skills can be defined as the individual capacity to access, manage, understand, integrate, communicate, evaluate, and create information safely and appropriately. Individuals differ in their level of proficiency in these competencies: at the higher end of the digital skills continuum, individuals can deploy digital technologies, develop new applications, and come up with solutions to new challenges.²³⁹ To ensure the widespread adoption of digital technologies across Ecuador's 24 provinces, it is critical that MINEDUC and the [National Secretariat of Higher Education, Science, Technology, and Innovation](#) (*Secretaría Nacional de Educación Superior, Ciencia, Tecnología e Innovación* [SENESCYT]), the public institution in charge of higher education in Ecuador, foster individual acquisition of digital skills through education and training, both formal and informal.

The widespread adoption of digital technologies can help stimulate investment in Ecuador and strengthen the national digital economy by reducing barriers to employability and entry into the labor force and encouraging entrepreneurship in high-productivity sectors.²⁴⁰ Widespread and meaningful adoption of digital services requires not only increasing access to technology infrastructure, but also improving digital skills through education and training in key competencies demanded by the labor market—currently and in the future. Training in digital competencies needs to be complemented with the implementation of a national strategy on digital skills, improvements in infrastructure and connectivity, and teacher professional development. In this way, Ecuador can improve individual acquisition of digital skills to enable the widespread adoption of digital technology and impact productivity growth.

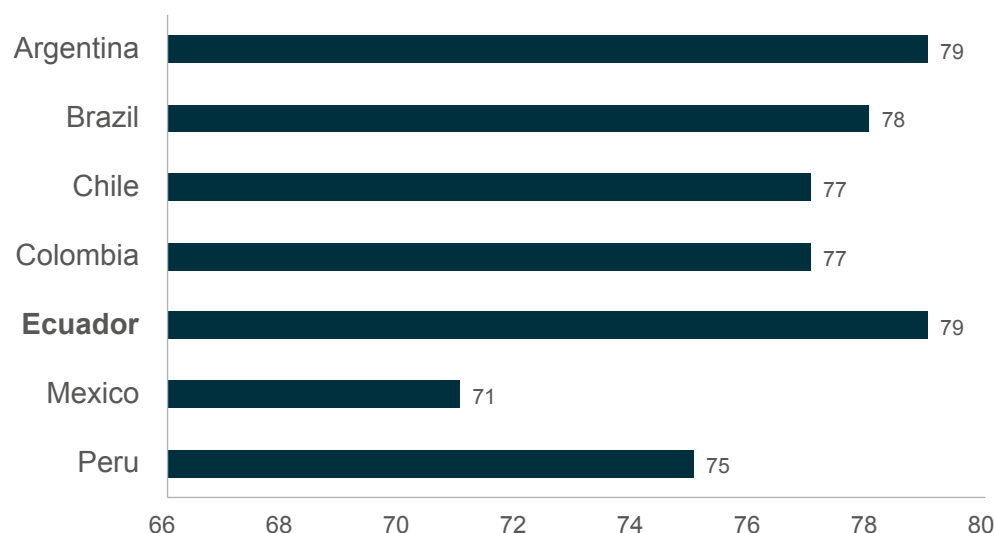
Digital skills should not be developed in isolation, but rather alongside other competencies, such as literacy and numeracy skills, information management, communication, critical and innovative thinking, problem solving, collaboration, and socio-

emotional skills.²⁴¹ Digital skills encompass not only the capacity to use digital technologies, but also the ability to make informed decisions while using technology and working within the new technology-rich environment. For instance, organizations that use information technologies to facilitate horizontal work require more cooperation and communication across teams, as well as stronger leadership. The development of these skills, in Ecuador and elsewhere, relies on the availability and quality of formal education.²⁴²

Low levels of digital connectivity and access to devices present a barrier for Ecuadorians to acquiring digital skills, and alternative solutions, such as training and hybrid education systems, can be developed to strengthen education and training in this area. Although improving access to connectivity and technological infrastructure could increase computer usage and proficiency, it would not necessarily result in better education or socioeconomic outcomes. Training in the usage of digital tools, software designed to help students develop skills at their own rate of progress, technology-enabled social psychology, and a combination of online and in-person instruction could strengthen education outcomes and open space for all students to engage with new technologies.²⁴³

School closures during the COVID-19 pandemic severely affected over 4.5 million Ecuadorian students. Beginning in the first quarter of 2020 at the start of the pandemic, schools in Ecuador were fully or partially closed for almost 79 weeks until November 2021 (see [Figure 6.1](#))—a situation that affected over 4.5 million students who were enrolled in the formal education system.²⁴⁴ Children from disadvantaged backgrounds in Ecuador, as elsewhere, suffered from these shocks even more and may, as a result, be at a higher risk of dropping out of school. A study conducted during the pandemic found that 16 percent of 14–18-year-old students in Ecuador presented symptoms of depression, an increase compared to pre-pandemic figures. The lack of socio-emotional support offered by schools and the social isolation caused by the remote learning experience were among the main factors contributing to these symptoms of depression.²⁴⁵ The pandemic also increased the migration from private to public schools in Ecuador: in June 2020, enrollment in public institutions grew by 120,000 students (6.5 percent). Ensuring access to education for those students who moved from private to public institutions will be a significant challenge for MINEDUC.

Figure 6.1. School Closures in Ecuador and Regional Peers, Weeks



Source: UNESCO, "Dashboards on the Global Monitoring of School Closures Caused by COVID-19," 2022, <https://covid19.uis.unesco.org/global-monitoring-school-closures-covid19/>.

In response to the COVID-19 pandemic, Ecuador developed an educational plan and introduced remote learning programs to support students. MINEDUC also adjusted the [National Curriculum](#) in response to the shortened school year by focusing on four competencies: communication, mathematics, digital proficiency, and socio-emotional skills. The COVID-19 Educational Plan aimed to guarantee education services during the health emergency, support the educational community, and provide protection and emotional support to teachers, parents, and students.²⁴⁶ The first phase of the plan, "Learning Together at Home," intended to ensure educational continuity through a multimodal remote learning program that included educational TV sessions, radio learning programs, paper-based materials, and online learning programs, among other tools.²⁴⁷ The second phase of the plan, "Educational Continuity," aimed at gradually returning to in-person schooling, ensuring minimum conditions for the progressive use of educational facilities. These plans encouraged learning continuity, as most students were engaging in remote learning from over 1,500 high schools.²⁴⁸ Even though the quality of the internet connection and affordability remain a concern (see [Chapter 2](#)), access to remote learning technologies was reasonably high (74 percent had internet access at home and 59 percent also had a computer or tablet), three-quarters of students had done some form of remote learning in the previous week, and 86 percent had some form of schoolwork. However, in the absence of a thorough national digital skills strategy providing better opportunities to access digital devices and connectivity for all, students from more disadvantaged groups—

the lowest wealth quartile, indigenous students, students whose mothers have secondary education or lower, and students without internet access—were more affected by the pandemic. For instance, 22 percent of students without internet access did no schoolwork in the preceding day compared to 9 percent of those with internet and a computer or tablet.²⁴⁹

6.2. Current State of Digital Skills: Low Digital Skills Levels Risk the Future of Many Ecuadorians

Framework for Digital Skills Development

The GoE has developed the national plan, "*Creación de Oportunidades*," to guide the country's development from 2021 to 2025, and MINEDUC has created the Digital Education Agenda for the development of digital skills during the same period. One of the main objectives of the [Creación de Oportunidades 2021-2025](#) plan is to strengthen Ecuadorians' capacities and to provide innovative, inclusive, and quality education. This national plan promotes the modernization of the educational system through innovation and digital tools at all levels and through the creation of technical and technological training programs that are relevant to the local context. This 2021–2025 plan aims to increase the share of Ecuadorians between 18 and 29 years old with a high

school diploma from 70 to 78 percent, the share of public schools with internet coverage from 42 to 66 percent, and the number of Ecuadorians with technical higher education degrees from 23,274 to 28,756.²⁵⁰ At the basic education level, in 2017, MINEDUC developed and launched the first Digital Education Agenda 2017–2021, a valuable policy document created to provide strategic guidance on digital skills.²⁵¹ However, this agenda was not fully implemented due to budget constraints, political changes, and instability within MINEDUC during this period. The new [Digital Education Agenda 2021–2025](#) (*Agenda Educativa Digital*) provides a roadmap to advance the process of digital skills development in the education sector (see Table 6.1). This public policy instrument allows for the planning, execution, and evaluation of strategies and actions aimed at developing the skills of all members of the educational community, including the 143,000 bilingual students who live mostly in Ecuador’s rural areas.²⁵² The new Digital Education Agenda has been co-developed by the MINEDUC, SENSECYT, and MINTEL and integrated into the different departments of MINEDUC.²⁵³

Effectively implementing and monitoring progress toward the objectives of the new Digital Education Agenda will be a challenge, as will mapping the provision of digital skills from primary to higher education. In addition to the general roadmap to guide digital skills development, MINEDUC has also included competencies and content related to ICT (for example, information and data literacy, communication and collaboration,

digital content creation) in the National Curriculum, some of which are aligned to UNESCO’s Digital Literacy Global Framework (See [Table 6.2](#)). At the same time, MINTEL is in the process of developing a digital skills framework that has been adapted from the EU’s Digital Competence Framework for Citizens (DigComp 2.1).²⁵⁴ Going forward, MINEDUC needs to ensure that digital skills training programs are aligned with the objectives of the Digital Education Agenda 2021–2025 framework, which specifically defines how digital skills should be monitored, and the National Curriculum, which sets up the competencies, content, and standards in education for all students. Although these frameworks provide general guidance on digital skills, neither the Digital Agenda nor the National Curriculum specifically outline how students can progress through the digital skills continuum from primary to higher education. In this regard, [UNESCO’s Digital Literacy Global Framework](#) and the [EU’s DigComp 2.1](#) can be used as guiding documents to map the provision and proficiency levels for digital skills (See [Table 6.2](#)). Equally important, MINEDUC’s National Directorate for Monitoring and Evaluation has to monitor progress toward the objectives of this agenda as well as work in coordination with the National Institute of Educational Evaluation (*Instituto Nacional de Evaluación Educativa* [INEVAL]) to evaluate students’ progress in digital skills. Thus, MINEDUC needs to go beyond having a general framework and ensure an efficient implementation of Ecuador’s digital skills strategy, with constant monitoring to understand progress and make the required adjustments.

Table 6.1. Digital Skills–Related Objectives, Digital Education Agenda 2021–2025

	Strategic Line 1: Digital Learning	Strategic Line 2: Digital Literacy and Citizenship
Main objective	Promote Digital Learning through training, creation and management of digital resources and access to digital environments for the educational community.	Promote Digital Literacy and the construction of a universal, inclusive and intercultural Digital Citizenship in the educational community.
Key Performance Indicator	Percentage of educational institutions that implement the seven actions of the Digital Learning axis.	Percentage of educational institutions that implement the five actions of the Digital Literacy and Digital Citizenship axis.
Goal	By 2025, at least 45 percent of educational institutions implement the seven actions of the Digital Learning axis.	By 2025, at least 45 percent of educational institutions implement the five actions of the Digital Literacy and Digital Citizenship axis.

Source: MINED, “Digital Education Agenda 2021–2025,” <https://educacion.gob.ec/wp-content/uploads/downloads/2022/02/Agenda-Educativa-Digital-2021-2025.pdf>.

Table 6.2. International Digital Skills Frameworks and Ecuador's National Curriculum

Competence	Description	Framework		
		UNESCO	DigComp	Ecuador's Curriculum
Devices and software operations	Identify and use hardware tools and technologies. Identify data, information, and digital content needed to operate software and technologies.	X		
Information and data literacy	Articulate information needs, as well as locate and retrieve digital data, information, and content. Judge the relevance of the source and content. Store, manage, and organize digital data and information.	X	X	X O.CN.B.5.6
Communication and collaboration	Interact, communicate, and collaborate through digital technologies while being aware of cultural and generational diversity. Participate in society through public and private digital services.	X	X	X O.CN.B.5.7 CE.CN.B.5.5
Digital content creation	Create digital content. Improve and integrate information into an existing body of knowledge while understanding copyright and licenses. Know how to give understandable instructions for a computer system.	X	X	X CE.ECA.5.4 O.M.5.2.
Safety	Protect devices, content, personal data, and privacy in digital environments. Protect physical and psychological health, and be aware of digital technologies for social well-being and social inclusion.	X	X	
Problem solving	Identify needs and resolve conceptual problems in digital environments. Use digital tools to innovate processes and products.	X	X	
Career-related competencies	Operate specialized digital technologies to understand, analyze, and evaluate specialized data, information, and digital content for a particular field.	X	X	

Source: Authors' elaboration, with data from UNESCO (2018).

Demand for and Supply of Digital Skills

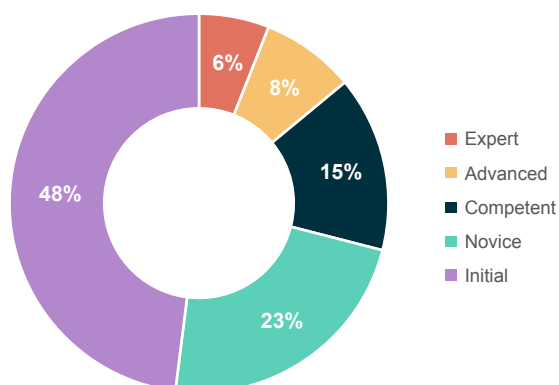
Demand for trained professionals in digital technologies has been growing since 2010. The labor demand in Ecuador for workers with technical backgrounds grew almost 36 percent between 2010 and 2017, reaching nearly 35,800 workers; similarly, the demand for workers with tertiary education (excluding those with technical backgrounds) grew almost 45 percent in the same period.²⁵⁵ Since 2020, mobility restrictions to prevent the spread of COVID-19 have fueled a rapid increase in the adoption and use of digital technologies in Ecuador, and with it the demand for professionals with digital skills and technical backgrounds.²⁵⁶ In fact, a study conducted by the [International Labour Organization](#) in Ecuador identified that digital skills were the skill most demanded by businesses during the pandemic.²⁵⁷ According to the human resource firm Adecco, out of the 14 most highly demanded professional profiles in Ecuador currently, four require advanced digital knowledge: digital marketing specialists, digital managers, software developers, and e-commerce directors.²⁵⁸ However, supply is not keeping up with demand, as Ecuadorian firms struggle to find trained professionals in digital technologies and to pay the wages of the few skilled technicians that higher education institutions currently graduate.²⁵⁹ The insufficient supply of talent with digital skills could slow down the pace of digital transformation in Ecuador.

The demand-supply digital skills gap and low levels of innovation could be holding back firms' digital transformation potential. "Chequeo Digital," a tool

developed by IDB to measure businesses' digital maturity,²⁶⁰ evaluated 617 companies in Ecuador between 2020 and 2021. This tool assesses companies using eight dimensions: technologies and digital skills; products and innovation; strategy and digital transformation; people and organization; culture and leadership; communications; processes; and data and analytics. Based on this assessment, companies are classified into five levels of digital maturity: initial, novice, competent, advanced, and expert. The assessment found that 71 percent of the Ecuadorian companies that participated in this digital checkup were at the two lowest levels of digital maturity (see Figure 6.2). A considerably larger share of MSMEs have lower levels of digital maturity than large enterprises: 77 percent of microenterprises and 65 percent of SMEs are in the initial and novice levels, while only 29 percent of large enterprises are in these levels. On the other side, while 45 percent of large enterprises are in the advanced and expert levels, only 16 percent of SMEs and 9 percent of microenterprises are in higher levels of digital maturity (see Figure 6.3). (For a detailed discussion of digital businesses, see [Chapter 5](#)).

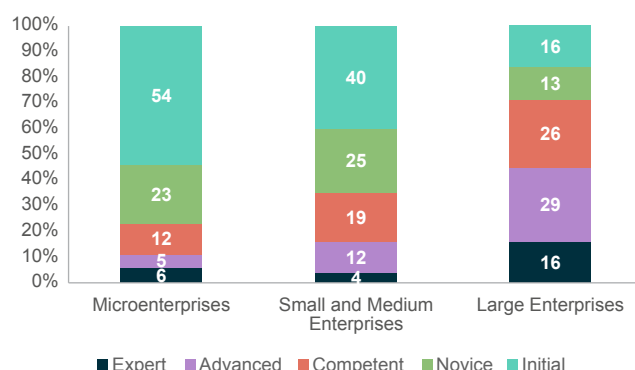
Coordination between government, academia, and the private sector is critical to reducing the demand-supply skills gap. Before the COVID-19 pandemic, private-public collaboration in education for certain areas, such as school infrastructure, educational materials, and teacher professional development, was limited.²⁶¹ During the pandemic, *Unidos por la Educación* was created to foster collaboration between the government, the private sector, and academia to strengthen the education system. As of March 2022, *Unidos por la Educación* had worked with 145 public schools to improve investment in infrastructure, the provision of educational materials,

Figure 6.2. Digital Maturity of Ecuadorian Businesses



Source: IDB (2022).

Figure 6.3. Digital Maturity of Ecuadorian Businesses, by Firm Size



Source: IDB (2022).

teacher training, management practices, and monitoring and evaluation. The organization has also incorporated a technical education program for high school that allows students to choose different practical paths: digital skills, carpentry, and tourism services, among others.²⁶²

EPICO, Guayaquil's municipal enterprise, is also an example of public-private collaboration to promote innovation and competitiveness across multiple sectors, including education. The organization is funded by the city of Guayaquil and the private sector, and the government, academia, nongovernmental organizations, and private companies participate on the board. EPICO has short digital skills programs to train youth in software development, full stack, front end, data science, and artificial intelligence—and all programs are complemented with socio-emotional skills.²⁶³ EPICO has supported over 9,000 entrepreneurs and 2,600 small businesses and generated over 10,000 self-employment jobs. Moreover, EPICO has also launched PIXEL, a program to train over 10,000 Ecuadorians in digital skills, allocating US\$500,000 to this endeavor.²⁶⁴ Another example is MINTEL's flagship program, *Puntos del Encuentro*, which is a series of technological centers that guarantee free access to ICTs for citizens living in rural and low-income urban areas. Telecommunication operators, such as Claro and Telefonica, and tech companies such as Cisco have collaborated with these programs by providing training and resources. Yet, despite these efforts to increase public-private collaboration in the education sector, according to CEOs of major Ecuadorian companies, more such collaboration is required at the higher education level. Ecuadorian firms that hire recent graduates with technical degrees usually argue that although professionals have an adequate technical level, companies need to invest in further training in the specific skills needed for the job, such as project management and socio-emotional skills.²⁶⁵

Ecuador's government is also working to supply a comprehensive set of digital skills programs in primary and high school, but some programs lack funding. *Conectando al Futuro*, a project developed by MINEDUC, aims to strengthen the teaching learning process in schools and to reduce the digital gap by providing internet services, connectivity, and tablets to students and teachers, but the program has not been fully implemented due to budget constraints.²⁶⁶ Additionally, the program, *Escuelas que me Inspiran* fosters the use of technology in schools by identifying districts where students need more support in the science, technology, engineering, and math (STEM) subjects, partnering with

local universities, and providing tools and training for teachers.²⁶⁷ In high school, students can choose to follow a technical degree, and the [Chamber of Innovation and Technology in Ecuador](#) (*Cámara de Innovación y Tecnología del Ecuador*) is working closely with MINEDUC to sign an agreement to increase the number of students who follow this technical path.²⁶⁸ Since 2018, MINEDUC has also partnered with Microsoft to strengthen teacher training and student learning; over 3.5 million Office 365 users have been enabled free of charge, meaning that Ecuador's MINEDUC has the second largest number of Office 365 users worldwide.²⁶⁹ However, during the pandemic, although Microsoft Teams was an official tool for remote learning, many students had connectivity constraints, and messaging applications such as WhatsApp ended up being the preferred tools for teacher-student interaction.²⁷⁰

The supply of technical and digital skills programs within higher education is limited. SENESCYT is working to increase enrollment in the STEM fields.²⁷¹ However, out of the 53 institutions that SENESCYT has accredited at the university level,²⁷² most are focused on conventional subjects, such as law and business, rather than technical ones. An exception is the Polytechnic School of the Coast (*Escuela Superior Politécnica del Litoral* [ESPOL]), a public institution accredited by the Accreditation Board for Engineering and Technology (ABET), where 70 percent of the programs are in the technical or engineering fields. In ESPOL, 60 percent of students come from the poorest quintile, and independently of the program they study, all learn to program software. ESPOL's students can also take massive open online courses (MOOCs) on learning platforms, such as Coursera and Edx, for credit. At the level of technical and vocational education and training (TVET), SENESCYT has accredited 85 institutions. TVET institutions have a [dual training program](#) in which 50 percent of studies are done at the educational institution and the other 50 percent through training in local companies. This program benefits almost 10,000 students every year through agreements between TVET institutions and companies.

Although technical and digital skills programs in higher education meet high-quality standards, supply is concentrated in Quito and Guayaquil. Most higher education programs are concentrated in Guayaquil and Quito, a situation that is not unexpected, given that these two cities contribute over 50 percent of Ecuador's GDP. This case is also reflected in the country's labor market, as Quito and Guayaquil consolidate over 80 percent of job offers posted on the internet.²⁷³

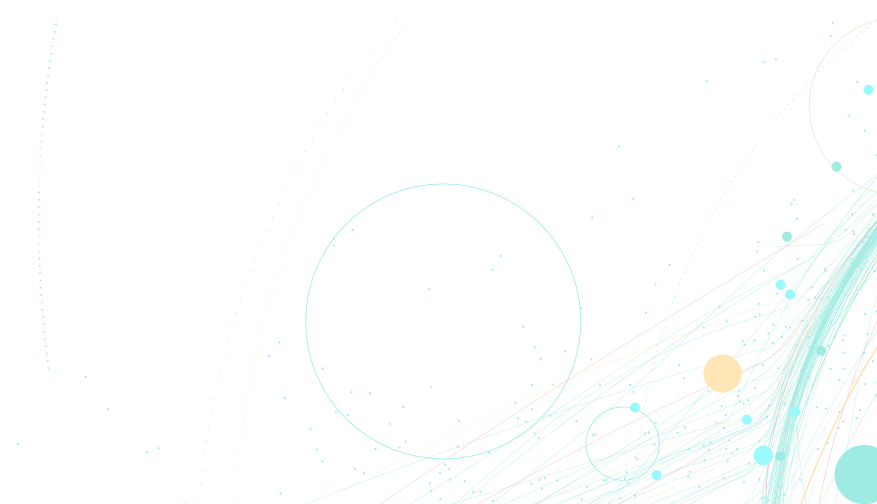
Outside of the formal education system, the government could provide incentives for the private sector to share its expertise and invest in training resources to boost digital skills. The organization, Centro Campus, develops programs to train students in basic technology, robotics, coding concepts, and the logic of computational thinking through STEM projects. Centro Campus also organizes three national robotics competitions with international partners such as World Robot Olympiad, FIRST LEGO League, and Destination Imagination.²⁷⁴ Ecuador's Chamber of E-Commerce (*Cámara*

Ecuatoriana de Comercio Electrónico [CECE]) has partnered with Latin America's E-Commerce Institute to provide digital skills and business-related training programs and also has partnerships with prestigious local universities such as *Espiritu Santo* to provide digital business courses.²⁷⁵ Nevertheless, aside from the training programs provided by such institutions as Centro Campus and CECE, there are just very few programs outside the formal education system focused on training and/or boosting the digital skills of technicians.²⁷⁶

Table 6.3. Digital and Technical Skills Training Programs in Ecuador

Program	Type	Focus
Unidos por a Educación	PPP	Allows students to choose different practical paths, such as digital skills, carpentry, and tourism services.
EPICO	PPP	Provides digital skills programs to train youth in software development, full stack, front end, data science, and artificial intelligence.
Chamber of Innovation and Tech	PPP	Increases the number of students who follow this technical path during high school.
Formación Dual	PPP	Provides dual training program in technical fields, in which 50% of studies are done at the institution and 50% at companies.
Conectando con el futuro	Government	Supports the teaching-learning process in schools and reduces the digital gap by providing internet services.
Escuelas que me Inspiran	Government	Increases use of edtech in districts where students need more support in STEM subjects.
CECE	Private	Provides digital skills and business-related training programs.
Centro Campus	Private	Trains students in basic technology, robotics, coding concepts, and the logic of computational thinking.

Note: * Indicates how the program is provided, i.e., through a PPP, the government, or the private sector.



Assessing Hurdles and Constraints

Insufficient institutional capacity and low digital technology adoption constrain Ecuador's efforts to create and execute a policy environment that fosters the development of digital skills. A strong regulatory framework and high institutional capacity are necessary elements to developing programs and policies that provide a quality formal education, while digital technology adoption and school enrollment are essential to building well-performing digital skills programs. Out of 141 countries assessed in the [2019 Global Competitiveness Index](#),²⁷⁷ Ecuador ranks 106th in terms of institutional capacity,²⁷⁸ 92nd in digital technology (ICT) adoption,²⁷⁹ 76th in skills,²⁸⁰ 98th in digital skills²⁸¹ and 88th in innovation capability²⁸². The country has a low rank (130th) in the burden of government regulation, indicating a difficult environment for companies hoping to comply with public administration requirements. Ecuador (97) also ranks below regional peers in the [ITU's ICT Development Index](#): Argentina (51), Chile (56), Brazil (66), Colombia (84), Mexico (87), and Peru (96). According to Ecuador's INEC, digital illiteracy has been declining at a rate of 10 percentage points per year, though this indicator only measures access to technological devices, such as cell phones and computers.²⁸³ The remaining challenge in this regard for the INEC is to understand how students use such devices, how they acquire digital skills, and whether they are learning.

With regard to digital infrastructure and connectivity, the GoE aims to gradually increase access to high-speed internet in schools, but adjustments are needed to improve devices. As of December 2020, 53 percent of Ecuadorians had access to the internet at home and 71 percent had used the internet in the previous 12 months.²⁸⁴ Although currently only 40 percent of schools have internet connectivity, the aim is to reach 65 percent by 2025.²⁸⁵ In terms of internet quality, even though there is no substantial difference between urban and rural areas (see [Table 2.2, Chapter 2](#)), which would normally be good news, both fixed and mobile broadband speeds are substantially below the OECD average (see [Figure 2.16](#)).²⁸⁶ Regarding digital devices, even though initiatives such as [Presta tu Compu](#) emerged to encourage the donation of computers to students most in need during the pandemic, only 25 percent of households had access to a desktop computer and 31 percent to a laptop. Updating equipment is yet another challenge; under

regulations in Ecuador, digital devices such as computer equipment should last for three years, but in most cases, public school devices are already technologically obsolete.

Teacher training, both in basic and higher education, is essential to closing learning gaps and guiding students in the process of digital skills development. Ecuador has almost 160,000 teachers in basic education, most of whom are over 45 years old and have not attended a training program in digital skills.²⁸⁷ MINEDUC's Department of Digital Technologies is planning to carry out a survey to better understand teachers' proficiency levels in digital skills and to develop targeted training programs.²⁸⁸ In 2016, the Secretary of Teacher Professional Development at MINEDUC developed the virtual training platform [Mecapacito](#) with the aim of maximizing access to training programs through this learning management system. With this tool, teacher training processes were strengthened and scaled, reaching over 1.5 million teachers (repeated users) through one or more training programs. In higher education, SENESCYT has identified that 60 percent of teachers in public higher education institutes have already been trained in basic digital skills and in the use of artificial intelligence in math, but the remaining 40 percent urgently need to receive training to better guide students in the process of digital skills development.²⁸⁹

The lack of complementary subjects such as English and the low graduation rates in STEM careers are among the factors that limit the number of skilled professionals with a technical background in Ecuador. Resolution 41-014, published in March 2014, made English language courses required only from 8th to 10th grade. English is a complementary skill needed for technical careers such as software engineering. Tech companies in Ecuador that operate globally usually hire technicians who are fluent in English, but they struggle to find technicians with this skill.²⁹⁰ An additional problem for firms looking for professionals with technical backgrounds is that, of undergraduates who decide to study for a technical degree, only 17 percent actually graduate, and among those who do, several end up working abroad for foreign firms.²⁹¹ These factors limit the number of professionals with a technical background in Ecuador and make it more expensive to hire young technicians, not only because there is a high demand for professionals with technical and digital expertise, but because government policies do not stimulate connecting labor market demand with young technicians.²⁹²

Ecuador has strengthened its monitoring and evaluation process through INEVAL's large-scale system-level assessments that provide national-level data for decision making. The monitoring and evaluation process is the compass required to understand progress and make adjustments, improvements, and troubleshooting during the implementation. INEVAL was created by the government in 2012 to develop and implement internal and external evaluations of the national education system. It has successfully conducted large-scale evaluations to understand student learning

in math, Spanish, and science. As in most countries, Ecuadorian teachers conduct formative assessments in which students have to use digital skills. These learning assessments serve as feedback mechanisms to help teachers understand what students are learning and to adapt teaching and learning methods in the classroom. However, the government has yet to implement evaluations or large-scale examinations to assess students' progress in digital skills and certify them as they move from one level of the digital skills framework to the next.

Table 6.4. Digital Skills: Key Challenges and Opportunities

Strengths	Areas for Improvement
<ul style="list-style-type: none"> » Government programs such as <i>Puntos del Encuentro</i> have increased access to digital technologies for citizens living in rural and low-income urban areas. » SENESCYT's dual vocational training program benefits almost 10,000 students every year from agreements between government TVET institutions and companies. » MINED's virtual training platform <i>Mecapacito</i> has increased access to teacher training programs through a learning management system. 	<ul style="list-style-type: none"> » MINED's digital skills frameworks lack specificity on how students can acquire and progress through the digital skills continuum from primary to higher education and also lack resources and monitoring to ensure efficient implementation. » Computers and other digital devices in schools are, in most cases, obsolete. » Making the subject of English non-compulsory in basic education limits the potential of professionals with a technical background in Ecuador. » The supply of technical and digital skills in education programs is not easily available beyond Guayaquil and Quito. » Ecuador ranks below regional peers in ITU's ICT Development Index and Skills Index.
Opportunities	Challenges
<ul style="list-style-type: none"> » Higher education institutions can leverage ESPOL's experience in strengthening students' digital skills through online courses on accredited learning platforms for credit. » The country should promote opportunities to increase the supply of digital skills outside the formal education system. 	<ul style="list-style-type: none"> » Over 70 percent of Ecuadorian companies have low levels of digital maturity. » The quality of download speed for fixed and mobile network broadband internet is below the OECD average. » Ecuador's government regulations create a burdensome environment for company innovation and delay firms' digital progress.

6.3. Recommendations: Creating a Comprehensive Framework to Guide and Measure Students' Digital Skills

The following recommendations have been identified as critical areas for Ecuador to strengthen its digital education ecosystem. Inclusive digital skills policies with a clear vision, such as equipping teachers with digital tools and supporting them with frequent coaching, engaging a broad set of stakeholders, and monitoring progress toward objectives set in the Digital Education Agenda and the National Curriculum, would facilitate the development of digital competencies for Ecuadorians. These recommendations closely follow the five guiding principles outlined in the World Bank's recent educational technology approach paper, "Reimagining Human Connections."²⁹³ The World Bank's knowledge packs are also provided as guiding tools for key planning, design, procurement, and implementation of interventions with digital teaching and learning resources.

Ask why. Digital skills policies and projects need to be developed with a clear purpose, strategy, and vision of the desired educational change. Ecuador needs to adjust its Digital Education Agenda to specify how students can develop digital skills, from the foundational level at school to the highly specialized level in higher education. This agenda should have clear links to the National Curriculum, which also needs to clearly map the development of complementary skills, such as English, literacy, numeracy, and problem solving, all critical for digital skills development. The Digital Agenda should also consider the 14 indigenous languages recognized by MINEDUC's Secretary of Intercultural Bilingual Education. It is critical for both MINEDUC and SENESCYT to closely coordinate with MINTEL, as the latter is already in the process of developing a digital skills framework. Global frameworks for the development of digital skills, such as UNESCO's Digital Literacy Global Framework and the EU DigComp 2.1, can work as a guide to adjusting Ecuador's existing Digital Agenda.

Design and act at scale, for all. The design of digital skills initiatives should be flexible and user-centered, with an emphasis on equity and inclusion, in order to realize scale and sustainability for all. When designing digital skills solutions, the government could focus on deploying learning solutions through devices that are available and appropriate for the specific needs of the country. These digital skills solutions should also include the over 140,000 bilingual students who live mostly in Ecuador's rural areas. In the short term, MINEDUC could leverage the potential of mobile technologies to scale digital education programs, taking advantage of the government plan to expand 4G connections from 58 to 92 percent

by 2025. As important as increasing the quality of connectivity for all students and teachers is improving digital equipment, as many devices in schools are already obsolete, a situation that limits computer usage and proficiency. The Devices for Education Knowledge Pack can be used as a guide to identify the right digital devices required for the Ecuadorian education system,²⁹⁴ and the selection and acquisition of devices should be guided by a clear and precise vision of bettering education's quality, accessibility, equity, and relevance. At the higher education level, SENESCYT can foster the design and scale of programs for skills adaptability, upskilling, and reskilling as they will become critical attributes for both workers and job seekers and can potentially reduce the existing demand-supply digital skills gap. Technology-led solutions emerging in the TVET space can support this transition and lead to a rapid diffusion of digital and technical skills.²⁹⁵

Empower teachers. Digital technology should enhance teacher engagement with students through improved access to content, data, and networks, helping teachers to better support student learning. Sustained professional development in digital skills through pre-service teacher education and in-service teacher training can be effective in both assessing teachers' current digital skills and equipping them with digital tools for teaching and learning. However, most teachers do not know how to effectively integrate or use digital technologies to engage students in their learning. The virtual training platform [Mecapacito](#), developed by the Secretary of Teacher Professional Development at MINEDUC, can be a valuable resource to strengthen and scale up teacher professional development programs as well as to equip teachers with tools and strategies relevant to their day-to-day professional activities. However, it also needs to be constantly updated and monitored periodically to ensure that teachers are using the platform and putting into practice new lessons to improve delivery. The World Bank's [Teachers' Skills for Remote Learning Knowledge Pack](#) and the Technology for Teaching (T4T) program can be valuable resources to identify and prioritize the skills teachers need for effective remote, blended, and digitally enhanced instruction.

Engage the ecosystem. To quickly deploy digital skills programs and support student learning, education systems should adopt a multi-stakeholder approach by engaging a broad set of actors. Ecuador's government can incentivize the private sector to invest in digital skills development programs, thus leveraging the expertise and resources of stakeholders interested in improving education outcomes. The GoE should also ensure transparency and procurement rules for companies that receive the incentives to navigate procurement processes. Although clear rules are required, the government could avoid

excess regulations that make it burdensome for companies to comply with public administration requirements. PPPs such as EPICO in Guayaquil can be further supported by scaling, reskilling, and upskilling digital skills programs, not only to increase the supply of digital skills outside the formal education system but also to strengthen firms' digital maturity through training programs for employees. Partnerships with telecommunications operators could focus on increasing the quality of download speed for fixed and mobile network broadband internet; moreover, through the program *Puntos del Encuentro*, the GoE could increase computer usage, allow citizens in rural areas to access data at discounted bandwidth costs, and potentially decentralize digital skills programs that are currently concentrated mainly in Guayaquil and Quito. Finally, to meet the demand for digital and technical skills, it is necessary to improve alignment and coordination between businesses and academic institutions that develop training programs. The World Bank's Innovation Ecosystems Knowledge Pack can be used as a guide for collaboration with the private sector.

Be data driven. Evidence-based decision making within cultures of learning and experimentation enabled by educational technologies leads to more impactful, responsible, and equitable uses of data. At the MINEDUC level, it is critical to set specific targets and progression levels for digital skills development as well as to develop monitoring and evaluation tools, in collaboration with INEVAL, to better understand the progress made toward the main objectives of the Digital Education Agenda and Ecuador's National Curriculum. INEVAL could lead the task of conducting large-scale evaluations to understand student progress in digital skills as it has successfully done with other subjects, such as math, Spanish, and science. The [Remote Formative Assessment Knowledge Pack](#) can be used as a tool to provide information on how basic devices can support formative assessment activities and the continuation of learning outside the classroom even in low-resource contexts. The EdTech Hub monitoring and evaluation framework for blended learning and the World Bank's EdTech Readiness Index (ETRI) can also be used as a reference.

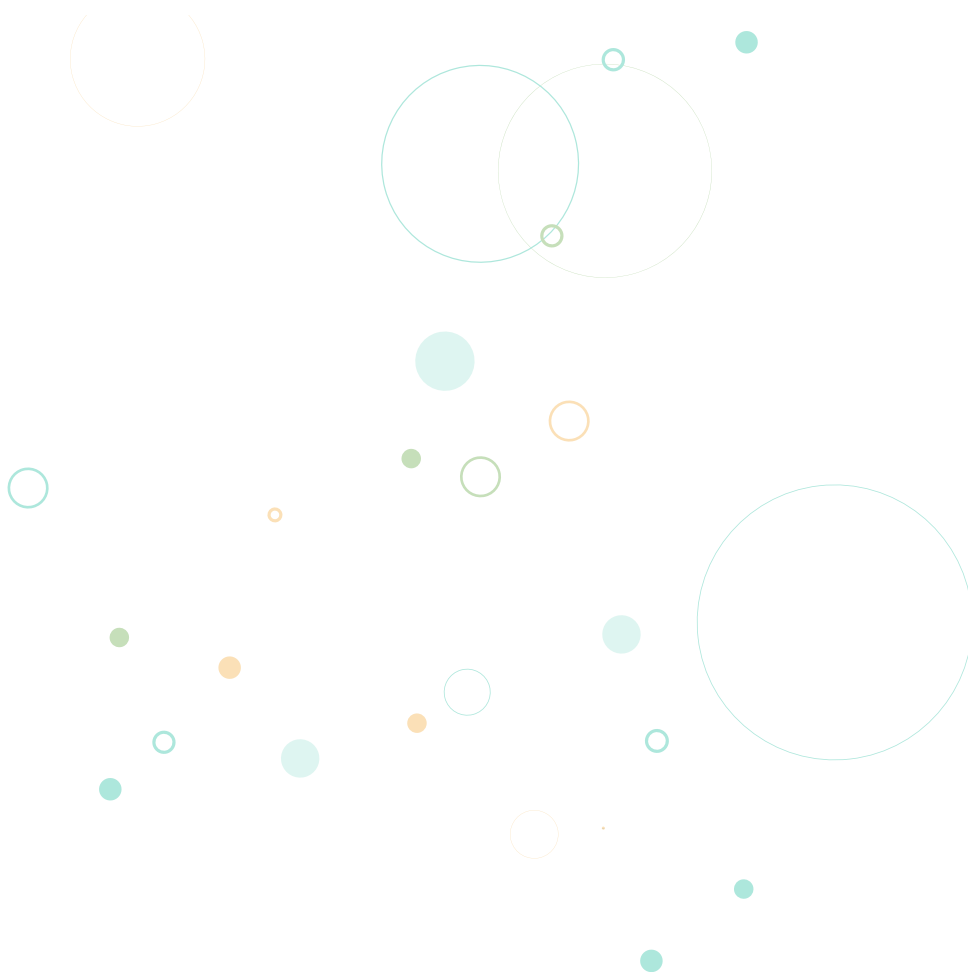
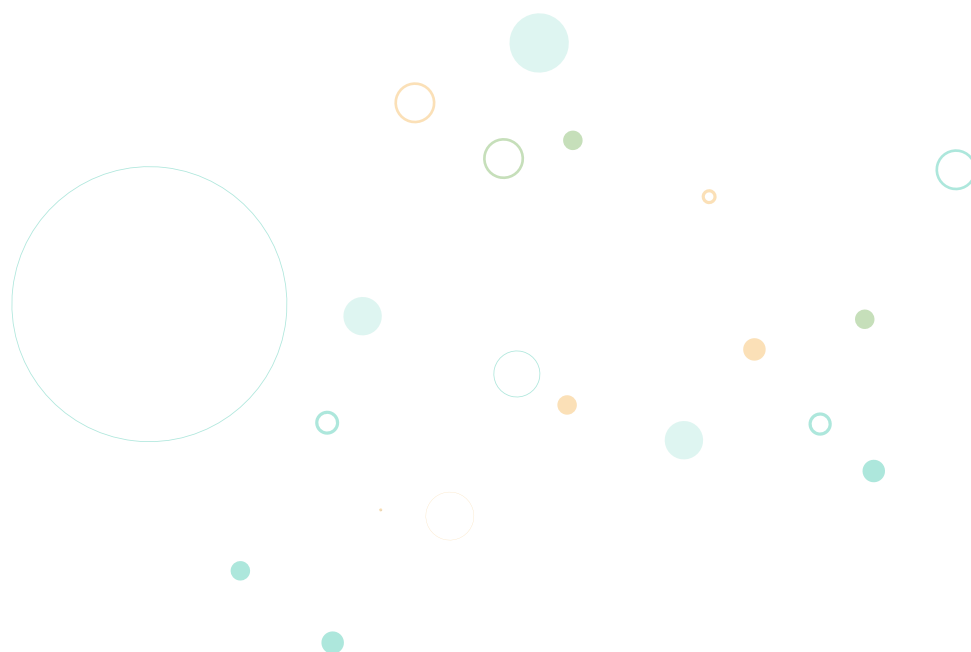


Table 6.5. Digital Skills: Policy Recommendations (1 of 2)

Reform area	Recommendation	Responsible Entity	Timing	Is Legal Change Required?
Curriculum and national framework for digital skills	Adjust the new Digital Education Agenda by specifying how can students develop digital skills, considering proficiency levels (foundational, intermediate, advanced, and highly specialized) from school to higher education. PRIORITY	MINED, National Directorate of Curriculum and National Directorate of Technologies for Education, SENESCYT, MINTEL	Short term	No
	Include complementary skills (devices and software operations, safety, problem solving, and career-related competencies) in the National Curriculum to ensure the meaningful development of digital skills. UNESCO's Digital Literacy Global Framework and the EU DigComp 2.1 can work as a guide to adjust Ecuador's digital competency in the National Curriculum.	MINED, National Directorate of Curriculum	Short term	Yes
Technology and infrastructure	Use digital technology that is widely available such as mobile devices to scale and improve teacher professional development and student learning, as <u>has been done in Chile, Colombia, and Argentina</u> .	MINED, National Directorate of Technologies for Education, MINTEL	Short term	No
	Ensure that both hardware and software at schools are in optimal condition to enhance the learning experience. At the same time, improve training programs for all teachers and students so that they can effectively use the devices provided for the teaching-learning process. PRIORITY	MINED, National Directorate of Technologies for Education	Medium term	No
Teacher professional development	Constantly update the virtual training platform <u>Mecapacito</u> and its monitoring process to ensure teachers are equipped with tools and strategies relevant to their day-to-day professional activities. PRIORITY	MINED, Secretary of Teacher Professional Development	Short term	No

Table 6.5. Digital Skills: Policy Recommendations (2 of 2)

Reform area	Recommendation	Responsible Entity	Timing	Is Legal Change Required?
Public-private collaboration	Foster public-private collaboration to strengthen the supply of digital skills programs. Both the government and private sector could invest further resources to increase and scale upskilling and reskilling programs, such as the ones offered by EPICO. Similarly, partnerships with TVET operators may make it possible to scale up effective programs such as ESPOL. Agreements with telecommunications operators could help increase access to computers and connectivity packages for all citizens through the program <i>Puntos del Encuentro</i> . PRIORITY	MINED, Directorate of Research and Innovation	Short term	No
Monitoring and evaluation	Develop monitoring and evaluation tools in collaboration with INEVAL to periodically measure progress, and identify good practices and areas where digital skills policies can be strengthened. PRIORITY	MINED, National Directorate of Curriculum and National Directorate of Technologies for Education, INEVAL	Medium term	No



7. TRUST ENVIRONMENT



Ecuador's Path to the Implementation of a National Strategy



KEY MESSAGES

- » **Ecuador has established key enablers and safeguards to support digital transactions and data flows, but a key institution for data protection has yet to be established.** Although the country has a comprehensive data protection framework with some key secondary legislation that will soon be approved, it lacks a data protection authority to monitor and enforce this data protection framework.
- » **Digital ID has the potential to offer digital authentication, but its adoption and usage need to be improved.** The launch of a new ID card that includes digital signatures could create new opportunities for service delivery, but it needs to reach the majority of Ecuadorians and its usage should be increased. The use of digital platforms, such as ID systems or interoperability platforms, could boost financial inclusion and improve the digital payments ecosystem.
- » **The newly adopted NCS is a notable achievement for Ecuador.** Its smooth implementation will require a well thought out action plan, established governance structure, and adequate allocation of financial resources.
- » **National-level incident response management, protection of critical information infrastructures, and national cyber crisis management are major areas to strengthen.** Although EcuCERT is serving as the *de facto* national CERT, its legal mandate is not adequate. NCS objectives for the protection of critical information infrastructures need to be advanced. To boost national resiliency, the country could consider preparing a national cyber crisis management framework.
- » **The allocation of further resources to fight cybercrime remains a priority as cyberattacks are growing in frequency and sophistication.** Ecuador has made significant advances in creating specialized units within relevant institutions. Major challenges in hiring and retaining qualified staff remain, along with developing skills and competencies to adjudicate complex and cross-border cybercrime cases.
- » **Building cybersecurity capacities in all sectors is one of Ecuador's main strategic medium-to long-term challenges, closely linked to the development of cybersecurity labor force development.** A specialized tripartite working group may be a pragmatic instrument to strengthen cybersecurity education in Ecuador.

7.1. The Importance of a Trust Environment: Building the Foundation for a Well-functioning Digital Economy

Previous chapters of this report have demonstrated how the digital economy and its various elements hold tremendous developmental promise. However, building a digital economy in a weak trust environment will inevitably jeopardize this promise. There is a growing understanding across the world that digital technologies will evolve into essential parts of the supply chain for many critical services, including social services. The integrity and availability of those services have become major national security concerns and challenges, and a country's failure to respond could lead to losses in potential economic value. Yet, security concerns are slowing the adoption of some technologies, especially cloud-based services, which is in turn preventing many countries from making the most of innovation to boost economic efficiency. For developing countries that seek a hyper-connected future, priority must be given to building a trust environment around digital technologies and their associated assets that today are often thought to be the most important infrastructure of this century.

7.2. Current State of the trust Environment: Overcoming Challenges in the Implementation of Ecuador's National Strategy

As Ecuador's digital economy advances and becomes more inclusive, strengthening data enablers and safeguards is instrumental to building a trust environment for the growth of electronic transactions and data flows. The World Bank's 2021 *World Development Report* categorizes data policies and regulations as enablers and safeguards. Enablers are policies and regulations that facilitate the use of data as a necessary condition for the digital economy, such as through data sharing models that underpin e-commerce transactions and public and private intent data. *Safeguards* encompass policies and regulations that protect personal and non-personal data and prevent data abuse, cybercrime, and other misuse.²⁹⁶ Despite significant advances in the past few years, Ecuador still faces barriers in establishing a reliable environment for strengthening international and domestic electronic transactions with a fair balance of data enablers and safeguards. Developing a comprehensive regulation of data exchanges is critical to (i) enabling the kind of interactions and data flows that are typical of an advanced digital economy; and (ii) ensuring

that personal data are collected, processed, and stored fairly and lawfully, that is, for a specific purpose only, in a manner that is not excessive concerning the specific purpose, and for no longer than necessary.

Data Regulation

In Ecuador, the right to data protection and the right to privacy are considered two separate fundamental rights.²⁹⁷ The right to data protection safeguards the protection of personal data, including access to and decision making over that information and its corresponding protection. The collection, archiving, processing, distribution, or dissemination of this data or information will require the data subject's consent (express authorization) or a specific legal mandate. On the other hand, the right to privacy refers to the right that prohibits arbitrary interference in the personal and family sphere. In Ecuador, the Comprehensive Organic Criminal Code (*Código Orgánico Integral Penal* [COIP]) further safeguards and protects the right to privacy by criminalizing violations, such as the disclosure of secret or personal information to third parties, dissemination of restricted circulation information, and violation of private property.

Ecuador has a comprehensive data protection framework that protects key rights, such as the right to be informed, right to access, right to rectification and update, right to erasure, right to opposition, and right to data portability, among others. The data protection framework consists of a specific law and several complementary laws. Existing constitutional safeguards, complementary laws, and secondary regulations address critical aspects of data regulation and personal data protection (see [Annex 3](#)). In May 2021, the National Assembly of Ecuador enacted the LOPDP, which is the first specific regulation that contains comprehensive personal data protection provisions, including general principles, rights, obligations, and protection mechanisms.

The LOPDP governs the processing of personal data whether automated or not, regardless of location (including in Ecuadorian territory or abroad), and covers all subsequent use of that data. The LOPDP establishes general principles governing personal data processing, such as lawfulness, fairness, transparency, (legitimate) purpose, data minimization, the proportionality of treatment, confidentiality, and others. The LOPDP also applies to individuals, private organizations, and government agencies that collect, process, and store personal data related to data subjects in Ecuador. In the case of cross-border data flows, Ecuador, along with

some other LAC countries, has adopted a conditional transfer model aligned with the EU's General Data Protection Regulation (GDPR).²⁹⁸ This approach promotes regional harmonization.

The LOPDP aligns with international standards and best practices but could be further developed to address certain shortcomings. During a cybersecurity diagnostic using the Cybersecurity Capacity Maturity Model for Nations (CMM, or CMM Ecuador),²⁹⁹ interviewed participants were in agreement that the LOPDP is aligned with internationally recognized standards and best practices,³⁰⁰ and that it is influenced by the EU's data protection regulations, mainly the GDPR.³⁰¹ However, the LOPDP was prepared and enacted in a rushed legislative process. Consequently, the law contains some inconsistencies as highlighted by national data protection experts at the time of its adoption.³⁰²

Implementation of the LOPDP faces important challenges, such as establishing an SPD and formally adopting the secondary legislation. The lack of LOPDP supervision, enforcement, and secondary legislation is becoming a major concern as its framework becomes legally binding. The LOPDP was enacted with a two-year grace period (until May 2023) to adapt all processes to the new provisions. In the meantime, the SPD has not yet been established. By the end of this grace period, the sanctioning framework will enter into force, but key secondary regulation is still not formally in place. Even though the latter has been prepared, it can only be adopted by the President of the Republic once the SPD is formally established. On that front, the Council of Citizen Participation and Social Control (*Consejo de Participación Ciudadana y Control Social* [CPCCS]) is the agency responsible for appointing the SPD Superintendent based on a shortlist proposed by the President of Ecuador (article 77, LOPDP). The CPCCS has already drafted the regulation for the appointment of the superintendent, but its formal adoption is pending while there is no official time frame for the formal establishment of the SPD. Although the sanctioning regime of the LOPDP came into force on May 2023, there have been no updates in the establishment of the SPD.³⁰³

Development of a qualified cadre of legal and technical advisors and data protection officers will be key to a successful and timely LOPDP. However, at the time of this writing, academic institutions had not developed robust training and degree programs for data protection specialists or data protection officers. To tackle this, the LOPDP framework could establish clear academic and experience requirements for data protection officers. This issue could be addressed through relevant secondary regulation.

As the SPD is not yet established, the awareness-raising and capacity-building activities in Ecuador are limited. Such activities are not systematic and are mostly conducted by government and civil society. As a result, the level of understanding of the LOPDP and its provisions among the public and MSMEs is still low. This may turn into a serious challenge for LOPDP implementation as public and private organizations are now obligated to comply with its specific legal and technical provisions, such as an impact evaluation, data leak and breach notifications, risk assessments, and monitoring mechanisms, among others. Insufficient capacity within public and private organizations, coupled with the absence of an SPD, is likely to become a major impediment to the implementation of a data protection framework in Ecuador.

Enhancing and implementing its data protection framework could help Ecuador fulfill the critical conditions needed to foster efficient and responsible data flows, strengthen the domestic digital economy, and facilitate the process of joining internationally recognized data protection conventions. The Council of Europe (CoE) provided technical assistance to Ecuador during the development and consultation process of the LOPDP and the related secondary regulations to harmonize those legal instruments with international standards and best practices. The ultimate goal is for Ecuador to join the Council's Convention 108+ on personal data protection.³⁰⁴

Ecuador's data protection framework should go further in addressing the challenges brought by emerging technologies, such as artificial intelligence, blockchain, cloud computing, and others. The current data protection framework does not expressly address the challenges of the evolving digital environment, such as protecting personal data before using artificial intelligence technologies and cloud computing. Regular reviews and necessary reforms would be instrumental in ensuring that the country is able to keep pace with the fast-changing technological environment.

Ecuador's performance on key data flow enablers identified in the 2021 *World Development Report* is on par with other middle-income countries. Overall, most LAC countries score higher on enablers than on safeguards for data transactions, with a high variance within the region. However, Ecuador is an exception to this trend (see [Table 7.1](#)).

- » **Enablers for e-commerce transactions.** Ecuador has a range of enablers in place to facilitate e-commerce transactions, including e-commerce legislation and legal recognition of electronic signatures, which includes Law No. 67 of 2002, the Law on Electronic Commerce, Electronic Signatures, and Data Messages (*Ley de Comercio Electrónico, Firmas y Mensajes de Datos*) and its secondary regulation Decree No. 3496 of 2005, General Regulation to the Law on Electronic Commerce, Electronic Signatures, and Data Messages (*Reglamento General a la Ley de Comercio Electrónico, Firmas Electrónicas y Mensajes de Datos*). A digital ID system is in place, but it cannot be used for digital authentication.
- » **Enablers for public intent data.** Ecuador has a robust open data framework that includes article 18, subsection 2, of the Constitution (access to information as a constitutional right), Law No. 24 of 2004, the Organic Law on Transparency and Access to Public Information (*Ley Orgánica de Transparencia y Acceso a la Información Pública*), and Law No. 162 of 2010, the Organic Law on the National System for the Registration of Public Data (*Ley Orgánica del Sistema Nacional de Registro de Datos Públicos*), with its secondary regulation, Decree No. 950, *Reglamento a la Ley Orgánica del Sistema Nacional de Registro de Datos Públicos*. The framework also covers policies (Open Data Policy of 2022) and guidelines (Open Data Guidelines)³⁰⁵ that address quality and interoperability standards, an open data roadmap, a common language standard, data protection provisions, and anonymization techniques, among others.
- » **Enablers for private intent data.** Article 17 of the LOPDP explicitly recognizes the right to data portability. Once established, the SPD will be responsible for adopting administrative resolutions to address the exercise of this right.
- » **Safeguards for cross-border transfer of personal data.** In Ecuador, the cross-border transfer of personal data is governed by the LOPDP, specifically in its Chapter IX: Cross-Border Flow of Personal Data. In principle, cross-border personal data flow is allowed if the data destination is a country, organization, or legal entity with adequate data protection levels.
- » **Safeguards for personal data.** As noted, Ecuador's overall robust personal data protection framework could be further strengthened (see [Annex 3](#)).
- » **Safeguards against cybercrime.** The COIP is considered the primary substantive and procedural cybercrime legislation in the country. It recognizes digital evidence as probative material within judicial investigation processes. Other procedural cybercrime provisions are contemplated in the Penal Procedure Code. Ecuador is not a signatory party to the Convention on Cybercrime of the CoE, known as the Budapest Convention, but the competent authorities, including the Ministry of Foreign Affairs, MINT-EL, and other ministries, are working closely with the Council to meet the accession requirements and join the Convention.
- » **Safeguards for child protection online.** The latest reforms to the COIP in 2021 integrated additional cybercrime offenses related to children, such as child sexual exploitation and child pornography, among others. Further reforms are in the National Assembly to strengthen child protection online in the country.
- » **Safeguards for intellectual property protection concerning digital services and products.** In 2021, Ecuador adopted the Organic Code on the Social Economy of Knowledge, Creativity, and Innovation (*Código Orgánico de la Economía Social de los Conocimientos, Creatividad e Innovación*), which regulates, among others, software and databases, open-source technologies and formats, and domain names. Since 2002, Ecuador has been a signatory party to the Copyright Treaty of the World Intellectual Property Organization and its Performances and Phonograms Treaty, known as the Internet Conventions.
- » **Safeguards for consumer protection online.** Article 52 of the Constitution establishes the foundation for consumer protection legislation in Ecuador. The Organic Law on Consumer Defense (2000) and Law No. 67 of 2002, the Law on Electronic Commerce, provide further consumer protection provisions.

Table 7.1. Summary of Key Safeguards and Enablers for Ecuador and Selected Benchmark Countries

Dimension \ Country	Enablers				Safeguards		
	E-commerce/e-transactions law	Digital ID system for online authentication	Open data act/policy	Data portability rights	Personal data protection law	National cybersecurity strategy/plan	Regulation of non-personal government data
Ecuador	YES	NO	YES	YES	YES	YES	NO
El Salvador	YES	NO	YES	NO	NO	NO	NO
Costa Rica	YES	YES	YES	NO	YES	YES	YES
Colombia	YES	YES	YES	YES	YES	YES	YES
Mexico	YES	NO	YES	YES	YES	YES	NO
Dominican Republic	YES	YES	YES	NO	YES	YES	NO

Source: Framework from World Bank (2021d). For Colombia, Mexico, and the Dominican Republic, data from World Bank (2021d); for Ecuador, El Salvador, and Costa Rica, data are based on original analysis.

Digital ID

Ecuador has made important advances in the past decade to ensure that all individuals are registered and have a digital ID. In 2010, the GoE started a new project to modernize the system, reaching some remarkable achievements. These include: (i) moving from paper-based to an electronic registration process; (ii) increasing birth registration from 80 to 90 percent; (iii) increasing identification coverage from 78 to 95.4 percent (iv) beginning the process of issuing a modern and more secure national ID; and (v) transforming an obsolete technology infrastructure by developing its own technological solutions. However, Ecuador still faces challenges related to the digital identity system and promoting a more secure and inclusive access to services.

In 2021, the ID agency started a process to revamp authentication mechanisms for service delivery, but usage is low. Since February 2021, the DIGERCIC has been issuing a new ID card with a chip that includes the person's digital signature. By using this ID, individuals can sign electronic documents more easily and securely. Although this new card is being issued progressively and the digital signature is already in the chip, the DIGERCIC and MINTEL have not yet developed the technical

mechanisms needed for its digital use, and the new ID card has not reached a large portion of the population.

The GoE could continue to support efforts to supply a mobile option for authentication. The ID agency and MINTEL are developing solutions to store the ID card in smartphones to ease authentication for access to services. As implemented by other countries such as Peru, these developments will facilitate access to digital wallets and digital payments.

Including the digital signature in ID cards could open new possibilities. Considering that the ID agency was certified to provide digital signatures and some regional initiatives for the recognition of cross-border digital signatures (e.g., Argentina and Uruguay), the government could use the digital ID to boost the use of international digital signatures to facilitate trade.

Strengthening the digital ID infrastructure is critical to the government's response in the event of a new public emergency. For example, in 2018, Guatemala used the digital ID infrastructure to quickly identify people after an earthquake. Similarly, some countries, including India and Peru, used the digital ID system to rapidly provide social benefits and cash transfers for those affected by the lockdown during the COVID-19 pandemic.

There are considerable gaps in the linkages between public platforms and digital payments. Ecuador still faces gaps related to financial inclusion and payments, especially with digital payments, as less than half the population has made or received digital payments in the previous year (for a more detailed discussion on DFS uptake, see [Chapter 4](#)). Similarly, only 59 percent of Ecuadorians have a smartphone. Although during the pandemic alternative payment systems were explored by the GoE, the most frequently used channels for payments are still offline—using ATMs or going to one of the 3,500 points of sale to receive cash. As an example, the payment of the Emergency Subsidy (*Bono de Emergencia*) delivered during the pandemic was mostly deployed through the 7,000 points of sale selected by the GoE.

Digital platforms, such as ID systems or interoperability platforms, could boost financial inclusion and the digital payments ecosystem. The deployment of the enhanced ID card could ease the use of secure and reliable authentication methods to access banking services. For example, new authentication methods for service delivery such as a one-time-password could be implemented. Likewise, the GoE could consider alternative online authentication mechanisms for those living in areas without internet connectivity.

Cybersecurity and Cybercrime

COVID-19 accelerated the digital transformation process worldwide, bringing about business innovation and rapid technological changes, but it also revealed vulnerabilities and brought about new cybersecurity threats and risks. Cyberattack vectors, such as ransomware, phishing, and distributed denial of service, are causing severe harm to critical infrastructure operations, economic value, and livelihoods.³⁰⁶ Even when there is no tangible damage, concerns among citizens and consumers regarding potential cyber risks undermine trust in the adoption and use of digital products and services. As the world is increasingly interconnected and digital technologies underpin personal lives and business activities across many sectors, cybersecurity must become an integral and instrumental component of the overall digital ecosystem.

In the past few years, Ecuador has consistently built and enhanced its cybersecurity capabilities, but further strengthening is important to match ever-growing challenges in the cybersecurity domain.

Ecuador, like any country, operates in an environment prone to significant cyberattacks, which are increasing in frequency and sophistication. For example, in 2021, ransomware cyberattacks targeted the Pichincha Bank and the Ministry of Finance. In 2022, similar attacks targeted the Municipality of Quito's IT infrastructure and the Strategic Intelligence Center's computer platform, compromising the information processed by this institution and the intelligence systems of the Armed Forces and the police. The Ecuadorian Joint Command of the Armed Forces was also attacked.³⁰⁷ As there is no mandatory incident reporting regulation, cyberattacks are likely to be under-reported, especially by private sector firms. The Password Managers' 2020 Cybersecurity Exposure Index ranks Ecuador 63rd out of 108 countries in its global ranking and the eighth most exposed country in South America—the region with the second-highest exposure score per country.³⁰⁸ In 2021, there were approximately 623 million ransomware attacks worldwide, nearly 20 ransomware attempts every second, according to the 2022 SonicWall Cyber Threat Report. Although the global ransomware volume per year dropped in the first half of 2022, it remains far above pre-pandemic levels and this attack vector continues to cause harm globally.

ITU's 2020 Global Cybersecurity Index ranked Ecuador 119th out of 182 countries and 19th in the Americas region, suggesting a potential lag in organizational and cooperative measures.³⁰⁹ Likewise, the E-Governance Academy's National Cyber Security Index gives Ecuador a score of 53.25 out of 100 in cybersecurity preparedness and ranks the country 63rd out of 160.³¹⁰ Ecuador's commitment level concerning cybersecurity has been substantially enhanced in the past few years. However, the entire national ecosystem needs to coordinate and work closely to strengthen cybersecurity capacities in all sectors and to enhance their performance and outcomes, particularly in the implementation stage, when financial and technical support is especially needed.

The newly adopted NCS for 2022–2025 is a notable achievement for Ecuador. In 2019, Ecuador started strengthening its cybersecurity capacities with the development of the National Cybersecurity Policy, which was adopted in 2021. Recent governments have consistently made cybersecurity a national priority. Technical support was recently leveraged from the Organization of the American States (OAS) and other international partners, such as Cyber4Dev, MITRE, and the World Bank, to further strengthen the policy effort in this area (see [Box 7.1](#)).

BOX 7.1. National Cybersecurity Strategy 2022–2025

In August 2022, following a multi-stakeholder consultative approach led by the government, Ecuador formally adopted a new National Cybersecurity Strategy 2022–2025³¹¹ through Resolution No. CNC-2022-07 of the National Cybersecurity Committee.

The NCS has six pillars: (i) national governance and coordination, (ii) cyber resilience, (iii) prevention and fight against cybercrime, (iv) cyber

defense, (v) cybersecurity skills and capabilities, and (vi) international cooperation. Ecuador now needs to develop an action plan to implement the activities associated with those six pillars. The lines of action should be regularly monitored and evaluated to ensure adequate implementation in order to avoid any duplication of effort and to maximize resources.

Source: MINTEL (2021).

Establishing a national cybersecurity governance structure to implement the NCS is a priority for the country. The first pillar of the NCS addresses the need to establish a national cybersecurity governance structure. The NCS aims to strengthen the role of the national cybersecurity coordinator at the National Cybersecurity Committee (CNC, *Consejo Nacional de Ciberseguridad*). The CNC was established in 2021 and is composed of government agencies and ministries, such as the Ministry of Foreign Affairs, the Ministry of the Interior, the Ministry of National Defense, the Strategic Intelligence Center (*Centro de Inteligencia Estratégica*), and MINTEL, which presides over the committee. CNC members meet every two months or when needed. The NCS and the provisions of the LOTDA and its secondary regulation (Decree No. 813, published officially in the Gazette on July 11, 2023) provide the foundation for the cybersecurity governance structure, including the fact that MINTEL is the governing body for digital transformation and digital government matters. Those legal provisions provide specific instructions in the cybersecurity domain, such as the development of a regulatory framework for the national digital security governance. However, the framework is yet to be developed. Such governance framework shall be developed by MINTEL and CNC (Art. 26 Decree No. 813).

Incident Response and Crisis Management Capabilities

Establishing a national-level computer emergency response team is urgent for the country and the entire digital ecosystem. Ecuador does not have a

national-level incident response team (national CERT) or a central registry to record and categorize the cyber incidents that occur in the country. Given the need to establish a national CERT in Ecuador, both MINTEL and ARCOTEL have encouraged EcuCERT (the telecom sectoral CERT) to adopt and integrate, within its management, some functions and responsibilities that are typical of a national CERT. Due to restrictions within its legal mandate that have not yet been addressed, EcuCERT was not *de jure* nominated as a national CERT. Despite the above, EcuCERT continues to operate as the *de facto* focal point for incident response for international partners and incident response communities (e.g., FIRST³¹²) and to monitor the government ICT infrastructure.

To operate at a national level, EcuCERT's operational incident response management capacity, including human, technological, and financial resources, has to be strengthened. To strengthen EcuCERT's incident response capacity, MINTEL and ARCOTEL plan to develop a Security Operations Center that will be managed by MINTEL/EcuCERT. MINTEL and ARCOTEL have recently elaborated a five-year budget plan to supply state-of-the-art resources for this goal. EcuCERT staff was recently renewed, and some technological resources and tools have been procured. However, further software and hardware components are reportedly needed.

Establishing EcuCERT as the national CERT will build stronger trust throughout the ecosystem. Additionally, robust incident reporting and information-sharing frameworks are needed to ensure that public and private sector organizations are obligated not only to report their cyber incidents to the national CERT but also to share relevant information with the community to prevent and adequately contain the cyber incidents that do occur.

Large and international organizations, mainly in the telecommunications, financial, and energy sectors, are developing their own incident response management capacities. MSMEs have very little to no capacity to handle cyber incidents. Most public and larger private organizations, especially international, have developed internal mechanisms to manage incidents, including identification, categorization, containment, and recovery. Some organizations have technical support provided by their headquarters or regional offices, while others outsource security operations services, which is common since qualified personnel and relevant technological tools are difficult to afford. However, MSMEs rarely have the resources to address cybersecurity, and there is often a low level of awareness of cybersecurity issues. The level of vulnerability in this domain is high.

Although sectoral CERTs are emerging, more needs to be done to advance these initiatives. For instance, in the financial sector, the SB and ASOBANCA have explored the possibility of creating a sectoral CERT, but this initiative has not yet gotten off the ground. Efforts have also been made to establish a sectoral CERT in the energy sector. For example, the Electric Corporation of Ecuador (*Corporación Eléctrica Del Ecuador* [CELEC]) has a CERT with an acceptable operational level, and in the past, the possibility of expanding the target community to cover all companies in the electricity sector was discussed but did not materialize. It would be important to follow up on these two significant bottom-up initiatives. Since EcuCERT currently operates as de facto CERT for the telecom sector, if it were to formally become the national CERT, a new sectoral CERT for that sector may be needed.

There is no national cyber crisis management framework in Ecuador, and national cybersecurity exercises are not systematically organized. Cybersecurity is not yet integrated into Ecuador's national crisis or emergency management structures. In 2020, MINTEL drafted a cyber crisis management plan, but it did not evolve due to the lack of a clear cybersecurity governance structure that could take it forward. There is an outstanding need to develop a comprehensive framework with roles, responsibilities, procedures, and protocols to manage national cyber crises. Moreover, national cybersecurity exercises are not systemically organized and require the broader participation of critical domestic and international partners. In other countries, such exercises are being led by the national CERT.

Cybercrime

Ecuador has comprehensive cybercrime legislation.

The COIP of 2014 is considered the primary substantive and procedural cybercrime legislation. To keep pace with the fast-changing technological and cybercrime landscape, in 2021 the COIP was amended to integrate more cybercrimes into domestic criminal legislation. The COIP has also recognized digital evidence as probative material within judicial investigation processes. Other procedural cybercrime provisions are contemplated in the Penal Procedure Code.

Ecuador is on the path to becoming a signatory party to the Budapest Convention.³¹³

The Ministry of Foreign Affairs recently presented an accession request to the CoE, and to date, there have been no objections by the other member states. According to the accession procedure, Ecuador has five years (ending in March 2027) to complete the ratification process. Recent amendments to the COIP aim to harmonize the domestic substantive and procedural cybercrime provisions with the Budapest Convention and its protocols. In the meantime, the CoE, through its Glacy+ and Octopus programs, will provide technical assistance and training to Ecuador to strengthen its cybercrime legislation and human resource capacities.

In 2011, the National Police established a specialized cybercrime unit (*Unidad de Delitos Cibernéticos*), but developing the unit and finding enough qualified staff have been a challenge.

This specialized unit's operations center is based in Quito and its jurisdiction is nationwide. The unit is resourced by the National Police and its headcount is around 20 staff. Its investigators and police officers have experience in both investigative and technical aspects and begin the investigative process once the incident is reported to the Prosecutor's Office, which verifies the criminal nature of the reported conduct and then delegates the investigation to this unit. However, the current capacity of the unit to hire new staff and procure new equipment and software is limited by financial resources. For instance, the unit does not have a digital forensic lab and depends on another department for its forensic analysis. Concerning human capital, for its current training opportunities the unit mainly relies on its international partners (e.g., the CoE) and to some extent on domestic training centers, such as the National

Police Institute, which plans to offer a specialized degree in cybercrime and digital evidence. Currently, many investigators and police agents are pursuing an online master's degree in cybercrime from the International University of La Rioja (*Universidad Internacional de La Rioja* [UNIR]), which will enhance the capacity within the unit. Nevertheless, finding qualified investigators has become a significant challenge for Ecuador, as is the case for many other countries around the world.

There are plans to strengthen the unit's investigative capacity, as the high workload may have a negative impact on its ability to process all cybercrime investigations in a timely manner. In 2021, the specialized unit processed an average of 1,851 investigations (some still in progress); on average, each investigator oversees roughly 200 cases. The high workload prevents investigations from being completed promptly and adequately. To address the situation there are plans to increase the staff count and to open a new center in Guayaquil to decentralize the operation. Despite its limited capacity, in recent years the unit has carried out multiple investigations that have sent 46 cybercriminals to prison, and the first person tried for online child pornography crimes has been sentenced to 33 years. The unit participates actively in awareness-raising campaigns targeting the general public and school-age children. For instance, the unit plans to implement a program called “*ciberpatrullaje*,” using OSINT and WEBINT sources and techniques, to monitor illegal activities in cyberspace and generate early alerts to the community.

The investigation and prosecution of cybercrime cases in the country is the responsibility of the Prosecutor's Office (*Fiscalía General de Estado*), which, despite facing challenges related to qualified staff and financial and technical resources, is being strengthened. In 2022, the Prosecutor's Office created a specialized cybercrimes unit (*Unidad Nacional Especializada en Investigación del Ciberdelito*) that has nationwide jurisdiction, but its operations center is also in Quito. As this unit was recently created, hiring qualified staff (mostly lawyers specializing in cybercrime and digital evidence) is an immediate first challenge.

The judiciary system is responsible for adjudicating cybercrime cases, but most judges have a limited knowledge of cybercrime and digital evidence. There is no specialized cybercrime court within the judiciary system. In most countries in the region, judges and magistrates are highly skilled in civil and penal procedures, but their level of understanding and knowledge of cybercrime and digital evidence is still limited.

The Judiciary Training Center (*Escuela de la Función Judicial*) provides regular training to judges, magistrates, and prosecutors, but its programs need to be strengthened to increase the level of specialization in this area. The Judiciary Council (*Consejo de la Judicatura*) is aware of this and is working with judicial authorities to develop the skills and competencies needed to adjudicate complex and cross-border cybercrime cases in the country.

Cybersecurity Awareness Raising and Skills Development

The NCS acknowledges the significant cybersecurity knowledge and skills gaps and underlines the need to strengthen cyber awareness in all sectors and to expand cybersecurity education offerings, particularly among vulnerable groups. In terms of awareness raising, some government agencies and ministries (e.g., National Police, MINTEL) and organizations from the private sector (e.g., Microsoft, ISACA), civil society (e.g., *Asociación Ecuatoriana de Ciberseguridad*), and academia (e.g., *Universidad Central de Ecuador*, *Escuela Politécnica Nacional*, and *Universidad Técnica del Norte*) carry out awareness-raising campaigns and activities (e.g., *Internet Segura*, *Safer Internet Day*, *Seguros en la Red*). Some campaigns target primary and secondary school students, teachers, and parents. Although these campaigns are not coordinated, their impact seems to be relatively high.³¹⁴ The NCS aims to introduce some needed coordination, which may potentially strengthen the outcomes of those activities. Currently there is no nationally coordinated awareness program targeting vulnerable groups.

The curricula of primary and secondary schools do not cover cybersecurity-related courses at present, and knowledge about the essentials of cybersecurity is delivered through suboptimal awareness-raising campaigns. The NCS foresees specific activities, such as developing a national education plan and integrating cybersecurity-related content into primary and secondary education curricula targeting school students and teachers. At the time of this writing, those activities had not yet been implemented. MINTEL is in dialogue with MINEDUC to explore collaboration opportunities. It is important that all stakeholders come together to build a robust and interactive academic program to raise awareness, enhance cyberculture, and promote the attractiveness of cybersecurity education.

The demand for cybersecurity services and professionals has increased sharply since 2020 as more public and private sector organizations seek to protect their digital assets from cyberattacks. Developing a cybersecurity labor force is a challenge not only for Ecuador but globally. Cybersecurity education activities planned under the NCS are expected to be implemented within the 2022–25 period, but many of these are not what could be called low hanging fruit and therefore need to be addressed immediately. For instance, there is a lack of well-versed cybersecurity academics, specifically for courses requiring a certain level of specialization, such as malware engineering, cyber defense, and forensic analysis. There are highly qualified cybersecurity professionals in the country, but they do not work in academia. There are no formal training programs for academics or public policies that encourage cybersecurity professionals to venture into the academic field. At the beginning of 2022, there was still no policy to incentivize the attractiveness of cybersecurity careers, and public and private universities and other organizations did not offer any scholarships or student loan programs focused on cybersecurity.

The academic offering of cybersecurity education at the tertiary level is growing, but it is not keeping pace with the country's current demands and is about to reach its capacity limit. Academic offerings of cybersecurity-related content in ICT education in Ecuador are limited. For instance, in engineering degrees, such as informatics, systems, software development, telecommunications, and the like, there is only one cybersecurity- or information security-related course within the entire academic program. The undergraduate and master's degree programs, which offer six or seven different options (with a couple under development), are growing and their enrollment rate is around 20 to 30 students per course on average. However, they are about to reach their capacity limit—including facilities, academics, and courses—and their scope is limited to the computer science field. It is highly recommended that cybersecurity education be strengthened from different angles, such as more accredited degree programs, facilities, and academics. Furthermore, cybersecurity education in Ecuador needs to adopt a multidisciplinary approach, integrating cybersecurity-related courses into business administration schools, law schools, and other faculties' curricula to develop a robust cadre of professionals with comprehensive cybersecurity training.

Research and development projects in cybersecurity are at an incipient stage. Several universities are developing research projects that address some relevant topics, such as software security and cryptography, but their impact is still low. The NCS refers to the need to

integrate research, development, and innovation activities into the cyber defense field through academic offerings. However, it does not outline any specific actions in the NCS action plan. It may be useful to consider developing research and development activities with the support of the private sector.

A specialized tripartite working group may be a pragmatic instrument to strengthen cybersecurity education in Ecuador. In countries where this kind of working group has been established (e.g., the United Kingdom), cybersecurity education has expanded and is able to inform and advance national priorities in this area more efficiently. A working group formed by representatives of the relevant government authorities, academia, and industry could explore collaboration mechanisms, address the current academic needs of the domestic cybersecurity market, and exchange and collect metrics and statistics to inform policy development, including the NCS and its action plan.

Critical Infrastructure Protection

Ecuador has not officially identified its critical national digital infrastructure (*Infraestructuras Críticas Digitales* [ICD]), and critical private sector assets need to be included in any such identification process. In 2019, the relevant authorities developed some guidelines for identifying ICDs. In 2020, the Ministry of Defense and the Cyberdefense Command (*Comando de Ciberdefensa* [COCIBER]), using their own methodology, started the ICD identification process, whose scope was limited to public sector assets, excluding from the review those ICD assets managed by the private sector. However, the current status of this identification process has not been disclosed.

Pillar 2 of the NCS recognizes the need to adopt a comprehensive framework for the identification, regulation, and supervision of ICD, but though a comprehensive framework is an important first step, the country needs to accelerate its implementation efforts. Through its NCS, Ecuador establishes that both public and private sector ICDs need to be identified, regulated, and supervised to ensure adequate protection for critical services. The CNC is tasked with the development of a methodology for ICD identification based on social, economic, and environmental considerations as well as a list of ICDs (*catálogo de ICD*) that should be updated regularly. Although this comprehensive effort has been identified, it is important to move ahead with its implementation.

Security Standards Implementation

The Government Scheme for Information Security (*Esquema Gubernamental de la Seguridad de la Información* [EGSI]) Version 2.0 is progressively being adopted and implemented by public institutions.

The ISO [International Organization for Standardization] 27000 family standards inspire this information security framework, and MINTEL supervises its implementation. Early in 2022, MINTEL supervised only those public institutions that reported a 100 percent compliance level. Public agencies are obligated to submit an EGSI Version 2.0 compliance report every January; as of 2020, the great majority were in the range of 70 to 90 percent compliance.³¹⁵

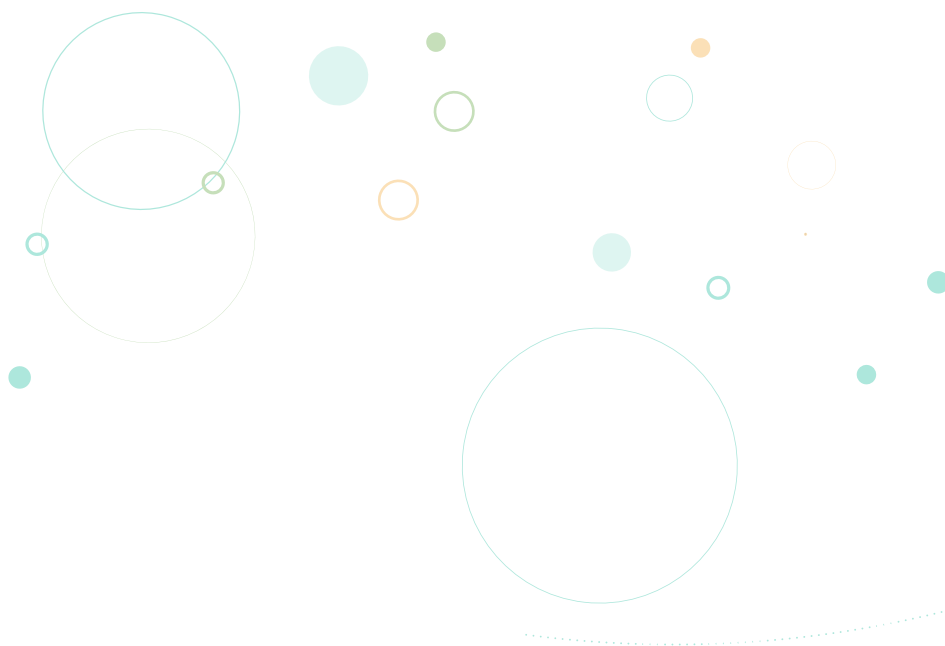
Large and transnational companies, mainly in the financial and telecommunications sectors, have developed their own information security schemes based on international standards and good practices, such as ISO 27001, ISO 22301, and the U.S. National Institute of Standards and Technology (NIST), among others. The CMM Ecuador revealed that security standards and best practice implementation in the ICT field varies and depends on the nature and size of the organization and the sector in which it operates. Since the degree of awareness at the domestic corporate level is improving due to COVID-19 and other factors, more

and more public and private organizations are adopting a responsible posture. As a result, those organizations are investing more resources in cybersecurity and implementing general or sector-specific security standards, mainly as a best practice or even because the market demands their implementation to guarantee service availability. Some sophisticated users are starting to see it as a differentiating element when selecting a service provider because the privacy and security of users' personal information are at stake. Nevertheless, many private companies and even a few public institutions still do not implement security standards and best practices because the existing human and financial resources and level of awareness are limited.

Sectoral regulators are progressively integrating security standards and measures into the regulatory compliance framework. MINTEL and the SB are progressively integrating security standards and measures through sectoral resolutions and guidelines, but they do not have a holistic approach. The Ministry of Energy, the Civil Aviation Directorate, the Ministry of Transport, and the Ministry of Health, as regulators of the energy, airport, transport, and health sectors, respectively, have not adopted any specific security framework or technical resolutions because public institutions are subject to EGSI Version 2.0 compliance. However, many private sector organizations are not subject to this government information security framework, thus creating significant gaps within the ICD sectors.

Table 7.2. Key Trust Environment: Challenges and Opportunities

Strengths	Areas for Improvement
<ul style="list-style-type: none"> » Recently adopted comprehensive strategy (NCS) and Committee (CNC) for cybersecurity issues. » The LOPDP aligns with international standards and best practices (e.g., GDPR). » Existence of a comprehensive data protection framework that safeguards key rights (e.g., right to information, access, rectification, updates, erasure, opposition, and data portability, among others). 	<ul style="list-style-type: none"> » Lack of an SPD to monitor and supervise adherence to data protection legislation. » Lack of a national cyber crisis management framework. » Limited awareness-raising and capacity-building activities. » Need to decentralize the operation of the specialized cybercrime units within the National Police and Prosecutor's Office. » Limited resources to carry out operative budget for agencies leading national cybersecurity, cybercrime, and data protection issues (CNC, SPD, EcuCERT, etc.).
Opportunities	Challenges
<ul style="list-style-type: none"> » Technical support from the international community (World Bank, OAS, Cyber4Dev, MITRE) is available. » The new ID card with digital signatures could create new opportunities for service delivery. » The successful establishment of EcuCERT as the national CERT could build stronger trust throughout the ecosystem. » The integration of municipalities into national cybersecurity policies and plans could help advance the cybersecurity resilience of the country. 	<ul style="list-style-type: none"> » Inadequate incident response capabilities, procedures, and protocols to manage a major national-level cyber crisis. » Inadequate cybercrime investigation, prosecution, and judiciary capacity. » Limited resources for the implementation of the NCS and its action plan. » Limited or nonexistent policy and legal frameworks to address cybersecurity and data protection issues for emerging technologies.



7.3. Recommendations: Strengthening Incident Response Management and Protection of Critical Information Infrastructures

This chapter identified three main areas where considerable effort should be undertaken to improve Ecuador's trust environment:

- » **Cybersecurity strategy and its implementation and governance structure.** The establishment of a legal framework for the cybersecurity governance structure (although clear instructions were given to MINTEL and CNC by the LOTDA's secondary regulation, it has not been developed yet) and the allocation of sufficient resources to implement the pillars and strategic objectives of the NCS are instrumental to the enhancement of the country's cybersecurity capacities. Among those objectives are: (i) the adequate operation of the EcuCERT as the national CERT, (ii) the development of the NCS action plan, and (iii) the identification and inventory of ICD in the public and private sectors.
- » **Legal and regulatory framework.** The current cybersecurity, cybercrime, and data protection frameworks have room to be refined to integrate internationally recognized standards and best practices. In the case of data protection legislation, the competent authorities may consider correcting the existing form and substance errors via secondary regulation and addressing the challenges brought forth by emerging technologies. The cybercrime legislation was recently updated, but regular reviews are highly recommended. Ecuador's cybersecurity framework should adopt incident reporting and information-sharing frameworks, as well as national cyber crisis management policy and legal frameworks. The establishment of a legal framework for the identification and protection of ICD and other critical services operated by the public and private sectors needs to be a priority. Strengthening the legal mandates of the CNC and EcuCERT in accordance with the NCS is also important.

- » **Capacity building, skills and knowledge development.** In Ecuador, there needs to be a consistent national effort to strategically build a labor force in cybersecurity, something that is also noted in the NCS. For instance, the competent authorities could address the following: offering more accredited degree programs in cybersecurity, integrating cybersecurity courses into the primary and secondary education curricula, and strengthening the cybersecurity or information security courses in the technology-based degree programs. A specialized tripartite working group may be a pragmatic instrument to strengthen cybersecurity education in Ecuador. There is an urgent need to create better training opportunities—at the specialization level—for officials from law enforcement agencies, the Prosecutor's Office, and the judiciary branch in cybercrime and digital evidence. It is vital that the competent authorities (MINTEL, EcuCERT) work closely with regional chambers of commerce and other partners from the private sector and academia to coordinate all awareness-raising efforts and increase cybersecurity awareness among MSMEs and vulnerable groups.

Implementing the suggested policy and legal reforms and making further investments to strengthen these three key areas will benefit the domestic digital ecosystem and cybersecurity market. By creating an inclusive, trustworthy, and secure digital environment, Ecuador will enhance its level of cyber resilience and become an attractive spot for national and foreign private investment from the technology industry. Indeed, tech companies planning to do business in a foreign country seek, among other factors, legal certainty, highly qualified human capital, and a high commitment to promoting a reliable digital economy and digital security environment through the adoption of national policies and legal and regulatory frameworks. The table below offers recommendations along the priorities identified above.

Table 7.3. Trust Environment: Policy Recommendations (1 of 4)

Reform area	Recommendation	Responsible Entity	Timing	Is Legal Change Required?
Cybersecurity strategy and its implementation and governance structure Consistent implementation of the NCS pillars and strategic objectives, with efficient monitoring and evaluation mechanisms, sufficient resources, and a functional and inclusive governance structure, is instrumental to advancing national cybersecurity capacities.	Prepare an action plan for the implementation of the NCS. Such a plan should distribute responsibilities and be backed by the necessary financial resources. PRIORITY	CNC	Short term	No
	Conduct monitoring and evaluation of NCS implementation to ensure implementation performance, to introduce timely adjustments as needed in the event of lagging actions, and to adjust resources to ensure all actions are implemented.	CNC	Short to Medium term	No
	Ensure that EcuCERT has a mandate to operate as the national-level incident response management authority. EcuCERT may need to strengthen its human, technical, and financial capacities to comply with this formal role. PRIORITY	CNC	Short term	Yes
	Ensure that the cybersecurity governance regulatory framework is adopted and becomes operational and also contains specific functions to promote an inclusive and coordinated environment. Establishing the legal instruments for the governance structure is vital to adequately implement cybersecurity strategies and policies. PRIORITY	MINTEL, CNC	Short term	Yes
	Integrate municipalities into cybersecurity strategies and policies to enhance national cybersecurity capacities. Municipalities are not part of the current national cybersecurity effort. Integrating subnational institutions into this effort will enable them to be more inclusive and closer to the people.	CNC, Association of Ecuadorian Municipalities	Medium term	No

Table 7.3. Trust Environment: Policy Recommendations (2 of 4)

Reform area	Recommendation	Responsible Entity	Timing	Is Legal Change Required?
Legal and regulatory framework Keeping an updated cybersecurity legal and regulatory framework is vital for a well-functioning society. Even though Ecuador has established comprehensive data protection and cybersecurity and cybercrime legislation, it needs to be regularly reviewed and updated to keep pace with the fast-changing environment. The country also needs to identify and regulate the critical information infrastructure sectors and assets, including the essential services operated by the private sector. It is additionally important to establish mandatory incident reporting and information-sharing obligations and a national cyber crisis management framework to enhance national cybersecurity capacities.	Adopt secondary regulation for implementation of the data protection framework and establishment of the SPD. Both actions are crucial to practical implementation, oversight, and enforcement of the data protection provisions within the public and private sectors. PRIORITY	CNC, President's Office, SPD	Medium term	Yes
	Regularly review and update the substantive and procedural cybercrime framework to ensure that it facilitates the accession process to the Budapest Convention.	CNC, Ministry of Justice	Medium term	Yes
	Establish a critical information infrastructure protection framework to ensure that national critical information infrastructure sectors and assets owned both by the public and private sectors are adequately protected. PRIORITY	CNC, Ministry of National Defense, EcuCERT, sectoral regulators	Short term	Yes
	Establish a mandatory incident response and information-sharing framework to strengthen the collaboration among stakeholders and incident response effectiveness. PRIORITY	CNC, EcuCERT, Ministry of National Defense, sectoral regulators	Short term	Yes
	Establish a national cyber crisis management framework and organize regular national cyber drills to define the roles, responsibilities, and specific procedures and protocols in the event of a major cyber crisis. This will boost the country's level of cyber resilience and capacity.	CNC, EcuCERT, Ministry of National Defense, sectoral regulators	Short term	Yes
Capacity building and skills and knowledge development Ecuador has to improve cybersecurity awareness in all sectors and boost cybersecurity skills and knowledge development to reach an adequate cyber resilience level.	Establish a nationally coordinated cybersecurity awareness-raising effort , with support from the private sector, civil society organizations, and academia, covering a wide range of demographics, including vulnerable groups, such as the poor, persons with disabilities, elderly, children, and female heads of households, as well as MSMEs.	CNC, MINTEL, EcuCERT, Chambers of Commerce, private sector, civil society organizations, academia	Short term	No

Table 7.3. Trust Environment: Policy Recommendations (3 of 4)

Reform area	Recommendation	Responsible Entity	Timing	Is Legal Change Required?
	Ensure that the competent authorities, with support from the private sector and academia, provide technical assistance and resources to enhance the cybersecurity posture of the private sector, especially MSMEs.	CNC, MINTEL, EcuCERT, Chambers of Commerce and industry, civil society organizations	Short term	No
	Establish a skills and knowledge development program for public servants. It is recommended that systematic capacity-building activities be carried out, followed by skills tests, to strengthen cybersecurity capabilities in the public sector and thus mitigate the negative impact of cyberattacks.	CNC, MINTEL, EcuCERT	Short term	No
	Build the knowledge and capabilities of EcuCERT staff. It will help EcuCERT to meet the challenges related to the incident response management cycle. It is also highly recommended that an internal training policy be defined that has sufficient resources and cooperative training arrangements with international partners (FIRST, Cyber4Dev, etc.).	CNC, EcuCERT, Ministry of Foreign Affairs	Short term	No
	Enhance the knowledge and capabilities of officials and professionals within law enforcement, prosecutor's offices, and the judiciary. To tackle constantly increasing cybercrime activities in the country, competent authorities may consider joining efforts to ensure systematic training at the specialization level. It is vital to first assess the current level of capabilities to ascertain subsequent capacity-building actions. PRIORITY	CNC, MINTEL, Ministry of Justice, Law Enforcement, Prosecutor's Office, judicial branches	Short term	No

Table 7.3. Trust Environment: Policy Recommendations (4 of 4)

Reform area	Recommendation	Responsible Entity	Timing	Is Legal Change Required?
	<p>Enhance the cybersecurity education offerings at the tertiary level and create more affordable cybersecurity professional training opportunities. This could be achieved by reviewing and expanding the academic offerings related to cybersecurity in the different degree plans and integrating more cybersecurity-related courses into the technology-based degree curricula. Creating more affordable professional training opportunities with industry certifications may help to increase the cadre of cybersecurity professionals and academics. It is recommended that a tripartite working group be established (composed of government, industry, and academia) to identify current national priorities and needs in the education field.</p> <p>Expediting the integration of cybersecurity-related courses into primary and secondary school curricula is also essential to improving the skills and readiness of younger generations and their willingness to pursue a cybersecurity career. PRIORITY</p>	CNC, MINED	Medium term	No

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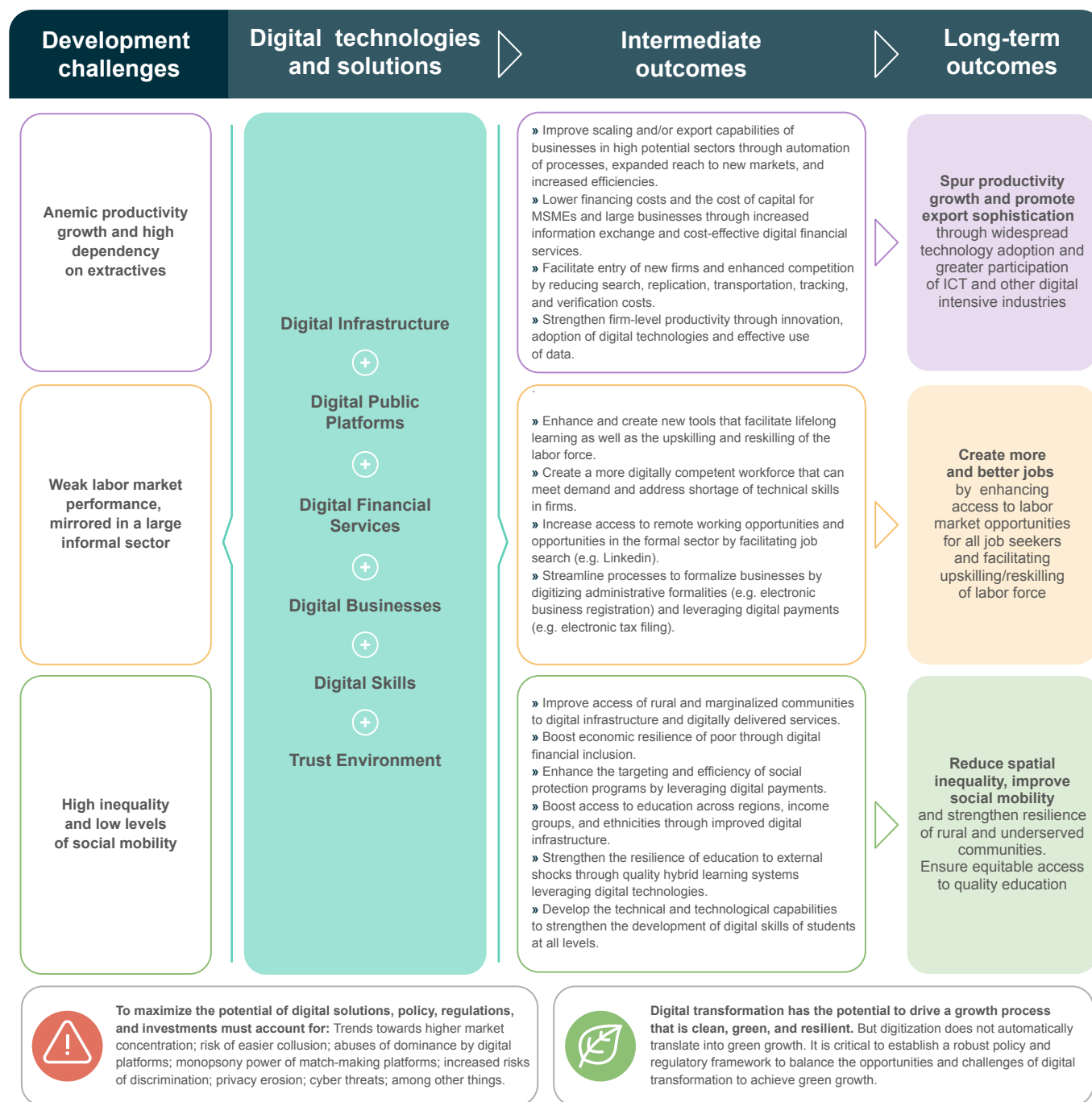
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ANNEXES

Annex 1. Digital Technologies to Help Ecuador Address its Persistent Development Challenges: A Theory of Change



Source: Authors' elaboration.

Annex 2. World Bank Global Digital Business Database

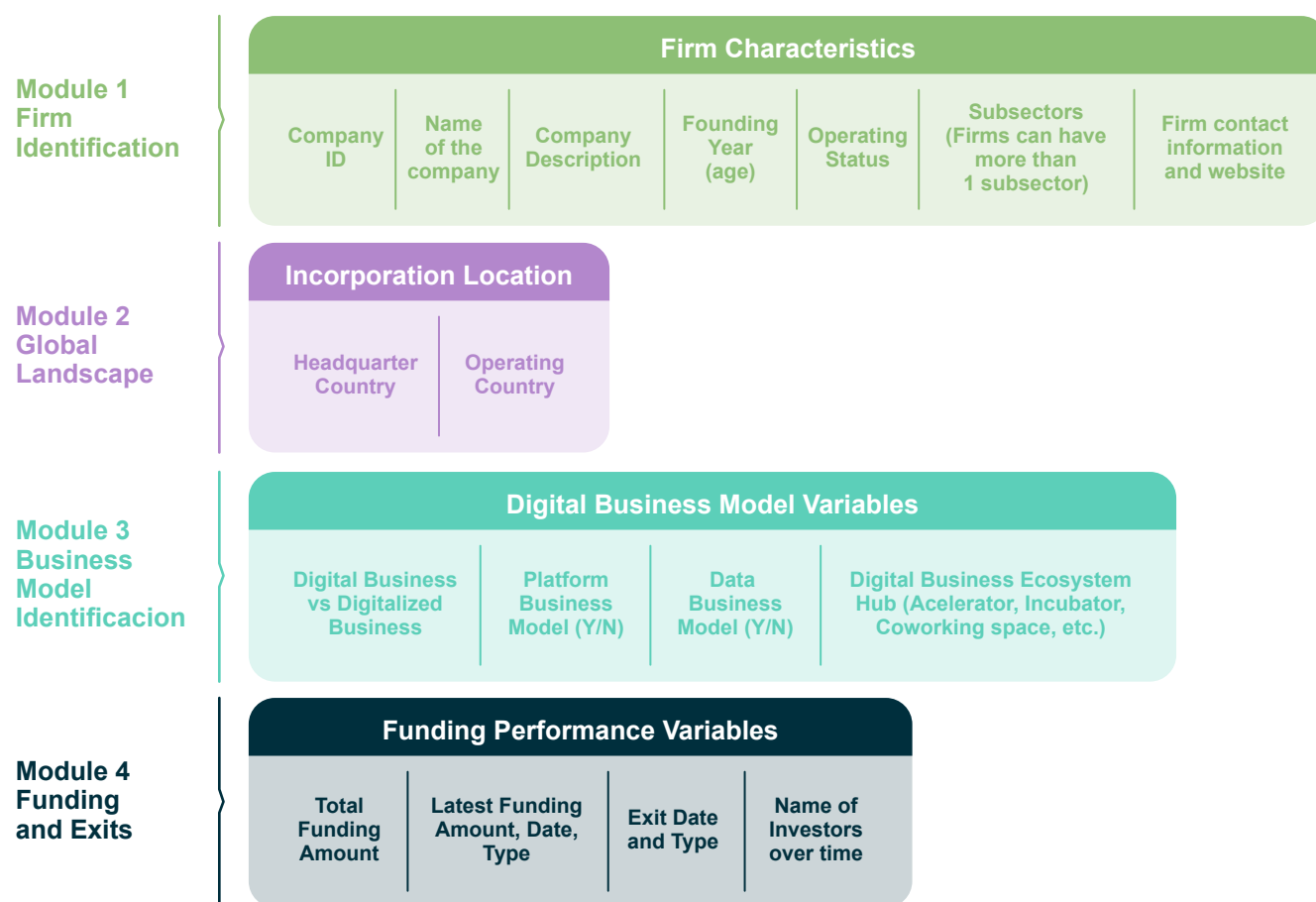
About the Data Source: World Bank Global Digital Business Database

The landscape analysis is drawn from the World Bank Digital Business Database of the Finance, Competitiveness and Innovation (FCI) Global Practice, which contains firm-level data of digital solution firms from three proprietary data sources (CB Insights, Pitchbook, and Briter Bridges). The data were collected using different techniques, including web scraping and the compilation of firm information from entrepreneurship networks, venture capital, or other investment deals. The data source

providers specialize in collecting information on tech start-ups and digitalized firms that may be attractive to risk capital investors due to certain innovative elements in their business models or core product offering. The database includes approximately 200,000 digital businesses in 190 countries across all World Bank regions, harmonized and categorized in 44 digital subsectors, such as fintech, e-Commerce, healthtech, and software as a service.

For each firm, the database contains information about its characteristics (e.g., name and address), location (headquarters and operating country), digital business model variables (e.g., digital platform or data-driven business), and funding performance as of 2020 (e.g., total funding amount, name of investors, exit dates and type—see Figure A2.1). The database will be updated biannually.

Figure A2.1. Information Covered by the World Bank’s FCI Digital Business Database

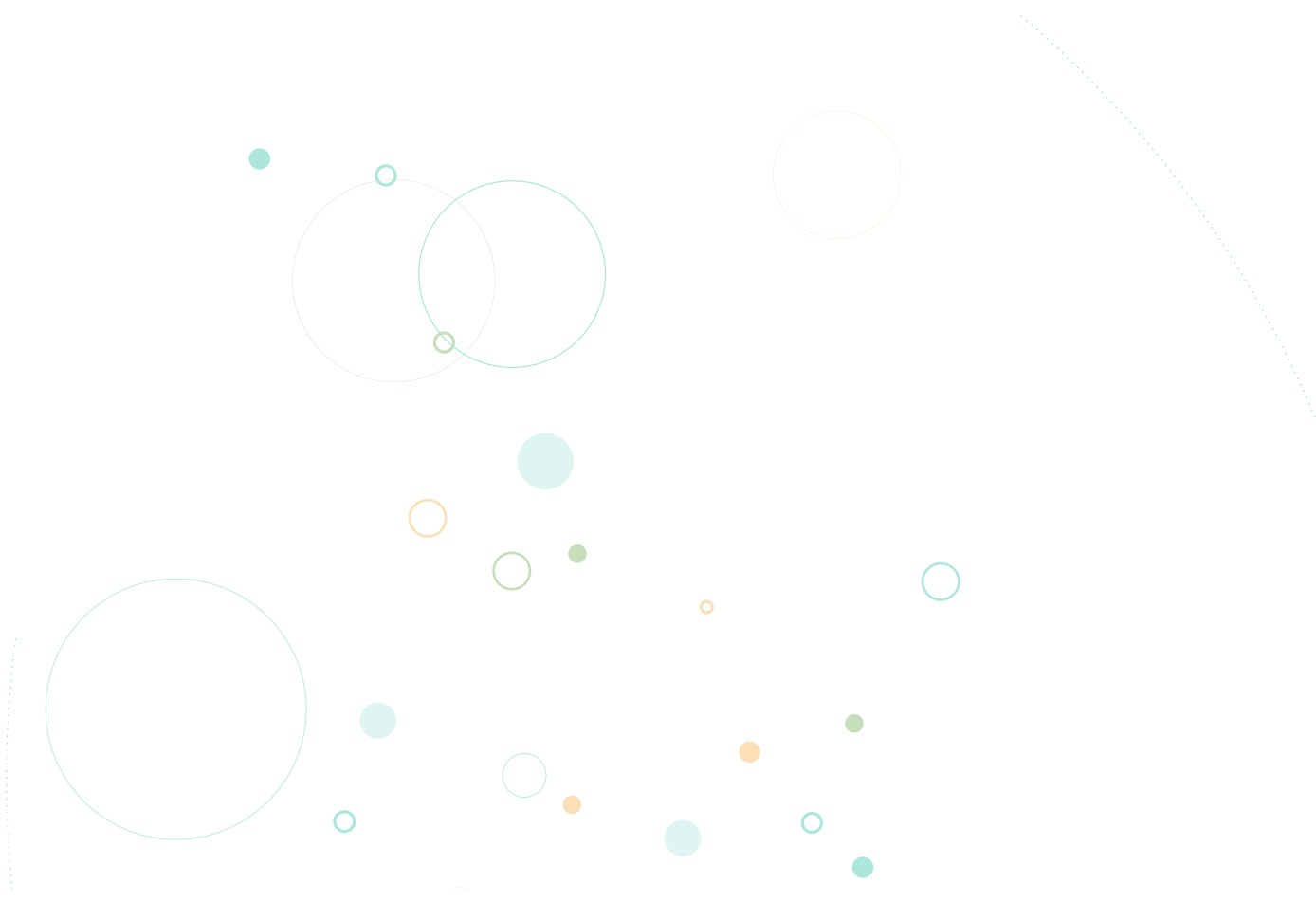


Source: Zhu et al. 2022.

Annex 3. Main Laws and Regulations Governing Data Protection in Ecuador

In addition to the constitutional and ordinary safeguards established in the Constitution of the Republic of Ecuador and the Organic Law on Protection of Personal Data (*Ley Orgánica de Protección de Datos Personales*), the Ecuadorian data protection framework contains the following provisions:³¹⁶

- » The *Organic Law on Transparency and Access to Public Information* of 2004 regulates publicly available data and the management of credit information.
- » The *Organic Law on Telecommunications* of 2015 regulates telecommunications operators.
- » The *Labor Code* of 2005 contains the duty of employers to protect the personal information of their employees.
- » The *Health Law* of 2006 establishes the duty of people involved in the health care industry to protect confidential health information.
- » The *Monetary and Financial Code* includes provisions regarding data protection in all financial transactions.
- » The *Law of the National System of Registration of Public Data* includes general provisions related to public data protection.
- » The *Comprehensive Organic Criminal Code (Código Orgánico Integral Penal)* protects the right to privacy by criminalizing the violation of the right to privacy, the disclosure of secret or personal information to third parties, the dissemination of restricted circulation information, and the violation of private property.
- » The *e-Commerce Law (Ley de Comercio Electrónico, Firmas y Mensajes de Datos)* and its secondary regulation Decree No. 3496 of 2005 – Reglamento General a la Ley de Comercio Electrónico, Firmas Electrónicas y Mensajes de Datos) regulate protection and security measures while processing personal data in electronic transactions.



1. The Big Five LAC countries included in this analysis are Argentina, Brazil, Chile, Colombia, and Mexico.
2. MINTEL (2022b).
3. MINTEL (2021).
4. OECD, CAF, and EC (2021).
5. World Bank, "Gini Index – Ecuador," <https://data.worldbank.org/indicator/SI.POV.GINI?locations=EC>.
6. OECD, CAF, and EC (2020).
7. Campoverde, Granda and Saboin (2022).
8. Dutz, Almeida and Packard (2018, xv).
9. See Cloudscene, <https://cloudscene.com/market/data-centers-in-ecuador/all>.
10. See ITU, "Digital Development Dashboard," <https://www.itu.int/en/ITU-D/Statistics/Dashboards/Pages/Digital-Development.aspx>.
11. See A4AI (2022).
12. Table 3.2 presents a summary of the results of the analysis in each of the 42 key aspects.
13. See, for instance, OECD (2019).
14. See Knickrehm, Berthon, and Daugherty (2016).
15. Adapted from Santander (2022).
16. WEF and Deloitte (2022).
17. See World Bank (2016, 50).
18. For example, real-time data can help manufacturers forecast optimal stock levels, improve order management, and speed up inventory turnover. See Grainger, "7 Ways Real-Time Data Is Transforming Inventory and Supply Chain Management," March 31, 2020, <https://www.grainger.com/know-how/business-operations/inventory-management/kh-7-ways-real-time-data-is-transforming-inventory-management>.
19. See World Bank (2016).
20. MINTEL (2022b).
21. MINTEL (2021).
22. The Big Five LAC countries included in this analysis are Argentina, Brazil, Chile, Colombia, and Mexico.
23. World Bank (2016).
24. Laroche et al. (2019).
25. The gap in income is the difference in the level of uptake of accounts or digital payments between people in the bottom 40 percent of income and those in the upper 60 percent.
26. OECD, CAF, and EC (2021).
27. Ibid.
28. BCE, "Informe de Resultados Cuentas Nacionales Trimestrales" (Quito: Banco Central de Ecuador, 2022), https://contenido.bce.fin.ec/documentos/PublicacionesNotas/Catalogo/CuentasNacionales/cnt65/InformeIIT_2022.pdf.
29. World Bank (2018).
30. Ibid.
31. World Bank, "Gini Index – Ecuador," <https://data.worldbank.org/indicator/SI.POV.GINI?locations=EC>.
32. INEC, "Tecnologías de la Información y Comunicación-TIC," National Institute of Statistics and Censuses, <https://www.ecuadorencifras.gob.ec/tecnologias-de-la-informacion-y-comunicacion-tic/>.
33. World Bank (2018).
34. Campoverde, Granda, and Saboin (2022).
35. See, for instance Cusolito et al. (2020); Brynjolfsson and Petropoulos (2021).
36. Based on the Inter-American Development Bank's measurement of firms' digital maturity, "Chequeo Digital." See IDB (2022).
37. Formal funding from entities, such as from governments, banks, or venture capital/private equity funds.
38. See, for instance Cusolito et al. (2020); Brynjolfsson and Petropoulos (2021).
39. Dutz, Almeida, and Packard (2018).
40. World Bank (2018).
41. Linos et al. (2021).
42. This report uses "digital infrastructure" and "data infrastructure" as synonyms.
43. See World Bank (2021d).
44. ITU, "Digital Development Dashboard," <https://www.itu.int/en/ITU-D/Statistics/Dashboards/Pages/Digital-Development.aspx>.
45. See INEC, "Information and Communication Technologies," <https://www.ecuadorencifras.gob.ec/tecnologias-de-la-informacion-y-comunicacion-tic/>.
46. Ibid.
47. INEC, ICT Survey, 2019, <https://www.ecuadorencifras.gob.ec/tecnologias-de-la-informacion-y-comunicacion-tic-2019>.
48. Peers taken into account in this chapter are Argentina, Brazil, Chile, Colombia, Mexico, and Peru.
49. TeleGeography, Global Bandwidth Forecast Service Q, 2021.
50. TeleGeography, "Submarine Cable Map," <https://www.submarine-cablemap.com/>.
51. ARCOTEL (2019).
52. Utpal and Raju (2021).
53. MINTEL (n.d.).
54. Collins Bartholomew, TeleGeography, ITU, OpenCellID, and ICANN.
55. Cloudscene, <https://cloudscene.com/market/data-centers-in-ecuador/all>.
56. UNESCAP (2019).
57. World Bank, <https://data.worldbank.org/>; and TeleGeography, <https://www2.telegeography.com/>.
58. Ibid.
59. Among the LAC countries, Ecuador's market penetration in the mobile sector is larger only than that in Nicaragua, Honduras, and Guatemala.
60. Butler (2021).
61. Butler (2021).
62. ARCOTEL (2020).
63. INEC and World Bank (2016).
64. See ITU, "Digital Development Dashboard," <https://www.itu.int/en/ITU-D/Statistics/Dashboards/Pages/Digital-Development.aspx>.
65. "La Conectividad en Ecuador y el Internet Satelital Como Herramienta para Cerrar la Brecha Digital," *Que Onda Gye*, March 24, 2022, <https://queondagye.com/la-conectividad-en-ecuador-y-el-internet-satelital-como-herramienta-para-cerrar-la-brecha-digital/>.
66. INEC, "Poverty by Consumption," <https://www.ecuadorencifras.gob.ec/pobreza-por-consumo/>.
67. Woodhouse (2021b).
68. https://digitalforwomen.worldbank.org/sites/gender_toolkit/themes/barrier/pdf/Toolkit-v2.pdf.
69. See Kongaut and Bohlin (2014) and Hampton et al. (2020).
70. See Woodhouse (2021a).
71. See ITU, "Digital Development Dashboard," <https://www.itu.int/en/ITU-D/Statistics/Dashboards/Pages/Digital-Development.aspx>.
72. "Speedtest Global Index," <https://www.speedtest.net/global-index>.
73. Interview with Romel Espinosa, National Director of Telecommunications, Ministry of Telecommunications.
74. World Bank analysis based on Ookla Speedtest Intelligence data.
75. Gozzi, Comini, and Perra (2023).
76. See García Zaballos et al. (2020).
77. Watts (2020).
78. Meta's Data for Good program, <https://dataforgood.facebook.com>.
79. Hale et al. (2021).
80. Gozzi, Comini and Perra (2023).
81. Mora-Rivera and García-Mora (2021).
82. Johnson and Wichern (2002).

83. UN and ITU (2022).
84. ARCOTEL, "Estadísticas de Telecomunicaciones", <https://www.arcotel.gob.ec/lineas-telefonicas/>.
85. ARCOTEL, Líneas Activas, <https://www.arcotel.gob.ec/lineas-activas/>.
86. The Herfindahl-Hirschman Index is a measure of market concentration obtained by summing the square of each firm's market share competing in the same relevant market. A score above 2,500 points can be considered concentrated.
87. Pedrós *et al.* (2018).
88. Peñaloza (2019).
89. By MINTEL and the head of the Government's Planning Department.
90. Market power is the ability of a firm or group of firms to raise and maintain prices above the level that would prevail under competition. Significant market power refers to the potential threshold by which firms or a group of firms can harm public welfare due to their ability to raise prices, and in consequence, these firms may be subject to specific obligations imposed by the authorities. For example, according to European Community directives, an operator is presumed to have significant market power if it concentrates more than 25 percent of the telecommunications market in a specific geographic area. See <https://stats.oecd.org/glossary/>.
91. Butler (2021).
92. For instance, Brazil, Chile, Colombia, Mexico, and Peru already have at least one 5G commercial operator, and Argentina and Uruguay are planning commercial launches.
93. See World Bank (2019).
94. The National Development Plan 2021–2025, "Plan for the Creation of Opportunities," was approved by Resolution No. 002-2021-CNP of September 20, 2021, of the National Planning Council.
95. The LOTDA concluded its process in the National Assembly on January 31, 2023, and was published in the Official Gazette on February 7, 2023. MINTEL, as the governing body for digital transformation and digital government, must request the Ministry of Economy and Finance to allocate the sufficient and necessary budget for the effective implementation and application of this Law (article 7).
96. <https://asobanca.org.ec/wp-content/uploads/2023/07/Decreto-Ejecutivo-No.-813-REGLAMENTO-LEY-ORGANICA-DE-TRANSFORMACION-DIGITAL.pdf>.
97. The EGDI is a weighted and normalized average of three sub-indices: telecommunications infrastructure, human capital, and online services. The first two are prepared with connectivity and education indicators standardized by the ITU and UNESCO. To build the online services sub-index, compliance with 180 criteria is verified (the number may vary in each edition) that respond to five thematic areas: institutional framework, content provision, service provision, technology, and e-participation. Additionally, the Report includes the Electronic Participation Index and the Open Government Data Index. See UN (2022).
98. Table 3.2 presents a summary of the results of the analysis in each of the 42 key aspects.
99. Since 2020, significant regulatory advances have been made that have defined MINTEL as the governing entity for the simplification of procedures.
100. See MINTEL (2011).
101. See <https://www.gob.ec/articulos/firmaec-300>.
102. See MINTEL (2021).
103. Some of these shared services can be used only if the procedure is digitized through the solution provided in the Gob.EC platform.
104. Despite being prioritized in the planning instruments in a generic way, a strategy that comprehensively addresses data management in government has not been identified. This represents an opportunity to be addressed by MINTEL in the face of current and future challenges in certain aspects, such as interoperability, advanced analytics, and artificial intelligence.
105. It is made up of 1,500 entities that are obligated to use it because they are part of the national budget and others that can do so voluntarily. The main applications of the system are: the Salary and Payroll Budgetary System (eSIPREN), which was created with the objective of managing the different types of income and discounts for civil servants; and the System of Goods and Stocks (eSBYE), a section for inquiries from public sector service providers.
106. The SOCE was created in 2014 and brings together a set of actors from the public procurement ecosystem (contractors, bidders, regulatory, and planning and budget bodies).
107. QUIPUX is used by 289 public institutions and has as users more than 200,000 public servants and more than 3 million citizens.
108. Executive Decree No. 5 of May 24, 2017, determined that the Ministry of Labor is in charge of establishing the methodology and tools for process management and provision of public services, as well as promoting projects for their improvement. Through Ministerial Agreement No. MDT-2020-0111, the Ministry of Labor issued the Technical Standard for the continuous improvement and innovation of processes and services, and a methodological guide for its application was published in January 2023.
109. To consult the different standards, guides, and manuals that must be applied by institutions in the process of simplifying procedures, see <https://www.gob.ec/normativa-manuales>.
110. With the approval of the recent Digital Transformation Law, MINTEL has the opportunity to improve articulation in the face of this duality, considering that the Law grants it the power to "establish, arrange and evaluate compliance with digitization and automation plans procedures and administrative processes of public sector entities" (literal i, article 7).
111. Official Gazette Supplement 245, February 7, 2023.
112. See Government of Ecuador, Second Open Government Action Plan 2022–2024.
113. Information on ICTs released by the INEC is available at <https://www.ecuadorencifras.gob.ec/tecnologias-de-la-informacion-y-comunicacion-tic/>.
114. G20 High Level Principles for Financial Inclusion. Securities were not included in the DFS analysis.
115. Pazarbasioglu *et al.* (2020).
116. See Klapper, El-Zoghbi and Hess (2016).
117. Demirgüç-Kunt *et al.* (2022).
118. Most members of the Alliance for Financial Inclusion signed an updated version of their Sharm El Sheikh agreement in September 2022. See AFI, "Roadmap for Inclusive Green Finance implementation: Building Blocks to Implement IGF Initiatives and Policies" (Kuala Lumpur: Alliance for Financial Inclusion, 2022).
119. Volz *et al.* (2020).
120. Demirgüç-Kunt *et al.* (2022).
121. The World Bank survey questions asked specifically about mobile wallets deployed by banks and linked to bank accounts, such as Deuna (Banco Pichincha), BDP wallet (Banco del Pacifico), and BIMO (interoperable wallet managed by Banred and offered by banks).
122. World Bank, "Digital Economy Assessment for Latin America and the Caribbean: the Case of Ecuador" (2022, Unpublished).
123. See Demirgüç-Kunt *et al.* (2022). The share of the population with a debit card is 40 percent among account owners, and only 16 percent of the population has made a merchant digital payment.
124. World Bank, "Global Financial Development Database" <https://www.worldbank.org/en/publication/gfdr/data/global-financial-development-database>.
125. Cooperatives in segment 1 have the size of a bank.
126. FMI (2022).
127. Ibid.
128. Providers in the stock market use digital channels and mechanisms to conduct their transactions but do not offer any specific product targeting lower-income segments.

129. Mutualistas are financial institutions whose main activity is to attract resources from the public and allocate them to finance housing, construction, and the well-being of their partners and clients' families.
130. The Superintendency of Banks report on Financial Services Statistics from January to June 2022 states that 14 banks do not have transactions on mobile platforms, but one of those 14 has transactions in the field of auxiliary financial companies and offers some financial services through a mobile app, according to information on its website (Produbanco).
131. There are five credit cooperative segments according to their size, and a risk-based approach is followed for their regulation and supervision. The biggest institutions are in segment 1, and they have sizes similar to banks; the smallest institutions are in segment 5, with much lighter regulations.
132. See Hernández (2022). The report also indicates that digital peer-to-peer payments are only possible in 70 percent of the credit cooperatives of segment 1 and 31 percent of the cooperatives from segment 2. Digital payment of public services is offered by 50 percent of the cooperatives in segment 1 and by 20 percent of those in segment 2.
133. See BuenTrip Hub, <https://www.buentriphub.com/>. The Radar tech start-up 14.0 report the existence of 63 fintechs, although not all of them are "verified" (having reported information in the previous year). Around 50 percent are providers of business solutions, such as accounting and electronic billing services.
134. Anecdotal information provided by the industry.
135. Interviews with fintech institutions in September and October 2022.
136. COMF, art. 36.
137. Only Chile, Costa Rica, Panamá, and Uruguay, in addition to Ecuador, do not report data on mobile money accounts in the latest Global Findex Survey.
138. Demirgüç-Kunt *et al.* (2022).
139. Ibid.
140. World Bank, "Digital Economy Assessment for Latin America and the Caribbean: the Case of Ecuador" (2022, Unpublished).
141. The comparison with 2019 data was done based on the numbers reported in World Bank (2020c). Current SB data do not indicate whether or not access points from public banks are included. Their inclusion was assumed in order to estimate the growth. 2022 data for access points come from SB (2022), <https://www.superbancos.gob.ec/estadisticas/portalestudios/> and Data SEPS, "Caracterización del Sector," <https://data.seps.gob.ec/#/dashboards/analytics/0/3>.
142. According to SEPS data, 96 percent of cantons have an access point from financial institutions in the EPS.
143. World Bank (2020c).
144. Facilito defines itself as a provider of collection and payment services that enable institutions to leverage their payment points for these purposes. It works with over 200 banks and credit cooperatives. See <https://www.facilito.com.ec/>, the SB report on access points <https://www.superbancos.gob.ec/estadisticas/portalestudios/?> and the Servipagos website: <https://www.servipagos.com/servicios/>.
145. Conversation with BCE staff in April 2022.
146. Fourteen partnerships were forged in 2021 to facilitate smaller cooperatives to use digital channels deployed by larger cooperatives. Conversation with SEPS in April 2022.
147. See World Bank (2020b) for a more detailed analysis of basic accounts.
148. Payphone has partnered with Produbanco, and to open an account, one needs to insert either a credit or debit card. Peigo is a product of Banco de Guayaquil and follows a similar enrollment mechanism. See <https://www.payphone.app/ayuda/> and <https://www.peigo.com.ec/>.
149. The World Bank's DEA for Ecuador found that both the urban and rural populations (over 60 percent) are affected by the low quality of the internet network, and over 30 percent of the population in urban areas and 50 percent in rural areas by power outages. Also, over 25 percent in both regions cite high costs as a constraint to internet access.
150. Over 78 percent of the population has a pre-paid phone, which might limit access to these types of financial products if the cost of using the internet is too high. See ARCOTEL (2022).
151. Such as Crece Ecuador (<https://www.creceecuador.com/>) and Sammas (<https://www.sammas.com.ec/>).
152. For more on the UAFE, see <https://www.uafe.gob.ec/>.
153. COMF, art. 14.4.
154. According to World Bank data for 2021, 75 financial authorities around the world have implemented one of these mechanisms. See "Global Fintech-Enabling Regulations Database," <https://www.worldbank.org/en/topic/fintech/brief/global-fintech-enabling-regulations-database>.
155. An Innovation Hub can take different avatars depending on the objective of the financial authority. It is usually designed as the place to go to respond to inquiries, to provide support, advice, or guidance to both regulated and unregulated institutions, and to navigate the legal, regulatory, and supervisory environment. Financial authorities can provide guidance to the market, connect funders and entrepreneurs, and create contests to support specific initiatives in the sector, among other actions. They do not include the testing of products and services. See World Bank, "How Regulators Respond to Fintech: Evaluating the Different Approaches—Sandboxes and Beyond," Fintech Note 5 (Washington, DC: World Bank, 2020).
156. JPRMF (2019).
157. JPRM (2022a).
158. JPRMF (2021b).
159. SRI (2022).
160. World Bank (2021a).
161. For a more detailed analysis, see World Bank (2020b).
162. ASOBANCA (2022).
163. Ibid.
164. Ibid.
165. See UAFE (2020) and SEPS.
166. The credit cooperatives not included belong to segments 1 or 2 and are not able to comply with the minimum technological requirements set by the BCE to participate in the system.
167. See World Bank (2020b).
168. New regulations on auxiliary payment services were issued in early 2022 but do not solve the problems observed in World Bank (2020b).
169. BCE (2019).
170. Information gathered in conversations with SEPS, April 2022.
171. This included principal plus other charges owed to the financial institutions.
172. Principal component of a past due loan.
173. See also JPRMF (2021a).
174. See SB (2022).
175. World Bank (2020b).
176. World Bank data. <https://data.worldbank.org/indicator/BX.TR.F.PWKR.DT.GD.ZS?locations=EC>. Estimates are based on IMF balance of payment data and OECD GDP estimates.
177. See World Bank, "Remittance Prices Worldwide, Sending Money from Italy to Ecuador," <https://remittanceprices.worldbank.org/corridor/Italy/Ecuador>.
178. World Bank (2020b).
179. Definition of auxiliary payment systems, JPRM (2022a), article 1.
180. Prepaid cards have recently been recognized as a payment instrument (see JPRM 2022b), but regulations are pending, as reported by a BCE email in September 2022.
181. Demirgüç-Kunt *et al.* (2022).
182. According to the LOPDP, the *Superintendencia de Protección de Datos* (SPD) is the data protection authority. However, this agency has not yet been established. Once such a data protection authority is established, it will pass a secondary regulation to supplement the primary law and address the existing gaps.

It is likely that sectoral regulators, such as ARCOTEL and the SB, will update and harmonize their sectoral regulations addressing privacy and data protection to be consistent with the primary data protection law and secondary regulations. For more information on the LOPDP, see [Chapter 7](#).

183. See details on the methodology in Zhu *et al.* (2022).
184. Firms in Ecuador are overwhelmingly young and small and struggle to grow over time. In 2015, more than 18 percent of firms were new entrants, with nearly 40 percent less than five years old. Over 90 percent of firms are microenterprises. Markets are highly concentrated among a few large firms. In 2015, only one half of 1 percent of all Ecuadorian firms were large firms, but they represented 73 percent of total sales and 42 percent of employment in the country. These large firms can dominate economic activity in their sector, where there are often many small and unproductive firms. See IFC (2021).
185. See IFC (2021, 35).
186. World Bank, "Digital Adoption Index," 2016, <https://www.worldbank.org/en/publication/wdr2016/Digital-Adoption-Index>.
187. Further information can be found in Baller, Dutta, and Lanvin (2016).
188. Dutz, Almeida and Packard (2018).
189. The global database is based on three data providers: Pitchbook, CB Insights, and Briter Bridges. (The LAC region is only covered by Pitchbook and CB Insights.) They specialize in collecting information on tech start-ups or digitalized firms that would be attractive to venture capital/private equity investors due to certain innovative elements in their business models or core product offering. These data sources use various techniques, from web-scraping to gathering firm information from entrepreneurship networks, venture capital, and other investment deals. They therefore give an estimate of the investment-ready digital businesses in a country.
190. For further details, see Zhu *et al.* (2022).
191. Note that the countries appear in alphabetical order within their performance groups. See Zhu *et al.* (2022).
192. The comparison countries in LAC exclude island states like Cayman Islands whose digital business performance is driven mostly by their status as tax havens without providing insights for Ecuador on how to create an enabling environment for digital businesses that serves the local economy.
193. Zhu *et al.* (2022).
194. A possible contributing factor could have been political instability in Ecuador as indicated also in the section "Policy, Regulatory, and Institutional Environment."
195. It is worth noting that the World Bank's FCI Digital Business Database undercounts multinational digital companies that operate in a large number of countries globally, as these do not always show up multiple times for each country in which they offer their services (e.g., Facebook, Google, Amazon, etc.).
196. "Reality tech" refers to firms developing and using technology that provides user experience in a different reality environment (this includes both virtual and augmented reality).
197. Please note that [Figure 5.6](#) shows only a selection of top subsectors offered by both foreign and domestic firms.
198. As mentioned above, the FCI Digital Business Database focuses on firms that are investment-ready, and hence the share of firms receiving formal funding is, per definition, relatively high.
199. This refers to the 1970–2020 time period that is covered by the FCI Digital Business Database.
200. A "killer acquisition" is an acquisition of a potential rival while it is still in the early stages of its development, whose turnover is small or zero, to eliminate it as a possible source of future competition.
201. The results of the Enterprise Surveys for Ecuador show the responses of business owners and top managers in 361 firms who were interviewed between March and October 2017. The indicator "Biggest Obstacle" shows the percentage of firms that consider a specific business environment obstacle as the most important one. The respondent was asked to choose the biggest obstacle to their business from a list of 15 business environment obstacles.
- The Enterprise Surveys are conducted by the World Bank and its partners across all geographic regions and cover small, medium, and large companies. The surveys are administered to a representative sample of firms in the non-agricultural formal private economy. The topics covered include infrastructure, trade, finance, regulations, taxes and business licensing, corruption, crime and informality, finance, innovation, labor, and perceptions about obstacles to doing business. See World Bank (2017).
202. More recent reports, such as the Doing Business Ecuador report by Deloitte, suggest this may still be the case today. See Deloitte (2021).
203. The product market regulation indicators are a comprehensive and internationally comparable set of indicators that measure the extent to which *de jure* policies promote or limit competition in areas of the product markets where competition is viable. See OECD, "Product Market Regulation 2018," <https://stats.oecd.org/Index.aspx?DataSetCode=PMR2018>.
204. The Global Entrepreneurship Index (GEI), conducted by the Government and Economic Development Institute, is an annual index that measures the health of entrepreneurship ecosystems in 137 countries. The GEI is composed of three building blocks or sub-indices: entrepreneurial attitudes, entrepreneurial abilities, and entrepreneurial aspirations. These three sub-indices stand on 14 pillars, each of which contains an individual and an institutional variable that corresponds to the micro- and macro-level aspects of entrepreneurship. All individual-level variables are from the Global Entrepreneurship Monitor survey. The institutional variables are obtained from various sources. The GEI methodology has been validated by rigorous academic peer review and has been widely reported in the media. See GEDI (2019).
205. Lasio *et al.* (2018).
206. MINTEL (2022b).
207. Lasio *et al.* (2018).
208. In 2020, the law was modified to add a chapter on how the government will send and receive notifications to and from Ecuadorian citizens by creating an electronic mailbox. In 2021, it was added that the Committee on Foreign Trade should protect and promote e-commerce in order to avoid illicit commerce and organized crime. In May 2021, all concepts about personal data were excluded from this law, since a new law on data protection had been issued.
209. Ecuador (2015, art. 144, numeral 129).
210. Unnumbered article of the Regulation for the Law on Electronic Commerce. See Ecuador (n.d.).
211. ARCOTEL (s.f.).
212. Malavé (2022).
213. Noboa Baquerizo and Olmedo (2021). Notaries in Ecuador are considered a public service and are regulated by the judiciary authority according to article 199 of the Ecuadorian Constitution.
214. See, for example, IFC (2021).
215. Articles 18, 136, 148 and the Seventh General Provision of the Companies Law.
216. Unnumbered article of the Section for Simplified Joint Stock Company of the Companies Law.
217. Such offenses are a serious violation, with a penalty of two basic salaries, the loss of 10 points on the driver's license, and the detention of the vehicle (Art. 386, Penal Code).
218. Ministerio de Turismo (2019).
219. An authorization given by local authorities that included an inspection of the place where the service will be provided and the obligation to present a tax identification number, most likely for tax purposes.
220. On criticism concerning the law see, for example, El Universo (2022a).
221. MINTEL (2022a).
222. Ecuador (2022a).
223. Ecuador (2021a, art. 56).
224. Ecuador (2021a, art. 57).
225. Ecuador (2021a, art. 59).

226. Ecuador (n.d., art. 48 and 50).
227. Articles 17 to 31 of the Consumer Protection Law.
228. Ekos Negocios (2021).
229. Art. 3 of the Law on the Registry of Taxpayers.
230. SRI (n.d.).
231. Torres (2021).
232. BTI, "The Transformation Index," <https://bti-project.org/en/?cb=00000>.
233. Schwab (2019).
234. See Crémer, de Montjoye, and Schweitzer (2019).
235. OECD and IDB (2021).
236. Ecuador (2011, art. 14).
237. Ecuador (2011, art. 14 and 15).
238. SCPM (2018). See also OECD and IDB (2021).
239. UNESCO (2018).
240. See Barone (2021) and World Bank (2021x).
241. See van Laar *et al.* (2019).
242. See OECD (2016).
243. See J-PAL (2019).
244. See Global Monitoring of School Closures, UNESCO Data (2021). <https://covid19.uis.unesco.org/global-monitoring-school-closures-covid19/country-dashboard/?McasCtx=4&McasTsid=15600>.
245. See Asanov *et al.* (2020).
246. See SITEAL (2020).
247. See MINEDUC (2020).
248. See Asanov *et al.* (2020).
249. Ibid.
250. See SNP (2021).
251. Interview with Monserrat Creamer, Ecuador's former Minister of Education.
252. See Stinson, H. (2022).
253. Interview with Andres Bedon, National Director of Education Technology, MINEDUC. MINEDUC (2021).
254. Interview with Marco Villacis and Guido Carrion, Direction of Digital Culture, MINTEL.
255. See Carrillo Maldonado (2019).
256. Interview with Ernesto Kruger (CEO, Kruger) and Juan Diego Velasquez (CEO, Payphone).
257. ILO, *Identificación Rápida de Necesidades de Cualificación y Recualificación de Competencias en Quito, Guayaquil, Machala y Loja: Efectos de la COVID-19 en la Demanda Laboral* (Geneva: International Labour Organization, 2021).
258. See *El Universo* (2022b).
259. Interview with Edgar Sanchez (CEO, LogicStudio).
260. Digital maturity refers to five key stages of progress (beginning, novice, proficient, advanced, or expert) toward business digital transformation. A company that has developed a set of technological tools and has a workforce with the digital skills needed to adapt and use new technologies will usually be at a more developed stage of digital maturity.
261. Interview with Monserrat Creamer, Ecuador's former Minister of Education.
262. Interview with Sergio Carnero, Director, Unidos por la Educación.
263. Interview with David Ponce, Director of Digital Transformation, EPICO.
264. EPICO's training programs have an approximately 6 percent admission rate, and 40 percent of participants are women.
265. Interview with Edwin Hidalgo (CIO, Yanbal).
266. Interview with Monserrat Creamer, Ecuador's former Minister of Education.
267. Interview with Andres Bedon, National Director of Education Technology, MINEDUC.
268. Interview with Gisela Montavo, Director, Chamber of Innovation and Technology in Ecuador.
269. See Rodríguez, Federico (2021).
270. Interview with Maria Cevallos, Program Manager, Liderar es Transformar, Enseña Ecuador.
271. Interview with Luis Fernando Cuji, Secretariat of Higher Education Institutions, SENESCYT.
272. Ibid.
273. See Benítez, Lucero, and Pazmiño (2018).
274. Interview with Shammy Cuello, PBL Specialist, Centro Campus.
275. Interview with Leonardo Ottati, Director, Ecuador's Chamber of E-Commerce.
276. Interview with Andres Castelo, Executive Director, Endeavor Ecuador.
277. The Global Competitiveness Index is part of a yearly report published by the World Economic Forum to assess countries in their ability to provide high levels of prosperity to their citizens.
278. Institutions is the 1st pillar of the Global Competitiveness Index and measures the country's security, social capital, checks and balances, public sector performance, transparency, property rights, corporate governance, and future orientation of government.
279. ICT is the 3rd pillar of the Global Competitiveness Index and measures the country's adoption of mobile-cellular telephone subscriptions, mobile-broadband subscriptions, fixed-broadband telephone subscriptions, fixed-internet subscriptions, and internet users.
280. Skills is the 6th pillar of the Global Competitiveness Index and measures the current and future skills of the country's workforce.
281. Digital skills is a sub-component of the 6th pillar (skills) of the Global Competitiveness Index.
282. Innovation capability is the 12th pillar of the Global Competitiveness Index and ranks countries' interaction and diversity, research and development, and commercialization.
283. See *INEC* (2017).
284. See *INEC*, "Tecnologías de La Información y Comunicación-TIC," <https://www.ecuadorencifras.gob.ec/tecnologias-de-la-informacion-y-comunicacion-tic/>.
285. Interview with Monserrat Creamer, Ecuador's former Minister of Education.
286. See WorldData, "Telecommunication in Ecuador", 2020, <https://www.worlddata.info/america/ecuador/telecommunication.php>.
287. Interview with Andres Bedon, National Director of Education Technology, MINEDUC.
288. Ibid.
289. Interview with Luis Fernando Cuji, Secretariat of Higher Education Institutions, SENESCYT.
290. Interview with Guadalupe Durán (CEO for Mastercard Ecuador).
291. Interview with Andrés Castelo, Executive Director, Endeavor Ecuador.
292. Interview with Ernesto Kruger (CEO, Kruger).
293. R. Hawkins and others, "Reimagining Human Connections: Technology and Innovation in Education at the World Bank" (Washington, DC: World Bank, 2020).
294. World Bank. "Knowledge Pack: Devices for Education," <https://documents1.worldbank.org/curated/en/099120304132250891/pdf/P174252080a0e00760af3303dddc14578b5.pdf>.
295. World Bank (2021c).
296. Following the conceptual framework presented in World Bank (2021d).
297. According to article 66, subsections 19 and 20, respectively, of the Constitution.
298. "Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the Protection of Natural Persons with Regard to the Processing of Personal Data and on the Free Movement of Such Data, and Repealing Directive 95/46/EC (General Data Protection Regulation)," *Official Journal of the European Union*, L 119, May 4, 2016, p. 1, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0679>.
299. Conducted by the World Bank in Ecuador in 2022.
300. It also adopts an explicit guarantee posture that integrates (i) multiple legal bases for processing lawfully personal data, (ii) general principles such as the principle of accountability, (iii) the designation of data protection officers, and (iv) processors' liability for data breaches with severe penalties, among others.
301. EU (2016).

- 302.** Inconsistencies referred to are form errors, such as incomplete articles, repetitions, and discordant references, and substance errors, such as issues in defining the guiding principles, the recognition of the right to digital education, and deletion of the right to be forgotten and the right to cancel.
- 303.** Ramos (2023).
- 304.** CoE (2022).
- 305.** Government of Ecuador, "Normativas y Guías - Datos Abiertos Ecuador," <https://www.datosabiertos.gob.ec/normativa/>.
- 306.** Nabe (2020).
- 307.** Onofa (2022).
- 308.** Frisby (2020).
- 309.** The number of rankings is higher than the number of countries, as some countries are assigned the same rank. See ITU (2021).
- 310.** See National Cyber Security Index, "Ecuador," <https://ncsi.egee/country/ec/>.
- 311.** See MINTel (2021).
- 312.** FIRST stands for the Forum of Incident Response and Security Teams. See www.first.org.
- 313.** CoE (n.d.).
- 314.** According to the information collected in World Bank and MINTel (2022).
- 315.** Ibid.
- 316.** <https://www.dataguidance.com/notes/ecuador-data-protection-overview>.

