TELECOMMUNICATIONS GOVERNANCE

Toward the Digital Economy

Authors:

Joan Prats Cabrera and Pau Puig Gabarró

IDB

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Acronyms

3G	Third-generation mobile broadband
4G	Fourth-generation mobile broadband
5G	Fifth-generation mobile broadband
ACH	Automated Clearing House
ACODECO	Consumer Protection and Competition Defense Authority
AEMP	Company Inspection Authority
AIG	National Government Innovation Authority
AN	Andean countries
ANATEL	National Telecommunications Agency
ARCOS	Americas Region Caribbean Ring System
ARCOTEL	Communications Regulatory and Control Authority
ASEP	National Public Services Authority
ATM	Automated Teller Machine
ATT	Telecommunications and Transportation Regulation and Inspection Authority
BDI	Broadband Development Index
BTL	Belize Telemedia Limited
CA	Central America
CADE	Economic Defense Administrative Council
CAR	Caribbean
CCAC	Competition and Consumer Affairs Commission
CDN	Content Delivery Networks
CDPC	Competition Defense and Promotion Commission
CMF	Connectivity, Markets, and Finances
CNDC	National Competition Defense Commission
CNSIC	National Commission for the Information and Knowledge Society
CONACOM	National Competition Commission
CONATEL	National Telecommunications Commission/National Telecommunications Council
COPROCOM	Competition Promotion Commission
CPCD	Competition Defense and Promotion Commission
CRC	Communications Regulatory Commission
CSIRT	Computer Security Incident Response Team
DINATEL	National Directorate for Telecommunications and Audiovisual Communication Services
DTDCDN	Technical Directorate for the Defense of Competition and Regulatory Development
ECS	Electronic Communications Sector
EEDE	Electronic Currency Issuing Companies
EMPE	Electronic Payment Entities
ENACOM	National Communications Entity
ETED	Dominican Electricity Transmission Company
EU	European Union
FDT	Fund for the Development of Telecommunications

FITT	Fund for Investment in Telecommunications, Information Technology, and Communications
FONATEL	National Telecommunications Fund
FTC	Fair Trade Commission
GATS	General Agreement on Trade in Services
GB	Gigabyte
GDP	Gross Domestic Product
HHI	Herfindahl-Hirschman Index
ICT	Information and Communication Technologies
IDB	Inter-American Development Bank
IFD	Institutions for Development
IFT	Federal Telecommunications Institute
IMEI	International Mobile Equipment Identity
INDECOPI	National Institute for the Defense of Competition and Intellectual Property Protection
INDEL	Non-banking institution that offers electronic currency services
INDOTEL	Dominican Telecommunications Institute
IP	Internet Protocol
ITU	International Telecommunication Union
IXP	Internet Exchange Point
KYC	Know Your Customer
LAC	Latin America and the Caribbean
LTE	Long-Term Evolution
MB	Megabyte
Mbps	Megabits per second
MCIV	Ministry of Communications, Infrastructure and Housing
MCTI	Ministry of Science, Technology, Innovation, and Communications
ME	Ministry of Economy
MESTPU	Ministry of Energy, Science, Technology, and Public Services
MHz	Megahertz
MICITT	Ministry of Science, Technology, and Communications
MIEM	Ministry of Industry, Energy, and Mining
MINCI	Ministry of the Popular Power for Communication and Information
MINTCT	Ministry of Industry, Commerce, and Tourism
MINTEL	Ministry of Communications and the Information Society
MINTIC	Ministry of Information and Communication Technologies
MOPC	Ministry of Public Works and Communications
MPUC	Ministry of Public Administration and Communications
MSTEM	Ministry of Science, Technology, Energy, and Mining
MTC	Ministry of Transportation and Communications
MTPTC	Ministry of Public Works, Transportation, and Communications
MTT	Ministry of Transportation and Telecommunications
NCONACYT	New National Council on Science and Technology
NRA	National Regulatory Authority
OECD	Organisation for Economic Co-operation and Development
OGP	Open Government Partnership
OOPP	Ministry of Public Works, Services, and Housing
OP	Office of the President
OPTIC	Presidential Office on ICT
OSIPTEL	Supervisory Body for Private Investment in Telecommunications
OUR	Office of Utilities Regulation

PROCOMPETENCIA	National Institute for Competition Promotion
PUC	Public Utilities Commission
RIO	Reference Interconnection Offer
SC	Southern Cone
SCT	Secretariat of Communications and Transportation
SEDPE	Companies specialized in electronic deposits and payments
SENATICs	National ICT Secretariat
SIC	Superintendence of Industry and Commerce
SIGET	General Superintendence of Electricity and Telecommunications
SIT	Superintendence of Telecommunications
SLA	Service-Level Agreements
SMP	Significant Market Power
SUBTEL	Undersecretariat of Telecommunications
SUPERTEL	Superintendence of Telecommunications
SUTEL	Superintendence of Telecommunications
TAS	Telecommunications Authority of Suriname
TATT	Telecommunications Authority of Trinidad and Tobago
TDLC	Tribunal for the Defense of Free Competition
TELCOR	Nicaraguan Telecommunications and Postal Institute
TSTT	Telecommunications Services of Trinidad and Tobago
TV	Television
URCA	Public Services Competition and Regulation Authority
URSEC	Communications Services Regulatory Unit
US$	United States Dollar
USF	Universal Service Fund
VoIP	Voice over Internet Protocol
WB	World Bank
WTO	World Trade Organization

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Disclaimer

In the process of selecting and defining the analytical criteria for sectoral development in the countries analyzed in this report, the authors prioritized the adoption of factual and objective criteria. Neither the evaluations nor the descriptions of possible reforms are intended to recommend specific reforms or actions to any authority in the region, for which a much more detailed analysis would be required. Instead, the report proposes an analytical framework for sectoral development that identifies key parameters to facilitate a high-level comparative analysis of the diversity of sectoral advances and reforms in the region.

The data that support the sectoral analysis in this report were obtained from secondary sources, such as IDB publications, international data bases, information available on web pages for sectoral institutions in the region, and specialized news portals. In case a data point is incorrect or outdated due to the advances and reforms carried out continually by sectoral authorities in the 26 countries in the region analyzed in this report, we would appreciate being notified so that we can take it into consideration for future editions (contact: paup@iadb.org).

Introduction

Information and communication technologies (ICT) have become essential components in the development of countries and in the quality of life of their people. In an economic model that is increasingly focused on knowledge and information, people's ability to use ICT is essential for them to benefit from the opportunities offered by technological advances. We are increasingly immersed in a digital ecosystem that frames society's social and labor interactions. Universal inclusion is fundamental in improving our lives and in our ability to reach economic, social, and familial achievements.

The digital ecosystem is characterized by accelerated dynamism and increasing convergence between a broad number of sectors and technologies that compete fiercely among themselves. Governance of the digital ecosystem by the region's public sectors seeks to establish institutions and regulations that promote inclusive innovation and growth. That is, they seek to take advantage of the opportunities offered by ICT to bridge the gaps that may exist in different areas (education, finance, health, information, and others). This is a broad and complex task that combines infrastructure development with the promotion of competition and innovation within a vast network of sectors and activities. It simultaneously involves the public sector, the private sector, civil society, and academia in a shared effort to achieve an action framework that is flexible and coherent and promotes a technological change that is beneficial for the whole of society.

This report sets forth the key topics that the region must tackle to adequately govern the impacts of this technological change. In the first chapter we describe the state of digital development in LAC and the importance of the digital ecosystem as a driver for the region's development. In the second chapter, we present a basic framework to understand the essential aspects of the change the region faces, divided into four fundamental pillars: (i) the legal and institutional framework of the digital economy, (ii) regulation of the development of and access to digital infrastructure, (iii) regulation of competition and consumer protection, and (iv) public policies for the development of ICT and the digital economy. The third chapter discusses each pillar, highlighting its importance for the growth of ICT, how the region's countries compare on each, and the main currents and short-term challenges. The fourth chapter presents summarized analyses of each country in terms of public policies, quality of service, digital inclusion, affordability, and competition and points out the main short-term and medium-term institutional and regulatory challenges. This is the first exercise to review, in a comprehensive and comparative manner, the challenges faced by the countries in the region in taking advantage of the opportunities offered by the digital economy.

1

The Digital Ecosystem as a Driver of Development

In recent years, economic growth has been accompanied by disruptive technological advances that have changed the ways in which individuals, companies, public sectors, and governments act and interact. Various studies show that increasing the adoption of new technologies by a broader network of people and companies generates benefits in terms of economic growth and wellbeing. According to a recent study conducted by the Inter-American Development Bank (IDB), a 10 percent increase in broadband penetration in the region is linked to an average gross domestic product (GDP) growth of 3.2 percent and a productivity gain of 2.6 percentage points (García Zaballos and López-Rivas, 2012).[1] Likewise, according to a study prepared for the European Commission (European Union, 2013),[2] ICT provides more than 40 percent of the European Union's (EU) annual productivity gains (75 percent in the United States) and accounts for nearly 25 percent of the annual GDP growth of the EU-5.[3] According to IBM, for every euro invested by the public sector in ICT, the private sector invested €7, and every direct job created in the ICT sector generates six indirect jobs (IBM, 2008). Furthermore, ensuring that these benefits reach all sectors and economic actors in a country is increasingly vital for reducing inequality. From this perspective, ICTs not only create economic opportunities, but are also a key right for people's wellbeing. A growing number of solutions to development problems convert digital tools into opportunity-laden instruments, thanks to greater interoperability of increasingly advanced devices, ubiquitous access to expanded broadband, and greater capacity of processors to handle large volumes of information.

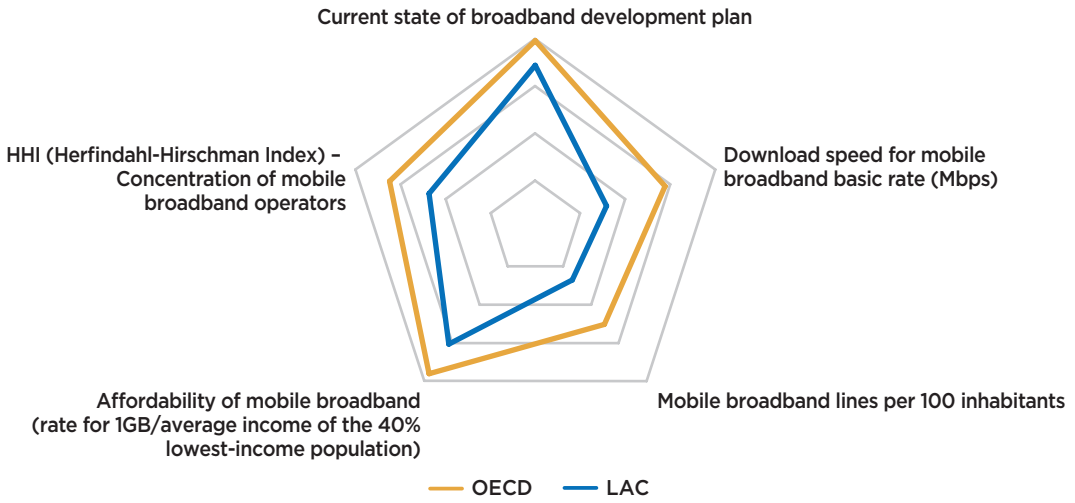
Compared to other regions of the world, the Latin America and the Caribbean (LAC) region presents important challenges in adoption, use, affordability, and access to ICT. According to data from the International Telecommunications Union (ITU), fixed broadband penetration is only 10 percent in LAC, compared to 28 percent in OECD countries. Mobile broadband penetration reached 30 percent of the population, which is far below the OECD's average of 72 percent. In addition, connections are of inferior quality. According to data from Akamai, a provider of cloud-based digital content services, the average speed for fixed connections in LAC countries was 4.64 Mbps in 2016, compared to 13.14 Mbps in OECD countries. A similar gap can be seen in mobile connections: the average for LAC countries is 3.87 Mbps, compared to 10.84 Mbps in

[1] The econometric study measures the correlation between the variables studied, not a causal relationship.

[2] See http://ec.europa.eu/information_society/newsroom/cf/dae/document.cfm?doc_id=4242.

[3] EU-5 refers to France, Germany, Italy, Spain, and the United Kingdom.

FIGURE 1 Comparison of Digital Development in LAC and OECD Countries



Source: Authors' elaboration based on the Broadband Development Index (BDI) (García Zaballos and Iglesias Rodríguez, 2017).
Note: For more details on parameters for the comparative graphic on digital development between LAC and the OECD, see Annex 1.

OECD countries. Finally, price is also a determining factor driving the lower usage of telecommunications services in LAC countries. According to the IDB's broadband affordability index—an indicator that measures the percentage of income that a basic broadband connection represents for the bottom 40 percent of income earners—citizens in the LAC region must devote 10 percent of their monthly income for either fixed or mobile broadband, while in OECD countries the figures are 2 percent (mobile broadband) and 3 percent (fixed broadband) (García Zaballos and Iglesias Rodríguez, 2017) (Figure 1).

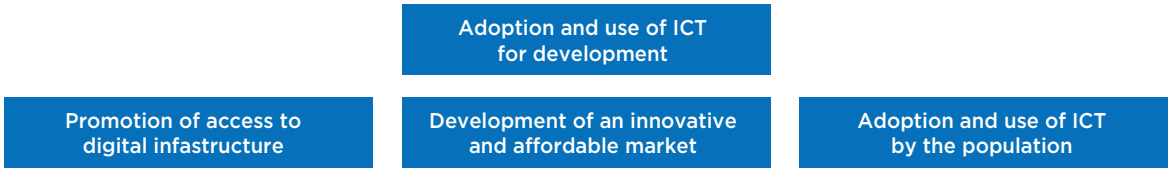
All these factors contribute to the digital gap. In addition, rural areas throughout the world face another internal digital gap as a result of difficulties in bringing infrastructure to remote regions with low population densities.

State of ICT in LAC

The digital ecosystem comprises the combination of telecommunications infrastructure deployment and the development of applications, content, and platforms on which a large number of goods and services converge. In this new environment, the public sector has certain strategic objectives that are shared by many of the actors within the ecosystem that promote the adoption and use of ICT for development. These include: (i) promote access to digital infrastructure, (ii) develop an innovative market, and (iii) achieve the adoption and use of ICT by the population (Figure 2).

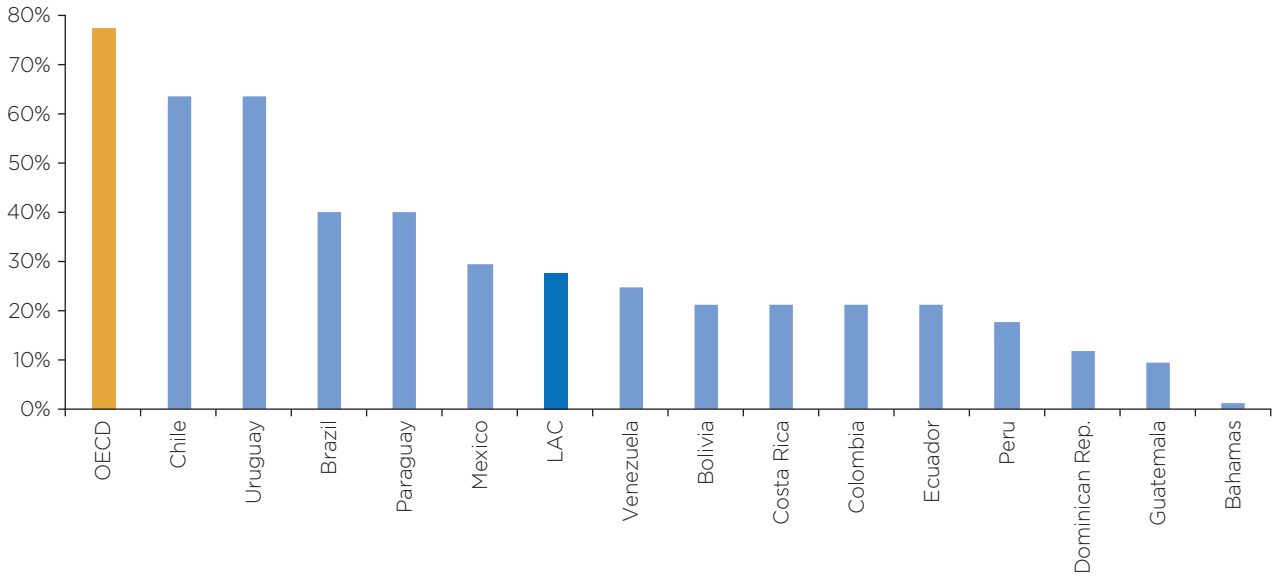
According to a study conducted by the Hispanic-American Association of Research Centers and Telecommunication Enterprises in 2014, an investment of US$44.378 million is

FIGURE 2 Main Objectives of ICT Governance



Source: Authors' elaboration.

FIGURE 3 **Percentage of Population Covered by Fourth-Generation Mobile Broadband Networks (4G) (2016)**



Source: Authors' elaboration.

required to close the digital gap between LAC and OECD countries.

Access to Digital Infrastructure

Average figures for LAC in terms of access to digital infrastructure are significantly lower than those of OECD countries. For example, 27 percent of the population in the LAC region is covered by fourth-generation mobile broadband, compared to 77 percent of the population in OECD countries. The LAC region is characterized by very disparate levels of development. For example, there is practically no 4G available in the Caribbean, while 36 percent of the population in Southern Cone countries, 22 percent in Central America, and 20 percent in the Andean countries have access to 4G mobile broadband networks (Figure 3).

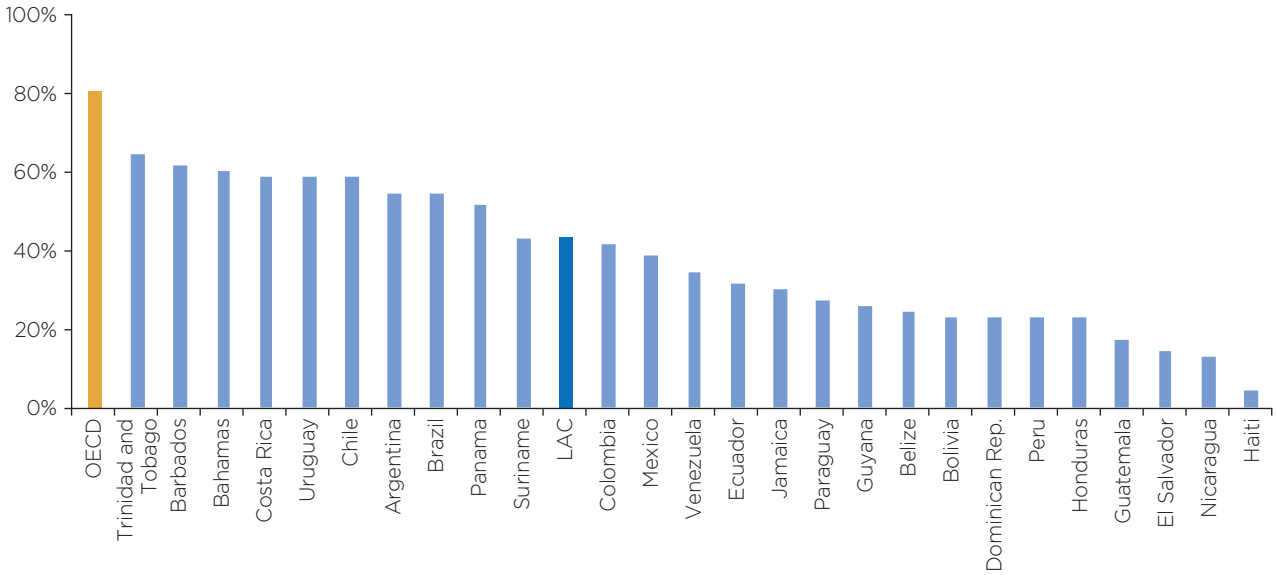
In terms of households with internet access, the LAC average (44 percent) is half that of the OECD average (81 percent). Again, there are important differences in the percentage of households with internet access among the subregions: Southern Cone (54 percent), Central America (34 percent), Andean countries (34 percent), and the Caribbean (20 percent) (Figure 4).

Innovative and Affordable Market

A similar pattern can be found in parameters used to measure the affordability of services. In LAC, on average, the bottom 40 percent of income earners would have to set aside an amount equal to 10 percent of their monthly income to subscribe to basic fixed broadband (with a capacity of 2Mbps), compared to 3 percent of wages for the same population segment in OECD countries. There are also subregional differences for this parameter, although they are not as pronounced: 13 percent in the Caribbean, 13 percent in Central America, 11 percent in Andean countries, and 8 percent in the Southern Cone (Figure 5).

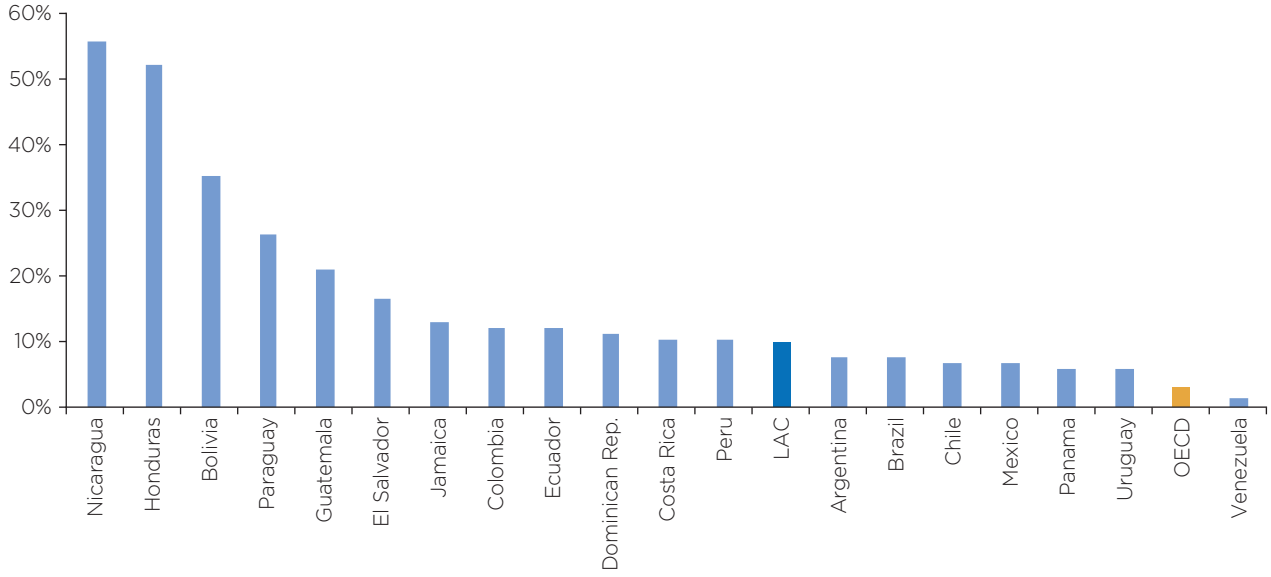
Data on affordability of rates for basic mobile broadband (maximum usage of 1GB) show similar results: in LAC, on average, the bottom 40 percent of income earners would have to devote an amount equal to 10 percent of their monthly earnings for a subscription, compared to 2 percent of income for the same population segment in OECD countries.

FIGURE 4 **Percentage of Households with Internet Access (2016)**



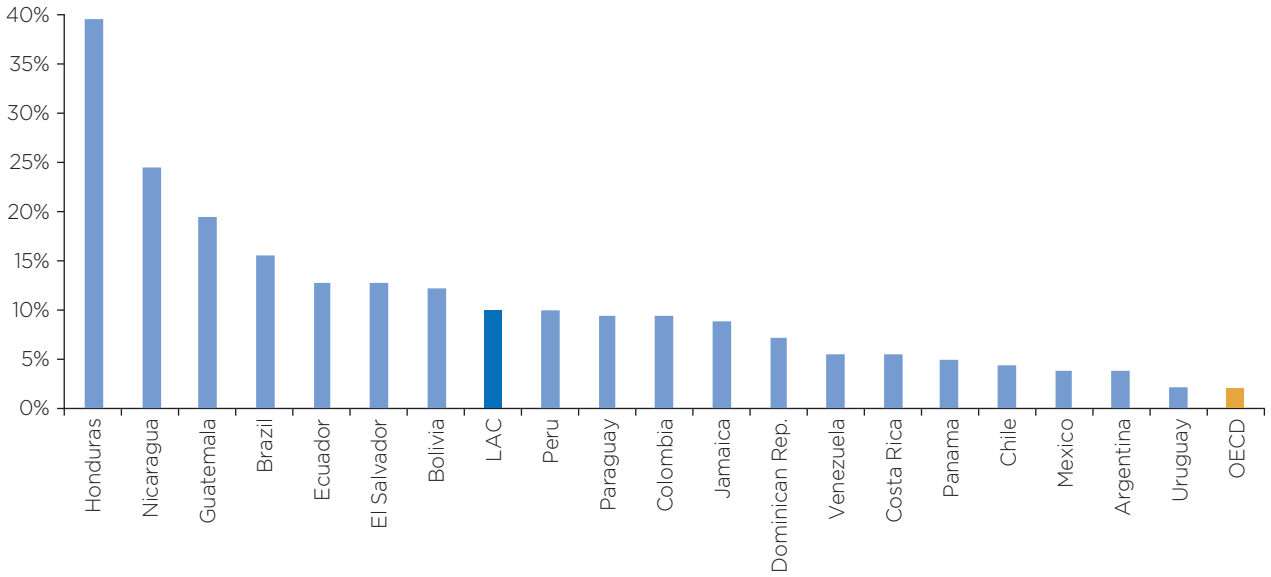
Source: Authors' elaboration.

FIGURE 5 **Percentage of Monthly Minimum Wage that the Bottom 40 Percent of Income Earners Must Spend for a Basic Fixed Broadband Subscription (2016)**



Source: Authors' elaboration.

FIGURE 6 **Percentage of Monthly Minimum Wage that the Bottom 40 Percent of Income Earners Must Spend for a Basic Mobile Broadband Subscription (2016)**



Source: Authors' elaboration.

In the subregions, the percentages are: 13 percent in the Southern Cone, 9 percent in Caribbean and Andean countries, and 8 percent in Central America (Figure 6).

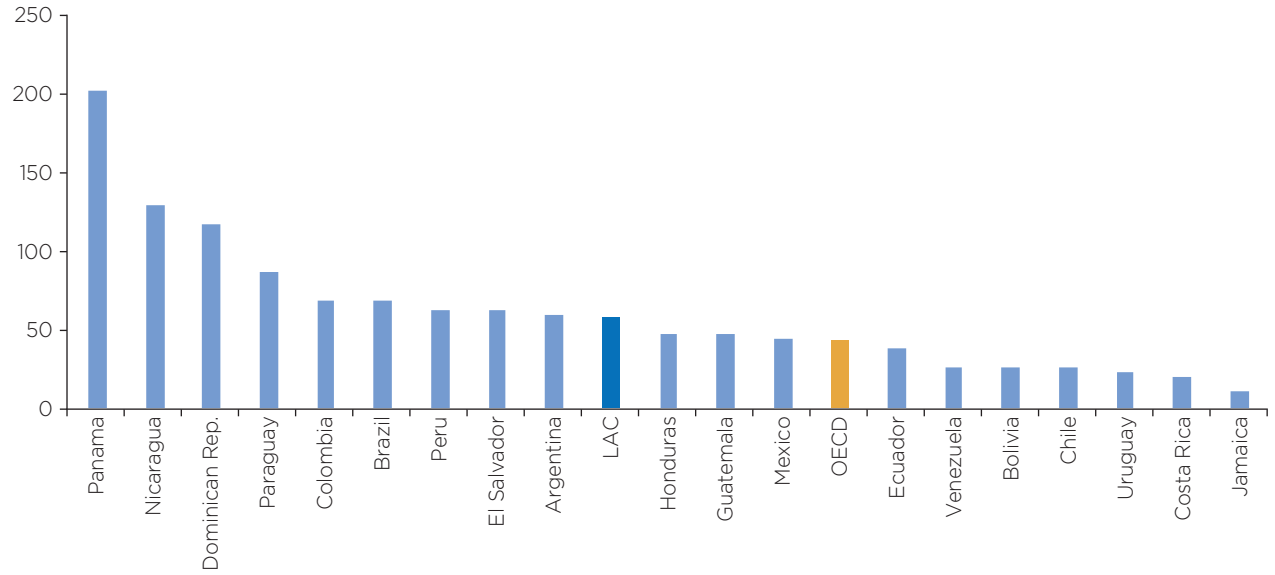
However, average per capita investment in telecommunications and traffic management infrastructure with private sector participation, which tends to concentrate on innovative technologies that improve the quality of services offered, is higher in LAC (US$57) than in the OECD (US$43). This shows that the LAC region is in the process of investing in basic telecommunications infrastructure that already exists in OECD countries. It highlights the differences in the percentage of populations covered by 4G networks and in households with internet access, as indicated above. Once again, subregional differences are significant: US$62 in the Southern Cone, US$55 in Central America, US$51 in the Andean countries, and US$9 in the Caribbean (Figure 7).

Adoption and Use of ICT

In LAC, on average 54 percent of the population say they have used the internet during the past 12 months, which is well below the OECD average (77 percent). Also, within this parameter of internet usage, the subregional differences are significant: 60 percent in the Southern Cone, 52 percent in the Andean countries, 50 percent in Central America, and 26 percent in the Caribbean (Figure 8).[4]

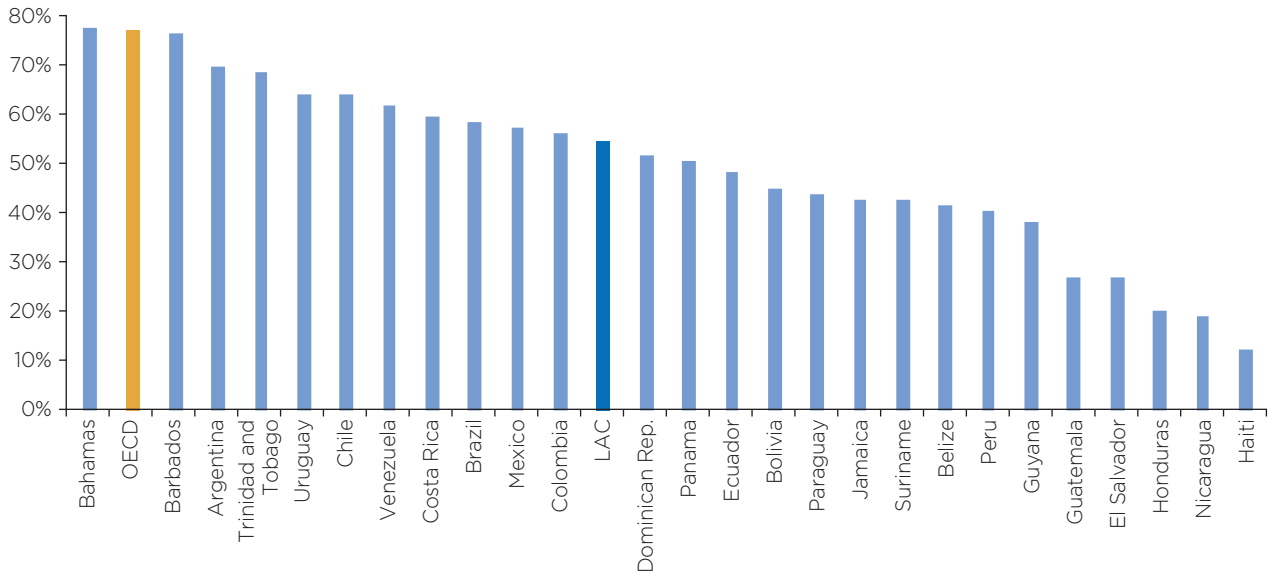
[4] In this publication, LAC statistics refer to those of the 26 countries in the region that are IDB members, grouped into the following subregions: Caribbean (Bahamas, Barbados, Guyana, Haiti, Jamaica, Suriname, and Trinidad and Tobago), Central America (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, and the Dominican Republic), Southern Cone (Argentina, Brazil, Chile, Paraguay, and Uruguay), and Andean countries (Bolivia, Colombia, Ecuador, Peru, and Venezuela) (García Zaballos and Iglesias Rodríguez, 2017).

FIGURE 7 **Average per Capita Investment in Telecommunications and Traffic Management Infrastructure (US$) (2016)**



Source: Authors' elaboration.

FIGURE 8 **Percentage of the Population that Uses the Internet (2016)**



Source: Authors' elaboration.

2

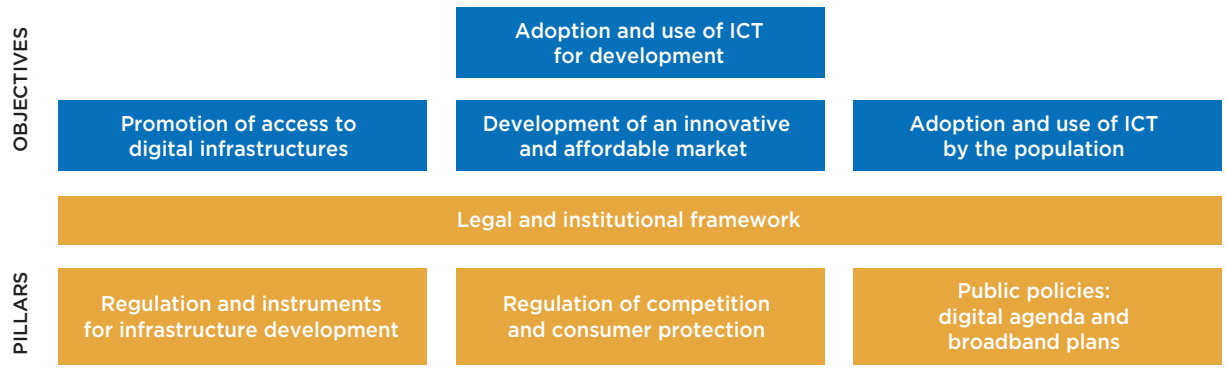
Main Pillars of Governance of the Digital Ecosystem

While keys stakeholders within the digital ecosystem share high-level strategic objectives, the interests of all stakeholders are not always aligned. The public sector has the tools to design legal and regulatory mechanisms that allow the maximum possible alignment of private sector actors' interests with those of the public sector and consumers. The key elements that facilitate governance of the digital ecosystem can be grouped in the four pillars described briefly in Figure 9.

Legal and Institutional Framework

The new digital era is characterized by the convergence of services provided by companies within industries traditionally separated at the regulatory level (telephony, radio, television, internet, digital content, etc.). The legal and institutional framework for ICT must acknowledge this convergence and, therefore, adapt both the organization and roles of actors responsible for executing public policy (ministries, regulatory authorities, and others) as well as their main laws and regulations (e.g., the telecommunications framework laws). The institutional architecture requires a high level of strategic direction and coordination among ministries and national regulatory authorities (NRA), whose competencies had been clearly delineated by industry and technology in recent years. In the current environment, legal frameworks tend to define the service more than the technology (technological

FIGURE 9 **ICT Governance: Main Objectives and Pillars**



Source: Authors' elaboration.

neutrality), while regulatory and policy agencies tend to have more cross-cutting roles that include all industries, companies, technologies, and interactions within the new digital ecosystem.

Regulation onf Infrastructure Development and Access

The expansion of new-generation networks (e.g., 4G and 5G networks) is the basis for the adoption of ICT by a broad segment of the population. Infrastructure regulation must address the dual objective of promoting private investment to the greatest extent possible, while not overlooking the more disadvantaged segments or areas with higher-cost access. In this respect, efficiency in resource allocation (e.g., radioelectric spectrum policies) and the use of available infrastructure (infrastructure sharing) must be combined with the effective use of universal service and access to promote infrastructure in more disadvantaged areas.

Regulation of Competition and Consumer Protection

The deployment of ICT infrastructure produces strong economies of scale and reach, and network effects. This leads to a portion of the telecommunications networks becoming essential inputs that must be regulated to avoid anti-competitive behaviors, so as to maintain strong ICT market dynamism. At the same time, the highly dynamic environment has tended to increase the importance of regulations ex post; that is, regulations aimed at correcting behaviors that are disadvantaging consumers or reducing the incentive for companies to invest and innovate. Within the digital convergence environment, the competition analysis also changes, requiring new metrics and analytical methodologies (e.g., to analyze the economic impact of mergers and acquisitions among companies in sectors that have been traditionally different but may currently provide the same service).

Public Policies for the Digital Economy: Digital Agendas

The digital ecosystem touches all sectors of the economy. From a demand perspective, public policies should aim to increase the capacity of people and organizations within such sectors to adopt and therefore take advantage of the benefits offered by ICTs. These public policies have a cross-cutting focus and encompass a wide variety of sectors, such as digital finance (digital payments, regulation of financing platforms, etc.), ICT in education and healthcare, and digitization of public sector and government actions (electronic procedures, transparency, digital participation, etc.). Given the cross-cutting nature of these policy actions, it is essential that they be structured as policy instruments, such as digital agendas and broadband plans. These instruments enable adequate prioritization, improvement in coordination and coherence, harnessing of synergies, and strengthening of supervision and monitoring of government actions to boost the digital economy in various sectors.

3

Reforms for the Digital Economy

Public sector authorities must periodically reform the institutional, legal, regulatory, and public policy frameworks that rule each of the four pillars that contribute to pursuing strategic objectives for development of the digital ecosystem. Figure 10 outlines the main reforms which public sector authorities can make in each pillar.

Legal and Institutional Framework

In recent years, the massive deployment of broadband infrastructure and growing cross-cutting adoption of this service have led to the proliferation of a wide variety of digital services and applications. Some of these services and applications are nearly replacing traditional telecommunications services; others go far beyond and generate new value-added services for practically any sector, institution, or individual.

The legal, institutional, regulatory, and public policy frameworks are also responding to this transformation. Many of them—albeit at various speeds in different countries of the region—seek to expand the reach of the intervention and sectoral specificity of telecommunications to the cross-cutting, multisectoral nature of ICT.

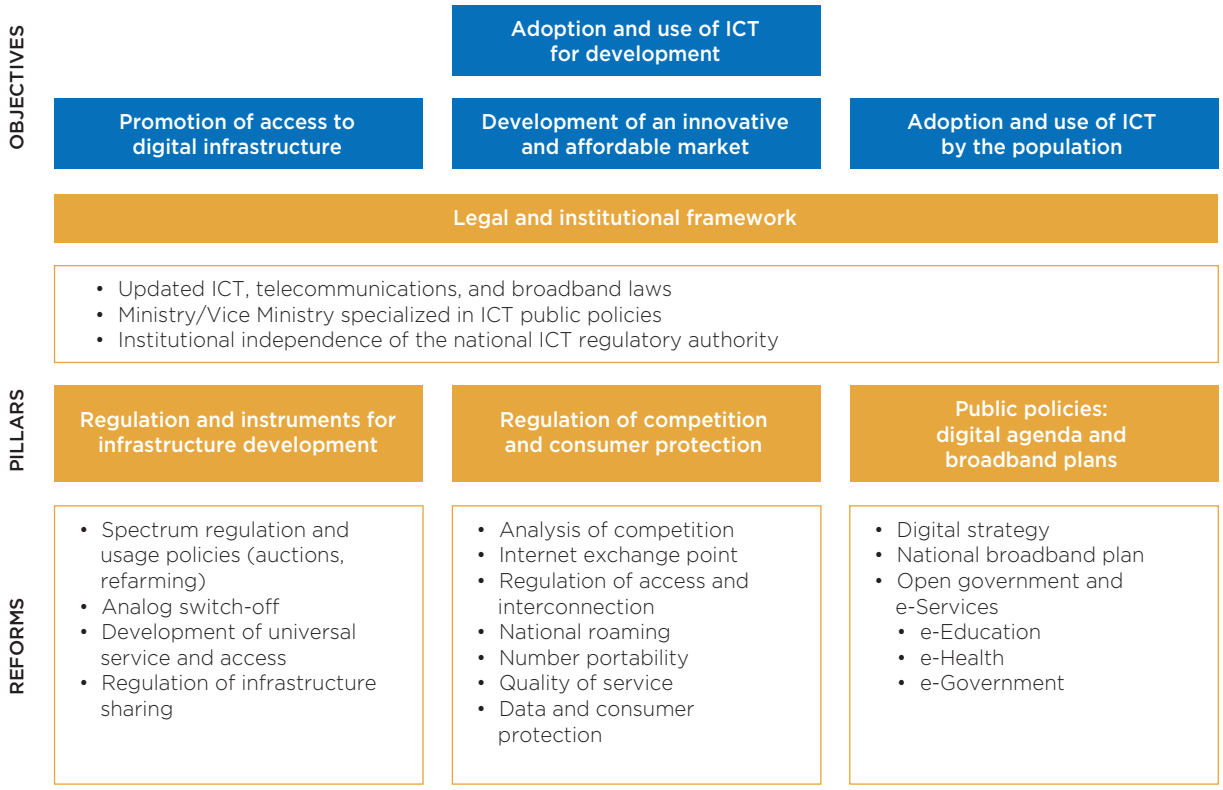
Updated Laws for ICT, Telecommunications, and Broadband

The framework of the telecommunications amendment to the World Trade Organization's (WTO) General Agreement on Trade in Services (GATS) recognized and compiled a series of principles in the Reference Document on WTO Regulation (1996) to be considered in legal reforms, among others, of the telecommunications sector by those WTO member countries that agreed to comply with them. Legal reforms would enable the development of secondary legislation and regulation aligned with principles such as: (i) safeguards for competition; (ii) guarantees of interconection under reasonable terms; (iii) non-discriminatory conditions and rates; (iv) obligations for universal service that is transparent and neutral from a competitive perspective; (v) public availability of criteria for license concessions; (vi) institutional independence of the NRA; and (vii) procedures that are objective, timely, transparent, and non-discriminatory for the allocation and use of scarce resources, such as numbering, frequencies and rights of way.

Situation in the Region

Approximately half of the region's telecommunications and ICT laws were passed during the twentieth century (Figure 11). Fifteen countries are studying, drafting, or have recently completed a sectoral legal framework reform. Telecommunications laws that have not been recently approved or updated do not reflect market changes resulting from technological evolution. For example, in telecommunications law, telecommunications services were traditionally defined based on the technology

FIGURE 10 **Analytical Framework: Main Objectives, Pillars, and Reforms**



Source: Authors' elaboration.

used to offer them (e.g., fixed telephony over copper cables). Such is the case with Paraguay's Law Nº 642/95 on Telecommunications,[5] in which "basic service" is defined as "the telephone service switched point-to-point through the use of fixed cable or radio, used as a substitute or extension of the network of cables." However, due to technological evolution, services are currently defined independent of the technology platform (e.g., fixed telephony is also offered using broadband through voice over internet protocol [VoIP] technology).

One particularly interesting case of sectoral legal framework reform from a few years ago was the passage of Mexico's Federal Telecommunications and Broadcasting Law in 2014. It stemmed from a 2013 constitutional reform that recognized, among other points, the right to broadband access and the promotion of competition in telecommunications and broadcasting services.[6]

Challenges

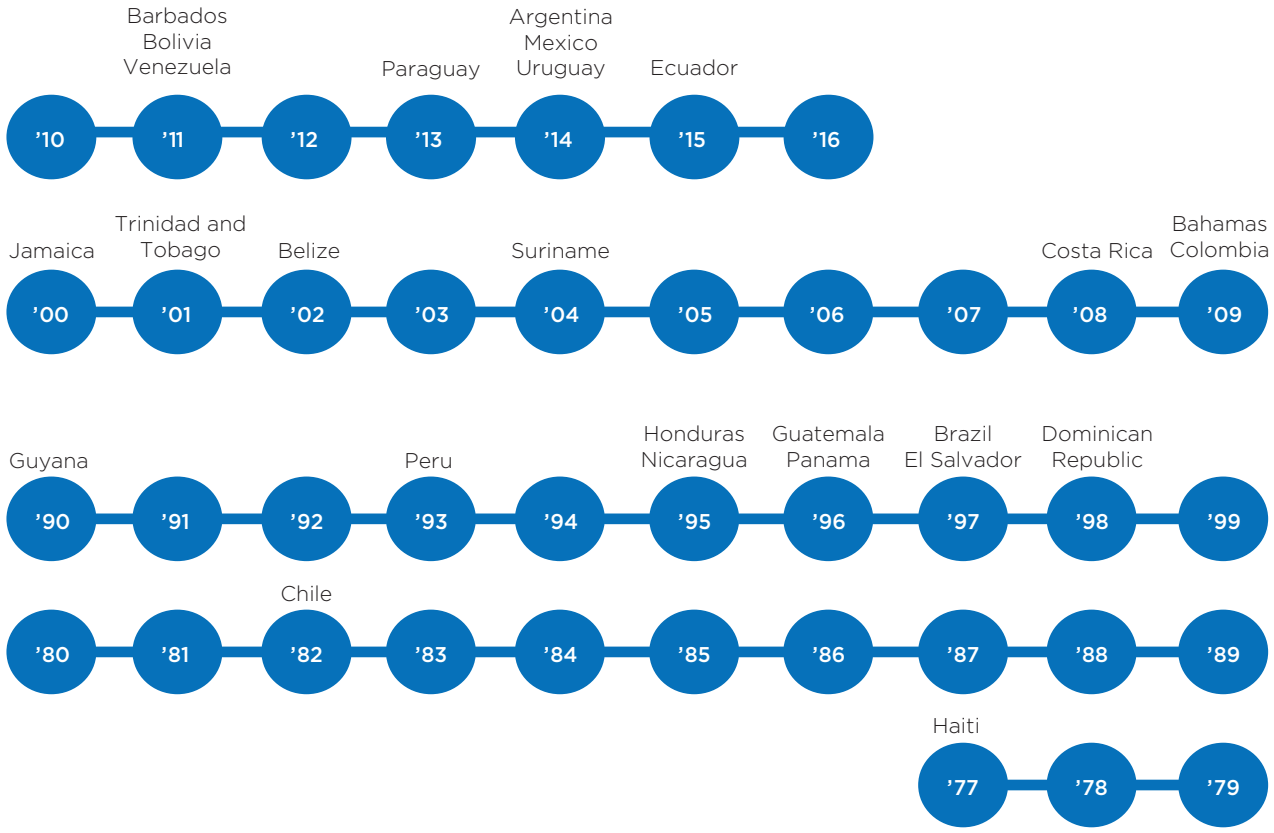
In addition to the intrinsic difficulties in modernizing a sectoral framework law, such as diverse political views, commercial interests of private sector agents, and general interest, there is the uncertainty generated by the evolution of telecommunications technologies, services, business models, and traditional markets.

The focus of the sectoral legal framework has traditionally been tied to telecommunications services. It often does not cover ICT services and applications, even when considering quasi-substitute services for traditional telecommunications ser-

[5] See https://www.conatel.gov.py/images/iprincipal/LEY%20642/Ley_N_642-95.pdf.

[6] see http://www.ift.org.mx/que-es-el-ift/que-es-la-reforma-de-telecomunicaciones.

FIGURE 11 Date of Approval of Telecommunications/ICT Framework Laws in LAC



Source: Authors' elaboration.

vices. Therefore, since the recent convergence of broadband telecommunications services escapes the definition of telecommunications services contemplated within the traditional sectoral framework laws, their modernization has become a priority for countries that have not updated the relevant framework in recent years.

Faced with the difficulties in predicting the sector's evolution to establish a new legal framework that covers it, one option under consideration is to base the drafting of the law on a series of general principles that should govern the sector, rather than drafting a very precise law that runs the risk of quickly becoming outdated. In this regard, this option proposes that certain principles be recognized, such as convergence of services and technological neutrality, over which there is not only a broad international consensus, but whose definition can accommodate innovations in technology and services. However, other principles, such as network neutrality, do not enjoy such broad consensus and, though they may still leave room for innovations in technology and services, may affect innovation of business models, whose definition and recognition within the framework law must be preceded by a particularly in-depth reflection on its objectives.

Ministry/Vice Ministry Specialized in ICT Public Policies

The liberalization of telecommunications services and the participation of the public sector in its offering necessitated modification of the institutional structure. The model where the State controlled the deployment of infrastructure, provision of services, formulation of public policies, and their execution

through government-owned telecommunications operators began to transition toward one in which government-owned telecommunications operators were privatized, markets were liberalized, and new private operators began competing with incumbent operators. National regulatory authorities had to be created as independent institutions that could impose obligations on operators that committed abuses from their position of market dominance. Sector ministries were also created—for communications, for example, and which often share their portfolios with other infrastructure sectors, such as transportation—to formulate public policies that necessarily included incentives for private operators to participate in their execution.

Situation in the Region

Some LAC countries have a Ministry of ICT (Colombia), of Modernization (Argentina), of Information Society Services (Ecuador), or of Innovation (Panama), which enable a cross-cutting, broad, and strategic public policy with respect to digital matters to transform the various sectors of the economy and society. Most countries (e.g., Guyana) have a Telecommunications Ministry, which often shares its portfolio with other technology and infrastructure sectors, such as the Ministries of Communications and Transportation (Chile); Science, Technology and Telecommunications (Costa Rica); Communications, Infrastructure and Housing (Guatemala); Science, Energy and Technology (Jamaica); or Telecommunications and Postal Services (Nicaragua). In a few cases (e.g., Barbados), jurisdiction over ICT falls directly under the Office of the Prime Minister, which gives it great prominence within the government organizational structure but could bring limited team specialization and limited agenda prioritization. Finally, in some other countries (e.g., Honduras), the government institution in charge of ICT public policies does not have a ministerial rank, but instead operates as a vice ministry, directorate or decentralized institution (Table 1).

Challenges

There are many options for addressing the need for reform of public policy institutional frameworks sparked by the digital revolution, which is the result of the massive adoption of broadband and ICT-based services and applications. One such option is the creation of ICT ministries and even consideration of ministries and deputy ministries with a broader scope, such as Digital Economy (e.g., Colombia). Another option proposed for an institutional model is an ICT ministry comprised of an Interministerial ICT Commission and three deputy ministries: (i) of Communications; (ii) of State Modernization and Electronic Government, and (iii) of Digital Economy and Society (Katz, 2015).

TABLE 1 **Telecommunications/ICT Public Policy Authorities in LAC**

Ministry of ICT/ Innovation/Modernization/ Information Society (7)	Ministry of Telecommunications/ Communications/Technology/ Industry/etc. (16)		Office of the Prime Minister/ President (3)
Argentina	Belize	Jamaica	Bahamas
Brazil	Bolivia	Mexico	Barbados
Colombia	Chile	Peru	Nicaragua
Ecuador	Costa Rica	Suriname	
Panama	El Salvador	Trinidad and Tobago	
Paraguay	Guatemala	Uruguay	
Dominican Rep.	Guyana	Venezuela	
	Haiti		
	Honduras		

Source: Authors' elaboration.

Institutional Independence of the National ICT Regulatory Authority

Following the telecommunications sector liberalization process, institutional, regulatory, legal and public policy frameworks were reformed. As such, the trend was to create national regulatory authorities—institutions independent of the executive branch—with goals such as fostering market competition, incentivizing infrastructure investments, protecting users, making efficient use of the radioelectric spectrum, and pursuing universal access to telecommunications services.

Situation in the Region

The convergence of telecommunications services with those that are ICT-based over broadband has sparked a debate over the need and convenience of creating convergent regulatory authorities; that is, a single regulatory entity in the information and communication technologies sector, with a reach that stretches beyond the telecommunications sector. For example, the Federal Telecommunications Institute in Mexico and the National Communications Authority in Argentina are examples of national regulatory bodies that have begun taking steps to adapt their regulatory mandates to the convergence of telecommunications services with ICT-based services. In some countries, the NRA oversees other sectors besides telecommunications, often those that traditionally also offered utility services through government-owned infrastructure. This is the case of General Superintendence of Electricity and Telecommunications in El Salvador.

In other cases, although there are few in the region, the NRA falls under the government, and there is no ministry devoted to telecommunications or ICT; in Barbados, for example, the NRA (Telecommunications Unit) is part of the Division of Energy and Telecommunications of the Office of the Prime Minister.[7]

In the LAC region, the mandate of around half of the NRAs is restricted to the telecommunications sector (ex ante interventions), while in some cases the authority's mandate also includes protecting the competitive environment (ex post interventions). This is true, for example, of the Mexican Federal Telecommunications Institute (Table 2).[8]

Challenges

The regulatory and public policy framework for the ICT sector, including telecommunications, sets goals such as fostering competition, protecting users, managing the radioelectric spectrum

[7] See http://www.telecoms.gov.bb/website/index.php?option=com_content&view=article&id=7:about-us-telecoms&catid=2:uncategorised&Itemid=101.

[8] See http://www.ift.org.mx/conocenos/objetivosinstitucionales.

TABLE 2 National Telecommunications and ICT Regulatory Authorities in LAC

Telecommunications (11)	Telecommunications and other sectors (7)	Telecommunications (and other sectors) and competition (6)	Not indepedendent of the Ministry (2)
Argentina Brazil Chile Colombia Guatemala Paraguay Peru Trinidad and Tobago Suriname Uruguay Venezuela	Belize Bolivia El Salvador Guyana Jamaica Nicaragua Panama	Bahamas Costa Rica Ecuador Haiti Mexico Dominican Rep.	Barbados Honduras

Source: Authors' elaboration.

efficiently, providing universal access to ICT services, and promoting the development of ICT capabilities for digital inclusion.

However, the increasingly faster evolution of technological advances and of new ICT-based services, as well as new business models, new market actors, and synergies between markets and vertical integration dynamics, call into question the effectiveness of the tools and traditional mandates of NRAs in achieving some of their objectives.

Regulation of Development and Access to Infrastructure

Limited infrastructure development is one of the main obstacles to developing a digital ecosystem in the LAC region. Some countries (e.g., El Salvador) do not have direct access to submarine cables, which are the main internet data transmission channel worldwide. Others (e.g., Suriname) depend on a single submarine cable, which may pose competitive risks for the broadband wholesale market—with possible impacts on the retail market—and for ensuring the resiliency of the country's international connectivity through this channel, due to technical failures, accidents, or natural disasters. Furthermore, since investments in broadband infrastructure deployment tend to be recovered through final customers' suscriptions, private telecommunications operators have little economic incentive to offer services in areas of lower population density. Thus, many citizens do not have access to telecommunications services or only have access to services from a single provider, which may make the market's correct functioning difficult.

Assignment of Radioelectric Spectrum for Mobile Broadband

The radioelectric spectrum is a limited resource that is essential in offering mobile telecommunications and broadcasting services. Some trends that seek to increase efficiency in the spectrum's usage include the use of a single spectrum frequency by multiple operators, the possibility of leasing or selling spectrum among operators, and the use of certain non-used frequencies (e.g., guard frequencies originally reserved for avoiding interference between assigned frequencies, and frequencies that do not require a license).

Situation in the Region

In the region, the average amount of spectrum assigned for mobile communications (Figure 12) is far below (less than a third) the amount of spectrum that the ITU, the United Nations specialized agency, recommends be assigned for mobile communications by 2020. This lower assignment compared to the recommended amount is due partly to delays in some countries' spectrum band tenders, particularly to the overall delay in LAC in the analog switch-off. This is the result of the interruption of analog television broadcasts to replace them with digital television broadcasts, which enables a valuable portion of radioelectric spectrum for mobile communications to be freed up due to its propagation characteristics (GSMA, 2017; OECD and IDB, 2016).

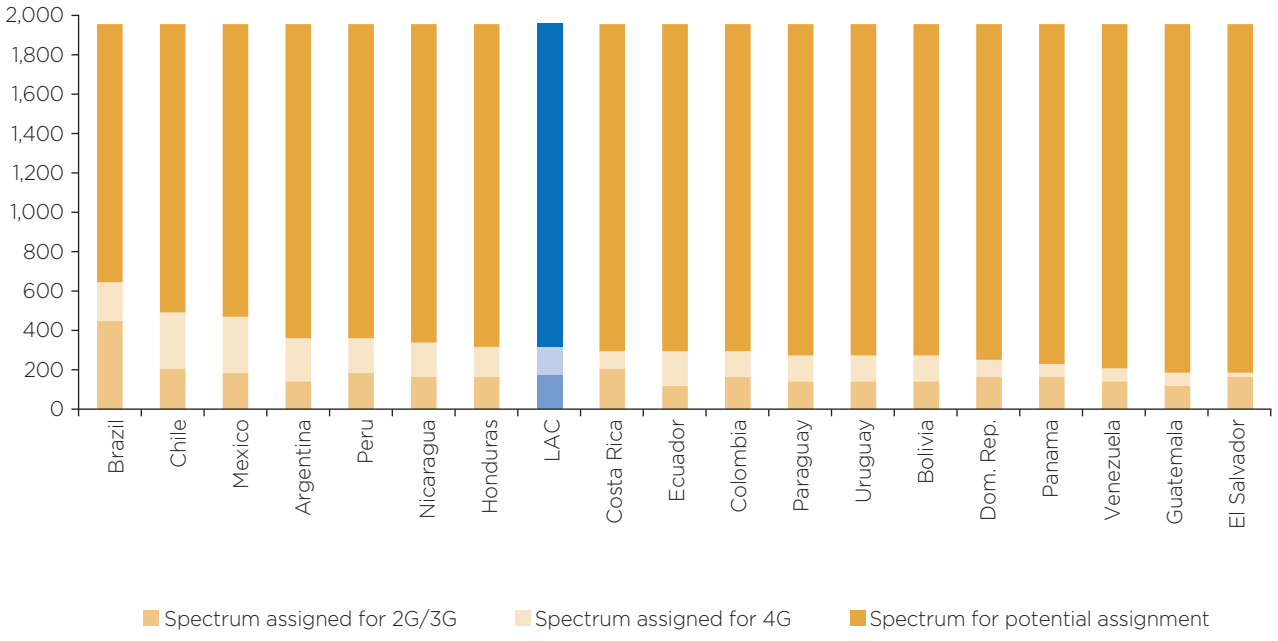
Challenges

The conditions of usage of many of the spectrum licenses issued to date limit the technologies for which the spectrum may be used, which prevents their usage for newer technologies that arose after the spectrum licenses were adjudicated. Also, in many instances, conditions associated with such licenses prohibit the adjudicating operators from marketing the spectrum (e.g., subletting portions of the spectrum that they do not use in certain geographic areas where the necessary infrastructure has not yet been deployed). Spectrum refarming processes may contribute to improving their efficient usage.

Analog Switch-Off in the Transition from Analog to Digital TV

Since digital signals require less spectrum that analog signals to transmit the same information

FIGURE 12 Spectrum Assigned by Country for Mobile Communications in LAC (MHz) (2017)



Source: Authors' elaboration.

packet, the analog switch-off—the process of migrating television broadcasts to a digital format and ceasing of analog broadcasts—allows spectrum to be freed up and used for services such as mobile broadband.

Situation in the Region

As seen in Figure 13, the dates for the analog switch-off, subject to frequent calendar adjustments and rescheduling, show that, for most countries in the region, the analog switch-off will not occur in the short term (OECD and IDB, 2016).

Challenges

The analog switch-off process presents certain difficulties. These include: (i) the cost of digital television receiver equipment that users must install on their analog television sets to be able to receive digital signals; (ii) the cost of replacing

FIGURE 13 Expected Calendar for Analog Switch-Off in LAC

Source: Authors' elaboration.

analog equipment with digital equipment throughout the country and to offer universal coverage; (iii) the complexity of designing effective communications campaigns regarding the advantages of digital television and of the actions required by users to complete the technological transition; (iv) the complexity of coordinating frequencies and times among bordering countries to avoid cross-border interference; and (v) the complexity of planning the deployment of the digital television network without delays (GSMA, 2013). The delay in transitioning from analog to digital television, along with the resulting analog switch-off, has prevented the freeing up of the amount of spectrum that was expected to be available for mobile communications.

Use of the Universal Service Fund to Deploy Broadband

Since costly telecommunications investments are recovered through user subscriptions, private telecommunications operators tend to offer services in areas with higher population density because they are more profitable (in LAC, around two-thirds of the population lives in these areas). Since it is not very profitable for private telecommunications operators to invest in infrastructure to offer services to around one-third of the population in LAC, government intervention is required to incentivize investments. A tool frequently used to subsidize broadband infrastructure expansion projects in areas that offer little or no profitability is a universal service fund (USF), which is generally funded through taxes on telecommunications operators (e.g., 1 to 2 percent of gross income).

Another common tool is to include coverage obligations in assigning spectrum licenses to mobile broadband operators to ensure that, in exchange for being able to tap such a valuable resource as the spectrum, they also offer services in certain areas with little or no profitability, or offer reduced rates for public institutions (schools, hospitals, etc.). Both the investments to deploy infrastructure in areas with little or no profitability and the lower income that telecommunications spectrum operators will receive due to the special rates contribute to reducing the amounts offered by bidders. Therefore, these spectrum bids produce less income for the public coffers.

Situation in the Region

In most of the region's countries there is a universal service fund (USF) (Table 3) with resources, as in the Dominican Republic, for example, while in many other cases the USF exists but with very limited resources, as is the case in the Bahamas. On the other hand, in some of the region's countries there is no USF as such (e.g., Uruguay), although there may be other mechanisms with similar structures (OECD and IDB, 2016).

TABLE 3 Existence of Universal Access/Service Funds in LAC

Countries with funds (14)	Countries with limited funds (8)	Countries without funds (4)
Argentina Brazil Chile Colombia Costa Rica Dominican Rep. Ecuador Guatemala Honduras Jamaica Mexico Panama Paraguay Peru	Bahamas Barbados Belize Bolivia El Salvador Nicaragua Trinidad and Tobago Venezuela	Guyana Haiti Suriname Uruguay

Source: Authors' elaboration.

Challenges

USFs are tools that can be very impactful, but their execution is not simple and there is a risk that their resources will not be used for their intended purpose. In some instances, part of the funds are used in projects that are not completely aligned with the objective of promoting universal service or access. This could result in users of telecommunications services—including those in remote areas, who often receive lower-cost and lower-quality telecommunications services—contributing to financing, through USFs, projects that do not improve connectivity in areas that are not served or are underserved. In addition, such projects are often executed by government agencies that do not necessarily have jurisdiction over the USF. In other cases, the managing entity for the USF does not have the capacity required to design, budget, tender, award, and monitor complex projects that can contribute to the USF's objectives, for which a significant portion of the funds may possibly remain unused.

Regulation of Infrastructure Sharing

Passive infrastructure represents a large part of the cost of building telecommunications networks. Civil works (enclosures, ditches, ducts, etc.) can account for more than half the cost of deployment of a fiber optic network, which could present a barrier to entry for new operators. A common regulatory tool, particularly applicable to operators with significant market share, is the obligation to offer access to certain passive infrastructure (e.g., mobile telephony and broadband towers) to other operators under reasonable and non-discriminatory terms.

One must also consider that a significant portion of passive infrastructure for services in other sectors (e.g., gas, water, and electricity) can be used for telecommunications services. In this context, an effective public policy tool could be a regulation that promotes that opening of ditches only once, that is, by the first operator that decides to install underground infrastructure. This type of regulation is particularly applicable to civil works wholly or partially financed by the government, since the latter promotes infrastructure projects in different sectors that require public works. For example, with the interdepartmental coordination required, when a road is built the ditch that is created can be used to install ducts that can accommodate fiber.[9]

In any case, facilitating the sharing of passive infrastructure, both among telecommunications operators and among infrastructure operators from different sectors, requires information that is current, credible, and precise on the location, characteristics, availability, and condition of the existing passive infrastructure. For this purpose, it is useful to have regulations on documenting, reporting, and updating information periodically, so that the authorities can create georeferenced databases and maps.

Situation in the Region

Infrastructure sharing is a common practice in the region. The following are some non-exclusive models in various countries: (i) an agreement among telecommunications operators (e.g., Jamaica); (ii) an agreement among operators from different sectors (e.g., Suriname); (iii) regulation of infrastructure sharing among telecommunications operators (e.g., Costa Rica); (iv) regulation of infrastructure sharing among operators from different sectors (e.g., Brazil); (v) agreement and regulation among telecommunications operators (e.g., Mexico); and (vi) agreement and regulation among operators from different sectors (e.g., Belize). Table 4 summarizes the scenario for regulations and agreements for infrastructure sharing in the region.

Challenges

On the one hand, the lack of harmonization of local permits, rights, and obligations could delay plans and increase the cost of deploying telecommunications networks. On occasion, national,

[9] For example, Directive 2014/61/UE of the European Union on May 15, 2014.

TABLE 4 Existence of Regulations and Agreements for Infrastructure Sharing in LAC

Regulated (11)	Not regulated (5)	? (10)
Argentina Bahamas Belize Brazil Chile Colombia Costa Rica Ecuador Mexico Panama Peru	Guatemala Jamaica Nicaragua Dominican Rep. Uruguay	Barbados Bolivia El Salvador Guyana Haiti Honduras Paraguay Suriname Trinidad and Tobago Venezuela

Source: Authors' elaboration based on survey responses (OECD and IDB, 2016).

regional, and local regulations regarding rights of way overlap, generating controversies among administrations that could generate delays and added costs.

On the other hand, the creation of a comprehensive georeferenced infrastructure map requires considerable effort in terms of coordination, standardization, and dedication by public sector authorities, telecommunications operators, and utility companies that provide data.

Regulation of Competition and Consumer Protection

The telecommunications sector is known for being very capital-intensive. Investment decisions by telecommunications operators are related not only to infrastructure investments, but also to investments in the development of new services to capture and/or retain customers whose subscriptions allow their investments to be recovered in as short a time as possible. Given that infrastructure investments can pose a barrier to entry for new operators, NRAs must define and analyze relevant markets—considering the different services offered within each country's geography—to determine whether there are operators with significant market power (SMP) and whether their dominance may generate competition problems in each of the relevant markets identified. In this case, the NRAs impose regulatory obligations ex ante on operators with SMP to promote market competition.

Interconnection is one of the key aspects of increasing a market's competition. Since network interoperability is fundamental to guarantee the provision of services, NRAs must pay special attention not only to the content of the Reference Interconnection Offer—particularly regarding non-discrimination and the relationship between prices and costs—but also to the procedures that must be followed to resolve conflicts, such as those that arise from complaints about noncompliance with service-level agreements.

Competition Analysis

Telecommunications infrastructure could be defined as the essential facilities required for the provision of telecommunications services. Operators who control these essential facilities may occasionally engage in anti-competitive behaviors, such as negative supplies, excessive information requirements, wrongful use of information on competitors, discriminatory use of information, discriminatory prices, excessive prices, predatory prices, cross subsidies, delay tactics, anti-competitive bundling, design of strategic products, and discrimination in the quality of service.

Situation in the Region

In most LAC countries, regulatory frameworks include methodologies for the definition and analysis of relevant markets, with criteria for identifying

operators with SMP (or dominant position) in one of the relevant markets, as well as regulatory measures to correct problems with competition that may arise from certain operators' dominant positions.

Challenges

In some LAC countries, one of the most important steps in terms of regulating competition is the development and execution of a market analysis methodology that enables a determination of which operators are considered to have SMP in each of the relevant markets identified.

Internet Exchange Points

Traditionally, the internet exchange point (IXP) that most of the region's telecommunications operators used for interconnection was located in Miami. This prompted the creation of points through which telecommunications operators connect with content delivery networks (CDN). The fact that the region's telecommunications operators exchanged traffic in Miami created delays in content traffic that affected the quality of services and generated additional costs to compensate international broadband operators that delivered the data to and from Miami. However, thanks to the proliferation of IXP and CDN in the region, this problem is becoming less severe.

Situation in the Region

There are more than 60 IXPs in the region (Figure 14). Most LAC countries have at least one IXP, and those with the largest land mass, such as Brazil and Argentina, have more than 20 IXPs each. Some countries, however (e.g., El Salvador), still have no IXPs.[10]

Challenges

The development of an IXP requires the collaboration of telecommunications operators, which in most cases compete among themselves in the same markets. Sometimes, the dynamics in certain markets do not make it attractive for all operators to join an IXP. For example, in a market with two operators with large market shares and other operators with substantially lower shares, the two dominant operators may give priority to reaching a bilateral traffic exchange agreement, rather than a multilateral one with all market operators to create an IXP and exchange traffic with all of them.

Regulation of Access and Interconnection

NRAs tend to have regulatory tools, such as access obligations and guidelines on prices and costs, on price controls, on transparency, on non-discrimination, on restrictions in the use of information, on cost accounting, and on separate accounting. With these types of obligations, NRAs seek to ensure that operators with SMP (i) adopt competitive practices, such as responding to requests for access to their networks whenever reasonable and technically and economically feasible; (ii) offer interconnection with other networks at prices based on costs; (iii) undergo audits to ensure that they have separate accounting and that their prices are based on costs; (iv) publish a reference interconnection offer (RIO) with prices and conflict-resolution procedures; and (v) apply the same technical and financial conditions to third-party operators as they apply to themselves or to any of their subsidiaries.

Situation in the Region

Most of the interconnection regulations in effect in the region (e.g., Venezuela) include the practice of all of the basic principles: (i) open network (i.e., mandatory interconnection); (ii) publication of interconnection agreements; (iii) issuance of a RIO; (iv) cost-oriented prices; and (v) inclusion of

[10] Telegeography (http://www.Internetexchangemap.com/). Display: Map Customizer (https://www.mapcustomizer.com/).

FIGURE 14 **Map of Internet Exchange Points (IXPs) in LAC**

Exists (17)		Does not exist (9)	
Argentina	Jamaica	Bahamas	Honduras
Barbados	Mexico	El Salvador	Suriname
Belize	Nicaragua	Guatemala	Uruguay
Bolivia	Panama	Guyana	Venezuela
Brazil	Paraguay	Haiti	
Chile	Peru		
Colombia	Dominican Rep.		
Costa Rica	Trinidad and Tobago		
Ecuador			

Source: Authors' elaboration.

TABLE 5 Regulation of Interconnection among Telecommunications Operators in LAC

Regulated (23)		Not regulated (1)	? (2)
Argentina	Honduras	Haiti	Guyana
Bahamas	Jamaica		Venezuela
Barbados	Mexico		
Belize	Nicaragua		
Bolivia	Panama		
Brazil	Paraguay		
Chile	Peru		
Colombia	Dominican Rep.		
Costa Rica	Suriname		
Ecuador	Trinidad and Tobago		
El Salvador	Uruguay		
Guatemala			

Source: Authors' elaboration.

conflict-resolution mechanisms, among others. However, in many of the region's countries, some practices have not been implemented, such as separate accounting of services, and the setting and application of cost methodologies (Table 5).

Challenges

Several countries could strengthen both the design and the execution of interconnection regulations by training NRAs on technical, financial, and legal issues, particularly those regarding cost guidelines for interconnection rates and solutions to controversies that might arise among operators subjected to such regulations.

National Roaming

National roaming agreements allow mobile operators with limited infrastructure with which to offer customers coverage to provide services nationwide. Often, when national regulatory authorities mandate that mobile operators offer national roaming services to another mobile operator's customers, they do so for one of two reasons: (i) public sector authorities have divided the territory geographically and assigned the deployment of mobile infrastructure to one operator in each territorial division to foster competition in services rather than infrastructure, thereby prioritizing an increase in the country's coverage; or (ii) the NRA imposes the obligation on an existing mobile operator for a period of time to allow new operators to compete with existing operators in terms of services, while they can deploy their own infrastructure to compete in terms of coverage.

Sometimes, two or more mobile operators reach agreements to offer services using outside infrastructure. In these cases, the motivating factor is often that operators who join the agreement prefer not to invest in their own infrastructure to be able to compete in terms of nationwide services.

Situation in the Region

National roaming is only regulated in some countries in the region (e.g., Ecuador) (Table 6). It is important to note that this regulatory measure is not necessarily recommended in all market circumstances and its implementation would not necessarily be beneficial in all countries.

Challenges

When national roaming is applied as an asymmetrical regulatory measure—that is, when it is applied

TABLE 6 Regulation of National Roaming in LAC

Regulated (7)	Not regulated (14)	? (5)
Argentina Bahamas Bolivia Brazil Colombia Ecuador Mexico	Chile Costa Rica El Salvador Guatemala Honduras Jamaica Nicaragua Panama Paraguay Peru Dominican Rep. Suriname Trinidad and Tobago Uruguay	Barbados Belize Guyana Haiti Venezuela

Source: Authors' elaboration.

to a mobile operator with market dominance—it is very difficult to be precise when setting the values of the regulation's key parameters (e.g., price of roaming service and duration of the obligation). There are many factors (endogenous and exogenous, macroeconomic and microeconomic, etc.) that can be taken into account when estimating such values, particularly if the obligation will be in effect for several years.

Number Portability

Number portability allows users of fixed and mobile telephony to change service providers while maintaining the same telephone number. Full number portability allows users to keep the same number even when switching from fixed to mobile service and vice versa.

The importance of number portability is that it allows a considerable reduction in transaction costs required to change telephony service providers, which facilitates market competition. The lower the number of maximum days the regulation allows telephony operators to complete the portability process, the lower the transaction costs will be.

Situation in the Region

In most of the countries in the region, there is number portability in fixed and/or mobile telephony services. Full number portability is beginning to be introduced in some countries, such as Chile (OECD and IDB, 2016) (Table 7).

Challenges

The execution of number portability requires the implementation of mechanisms for close coordination among telephony operators, as well as the approval of a number portability regulation by the NRA.

Furthermore, national numbering plans, which define the sets of telephone numbers assigned to each service (e.g., fixed, mobile, and VoIP), do not always allow for full number portability. In reality, national numbering plans traditionally separate the sets of phone numbers by service and, in the case of fixed telephony, by geographic area. Therefore, full number portability would, in many cases, require a revision of national numbering plans.

Quality of Service

Sector authorities often define key parameters to check the quality of service that customers receive from each telecommunications operator. Authorities can request that operators measure the value of their networks for each parameter in different areas (e.g., actual download time for a mobile broadband service in a specific location), or they can measure the value of these parameters

TABLE 7 Regulation of Number Portability in LAC

Fixed and mobile (9)	Fixed or mobile (9)	No (4)	? (4)
Brazil Chile El Salvador Jamaica Mexico Panama Peru Dominican Rep. Venezuela	Argentina Bahamas Colombia Costa Rica Ecuador Guatemala Honduras Paraguay Trinidad and Tobago	Bolivia Haiti Nicaragua Uruguay	Barbados Belize Guyana Suriname

Source: Authors' elaboration.

directly. A good way to foster competition in terms of quality of service from operators is for sector authorities to periodically publish the results of such metrics.[11]

Situation in the Region

Regarding the regulation of the quality of telecommunications services, most LAC countries monitor and publish parameters for the actual quality of service offered by various telecommunications operators (e.g., El Salvador), while in some others quality is monitored but not published (e.g., Uruguay), and in a few others there is no monitoring at all (e.g., Guatemala) (OECD and IDB, 2016) (Table 8).

Challenges

In markets with several telecommunications service providers, the heterogeneity of services makes it difficult to compare offerings, and it is difficult for the users organization to report noncompliance or abuse on the part of the provider. In addition, since commercial contracts between telecommunications retailers and customers are complex and

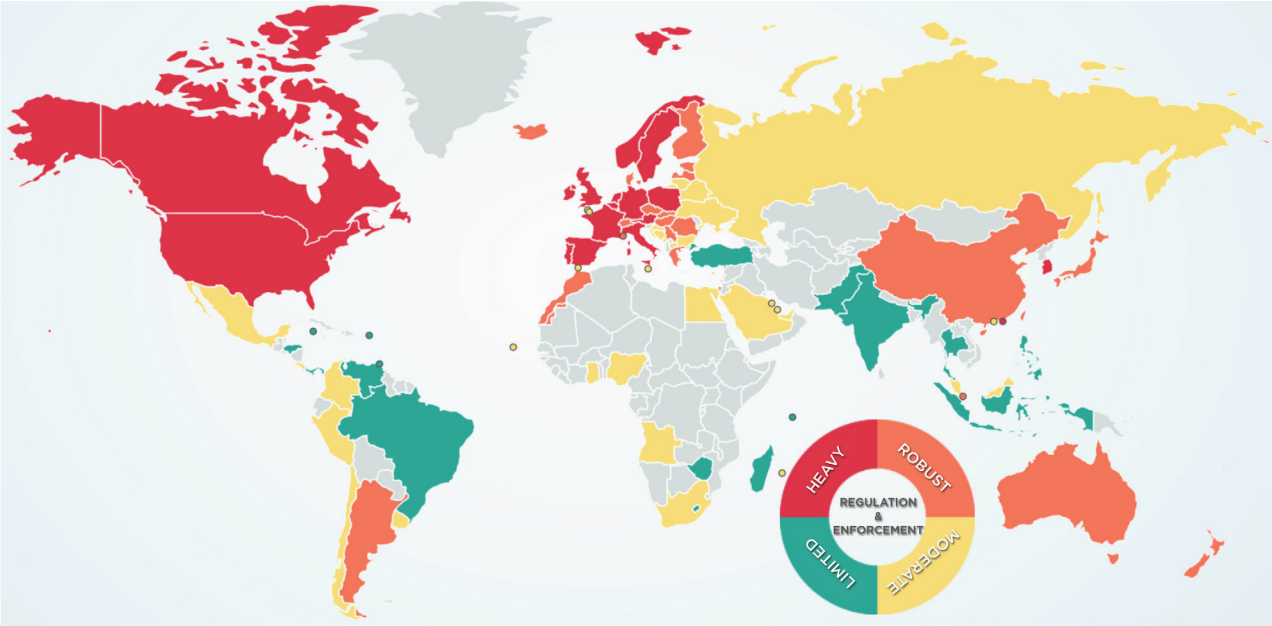
[11] Some private sector initiatives publish certain results for quality of service. For example, Netflix, the provider of audiovisual content, publishes monthly results on data download speeds for its audiovisual content in most of the countries where it operates, desegregating the information by broadband operator (https://ispspeedindex.netflix.com/).

TABLE 8 Regulation of the Quality of Service in LAC

Monitored and published (13)	Monitored, not published (2)	Not monitored, not published (4)	? (7)
Argentina Brazil Chile Colombia Costa Rica Ecuador El Salvador Haiti Mexico Paraguay Peru Dominican Rep. Venezuela	Panama Uruguay	Bahamas Bolivia Guatemala Nicaragua	Barbados Belize Guyana Honduras Jamaica Suriname Trinidad and Tobago

Source: Authors' elaboration.

FIGURE 15 Comparison of Levels of Data Protection in LAC



Source: www.dlapiperdataprotection.com.

pre-formulated standard contracts, and given the nature of the design of broadband networks in which retail offerings show maximum or indicative download speeds, customers may face difficulties in lodging a complaint regarding quality of service.

Protection of Data and Consumers

The power relationship between telecommunications operators and customers is unequal, which may justify the adoption of a regime to protect the rights of telecommunications service customers. While many legislative and regulatory frameworks include generic metrics on consumer protection, not all include specific regulations on the protection and rights of telecommunications services customers.

Situation in the Region

There are some successful initiatives regarding regional coordination for consumer protection, such as a blacklist of stolen mobile terminals, to which operators in the region refuse to provide services. This initiative is carried out in coordination with GSMA, the association of mobile telephony operators, which manages the International Mobile Equipment Identity (IMEI) list for stolen mobile terminals.[12]

With respect to the legal and regulatory framework for data protection, the status of approval and application of laws is quite varied throughout the region (2). Some countries have a robust level of development (e.g., Argentina), a moderate level (e.g., Costa Rica) and a limited level (e.g., Trinidad and Tobago). However, no country in the region has yet reached a level of development similar to that of Canada, the United States, or the European Union, among others.[13]

Challenges

ICT-based services and their business models evolve at great speed and with much variety. This

[12] See https://www.gsma.com/services/gsma-imei/imei-blacklisting/.

[13] See https://www.dlapiperdataprotection.com/#handbook/about-section/c1_CO/c2_AR.

makes it difficult for public sector authorities and consumers to identify new risks. For this reason, new requirements for consumer protection are not yet covered in the regulations.

Public Policies for the Digital Economy

Because digital technologies are cross-cutting and transformative, they have a huge impact on society and the economy. However, this impact is not necessarily homogeneous nor does it benefit all citizens and companies equally. To begin with, there are significant inequalities in terms of possible access to and adoption, use, and exploitation of digital technologies. These are caused by a variety of factors, such as: (i) inequalities in awareness of the relevance and possible benefits of digital technologies; (ii) inequalities in the ability to make effective use of certain digital technologies; (iii) inequalities in the presence of infrastructure and in affordable and quality service offerings by telecommunications service providers in the geographic area of influence of potential users; (iv) inequalities in purchasing power to assume the cost of service subscriptions and terminal devices; and (v) inequalities in habits of use of digital technologies relative to the benefits they offer. This set of inequalities is often referred to as the digital divide.

For a public policy designed to close the digital divide to be successful, it must consider the multiple dimensions that comprise the divide, including the way that digital technologies are used relative to the exploitation of the benefits of these technologies. If this happens, significant results can be achieved, such as: (i) a 12–19 percent increase in Peru thanks to internet adoption (De los Rios, 2010); (ii) a 33 percent increase in hourly wages in households in Uruguay with below-average income for beneficiaries of the One Laptop per Child program (Marandino and Wunnava, 2014); and (iii) an increase in salaries, production of processed goods, and prices that farmers receive for their products, thanks to access to mobile telephony and the internet in rural areas of Peru (Ritter and Guerrero, 2014; World Bank, 2016).

The digitalization of a society and an economy characterized by a significant digital divide can result in increased inequalities. This phenomenon is another manifestation of what is known as the Matthew Effect:[14] those who are better off benefit most from new opportunities. In the case of the digitalization of a society and an economy with a wide digital divide, companies and citizens that are better positioned in terms of purchasing power, access to telecommunications infrastructure and services, access to financial markets, entrepreneurship, education, knowledge networks, and electricity will be better able to benefit from digital technologies. With respect to public policies to support digitalization, there are many experiences of the incorporation of digital technologies in education. One of the most common ones is the delivery of computers to schools, teachers, and students in a country or region. It would appear intuitive that, for example, schools that have electricity and a more reliable internet connection, teachers who have groups of less problematic students, and students who have digital devices, internet connection at home, and relatives or tutors with digital skills will be better able to take advantage of public policies to deliver computers than their more disadvantaged peers.[15]

As a result, if one of the objectives of a government is inclusive development, public sector intervention should, on the one hand, devote considerable effort to closing the digital divide. On the other hand, the digital divide must be precisely measured and considered when designing public policies based on digital technologies, to adapt

[14] The term Matthew Effect—which owes its name to the biblical passage in Matthew 25:29: "For whoever has will be given more, and they will have an abundance; whoever does not have, even what they have will be taken from them"—was popularized by Robert K. Morton in Science magazine in 1968, in an article titled The Matthew Effect in Science. It notes that in the scientific field when a group of scientists conduct research, the scientific community tends to attribute the merits of such findings to the best-known scientist in the group, regardless of that person's role or true contribution to the research.

[15] See http://www.garfield.library.upenn.edu/merton/matthew1.pdf.

them to the conditions of citizens and companies to maximize the advantages of the opportunities offered by digital technologies.

Since public policy includes elements based on digital technology in an increasing number of sectors and levels, it is important to establish coordination mechanisms for digital issues in all public sector departments as well as an institutionality to lead their design and execution. As such, a digital agenda—including plans for national broadband, infrastructure development, electronic government, cybersecurity, and others—is a useful tool to establish tangible goals for the development, monitoring, and evaluation of public initiatives on digital technologies. These initiatives may include policies such as: (i) commitments and action plans within the framework of the open government partnership; (ii) digital services (e.g., in health and education, as well as open courses online or through digital broadband connection in schools and hospitals; on cybersecurity, and electronic government); and (iii) ventures based on digital technologies (e.g., the development of industries, employability, and regulation of platforms for transportation services, housing, and financing).

Most governments in the LAC region have been making significant efforts to enable the economy and society to take advantage of the opportunities offered by the digital revolution. One can find numerous examples in the region of public policies in areas such as digital agendas, electronic government, cybersecurity, open government, digital services, electronic commerce, entrepreneurship based on digital technologies, and development of digital industries, among others. Yet despite the efforts and public policies implemented by the region's governments, there are important challenges in the process of promoting the access, adoption, and use of digital technologies by various segments of the economy and society. Below are illustrative data on the status of the region's development with respect to design and implementation of relevant public policies for some of the areas mentioned, as well as some of the most important public policy challenges in those areas with the greatest potential impact on society and the economy.

Updated National Digital Strategy

The functions of a national digital strategy can be included in other initiatives or under other names, such as Digital Agenda, National Agenda for the Information Society and Knowledge, Development Strategy for the ICT Sector, or National ICT Strategy for Development.

A digital strategy sets short- and medium-term digital development goals, such as: (i) foster the deployment of broadband networks; (ii) develop the digital economy; (iii) improve public digital service offerings; (iv) promote the use of digital services; (iv) spur the development of innovative ICT services, products, and applications; and (vi) promote the inclusion and development of digital skills at both the user and professional level.

For this reason, a digital agenda is complemented by national thematic plans—often executed by different government agencies—such as national broadband plans, national electronic government plans, action plans for open government, plans for smart cities, plans for smart nations, digital inclusion plans, digital literacy plans for the population, and national plans for the export of digital services, among others.

Situation in the Region

Half the countries in the region have digital agendas in force (e.g., Honduras), and it is estimated that they will be updated over the next five years as they expire. Some countries have recently approved, or plan to soon approve, a national digital strategy (e.g., Dominican Republic), while in other countries (e.g., Barbados) there has been no evidence suggesting that they plan to update their expired national digital strategy or that they will approve their first national digital strategy in the short-term (e.g., Suriname) (OECD and IDB, 2016) (Figure 16).

Challenges

Lack of institutional structure, interdepartmental coordination, political will, and technical capacity are some of the main barriers to promoting the

FIGURE 16 Time Horizon for National Digital Strategies in LAC

Source: Authors' elaboration.

creation and updating of a digital agenda in some countries in the region. Furthermore, once a digital agenda has been approved, these same barriers make its successful execution difficult, especially because the decentralized execution of public policies does not always favor their adoption and prioritization by some implementing agencies, for which great interinstitutional coordination efforts are required.

Updated National Broadband Plan

A national broadband plan complements the digital agenda by setting broadband coverage objectives for the country. The design of activities included in the national broadband plan to achieve its objectives is based on an assessment that reveals existing connectivity gaps, which can be plotted in an infrastructure and population map. In addition to specific programs with targets, time horizons, and specific resources, public sector authorities have the capacity to decisively facilitate the deployment of broadband infrastructure by simplifying procedures and costs for obtaining licenses and permits, both nationally (e.g., as a broadband infrastructure operator) and locally (e.g., for rights of way).

Situation in the Region

A third of LAC countries have national broadband plans in force (e.g., Uruguay) and it is estimated that they will update them over the next five years as they expire. Some countries have recently approved, or plan to approve shortly, a national broadband plan (e.g., Nicaragua), while in other countries there is no evidence suggest that they plan to update their expired national broadband plans (e.g., Guyana) or are planning the approval of their first national broadband plan in the short term (e.g., Haiti) (Figure 17).[16]

Challenges

Interinstitutional coordination is also an important challenge for the correct execution of national broadband plans, as their objectives include serving the priorities of other sectors, such as education, health, and public safety. For this reason, it is important to ensure, at the design stage, that national broadband plans are aligned with digital agendas and that they both incorporate interdepartmental coordination mechanisms and align the strategic objectives of national broadband plans with the needs of the various public sector institutions that can take advantage of the promotion of broadband to accelerate sectoral development.

[16] See https://blogs.worldbank.org/edutech/matthew-effect-educational-technology.

FIGURE 17 Time Horizon for National Broadband Plans in LAC

Source: Authors' elaboration.

Updated Action Plan for Open Government and e-Services

Open government promotes government transparency, accountability, opening of processes, and interaction between governments and citizens. The Open Government Partnership (OGP) is an international platform for governments and civil society. Some 15 LAC countries participate in the OGP. Member countries approve and execute successive Open Government Action Plans with a duration of around three years. Some countries are already executing their third action plan.

The IDB supports member countries of the OGP with regard to open government policies, through: (i) technical cooperation (e.g., georeferenced map to monitor projects in which royalties are invested, as in Colombia[17]); (ii) studies (analysis of Open Government Action Plans, etc.), and (iii) dialogue with governments on public policies.

The International Open Data Charter is a network for governments and civil society—in which there are two IDB members from LAC—linked to the Open Data work group of the OGP. Open Data are available digital data with the requisite technical and legal characteristics to be freely read by machines, used, reused, and redistributed by any person, at any time and any place. The countries that support or adopt the International Open Data Charter usually launch an open data portal and adopt data opening policies by default.

The use of digital technologies for the provision of public and private services enables digitization and automation of information, communications, and processes to improve productivity, as well as the development, operation, and protection of critical infrastructure for the secure provision of digital services.

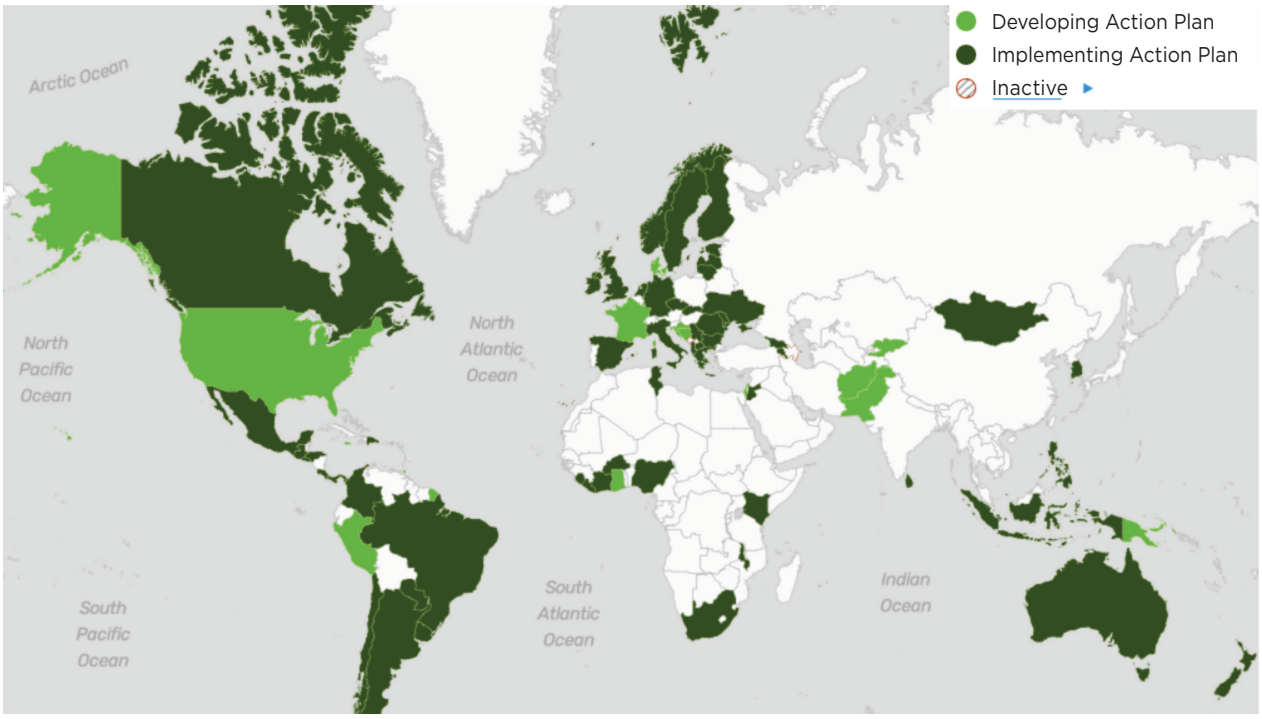
Some of the public policies that contribute to the provision of digital services are: (i) construction of broadband infrastructure and provide terminals to connect public institutions (schools, hospitals, police stations, local governments, etc.); (ii) promotion of the use of digital technologies for the provision of public services; (iii) construction and operation of critical infrastructure (e.g., a national data center) that groups together all government computer servers; (iv) reform of institutional structures and mandates, as well as regulations to protect critical infrastructure, and establishment of response protocols for attacks and failures, along with interinstitutional coordination mechanisms; (v) approval and reform of electronic commerce and electronic signature laws; and (vi) promotion of the development of digital services and applications.

Situation in the Region

Half the countries in the region are part of the OGP and have approved an Open Government Action

[17] See https://biblioguias.cepal.org/TIC/agendasdigitales.

FIGURE 18 Global Map of Open Government Action Plans



Source: https://www.opengovpartnership.org/participants.

Plan (Figure 18). Some countries are on their third action plan (e.g., Guatemala) or second action plan (e.g., Peru), while a few countries have approved their first (e.g., Trinidad and Tobago) or are drafting it (e.g., Jamaica). Many of the region's countries are currently not members of the OGP (e.g., Belize).[18]

In terms of digital services or e-services, most countries have recently approved, or plan to shortly approve, digital policies to connect public institutions (e.g., Nicaragua). Regarding broadband connection in the region's educational institutions (Figure 19), 70 percent of countries have policies to connect primary schools, 82 percent to connect secondary schools, and 67 percent to connect universities.[19]

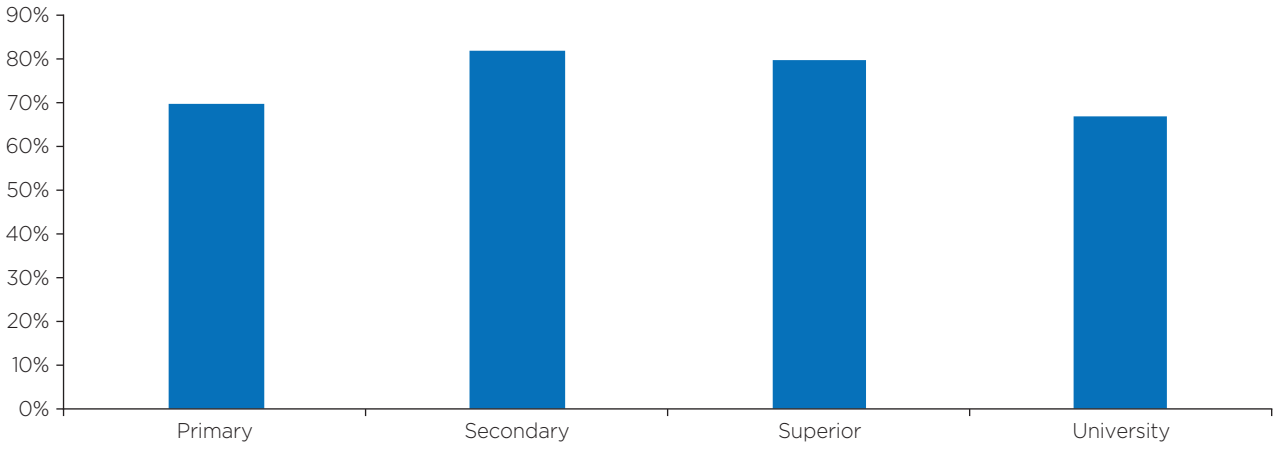
Challenges

The perception on the part of public sector authorities that the adoption of open government and open data policies involves relinquishing a certain level of control over government processes and data is a barrier for the adoption of these types of principles and policies. Moreover, not all public sector authorities are familiar with the positive externalities of these policies in certain aspects, such as: (i) the efficiency of public services; (ii) the promotion of entrepreneurship in digital services related to government processes and data; (iii) innovation in the provision of services; (iv) productivity of certain economic activities related to these services and data; (v) government transparency; and (vi) government-citizen relations.

However, outdated institutional and regulatory frameworks in some countries in the region do not allow them to take full advantage of the opportunities presented by the application of digital technologies to digital services, which often use

[18] See http://maparegalias.sgr.gov.co.
[19] See https://www.opengovpartnership.org/participants.

FIGURE 19 **Percentage of LAC Countries with Policies to Connect Educational Institutions to Broadband**



Source: Authors' elaboration.

data from open government. Other limiting factors are the lack of broadband infrastructure and digital technologies in public institutions that allow the incorporation of digital technologies into the provision of public services, and the lack of institutional regulations, capacity, and coordination to protect critical infrastructure that keeps digital services available and secure.

4

Analysis by Country

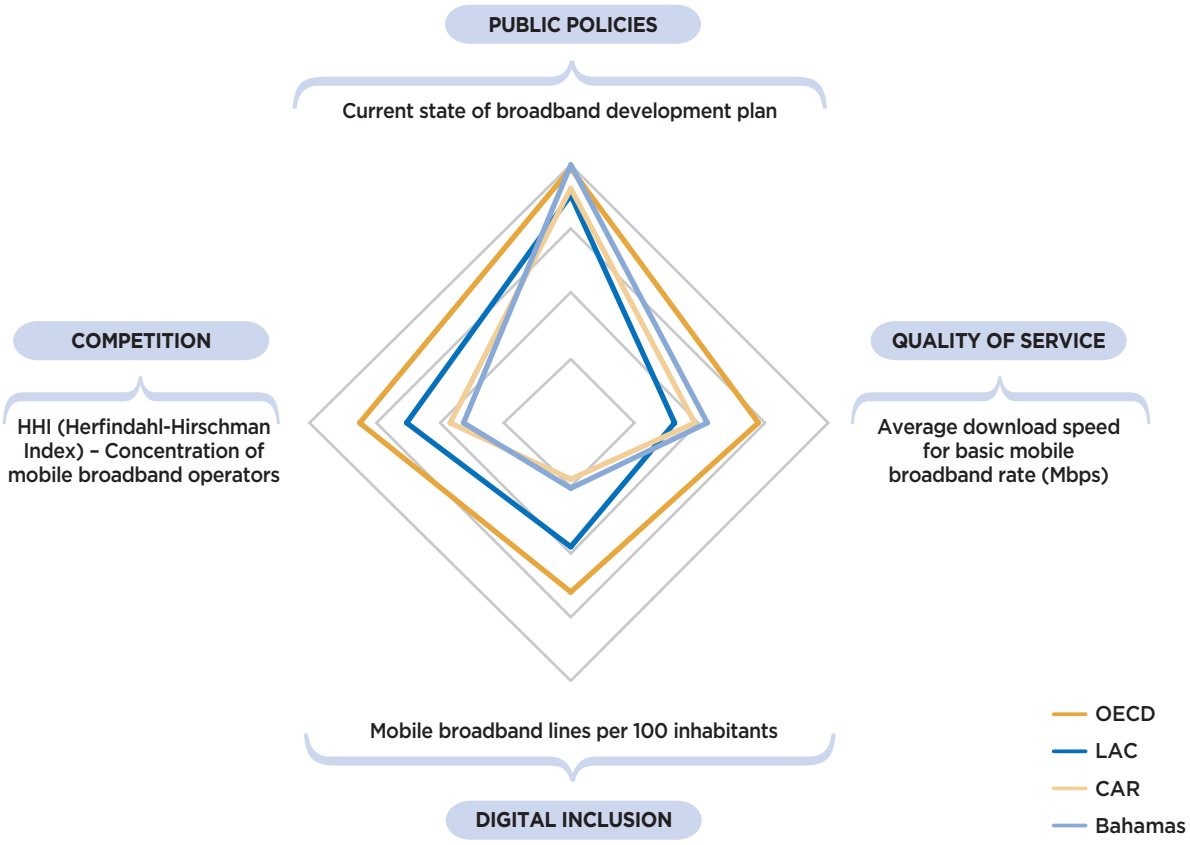
BAHAMAS

ICT sector legal and institutional framework

Legal framework	*Communications Act* (2009) and *Communications Amendment Act* (2011)
Institution responsible for ICT public policies	Ministry responsible for the Electronic Communications Sector (ECS); currently, Office of the Prime Minister
Authority on regulation and competition	Utilities Regulation and Competition Authority (URCA)

Assessment of the ICT sector

Performance comparison with the Caribbean (CAR), the region (LAC), and the OECD:



[a] https://publications.iadb.org/handle/11319/8193?locale-attribute=pt&.

Regulatory gap[a]

Legal and institutional framework	Bahamas	CAR	LAC
Updated ICT, telecommunications, and broadband laws	●	●	●
Ministry/vice ministry specialized in ICT public policies	●	●	●
Institutional independence of the national ICT regulation authority	●	●	●

Regulation of infrastructure development and access	Bahamas	CAR	LAC
Assignment of radioelectric spectrum to mobile broadband	●	●	●
Analog switch-off after transition from analog TV to digital TV	●	●	●
Use of the Universal Service Fund to deploy broadband	●	●	●
Regulation of infrastructure sharing	●	●	●

Regulation of competition and consumer protection	Bahamas	CAR	LAC
Competition (concentration of broadband markets)	●	●	●
Internet exchange point between telecommunications operators' networks	●	●	●
Regulation of access and interconnection of operators' networks	●	●	●
Regulation of national roaming among mobile operators	●	●	●
Regulation of number portability from one operator to another	●	●	●
Regulation of monitoring of telecommunications quality of service	●	●	●
Regulation of telecommunications customer data protection	●	●	●

Public policies for the digital economy	Bahamas	CAR	LAC
Updated national digital strategy	●	●	●
Updated national broadband plan	●	●	●
Updated open government action plan	●	●	●

● Delayed in compliance ● In the process of complying ● Compliant or in advanced level of compliance

[a] For more information, see Annex 2.

Identified limitations

- **Not very competitive broadband market.** The high broadband market concentration (fixed and mobile) does not foster the market's development in areas such as innovation in services offered, broader coverage, or price competition.
- **Low broadband adoption.** Only 4 percent of the population subscribe to fixed broadband and only 7 percent subscribe to mobile broadband. One of the causes of this situation is low competition, which impacts prices, coverage, and quality of service.
- **Higher costs for deploying telecommunications infrastructure in an archipelago.** The archipelago's geography, with long stretches of land (which does not make omnidirectional antennas very efficient) and bodies of water (which reflect microwaves, distorting signals, or requiring costly submarine cables), affects the design of telecommunications networks and makes their deployment costlier.

Possible reforms

- **Analyze market competition and, if necessary, regulate rates and issue a second mobile operator license.** Analyze the level of competition in the telecommunications markets to determine whether an operator has significant market power and whether obligations should be imposed on them, such as regulated rates. Tender a second mobile operator license, establishing the necessary obligations (e.g., in terms of coverage).
- **Regulate interconnection and quality of services.** First, establish non-discriminatory and fair prices for network interconnection. This can contribute to reducing costs for operators, which may result in more affordable retail rates for end users. Second, establish methodologies to measure quality of service and publish results for each operator. This may stimulate competition in terms of quality of service.
- **Regulate infrastructure sharing and review prices for spectrum rights.** Establish non-discriminatory and fair prices.

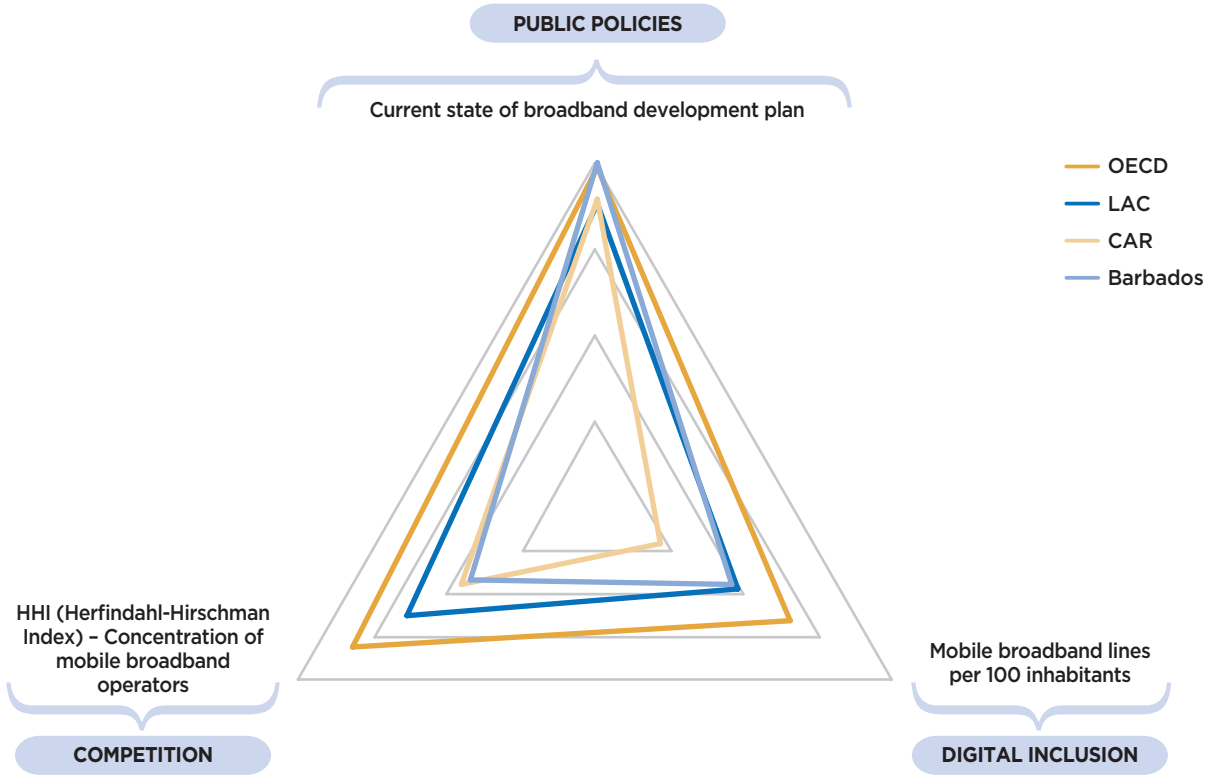
BARBADOS

Legal and institutional framework of the ICT sector

Legal framework	*The Telecommunications Act* CAP282B (2011)
Institution responsible for ICT public policies and regulation	Telecommunications Unit, Division of Energy and Telecommunications, Prime Minister's Office
Competition authority	Fair Trading Commission (FTC)

Assessment of the ICT sector[a]

Performance comparison with the Caribbean (CAR), the region (LAC), and OECD:



[a] https://publications.iadb.org/handle/11319/8193?locale-attribute=pt&.

Regulatory gap[a]

Legal and institutional framework	Barbados	CAR	LAC
Updated ICT, telecommunications, and broadband laws	⚪	🟡	🟡
Ministry/vice ministry specialized in ICT public policies	🔵	🔵	🔵
Institutional independence of the national ICT regulatory authority	🔵	⚪	⚪

Regulation of infrastructure development and access	Barbados	CAR	LAC
Assignment of radioelectric spectrum to mobile broadband	🔵	🔵	🔵
Analog switch-off after the transition from analog TV to digital TV	🔵	🔵	🔵
Use of the Universal Service Fund to deploy broadband	⚪	🟡	🟡
Regulation of infrastructure sharing	🔵	🔵	🟡

Regulation of competition and consumer protection	Barbados	CAR	LAC
Competition (concentration of broadband markets)	🔵	🔵	🟡
Internet exchange point between telecommunications operators' networks	⚪	🟡	⚪
Regulation of access and interconnection of operators' networks	⚪	⚪	⚪
Regulation of national roaming among mobile operators	🔵	🔵	🔵
Regulation of number portability from one operator to another	🔵	🟡	🟡
Regulation of monitoring of telecommunications quality of service	🔵	🔵	🟡
Regulation of telecommunications customer data protection	🔵	🔵	🔵

Public policies for the digital economy	Barbados	CAR	LAC
Updated national digital strategy	🟡	🔵	🟡
Updated national broadband plan	🔵	🔵	🟡
Updated open government action plan	🔵	🔵	🟡

🔵 Delayed in compliance 🟡 In the process of complying ⚪ Compliant or in advanced level of compliance

[a] For more information, see Annex 2.

Identified limitations

- **Not very competitive broadband market.** The high broadband market concentration (fixed and mobile) does not foster the market's development in areas such as innovation in services offered, broader coverage, or price competition.
- **Lack of internet exchange infrastructure between telecommunications operators' networks.** There is no internet exchange point (IXP) between networks. Operators must either reach multiple bilateral agreements for the exchange of data traffic or take the traffic to the IXP in another country to exchange it, with the inefficiencies that this entails in terms of cost and quality of service.
- **Lack of response team for computer security incidents.** There is no response team for computer security incidents (Computer Security Incident Response Team, or CSIRT), for which the country's critical infrastructure, such as the financial system, must either develop private cybersecurity initiatives or remain exposed to significant difficulties and delays in restoring normal operations following computer security incidents.

Possible reforms

- **Analyze market competition and, if necessary, regulate rates.** Analyze the level of competition in telecommunications markets to determine whether any operator has significant market power and whether rates should be regulated.
- **Create an IXP for interconnecting networks.** Create an IXP to improve the quality of service for the end user (primarily in latency reduction) and reduce costs for telecommunications service providers (primarily for international traffic).
- **Create a CSIRT.** Create a CSIRT to improve the response capacity for computer security incidents, thereby increasing the resilience and reliability of the country's critical infrastructure, such as the financial system.

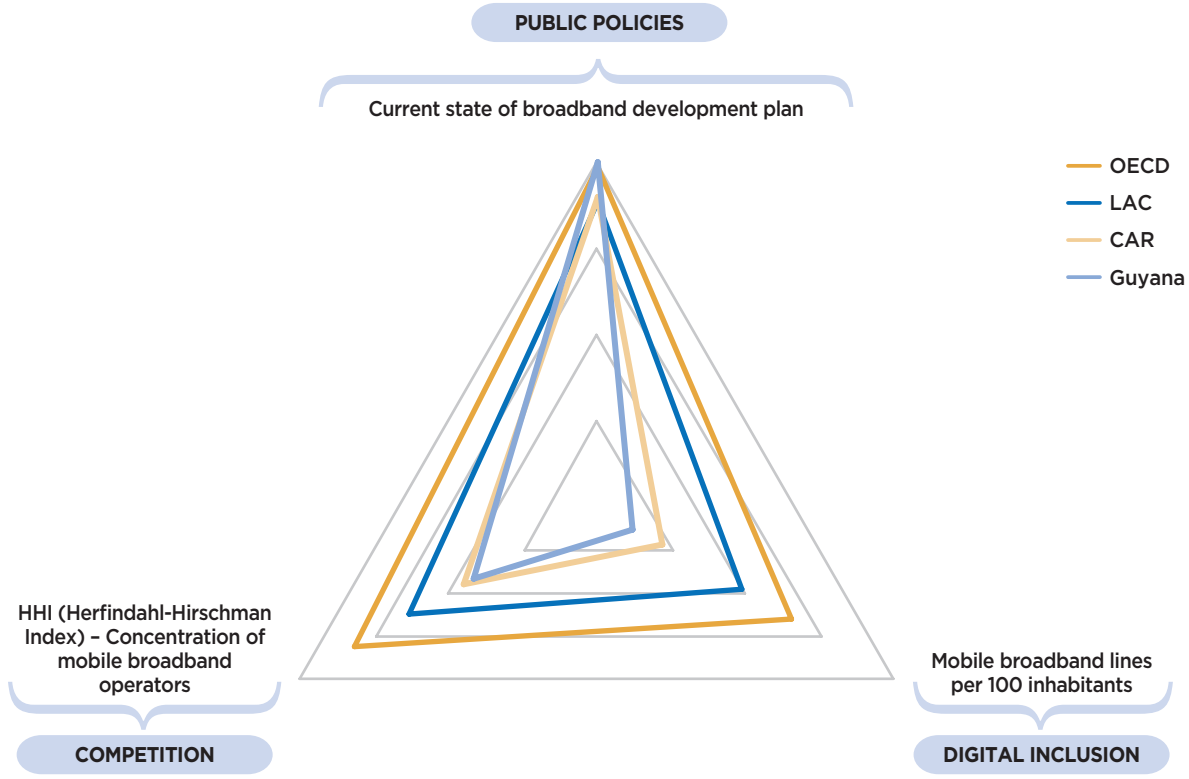
GUYANA

Legal and institutional framework for the ICT sector

Legal framework	*Telecommunications Act* (1990), Telecommunications (Amendment) Bill 15 (2016)
Institution responsible for ICT public policies	Ministry of Public Telecommunications
Regulatory authority	Public Utilities Commission (PUC)
Competition authority	Competition and Consumer Affairs Commission of Guyana (CCAC)

Assessment of the ICT sector[a]

Performance comparison with the Caribbean (CAR), the region (LAC), and OECD:



[a] https://publications.iadb.org/handle/11319/8193?locale-attribute=pt&.

Regulatory gap[a]

Legal and institutional framework	Guyana	CAR	LAC
Updated ICT, telecommunications, and broadband laws	⚪	🟡	🟡
Ministry/vice ministry specialized in ICT public policies	🔵	🔵	🔵
Institutional independence of the national ICT regulatory authority	🟡	⚪	⚪

Regulation of infrastructure development and access	Guyana	CAR	LAC
Assignment of radioelectric spectrum to mobile broadband	🔵	🔵	🔵
Analog switch-off after the transition from analog TV to digital TV	🔵	🔵	🔵
Use of the Universal Service Fund to deploy broadband	🔵	🟡	🟡
Regulation of infrastructure sharing	🔵	🔵	🟡

Regulation of competition and consumer protection	Guyana	CAR	LAC
Competition (concentration of broadband markets)	🔵	🔵	🟡
Internet exchange point between telecommunications operators' networks	🔵	🟡	⚪
Regulation of access and interconnection of operators' networks	🔵	⚪	⚪
Regulation of national roaming among mobile operators	🔵	🔵	🔵
Regulation of number portability from one operator to another	🔵	🟡	🟡
Regulation of monitoring of telecommunications quality of service	🔵	🔵	🟡
Regulation of telecommunications customer data protection	🔵	🔵	🔵

Public policies for the digital economy	Guyana	CAR	LAC
Updated national digital strategy	🔵	🔵	🟡
Updated national broadband plan	🔵	🔵	🟡
Updated open government action plan	🔵	🔵	🟡

🔵 Delayed in compliance 🟡 In the process of complying ⚪ Compliant or in advanced level of compliance

[a] For more information, see Annex 2.

Identified limitations

- **Limited legal and institutional framework.** The telecommunications law (*Telecommunications Act*) was enacted in 1990, and in the previous administration there was no Ministry of Telecommunications. Furthermore, the mandate for the telecommunications NRA, the Public Utilities Commission (PUC), is outdated and does not enable it to respond to the sector's current needs.
- **Not very competitive broadband market.** The high broadband market concentration (fixed and mobile) does not foster the market's development in areas such as innovation in services offered, broader coverage, or price competition.
- **Limited access to telecommunications infrastructure in rural and remote areas.** The terrain, population density, and vegetation density affect the deployment of telecommunications infrastructure. A large proportion of the population is concentrated in coastal areas, while a significant percentage of the interior has very low population density, with pronounced mountainous areas and dense tropical forests. These conditions affect the design of telecommunications networks and increase deployment costs. They prompt private operators to prioritize investments in coastal areas, making access to telecommunications services scarcer in interior regions of the country.

Possible reforms

- **Reform the telecommunications law, reestablish the Telecommunications Ministry and redefine the telecommunications NRA's functions.** Update the sector's framework law and the law that governs the the PUC, and reestablish the Telecommunications Ministry.
- **Liberalize telecommunications markets and conduct tenders for mobile broadband operators' licenses.** Liberalize the telecommunications markets (e.g., fixed telephony, international calls, and data transmission), which remain under the Guyana Telephone and Telegraph Company private monopoly, the Guyanese incumbent, and attract new participants to create competition in rates and quality of service. Conduct tenders for 4G mobile broadband—taking into consideration the setting of obligations (e.g., coverage) for winning bidders—to improve the quality of service (4G vs. 3G) and stimulate broadband market competition with possible new participants.
- **Create a fund to finance infrastructure development, identify needs in rural areas, and deploy a broadband network.** Create a telecommunications infrastructure development fund (e.g., the Universal Access Fund), with government contributions and/or through taxes on operators' income, to finance the deployment of a broadband network to provide access to unserved or underserved areas.

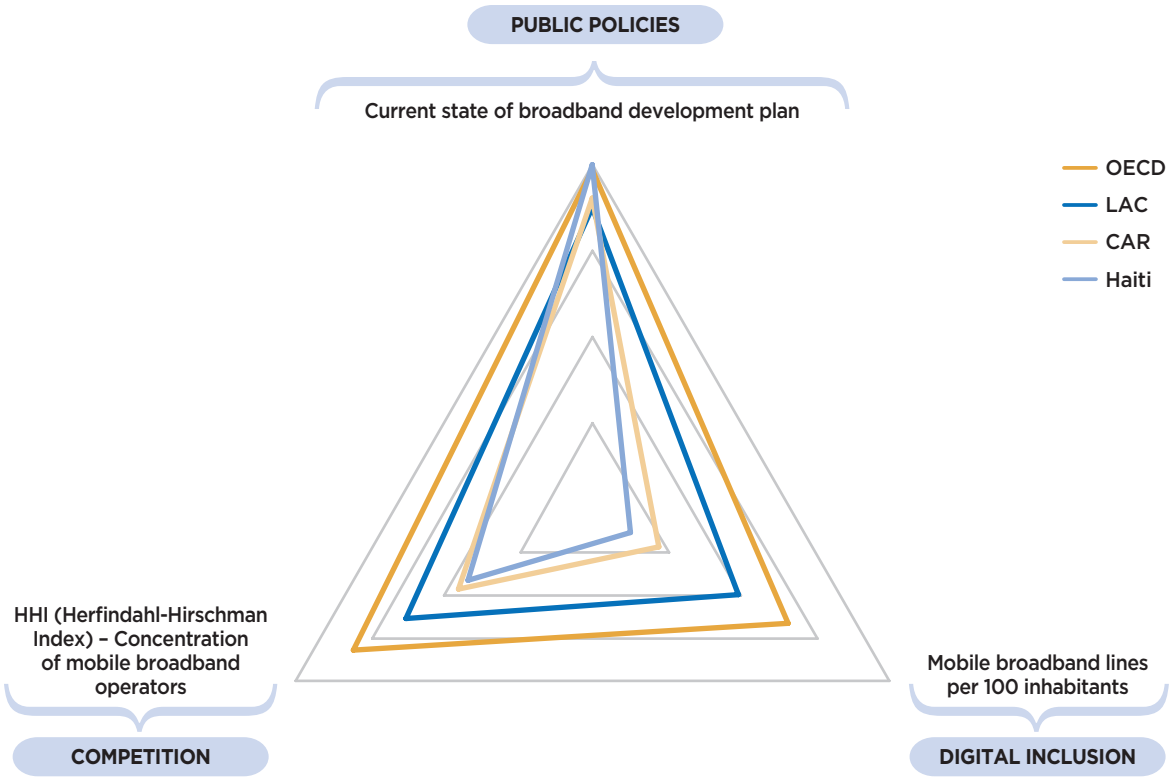
HAITI

Legal and institutional framework for the ICT sector

Legal framework	Telecom Law (1977)
Institution responsible for ICT public policies	Ministry of Public Works, Transportation and Communications (MTPTC)
Regulatory and competition authority	National Telecommunications Council (CONATEL)

Assessment of the ICT sector[a]

Performance comparison with the Caribbean (CAR), the region (LAC), and OECD:



[a] https://publications.iadb.org/handle/11319/8193?locale-attribute=pt&.

Regulatory gap[a]

Legal and institutional framework	Haiti	CAR	LAC
Updated ICT, telecommunications, and broadband laws	●	●	●
Ministry/vice ministry specialized in ICT public policies	●	●	●
Institutional independence of the national ICT regulatory authority	●	●	●

Regulation of infrastructure development and access	Haiti	CAR	LAC
Assignment of radioelectric spectrum to mobile broadband	●	●	●
Analog switch-off after the transition from analog TV to digital TV	●	●	●
Use of the Universal Service Fund to deploy broadband	●	●	●
Regulation of infrastructure sharing	●	●	●

Regulation of competition and consumer protection	Haiti	CAR	LAC
Competition (concentration of broadband markets)	●	●	●
Internet exchange point between telecommunications operators' networks	●	●	●
Regulation of access and interconnection of operators' networks	●	●	●
Regulation of national roaming among mobile operators	●	●	●
Regulation of number portability from one operator to another	●	●	●
Regulation of monitoring of telecommunications quality of service	●	●	●
Regulation of telecommunications customer data protection	●	●	●

Public policies for the digital economy	Haiti	CAR	LAC
Updated national digital strategy	●	●	●
Updated national broadband plan	●	●	●
Updated open government action plan	●	●	●

● Delayed in compliance ● In the process of complying ● Compliant or in advanced level of compliance

[a] For more information, see Annex 2.

Identified limitations

- **Lower radioelectric spectrum assigned to the provision of mobile broadband services than is recommended by the ITU.** Telecommunications operators need the government to assign to them more radioelectric spectrum frequencies to be able to offer higher-speed and better-quality mobile broadband transmission services.
- **Not very competitive broadband market.** The high broadband market concentration (fixed and mobile) does not foster the market's development in areas such as innovation in services offered, broader coverage, or price competition.
- **Limited digitalization of government data, procedures, and services.** The limited digitalization of the government's systems makes it difficult to provide public services efficiently since, for example, a public sector institution does not have the systematized electronic mechanisms with which to access another public sector institution's data.

Possible reforms

- **Complete the transition from analog television to digital television to free up part of the radioelectric spectrum and offer it through a tender for broadband mobile services.** The transition process from analog to digital television, which is completed through the analog switch-off, frees up very valuable spectrum frequencies that enable the provision of higher-quality mobile broadband service.
- **Approve a number portability regulation.** Number portability allows telephony customers to change service providers and maintain their phone numbers. This helps reduce transaction costs associated with switching telephony service providers, as well as allowing for the possible offering of personalized (public and private) value-added services through mobile devices without discontinuing customers' phone numbers after changing service providers.
- **Develop a digital platform for government management.** Implement a digital platform to facilitate shared management and the availability of government data among public sector institutions. Digitalization of government data, procedures, and services increases the efficient provision of public services and facilitates informed decision making.

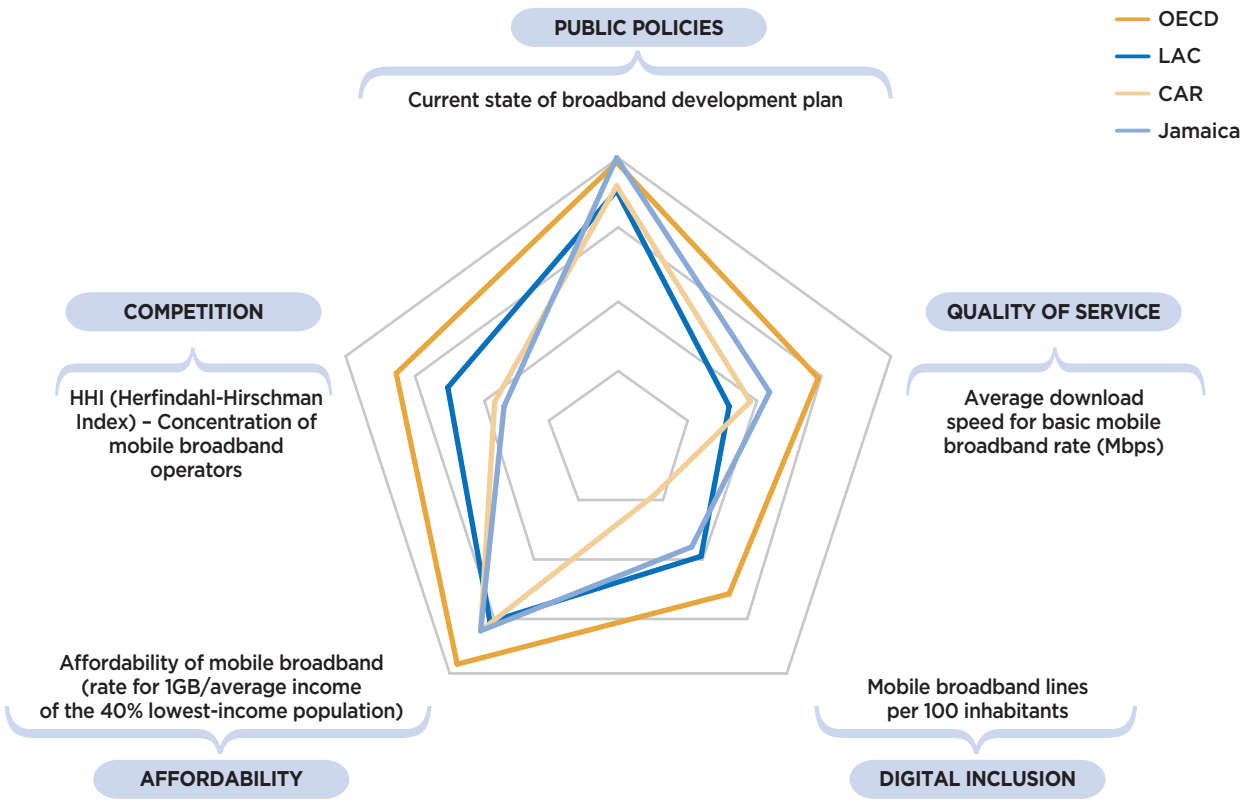
JAMAICA

Legal and institutional framework for the ICT sector

Legal framework	*Telecommunications Act* (2000)
Institution responsible for ICT public policies	Ministry of Science, Technology, Energy, and Mining (MSTEM)
Regulatory authority	Office of Utilities Regulation (OUR)
Competition authority	Fair Trading Commission (FTC)

Assessment of the ICT sector[a]

Performance comparison with the Caribbean (CAR), the region (LAC), and OECD:



[a] https://publications.iadb.org/handle/11319/8193?locale-attribute=pt&.

Regulatory gap[a]

Legal and institutional framework	Jamaica	CAR	LAC
Updated ICT, telecommunications, and broadband laws	●	●	●
Ministry/vice ministry specialized in ICT public policies	●	●	●
Institutional independence of the national ICT regulatory authority	●	●	●

Regulation of infrastructure development and access	Jamaica	CAR	LAC
Assignment of radioelectric spectrum to mobile broadband	●	●	●
Analog switch-off after the transition from analog TV to digital TV	●	●	●
Use of the Universal Service Fund to deploy broadband	●	●	●
Regulation of infrastructure sharing	●	●	●

Regulation of competition and consumer protection	Jamaica	CAR	LAC
Competition (concentration of broadband markets)	●	●	●
Internet exchange point between telecommunications operators' networks	●	●	●
Regulation of access and interconnection of operators' networks	●	●	●
Regulation of national roaming among mobile operators	●	●	●
Regulation of number portability from one operator to another	●	●	●
Regulation of monitoring of telecommunications quality of service	●	●	●
Regulation of telecommunications customer data protection	●	●	●

Public policies for the digital economy	Jamaica	CAR	LAC
Updated national digital strategy	●	●	●
Updated national broadband plan	●	●	●
Updated open government action plan	●	●	●

● Delayed in compliance ● In the process of complying ● Compliant or in advanced level of compliance

[a] For more information, see Annex 2.

Identified limitations

- **Limited legal and institutional framework.** The telecommunications law (*Telecommunications Act*), passed in 2000, no longer corresponds to the sector's technological realities or business models.
- **Not very competitive broadband market.** The high broadband market concentration (fixed and mobile) does not foster the market's development in areas such as innovation in services offered, broader coverage, or price competition.
- **Lower radioelectric spectrum assigned for mobile broadband services than is recommended by the ITU.** Mobile telecommunications operators need the government to assign them more radioelectric spectrum frequencies with which to offer higher-speed and better-quality mobile broadband transmission services.

Possible reforms

- **Reform the telecommunications law.** Update the sector's framework law to grant the NRA—the Office of Utilities Regulation—the mandate to tackle challenges posed by the realities of the sector, which has evolved rapidly in recent decades along with technological development.
- **Create a license tender for a third mobile telecommunications service provider.** Increase competition in the mobile telecommunications market by creating a license tender for a new operator, including obligations (e.g., coverage) that are deemed necessary.
- **Complete the transition from analog to digital television to free part of the radioelectric spectrum and offer it through a tender for mobile broadband services.** The transition process from analog to digital television, which is completed through the analog switch-off, frees up very valuable spectrum frequencies that enable the provision of higher-quality mobile broadband service.

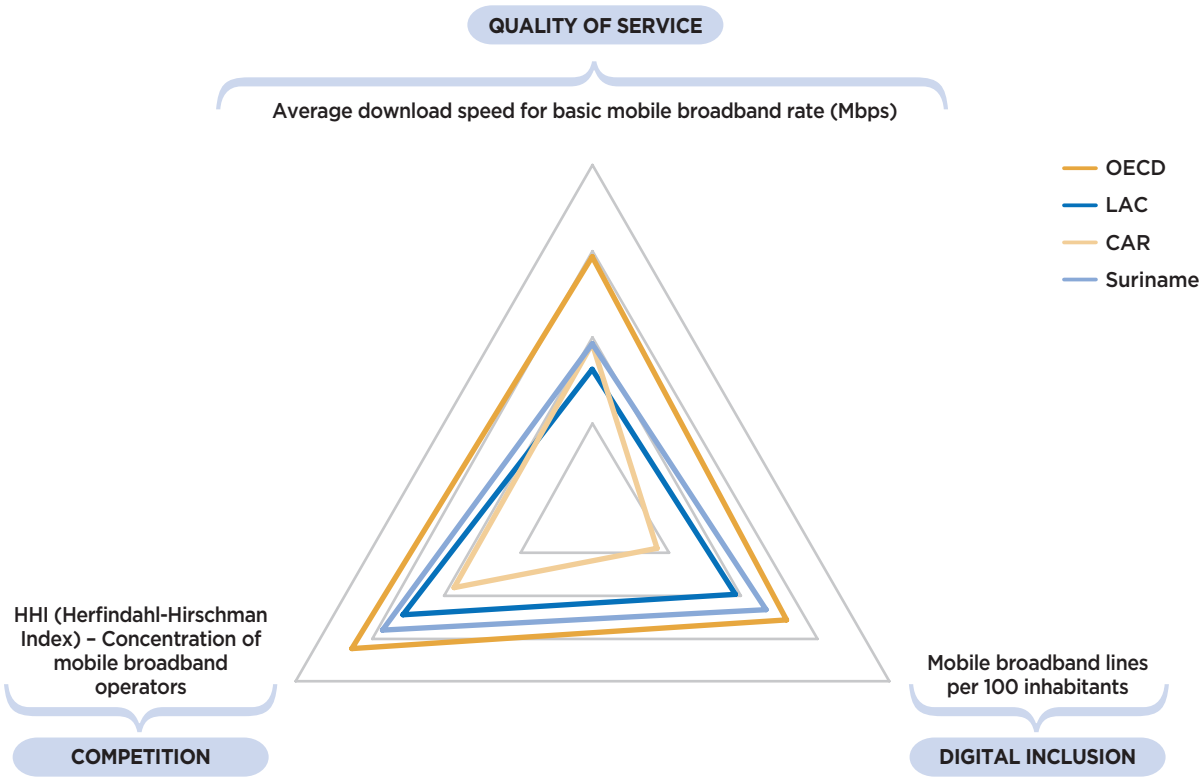
SURINAME

Legal and institutional framework for the ICT sector

Legal framework	*Telecommunications Facilities Law*, No.151 (2004)
Institution responsible for ICT public policies	Ministry of Trade, Industry and Tourism (MINTCT)
Regulatory authority	Suriname Telecommunications Authority (TAS)
Competition authority	—

Assessment of the ICT sector[a]

Performance comparison with the Caribbean (CAR), the region (LAC), and OECD:



[a] https://publications.iadb.org/handle/11319/8193?locale-attribute=pt&.

Regulatory gap[a]

Legal and institutional framework	Suriname	CAR	LAC
Updated ICT, telecommunications, and broadband laws	●	●	●
Ministry/vice ministry specialized in ICT public policies	●	●	●
Institutional independence of the national ICT regulatory authority	●	●	●

Regulation of infrastructure development and access	Suriname	CAR	LAC
Assignment of radioelectric spectrum to mobile broadband	●	●	●
Analog switch-off after the transition from analog TV to digital TV	●	●	●
Use of the Universal Service Fund to deploy broadband	●	●	●
Regulation of infrastructure sharing	●	●	●

Regulation of competition and consumer protection	Suriname	CAR	LAC
Competition (concentration of broadband markets)	●	●	●
Internet exchange point between telecommunications operators' networks	●	●	●
Regulation of access and interconnection of operators' networks	●	●	●
Regulation of national roaming among mobile operators	●	●	●
Regulation of number portability from one operator to another	●	●	●
Regulation of monitoring of telecommunications quality of service	●	●	●
Regulation of telecommunications customer data protection	●	●	●

Public policies for the digital economy	Suriname	CAR	LAC
Updated national digital strategy	●	●	●
Updated national broadband plan	●	●	●
Updated open government action plan	●	●	●

● Delayed in compliance ● In the process of complying ● Compliant or in advanced level of compliance

[a] For more information, see Annex 2.

Identified limitations

- **Less radioelectric spectrum assigned for mobile broadband services than is recommended by the ITU.** Mobile telecommunications operators need the government to assign them more radioelectric spectrum frequencies with which to offer higher-speed and better-quality mobile broadband transmission services.
- **Limited access to telecommunications infrastructure in rural and remote areas.** The terrain, population density and vegetation density affect the deployment of telecommunications infrastructure. A large portion of the population is concentrated in coastal areas, while a great percentage of the interior has a very low population density, with pronounced mountainous masses and dense tropical forests, which affects the design of telecommunications networks and increases deployment costs. These conditions prompt private operators to prioritize investments in coastal areas, making access to telecommunications services scarcer in interior regions.
- **Limitations in the national numbering plan limit number portability.** The national numbering plan makes distinctions by technology and geographic area, which does not allow for full number portability between fixed and private telephony services. This limits possible innovations in telephone service offerings and the ability to change telephone service providers—at least between fixed and mobile services—and maintain the same phone numbers.

Possible reforms

- **Complete the transition from analog to digital TV to free up part of the radioelectric spectrum and offer it through a tender for mobile broadband services.** The transition from analog to digital television, which is completed through the analog switch-off, frees up very valuable spectrum frequencies that enable the provision of higher-quality mobile broadband service.
- **Regulate infrastructure sharing.** Setting non-discriminatory and fair rates for telecommunications infrastructure sharing could incentivize telecommunications operators to invest in expanding and modernizing the infrastructure.
- **Update the national numbering plan.** The national numbering plan could be modernized to adopt principles of technological and geographic neutrality; that is, to not assign a set of telephone numbers to a specific geographic area or type of technology. This would reduce transaction costs for switching telephone service providers, regardless of whether there is a change in technology or geographic area.

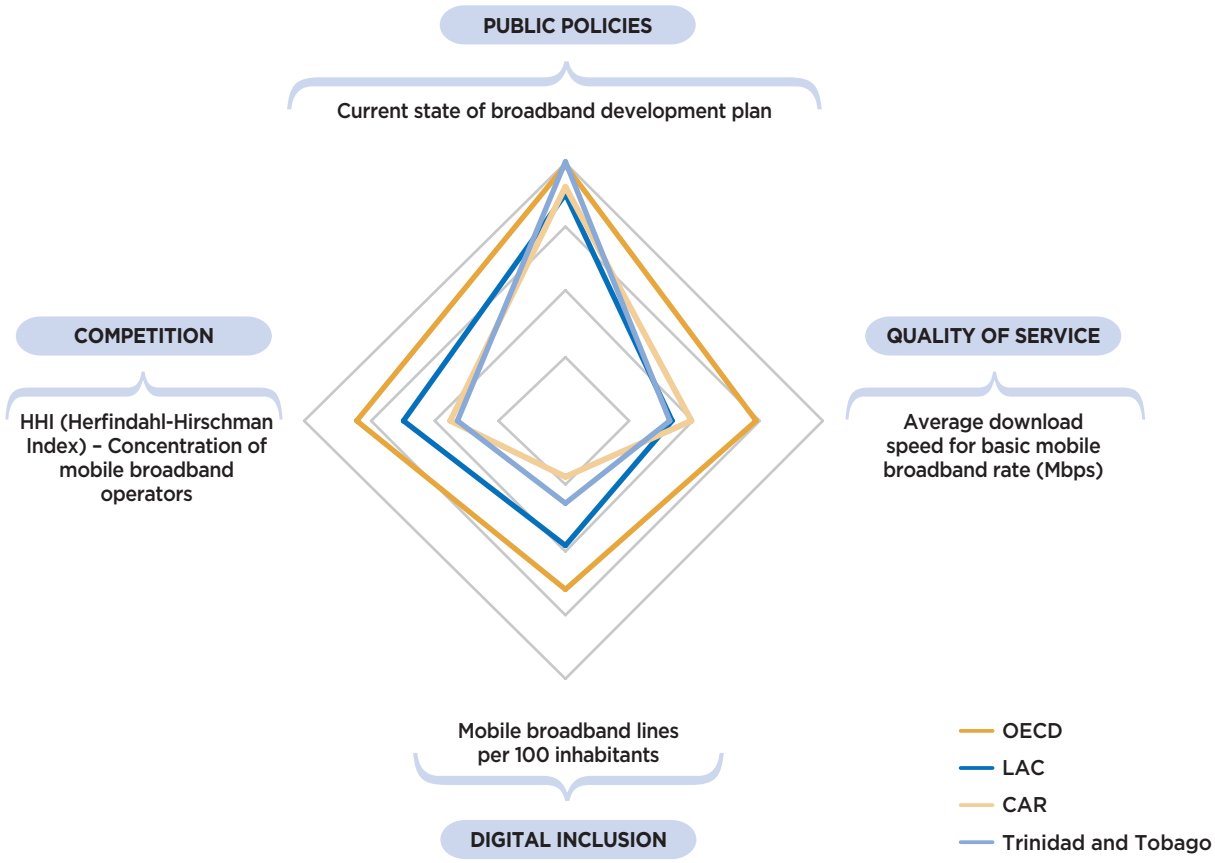
TRINIDAD AND TOBAGO

Legal and institutional framework for the ICT sector

Legal framework	*Telecommunications Act* (2001, amended in 2004)
Institution responsible for ICT public policies	Ministry of Public Administration and Communications (MPUC)
Regulatory authority	Telecommunications Authority of Trinidad and Tobago (TATT)
Competition authority	Fair Trading Commission (FTC)

Assessment of the ICT sector[a]

Performance comparison with the Caribbean (CAR), the region (LAC), and OECD:



[a] https://publications.iadb.org/handle/11319/8193?locale-attribute=pt&.

Regulatory gap[a]

Legal and institutional framework	Trinidad and Tobago	CAR	LAC
Updated ICT, telecommunications, and broadband laws	●	●	●
Ministry/vice ministry specialized in ICT public policies	●	●	●
Institutional independence of the national ICT regulatory authority	●	●	●

Regulation of infrastructure development and access	Trinidad and Tobago	CAR	LAC
Assignment of radioelectric spectrum to mobile broadband	●	●	●
Analog switch-off after the transition from analog TV to digital TV	●	●	●
Use of the Universal Service Fund to deploy broadband	●	●	●
Regulation of infrastructure sharing	●	●	●

Regulation of competition and consumer protection	Trinidad and Tobago	CAR	LAC
Competition (concentration of broadband markets)	●	●	●
Internet exchange point between telecommunications operators' networks	●	●	●
Regulation of access and interconnection of operators' networks	●	●	●
Regulation of national roaming among mobile operators	●	●	●
Regulation of number portability from one operator to another	●	●	●
Regulation of monitoring of telecommunications quality of service	●	●	●
Regulation of telecommunications customer data protection	●	●	●

Public policies for the digital economy	Trinidad and Tobago	CAR	LAC
Updated national digital strategy	●	●	●
Updated national broadband plan	●	●	●
Updated open government action plan	●	●	●

● Delayed in compliance ● In the process of complying ● Compliant or in advanced level of compliance

[a] For more information, see Annex 2.

Identified limitations

- **Limited legal and institutional framework.** The telecommunications law (*Telecommunications Act*) dates to 2001 and does not respond to the sector's reality.
- **Not very competitive mobile broadband market.** The high level of concentration in the mobile broadband market does not foster the market's development in terms of innovation of services offered, coverage expansion or pricing competition.
- **Lack of a data processing center on Tobago.** Data processing centers provide a secure infrastructure to install, operate, and maintain electronic equipment for communications and digital services. Without this infrastructure, the electronic services of the government and private sector are more vulnerable to failures and attacks that could compromise their availability. There are datacenters on the island of Trinidad, but not on the island of Tobago. Tobago's connectivity relies on a submarine cable to Trinidad, which had to be replaced recently after remaining inoperative for several years because of a breakdown, and on microwave links with low capacity and stability. As a result, the availability of electronic services on Tobago depends on relatively fragile connectivity with Trinidad.

Possible reforms

- **Reform the telecommunications law.** Update the framework law for the sector to assign the NRA—the Telecommunications Authority of Trinidad and Tobago (TATT)—the necessary mandate to address the challenges posed by the realities of the sector, which has evolved rapidly in recent decades along with technology.
- **Create license tenders for mobile broadband operators.** Create license tenders for 4G mobile broadband and consider imposing obligations (e.g., coverage) on winning bidders to improve the quality of service (4G vs. 3G) and stimulate competition in the mobile broadband market with the arrival of new participants.
- **Build a data processing center on Tobago.** Build the first data processing center on Tobago, possibly through the intervention of Telecommunications Services of Trinidad & Tobago (TSTT), the public utility operator.

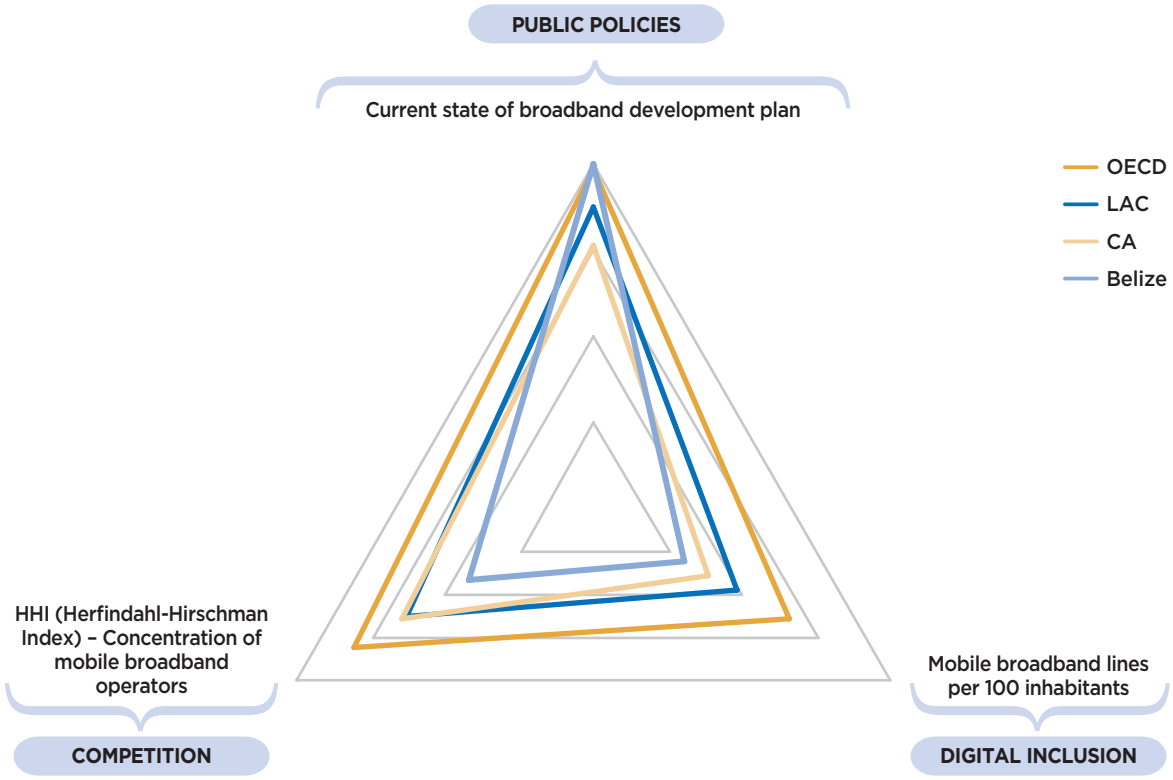
BELIZE

Legal and institutional framework for the ICT sector

Legal framework	*Belize Telecommunications Act* CAF229 No. 16 (2002)
Institution responsible for ICT public policies	Ministry of Energy, Science & Technology and Public Utilities (MESTPU)
Regulatory authority	Public Utilities Commission (PUC)
Competition authority	—

Assessment of the ICT sector[a]

Performance comparison with Central America (CA), the region (LAC), and OECD:



[a] https://publications.iadb.org/handle/11319/8193?locale-attribute=pt&.

Regulatory gap[a]

Legal and institutional framework	Belize	CA	LAC
Updated ICT, telecommunications, and broadband laws	●	●	●
Ministry/vice ministry specialized in ICT public policies	●	●	●
Institutional independence of the national ICT regulatory authority	●	●	●

Regulation of infrastructure development and access	Belize	CA	LAC
Assignment of radioelectric spectrum to mobile broadband	●	●	●
Analog switch-off after the transition from analog TV to digital TV	●	●	●
Use of the Universal Service Fund to deploy broadband	●	●	●
Regulation of infrastructure sharing	●	●	●

Regulation of competition and consumer protection	Belize	CA	LAC
Competition (concentration of broadband markets)	●	●	●
Internet exchange point between telecommunications operators' networks	●	●	●
Regulation of access and interconnection of operators' networks	●	●	●
Regulation of national roaming among mobile operators	●	●	●
Regulation of number portability from one operator to another	●	●	●
Regulation of monitoring of telecommunications quality of service	●	●	●
Regulation of telecommunications customer data protection	●	●	●

Public policies for the digital economy	Belize	CA	LAC
Updated national digital strategy	●	●	●
Updated national broadband plan	●	●	●
Updated open government action plan	●	●	●

● Delayed in compliance ● In the process of complying ● Compliant or in advanced level of compliance

[a] For more information, see Annex 2.

Identified limitations

- **Limitations in the institutional framework that governs the sector's development.** There is scant institutional specialization within the public policy entities in the telecommunications sector (Office of the Prime Minister; Ministry of Energy, Science, Technology and Public Services) and the the NRA, the Public Utilities Commission, and there is no competition defense authority. However, the incumbent telecommunications provider is a government company, with a renationalization underway after a privatization process launched in 2004 was unsuccessful due to private investors' failure to pay.
- **Deficit in broadband infrastructure, particularly in rural areas.** Since most of the population lives in rural areas (56 percent), and the population in some of these areas has lower per capita purchasing power, broadband operators have little economic incentive to deploy infrastructure in certain rural areas. Furthermore, environmental measures to protect extensive wildlife and conservation areas (it is estimated that one-fourth of the country's territory is legally protected) affect technical designs and make deployment of networks to provide connectivity to rural areas costlier.
- **Mobile broadband market that is not very competitive and has few subscribers.** The relatively low percentage of subscribers (30 percent) compared to Central American, LAC, and OECD countries is due to the high concentration of the mobile broadband market as well as infrastructure limitations.

Possible reforms

- **Resolve the renationalization process of the incumbent operator.** Resolve the renationalization of Belize Telemedia Limited (BTL), initiated in 2009, and reach an agreement with private shareholders on a timeline and payment amounts.
- **Deploy mobile broadband infrastructure.** Deploy mobile broadband infrastructure with 4G LTE technology through BTL, thereby increasing both the quality of service offered and the geographic coverage for mobile broadband.
- **Create an IXP.** Foster competition with the creation of an internet exchange point between the networks of various operators to improve the quality of service for end users (particularly in latency reduction) and reduce costs for telecommunications operators (particularly in international traffic).

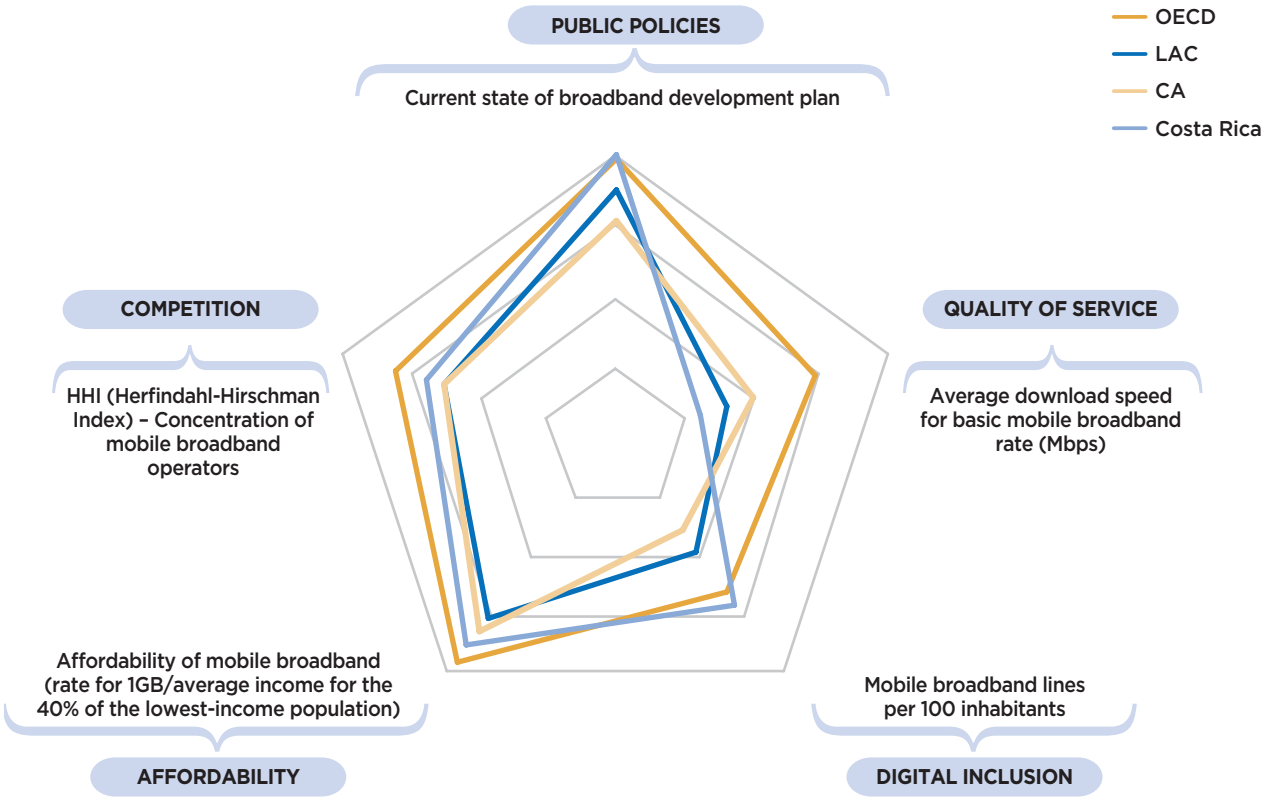
COSTA RICA

Legal and institutional framework of the ICT sector

Legal framework	*Telecommunications General Law* (No. 8642, 2008)
Institution responsible for ICT public policies	Ministry of Science, Technology and Communications (MICITT)
Regulatory and competition authority	Superintendence of Telecommunications (SUTEL)

Assessment of the ICT sector[a]

Performance comparison with Central America (CA), the region (LAC), and OECD:



[a] https://publications.iadb.org/handle/11319/8193?locale-attribute=pt&.

Regulatory gap[a]

Legal and institutional framework	Costa Rica	CA	LAC
Updated ICT, telecommunications, and broadband laws	⚪	🟡	🟡
Ministry/vice ministry specialized in ICT public policies	🔵	🔵	🔵
Institutional independence of the national ICT regulatory authority	⚪	⚪	⚪

Regulation of infrastructure development and access	Costa Rica	CA	LAC
Assignment of radioelectric spectrum to mobile broadband	🟡	🟡	🔵
Analog switch-off after the transition from analog TV to digital TV	🟡	🟡	🔵
Use of the Universal Service Fund to deploy broadband	⚪	⚪	🟡
Regulation of infrastructure sharing	⚪	🟡	🟡

Regulation of competition and consumer protection	Costa Rica	CA	LAC
Competition (concentration of broadband markets)	🟡	🟡	🟡
Internet exchange point between telecommunications operators' networks	⚪	⚪	⚪
Regulation of access and interconnection of operators' networks	⚪	⚪	⚪
Regulation of national roaming among mobile operators	🟡	🔵	🔵
Regulation of number portability from one operator to another	🔵	🟡	🟡
Regulation of monitoring of telecommunications quality of service	⚪	🟡	🟡
Regulation of telecommunications customer data protection	🟡	🔵	🔵

Public policies for the digital economy	Costa Rica	CA	LAC
Updated national digital strategy	⚪	🟡	🟡
Updated national broadband plan	🟡	🟡	🟡
Updated open government action plan	⚪	⚪	🟡

🔵 Delayed in compliance 🟡 In the process of complying ⚪ Compliant or in advanced level of compliance

[a] For more information, see Annex 2.

Identified limitations

- **Deficit of broadband infrastructure, particularly in rural areas.** Rural areas are not economically attractive for private operators, given demographic dispersion. This makes it difficult for them to recover investments in infrastructure deployment.
- **Lack of investment in telecommunications infrastructure.** Investment is necessary to connect education and health institutions, update copper networks, and deploy fiber optic networks to end users.
- **Mobile broadband service speed is slower than the average in Central America, LAC, and OECD countries.** The broadband infrastructure deficit, which is particularly acute in rural areas, contributes to an average download speed for basic mobile broadband rates that is slower than desired.

Possible reforms

- **Draft a Telecommunications Infrastructure Action Plan and execute programs for rural connectivity.** This type of plan would establish master guidelines for telecommunications infrastructure development, which would include rural connectivity programs financed by the National Telecommunications Fund, such as Connected Communities, Connected Households, Connected Public Centers, and Connected Public Spaces.
- **Approve a regulation for shared infrastructure usage to support public telecommunications networks.** The deployment of passive infrastructure (e.g., a civil works project to install underground fiber optics and towers) is the main investment item in the upgrading of telecommunications networks, but it has limited impact on quality, pricing, and innovation of services. Regulations on infrastructure sharing enable service providers to focus on investments in equipment and operations, thereby increasing competition in terms of services and not infrastructure.
- **Measure and publish mobile broadband quality of service parameters for each service provider.** Make available to users the comparison of quality of service parameters (download speed, coverage, voice quality, etc.) for each operator, which promotes competition among operators.

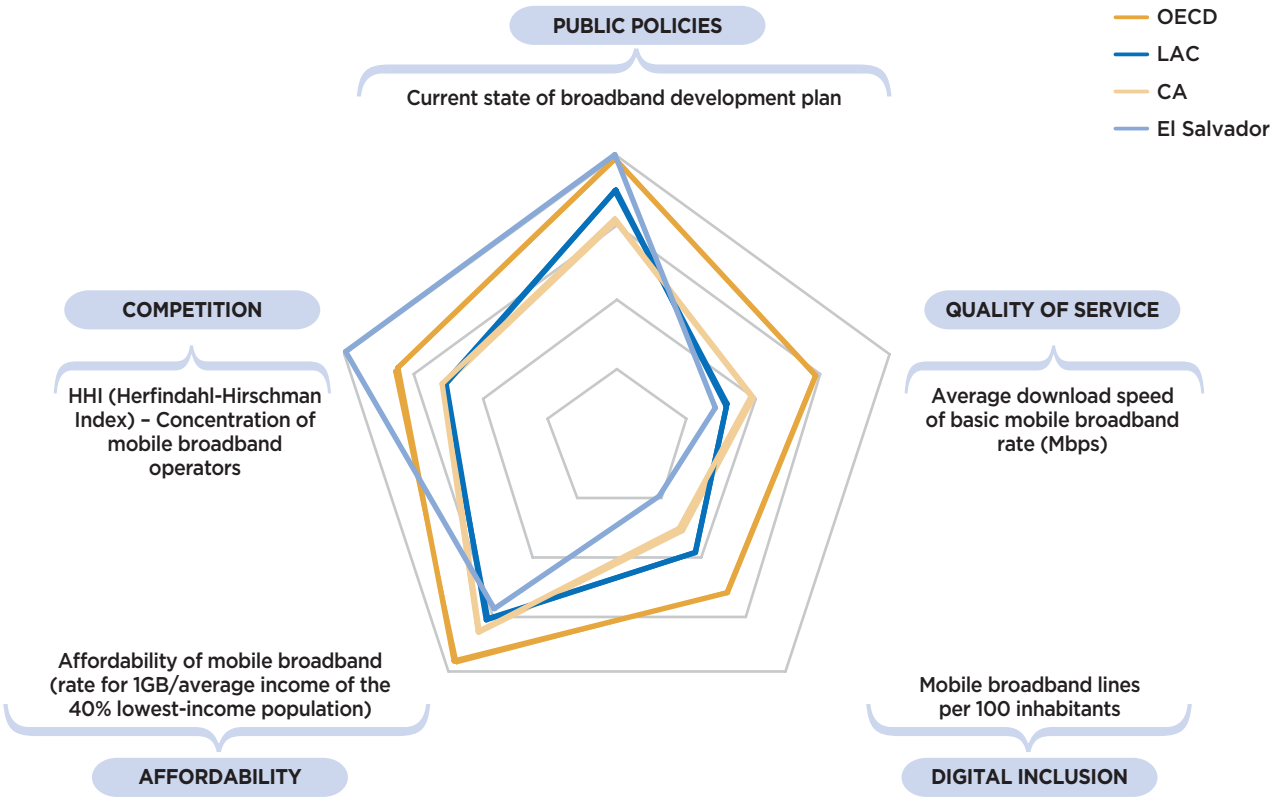
EL SALVADOR

Legal and institutional framework for the ICT sector

Legal framework	Telecommunications Law (Legislative Decree No. 142, 1997, with reforms through Legislative Decree No. 372, 2016)
Institutions responsible for ICT public policies	New National Council on Science and Technology (NCONACYT), Vice Ministry of Science and Technology, and Ministry of Education
Regulatory authority	General Superintendence of Electricity and Telecommunications (SIGET)
Competition authority	Superintendence of Competition

Assessment of the ICT sector[a]

Performance comparison with Central America (CA), the region (LAC), and OECD:



[a] https://publications.iadb.org/handle/11319/8193?locale-attribute=pt&.

Regulatory gap[a]

Legal and institutional framework	El Salvador	CA	LAC
Updated ICT, telecommunications, and broadband laws	●	●	●
Ministry/vice ministry specialized in ICT public policies	●	●	●
Institutional independence of the national ICT regulatory authority	●	●	●

Regulation of infrastructure development and access	El Salvador	CA	LAC
Assignment of radioelectric spectrum to mobile broadband	●	●	●
Analog switch-off after the transition from analog TV to digital TV	●	●	●
Use of the Universal Service Fund to deploy broadband	●	●	●
Regulation of infrastructure sharing	●	●	●

Regulation of competition and consumer protection	El Salvador	CA	LAC
Competition (concentration of broadband markets)	●	●	●
Internet exchange point between telecommunications operators' networks	●	●	●
Regulation of access and interconnection of operators' networks	●	●	●
Regulation of national roaming among mobile operators	●	●	●
Regulation of number portability from one operator to another	●	●	●
Regulation of monitoring of telecommunications quality of service	●	●	●
Regulation of telecommunications customer data protection	●	●	●

Public policies for the digital economy	El Salvador	CA	LAC
Updated national digital strategy	●	●	●
Updated national broadband plan	●	●	●
Updated open government action plan	●	●	●

● Delayed in compliance ● In the process of complying ● Compliant or in advanced level of compliance

[a] For more information, see Annex 2.

Identified limitations

- **Outdated legal framework for the sector.** Given that the telecommunications law was passed in 1997 and the sector has evolved substantially in the past 20 years, the legal framework does not cover some key principles or grant a mandate to the NRA to oversee its compliance.
- **Broadband services with low adoption and slow speed.** Only 7 percent of the population subscribe to mobile broadband services and 4 percent to fixed broadband. The speed for these services is between three and four times slower than the Central American average. The infrastructure deficit is one of the main causes of this situation.
- **Need for investments in telecommunications infrastructure.** Infrastructure deployment projects could be designed to complete a fiber optic network, deploy mobile broadband, connect educational and health institutions, and update copper networks.

Possible reforms

- **Reform the telecommunications law and develop secondary legislation.** Modernize the telecommunications law to adapt it to the sector's reality and, based on the new principles and mandates established by the law, develop secondary legislation, regulations, and rules to stimulate the sector's development.
- **Regulate interconnection services between operator networks, for infrastructure sharing and number portability.** Under the protection of the new telecommunications law, draft regulations that lower costs for operators (e.g., by imposing an obligation on operators with significant market power to set reasonable rates for interconnection of networks and infrastructure sharing) as well as reduce transaction costs for users (e.g., by requiring service providers to complete the switch from one telephony operator to another within a maximum time limit and allowing customers to retain the same phone number).
- **Create radioelectric spectrum tenders to attract and stimulate investment in mobile broadband networks.** Carry out the transition from analog to digital television, which is completed with the analog switch-off (estimated for 2018), to free up part of the radioelectric spectrum and offer it through tenders for mobile broadband services.

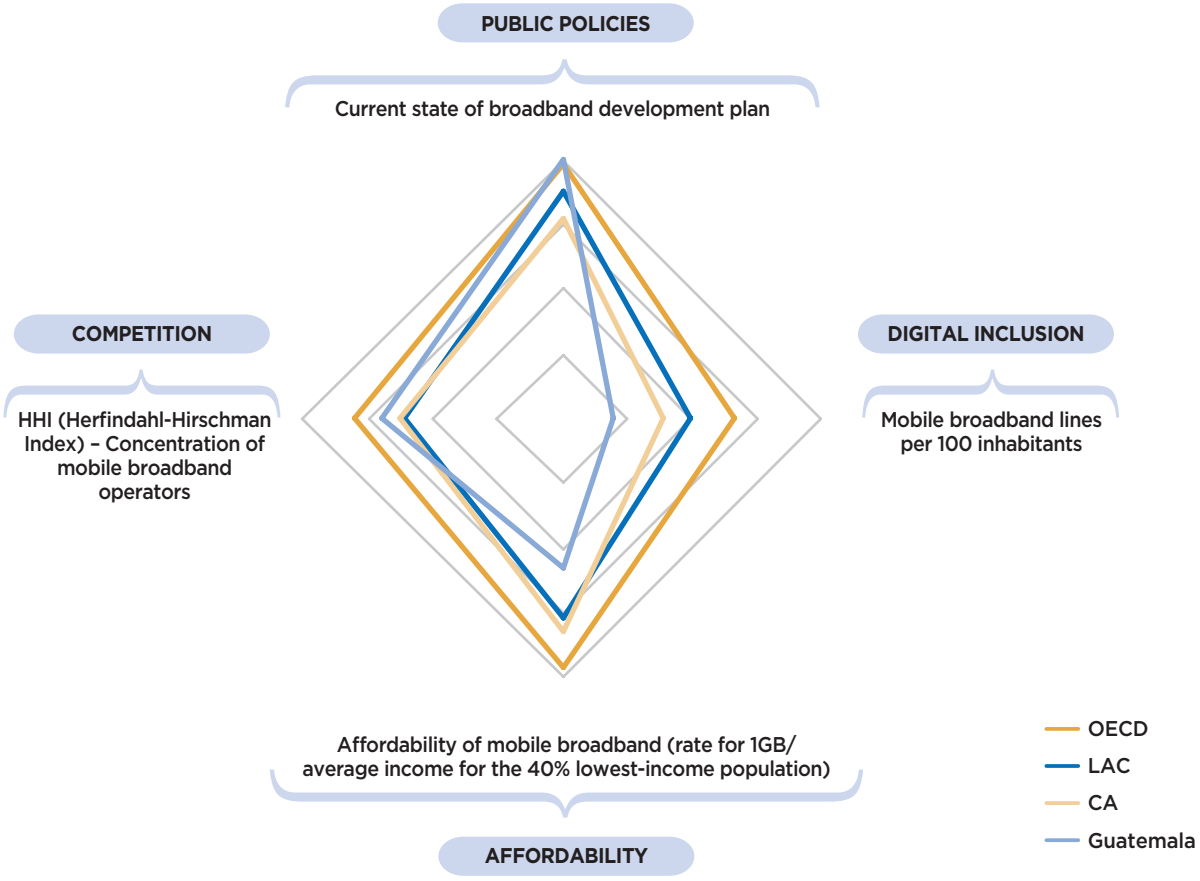
GUATEMALA

Legal and institutional framework for the ICT sector

Legal framework	General Telecommunications Law, Decree 94–96 of the Congress of the Republic of Guatemala
Institution responsible for ICT public policies	Ministry of Communications, Infrastructure and Housing (MCIV)
Regulatory authority	Superintendence of Telecommunications (SIT)
Competition authority	Ministry of Economy (ME)

Assessment of the ICT sector[a]

Performance comparison with Central America (CA), the region (LAC), and OECD:



[a] https://publications.iadb.org/handle/11319/8193?locale-attribute=pt&.

Regulatory gap[a]

Legal and institutional framework	Guatemala	CA	LAC
Updated ICT, telecommunications, and broadband laws	●	●	●
Ministry/vice ministry specialized in ICT public policies	●	●	●
Institutional independence of the national ICT regulatory authority	●	●	●

Regulation of infrastructure development and access	Guatemala	CA	LAC
Assignment of radioelectric spectrum to mobile broadband	●	●	●
Analog switch-off after the transition from analog TV to digital TV	●	●	●
Use of the Universal Service Fund to deploy broadband	●	●	●
Regulation of infrastructure sharing	●	●	●

Regulation of competition and consumer protection	Guatemala	CA	LAC
Competition (concentration of broadband markets)	●	●	●
Internet exchange point between telecommunications operators' networks	●	●	●
Regulation of access and interconnection of operators' networks	●	●	●
Regulation of national roaming among mobile operators	●	●	●
Regulation of number portability from one operator to another	●	●	●
Regulation of monitoring of telecommunications quality of service	●	●	●
Regulation of telecommunications customer data protection	●	●	●

Public policies for the digital economy	Guatemala	CA	LAC
Updated national digital strategy	●	●	●
Updated national broadband plan	●	●	●
Updated open government action plan	●	●	●

● Delayed in compliance ● In the process of complying ● Compliant or in advanced level of compliance

[a] For more information, see Annex 2.

Identified limitations

- **Structural limitations within the sectoral framework (legal, institutional, regulatory, and policy).** The General Telecommunications Law, passed in 1996, does not incorporate recent technological advances that have led to the convergence of services over broadband, for which the NRA does not have the mandate to adapt the sector's regulations to market changes.
- **The fixed broadband market is more concentrated, and services are less affordable than the average for LAC and OECD countries.** A higher concentration of operators may translate into less competitive markets, which could result in lower affordability of services offered (as is the case with fixed broadband services in Guatemala).
- **Lower radioelectric spectrum assigned for the provision of mobile broadband services than is recommended by the ITU.** Mobile telecommunications operators need the government to assign them more radioelectric spectrum frequencies with which to offer higher-speed and better-quality mobile broadband transmission services.

Possible reforms

- **Approve the National Broadband Plan and study a possible modernization of the General Telecommunications Law.** The approval of the "Digital Nation" National Connectivity and Broadband Plan, as part of the Guatemalan Open Government Action Plan for 2016–18, would establish master guidelines for the development of broadband services. Furthermore, the sector would also benefit from modernization of the General Telecommunications Law, which was passed in 1996.
- **Regulate the interconnection of networks among telecommunications operators and create an internet exchange point between operator networks.** Regulation of interconnection and creation of internet exchange points reduce costs for operators, which increases the affordability of the services they offer.
- **Complete the transition from analog to digital television to free up radioelectric spectrum and offer it through a tender for mobile broadband services.** The transition process from analog to digital television, which is completed with the analog switch-off (estimated for 2021), frees up very valuable spectrum frequencies that enable higher-quality broadband service to be offered.

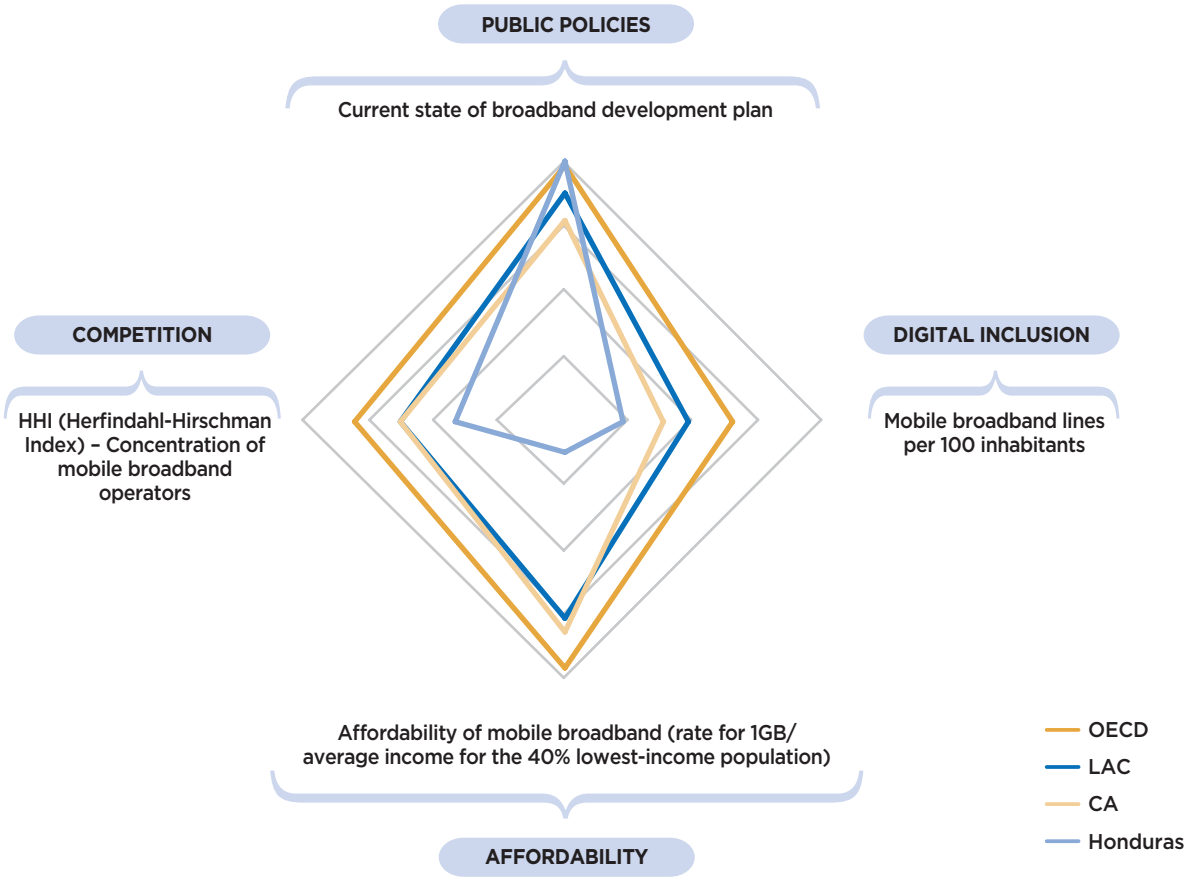
HONDURAS

Legal and institutional framework of the ICT sector

Legal framework	Telecommunications Sector Framework Law (1995, updated in 2013)
Institution responsible for ICT public policies and regulatory authority	National Telecommunications Commission (CONATEL)
Competition authority	Commission for the Defense and Promotion of Competition (CDPC)

Assessment of the ICT sector[a]

Performance comparison with Central America (CA), the region (LAC), and OECD:



[a] https://publications.iadb.org/handle/11319/8193?locale-attribute=pt&.

Regulatory gap[a]

Legal and institutional framework	Honduras	CA	LAC
Updated ICT, telecommunications, and broadband laws	●	●	●
Ministry/vice ministry specialized in ICT public policies	●	●	●
Institutional independence of the national ICT regulatory authority	●	●	●

Regulation of infrastructure development and access	Honduras	CA	LAC
Assignment of radioelectric spectrum to mobile broadband	●	●	●
Analog switch-off after the transition from analog TV to digital TV	●	●	●
Use of the Universal Service Fund to deploy broadband	●	●	●
Regulation of infrastructure sharing	●	●	●

Regulation of competition and consumer protection	Honduras	CA	LAC
Competition (concentration of broadband markets)	●	●	●
Internet exchange point between telecommunications operators' networks	●	●	●
Regulation of access and interconnection of operators' networks	●	●	●
Regulation of national roaming among mobile operators	●	●	●
Regulation of number portability from one operator to another	●	●	●
Regulation of monitoring of telecommunications quality of service	●	●	●
Regulation of telecommunications customer data protection	●	●	●

Public policies for the digital economy	Honduras	CA	LAC
Updated national digital strategy	●	●	●
Updated national broadband plan	●	●	●
Updated open government action plan	●	●	●

● Delayed in compliance ● In the process of complying ● Compliant or in advanced level of compliance

[a] For more information, see Annex 2.

Identified limitations

- **Not very competitive mobile broadband market, with low affordability of services and low adoption rate.** For the bottom 40 percent of income earners, the basic mobile broadband rate represents 42 percent of their income, while the basic rate for fixed broadband represents 85 percent of their income. This means that only 11 percent of the population can afford mobile broadband service subscriptions and only 1 percent can afford fixed broadband subscriptions. Low market competition is one of the main causes of this situation.
- **Less radioelectric spectrum assigned for the provision of mobile broadband services than is recommended by the ITU.** Mobile telecommunications operators need the government to assign them more radioelectric spectrum frequencies with which to offer higher-speed and better-quality mobile broadband transmission services.
- **Limited operation of the Fund for Investment in Telecommunications, Information Technology and Communications (FITT).** The Universal Service Fund, in this case the FITT, does not take advantage of the opportunity to allocate resources—generally raised through telecommunications operators—to deploy telecommunications infrastructure in areas that are less commercially attractive and to encourage their use.

Possible reforms

- **Create an internet exchange point between operator networks and regulate wholesale rates.** A substantial part of Honduras' international connectivity depends on the Americas Region Caribbean Ring System (ARCOS) submarine cable, owned by an international consortium of which Hondutel is a member. Analyzing this cable's international broadband capacity to offer wholesale service, with Hondutel renting the cable to other operators in Honduras—together with possible rate regulations, if necessary—as well as the creation of an IXP between network operators, would reduce wholesale costs for operators by increasing the number of subscribers.
- **Complete the transition from analog to digital television to free up part of the radioelectric spectrum and offer it through tenders for mobile broadband services.** The transition process from analog to digital television, which is completed with an analog switch-off (estimated for 2020), frees up very valuable spectrum frequencies that enable higher-quality mobile broadband service to be offered.
- **Update the FITT regulation to systematize the design and financing of projects to promote telecommunications infrastructure.** A correct functioning of this fund would reduce the digital divide, mainly the urban-rural divide.

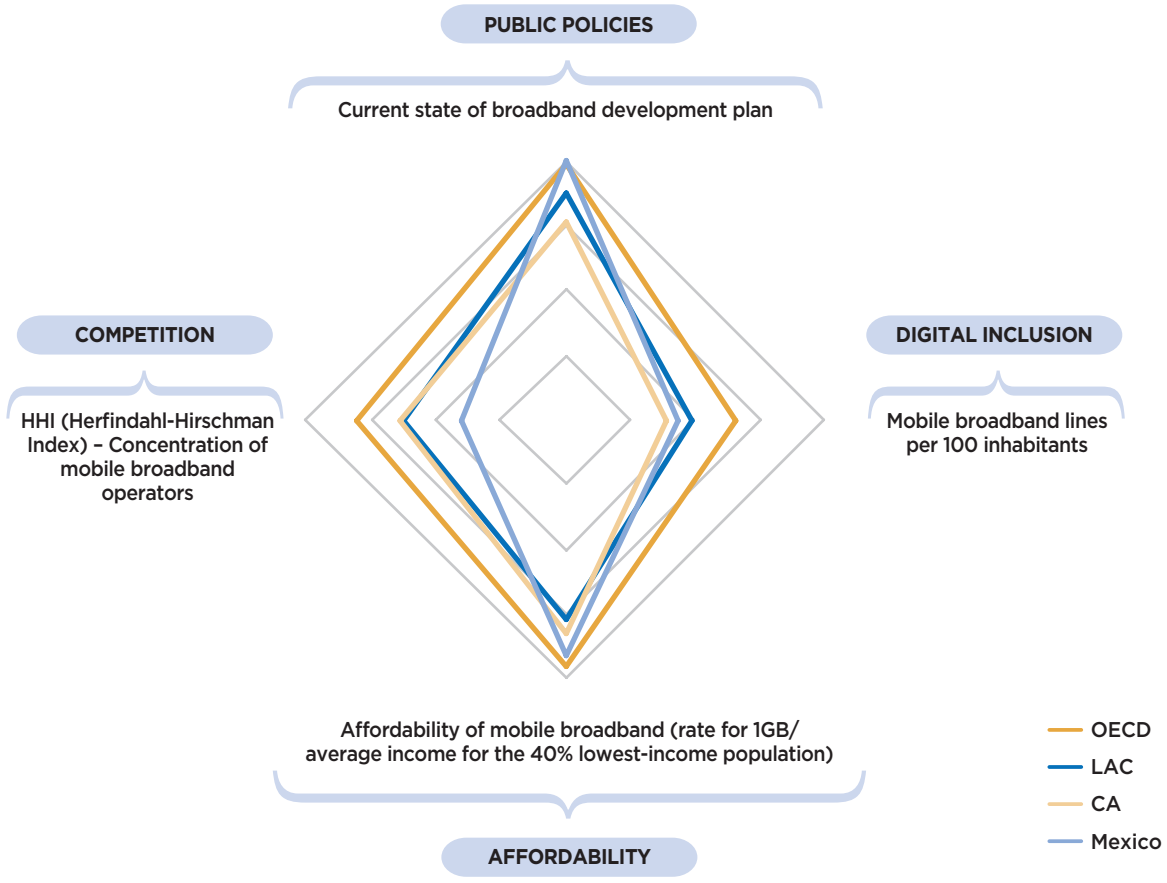
MEXICO

Legal and institutional framework of the ICT sector

Legal framework	Federal Telecommunications and Broadcasting Law (2014)
Institution responsible for ICT public policies	Secretariat of Communications and Transportation (SCT)
Regulatory and competition authority	Federal Telecommunications Institute (IFT)

Assessment of the ICT sector[a]

Performance comparison with Central America (CA), the region (LAC), and OECD:



[a] https://publications.iadb.org/handle/11319/8193?locale-attribute=pt&.

Regulatory gap[a]

Legal and institutional framework	Mexico	CA	LAC
Updated ICT, telecommunications, and broadband laws	●	●	●
Ministry/vice ministry specialized in ICT public policies	●	●	●
Institutional independence of the national ICT regulatory authority	●	●	●

Regulation of infrastructure development and access	Mexico	CA	LAC
Assignment of radioelectric spectrum to mobile broadband	●	●	●
Analog switch-off after the transition from analog TV to digital TV	●	●	●
Use of the Universal Service Fund to deploy broadband	●	●	●
Regulation of infrastructure sharing	●	●	●

Regulation of competition and consumer protection	Mexico	CA	LAC
Competition (concentration of broadband markets)	●	●	●
Internet exchange point between telecommunications operators' networks	●	●	●
Regulation of access and interconnection of operators' networks	●	●	●
Regulation of national roaming among mobile operators	●	●	●
Regulation of number portability from one operator to another	●	●	●
Regulation of monitoring of telecommunications quality of service	●	●	●
Regulation of telecommunications customer data protection	●	●	●

Public policies for the digital economy	Mexico	CA	LAC
Updated national digital strategy	●	●	●
Updated national broadband plan	●	●	●
Updated open government action plan	●	●	●

● Delayed in compliance ● In the process of complying ● Compliant or in advanced level of compliance

[a] For more information, see Annex 2.

Identified limitations

- **Limitations in the policy framework that governs the sector's development.** While there are initiatives regarding broadband promotion, there is no national broadband plan that integrates them and establishes master guidelines for the development of this technology in the short and medium term.
- **Deficit of broadband infrastructure, particularly in rural areas.** Due in large part to the rugged terrain of some regions, the vast territorial extension, and the low population density in rural areas, along with lower per capita purchasing power in some areas, broadband operators have little economic incentive to deploy infrastructure in certain rural areas.
- **Not very competitive mobile broadband market and with few subscribers.** The high concentration of the mobile broadband market, along with infrastructure limitations, contributes to a low percentage of subscribers (50 percent) compared to LAC and OECD countries.

Possible reforms

- **Establish a National Broadband Plan, a Universal Digital Inclusion Policy, and a National Digital Agenda.** Establish public policies that contemplate infrastructure development, access to digital technologies, connectivity among regions, adoption of information and communications technology, and development of digital skills.
- **Execute broadband deployment programs, such as Connected Mexico, the Shared Network, and the National Trunk Network.** Begin the execution of the Connected Mexico Program to supply free broadband in public spaces in remote areas, connecting nearly 70,000 public spaces. Adjudicate the tender for the Shared Network in the 700 MHz band of the radioelectric spectrum, and prepare the tender for an open-access fiber optic National Trunk Network so that operators can rent capacity to provide final services in rural communities.
- **Determine the existence of preponderant agents and reduce the maximum time for number portability.** Analyze the markets, identify preponderant agents and, where necessary, impose measures to limit the abuse of market dominance, such as: setting a zero rate for interconnection, obligation to rent their infrastructure to other operators in a disaggregated manner, and elimination of long distance for telephone calls. Reduce the maximum time allowed for telecommunications operators to complete the number portability process, so that telephone service users can switch service providers while maintaining the same telephone number.

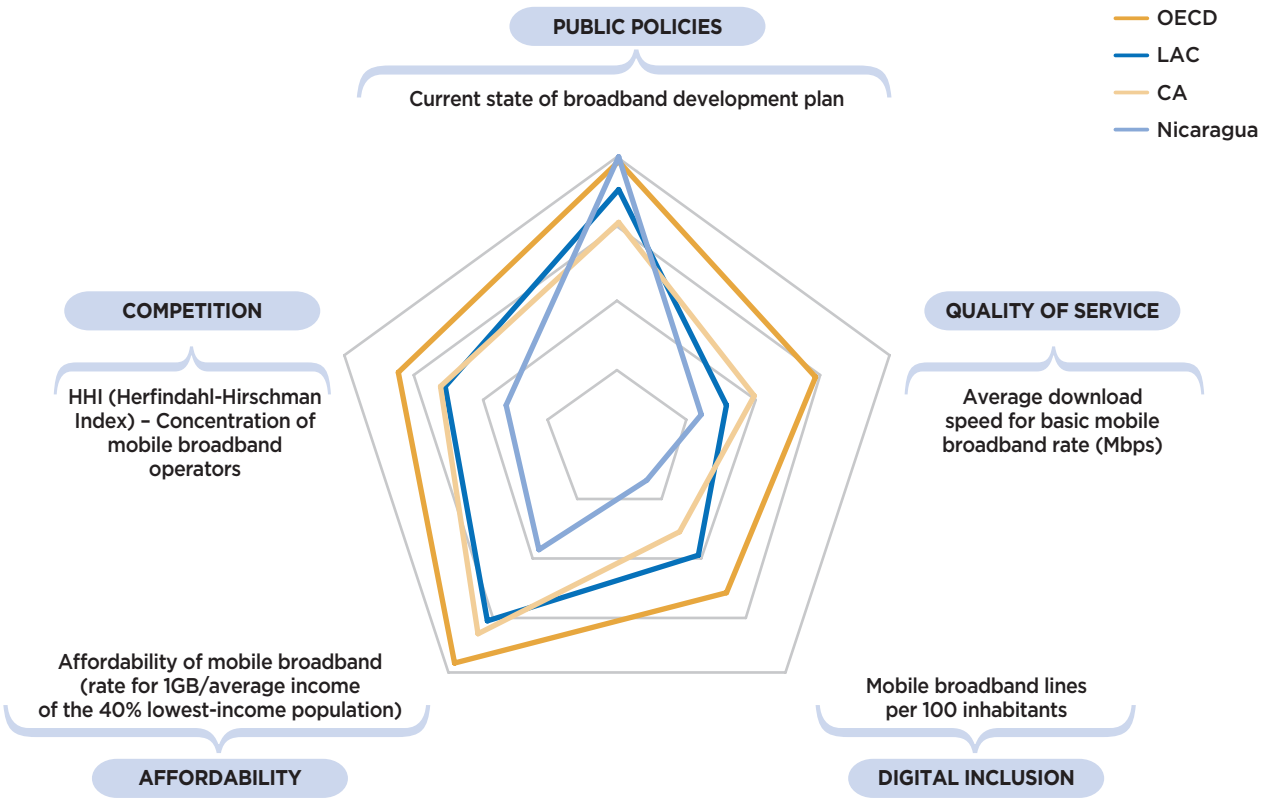
NICARAGUA

Legal and institutional framework of the ICT sector

Legal framework	General Telecommunications and Postal Services Law No. 200 (1995)
Institution responsible for ICT public policies	Presidency
Regulatory and competition authority	Nicaraguan Telecommunications and Postal Institute (TELCOR)

Assessment of the ICT sector[a]

Performance comparison with Central America (CA), the region (LAC), and OECD:



[a] https://publications.iadb.org/handle/11319/8193?locale-attribute=pt&.

Regulatory gap[a]

Legal and institutional framework	Nicaragua	CA	LAC
Updated ICT, telecommunications, and broadband laws	●	●	●
Ministry/vice ministry specialized in ICT public policies	●	●	●
Institutional independence of the national ICT regulatory authority	●	●	●

Regulation of infrastructure development and access	Nicaragua	CA	LAC
Assignment of radioelectric spectrum to mobile broadband	●	●	●
Analog switch-off after the transition from analog TV to digital TV	●	●	●
Use of the Universal Service Fund to deploy broadband	●	●	●
Regulation of infrastructure sharing	●	●	●

Regulation of competition and consumer protection	Nicaragua	CA	LAC
Competition (concentration of broadband markets)	●	●	●
Internet exchange point between telecommunications operators' networks	●	●	●
Regulation of access and interconnection of operators' networks	●	●	●
Regulation of national roaming among mobile operators	●	●	●
Regulation of number portability from one operator to another	●	●	●
Regulation of monitoring of telecommunications quality of service	●	●	●
Regulation of telecommunications customer data protection	●	●	●

Public policies for the digital economy	Nicaragua	CA	LAC
Updated national digital strategy	●	●	●
Updated national broadband plan	●	●	●
Updated open government action plan	●	●	●

● Delayed in compliance ● In the process of complying ● Compliant or in advanced level of compliance

[a] For more information, see Annex 2.

Identified limitations

- **Limitations in the legal framework that governs the sector's development.** The General Telecommunications and Postal Services Law No. 200 was passed in 1995. It does not contain principles for broadband infrastructure promotion and competition, nor does it grant TELCOR a mandate to oversee its compliance.
- **Limitations in the telecommunications regulatory framework makes the promotion of broadband competition, affordability, adoption, and quality of service difficult.** The current law does not empower the NRA with the mandate to apply key principles for promotion of broadband infrastructure and competition, which are key for the sector's development.
- **Deficit of broadband infrastructure, particularly in rural areas.** Due in large part to the terrain in certain rural areas, limited ground transportation infrastructure in some remote regions, and low population density in rural areas, together with lower per capita purchasing power in some of these areas, broadband operators have little economic incentive to deploy infrastructure in certain rural and remote areas.

Possible reforms

- **Modernize the General Telecommunications and Postal Services Law.** Update the framework law for the sector so that it establishes key principles and mandates, based on technological advances in recent decades and global trends in this market, for the sector's short- and medium-term development.
- **Develop secondary legislation and regulation for promotion of broadband infrastructure deployment and market competition.** Under the new Telecommunications Law—and, to the extent possible, within the current legislative framework until the new law is approved—develop regulation that contemplates infrastructure sharing, open access to broadband networks, interconnection regulation, and regulation of wholesale rates for operators with significant market power in relevant markets.
- **Design and implement national programs for broadband infrastructure deployment that reaches rural areas.** Deployment of broadband infrastructure, both to reinforce the national trunk network and offer wholesale services, as well as to reinforce transportation and access networks serving rural areas.

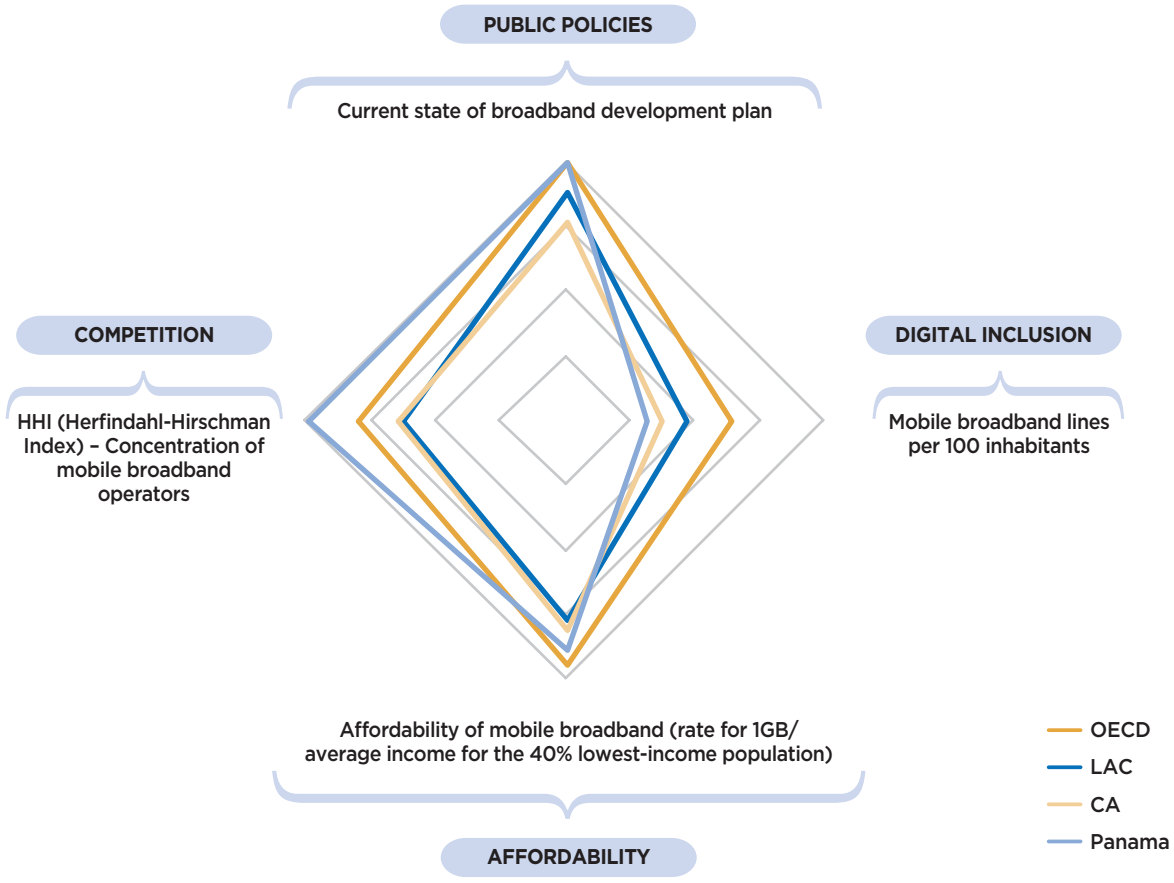
PANAMA

Legal and institutional framework for the ICT sector

Legal framework	Law No. 31 (of February 8,1996) "For which norms are dictated for regulation of telecommunications in the Republic of Panama"
Institution responsible for ICT public policies	National Government Innovation Authority (AIG)
Regulatory authority	National Public Services Authority (ASEP)
Competition authority	Consumer Protection and Competition Defense Authority (ACODECO)

Assessment of the ICT sector[a]

Performance comparison with Central America (CA), the region (LAC), and OECD:



[a] https://publications.iadb.org/handle/11319/8193?locale-attribute=pt&.

Regulatory gap[a]

Legal and institutional framework	Panama	CA	LAC
Updated ICT, telecommunications, and broadband laws	●	●	●
Ministry/vice ministry specialized in ICT public policies	●	●	●
Institutional independence of the national ICT regulatory authority	●	●	●

Regulation of infrastructure development and access	Panama	CA	LAC
Assignment of radioelectric spectrum to mobile broadband	●	●	●
Analog switch-off after the transition from analog TV to digital TV	●	●	●
Use of the Universal Service Fund to deploy broadband	●	●	●
Regulation of infrastructure sharing	●	●	●

Regulation of competition and consumer protection	Panama	CA	LAC
Competition (concentration of broadband markets)	●	●	●
Internet exchange point between telecommunications operators' networks	●	●	●
Regulation of access and interconnection of operators' networks	●	●	●
Regulation of national roaming among mobile operators	●	●	●
Regulation of number portability from one operator to another	●	●	●
Regulation of monitoring of telecommunications quality of service	●	●	●
Regulation of telecommunications customer data protection	●	●	●

Public policies for the digital economy	Panama	CA	LAC
Updated national digital strategy	●	●	●
Updated national broadband plan	●	●	●
Updated open government action plan	●	●	●

● Delayed in compliance ● In the process of complying ● Compliant or in advanced level of compliance

[a] For more information, see Annex 2.

Identified limitations

- **Low penetration (percent of population subscribed) of broadband services.** Despite the high level of competition in the broadband market (score of 8 of 8 for mobile broadband and 5.6 of 8 for fixed broadband) and affordability of fixed and mobile broadband services (the monthly subscription cost equals around 5 percent of the average income for the bottom 40 percent of income earners), which are close to levels recommended by the ITU, only 7 percent of Panamanians subscribe to fixed broadband and 32 percent to mobile broadband.
- **Deficit of broadband infrastructure, particularly in rural areas.** Due in large part to the terrain in certain remote regions and the low population density in rural areas, as well as lower per capita purchasing power in some of these areas, broadband operators have little economic incentive to deploy infrastructure in certain rural areas, where one-third of the population resides.
- **Insufficient amount of radioelectric spectrum assigned for mobile telecommunications.** Panama is one of the LAC countries with the least amount of spectrum assigned for mobile telecommunications: it assigns only 6 percent of the amount recommended by the ITU for 2020 (220MHz versus 1350MHz).

Possible reforms

- **Design public policies for the adoption and use of broadband for the digital economy.** Approve national strategies and plans, such as the Digital Agenda, National ICT Strategic Plan, ICT Sector Development Strategy, and Smart Nation strategy.
- **Design and prepare the tender for the Internet 2.0 National Network – Internet for All.** Execute a national initiative to expand the number of free internet access points. In addition, this broadband infrastructure deployment and adoption initiative should serve as a catalyst to increase fixed broadband penetration to at least 11 percent and mobile broadband to 34 percent of the population in 2019.
- **Complete the transition from analog to digital television to free up part of the radioelectric spectrum, the proposal to modify the National Plan for Frequency Assignments, and offer it through tenders for mobile broadband frequencies.** The transition process from analog to digital television, which is completed with an analog switch-off, frees up very valuable spectrum frequencies that allow for the provision of higher-quality mobile broadband service. The National Plan for Frequency Assignments, which indicates how frequencies contained in each segment of the radioelectric spectrum should be used (e.g., mobile telecommunications), could also be revised.

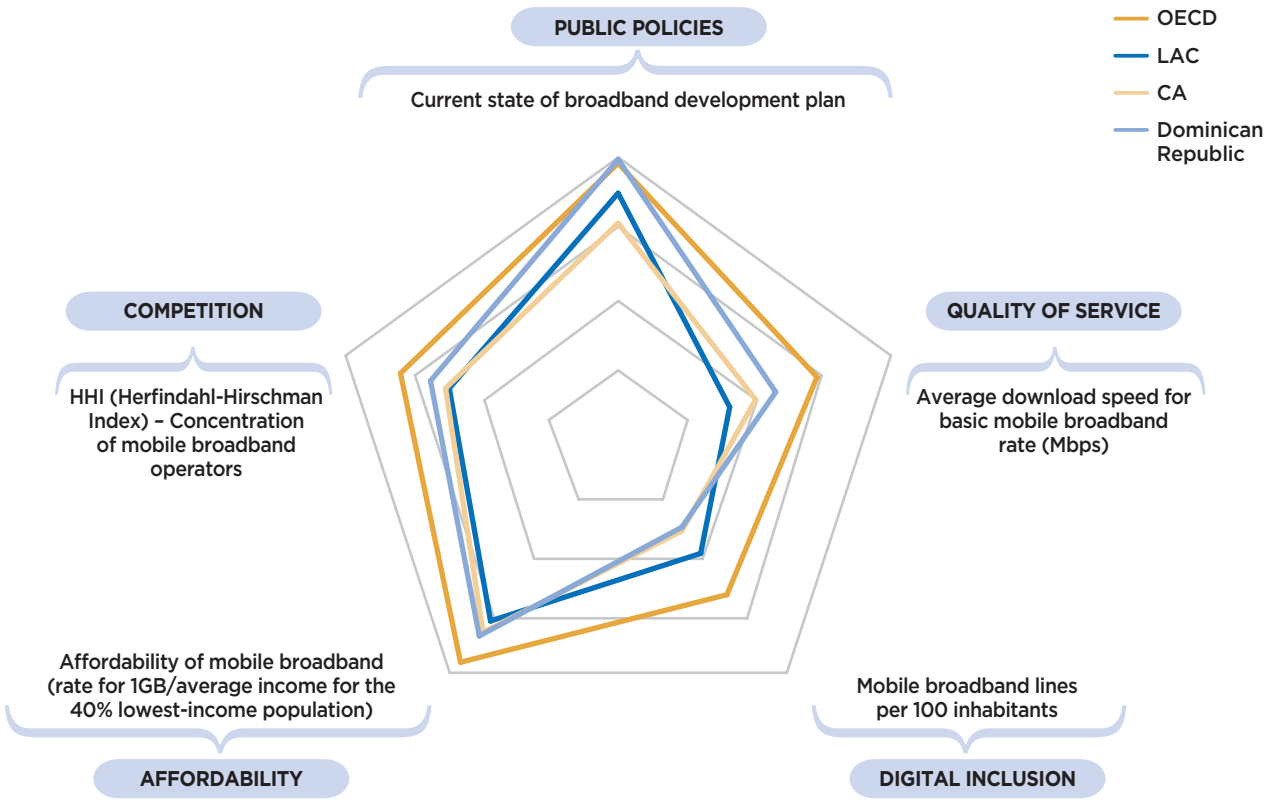
DOMINICAN REPUBLIC

Legal and institutional framework for the ICT sector

Legal framework	General Telecommunications Law 153–98
Institutions responsible for ICT public policies	Dominican Telecommunications Institute (INDOTEL), Presidential Commission for the Digital Republic, and the Presidential Office on ICT (OPTIC)
Regulatory authority	Dominican Telecommunications Institute (INDOTEL)
Competition authorities	Dominican Telecommunications Institute (INDOTEL) and the National Commission for Defense of Competition (Pro-Competencia)

Assessment of the ICT sector[a]

Performance comparison with Central America (CA), the region (LAC), and OECD:



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Regulatory gap[a]

Legal and institutional framework	Dominican Republic	CA	LAC
Updated ICT, telecommunications, and broadband laws	●	●	●
Ministry/vice ministry specialized in ICT public policies	●	●	●
Institutional independence of the national ICT regulatory authority	●	●	●

Regulation of infrastructure development and access	Dominican Republic	CA	LAC
Assignment of radioelectric spectrum to mobile broadband	●	●	●
Analog switch-off after the transition from analog TV to digital TV	●	●	●
Use of the Universal Service Fund to deploy broadband	●	●	●
Regulation of infrastructure sharing	●	●	●

Regulation of competition and consumer protection	Dominican Republic	CA	LAC
Competition (concentration of broadband markets)	●	●	●
Internet exchange point between telecommunications operators' networks	●	●	●
Regulation of access and interconnection of operators' networks	●	●	●
Regulation of national roaming among mobile operators	●	●	●
Regulation of number portability from one operator to another	●	●	●
Regulation of monitoring of telecommunications quality of service	●	●	●
Regulation of telecommunications customer data protection	●	●	●

Public policies for the digital economy	Dominican Republic	CA	LAC
Updated national digital strategy	●	●	●
Updated national broadband plan	●	●	●
Updated open government action plan	●	●	●

● Delayed in compliance ● In the process of complying ● Compliant or in advanced level of compliance

[a] For more information, see Annex 2.

Identified limitations

- **Limitations in strategic coordination of ICT public policies.** Notable efforts in the modernization of government and other segments of society, directed by OPTIC and INDOTEL, among others, were not included within a national ICT strategy.
- **Structural limitations in the legal framework.** The General Telecommunications Law, which dates to 1998, does not incorporate recent technological advances that have led to the convergence of services (telephony, television, etc.) through a single medium (internet), for which public authorities (e.g., INDOTEL) do not have the mandate to adapt the sector's regulations to market changes.
- **Low incentive for investments in deployment of broadband connectivity infrastructure throughout the country.** The national broadband network does not cover all parts of the country, which makes access to ICT-based services difficult for part of the population. Factors such as access to financing, return on the investment, administrative processes, and dynamics may disincentivize private investment in broadband infrastructure.

Possible reforms

- **Implement the Digital Republic ICT national strategy.** The national strategy proposed by the government would seek the active participation of various public sector institutions to increase access to digital connectivity services, as well as foster the adoption of ICT in critical areas such as education, employability, productivity, government, security, and digital inclusion.
- **Study a possible modernization of the General Telecommunications Law.** INDOTEL is drafting recommendations to modernize the 1998 Telecommunications Law, which would empower public sector institutions to update secondary legislation and regulations, thereby facilitating the implementation of the national ICT strategy.
- **Plan the deployment of a dorsal fiber optic network and access points, coupled with regulations on infrastructure sharing.** The Dominican Electric Distribution Company plans to deploy a fiber optic network by using the electricity infrastructure, which would supply telecenters with free Wi-Fi access points. INDOTEL and the Ministry of Public Works and Communications plan to approve regulations to include ducts for fiber optics in roadbuilding projects.

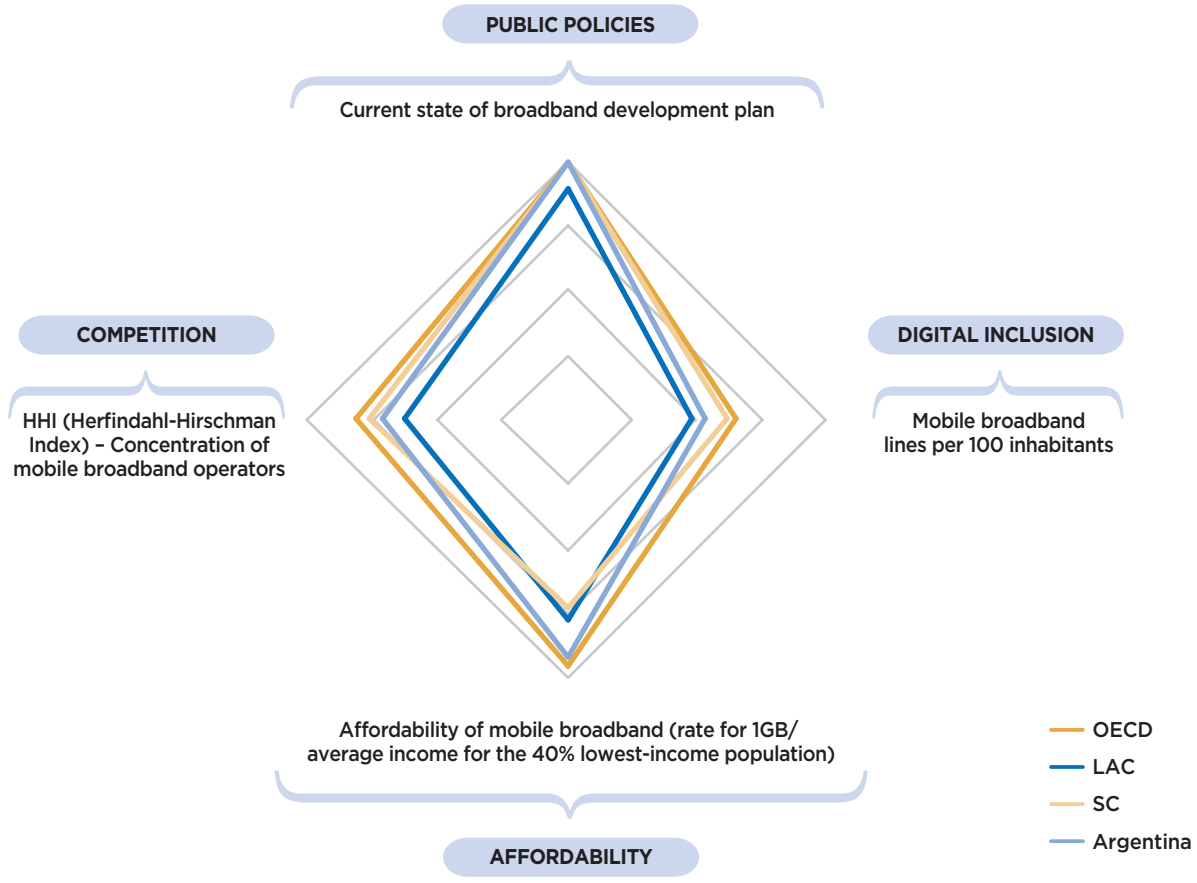
ARGENTINA

Legal and institutional framework for the ICT sector

Legal framework	Audiovisual Communication Services Law (2009), Argentina Digital Law (2014)
Institution responsible for ICT public policies	Ministry of Modernization
Regulatory authority	National Communications Agency (ENACOM)
Competition authority	National Commission for Defense of Competition (CNDC)

Assessment of the ICT sector[a]

Performance comparison with the Southern Cone (SC), the region (LAC), and OECD:



[a] https://publications.iadb.org/handle/11319/8193?locale-attribute=pt&.

Regulatory gap[a]

Legal and institutional framework	Argentina	SC	LAC
Updated ICT, telecommunications, and broadband laws	●	●	●
Ministry/vice ministry specialized in ICT public policies	●	●	●
Institutional independence of the national ICT regulatory authority	●	●	●

Regulation of infrastructure development and access	Argentina	SC	LAC
Assignment of radioelectric spectrum to mobile broadband	●	●	●
Analog switch-off after the transition from analog TV to digital TV	●	●	●
Use of the Universal Service Fund to deploy broadband	●	●	●
Regulation of infrastructure sharing	●	●	●

Regulation of competition and consumer protection	Argentina	SC	LAC
Competition (concentration of broadband markets)	●	●	●
Internet exchange point between telecommunications operators' networks	●	●	●
Regulation of access and interconnection of operators' networks	●	●	●
Regulation of national roaming among mobile operators	●	●	●
Regulation of number portability from one operator to another	●	●	●
Regulation of monitoring of telecommunications quality of service	●	●	●
Regulation of telecommunications customer data protection	●	●	●

Public policies for the digital economy	Argentina	SC	LAC
Updated national digital strategy	●	●	●
Updated national broadband plan	●	●	●
Updated open government action plan	●	●	●

● Delayed in compliance ● In the process of complying ● Compliant or in advanced level of compliance

[a] For more information, see Annex 2.

Identified limitations

- **Limitations in the legal framework.** The regulatory framework consists mainly of Law 26.522 on audiovisual services and Law 27.078, which regulates information and communications technologies. This framework does not fully cover the convergence of networks and services over broadband.
- **Limitations in the efficient use of the radioelectric spectrum.** The fact that the 700MHz band for mobile communications is not available hinders the expansion of 4G coverage and improvements in the quality of mobile communications services.
- **Absence of a national digital strategy.** The development of the digital economy requires the design and execution of a national digital strategy that promotes the use and appropriation of information and communications technologies by different economic sectors.

Possible reforms

- **Modernize the legal framework for the information and communications technology sector.** Development of the ICT sector requires a legal framework that regulates services independently of technology platforms and is the result of a consultative process in which all stakeholders participate.
- **Accelerate the assignment of radioelectric spectrum for mobile communications.** Adopt measures aimed at guaranteeing the availability of the 700MHz band and initiate a process for its assignment, as well as the assignment of other frequency bands for the provision of mobile communication services.
- **Design a digital strategy.** To define a digital strategy, a required starting point is the measurement of the state of economic digitalization, followed by the elaboration of a strategy consisting of actions geared to fostering the use and appropriation of ICT by different economic sectors.

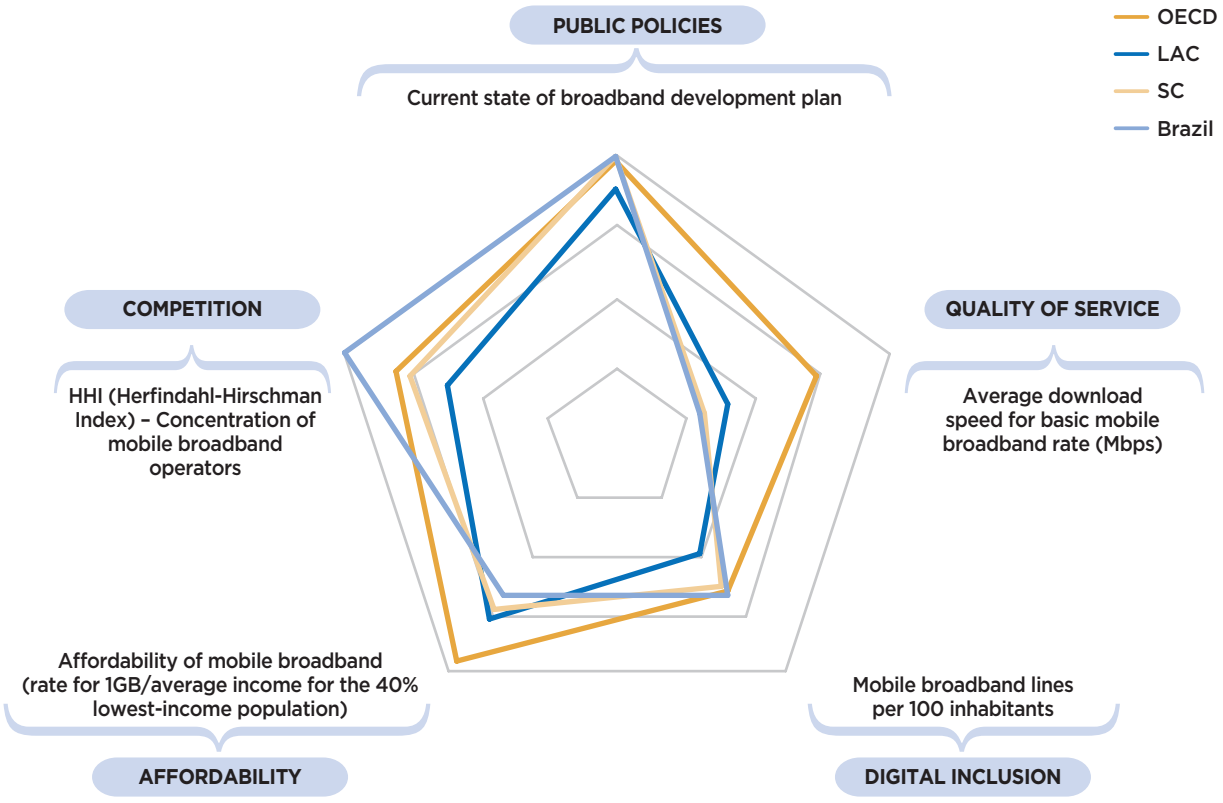
BRAZIL

Legal and institutional framework for the ICT sector

Legal framework	General Telecommunications Law Nº 9.472 (1997)
Institution responsible for ICT public policies	Ministry of Science, Technology, Innovation and Communications (MCTI)
Regulatory authority	National Telecommunications Agency (ANATEL)
Competition authority	Economic Defense Administrative Council (CADE)

Assessment of the ICT sector[a]

Performance comparison with the Southern Cone (SC), the region (LAC), and OECD:



[a] https://publications.iadb.org/handle/11319/8193?locale-attribute=pt&.

Regulatory gap[a]

Legal and institutional framework	Brazil	SC	LAC
Updated ICT, telecommunications, and broadband laws	●	●	●
Ministry/vice ministry specialized in ICT public policies	●	●	●
Institutional independence of the national ICT regulatory authority	●	●	●

Regulation of infrastructure development and access	Brazil	SC	LAC
Assignment of radioelectric spectrum to mobile broadband	●	●	●
Analog switch-off after the transition from analog TV to digital TV	●	●	●
Use of the Universal Service Fund to deploy broadband	●	●	●
Regulation of infrastructure sharing	●	●	●

Regulation of competition and consumer protection	Brazil	SC	LAC
Competition (concentration of broadband markets)	●	●	●
Internet exchange point between telecommunications operators' networks	●	●	●
Regulation of access and interconnection of operators' networks	●	●	●
Regulation of national roaming among mobile operators	●	●	●
Regulation of number portability from one operator to another	●	●	●
Regulation of monitoring of telecommunications quality of service	●	●	●
Regulation of telecommunications customer data protection	●	●	●

Public policies for the digital economy	Brazil	SC	LAC
Updated national digital strategy	●	●	●
Updated national broadband plan	●	●	●
Updated open government action plan	●	●	●

● Delayed in compliance ● In the process of complying ● Compliant or in advanced level of compliance

[a] For more information, see Annex 2.

Identified limitations

- **Structural limitations in the legal framework.** The General Telecommunications Law, passed in 1997, does not include the technological advances that have led to the convergence of services, nor does it define guidelines for digitalization of the economy following the adoption and use of ICT by different sectors.
- **Broadband strategy not in effect.** Various projects have been created for broadband plans; however, there is none in effect that promotes projects for broadband infrastructure deployment in a structured manner, with clear objectives, deadlines, and milestones that would enable improvements in quality and coverage of these services.
- **Less radioelectric spectrum assigned for the provision of mobile broadband services than is recommended by the ITU.** The radioelectric spectrum assigned is 46 percent of what the ITU recommended by 2015, and 31 percent of what it recommends by 2020.

Possible reforms

- **Modernize the legal framework for information and communications technologies.** Reform the regulatory framework for the ICT sector in a way that incorporates the sector's best practices and the foundations for digitalization of the economy.
- **Approve and execute a National Broadband Plan.** Design, approve, and execute a National Broadband Plan with the goal of implementing a series of actions and policies aimed at guaranteeing digital inclusion, with particular measures geared to providing connectivity to a high percentage of communities and to improve broadband speed.
- **Accelerate the assignment of radioelectric spectrum.** Considering the small amount of spectrum assigned for mobile communications, the assignment of a larger amount of this resource to mobile telecommunications operators is required, which will have a positive impact on coverage and quality of service.

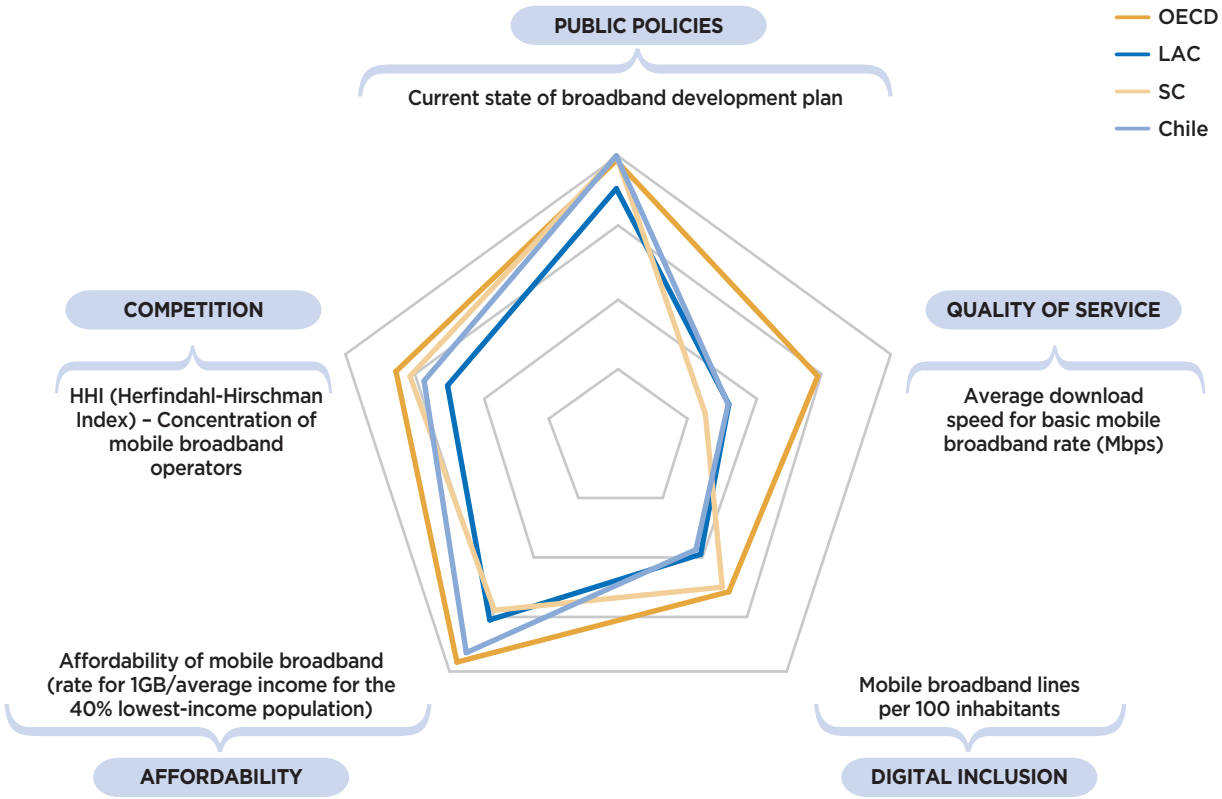
CHILE

Legal and institutional framework for the ICT sector

Legal framework	General Telecommunications Law (1982, updated in 2016)
Institution responsible for ICT public policies	Ministry of Transportation and Telecommunications (MTT)
Regulatory authority	Sub secretariat of Telecommunications (SUBTEL)
Competition authority	Tribunal for the Defense of Free Competition (TDLC)

Assessment of the ICT sector[a]

Performance comparison with the Southern Cone (SC), the region (LAC), and OECD:



[a] https://publications.iadb.org/handle/11319/8193?locale-attribute=pt&.

Regulatory gap[a]

Legal and institutional framework	Chile	SC	LAC
Updated ICT, telecommunications, and broadband laws	●	●	●
Ministry/vice ministry specialized in ICT public policies	●	●	●
Institutional independence of the national ICT regulatory authority	●	●	●

Regulation of infrastructure development and access	Chile	SC	LAC
Assignment of radioelectric spectrum to mobile broadband	●	●	●
Analog switch-off after the transition from analog TV to digital TV	●	●	●
Use of the Universal Service Fund to deploy broadband	●	●	●
Regulation of infrastructure sharing	●	●	●

Regulation of competition and consumer protection	Chile	SC	LAC
Competition (concentration of broadband markets)	●	●	●
Internet exchange point between telecommunications operators' networks	●	●	●
Regulation of access and interconnection of operators' networks	●	●	●
Regulation of national roaming among mobile operators	●	●	●
Regulation of number portability from one operator to another	●	●	●
Regulation of monitoring of telecommunications quality of service	●	●	●
Regulation of telecommunications customer data protection	●	●	●

Public policies for the digital economy	Chile	SC	LAC
Updated national digital strategy	●	●	●
Updated national broadband plan	●	●	●
Updated open government action plan	●	●	●

● Delayed in compliance ● In the process of complying ● Compliant or in advanced level of compliance

[a] For more information, see Annex 2.

Identified limitations

- **The radioelectric spectrum assigned for the provision of mobile broadband services does not comply with the ITU's recommendation.** The radioelectric spectrum assigned is 35 percent of the spectrum that the ITU recommended for 2015, and 27 percent of the spectrum that it recommends for 2020.
- **Limitations in infrastructure deployment.** A larger investment in the deployment of physical telecommunications infrastructure would enable an improvement in current low levels of coverage and access to telecommunications services in certain rural areas.
- **Number portability limited by type of telephony service.** Telephony service users may port their numbers to other operators offering the same type of service (fixed, mobile, VoIP, etc.), but not to those offering other types of telephony services; the latter represents a transaction cost that limits the possibility for competition in services generated by the convergence of broadband services.

Possible reforms

- **Accelerate the assignment of radioelectric spectrum.** Considering the small amount of spectrum assigned for mobile communications, assign a larger amount of this resource to mobile communications operators.
- **Prepare a project for fiber optic deployment in the southern region.** Design and approve a project for fiber optic deployment in the country's southern region, subsidized by the Telecommunications Development Fund (FDT), to increase access to broadband infrastructure in this part of the country.
- **Approve and execute full number portability.** Approve the regulation so that telephony users can port their number to other service providers, including between fixed telephony, mobile telephony, and telephony over IP (VoIP).

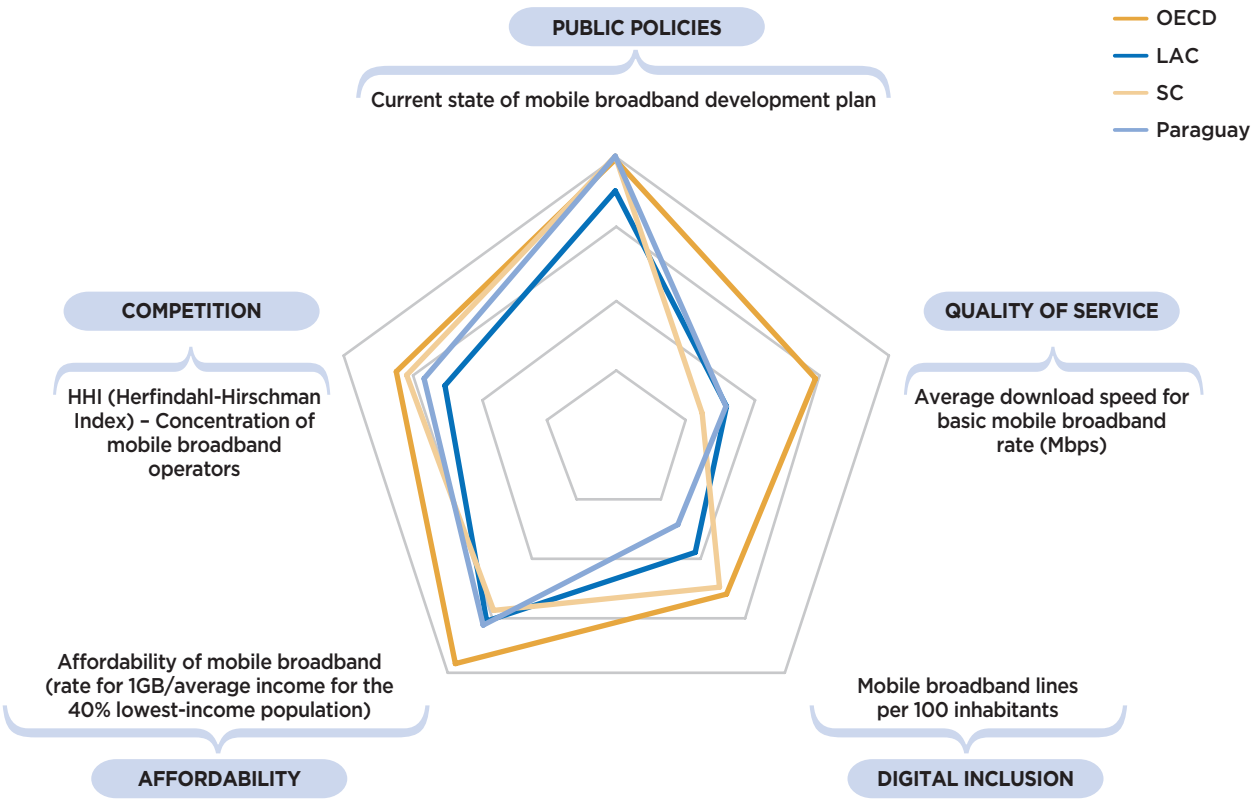
PARAGUAY

Legal and institutional framework for the ICT sector

Legal framework	Law Nº 4989 framework for ICT application in the public sector (2013), Law Nº 642 on Telecommunications (1995)
Institution responsible for ICT public policies	National ICT Secretariat (SENATICs)
Regulatory authority	National Communications Commission (CONATEL)
Competition authority	National Competition Commission (CONACOM)

Assessment of the ICT sector[a]

Performance comparison with the Southern Cone (SC), the region (LAC), and OECD:



[a] https://publications.iadb.org/handle/11319/8193?locale-attribute=pt&.

Regulatory gap[a]

Legal and institutional framework	Paraguay	SC	LAC
Updated ICT, telecommunications, and broadband laws	●	●	●
Ministry/vice ministry specialized in ICT public policies	●	●	●
Institutional independence of the national ICT regulatory authority	●	●	●

Regulation of infrastructure development and access	Paraguay	SC	LAC
Assignment of radioelectric spectrum to mobile broadband	●	●	●
Analog switch-off after the transition from analog TV to digital TV	●	●	●
Use of the Universal Service Fund to deploy broadband	●	●	●
Regulation of infrastructure sharing	●	●	●

Regulation of competition and consumer protection	Paraguay	SC	LAC
Competition (concentration of broadband markets)	●	●	●
Internet exchange point between telecommunications operators' networks	●	●	●
Regulation of access and interconnection of operators' networks	●	●	●
Regulation of national roaming among mobile operators	●	●	●
Regulation of number portability from one operator to another	●	●	●
Regulation of monitoring of telecommunications quality of service	●	●	●
Regulation of telecommunications customer data protection	●	●	●

Public policies for the digital economy	Paraguay	SC	LAC
Updated national digital strategy	●	●	●
Updated national broadband plan	●	●	●
Updated open government action plan	●	●	●

● Delayed in compliance ● In the process of complying ● Compliant or in advanced level of compliance

[a] For more information, see Annex 2.

Identified limitations

- **Limitations in the telecommunications legal framework.** Despite the fact that the ICT framework law, approved in 2013, contains important advances in the institutional framework for the ICT sector, the law that governs the telecommunications sector specifically dates back to 1995, and it does not contain several of the legal and regulatory principles that have become relevant in recent years as a result of the convergence of telecommunications services over the broadband platform.
- **Low broadband penetration.** Broadband penetration and the number of internet users is below the average for the Southern Cone region, as well as for LAC and OECD countries.
- **Less radioelectric spectrum assigned for the provision of mobile broadband services than is recommended by the ITU.** The spectrum assigned is 21 percent of what the ITU recommended by 2015, and 16 percent of what it recommends by 2020.

Possible reforms

- **Modernize the legal framework for the telecommunications sector.** Evaluate a possible update of Telecommunications Law No. 642, incorporating, among others, relevant principles for current (and possible future) telecommunications services convergent over broadband.
- **Implement measures to guarantee digital inclusion.** Continue the installation of collective broadband access centers as a solution for accessibility and affordability of internet services in areas that are strategic because of their level of citizen participation. This is aimed mainly at guaranteeing access to this service and to teaching digital literacy by promoting this type of appropriation of information and communications technologies.
- **Accelerate the assignment of radioelectric spectrum.** Considering the small amount of spectrum assigned for mobile communications, assign a larger amount of this resource to mobile communications operators, which would positively impact coverage and quality of service.

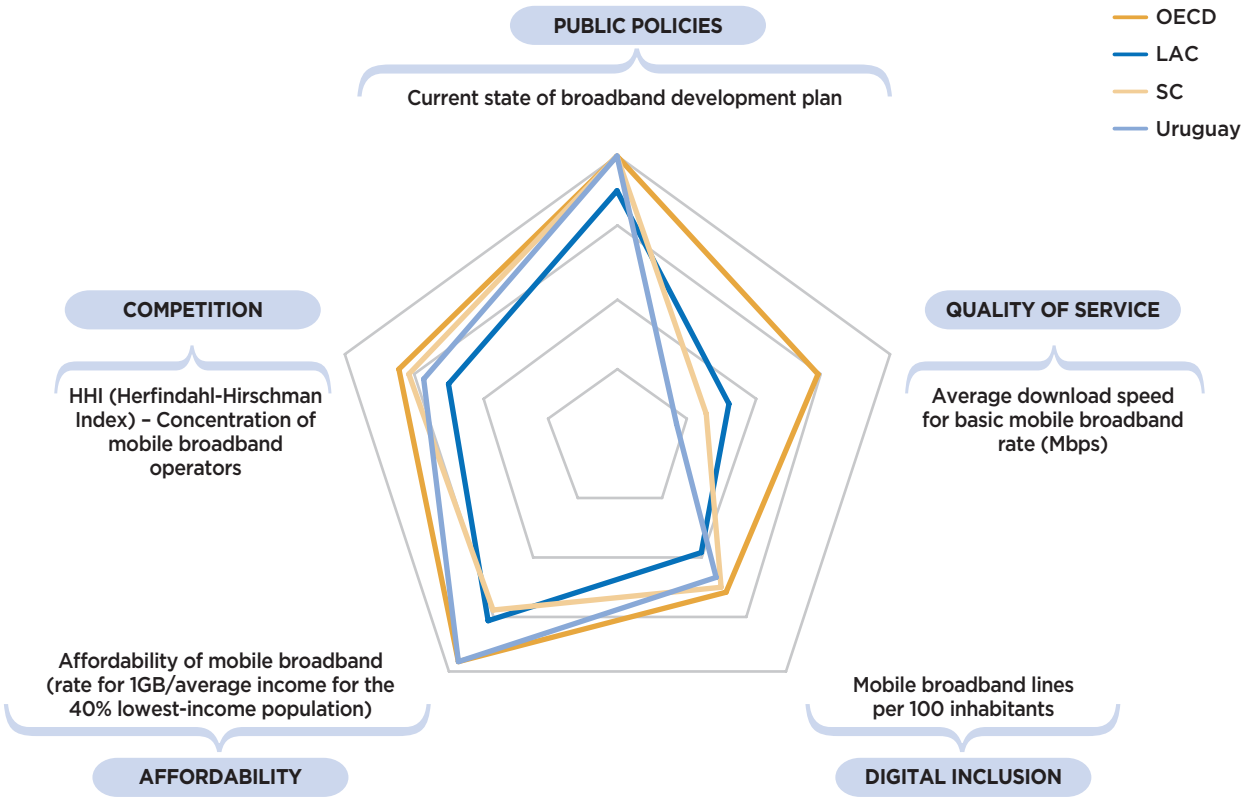
URUGUAY

Legal and institutional framework for the ICT sector

Legal framework	Audiovisual Communication Services Law (2014)
Institution responsible for ICT public policies	Ministry of Industry, Energy and Mining (MIEM) – National Telecommunications and Audiovisual Communication Services Directorate (DINATEL)
Regulatory authority	Communication Services Regulatory Unit (URSEC)
Competition authority	Competition Promotion and Defense Commission (CPCD)

Assessment of the ICT sector[a]

Performance comparison with the Southern Cone (SC), the region (LAC), and OECD:



[a] https://publications.iadb.org/handle/11319/8193?locale-attribute=pt&.

Regulatory gap[a]

Legal and institutional framework	Uruguay	SC	LAC
Updated ICT, telecommunications, and broadband laws	●	●	●
Ministry/vice ministry specialized in ICT public policies	●	●	●
Institutional independence of the national ICT regulatory authority	●	●	●

Regulation of infrastructure development and access	Uruguay	SC	LAC
Assignment of radioelectric spectrum to mobile broadband	●	●	●
Analog switch-off after the transition from analog TV to digital TV	●	●	●
Use of the Universal Service Fund to deploy broadband	●	●	●
Regulation of infrastructure sharing	●	●	●

Regulation of competition and consumer protection	Uruguay	SC	LAC
Competition (concentration of broadband markets)	●	●	●
Internet exchange point between telecommunications operators' networks	●	●	●
Regulation of access and interconnection of operators' networks	●	●	●
Regulation of national roaming among mobile operators	●	●	●
Regulation of number portability from one operator to another	●	●	●
Regulation of monitoring of telecommunications quality of service	●	●	●
Regulation of telecommunications customer data protection	●	●	●

Public policies for the digital economy	Uruguay	SC	LAC
Updated national digital strategy	●	●	●
Updated national broadband plan	●	●	●
Updated open government action plan	●	●	●

● Delayed in compliance ● In the process of complying ● Compliant or in advanced level of compliance

[a] For more information, see Annex 2.

Identified limitations

- **Structural limitations in the legal framework.** The legal framework does not have a norm for consumer protection specifically for users of ICT services or a framework law for the ICT sector.
- **Mobile broadband quality of service inferior to regional averages.** The average download speed for a basic mobile broadband rate (measured in Mbps) in Uruguay is noticeably slower than the average in the Southern Cone, LAC, and OECD countries. Thus, end users, on average, access digital content through mobile broadband services at lower speeds than in other countries.
- **Less radioelectric spectrum assigned for the provision of mobile broadband services than is recommended by the ITU.** The radioelectric spectrum assigned is only 20 percent of what the ITU recommended by 2015 and 15 percent of what it recommends by 2020.

Possible reforms

- **Modernize the regulatory framework.** Draft a bill that consecrates the rights of ICT users and the mechanisms to ensure their effectiveness, as well as a bill for the ICT sector that includes best practices.
- **Effectively implement regulations and mechanisms to foster quality of service.** The regulation, monitoring, measurement, and publication of quality of service results could have significant positive effects on competition in terms of quality of service for retail telecommunications services, and could significantly improve the quality of the experience of final users of telecommunications services.
- **Accelerate the assignment of radioelectric spectrum.** The small amount of radioelectric spectrum for mobile communications demands an increase in the amount of radioelectric spectrum assigned for this purpose, as well as the design of policies aimed at guaranteeing the efficient management of this scarce resource.

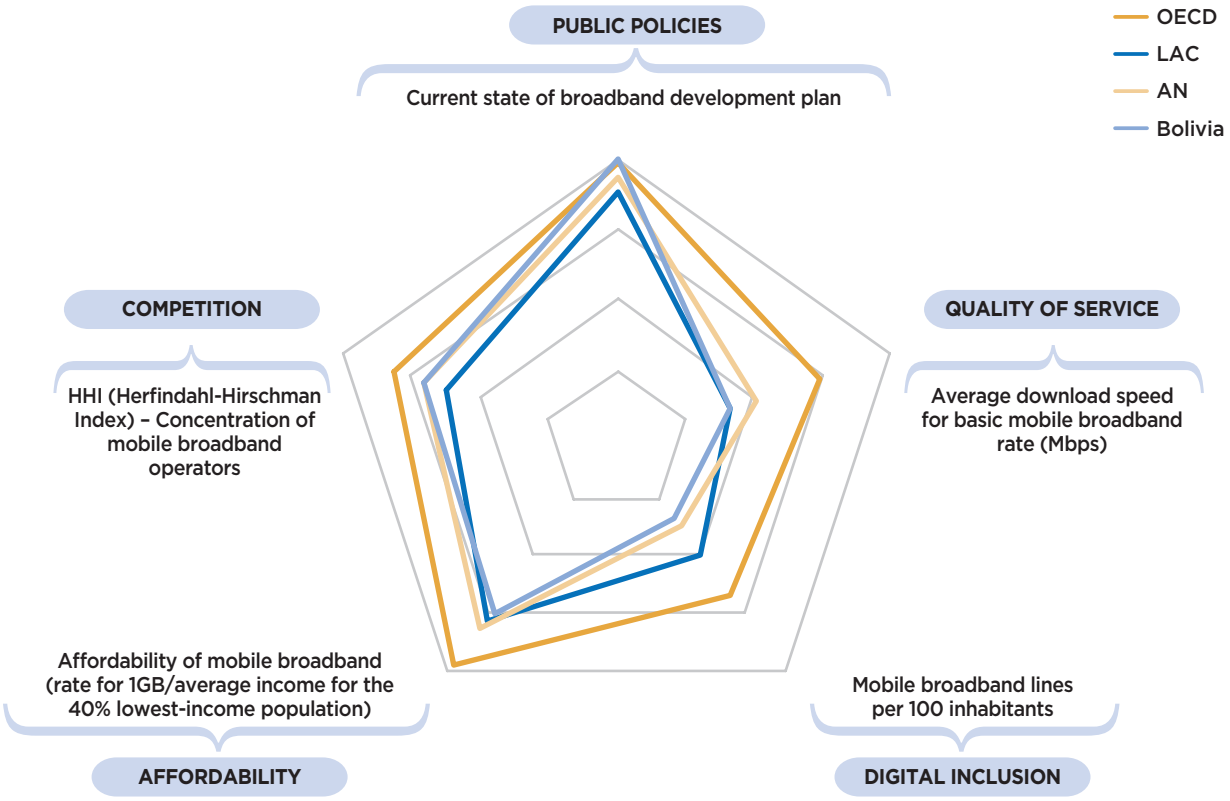
BOLIVIA

Legal and institutional framework for the ICT sector

Legal framework	General Law on Telecommunications, Information and Communications Technologies for the Development of Content and Applications of Information and Communications Technologies (2011)
Institutions responsible for ICT public policies	Vice Ministry of Telecommunications and Ministry of Public Works, Services, and Housing (OOPP)
Regulatory authority	Authority for the Regulation and Inspection of Telecommunications and Transportation (ATT)
Competition authorities	Authority for Company Inspections (AEMP), Technical Directorate for the Defense of Competition and Regulatory Development (DTDCDN)

Assessment of the ICT sector[a]

Performance comparison with the Andean countries (AN), the region (LAC), and OECD:



[a] https://publications.iadb.org/handle/11319/8193?locale-attribute=pt&.

Regulatory gap[a]

Legal and institutional framework	Bolivia	AN	LAC
Updated ICT, telecommunications, and broadband laws	●	●	●
Ministry/vice ministry specialized in ICT public policies	●	●	●
Institutional independence of the national ICT regulatory authority	●	●	●

Regulation of infrastructure development and access	Bolivia	AN	LAC
Assignment of radioelectric spectrum to mobile broadband	●	●	●
Analog switch-off after the transition from analog TV to digital TV	●	●	●
Use of the Universal Service Fund to deploy broadband	●	●	●
Regulation of infrastructure sharing	●	●	●

Regulation of competition and consumer protection	Bolivia	AN	LAC
Competition (concentration of broadband markets)	●	●	●
Internet exchange point between telecommunications operators' networks	●	●	●
Regulation of access and interconnection of operators' networks	●	●	●
Regulation of national roaming among mobile operators	●	●	●
Regulation of number portability from one operator to another	●	●	●
Regulation of monitoring of telecommunications quality of service	●	●	●
Regulation of telecommunications customer data protection	●	●	●

Public policies for the digital economy	Bolivia	AN	LAC
Updated national digital strategy	●	●	●
Updated national broadband plan	●	●	●
Updated open government action plan	●	●	●

● Delayed in compliance ● In the process of complying ● Compliant or in advanced level of compliance

[a] For more information, see Annex 2.

Identified limitations

- **Limited access to broadband services.** Compared to LAC and the Andean region, Bolivia had lower indicators in terms of mobile broadband lines per 100 inhabitants and in the status of the broadband development plan, which made necessary the adoption of public policies and strategic actions aimed at guaranteeing digital inclusion.
- **Limited broadband quality of service.** Access speed for broadband service in Bolivia, both for fixed and mobile service, is inferior to that of the Andean region, which impacts the quality of this service and its possible uses and applications.
- **Less radioelectric spectrum assigned for the provision of mobile broadband services than is recommended by the ITU.** The amount assigned is only 21 percent of the radioelectric spectrum that the ITU recommended by 2015, and only 15 percent of the percentage it recommended by 2020.

Possible reforms

- **Execute a broadband plan.** Following the recent design and approval of a broadband plan to implement a series of actions and policies aimed at guaranteeing digital inclusion, the next step is to execute specific measures to increase the number of internet users, reduce costs for providing the service, and improve connectivity.
- **Strengthen international connectivity and internet exchange points to improve broadband quality of service.** Pursue, formalize, and execute bilateral agreements with border countries with submarine cables (e.g., Peru), as well as agreements between telecommunications operators to participate in internet exchange points, to improve the quality of service offered to users.
- **Accelerate the assignment of radioelectric spectrum for mobile communications.** Considering the small amount of radioelectric spectrum assigned for mobile communications, draft a radioelectric spectrum policy that makes possible the assignment of a greater amount of this resource to mobile communications operators, which will expand coverage and improve quality of service.

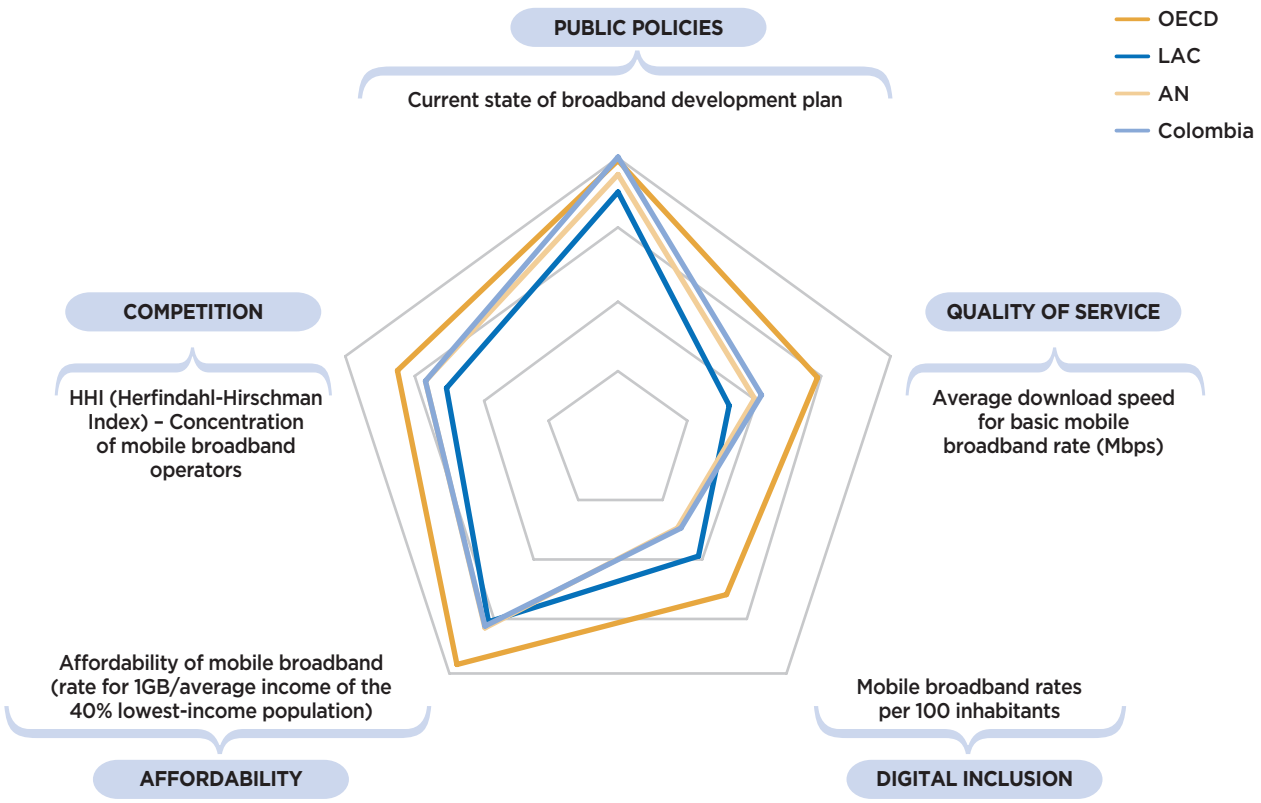
COLOMBIA

Legal and institutional framework for the ICT sector

Legal framework	Law 1341 (2009)
Institution responsible for ICT public policies	Ministry of Information and Communications Technologies (MINTIC)
Regulatory authority	Communications Regulatory Commission (CRC)
Competition authority	Superintendence of Industry and Commerce (SIC)

Assessment of the ICT sector[a]

Performance comparison with the Andean countries (AN), the region (LAC), and OECD:



[a] https://publications.iadb.org/handle/11319/8193?locale-attribute=pt&.

Regulatory gap[a]

Legal and institutional framework	Colombia	AN	LAC
Updated ICT, telecommunications, and broadband laws	●	●	●
Ministry/vice ministry specialized in ICT public policies	●	●	●
Institutional independence of the national ICT regulatory authority	●	●	●

Regulation of infrastructure development and access	Colombia	AN	LAC
Assignment of radioelectric spectrum to mobile broadband	●	●	●
Analog switch-off after the transition from analog TV to digital TV	●	●	●
Use of the Universal Service Fund to deploy broadband	●	●	●
Regulation of infrastructure sharing	●	●	●

Regulation of competition and consumer protection	Colombia	AN	LAC
Competition (concentration of broadband markets)	●	●	●
Internet exchange point between telecommunications operators' networks	●	●	●
Regulation of access and interconnection of operators' networks	●	●	●
Regulation of national roaming among mobile operators	●	●	●
Regulation of number portability from one operator to another	●	●	●
Regulation of monitoring of telecommunications quality of service	●	●	●
Regulation of telecommunications customer data protection	●	●	●

Public policies for the digital economy	Colombia	AN	LAC
Updated national digital strategy	●	●	●
Updated national broadband plan	●	●	●
Updated open government action plan	●	●	●

● Delayed in compliance ● In the process of complying ● Compliant or in advanced level of compliance

[a] For more information, see Annex 2.

Identified limitations

- **Structural limitations in the institutional framework.** Updating the institutional framework for the ICT sector in line with the convergence of services and development of the digital economy would clarify the areas of responsibility of the different authorities, which could boost the sector's development.
- **The radioelectric spectrum assigned for the provision of mobile broadband services does not meet the recommendations of the ITU.** The radioelectric spectrum assigned is 27 percent and 21 percent of the amounts recommended by the ITU by 2015 and 2020, respectively.
- **Sectoral information for the design of digital public policies is limited.** The lack of measurement indicators on the level of economic digitalization has hampered the adoption of public policies and strategic actions aimed at the development of the digital economy. An evaluation of the validity of indicators, both general and sectoral, as well as the design of new indicators in line with development of the digital ecosystem, is required.

Possible reforms

- **Study the possible expansion of the NRA's mandate and public policies so that they also cover audiovisual markets and promotion of the digital economy.** Study the creation of an NRA that integrates regulation of both communications and audiovisual services. In terms of policymaking entities, approve the creation of the Vice Ministry of the Digital Economy as part of the structure of the Ministry of Information and Communications Technologies.
- **Complete the radioelectric spectrum tender process for land mobile services.** Complete the structuring of selection processes for the assignment of radioelectric spectrum in the 700MHz, 900MHz, 1,900MHz and 2,500MHz bands, and launch the tender process to use it for mobile communications.
- **Measure the digitalization of the economy.** Define a series of general and sectoral indicators, such as the use and adoption level of ICT by small- and medium-sized enterprises, to measure and monitor the digital economy and ecosystem, which could support the definition of public policies. Likewise, define both the frequency of measurements and the responsibilities of public sector entities that will participate in this measurement.

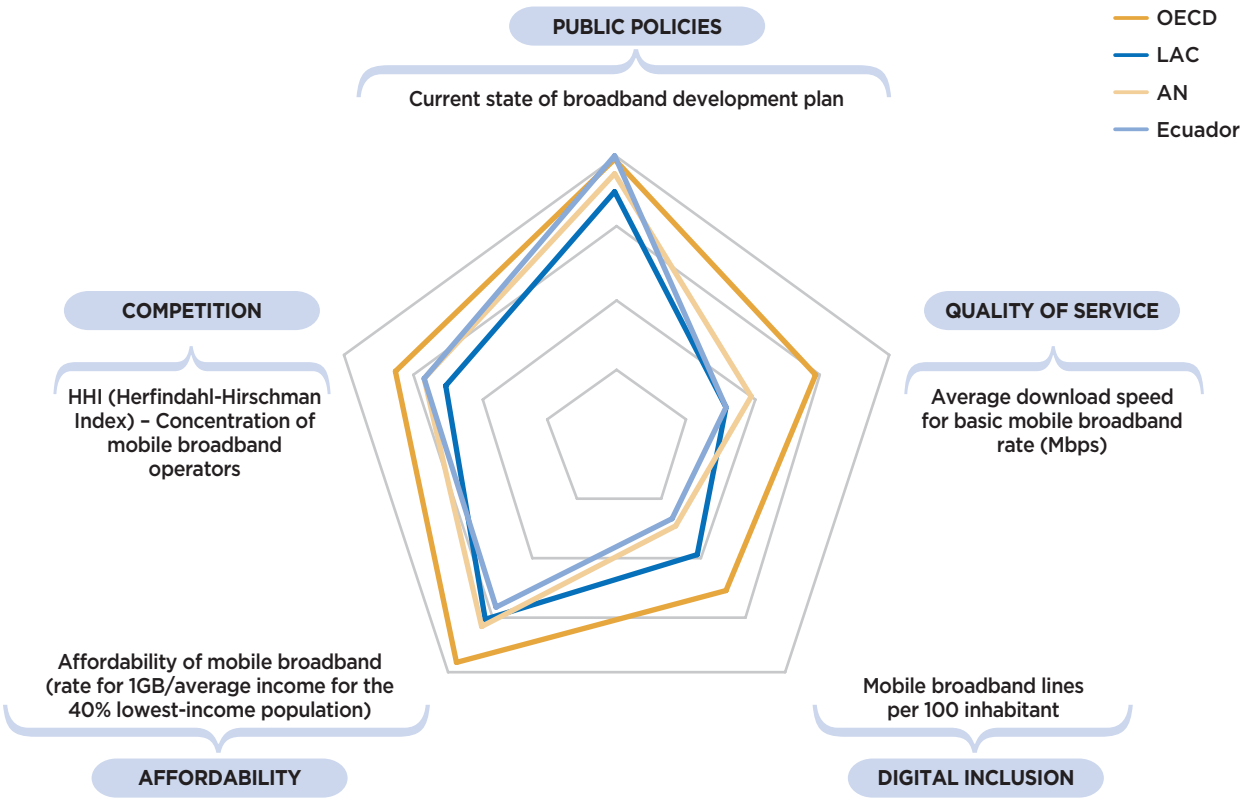
ECUADOR

Legal and institutional framework of the ICT sector

Legal framework	General Telecommunications Law (LOT 2015)
Institution responsible for ICT public policies	Ministry of Telecommunications and the Information Society (MINTEL)
Regulatory and competition authority	Telecommunications Regulation and Control Agency (ARCOTEL)

Assessment of the ICT sector[a]

Performance comparison with the Andean countries (AN), the region (LAC), and OECD:



[a] https://publications.iadb.org/handle/11319/8193?locale-attribute=pt&.

Regulatory gap[a]

Legal and institutional framework	Ecuador	AN	LAC
Updated ICT, telecommunications, and broadband laws	⚪	⚪	🟡
Ministry/vice ministry specialized in ICT public policies	⚪	⚪	🔵
Institutional independence of the national ICT regulatory authority	🔵	⚪	⚪

Regulation of infrastructure development and access	Ecuador	AN	LAC
Assignment of radioelectric spectrum to mobile broadband	🟡	🔵	🔵
Analog switch-off after the transition from analog TV to digital TV	⚪	🟡	🔵
Use of the Universal Service Fund to deploy broadband	🟡	🟡	🟡
Regulation of infrastructure sharing	⚪	🟡	🟡

Regulation of competition and consumer protection	Ecuador	AN	LAC
Competition (concentration of broadband markets)	🟡	🟡	🟡
Internet exchange point between telecommunications operators' networks	⚪	⚪	⚪
Regulation of access and interconnection of operators' networks	🟡	⚪	⚪
Regulation of national roaming among mobile operators	🟡	🟡	🔵
Regulation of number portability from one operator to another	🟡	🟡	🟡
Regulation of monitoring of telecommunications quality of service	⚪	⚪	🟡
Regulation of telecommunications customer data protection	🔵	🔵	🔵

Public policies for the digital economy	Ecuador	AN	LAC
Updated national digital strategy	⚪	🟡	🟡
Updated national broadband plan	⚪	🟡	🟡
Updated open government action plan	🔵	🔵	🟡

🔵 Delayed in compliance 🟡 In the process of complying ⚪ Compliant or in advanced level of compliance

[a] For more information, see Annex 2.

Identified limitations

- **Structural limitations in the regulatory framework.** The General Telecommunications Law and corresponding general regulations were modified in 2015 and 2016, respectively, for which a revision and update of the regulations, according to the principles and positions of the new legal framework, is necessary.
- **Low percentage of mobile broadband service subscribers per 100 inhabitants.** The indicators in terms of mobile broadband user penetration are low, and more so when compared to Andean and OECD countries.
- **Less radioelectric spectrum assigned for the provision of mobile broadband services than is recommended by the ITU.** The radioelectric spectrum assigned is 22 percent and 16 percent of the amount recommended by the ITU by 2015 and 2020, respectively.

Possible reforms

- **Modernize regulations for the telecommunications sector.** With the update of the telecommunications framework law, it is necessary to adapt the regulatory framework to the new principles and legal provisions in essential areas for the sector's development, such as infrastructure sharing, mobile virtual network operators, national roaming, analysis of relevant markets, and interconnection processes.
- **Execute programs that comprise the National Telecommunications and Information Technologies Plan, and the Universal Service Plan.** Monitor compliance with programs included in the National Telecommunications and Information Technologies Plan to increase access, adoption, and use of broadband services. Design a Universal Service Plan for the Ministry of Telecommunications and the Information Society which, based on the notion of broadband access as a basic service, incorporates strategic measures for digital inclusion.
- **Accelerate the assignment of more radioelectric spectrum.** The mechanism for assignment of radioelectric spectrum was modified with the introduction of the new legal framework; currently, the assignment is conducted through a public tender. Work has been conducted to clear frequency bands to have the largest amount of spectrum available. A next step consists of conducting tenders for the 700 MHz and 2.5GHz bands and, with that, improve connectivity and speed in the provision of services.

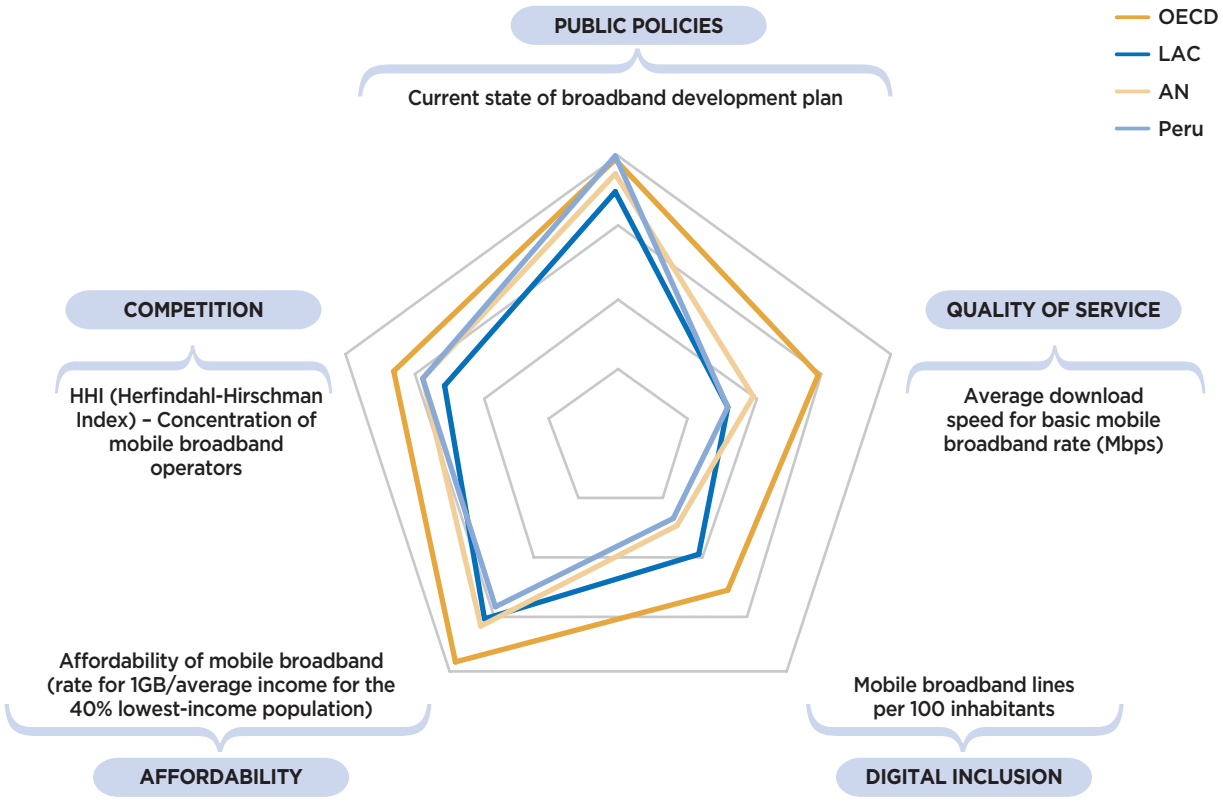
PERU

Legal and institutional framework for the ICT sector

Legal framework	Ordered Single Text of the "Telecommunications Law" (1993); Law 29904 – Law for the promotion of Broadband and the Construction of the National Fiber Optic Dorsal Network (2012) and its Regulations (2013)
Institution responsible for ICT public policies	Ministry of Transportation and Communications (MTC)
Regulatory authority	Supervisory Body for Private Investments in Telecommunications (OSIPTEL)
Competition authority	National Institute for the Defense of Competition and Intellectual Property Protection (INDECOPI)

Assessment of the ICT sector[a]

Performance comparison with the Andean countries (AN), the region (LAC), and OECD:



[a] https://publications.iadb.org/handle/11319/8193?locale-attribute=pt&.

Regulatory gap[a]

Legal and institutional framework	Peru	AN	LAC
Updated ICT, telecommunications, and broadband laws	●	●	●
Ministry/vice ministry specialized in ICT public policies	●	●	●
Institutional independence of the national ICT regulatory authority	●	●	●

Regulation of infrastructure development and access	Peru	AN	LAC
Assignment of radioelectric spectrum to mobile broadband	●	●	●
Analog switch-off after the transition from analog TV to digital TV	●	●	●
Use of the Universal Service Fund to deploy broadband	●	●	●
Regulation of infrastructure sharing	●	●	●

Regulation of competition and consumer protection	Peru	AN	LAC
Competition (concentration of broadband markets)	●	●	●
Internet exchange point between telecommunications operators' networks	●	●	●
Regulation of access and interconnection of operators' networks	●	●	●
Regulation of national roaming among mobile operators	●	●	●
Regulation of number portability from one operator to another	●	●	●
Regulation of monitoring of telecommunications quality of service	●	●	●
Regulation of telecommunications customer data protection	●	●	●

Public policies for the digital economy	Peru	AN	LAC
Updated national digital strategy	●	●	●
Updated national broadband plan	●	●	●
Updated open government action plan	●	●	●

● Delayed in compliance ● In the process of complying ● Compliant or in advanced level of compliance

[a] For more information, see Annex 2.

Identified limitations

- **Structural limitations in the institutional framework, which are frequently linked to the telecommunications sector.** Reforming the institutional framework to establish an entity with a broader area of influence beyond the telecommunications sector would foster the growth of the country's digital economy.
- **Low broadband penetration.** The number of fixed and mobile broadband lines per 100 inhabitants in Peru is below the average for both LAC and OECD countries.
- **Less radioelectric spectrum assigned for the provision of mobile broadband services than is recommended by the ITU.** The radioelectric assigned is 23 percent and 17 percent of what is recommended by the ITU by 2015 and 2020, respectively.

Possible reforms

- **Create an institutional framework that responds to a convergent and digital environment.** In terms of policymaking bodies, study the restructuring of the Vice Ministry of Communications and extend its jurisdiction to the ICT sector.
- **Adjudicate regional broadband projects.** Once the dorsal fiber optic network is deployed, covering more than 13,000 kilometers and connecting Lima with the 22 region capitals and the 180 province capitals, the next step is to complete the adjudication of all regional projects to increase the capillarity of the broadband network to the interior areas of these regions.
- **Accelerate the assignment of radioelectric spectrum for mobile communications.** Considering the small amount of spectrum assigned for mobile communications, a larger amount of this resource should be assigned to mobile communications operators, enabling coverage to be expanded and quality of service improved.

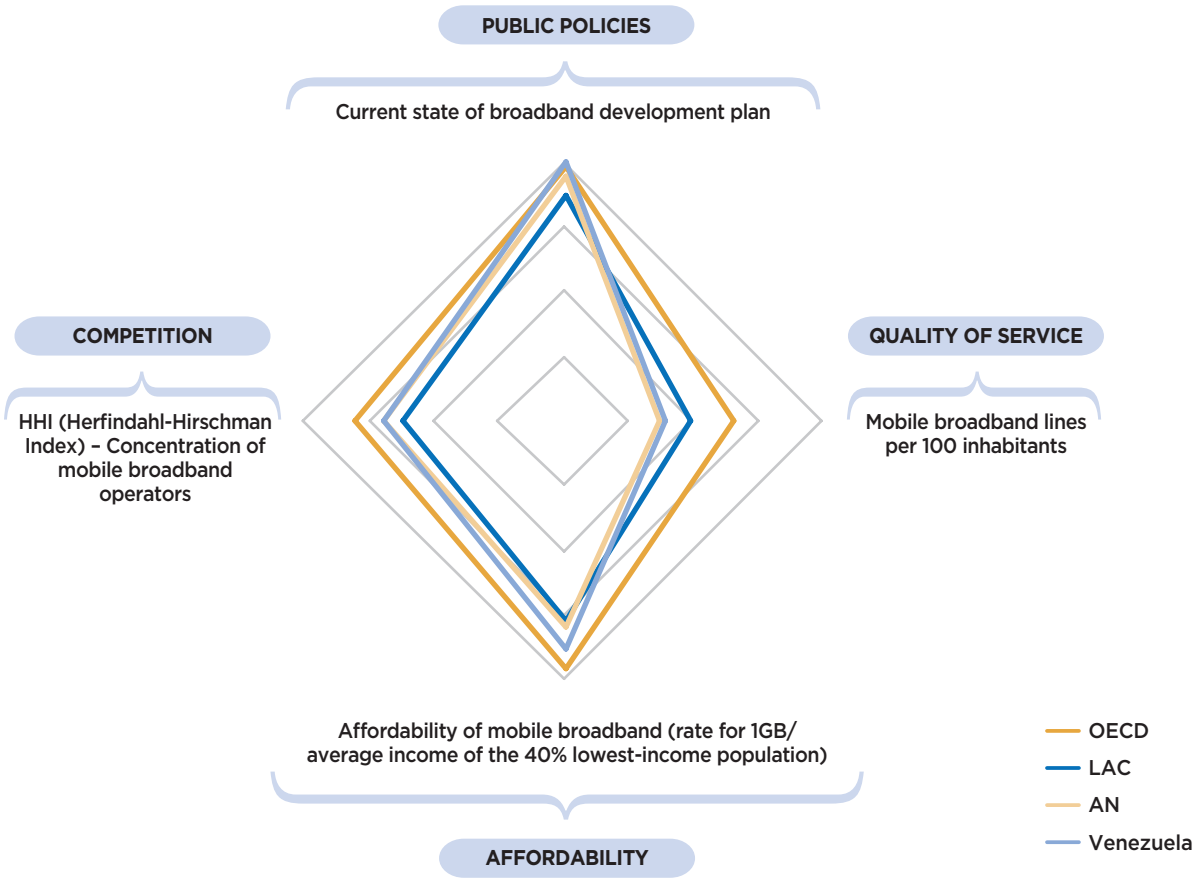
VENEZUELA

Legal and institutional framework for the ICT sector

Legal framework	General Telecommunications Law (2011)
Institution responsible for ICT public policies	Ministry of Popular Power for Communications and Information (MINCI)
Regulatory authority	National Telecommunications Commission of Venezuela (CONATEL)
Competition authority	Antitrust Superintendence

Assessment of the ICT sector[a]

Performance comparison with the Andean countries (AN), the region (LAC), and OECD:



[a] https://publications.iadb.org/handle/11319/8193?locale-attribute=pt&.

Regulatory gap[a]

Legal and institutional framework	Venezuela	AN	LAC
Updated ICT, telecommunications, and broadband laws	●	●	●
Ministry/vice ministry specialized in ICT public policies	●	●	●
Institutional independence of the national ICT regulatory authority	●	●	●

Regulation of infrastructure development and access	Venezuela	AN	LAC
Assignment of radioelectric spectrum to mobile broadband	●	●	●
Analog switch-off after the transition from analog TV to digital TV	●	●	●
Use of the Universal Service Fund to deploy broadband	●	●	●
Regulation of infrastructure sharing	●	●	●

Regulation of competition and consumer protection	Venezuela	AN	LAC
Competition (concentration of broadband markets)	●	●	●
Internet exchange point between telecommunications operators' networks	●	●	●
Regulation of access and interconnection of operators' networks	●	●	●
Regulation of national roaming among mobile operators	●	●	●
Regulation of number portability from one operator to another	●	●	●
Regulation of monitoring of telecommunications quality of service	●	●	●
Regulation of telecommunications customer data protection	●	●	●

Public policies for the digital economy	Venezuela	AN	LAC
Updated national digital strategy	●	●	●
Updated national broadband plan	●	●	●
Updated open government action plan	●	●	●

● Delayed in compliance ● In the process of complying ● Compliant or in advanced level of compliance

[a] For more information, see Annex 2.

Identified limitations

- **Limited regulatory framework for the protection of user data.** Even though the Constitution recognizes applicable principles for the protection of personal data, such as safeguarding honor, privacy, intimacy, public image, confidentiality, and reputation, as well as access to information, there are no telecommunications laws or regulations for data protection.
- **Less radioelectric spectrum assigned for the provision of mobile broadband services than is recommended by the ITU.** Only 25 percent of the radioelectric spectrum that the ITU recommended by 2015 and only 20 percent of spectrum it recommends by 2020 have been assigned.
- **Lack of internet exchange infrastructure between telecommunications operators' networks.** There is no IXP between networks, for which operators must either reach multiple bilateral agreements for data traffic exchange or carry traffic to an IXP outside the country for exchange, with the inefficiencies and costs that this entails.

Possible reforms

- **Carry out a public consultation and approve regulations on consumer data protection.** Draft, submit for public consultation and approve regulations to protect the personal data of telecommunications service users. This would regulate the personal data requirements by telecommunications service providers for those requesting services, as well as the treatment of such data by operators.
- **Accelerate the assignment of radioelectric spectrum.** Considering the small amount of spectrum assigned for mobile communications, the assignment of a greater amount of this resource to mobile communications operators is required, which would expand coverage and improve the quality of service.
- **Create an internet exchange point between networks.** Create an IXP to improve the quality of service for final users (particularly in latency reduction) and reduce costs to telecommunications service providers (mainly in international traffic).

Annex 1
Comparative Analysis Parameters for Digital Development

- **Current state of plans for broadband development (measured on a scale of 1–8):** Measures the extent to which the government has developed a national broadband plan. An evaluation will be conducted for each country on whether it has an official broadband plan; if broadband appears in plans, agendas and others, but is not strictly addressed under an official plan; if broadband is in the analysis stage; or if broadband is completely absent. 1: Countries where broadband is absent; 3.33: Countries with broadband in the analysis stage; 5.66: Countries with broadband in plans, agendas, and others, but without a national broadband plan; and 8: Countries with a national broadband plan.
- **Average download speed for basic mobile broadband rates (Mbps):** Mobile broadband speed (wireless) is the minimum download speed announced (Mbps) and does not involve guaranteed speeds for users and monthly mobile broadband internet subscribers (wireless). This speed is the average provided by the ITU for postpaid and prepaid 500MB rates for mobile devices when both data points exist. If not, the value available, either postpaid or prepaid, is considered.
- **Mobile broadband lines per 100 inhabitants (percent):** Mobile broadband subscribers are the number of subscribers to satellite broadband added to wireless land broadband and to mobile cellular networks with access to data transmission (e.g., internet) at announced broadband download speeds above 256kps. In the case of cellular mobile broadband, only active accounts are included (i.e., those accounts with at least one access to the web over the past three months or with a dedicated data plan rate). The service can be through a dongle or as an add-on to a voice plan. This indicator does not include Wi-Fi subscribers. Both residential and commercial subscriptions are considered. The number of mobile broadband subscribers per 100 inhabitants is calculated by dividing the number of mobile broadband subscribers by the number of total inhabitants and then multiplying the result by 100.
- **Affordability of mobile broadband (rate for 1GB/average income of the bottom 40 percent of income earners) (percent):** The affordability index for mobile broadband is the percentage of the average income for the bottom 40 percent of income earners to access mobile broadband with a 1GB maximum consumption (and a basic rate for voice service in the case of the 26 IDB member countries). This is calculated by dividing the average rate for services with these characteristics by the

average income of the bottom 40 percent of income earners. This income is calculated by applying the sum of two World Bank variables—the participation level of the 20 percent poorest segment and the second 20 percent poorest—to the monthly average income obtained from the per capita GDP data supplied by the World Bank.

- **Herfindahl-Hirschman Index (HHI) – Concentration of mobile broadband operators (measured on a scale of 1–8):** The concentration of mobile broadband operators is calculated using the HHI, which measures the size of companies in relation to the market in which they operate. It is calculated by adding the market shares of each operator squared. Furthermore, according to Katz (2012), a classification is conducted based on the value obtained. If it is below 3,000 it is classified as a highly competitive market and granted a higher point score, equal to 8. If the HHI value is between 3,000 and 5,000, it is a moderately competitive market and given a score of 5.66, while a result above 5,000 is considered a concentrated market and given a score of 3.33. Finally, if there is only one operator, the market is considered a monopoly for the incumbent operator and given the lowest score, which is 1.

Annex 2
Analysis of Evaluation Criteria for Regulatory Gaps[20]

TABLE A2.1 Legal and Institutional Framework

	Delayed in compliance	In the process of complying	Compliant or in advanced level of compliance
Updated laws for ICT, telecommunications, and broadband	Laws approved more than 10 years ago	Laws in the process of being updated	Laws approved in the past 10 years
Ministry/vice ministry specialized in ICT public policies	Other ministries	In the process of creating an ICT ministry/vice ministry	ICT ministry/vice ministry
Institutional independence of the **national ICT regulatory authority**	Part of the ministry	In the process of reforming/ separating the ministry	Not part of the ministry

TABLE A2.2 Regulation of Infrastructure Development and Access

	Delayed in compliance	In the process of complying	Compliant or in advanced level of compliance
Assignment of **radioelectric spectrum** to mobile broadband	Less than a third of the spectrum recommended by the ITU assigned for mobile broadband in 2020	Spectrum tenders underway or conducted recently	More than a third of the spectrum recommended by the ITU assigned for mobile broadband in 2020
Analog switch-off after the transition from analog TV to digital TV	Planned for 2020 or later, or not planned (or without evidence)	Planned for before 2020	Completed
Use of the **Universal Service Fund** to deploy broadband	Not established or not used for broadband projects (or without evidence)	Established and used in a limited manner or underway	Established and used regularly
Regulation of **infrastructure sharing**	Not regulated (or without evidence)	In the process of regulation	Regulated

[20] To evaluate the development of countries in each category, the following resources were used: Broadband Development Index (García Zaballos and Iglesias Rodríguez, 2017); OECD and IDB (2016); Telegeography (http://www.internetexchangemap.com); and corporate web pages of sectoral institutions in each country.

TABLE A2.3 Regulation of Competition and Consumer Protection

	Delayed in compliance	In the process of complying	Compliant or in advanced level of compliance
Competition (concentration of broadband markets)	Average mobile and fixed broadband market concentration (HHI) score between 1 and 3.9	Average mobile and fixed broadband market concentration (HHI) score between 4 and 6.9	Average mobile and fixed broadband market concentration (HHI) score between 7 and 8
Internet exchange point between telecommunications operators' networks	Not created (or without evidence)	In the process of creation	Created
Regulation of **access and interconnection** of operators' networks	Not regulated (or without evidence)	In the process of regulation	Regulated
Regulation of **national roaming** among mobile operators	Not regulated (or without evidence)	In the process of regulation	Regulated
Regulation of **number portability** from one operator to another	Not regulated (or without evidence)	In the process of regulation	Regulated fixed and mobile
Regulation of monitoring of telecommunications **quality of service**	Not monitored and published (or without evidence)	In the process of implementation	Monitored and published
Regulation of telecommunications customer **data protection**	Limited regulation and application (or without evidence)	Moderate regulation and application or in the process of reform	Robust regulation and application

TABLE A2.4 Public Policies for the Digital Economy

Public policies for the digital economy	Delayed in compliance	In the process of complying	Compliant or in advanced level of compliance
Updated national **digital strategy**	Not in effect (or without evidence)	In the preparation process	In effect
Updated **national broadband plan**	Not in effect (or without evidence)	In the preparation process	In effect
Updated **open government** action plan	First Action Plan approved (or without evidence)	Second Action Plan approved	Third Action Plan approved

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