OECD Telecommunication and Broadcasting Review of Brazil 2020

OECD

OECD Telecommunication and Broadcasting Review of Brazil 2020

Please cite this publication as:
OECD (2020), *OECD Telecommunication and Broadcasting Review of Brazil 2020*, OECD Publishing, Paris, *https://doi.org/10.1787/30ab8568-en*.

ISBN 978-92-64-31744-4 (print)
ISBN 978-92-64-93255-5 (pdf)

Photo credits: Cover © Sarunyu_foto/Shutterstock; © ElenVD/Shutterstock.

Corrigenda to publications may be found on line at: *www.oecd.org/about/publishing/corrigenda.htm*.

Foreword

The OECD Directorate for Science, Technology and Innovation (DSTI) carried out this study under the auspices of the Committee on Digital Economy Policy (CDEP) and the Working Party of Communication Infrastructures and Services Policy (WPCISP). The Government of Brazil requested the study through the Ministry of Science, Technology and Innovation (Ministério da Ciência, Tecnologia, Inovações e Comunicações, MCTIC)[1] and the National Telecommunications Agency (Agência Nacional de Telecomunicações, Anatel). Both entities represent Brazil at the CDEP and the WPCISP.

The *OECD Telecommunication and Broadcasting Review of Brazil* draws on responses by the Brazilian authorities to a questionnaire and on the results of an extensive series of interviews with major communication stakeholders. The WPCISP reviewed the report on 29 May 2020, with Camilla Bustani and Claire Lyons (United Kingdom), and Jonathan Levy and Tracey Weisler (United States) as lead peer reviewers. It was finalised on 5 June 2020, and reflects developments in the institutional framework in Brazil up to that time.

The drafting team for the report included the OECD Secretariat, as well as the following external experts: Pablo Márquez and Diana Castiblanco Narváez, both from the firm Márquez, Barrera, Castañeda & Ramírez (Colombia); Ernesto Flores-Roux, associate professor at Centro de Investigación y Docencia Económicas (Mexico); and Scott Marcus, senior fellow at Bruegel (Belgium). The OECD team comprised Verena Weber, Lorrayne Porciuncula, Alexia González Fanfalone, Maximilian Reisch and Frédéric Bourassa from the Digital Economy Policy Division, headed by Audrey Plonk under the overall direction of Andrew Wyckoff, Director of Science, Technology and Innovation. This publication also benefited from contributions by Jeremy West and Sarah Ferguson at the Digital Economy Policy Division (OECD). In addition, the chapter on taxation benefited from the review by Bert Brys and his team at the OECD Centre for Tax Policy. Mark Foss, Angela Gosmann and the OECD Public Affairs and Communications Directorate undertook editorial work. The team acknowledges our delegates from the WPCISP, chaired by Bengt Mölleryd (Sweden), for their guidance and contributions.

The review was made possible by support from MCTIC and Anatel and their staff who kindly replied to questionnaires, received the review team for meetings, organised an extensive series of interviews with major stakeholders and contributed their valuable input to the draft of this publication. The OECD Secretariat wishes to thank Vitor Elisio Góes De Oliveira Menezes, Secretary of Telecommunication at MCTIC; Chairman Leonardo Euler de Morais, President of Anatel; and their staff, in particular Artur Coimbra De Oliveira, Helio Mauricio Miranda da Fonseca from MCTIC and Taís Maldonado Niffinegger and Victor Muniz Estevam Dias from Anatel. The OECD also wishes to acknowledge the assistance of the Brazilian Delegation to International Economic Organizations in Paris for its support.[2]

[1] On 10 June 2020, the President of Brazil announced the recreation of the Ministry of Communications (MC), which had existed prior to 2016, when it became MCTIC. At the moment of finalising this report, the implications of this newly re-created ministry for the overall institutional framework where still being discussed in Brazil. The present report only reflects changes in the institutional framework up to 5 June 2020.

[2] On 15 May 2020, the OECD Council invited Costa Rica to become a Member. At the time of preparation of this publication, the deposit of Costa Rica's instrument of accession to the OECD Convention was pending and therefore Costa Rica does not appear in the list of OECD Members and is not included in the OECD zone aggregates reported.

Table of Contents

Tables

Figures

Boxes

List of acronyms, abbreviations and units of measure

ABC	Brazilian Cooperation Agency *Agência Brasileira de Cooperação*
ABERT	Brazilian Association for Radio and TV Broadcasting *Associação Brasileira de Emissoras de Rádio e Televisão*
AICE	Special Class Individual Access *Acesso Individual de Classe Especial (Telefone Popular)*
Anatel	National Telecommunications Agency *Agência Nacional de Telecomunicações*
Ancine	National Film Agency *Agência Nacional do Cinema*
BCPS	Brazilian Competition Policy System
BDAC	Broadband Deployment Advisory Committee (United States)
BRL	Brazilian real
BU-LRIC	Bottom-up long run incremental costs model
CADE	Administrative Council for Economic Defense *Conselho Administrativo de Defesa Econômica*
CAGR	Compound annual growth rate
CBT	Brazilian Telecommunication Code *Código Brasileiro de Telecomunicações*
CDUST	Consumer Protection Committee *Comitê de Defesa dos Usuários de Serviços de Telecomunicações*
CFRP	Contribution to Foster Public Broadcasting *Contribuição para o Fomento da Radiodifusão pública*
CGI.br	Brazilian Internet Steering Committee *Comitê Gestor da Internet no Brasil*
CITEL	Inter-American Telecommunications Commission
COFINS	Contribution for the Financing of Social Security *Contribuição para o Financiamento da Seguridade Social*
CONAR	Self-Regulatory Advertising Council *Conselho Nacional de Autorregulamentação Publicitária*
CONDECINE	Audio-visual Fund to Foster Development of the National Film Industry *Contribuição para o Desenvolvimento da Indústria Cinematográfica Nacional*
CONFAZ	Brazilian National Council of Finance Policy *Conselho Nacional de Política Fazendária*

CSLL	Social Contribution on Net Income *Contribuição Social sobre o Lucro Líquido*
DPDC	Department of Consumer Protection and Defense *Departamento de Proteção e Defesa do Consumidor*
DRU	Untying of Union Revenues *Desvinculação de Receitas da União*
DTH	Direct-to-home
DTT	Digital terrestrial television
DTV	Digital TV
EAD	Entidade Administradora do Processo de Redistribuição e Digitalização dos Canais de TV e RTV
EECC	European Electronic Communications Code
EBC	Empresa Brasil de Comunicação
FCA-HCA	Fully allocated costs – historical cost accounting model
FCC	Federal Communications Commission
FDI	Foreign direct investment
FISTEL	Telecommunications Oversight Fund *Fundo de Fiscalização das Telecomunicações*
FNC	National Culture Fund *Fundo Nacional de Cultura*
FNDCT	Science and Technology Fund *Fundo Nacional de Desenvolvimento Científico e Tecnológico*
FSA	Audio-visual Sectoral Fund *Fundo Setorial do Audiovisual*
FTA	Free-to-air
FTTH	Fibre-to-the-home
FUNTTEL	Telecommunications Technological Development Fund *Fundo para o Desenvolvimento Tecnológico das Telecomunicações*
FUST	Universal Service Fund *Fundo de Universalização dos Serviços de Telecomunicações*
GB	Gigabyte
Gbps	Gigabits per second
GDP	Gross domestic product
GESAC	Electronic Government Service for Citizens *Governo Eletrônico – Servico de tendimento ao Cidadão*
GHz	Gigahertz
HHI	Herfindahl-Hirschman Index
IARC	International Age Rating Coalition

ICMS	Tax on telecommunication services *Imposto sobre Circulação de Mercadorias e Serviços*
ICT	Information and communication technologies
IFT	Federal Telecommunications Institute *Instituto Federal de Telecomunicaciones*
IRP	Imposto sobre Renda de Pessoa Jurídica
ISP	Internet service provider
ITA	Information Technology Agreement
ITU	International Telecommunications Union
IXP	Internet exchange point
kA	Kiloampere
kbps	Kilobits per second
km	Kilometre
km^2	Square kilometre
LAC	Latin America and Caribbean
LGT	General Telecommunications Law *Lei Geral de Telecomunicações*
LDC	Brazilian Competition Law *Lei Brasileira de Defesa da Concorrência*
LOA	Annual Budget Law *Lei Orçamentária Annual*
M2M	Machine-to-machine
Mbit	Megabit
Mbps	Megabits per second
MCTIC	Ministry of Science, Technology and Innovation *Ministério da Ciência, Tecnologia, Inovações e Comunicações*
MHz	Megahertz
MNO	Mobile network operator
MP	Public Prosecutor's Office *Ministério Público*
MPF	Federal Prosecutor's Office *Ministério Público Federal*
MPU	Federal Prosecutor's Office *Ministério Público da União*
ms	millisecond
MTR	Mobile termination rates
MVNO	Mobile virtual network operators

MW	Medium wave
NIC.br	Brazilian Network Information Centre *Núcleo de Informação e Coordenação*
OTT	Over-the-top
PASEP	Public Service Employee Savings Programme *Programa de Formação do Patrimônio do Servidor Público*
PASTE	Programme for Restoration and Expansion of the Telecommunications System and Postal System *Programa de Recuperação e Ampliação do Sistema de Telecomunicações e do Sistema Postal*
PERT	Telecommunication Networks Structural Plan *Plano Estrutural de Redes de Telecomunicações*
PGMU	Universal Service Plan *Plano Geral de Metas de Universalização*
PGO	General Concession Plan *Plano Geral de Outorgas*
PIS	Social Integration Programme *Programa de Integração Social*
PNO	National Broadcasting Licensing Plan *Plano Nacional de Outorgas*
PPDUR	Public Price for the Right to Use Radio Frequencies *Preço Público pelo Direito de Uso de Radiofrequências*
PPP	Purchasing power parity
PRO	Public Reference Offers
PROCONs	Local departments for consumer protection *Procuradorias de Proteção e Defesa do Consumidor estaduais ou municipais*
PRODECINE	Programme for Support to the Development of the National Cinema *Programa de Apoio ao Desenvolvimento do Cinema Nacional*
PSB	Public service broadcasters
QoS	Quality of service
RAN	Radio Access Network
REPNBL-Redes	Special taxation regime of the National Broadband Programme for the deployment of telecommunication networks *Regime Especial de Tributação do Programa Nacional de Banda Larga para Implantação de Redes de Telecomunicações*
RGI	General Interconnection Rules *Regulamento Geral de Interconexão*
RIA	Regulatory impact assessment

RNP	National Education and Research Network *Rede Nacional de Ensino e Pesquisa*
RNPC	National Public Communication Network *Rede Nacional de Comunicação Pública*
RpTV	Television signal repetition *Repetição de televisão*
RTV	Television retransmission *Retransmissão de televisão*
SACP	System for Accompanying Public Consultations *Sistema de Acompanhamento de Consultas Públicas*
SCM	Multimedia communication service *Serviço de Comunicação Multimídia*
SeAC	Pay TV law *Lei do Serviço de Acesso Condicionado*
SEAE	Secretariat of Competition Advocacy and Competitiveness *Secretaria de Advocacia da Concorrência e Competitividade*
Senacon	National Consumers Secretariat *A Secretaria Nacional do Consumidor*
SGDC	Geostationary Defence and Strategic Communication Satellite *Satélite Geoestacionário de Defesa e Comunicações Estratégicas*
Sindec	National Information System for Consumer Protection *Sistema Nacional de Informações de Defesa do Consumidor*
SME	Specialised Mobile Service *Serviço Móvel Especializado*
SMP	Mobile telephony *Serviço Móvel Pessoal*
STF	Federal Supreme Court *Supremo Tribunal Federal*
STFC	Fixed telephony services *Serviço Telefônico Fixo Comutado*
SNOA	Wholesale Offers Negotiating System Sistema de Negociação de Ofertas de Atacado
SVA	Value-added service *Serviço de valor adicionado*
TAC	Conduct Adjustment Agreement *Termos de Compromisso de Ajustamento de Conduta*
Tbps	Terabits per second
TCP/IP	Transmission Control Protocol/Internet Protocol
TFF	Operational fee *Taxa de Fiscalização de Funcionamento*

TFI	Installation fee *Taxa de Fiscalização de Instalação*
TUC	Federal Court of Accounts *Tribunal de Contas da União*
TW	Tropical wave
USD	United States dollar
USD PPP	United States dollar in purchasing power parity
VHF	Very high frequency
VoD	Video-on-demand
WCIT-12	2012 World Congress on Information Technology in Dubai
WTO	World Trade Organization

Executive summary

High-quality communication services at competitive prices are the backbone of the digital transformation of the Brazilian economy. The *OECD Telecommunication and Broadcasting Review of Brazil 2020* analyses market performance of the communication and broadcasting sectors, as well as underlying policies and regulations. Based on its findings, the report recommends actions in five key areas: improving the policy and regulatory framework; overhauling the taxation, fees and tariff framework; improving market conditions; fostering competition in communication and broadcasting markets; and strengthening national policies and evidence-based policy making. These should be approached simultaneously for a holistic approach to reform.

Findings

Brazil's geography creates a challenge for inclusive digital transformation. With its 8.5 million square kilometres, Brazil is nearly eight times the size of France and Spain combined, while comprising 60% of the Amazon forest within its borders. In addition, a large percentage of the population is sparsely distributed. This makes it difficult to expand communication networks into rural and remote areas. Subscriptions to communication services in Brazil have continued to increase, however, the country still lags behind the OECD average in a number of key indicators such as fixed and mobile broadband penetration and quality of service.

Brazil has strengthened its legal and regulatory communication framework in recent years. The government has clearly understood the need for regulatory reform, a sound institutional framework and effective competition in the country. It has made strides to strengthen the independence of the communication regulator, and incorporated other reforms that are best practice in the OECD, such as issuing wholesale measures to promote competition in mobile markets.

Brazil's institutional structure for Internet governance is a strength. CGI.br, the Brazilian Internet Steering Committee (Comitê Gestor da Internet), co-ordinates and integrates Internet service initiatives in Brazil. It has been an example of best practice of multi-stakeholder institutional arrangements in the Internet ecosystem.

Free-to-air broadcasting television remains the audio-visual medium that reaches the most people and the greatest distance. Brazil has enacted legislation to strengthen domestic content in its cinema in the past decade. As a result, audio-visual content production has intensified over the last ten years.

Several important weaknesses, however, persist that call for regulatory reform. Areas for action include the high level of taxes and fees for communication services; the lack of an institutional design adapted to an increasingly convergent environment; the personal liability of public servants that may dissuade high calibre candidates from joining the public service and lead to overly cautious regulations; and a complex licensing regime that raises barriers to market entry and may lead to regulatory arbitrage, among other areas.

Recommendations

Adapting the policy and regulatory framework to a convergent environment

The creation of a converged, independent regulator would help simplify the regulatory regime and address the new convergent reality. A single entity should assign spectrum for broadcasting and communication services. To ease market entry, and to adapt the legal framework to convergence, a simple class-licensing regime for communication and broadcasting services would be advisable. In addition, Brazil should remove legal restrictions on the vertical integration of the pay TV value chain and cross-ownership between telecommunication and pay TV services on both foreign and domestic service providers. The assessment of vertical mergers should be conducted on a case-to-case basis.

Overhauling the taxation, fees and tariff framework

Brazil should harmonise its tax on communication services across states and reduce them where possible. A single-class licensing regime would minimise legal costs, administrative burdens and the potential for tax arbitrage. In the long run, Brazil should pursue efforts for a fundamental reform of the indirect tax framework to reduce distortions caused by the current indirect tax treatment.

Improving market conditions

Brazil should reduce barriers to entry for communication providers as much as possible. These efforts should further ensure fair and non-discriminatory access to ducts, poles and rights of way. Brazil should also continue to reduce costs of infrastructure deployment through dig-once policies and streamlining rights of way. As it monitors competition in the market, the government should encourage communication providers to share passive infrastructure. It should also further increase backhaul connectivity, and promote open wholesale access models. Efficient spectrum management is key to facing the increased demand on communication networks. Brazil should closely monitor the effects of recent legal reform of successive renewal of spectrum licences on market entry and competition in mobile markets. In particular, Brazil should carefully design the upcoming 5G auction given its implications for the competitive dynamics of the market.

Fostering competition in communication and broadcasting markets

Brazil should embrace recommendations from the OECD's recent peer review of competition policy. It should remove the 20% threshold for market share as a proxy for market power from the competition law.

Strengthening national policies and evidence-based policy making

Brazil should expand broadband networks and services, establishing targets for the Connected Brazil Programme and others. It should help entities across different levels of government (national, state and municipal) work together to implement broadband connectivity initiatives. Fostering investment in infrastructure to bridge the digital divide would help expand high-quality broadband networks to underserved regions. Finally, it should promote inclusive and forward-looking audio-visual public policies, while improving data collection for evidence-based policy making.

1. Recommendations

This chapter summarises policies analysed in subsequent chapters and provides a general assessment of strengths and weaknesses of the Brazilian communication and broadcasting frameworks. It provides insights on potential benefits of further public policy initiatives and of regulatory reform. These include recommendations on how to improve the institutional and regulatory framework; overhaul and the taxation, fees and tariff framework; improve market conditions; foster competition in communication and broadcasting markets; and strengthen national policies and evidence-based policy making.

Assessment of the Brazilian communication and broadcasting frameworks

Introduction

Effective communication and broadcasting sectors are the backbone of the digital transformation of the Brazilian economy. Without connectivity, there is no digital transformation. Design of policies and regulation for the communication[1] and broadcasting sectors in Brazil should pursue the overarching objective of increasing access to high-quality communication and broadcasting services at competitive prices. To achieve this objective, the assessment recommends a set of policies and regulations clustered into the following key areas:

- improving the legal and regulatory framework by strengthening institutions and adapting them to a convergent environment
- overhauling the taxation and fees framework for the communication and broadcasting sectors
- improving market conditions
- fostering competition in communication and broadcasting markets
- strengthening national policies and evidence-based policy making.

Strengths

Brazil has strengthened its legal and regulatory communication framework in recent years (Box 1.1). As the main strength of Brazil's communication policy and regulation, the government has clearly understood the need for: i) regulatory reform; ii) a sound institutional framework; and iii) effective competition in the country.

Brazil has made strides to strengthen the independence of the communication regulator, but further improvements can be made. The regulatory framework, including the reform in October of 2019, incorporates many regulatory instruments that are best practice in OECD countries. For example, Brazilian authorities have issued measures to promote competition in mobile markets, such as lowering termination rates. In addition, the regulator has implemented asymmetric measures in wholesale communication markets for players with significant market power through the General Competition Plan (Plano Geral de Metas de Competição).

To foster competition, a separate authority complements the National Telecommunications Agency (Agência Nacional de Telecomunicações, Anatel) in competition issues. This allows for a second review to ensure that communication operators do not act against competition law. This other body, the Administrative Council for Economic Defence (Conselho Administrativo de Defesa Econômica, CADE), in charge of competition law enforcement, has adjudication powers to prevent anticompetitive conduct from harming any market, including communication markets.

Brazil's institutional structure for Internet governance is another strength. CGI.br, the Brazilian Internet Steering Committee (Comitê Gestor da Internet) co-ordinates and integrates Internet service initiatives in Brazil. It has been an example of best practice of multi-stakeholder institutional arrangements in the Internet ecosystem.

As one of the interesting features of Brazilian Internet infrastructure management, revenues from the domain name registration (under CGI.br) fund improvements in Internet management and infrastructure. Among others, this includes programmes to enhance traffic management and exchange; to measure the quality and use of broadband connections; and to support

IPv6 adoption. Within CGI, CETIC.br has made important contributions to improve data collection of Internet use among firms, individuals and Internet service providers (ISPs).

In the mobile communication market, Brazil has made significant progress in spectrum management, including planning and assignment. In particular, the regulator uses market-based auction mechanisms for spectrum assignment, which is best practice among OECD countries. Furthermore, the use of spectrum caps and coverage obligations in auctions has helped promote competition, while improving network coverage. As a result, Brazil's mobile market is less concentrated than the markets of peer countries in Latin America.

Communication regulators in OECD countries widely accept that mobile termination rates – the wholesale interconnection tariff paid by one network to terminate calls in another – can substantially favour larger operators if these rates are set above efficient costs.[2] Brazil transitioned from having one of the highest mobile termination rates compared to OECD countries to a country with a rate lower than the OECD average. The reduction of these rates improves market conditions as it eases market entry, and fosters competition and innovation in mobile services. This is also reflected in prices for mobile communication services, which are quite affordable compared to OECD average prices.

For broadcasting services, free-to-air (FTA) broadcasting television remains the audio-visual medium with the highest reach in Brazil in terms of geographic coverage and population usage. Brazil has enacted legislation to strengthen local content in its cinema in the past decade. As a result, among other factors, production of local audio-visual content has intensified over the last ten years.

Box 1.1. Strengths of Brazil's communication and broadcasting frameworks

- Anatel was legally conceived as an independent regulatory agency for communication markets, with administrative independence, absence of subordination, stability of its directive members and financial autonomy.
- Competition law institutions in Brazil are generally sound and have made important contributions to the development of competition law in Latin America during the past decade.
- Brazil has a strong Internet governance framework through CGI.br, and has improved Internet Protocol interconnection through multiple Internet exchange points around the country.
- Anatel has managed to reduce mobile termination rates, passing from the highest prices among OECD countries in 2014 to termination rates lower than the OECD average.
- Free-to-air broadcasting television remains the audio-visual medium with the highest reach in Brazil (i.e. reaching practically 100% of municipalities), and efforts around promoting local audio-visual content resulted in more domestic production between 2007 and 2017.

Weaknesses

Despite the strengths of Brazil's communication policy and regulatory framework, some weaknesses persist that call for regulatory reform (Box 1.2).

One important weakness is the high level of taxes and fees applied to the communication sector. These may directly affect prices of communication services and can impact investments for the deployment of communication infrastructure. For example, overall taxes and fees in Brazil represent a tax burden of around 40.2% for prices of fixed and mobile broadband services (Anatel, 2020[1]). As connectivity is a foundational pillar of the digital transformation, lowering fees and taxes in the market will have positive spillover effects in other sectors of the Brazilian economy. This can only be addressed through a holistic overhaul of the fiscal framework.

In terms of institutional design, Anatel has been conceived as an independent regulatory agency, but several issues undermine its independence. These are related to budgetary independence, *ex ante* advice from the Federal Court of Accounts (Tribunal de Contas da União, TCU) and the liability of public servants. Budgetary independence is important to safeguard autonomous decision making of the regulator. With respect to liability, public servants are currently held *personally* liable in Brazil. While public servants should be professionally accountable, this should not extend to personal liability. Holding public servants liable through personal lawsuits as a result of regulatory action is not common practice in OECD countries. It can have several negative effects on multiple levels. For example, it may dissuade highly qualified professionals from taking-up public office. In addition, it may encourage public servants to take inadequate regulatory decisions to minimise the threat of lawsuits.

For pay TV, the regulatory mandate is currently split between Anatel and the National Film Agency (Agência Nacional do Cinema, Ancine). For FTA broadcasting, regulatory and policy-making roles fall under the responsibility of the Ministry of Science, Technology and Innovation (Ministério da Ciência, Tecnologia, Inovações e Comunicações, MCTIC).

As technology evolves, network convergence blurs the contours of previously separated sectors and markets (e.g. broadcasting and communication). This implies an increase in the provision of multiple services over multi-purpose communication networks, often in a bundle. In this context, multiple players and networks will likely provide voice, data and video services.

Consequently, a coherent regulatory framework adapted to a convergent environment is needed. As convergence gains momentum, both different licensing regimes for communication services and broadcasting, as well as separate agencies for communication and broadcasting, become anachronistic. This fragmentation further hinders the effective monitoring of developments in communication services and markets.

The creation of a converged regulator, established at arm's length from policy making, would help simplify the regulatory regime and address the new convergent reality. In this respect, spectrum assignments for both broadcasting and communication services would benefit from being conducted by a single entity.

Communication services are defined in multiple ways, which is also not adapted to a converged communication and broadcasting market. The existence of varied service definitions not only has negative impacts on market entry, but also renders the taxation system more complex as it may foster arbitrage to escape tax or regulatory burdens. Adopting a "unique licensing" approach that only requires registration would address this weakness and ease market entry.

As in other OECD countries, co-ordination to achieve policy objectives of the digital economy is becoming increasingly complex. Yet co-ordination among different levels of government to avoid gaps and overlapping functions is of paramount importance.

Box 1.2. Weaknesses of Brazil's communication and broadcasting regulatory frameworks

- High fees and special taxes in the communication sector severely impact the communication sector in Brazil. This raises the cost of communication services, compromising the sector's potential for innovation and investment. This, in turn, hinders adoption of communication services.
- The institutional framework is not well-adapted to convergent communication and broadcasting sectors. This includes the lack of a converged regulator with market regulation and monitoring responsibilities over communication, broadcasting (including pay TV) and emerging over-the-top (OTT) services.
- Multiple definitions for communication services create an artificial distinction between communication and broadcasting services, raising barriers to market entry and leading to taxation and regulatory arbitrage.
- The regulator's lack of budgetary consistency and independence, coupled with the control of the Federal Court of Accounts over some *ex ante* functions, potentially undermines Anatel's independence, limiting its capacity to carry out its functions.
- Consumer protection functions for telecommunication services still overlap, particularly between the National Telecommunications Agency (Agência Nacional de Telecomunicações, Anatel), the National Consumers Secretariat (Secretaria Nacional do Consumidor, Senacon) and local departments for consumer protection (Procuradorias de Proteção e Defesa do Consumidor estaduais ou municipais, Procons).
- No clear division exists between public policy and regulation for broadcasting and pay TV.
- A lack of data collection and monitoring of connectivity targets, and lack of monitoring of broadcasting markets, generally weaken the efficacy of policies.

Recommendations for the future

The following recommendations are based on the findings of this report, in conjunction with good practices in communication policy and regulation in OECD countries. These good practices are mostly drawn from solutions to challenges similar to those identified in Brazil presented throughout the review. The list does not provide recommendations in order of priority. It should instead be regarded as various elements of a holistic approach.

Improving the institutional and regulatory framework

Creating a converged regulator and separating policy from regulatory functions

Create a converged independent regulator overseeing the Brazilian communication and broadcasting sectors through a merger of the regulatory functions of Anatel, Ancine and MCTIC.

Multi-purpose Internet Protocol (IP)-based networks have enabled the provision of different services over the same network. As convergence progresses, and with the increase of bundling of communication services, it will be more challenging to distinguish operators according to the platforms upon which they deliver services. This will affect the clarity of regulators' roles given a potential duality among their functions. In the face of increasing convergence over IP networks, the institutional framework in Brazil is not well suited to oversee communication services effectively.

In the area of competition, for example, OECD's 2008 Review of the Regulatory Reform acknowledged the potential surge of impediments to competition derived from the institutional framework of the sector (OECD, 2008[2]). This was particularly true given the independence between telecommunication and broadcasting regulators that oversee different sectors that are converging.

With respect to broadcasting and pay TV services, multiple authorities are tasked with developing and implementing policy and regulation (e.g. MCTIC, Ancine and Anatel). The responsibilities of these different agencies are often intertwined and not well adapted to tackle the challenges inherent to a convergent environment. Furthermore, contrary to international best practices, there is no clear distinction between general policy formulation and the issuance of *ex ante* regulation in pay TV and broadcasting markets.

Regarding pay TV, understood in Brazil as a telecommunication service, the distinction between different activities in the value chain seems arbitrary. The pay TV law (known as SeAC), which assigns content programming and packaging to Ancine, and content distribution to Anatel, can create conflicting sectoral views. Under this framework, the conflict resolution mechanism is unclear in the event of divergent decisions from each sectoral regulator. Furthermore, it is not clearly defined which regulatory body should have oversight authority over the distribution of content over the Internet.

To strengthen the institutional framework, Brazil could create an independent convergent authority. This entity would oversee communication and broadcasting markets (including pay TV) and monitor evolving over-the-top (OTT) services. At the same time, it would keep an arm's length between regulation and policy making as suggested in the next recommendation.

The creation of such an entity would follow good international practice. An increasing number of OECD countries such as Australia, Hungary and the United Kingdom have merged their broadcasting and communication regulators (OECD, 2008[2]; OECD, 2017[3]).

In Brazil's case, the regulatory functions of Ancine and Anatel, as well as some regulatory powers of MCTIC over broadcasting, should be merged into this converged regulator. Should there be a need for a separate authority to foster national audio-visual content, Ancine could retain its public policy mandate in this area.

Nevertheless, the newly converged regulator should address all issues that affect *ex ante* competition in pay TV and FTA markets, such as must-carry/must-offer regulation and OTT services. On topics related to the remit of other authorities (e.g. public health, copyright issues), the convergent regulator could implement formal co-operation protocols.

In sum, a converged independent regulatory body should be entrusted with regulating the entire broadcasting and pay TV value chain under an integrated and coherent set of rules. These rules would ensure efficiency in the regulatory process and uniform application of the regulatory regime across public institutions. This, in turn, would create legal certainty for regulated entities.

Introduce a clear separation between policy making and regulation in the areas of broadcasting, pay TV and emerging OTT/video-on-demand.

OECD best practice is to distinguish clearly between policy making (i.e. providing the overall framework for the market) and regulation that translates this framework into the operational details needed for implementation. That is, the regulator should have commensurate powers to carry out its role and retain an arm's length from the government.

The institutional framework reflects the fragmentation in broadcasting and pay TV services regulation. Multiple authorities are tasked with develop and implement policy and regulation. These are primarily MCTIC, Ancine and Anatel, but others such as CADE manage *ex post* competition enforcement. Contrary to international best practices, there is no clear distinction between general policy formulation and the issuance of *ex ante* regulation to tackle market failures, promote competition and protect consumers (especially concerning OTT services).

General policy formulation for the broadcasting and pay TV sector should be primarily vested in MCTIC. However, an independent and accountable regulatory agency (ideally a converged regulator) should be in charge of all regulatory functions, such as the awarding of licences, the issuance of spectrum, and the application of the sanctioning regime. This entity should function without interference from the executive or legislative powers.

Combine all spectrum management functions (i.e. including allocation and assignment) in one regulatory entity (e.g. the converged regulator) to avoid concurrent powers.

Spectrum assignment and management in Brazil is complex, with concurrent powers in the area of broadcasting. As defined by law, Anatel is generally responsible for spectrum management in Brazil. However, when it comes to broadcasting services, Anatel is only in charge of spectrum allocation. Its licensing follows a complex structure as several other entities also participate in the process.

For broadcasting, the intertwining of responsibilities between multiple institutions is particularly cumbersome. For example, Anatel is responsible for spectrum allocation and provides technical studies for availability of channels and non-interference. Meanwhile, MCTIC, the President and Congress are in charge of the assignment process. This division of labour renders the process long, costly and inefficient. On average, it can take more than ten years to substantially modify an existing broadcasting licence in Brazil or to grant a new one.

Therefore, ideally, all regulatory functions regarding spectrum management, including licensing spectrum for broadcasting services, should be simplified and should lie solely within a converged regulator. If the creation of a converged regulator is not possible in the short- to medium-term, Anatel's functions should be broadened to include spectrum assignment for broadcasting services.

In the shorter term, for as long as Congress and the President take part in the broadcasting licence process, a rule of positive silence could be established. This rule would grant licences automatically after a certain period if Congress and/or the President remain silent.

With respect to auction design, the converged regulator should be able to define the different elements of the auction. The auction design should consider the policy objectives

of increasing coverage of communication networks, while enhancing competition in mobile markets. Coverage obligations can contribute to a broader coverage of the population in rural and remote areas. However, the extent of coverage obligations should not be an impediment for certain actors to bid in the auction. While designing auctions, the converged regulator should avoid imposing additional industrial policy obligations that may distort auction results or raise deployment costs.

Increasing the independence of the regulator and creating an independent oversight for regulatory impact assessments

> *Increase the independence of the sector – or converged – regulator to ensure that it can define its budget in an independent manner and enforce its decisions autonomously to fulfil its mission.*

To guarantee regulatory independence, the regulator must be the only entity overseeing the sector. Regulators require governance arrangements that ensure their effective functioning, preserve their integrity and allow effective achievement of their mandate. Furthermore, establishing the regulator with a degree of independence (both from those it regulates and from the government) can provide greater confidence and trust that regulatory decisions are made with integrity (OECD, 2014[4]). Ensuring adequate funding levels is of paramount importance in enabling the regulator to operate efficiently and to fulfil government objectives effectively (OECD, 2014[4]).

Financial independence should be guaranteed in all scenarios. In the absence of a new converged regulator, Anatel must be empowered to fulfil its mission and reduce market uncertainty. Despite improvements in Anatel's budget setting and stability since 2018, Anatel lacks direct and autonomous budgetary control over the sector fees directed at the specific purpose to fund the regulator (Telecommunications Oversight Fund [Fundo de Fiscalização das Telecomunicações, FISTEL]).

Therefore, Anatel's budget should be clearly defined and ring-fenced from the rest of government. This aims to minimise any ability or incentive for the government to use its budget for other purposes or to withhold it (i.e. for the sake of achieving fiscal balance with the agency's resources) (OECD, 2008[2]). Likewise, multi-annual budgets are preferable as they are less contingent to short-term political influences. Proposals in Congress to simplify sectoral funds should ensure the financial independence of Anatel (or the new converged regulator) so it can properly fulfil its mandate and implement regulation.

> *To promote an independent decision-making process on the part of the regulator, focus the important role of TCU on* ex post *assessments. Limit* ex ante *advice to the extent possible to balance the accountability framework and effective regulatory independence. Limit the personal liability of public servants.*

TCU's control is potentially undermining Anatel's independence, limiting its capacity to function properly. As the OECD noted in 2008, performance assessment by national audit offices can protect the public interest. However, the extent to which TCU *ex ante* assessment and advice is applied to the regulatory agencies in Brazil is unusual (OECD, 2008[2]).

According to the OECD Best Practice Principles on the Governance of Regulators, regulators should have enough autonomy to conduct their functions without interference from the Executive, Congress or Parliament. A clear framework for accountability needs to be balanced with the effective autonomy of the regulator. Certain prerogatives are essential to ensure the technicality, impartiality and predictability of the regulatory function (Moreira, 2004[5]).

Overall, TCU should refrain from imposing changes to regulatory decisions that are formally adequate and duly motivated.

Accountability is the other side of the coin of independence, and a balance is required between the two. Comprehensive accountability and transparency measures actively support good behaviour and performance by the regulator. These allow the legislature or another responsible authority to assess the regulator's performance (OECD, 2014[4]). A regulator is therefore accountable for its actions to the legislature. It should report regularly and publicly to the legislature on its objectives and the discharge of its functions. In addition, the judiciary should help ensure that the regulator operates within the powers attributed to it (OECD, 2014[4]).

However, while ensuring accountability of the regulator is crucial, it is not common practice in OECD countries to hold public servants personally liable for their actions. Brazil holds public servants liable through legal procedures against their personal wealth in case the regulatory measure is deemed inadequate. This may create the opposite of the intended effect. On the one hand, it may lead to lack of incentives for talented individuals to hold public office (e.g. heading regulatory agencies) due to inherent risks. On the other, once in office, public officials may seek to minimise the threat of lawsuits through their regulations instead of promoting social welfare. This would undermine the intended purpose of such mechanisms. Therefore, the personal liability of public servants should be limited, while ensuring proper accountability measures for the regulatory agency.

Establish an independent oversight body to review the regulatory impact assessments of different institutions, such as Anatel, Ancine or a future converged regulator.

Since 2007, Brazil has advanced in its regulatory policy agenda, particularly regarding regulatory agencies. For example, it initiated its Programme for the Strengthening of the Institutional Capacity for Regulatory Management and followed OECD recommendations made in 2008 (OECD, 2008[2]).

Anatel has led the way with its use of public consultation and regulatory impact assessments (RIAs), even before they were appropriately harmonised across the public administration in 2018 (Brazil, 2018[6]). However, Anatel could still improve regulatory practices.

Anatel has been the most active regulator in Brazil to promote RIAs. However, it has focused mainly on qualitative assessment and has little experience with quantitative assessment. Additionally, Anatel's information related to RIA implementation is difficult to access.

Overall, RIA reports should be consistent and readily accessible to the public. To that end, Brazil should establish an independent body to systematically review RIA reports of different institutions with regulatory roles, ensuring oversight and quality. This requires a "whole-of-government" approach and permanent co-ordination mechanisms and bodies that address policy coherence and strategic commitment in the long term (OECD, 2016[7]).

Many OECD countries have explicitly adopted such an approach for their RIA oversight bodies. Experience across the OECD suggests that such central oversight bodies are most effective if they: i) are independent from regulators (i.e. not closely tied to specific regulatory missions); ii) operate in accordance with a clear regulatory policy, endorsed at the political level; iii) operate horizontally (i.e. cut across government); iv) are staffed by experts (i.e. with information and capacity to exercise independent judgement); and v) are linked to administrative and budgetary authority (centres of government, finance ministries) (OECD, 2008[2]).

Establishing a converged regulatory and policy framework

> *To adapt the legal framework to a converging communication and broadcasting market, reform the legal framework to introduce a single-class licensing regime for communication and broadcasting services. Introduce a single licence to eliminate the differences between communication services categories (multimedia communication service, fixed telephony service, mobile telephony service, communication services classified as value-added service, pay TV and other broadcasting services).*

In light of increased convergence of communication services over IP networks, there is a need to overhaul the regulatory and policy framework, which has grown over time. Adapting the framework would allow market developments to be addressed holistically. At the same time, it would simplify the policy and regulatory framework and render it more transparent.

One key adaptation should consist in the introduction of a single-class licensing regime for communication and broadcasting services. Simplifying licensing would considerably reduce transaction costs, facilitate market entry and speed up the administrative processes for network deployment throughout Brazil. A single-class licence model based on a "registry" is one way to simplify the process. In this system, the company or legal entity interested in obtaining a licence agrees to reporting requirements and to operate under Anatel's regulations.

The regulation for individual licences in Brazil requires an authorisation for every type of communication service provided. It is therefore too burdensome for operators, creating artificial barriers to market entry. Anatel has taken steps in the right direction through Resolutions No. 719 and 720 of 2020. These aim to simplify the licence-granting procedure. However, the plurality of communication services subject to different regulations, fees and taxes raises barriers to entry in an increasingly convergent environment.

Anatel has gradually simplified its classification of communication services and licensing framework over the years. However, four main service categories still require an authorisation: fixed telephony (Serviço Telefônico Fixo Comutado, STFC); mobile telephony (Serviço Móvel Pessoal, SMP); "multimedia communication services" such as fixed broadband (Serviço de Comunicação Multimídia, SCM); and pay TV (Serviço de Acesso Condicionado, SeAC).

In addition, under the current licensing framework there are value-added services (serviços de valor adicionado, SVAs), which are considered neither telecommunication nor broadcasting services. Value-added services can include OTTs and certain Internet connection services. Some of the "small Internet service providers" (Prestador de Pequeno Porte), defined as ISPs with a national market share of less than 5%, provide portions of their broadband services as value-added.

Value-added services in the Brazilian framework are broadly defined as those that "complement" and "assist" telecommunication activities. For fixed broadband access, the most common

applicable telecommunication service is "multimedia services" (SCMs).[3] Conversely, Internet connection is the most prominent example of a value-added service (i.e. the authentication of the user in the network that originated in the past due to dial-up Internet services). In contrast to telecommunication services, value-added services are subject to limited regulation by Anatel. They are not subject to the tax on telecommunication services under the Service and Merchandise Tax (Imposto sobre Circulação de Mercadorias e Serviços, ICMS).

The plurality of definitions and classifications, even for the same service (i.e. broadband service), leads to arbitrage with respect to regulatory measures and in the area of taxation (Chapter 7). Furthermore, unclear distinctions are a burden that extends beyond the public. In the communication sector, lack of quality also negatively impacts administrative resources needed by companies, the regulator and tax authorities. This adversely impacts market entry.

Therefore, communication services classified as value-added services, such as Internet service provision, should be streamlined in the single-class licence regime. This does not imply that other general value-added services (such as OTTs, platforms and online applications) would be subject to additional regulation. The latter would entail a larger discussion of the mandate of communication regulators over digital platforms, which is still currently debated in many OECD countries.

For broadcasting services, the licensing regime is discriminatory as it applies different requirements to FTA broadcasting and equivalent pay TV services. Moreover, it is also cumbersome and may enable political influence in the granting of FTA licences.

Therefore, consideration could be given to abandoning the individual authorisations in use for all types of communication operators, including audio-visual content providers. These could be replaced with a class-licensing regime, except where resources are scarce, such as spectrum. In other words, a single licence would be available for all communication providers, moving from a service-based to a convergent licensing regime. This move could lower administrative entry barriers to the market and simplify the tax regime (see below).

Changing the licensing regime would require a modification to legislation in Brazil. In addition, to ensure the feasibility of a single-class licence regime, a simplification of the FISTEL tax table, part of the Annex of Law No. 5 070, would be required.

Remove legal restrictions on the integration of the pay TV value chain and cross-ownership between telecommunication and pay TV services on both foreign and domestic service providers. In particular, eliminate Articles 5 and 6 of the SeAC law that prohibit de facto vertical integration of communication players (e.g. content production and distribution).

The pay TV law (SeAC) of 2011 was a product of a long-debated demand from the audio-visual sector that sought, among other objectives, to support the production of independent content. Despite its positive effects on the growth of local content, the legislative change came at a moment where the audio-visual sector was undergoing profound changes in areas ranging from technology and business developments to general convergence.

The OECD generally favours free and unencumbered market access as much as possible. However, special considerations apply in the area of media policy in many countries. These considerations include the need to respect national, regional and local heritage, as well as to ensure media pluralism.

For these reasons, media ownership restrictions are not unusual. Like Brazil, Canada has a strong focus on encouraging local content production and availability, for example. Its Broadcasting Act sets forth the principle that "the Canadian broadcasting system shall be effectively owned and controlled by Canadians" (Canada, 1991[8]).

Restrictions on vertical ownership, however, are not common. In light of convergence, common ownership of content and transmission may offer economies of scope. Common ownership might also, however, lead to a loss of media pluralism, or to competition problems (e.g. vertical foreclosure). These issues have raised concerns in a number of jurisdictions,[4] but an outright prohibition as in Brazil is unusual.[5] In Brazil, the SeAC law establishes strict ownership restrictions between telecommunication and pay TV services.

Categorical restrictions on vertical integration may prevent potential economic efficiencies. These restrictions may hinder the sector from adapting to new demands and new technological contexts. Case-by-case reviews of vertical integration would be preferable. Competitive problems are more likely to occur when parties have market power in either or both of the upstream and downstream markets. Anatel's recent decision to loosen these vertical restriction rules only for foreign-owned firms seems arbitrary and is difficult to justify in the medium to long term.

Public policies and objectives in the areas of media pluralism, content production and fostering competition can and should be achieved through other means. The sector ministry can address concerns related to media pluralism through public policies.

Meanwhile, the sector or a converged regulator can address issues related to *ex ante* competition. The analysis of the potential harm of vertical mergers, for transactions above the merger notification threshold, should be done *ex ante* by CADE and by the converged regulator on a case-by-case basis. In the interim, CADE or one regulatory authority (either Anatel or Ancine) should ideally do the analysis.

Enhancing co-ordination of policies and regulation at all levels of government

> *Enhance the co-ordination of the federal, state and municipal level on issues such as streamlining rights of way, easing antenna deployment and harmonising power density regulations to promote broadband diffusion, particularly in underserved areas.*

The 2008 OECD Review of Regulatory Reform highlighted a significant overlap of functions between federal, state and municipal regulatory agencies in Brazil. Institutions at different levels of government had co-ordination mechanisms, but they were not frequently used (OECD, 2008[2]).

Brazil should promote co-ordination among the three levels of government (i.e. local, state and federal), which is particularly important for rights of way. The effective implementation of sectoral regulation sometimes depends on other related laws. This is the case for the telecommunication and broadcasting sectors, as the state and municipal levels handle relevant issues of both industries.

Removing barriers to infrastructure deployment is crucial for communication network investments and for lowering barriers to market entry. Any legal or administrative permits involved in the process of deploying networks should be carefully reviewed and assessed whether they are needed or whether there is room to reduce administrative burdens. In addition, provisions should be harmonised across the country to reduce the burden on operators.

Promote co-operation arrangements between CADE and sector regulators to eliminate multiple and possibly competing decisions ("double windows"), particularly on broadcasting issues (including pay TV).

Anatel and CADE seem to co-operate effectively on communication issues, although they may disagree on market definitions and on implementation of certain regulatory interventions. That co-operation would benefit from a formal agreement between the two agencies, as is the case between CADE and Ancine.

Nevertheless, regarding pay TV (considered a telecommunication service in Brazil), both Anatel and Ancine hold *ex ante* regulatory powers as established by the SeAC law. They are also involved in different stages of the service value chain and the broadcasting market more broadly.

CADE can further invite Anatel and Ancine to issue technical opinions on merger proceedings as competent sector regulators, according to the competition law. This creates a double window that could hamper an effective and expeditious analysis of merger review requests by CADE. This is especially the case when both institutions have diverging opinions (e.g. the recent AT&T/Time Warner merger).

In the absence of a converged regulator, Brazil should establish a process to resolve disputes between competent authorities during merger reviews in the communication and broadcasting sectors. This would entail an amendment to either the 2011 competition law or the SeAC law. One solution could be to preserve the non-binding nature of the technical notes. Such a measure could require CADE to justify its final ruling if it decides not to follow any Anatel or Ancine recommendation.

Improve co-operation and reduce overlapping functions in the regulatory design and enforcement of consumer protection regulations through upscaling co-operation instruments among Senacon, Procons and Anatel.

The work in the area of consumer protection could greatly benefit from an even closer and formal co-operation between Anatel and Senacon to address the regulatory and enforcement regime in consumer protection for communication services. Until recently, Anatel and Senacon had a technical co-operation agreement. This provided for the exchange of information and data related to complaints registered against communication service providers (Ministério da Justiça, 2013[9]; Anatel, 2019[10]).

Some consumer protection functions for communication services still overlap among Senacon, Anatel and the Procons. For example, Anatel has the technical capabilities and specialised knowledge to protect consumers' rights in light of specialised issues (e.g. signal quality). For its part, Senacon formulates, promotes, co-ordinates and implements the National Policy of Consumer Protection in a broad sense. Therefore, Anatel and Senacon require close co-ordination to address issues related to consumers of communication services.

Consumer protection also needs better co-ordination between the states and municipalities. There are more than 800 state and local departments for consumer protection (Procon) linked to the Executive Power, which also oversee communication companies. The creation of a Procon is subject to each state or municipality, which leads to different levels of access

to consumer protection organisations throughout the country. Procons may help protect consumer rights more effectively by intervening on behalf of consumers at the local level. However, the 800 state and local departments for consumer protection would benefit from clear and established co-ordination mechanisms. These would provide for exchange of information and experiences, as well as encourage enforcement bodies to simplify regulations.

Thus, to promote legal certainty and regulatory coherence, Anatel, Senacon and Procons should formally increase their roles and co-operation. Furthermore, they should be transparent with respect to the mechanisms put in place to this end. Therefore, the different institutions involved in consumer policy related to communication services should maintain close co-operation underpinned by clearly established formal procedures that ensure good co-ordination in regulatory design and enforcement.

Ensuring effective regulatory enforcement

> *Anatel should strengthen its enforcement framework, seeking to establish proportionate sanctions (monetary or non-monetary) based on quantitative evidence and targets, considering the severity of the violation and the resulting harm. It should further aim at improving the effective collection of administrative fines, using more actively the payment enforcement means at its disposal.*

Despite its sanctioning powers, Anatel has imposed far more fines than it has been able to collect. Between 2010 and 2017, Anatel imposed 60 000 fines, of which only 66% were fully paid by operators. This represents 13% of the monetary value of the total fines imposed (Anatel, 2017[11]).

Both the role of the judiciary in enforcement of regulatory decisions, as well as the high value of the fines, may be causing the significant divergence between the fines applied and actually collected. Anatel's administrative decision can be appealed through judiciary avenues. A significant number of companies appeal the fines imposed by Anatel, a process that can take up to ten years (Rosa, 2018[12]). In 2017, the judiciary suspended 1.2% of the fines imposed by Anatel (i.e. 34% if measured in monetary value)[6] (Anatel, 2017[11]).

To improve enforcement of applied fines and increase collection, Anatel should carefully substantiate the sanctions, which should fit the nature of the offence. Fines should be high enough to deter behaviour, but also follow the principle of proportionality to deter appeals. This would lessen the probability of the fines being successfully appealed and stalled in the judicial process.

From 2007 onwards, Anatel started to enforce quality of service (QoS) compliance. As a result, the number of applied fines increased dramatically from 2008-13, and many appeals were filed against Anatel's sanctions.

For Anatel, the legal challenges and the costs of collecting fines in the peak period of fines (2008-13) led to study groups and public consultations to standardise regulatory compliance. In 2012, Anatel adopted new rules for regulatory monitoring. These included the Sanction Guidelines (Regulamento de Aplicação de Sanções, Resolution No. 589 of May 2012) and the Guidelines of Regulatory Monitoring (Regulamento de Fiscalização, Resolution No. 596 of August 2012).

Anatel intends to modify its oversight regulation to adopt preventive and reparatory measures instead of punitive ones (Anatel, 2019[13]). It will consider a variety of sanctions besides monetary ones, including remedial conduct and warnings. This new regulation should follow best practice principles, including establishment of rational and proportionate sanctions. When imposing fines, it should also consider aggravating and mitigating factors when fines are imposed (e.g. severity of the violation). Finally, it should consider the resulting harm to users and service provision, as well as prior infringement (OECD, 2018[14]).

Shorten the appeal procedure through judiciary processes to avoid weakening the effectiveness of the enforcement decision of Anatel, through specialised training of judges and judiciary-related personnel. If training has proved insufficient, consider the creation of specialised courts on communication and broadcasting matters.

Anatel's administrative decisions can be appealed through judiciary processes. In 2017, the judiciary suspended 34% of fines imposed by Anatel measured in monetary value (Anatel, 2017[11]). The appeal procedure through the judiciary avenue should be shorter to avoid weakening the effectiveness of Anatel's regulatory and administrative measures.

Decisions in complex communication and broadcasting matters require a sound technical and legal knowledge about communication technologies. One way to shorten the process for judiciary decisions is through specialised training of judges and judiciary-related personnel. If this is deemed insufficient and has been tried in the past, the creation of specialised courts is a more complex option.

Brazil could establish specialised judges and courts for the substantiation of appeal procedures (injunctions) pertaining to the communication and broadcasting sectors. Such a move was a breakthrough for Mexico in 2013 during the reform of its telecommunication sector. In Brazil, it would alleviate the workload of other judicial institutions, and guarantee public servants had sufficient background to make decisions on highly complex and technical issues. This could stimulate greater efficiency within the whole judicial apparatus and increase the soundness of judicial resolutions. To implement specialised courts effectively, investment in human resources and their expertise/training is required.

If Anatel wishes to continue promoting the regulatory compliance tool of a "Conduct Adjustment Agreement" (TAC) that allows operators to commit to investment obligations instead of paying fines, carefully set and monitor these obligations.

Anatel has used the legal instrument of operators' Conduct Adjustment Agreement (Termos de Compromisso de Ajustamento de Conduta, TAC). This allows operators that have breached a regulation to trade fines for investment obligations. In TAC agreements, arrangements are negotiated after communication service providers have already been fined. In addition, Anatel has been modifying its sanction framework prior to deciding upon fines. This involves replacing eventual monetary sanctions by non-monetary ones (i.e. investment commitments) through "future obligations" (obrigação de fazer).

Any investment obligations stemming from TAC agreements, "future obligations" sanctions or set by coverage obligations within the context of an auction should be carefully monitored both in terms of design and implementation. For example, there is a substantial lack of

reporting of small ISPs. As these ISPs do not have reporting obligations, Anatel's statistics only partially accounted for them. However, these operators accounted for about 20% of the broadband market in 2019 in terms of subscriptions.[7] As a consequence, it is difficult for Anatel to have a full overview of network coverage and planned investments.

Asymmetric information and lack of granular data of the presence of broadband networks in the country may lead to challenges when designing TACs. On the one hand, it could allow a larger player to trade fines for coverage obligations in rural and remote areas that already have small operators. On the other, operators might have invested in certain areas anyway based on their longer-term investment plans, which are often not public. In these cases, an operator may be trading for an "obligation" it had already intended to make.

Therefore, if Anatel wishes to continue using the TAC, it needs sufficiently detailed information on both fixed and mobile broadband access network coverage and planned investments. To that end, it should undertake a thorough analysis *ex ante* to establish where such obligations should be imposed, and monitor ex post their implementation. Deployments under these agreements should also comprise open access obligations to foster infrastructure sharing and access by other service providers.

Overhauling the taxation, fees and tariff framework

Harmonise the ICMS across states and reduce the high ICMS rates for communication services to the extent possible because of their negative effects on adoption. In light of convergence, establish as mentioned above, a single-class licensing regime to eliminate the distinction among different communication services (SCMs, SeAC, SMP, STFC, SVAs) to minimise legal costs, administrative burdens and the potential for tax arbitrage. In the long run, pursue the fundamental reform of the indirect tax framework to reduce distortions caused by the current indirect tax treatment of the communication and broadcasting sector.

The high level of fees and special taxes severely impact the communication sector in Brazil. The high fees likely contribute to the total cost of communication services, compromising the sector's potential for innovation and investment. They thus hinder the adoption and lower the affordability of communication services.

In light of the extensive positive spillover effects of communication services on its economy and society, Brazil should reconsider the high taxes and fees and identify ways to reduce them. The high ICMS burden, in particular, may affect the cost of communication services and consequently their use. Brazilian states should therefore consider harmonising the ICMS across states and reducing the applicable ICMS rate to communication services to the extent possible.

The complexity around the application of the ICMS due to a multitude of communication service categories may results in higher entry barriers for some operators and thus hampers competition. The exact distinction between the different communication services (SCMs, SeAC, SMP, STFC, SVAs), as well as broadcasting services (FTA), for tax purposes is subject to discussions and legal disputes between companies of the sector and tax authorities. This leads to legal uncertainty, as well as tax arbitrage and, in consequence, to a loss of economic surplus. For taxation and convergence purposes, then, Brazil should consider a single-class licensing system to eliminate the distinction between communication and broadcasting services.

Regulatory and legal arbitrage concerning taxation regimes might be one competitive advantage of smaller operators. It may also have helped drive the emergence of a large number of small operators of telecommunication services, including ISPs. The growth of small operators is very welcome given their contributions to increased broadband coverage and more competition in the country. However, Brazil could put in place other mechanisms that do not rely on different interpretations of service types, such as special tax reductions, to foster their growth. This would also reduce legal uncertainty for the entire sector.

In the long run, it is recommended to pursue fundamental reform of the indirect tax framework to reduce distortions caused by the current indirect tax treatment. In line with previous OECD work on taxation issues in Brazil, it is suggested to consolidate consumption taxes at the state and federal levels into one value-added tax with a broad base and full refunds for input of value added paid (OECD, 2018[15]; OECD, 2019[16]).

Merge sectoral funds into one single fund to reduce costs and increase efficiency. Ensure that contributions to the funds are used for the further development of the digital economy in Brazil, including broadband deployment. Avoid using fund resources to close the general government budget deficit as this would result in a clear case of double taxation. In the long term, consider abolishing all sectoral contributions.

Fees paid to FISTEL are split into the Contribution for the Development of the National Film Industry (Contribuição para o Desenvolvimento da Indústria Cinematográfica Nacional, CONDECINE) and the Contribution to Foster Public Broadcasting (Contribuição para o Fomento da Radiodifusão Pública, CFRP). Moreover, the Universal Service Fund (Fundo de Universalização dos Serviços de Telecomunicações, FUST) and the Telecommunications Technological Development Fund (Fundo para o Desenvolvimento Tecnológico das Telecomunicações, FUNTTEL) are accounted for separately, which results in three different funds in Brazil (FISTEL, FUST, FUNTTEL). In line with simplification and convergence, Brazil should consider integrating all contributions into one, as for example Colombia did recently (OECD, 2019[17]). An integration of all funds into one single contribution may further reduce administrative costs and increase efficiency.

Resources collected through FISTEL, FUST and FUNTTEL have largely not been used for their designated purposes. By using fund contributions exclusively to develop its digital economy, Brazil could reduce contributions or use them more effectively. This would serve the development of the digital transformation in Brazil, particularly through expansion of broadband services. Fund resources should not be used to close general government budget gaps as this would result clearly in double taxation, but to extend connectivity, especially for underserved areas.

The OECD cannot recommend, under any circumstances, legal proposals that lead to the abolishment of sectoral funds for communication services but keep sectoral fees for these funds. Such proposals effectively transform the fees into a tax. This would lead, again, to a double taxation of the communication sector.

Integrating all sector contributions into one would represent a major improvement to the current situation. However, in the long term, Brazil should consider abolishing all sectoral contributions and funds in the communication sector. At the same time, it should ensure solid funding of the sectoral regulator and the availability of funds for specific broadband deployment projects in geographical areas where private funding may be insufficient. The

communication sector is crucial to the country's economy with positive spillover effects on productivity and thus growth and development. It should thus not be subject to unnecessary burdens (OECD, 2014[18]; OECD, 2017[19]).

> *Actively promote the entry of Mercosur countries into the WTO Information Technology Agreement, which creates a credible schedule for the reduction of tariffs on an increasing number of ICT goods.*

Steps taken by the government to reduce import tariffs on selected information and communication technologies (ICTs) and capital goods are welcome. However, the basket of goods exempted from import tariffs is still limited. With only 34 ICT goods falling under the new regime, tariffs still apply to potentially crucial components. Brazil should therefore actively promote the entry of Mercosur countries into the World Trade Organization (WTO) Information Technology Agreement, which would create a credible schedule for the reduction of tariffs on an increasing number of ICT goods. This would create a credible schedule to reduce tariffs on an increasing number of ICT goods. One estimate suggests that access to the ITA could increase gross domestic product growth by 0.08 percentage points in the first year alone. The increase in tax revenues from higher growth, including in the ICT sector, would exceed the loss in import tariffs from the fourth year onwards (Ezell and Foote, 2019[20]).

Improving market conditions

Lowering barriers to entry and easing infrastructure deployment

> *Reduce barriers to entry to the minimum possible, such as further ensuring fair and non-discriminatory access to ducts, poles and rights of way to promote deployment of next generation networks, and by reducing costs of infrastructure deployment through dig-once policies and streamlining rights of way. Further promote infrastructure sharing among communication providers with a focus on passive infrastructure sharing, while monitoring competition in the market.*

The deployment of communication infrastructure in Brazil, especially concerning access to rights of way and installation of cellular sites, has continued to be cumbersome. Operators must comply with both federal and local regulations, which may vary by municipality and by state.

The Senate started debating in 2012 how to develop a framework to standardise, simplify and streamline the process of obtaining rights of way. This initiative culminated three years later with the approval of the "Antennas law" (Lei das Antenas, Law No. 13 116 of 20 April 2015). This law mandated infrastructure sharing, when technically feasible. It also obliged all public interest infrastructure projects (e.g. roads, electrical grids) to accommodate the deployment of communication infrastructure, which is commonly known as "dig-once" policy.

The original project of the Antennas law contemplated an automatic tacit approval of requests in case of non-response (i.e. positive administrative silence or *afirmativa ficta*).

That rule was replaced in the end of the legislative process by one that transferred the decision from the municipality to Anatel if the former did not respond within 60 days.

The President's Office (Casa Civil) vetoed the new proposal as such clause was considered a violation of the Constitution: land-use and zoning are the prerogative of municipalities. Although there has been progress towards streamlining rights of way, states and municipalities have been slow in adapting their local rules to the Antennas law. An agreement on tacit approvals by municipalities would significantly contribute to a faster deployment of infrastructure.

To reduce costs of infrastructure deployment, Brazil should further establish dig-once policies, including for construction of highways, energy transmission lines, etc. The federal government should harmonise the application of the Antennas law. To that end, it should issue norms that promote deployment of infrastructure under the principle of positive silence.

Anatel should encourage infrastructure sharing among communication operators, either through mediation between operators or, if stronger measures are deemed necessary, by laying down general conditions for infrastructure sharing. Furthermore, Brazil could envision a general conflict resolution body for passive infrastructure sharing among utility providers, such as roadside ducts and electric cables.

Finally, Brazil could consider developing a one-stop online portal that geo-references publicly owned buildings available for lease. This would allow setting up communication infrastructure like the one built for Mexico. The Mexican National Information System of Telecommunications Infrastructure includes information on rights of way. It is aimed at allowing concessionaires to deploy telecommunication infrastructure on public assets, such as buildings. The purpose of the inventory is to reveal the availability and status of this infrastructure so as to lower deployment costs and increase the efficiency of deploying communication networks (OECD, 2017[19]).

Further increase backhaul and backbone connectivity and promote open wholesale access models.

Fixed and wireless broadband services need to be developed in tandem, playing complementary roles. Both need fixed networks for traffic offloading from mobile networks, which usually requires fibre deep into the backhaul and access networks. 5G technology will exacerbate requirements for fibre backhaul connectivity. This will be needed for extensive fixed infrastructure deployments to aggregate wireless data streams and hand them over to backbone networks.

Fibre backhaul, if accompanied by an effective open access regime, should also help decrease the costs of deploying 4G and 5G mobile networks. These networks are crucial for reaching end users in rural and remote areas of Brazil. Thus, Brazilian authorities should develop a strategy to further develop high capacity fixed backbone networks. In areas which are not commercially viable, the government may wish to adopt incentive mechanisms to foster backhaul connectivity. This would further promote investment in fibre backhaul and backbone connectivity in all parts of the country.

Anatel should consider using a bottom up, long-run incremental cost model (BU-LRIC) to regulate ex ante *wholesale national roaming rates to set them at efficient costs instead of the fully allocated costs model based on historical cost accounting (FAC-HCA).*

In the past, some regulators used historical cost accounting (HCA) models to set wholesale interconnection rates. These models cannot incorporate the impact of continuously evolving technologies, and thus fail to reflect market inefficiencies (ITU, 2009[21]). Many OECD countries have moved towards setting wholesale interconnection rates *ex ante* using long-run incremental cost (LRIC) models. LRIC models calculate the incremental costs of providing the relevant interconnection service. They consider only the costs that would be avoided if third parties did not provide the interconnection service.

Unlike HCA models, LRIC rates reflect the costs that an efficient entrant would face using modern technology. As one key study noted, "(T)he further termination rates move away from incremental cost, the greater the competitive distortions between fixed and mobile markets and/or between operators with asymmetric market shares and traffic flows" (European Commission, 2009[22]) . Before eliminating international mobile roaming rates in June 2017, the European Commission calculated wholesale roaming rates with a bottom up-LRIC model (European Commission, 2016[23]). This was similar to how mobile and fixed termination rates are determined in Europe.

Anatel has moved from a top-down fully allocated costs model based on HCA (FAC-HCA) to a bottom up-LRIC model to establish the glide path for mobile termination rates. This welcome development reduced interconnection rates by 90% from 2014 to 2019. The reference wholesale rates for national mobile roaming in Brazil could also benefit from using a similar cost methodology as the one used for mobile termination rates.

Foster the Internet of Things (IoT) by eliminating taxes such as FISTEL, establishing a separate IoT numbering plan, and re-examining outright IoT permanent roaming restrictions.

Several steps are crucial to foster the Internet of Things (IoT) ecosystem. These include interoperability, spectrum management, extra-territorial use of numbers and solutions to facilitate provider switching to avoid lock-in.

The Brazilian government has taken several positive steps to promote deployment of the IoT. These include the elaboration of the National IoT Plan (Decree No. 9 854 of 25 June 2019). Anatel has further accelerated the process to review regulation of IoT devices and services. It also launched a public consultation in August 2019 focusing on aspects related to licensing, taxation, numbering, Quality of service (QoS), spectrum and regulation for mobile virtual network operators (MVNOs).[8] Nevertheless, improvements can still be made to foster the IoT.

In Brazil, all active lines must pay contributions to FISTEL, not only when the line is activated but also on a yearly basis. Many IoT connections are services with low average revenue per user (ARPU) communication. As a result, FISTEL could make the service unprofitable or simply unviable. If IoT devices are exempt from certain taxes (i.e. ICMS and FISTEL), end-user prices would be substantially lower, which could lead to higher

adoption rates. This exemption measure, and consequent higher adoption rates, can increase productivity and growth of gross domestic product. This would generate positive effects across economic sectors and thus increase tax revenues. The National IoT Plan refers to reducing FISTEL for the IoT, but this requires reforming the FISTEL law.

Congress has been debating whether to eliminate FISTEL charges for IoT connections since 2016, but it has not reached an agreement. The Executive Power is considering a provisional measure that would set this rate to zero for IoT devices; however, the Ministry of Finance has requested an impact evaluation on foregone revenue. In addition, communication revenue may decrease if IoT development is hindered.

Numbering is another potential barrier to the diffusion of IoT devices, which are projected to grow exponentially, surpassing personal communications. Using the current numbering plan for mobile telephony, a scarce resource, may not be the appropriate solution. To avoid a bottleneck, establishing a separate numbering plan and fostering the deployment of the numbering protocol IPv6 could alleviate this issue.

When it comes to massive and dispersed connected devices, the IoT has evolved to provide new solutions, particularly at a global scale and along supply chains spanning multiple countries. Many IoT devices may be initially activated in one country and exported to another permanently. In other words, IoT applications and services transcend borders.

Therefore, many countries allow, or do not explicitly prohibit, permanent roaming for the IoT. However, a few countries (e.g. Brazil and Turkey) do not permit permanent roaming. In 2012, Anatel ruled that foreign-based carriers using foreign SIM cards may not offer services in Brazil on a permanent basis.

Anatel could reassess its current stance and re-examine its restrictions on permanent roaming to promote innovative services and facilitate deployment of IoT services. Allowing permanent roaming for IoT devices may complement existing solutions in the market, such as the use of embedded SIMs. It could also further drive growth in diverse sectors of the Brazilian economy, such as manufacturing and agriculture.

Permanent roaming arrangements could be subject to freely negotiated commercial rates between Brazilian network operators and international providers. This policy could mitigate any concerns from local players that international providers – which are not subject to local regulation and taxation – would gain an undue advantage.

Consider removing the legal restrictions on foreign direct investment in broadcasting in which foreign companies or individuals cannot hold more than 30% of the total and voting capital of free-to-air broadcasting companies.

Eliminating restrictions on foreign direct investment (FDI) would reduce barriers for market entry, and therefore spur investment and substantial progress in the broadcasting sector. Although this change requires a constitutional reform, it would allow new entrants to join the market and thereby boost competition.

At the same time, the change would also encourage greater availability of advanced technologies and specialised knowledge from foreign and national firms, all of which would benefit end users. Measures to maintain national identity, promote local content or support other objectives often associated with broadcasting, if desired, can be implemented in ways that foster competitive neutrality, while ensuring FDI benefits. In other words,

firms should compete on their merits and not receive undue advantages due to their ownership or nationality.

Streamlining and simplifying the licensing process for broadcasting should foster plurality and choice in the market. Easing the entry of new broadcasting service providers into the market may be critical to challenge large players. Removing barriers to FDI can further help meet these policy objectives in broadcasting through increased investment, employment, competition and media plurality.

Ensuring efficient spectrum management

> *Closely monitor the effects of changes introduced by Law No. 13 879 regarding a successive renewal of spectrum licences on market entry and competition in mobile markets. As spectrum auctions are one of the main tools to foster competition in mobile markets, the successive renewal of spectrum licences should only be done sparingly in order to promote new auctions of the bands granted for a predictable time horizon.*

Well-designed licensing regimes provide legal certainty in the aim of fostering long-term investment. As a consequence, it is recommended that spectrum licences be awarded for periods longer than ten years, or at least, provide mobile players with sufficient certainty that their licences will be renewed with a transparent renewal path. OECD countries have licence duration periods typically ranging 10-30 years, depending on the spectrum band; most last 15-20 years. This allows the pursuit of two important goals simultaneously. On the one hand, countries provide legal certainty, which strengthens incentives to invest in networks through licences lasting around 20 years. On the other, countries can hold auctions after the initial licence period ends when other parties are interested in using the assigned spectrum. The latter ensures that a scarce resource – radiofrequency spectrum – is used in the most efficient manner and to foster competition in the mobile market.

With the approval of Law No. 13 879 on 3 October 2019, spectrum licences in Brazil can now be successively renewed, without limit, after the first 20-year term. Each renewal is accompanied by a payment, determined by Anatel, which operators may exchange for investment commitments. Spectrum auctions are one of the main tools that countries use for a series of policy objectives, including to foster competition in mobile markets. As a result, Anatel should carefully observe and analyse the effects of this new arrangement on market entry of new mobile operators. Overall, there is considerable risk that the new arrangement reduces Anatel's tools to promote competition in mobile markets and may limit market entry in the Brazilian mobile market.

Some changes introduced in the law, such as spectrum trading and infrastructure sharing, may reduce some undesired effects in the competitive dynamics of the market. However, if spectrum is not assigned efficiently in the primary market, efficiency in the secondary market cannot be guaranteed. Given the significance of the secondary spectrum market, this is an important consideration.

Most OECD countries favour long spectrum licences with clear conditions in case of licence renewals in the primary market. However, this does not mean that countries cannot revoke spectrum licences. For instance, the United Kingdom had removed predefined licence

terms to increase certainty surrounding spectrum licences. Still, the regulator (Ofcom) can revoke any licence for spectrum management grounds, with a five-year notice.

In other words, "indefinite licences" only mean that Ofcom has limited rights of revocation during an initial term of 20 years. After this term, with appropriate notice to the licencee, Ofcom can revoke the licence. Ofcom retained this right to revoke licences due to the risk of specific market failures, such as lack of competition, as part of a suite of regulatory levers, designed to ensure efficient use of spectrum. Other levers include ensuring optimal allocative efficiency in the first instance and the application of opportunity cost licence fees after the expiry of the initial term.

Overall, countries need all possible tools to foster competition in the mobile market. This is an important communication market in Brazil, which may gain further importance with the launch of 5G services.

Brazil should further clarify the conditions for the non-renewal of a licence after the first 20-year period in Brazil, as efficient spectrum management also entails correcting for market failures, such as lack of competition. As it stands (Article 167 of Law No. 9 472 of 1997, modified by Article 2 of Law13 879 of 2019), it is unclear whether Anatel could revoke a licence to correct for market failure (such as lack of competition) through a new auction. The article only explicitly states that Anatel can revoke licences in case of infringement of regulation or if the spectrum band will be allocated to another use.

Anatel has already issued decisions to revoke licences for spectrum management reasons. However, non-renewal of spectrum licences, in spite of idle use, can prove to be more complicated than expected if operators appeal decisions through the judiciary. The regulator should further clarify whether this new spectrum arrangement will also apply to existing spectrum licences or only to new ones (e.g. the upcoming 5G auction). Finally, when assessing licence renewals, Anatel should consider undertaking a public call for expression of interest prior to the renewal of spectrum licences to consult with the market whether there is demand for the assigned spectrum.

Carefully design the upcoming 5G auction as the vast amount of spectrum planned to be placed in the market combined with the possibility of successive renewal of spectrum licences translates into high stakes of the effects of this auction in the competitive dynamics of the market.

The upcoming 5G auction will place a vast amount of spectrum in the market. Together with the changes brought about by Law No. 13 879, where spectrum licences can be successively renewed, the stakes of getting the design right of this 5G auction are extremely high.

The design of this particular auction may predetermine the competition dynamics of mobile market in Brazil in the long term, as the players that win spectrum would shape the market in the long run. Therefore, the different elements of the auction design (i.e. the design of blocks, reserve prices, coverage obligations and spectrum caps) should embody the objectives of enhancing competition in the market and providing incentives to expand coverage of mobile networks.

Consumer empowerment

> *Improve transparency of advertised fixed broadband communication service plans to empower consumers when deciding which commercial offer to contract.*

In Brazil, there is lack of transparency in advertised fixed broadband offers. Operators establish a price cap for fixed services and register the plan tariffs with Anatel prior to commercialisation. Online advertised plans in Brazil appear with time-limited promotional tariffs and a price cap tariff. These are the only two prices that Brazilian consumers can see when deciding on a fixed broadband plan. That is, fixed broadband operators in Brazil do not explicitly state the price in effect after the promotional tariff expires. This policy is not common practice in most OECD countries. The regulator suggests the price ceiling advertised in offers is non-binding, which means users in Brazil have no idea about the actual cost of the contract following the promotion. This lack of transparency in advertised plans hinders consumer empowerment. Consumers who can make informed choices, are a necessary condition to ensure competition in communication markets.

The regulator is holding a public consultation to eliminate the practice of setting price ceilings through the revision of the Regulatory Framework for Consumer Rights of Telecommunication Services (Regulamento Geral de Direitos do Consumidor de Serviços de Telecomunicações). However, the transparency of fixed broadband offers should be increased. This is in line with one of the key objectives of the regulator, which is to empower consumers by providing information that supports their decisions.

Brazil should enforce regulation that increases the transparency of broadband offers. At the very least, consumers ought to know, when contracting an offer, the price that they would have to pay once the promotional period expires. As is the case in all OECD countries, Brazilian operators should explicitly state the post-promotional price of fixed broadband offers when advertising these plans.

Fostering competition in communication and broadcasting markets

> *Follow the OECD recommendations of the 2019 Peer Review of Brazil of the Competition Committee. Remove the 20% threshold for market share as a proxy for market power from the competition law. Issue guidelines on a clear analytical framework to assess market dominance.*

The OECD Competition Committee, in its 2019 Peer Review of Brazil, made a number of key recommendations for improving the country's competition law and policy in general (OECD, 2019[24]). These included removing the purely market share-based definition of dominance in the competition law for one that considers a broader array of market information. Moreover, it recommended issuance of guidelines that clearly explain Brazil`s analytical framework to assess market dominance.

It further recommended to determine market power based on a rigorous assessment of all factors affecting competitive conditions in the market rather than market shares alone

(OECD, 2019[24]). Even among jurisdictions that consider market power from a certain market share threshold as a factor, Brazil's threshold – at 20% – is low.

In some other jurisdictions, a company is unlikely to be deemed dominant if its market share is under 40% (OECD, 2019[24]). Defendants can present evidence that they do not actually have market power. For example, they might present evidence showing that entry barriers are quite low. However, with such a low threshold, the likelihood of false positives is high. That translates into unnecessary investigations, and thus needless expenditures of government resources, as well as corresponding expenditures and distractions for businesses.

For the OECD's Competition Committee (2006[25]), "[m]arket share data continue to be the 'high priest' in assessing whether a firm has substantial market power, although the limitations of market shares as [a] proxy of market power are widely acknowledged." Market shares can nevertheless be a useful first step in competition analysis. However, if Brazil desires to retain market share as an initial proxy for market power, it should at least consider raising the threshold.

With regards to particular markets, the OECD previously recommended that Brazil monitor market dominance and market dynamics of the audio-visual sector (OECD, 2019[24]). It should focus on FTA, pay TV and emerging trends in OTT/video-on-demand (VoD) services. Anatel periodically assessed distribution of pay TV services and bundling of communication services. With Ancine, it also studied the whole pay TV value chain. However, market studies of the audio-visual services that consider FTA services are still absent in Brazil.

The Constitution prohibits the monopoly or oligopoly of media and limits ownership of FTA. However, Brazil has not systematically or effectively monitored or enforced competition principles in FTA broadcasting markets. The ownership rules enacted in the 1960s have mostly been ineffective. On the one hand, Brazil does not monitor whether ownership is already granted to business partners or family members. On the other, it does not monitor if one affiliated broadcaster is transmitting all of another's programming. MCTIC was expected to fulfil this monitoring role, but this has not happened.

A future converged regulator should carry out an integrated analysis of the sector to accurately assess the state of audio-visual markets in Brazil and capture emerging trends. In the absence of a converged regulator, Anatel, Ancine and MCTIC must work together with CADE on such an analysis. It should study market dominance in all types of audio-visual services, particularly FTA broadcasting, long excluded from most competition studies in Brazil. In the short term, CADE could also analyse broad sectoral competition to investigate issues of market dominance and failures in the audio-visual sector, including FTA.

The 2019 Peer Review of Brazil makes several other recommendations. These include: delineating the functions of the General Superintendence of CADE and the Tribunal; establishing a more transparent appointment system for CADE Commissioners and the General Superintendent; improving arms-length separation of CADE from the Ministry of Justice; prioritising abuse of dominance cases; improving settlement policy in line with international standards; and introducing a new merger notification threshold based on the value of the assets involved in the transaction to ensure CADE's resources are employed effectively. The OECD reiterates those recommendations, as they also apply for the communication and broadcasting sectors.

> *Conduct* ex post *reviews of significant merger decisions in the communication sector by examining their actual price and non-price effects, and compare them with the initially expected effects.*

CADE or Anatel should consider conducting some *ex post* reviews of significant mergers to examine their actual price and non-price effects, and to compare them with expected effects. Through its Department of Economic Studies, CADE has invested in improving staffing levels to conduct more detailed technical analyses and *ex post* evaluations (OECD, 2019[24]).

Ensure the competitive neutrality of State-owned enterprises, such as Telebrás, to avoid crowding out private investment.

The Brazilian government holds a majority share in the company Telebrás. The firm is also implementing the National Broadband Plan, including the supply of essential wholesale infrastructure and provision of retail broadband services in areas with low coverage at affordable prices. In this context, competition laws should be applied effectively to safeguard competitive neutrality. In this way, firms would not receive undue advantages due to their ownership or nationality. Furthermore, justification for subsidies should be transparent. They should only be used when not causing market distortions. For example, subsidies could be used in unserved areas with no viable business case for the private sector.

As its governance and legal framework, Telebrás should follow the *OECD Guidelines on Corporate Governance of State-Owned Enterprises* (OECD, 2015[26]). These contain good practices for preserving competition among private and State-owned enterprises. Public policies and regulations should not favour Telebrás beyond what is necessary and reasonable to attain its public policy goal of promoting the universalisation of Internet services.

In some markets, Telebrás faces competition from privately owned operators (whether wholesale or retail). In these cases, its conduct should be subject to the same standards and scrutiny applied to those companies by all relevant institutions. To increase transparency and prevent distortive cross-subsidies, Telebrás should hold separate accounts for its commercial and non-commercial activities.

Aside from competitive neutrality issues, the maintenance of Telebrás' operations in view of its recurring losses may be a concern. In particular, OECD guidelines call for State-owned enterprises to have market-consistent conditions on debt and equity financing and to achieve return rates comparable to competing private enterprises. State-owned enterprises should not receive any indirect support from the State that confers undue competitive advantage. Moreover, the guidelines recommend that when State-owned enterprises engage in public procurement, procedures should be competitive, non-discriminatory and transparent (OECD, 2015[26]).

In general, the OECD does not take a position on whether the State should own enterprises. The choice of whether to privatise a State-owned enterprise, for example, depends on a number of factors related to the national economy, domestic policy choices and emerging technology trends. If the government, however, decides to follow through with plans to privatise Telebrás again, this complex and challenging process should be based on internationally recognised good practices; public investments should not be left stranded.

A well-planned and executed privatisation process can enhance investors' confidence in the sector and gain support from stakeholders and the public. This needs to be backed by sound rationales, strong institutions, and good regulatory and governance arrangements. A recent OECD publication offers practical advice on key stages of the process, from inception to post-privatisation (OECD, 2019[27]).

Strengthening national policies and evidence-based policy making

Expanding broadband networks and services

> *Establish targets for the Connected Brazil Programme and other programmes directed at expanding networks, and monitor their implementation. Improve co-operation among governmental entities and across the different levels of government (national, state and municipal) for implementation of broadband connectivity initiatives.*

The E-Digital programme was an important step towards establishing a coherent governance model for digital initiatives and will be analysed in depth by *Going Digital in Brazil* (OECD, forthcoming[28]). However, except for the number of public schools to be connected, the programme does not define quantitative targets and relies on aggregate global comparison indexes.

Moreover, while both the decree and the background document mention high-speed broadband, they do not indicate a minimum desired speed for broadband. Most OECD countries measure with concrete targets measured in terms of percentage of population, households or business connected with 30 Mbps, 50 Mbps or even 100 Mbps.

In addition, significant co-ordination issues between national, regional and local governments hinder the effective deployment of connectivity initiatives. Hence, streamlining the institutional framework to create a single, independent and convergent regulator vested with the power to issue and implement *ex ante* regulation is critical. MCTIC should be clearly in charge of formulating policy.

Moreover, a public forum should be created for federal, regional and local governments to discuss their policy initiatives and reach collaborative agreements (e.g. respecting building permits and rights of way). This could take the form of an inter-governmental body meeting periodically, possibly under the E-Digital framework.

This body could be complemented with MCTIC field visits to the different regional and/or local governments and communities to liaise and clarify their policies. In a country as large as Brazil this could prove challenging and time-consuming. However, lack of communication between the three levels of government has generated substantial costs and wasted public resources, while hindering effective infrastructure deployment.

To ensure effective evaluation of policy programmes (such as Connected Brazil), clear milestones and specific targets must be defined from the start. These should address coverage, speed, population, number of schools and health centres connected, etc. (by geographic market). Complete measurements should be taken at the beginning to serve as baseline values.

In sum, broadband connectivity initiatives supported by the government should seek to be sustainable and involve local stakeholders. They should privilege infrastructure sharing (such as ditches, ducts and poles), and implement reasonable, cost-based access rates for such infrastructure.

Lastly, broadband connectivity programmes should be closely monitored for their implementation and quality performance, to ensure that they meet the required quality parameters, and experience quality improvements over time.

Expand high-quality broadband networks to underserved regions by fostering investment in infrastructure to bridge the digital divide.

In Brazil, income inequality is high (and incomes in underserved and remote areas are low). Moreover, in rural areas educational attainment is usually low and infrastructure deployment in such areas has been scarce due to the high costs of deployment. To foster broadband adoption in these areas, Brazil needs innovative approaches to incentivise investment and address the infrastructure gap.

It has taken steps in the right direction by including rural coverage obligations in spectrum auctions as a prerequisite to participate in the bidding process. Brazil has applied this measure for over ten years; it has also proven effective in many OECD countries. Other positive developments are policies encouraging the creation of Internet exchange points and their growth (which significantly reduced IP interconnection costs) and good practices in infrastructure management through CGI.br.

Nonetheless, incorporating coverage obligations with a clearly defined timeline for deployment in spectrum licences is insufficient if these are not accompanied by clear and reasonable QoS standards. It needs measurable objectives that define quantitative targets for what "high-speed" broadband means in a given geographical market. Finally, it needs periodic information reporting, which facilitates monitoring by the regulator.

However, even if such coverage and QoS obligations are set, other elements of the legal and regulatory framework may still deter operators from timely and adequate investment. These include the tax regime, which constitutes an important market barrier in Brazil.

Recent initiatives in Mexico and Peru (*Red Compartida* and *Internet para Todos*, respectively) aim to establish wholesale-only networks in remote and underserved areas. MNOs and MVNOs can access these networks under fair, reasonable and objective conditions to provide affordable retail communication services. It is still too soon to determine the success of these policies. However, they do suggest the need for innovation in infrastructure deployment. For example, *Internet para Todos* in Peru has connected 6 000 localities across Peru with more than 800 base stations with 3G and 4G technologies (Internet para Todos, 2020[29]).

Public-private partnerships could help bridge the digital divide. They could also diminish reliance on public resources derived from taxation (which are already high for communication services in Brazil) or universal service funds. A number of countries have used reverse auctions in the design of such partnerships to good effect.

Such policies will not be successful without co-ordination among multiple competent authorities and different levels of government. This is why a public forum for these authorities to co-ordinate initiatives related to building permits and rights of way should be established.

Lastly, considering the increasing relevance of broadband services, resources allocated to the different funds to expand fixed telephony deployment (i.e. FISTEL, FUST and FUNTTEL) should be liberated for use in broadband deployment.

Promoting inclusive and forward-looking audio-visual public policies

Design an integrated and overarching public policy vision for broadcasting, pay TV and emerging OTT services/VoD.

Unlike in the communication sector (e.g. E-Digital 2018-2020, Connected Brazil Programme), there is no overarching public policy vision for broadcasting, pay TV and emerging OTT services/VoD. Yet such a vision is needed in an increasingly convergent environment. FTA broadcasting has not received much attention in sector regulation and public policy making. In Brazil, where most consumers access information through FTA, this lack of attention is a concern for inclusion, media pluralism and diversity.

In an increasingly converged landscape, a holistic, technology-neutral policy vision is needed for the broadcasting, pay TV and VoD sectors. The first step is a regulatory and institutional reform that assigns clear roles for the sector or converged regulator and the policy-making institutions (ministerial or as a separate audio-visual authority). Policies should also be adapted to evolving market dynamics, including greater adoption of OTT services.

In the absence of such reform, MCTIC could lead the formulation of such public policies in co-ordination with other entities such as Anatel and Ancine. These policies should emphasise the need for competitive neutrality between all industry players through the issuance of convergent regulatory measures. In addition, media plurality, and diversity of regional and local content must be guaranteed (especially in light of market concentration in the broadcasting sector) and policies developed to foster media literacy.

Strengthen the national public broadcasting system by ensuring sufficient funding and editorial independence of public broadcasters, including EBC.

In comparison to OECD countries, Brazil lags behind in terms of funding, staffing and editorial independence of its public broadcasting system. A strong national public broadcaster can promote media pluralism and can help provide national, regional and municipal content that may not be commercially viable. As in many countries, trustworthy public journalism is at risk. Public service broadcasting could provide an important, independent voice in FTA broadcasting.

However, two factors have weakened the public service broadcasting system in the country. First, Brazil lacks a co-ordinated public policy concerning FTA broadcasting. Second, the governance and structure of the principal public system broadcaster in Brazil – EBC – have recently changed.

Ensuring the full editorial independence of EBC from the government would entail reversing the 2016-17 reforms. More funding would allow Brazil to guarantee the independence of EBC (or an equivalent new entity).

More opportunities for the sector could be possible through two actions. First, Brazil could promote infrastructure sharing for public broadcasters, and possibly local and community broadcasters. Second, it could integrate converging technologies into the strategy to promote public broadcasting.

Foster pluralism and domestic/regional content production and promote local and community broadcasters through a cross-media policy perspective for a multi-platform environment.

Brazil should encourage development of local content. The country has over 200 million inhabitants, and a geographical extension of over 8.5 million km^2. Moreover, FTA broadcasting delivers the bulk of information to residents. Encouraging locally relevant content where audiences can see themselves can bolster ICT adoption, and also promote media plurality, diversity and freedom of expression. This is especially the case as one vertically integrated player dominates FTA broadcasting.

Brazil has made efforts to promote the production of domestic content in the past decade. The Audio-visual Sectoral Fund (Fundo Setorial do Audiovisual, FSA), for example, subsidises the production of Brazilian content, and provides diverse financial tools to support the national film industry. In addition, Brazilian movie theatres must exhibit Brazilian films for a minimum number of days per year. Furthermore, Brazil has audio-visual package quotas whereby one-third of TV channels must show domestic content. However, these policies do not address promoting pluralism in broadcasting.

While FTA broadcasting still reaches the largest audience, broadband and audio-visual OTT services are steadily growing, with consumers tending to favour streaming platforms with Brazilian content. Therefore, the regulatory framework must ensure a fair competitive landscape for traditional broadcast and TV providers, as well as OTT service providers. Regulations tilt the playing field to the benefit of OTT service providers through tax asymmetries and lack of quotas for Brazilian content. Nevertheless, the solution is *not* to impose legacy regulations on OTT providers which are important drivers of broadband adoption in the country. Instead, a more balanced and consistent framework could promote competition, while encouraging investment in domestic content production and transmission.

Another issue related to domestic/regional content in the Brazilian market is the complex, lengthy and discriminatory licensing regime for broadcasting services. Commercial TV stations must submit competitive bids through a public procurement process to obtain a licence (Chapter 6). The process is lengthy, with multiple steps, and may take many years depending on the type of licence.

The bidding processes that apply to commercial TV and radio licences, as well as community radio broadcasting should be streamlined and subject to compulsory timelines to avoid unnecessary delays. More importantly, a converged and independent regulator should confer licences. It should guarantee transparency, equal access and an objective and impartial selection for interested parties. To reiterate an earlier recommendation, neither the President nor Congress should participate in the awarding of broadcasting licences. The process should include only the sector or converged regulator.

The regime establishes additional requirements for parties interested in setting up a community radio service. These include, for example, meeting requirements for local community coverage; a board of directors formed by residents of the community and use of low power in the transmission of their programming. In addition, community radio services are banned from inserting commercial advertising and on forming networks of community broadcasters.

Community broadcasters foster constitutionally protected values such as national and regional identity and contribute to the production and transmission of domestic and regional content. Therefore, Brazil is encouraged to move towards more flexible licensing requirements (e.g. considering removing low-power transmission obligations). Moreover, it could allow some limited advertising to make operations financially viable. On the one hand, such measures could incentivise the creation of community radio stations. On the other, they would level the competitive landscape. In other words, public service broadcasters that

offer content similar to their commercial counterparts would be subject to more lenient licensing and operation requirements (e.g. educational radio stations).

Improving data collection for evidence-based policy making

> *Substantially improve the data collection of the broadcasting sector and continue to improve the collection and analysis of statistical information with respect to connectivity coverage maps and use of communication services.*

Inconsistency within the institutional and regulatory framework of the broadcasting sector in Brazil has led to a profound scarcity of data on related services for both the most basic and more advanced indicators. Data needed to analyse market performance, the state of competition in the sector and the effectiveness of broadcasting policies are not systematically collected and reported. This also hinders fundamental monitoring and evaluation of administrative processes under MCTIC's responsibility. Substantial improvements in collecting data on broadcasting are needed, particularly on FTA. These data should consider convergence trends and emerging services, such as OTT and VoD.

Detailed and updated data are needed on deployment, adoption and usage of communication services, as well as on emerging trends, to allow consistent communication public policy and regulatory design. Anatel, MCTIC and Cetic.br collect and report data on the communication sector. Anatel's ambitious data portal launched in 2019 compiles numerous indicators. These cover access, infrastructure coverage and technology, investment, numbering, allocation of licences, spectrum, competition, product certification, QoS and consumer issues.

However, granular data on the availability and quality of communication services in Brazil still need improvement. In particular, information on mobile and fixed broadband access to network coverage should be gathered regularly. This would ensure new obligations do not overlap with existing or planned infrastructure investments.

Brazil has taken important steps in this direction. Recently, Anatel improved a sectoral database through the Telecommunication Networks Structural Plan (Plano Estrutural de Redes de Telecomunicações). For its part, MCTIC commissioned studies to map broadband networks in Brazil.

References

Anatel (2020), *Relatório de Nível de Carga Tributaria e Custo de Serviços de Telecomunicações*, [Report on the Level of Tax Burden and Cost of Telecommunication Services], Agência Nacional de Telecomunicações, Brasilia, https://sei.anatel.gov.br/sei/modulos/pesquisa/md_pesq_documento_consulta_externa.php?eEP-wqk1skrd8hSlk5Z3rN4EVg9uLJqrLYJw_9INcO749ZU8ZBGqV8kq12EGBtZ1IHF52JvEnYmAN5rZfOeuv5M080Av6KUM0moZuZ7Tm0-0dHpzq0tstYZxofwhLfzQ. [1]

Anatel (2019), *Acordo de cooperação entre Anatel e Senacon é renovado*, [Cooperation Agreement between Anatel and Senacon is Renewed], news release, 31 October, Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/consumidor/tv-por-assinatura/direitos/fidelizacao/99-novidades/682-acordo-de-cooperacao-entre-anatel-e-senacon-e-renovado (accessed on 16 April 2020). [10]

Anatel (2019), *Anatel apresenta consulta pública do Regulamento de Fiscalização Regulatória em Salvador (BA)*, [Anatel presents Public Consultation of the Regulatory Monitoring Guidelines in Salvador de Bahia], news release, Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/institucional/noticias-destaque/2198-anatel-apresenta-consulta-publica-do-regulamento-de-fiscalizacao-regulatoria-em-salvador-ba. [13]

Anatel (2017), *Relatório Anual*, [Annual Report], Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/Portal/verificaDocumentos/documentoVersionado.asp?numeroPublicacao=348395&documentoPath=348395.pdf&Pub=&URL=/Portal/verificaDocumentos/documento.asp. [11]

Brazil (2018), *Guidelines and Guidebook for Regulatory Impact Analysis - RIA*, Presidência da República, Casa Civil, Brasilia, https://www.gov.br/casacivil/pt-br/assuntos/governanca/regulacao/apresentacao-regulacao-pasta/comite-interministerial-de-governanca-aprova-as-diretrizes-gerais-e-roteiro-analitico-sugerido-para-analise-de-impacto-regulatorio-diretrizes-air-e-o-guia-orient. [6]

Canada (1991), *Broadcasting Act*, https://laws-lois.justice.gc.ca/eng/acts/b-9.01/page-1.html#h-34144. [8]

CGI.br (2019), "Pesquisa sobre o Setor de Provimento de Serviços de Internet no Brasil-TIC Provedores 2017", [ICT Providers 2017: Survey on the Internet Service Provider Sector in Brazil], Comitê Gestor da Internet no Brasil, São Paulo, https://cetic.br/media/docs/publicacoes/2/tic_provedores_2017_livro_eletronico.pdf. [32]

Dewing, M. (2014), *Canadian Broadcasting Policy*, https://lop.parl.ca/sites/PublicWebsite/default/en_CA/ResearchPublications/201139E. [30]

European Commission (2016), "Commission publishes study on the cost of providing wholesale roaming services in the EU", European Commission, Brussels, 15 June, https://ec.europa.eu/digital-single-market/en/news/commission-publishes-study-cost-providing-wholesale-roaming-services-eu. [23]

European Commission (2009), "Commission Recommendation of 7 May 2009 on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU (2009/396/EC)", European Commission, Brussels, https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:124:0067:0074:EN:PDF. [22]

Ezell, S. and C. Foote (2019), *Assessing how Brazil would benefit from joining the ITA*, Information Technology and Innovation Foundation, Washington, DC, http://www2.itif.org/2019-brazil-ita.pdf?_ga=2.158135738.1630844014.1583859596-1037633162.1583859596. [20]

Internet para Todos (2020), *Internet para Todos: Conectando a los no Conectados*, [Internet for All: Connecting the Unconnected], Lima, http://www.ipt.pe/ (accessed on 15 May 2020). [29]

ITU (2009), *Regulatory Accounting Guide*, Telecommunication Development Bureau, International Telecommunication Union, Geneva, https://www.itu.int/ITU-D/finance/Studies/Regulatory_accounting_guide-final1.1.pdf (accessed on 16 April 2020). [21]

Ministério da Justiça (2013), "Senacon e Anatel irão fiscalizar serviços de telecomunicações", *Jusbrasil*, [Senacon and Anatel will Monitor Telecommunications Services], news release, 1 November, Ministério da Justiça, Brasilia, https://mj.jusbrasil.com.br/noticias/308535057/senacon-e-anatel-irao-fiscalizar-servicos-de-telecomunicacoes?ref=serp (accessed on 16 April 2020). [9]

Moreira, V. (2004), *Estudos de Regulação Pública - I. Centro de Estudos de Direito Público e Regulação (CEDIPRE)*, [Public Regulation Studies - I. Centre for Public Law and Regulation Studies], Universidade de Coimbra Faculdade de Direito, Coimbra Editora, Coimbra, http://bibliobase.infarmed.pt/Opac/Pages/Document/DocumentCitation.aspx?UID=baa24095-cea4-49b5-88dd-e51a07b15b8f&DataBase=10300_BIBLIO. [5]

OECD (2019), *A Policy Maker's Guide to Privatisation*, Corporate Governance, OECD Publishing, Paris, https://dx.doi.org/10.1787/ea4eff68-en. [27]

OECD (2019), *Economic Policy Reforms 2019: Going for Growth*, OECD Publishing, Paris, https://dx.doi.org/10.1787/aec5b059-en. [16]

OECD (2019), *OECD Peer Reviews of Competiion Law and Policy: Brazil*, OECD Publishing, Paris, http://www.oecd.org/daf/competition/oecd-peer-reviews-of-competition-law-and-policy-brazil-2019.htm. [24]

OECD (2019), *OECD Reviews of Digital Transformation: Going Digital in Colombia*, OECD Publishing, Paris, https://dx.doi.org/10.1787/781185b1-en. [17]

OECD (2018), *OECD Economic Surveys: Brazil 2018*, OECD Publishing, Paris, https://dx.doi.org/10.1787/eco_surveys-bra-2018-en. [15]

OECD (2018), *Regulatory Enforcement and Inspections Toolkit*, OECD Publishing, Paris, https://doi.org/10.1787/9789264303959-en. [14]

OECD (2017), *OECD Digital Economy Outlook 2017*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264276284-en. [3]

OECD (2017), *OECD Telecommunication and Broadcasting Review of Mexico 2017*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264278011-en. [19]

OECD (2016), *Indicators of Regulatory Policy and Governance Latin America 2016: Brazil*, OECD, http://www.oecd.org/gov/regulatory-policy/Brazil-regulatory-policy-ireg-2016.pdf. [7]

OECD (2015), *OECD Guidelines on Corporate Governance of State-Owned Enterprises, 2015 Edition*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264244160-en. [26]

OECD (2014), *OECD Review of Telecommunication Policy and Regulation in Colombia*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264208131-en. [18]

OECD (2014), *The Governance of Regulators*, OECD Best Practice Principles for Regulatory Policy, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264209015-en. [4]

OECD (2012), *OECD Review of Telecommunication Policy and Regulation in Mexico*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264060111-en. [31]

OECD (2008), *OECD Reviews of Regulatory Reform - Brazil: Strengthening Governance for Growth*, OECD Reviews of Regulatory Reform, OECD Publishing, Paris, https://doi.org/10.1787/9789264042940-en. (accessed on 3 August 2019). [2]

OECD (2006), *Evidentiary Issues in Proving Dominance*, Policy Roundtables, OECD Competition Committee, Paris, http://www.oecd.org/daf/competition/abuse/41651328.pdf. [25]

OECD (forthcoming), *Going Digital in Brazil*, OECD Reviews of Digital Transformation, OECD Publishing, Paris. [28]

Rosa, B. (2018), "Operadoras de telefonia só pagam 25% das multas aplicadas pela Anatel", [Telephone Operators Only Pay 25% of Fines Imposed by Anatel], 20 September, https://oglobo.globo.com/economia/operadoras-de-telefonia-so-pagam-25-das-multas-aplicadas-pela-anatel-23084518. [12]

Notes

[1] The term communication service is used along the document meaning services provided by telecommunication and cable operators.

[2] This is especially the case when traffic is unbalanced in favour of incoming traffic to those operators. This puts the larger operators in a position where they can gain competitive advantage and large profits from creating a substantial disparity between on-net and off-net call prices, exploiting what are known as "club effects" or "tariff-mediated network externalities" (OECD, 2012[31]).

[3] Both concepts are laid out in Law No. 9 472 of 1997, Articles 60 and 61: "Art. 60. Telecommunication services is the set of activities that enables the offer of telecommunication. §1° Telecommunication is the transmission or reception of symbols, characters, signs, writings, images, sounds or information of any nature, by wire, radio-electricity, optical means or any other electromagnetic process. [...]

Art. 61. Added value service is the activity that adds to a telecommunication service that supports it new utilities related to access, storage, presentation, movement or retrieval of information, but shall not be confused with the telecommunication service itself. §1º Added value service does not constitute telecommunication service and its provider can be classified as a user of the telecommunications service that supports it, with the rights and obligations inherent to this condition".

[4] See for instance Dewing (2014[30]), Canadian Broadcasting Policy, op. cit.

[5] Art. 5 SeAC. "Control or ownership of more than 50% (fifty percent) of the total and voting capital of companies providing telecommunication services of collective interest shall not be held, directly, indirectly or through a controlled company common, by concessionaires and licencees of sound broadcasting and of sound and images and by producers and programmers based in Brazil. […] Control or ownership of more than thirty percent (30%) of the total and voting capital of concessionaires or ownership of more than thirty percent (30%) of the total and voting capital of concessionaires and licencees of sound broadcasting and of sound and images and of producers and programmers based in Brazil shall not be held, directly, indirectly or through a company under common control, by providers of telecommunications services of collective interest […]."

[6] This difference in values is due to the fact that large companies, which tend to appeal to the judiciary, are responsible for high-value fines.

[7] The ICT Providers survey by CETIC.br/NIC.br estimated that Brazil had 6 618 ISPs, out of which 75% were small ISPs with fewer than 1 000 subscriptions (CGI.br, 2019[32]).

[8] The public consultation submitted in August 2019 can be found here: https://www.anatel.gov.br/institucional/noticias-destaque/2333-anatel-aprova-consulta-publica-para-diminuir-barreiras-a-expansao-de-iot-e-m2m-no-brasil.

2. Background on the telecommunication and broadcasting sectors

This chapter is divided between a historical overview of telecommunication policies and a survey of the broadcasting and pay TV sectors in Brazil. Beginning with the establishment of the first Brazilian Telecommunication Code in 1962, the chapter moves to the creation of Telebrás in 1972, and the policy changes that set the stage for liberalisation in the mid-1990s. It then discusses the regulatory and policy framework for the post-privatisation era, including the emergence of mobile voice services and broadband services. The second part traces the development of a policy framework for a national broadcasting market since the liberalisation of the sector. It examines the digital television terrestrial transition, efforts to promote made-in-Brazil audio-visual content and recent trends in broadcasting and pay TV.

Background on the Brazilian telecommunication sector

The telecommunication sector in Brazil has transformed considerably since the first Brazilian Telecommunication Code (Código Brasileiro de Telecomunicações, CBT) was established in 1962. Since then, the sector has been governed by two telecommunication legal frameworks and a multitude of revisions, policy plans and regulatory measures (Table 2.1). Understanding the historical background is crucial for identifying lessons learnt, as well as avenues for improvement.

Table 2.1. Summary of telecommunication milestones in Brazil

Year	Action	Legal instrument
August 1962	Brazilian Telecommunication Code (Código Brasileiro de Telecomunicações, CBT)	Law No. 4 117
July 1966	Telecommunications Oversight Fund Law (Fundo de Fiscalização das Telecomunicações, FISTEL)	Law No. 5 070
July 1972	Creation of the State-owned Telecomunicações Brasileiras S/A (Telebrás)	Law No. 5 792
July 1996	Minimum Law (Lei Mínima)	Law No. 9 295
July 1997	General Telecommunications Law (Lei Geral de Telecomunicações, LGT)	Law No. 9 472
October 1997	Anatel Bylaws (Regulamento da Agência Nacional de Telecomunicações)	Decree No. 2 338
April 1998	1st General Concession Plan (Plano Geral de Outorgas, PGO)	Decree No. 2 534
May 1998	1st Universal Service Plan (Plano Geral de Metas de Universalização, PGMU)	Decree No. 2 592
July 1998	Privatisation of the Telebrás system	x
August 2000	Universal Service Fund (Fundo de Universalização dos Serviços de Telecomunicações, FUST)	Law No. 9 998
November 2000	Telecommunications Technological Development Fund (Fundo para o Desenvolvimento Tecnológico das Telecomunicações, FUNTTEL)	Law No. 10 052
June 2003	2nd Universal Service Plan	Decree No. 4 769
April 2008	Amendment to 2nd Universal Service Plan	Decree No. 6 242
October 2008	General Regulatory Plan to update the telecommunication regulatory framework in Brazil (Plano Geral de Atualização da Regulamentação das Telecomunicações no Brasil)	Anatel's Resolution No. 516
May 2010	National Broadband Plan (Programa Nacional de Banda Larga, PNBL)	Decree No. 7 175
June 2011	3rd Universal Service Plan	Decree No. 7 512
November 2012	1st Competition Plan (Plano Geral de Metas de Competição, PGMC)	Anatel's Resolution No. 600
April 2014	Internet Civil Rights Framework of Brazil (Marco Civil da Internet)	Law No. 12 965
December 2018	4th Universal Service Plan	Decree No. 9 619
June 2019	Structural Plan of Broadband Networks (Plano Estrutural de Redes de Telecomunicações, PERT)	Anatel's Board Decision No. 309
October 2019	Amendment to the LGT and FUST	Law No. 13 879

Note: x = not applicable.

The liberalisation of the telecommunication sector

Brazil liberalised its telecommunication sector in the mid-1990s, following the international trend that had begun in the mid-1980s. As such, its liberalisation process was inspired and informed by the effects of policies in other countries, especially the United States, Europe and Latin America. Brazil's economic liberalisation was accompanied by a consistent increase in investment in the communication sector, mainly in infrastructure expansion. This led to a progressive growth in service coverage and an increased diversification of services.

Telebrás system

Prior to the liberalisation process, a State-owned monopoly provided telecommunication services in Brazil as mandated by the 1988 Constitution. This model had already been established through the CBT in 1962 (Brazil, 1962[1]), and the creation of Telebrás in 1972 (Brazil, 1972[2]).

After its creation, Telebrás gradually acquired almost all local telecommunication providers. The company encompassed 27 different providers (i.e. one per state),[1] in addition to the long-distance company Embratel. Some exceptions existed such as Companhia Riograndense de Telecomunicações, Centrais Telefônicas de Ribeirão Preto, Sercomtel Telecomunicações and Companhia de Telecomunicações do Brasil Central (a privately owned company). However, due to historic developments in the sector, Telebrás was the only provider for all types of telecommunication services. At the time, these services were divided into local, intra-state long-distance, inter-state long-distance and mobile services.

The regional subsidiaries of Telebrás (e.g. Telesp, Telerj, Telebahia, Telemig), owned their local infrastructure. However, these companies were resellers of long-distance services, which they bought at regulated prices from Embratel under a revenue-sharing approach. Just before the government began restructuring the telecommunication sector in 1995, the State owned slightly more than half the voting shares of Telebrás, but only 21.7% of its total capital. While Telebrás shares of its 28 regional subsidiaries varied, ultimately it controlled all of them.

Prior to liberalisation, all communication prices were regulated and local services subsidised. Prices for basic plans for fixed telephony represented a considerable small proportion in consumers' income in Brazil in 1995 (i.e. USD 2.94 [BRL 2.7] for residential, USD 10.24 [BRL 9.42] for commercial)[2]. However, prices for long-distance services were high and installation charges amounted to around USD 1 200 (BRL 1 100)[3] (Guerreiro, 2006[3]). All regional subsidiaries had a fixed-line waiting list and it could take two or three years until users were served (Teleco, 2019[4]). As a consequence of the unmet demand, a large secondary market developed. This was especially the case in densely populated areas with high demand. In the cities of São Paulo and Rio de Janeiro, for example, the price for a line could reach over USD 5 435 (BRL 5 000) (Batista and Ferreira, 2004[5]). As in some other countries, investments to expand the local network were mostly financed by issuing non-voting shares.

The market structure established in the 1960s and 1970s did not meet the rising demand for telecommunication services towards the mid-1980s. In the early 1990s, fixed voice penetration measured by fixed-local telephone lines per 100 inhabitants was only 7.4. This was far below the 50 lines per 100 inhabitants in the United States and 52 lines per 100 inhabitants in Western Europe in 1994 (ITU, 2019[6]). There was growing recognition that the telecommunication sector required large investments, which would probably have to come from the private sector. It also became increasingly evident that the public sector needed to strengthen its regulatory role, and invest in specific areas to fulfil social development and national security objectives.

In light of these developments, the Constitution was amended in 1995 to allow for private investment in the telecommunication sector (Emenda Constitucional No. 8 of 1995). A few months later, the Programme for Restoration and Expansion of the Telecommunications System and Postal System (Programa de Recuperação e Ampliação do Sistema de Telecomunicações e do Sistema Postal, PASTE) was published (Ministério das Comunicações, 1995[7]). The PASTE aimed to set the guidelines, goals, programmes and projects to expand telecommunication and postal services, including an investment plan for 1995-99. This

would provide incentives for private capital to enter the market. The programme estimated that BRL 91 billion would be needed by 2003 to satisfy rising demand.

Setting the stage for liberalisation reforms in the telecommunication sector

To set the stage for liberalisation, Law No. 9 295 (Lei Mínima) was approved in 1996. This allowed for private investment and competition in certain markets, most notably, mobile telephony (Brazil, 1996[8]). It set the basis for auctioning licences for the B-band spectrum (i.e. 835-845 MHz, 846.5-849 MHz paired with 880-890 MHz and 891.5-894 MHz). This was completed by mid-1997, raising revenues of over USD 7.6 billion. It resulted in the entry of international telecommunication players to Brazil (e.g. BellSouth, Telia, SK Telecom, TIM, DDI, Bell Canada, and TIW). In addition to introducing private investment in the mobile telephony market and enhancing competition, Law No. 9 295 obliged certain local telecommunication operators to create subsidiaries to provide mobile telephony services. This rule affected operators that had been granted spectrum in the A-band (i.e. 824-835 MHz and 845-846.5 MHz paired with 869-880 MHz and 890-891.5 MHz) with no initial payment in 1992-93.

After these first steps, Brazil reformed the sector extensively to carry out the liberalisation. The General Telecommunications Law (Lei Geral de Telecomunicações, LGT) (Brazil, 1997[9]), published in 1997, set in motion several changes. It provided the framework for providing all communication services in a competitive environment; the creation of an independent sector regulator, the National Telecommunications Agency (Agência Nacional de Telecomunicações, Anatel); and established the foundation for the privatisation of Telebrás. Through laws passed in 2000, the LGT mandated the creation of two telecommunication funds that still exist: the Universal Service Fund (Fundo de Universalização dos Serviços de Telecomunicações, FUST) and the Telecommunications Technological Development Fund (Fundo para o Desenvolvimento Tecnológico das Telecomunicações, FUNTTEL). The LGT also maintained oversight of the Telecommunications Oversight Fund (Fundo de Fiscalização das Telecomunicações, FISTEL), created in 1966 (Box 2.1).

At the time, the LGT divided licensing for provision of communication services into concessions (public regime) and authorisations (private regime).[4] On the one hand, the concession regime implies the obligation to provide universal service and continuity of service. On the other, it implies the State is obliged to guarantee the economic feasibility of the provision of services. Concessions for public services in Brazil generally require return of all assets needed to provide the service to the state at the end of the concession (reversibility of assets). The LGT also established that at least one provider needed to deliver fixed telephony through a concession, whereas other communication services could be provided exclusively through an authorisation. This implies that different operators in the same area could provide the same service (i.e. fixed telephony) under both the authorisation and concession regimes.

Once the LGT was approved, the structure of the sector regulator, Anatel, was defined in October 1997 with the publication of Decree No. 2 338 and its bylaws (Regulamento da Agência Nacional de Telecomunicações) (Brazil, 1997[10]). Anatel became operational in November of the same year. The LGT provided that FISTEL would give Anatel financial independence (Box 2.1).

Box 2.1. The Brazilian telecommunication funds

The LGT mandated the creation of two funds, one for universal service (LGT, art. 81, II) and another one for technological development (LGT, art. 77):

- The Universal Service Fund (Fundo de Universalização dos Serviços de Telecomunicações, FUST) was created with the enactment of Law No. 9 998 (Brazil, 2000[11]). This law established a contribution of 1% of telecommunication revenues to the fund for the expansion of telecommunication services. As its main objective, FUST finances expansion of services provided under the "public regime". Since the government decided in 1997 that fixed telephony was the only service to be provided under such a regime, the use of FUST is restricted to this service. As time has passed, it has become clear that the fund's objective – namely, increasing the number of fixed lines in service – does not match market needs and technological developments. While attempts have been made to update the laws restricting the use of funds to expand broadband access, none have succeeded.
- The Technological Development Fund (Fundo para o Desenvolvimento Tecnológico das Telecomunicações, FUNTTEL) was enacted by Law No. 10 052 (Brazil, 2000[12]). The fund collects 0.5% of operators' gross revenues. In contrast to FUST, significant parts of the revenues have been used for multiple purposes linked to research and development in the telecommunication sector.

The LGT also maintains the Telecommunications Oversight Fund (Fundo de Fiscalização das Telecomunicações, FISTEL) based on Law No. 5 070 from 1966 used to finance the Telebrás system (Brazil, 1966[13]). Since creation of the LGT, the fund has financed the administrative costs of the National Telecommunications Agency (Agência Nacional de Telecomunicações, Anatel). Telecommunication operators contribute to this fund based on every telecommunication station in service (i.e. not only antennas and base stations, but also mobile phones, among others). More details about the funds are provided in Chapter 7.

Sources: Brazil (1966[13]), "Lei No. 5 070, de 7 de julho de 1966", http://www.planalto.gov.br/ccivil_03/LEIS/L5070.htm; Brazil (2000[11]), "Lei No. 9 998, de 17 de agosto de 2000", http://www.planalto.gov.br/ccivil_03/leis/L9998.htm; Brazil (2000[12]), "Lei No. 10 052, de 28 de novembro de 2000", http://www.planalto.gov.br/ccivil_03/LEIS/L10052.htm.

The General Concession Plan and the Universal Service Plan for expanding access to fixed telephony services

The LGT established the development of several types of complementary regulation. These included the General Concession Plan (Plano Geral de Outorgas, PGO, Decree No. 2 534, 1998) and the Universal Service Plan (Plano Geral de Metas de Universalização, PGMU, Decree No. 2 592, 1998). Both were prerequisites for the privatisation of Telebrás.

The General Concession Plan set the competition conditions for public services i.e. fixed telephony based on the concession model. At the time, the government understood that concessions should only apply to fixed telephony, including long distance. The plan introduced four different service areas: three local regions and one national for long-distance services. For each region, the General Concession Plan established that one authorisation and one concession would be reserved exclusively for Telebrás subsidiaries. On the one hand, it served as a basis for the divestiture of Telebrás into regional companies during privatisation. On the other, it paved the way for transitional regional duopolies between

concessionaires of the public regime (i.e. Telebrás subsidiaries) and the regional companies with an authorisation under the private regime ("mirror companies" or "companhias espelho"). Both the regional limitation and duopoly were transitory measures that could be lifted before the 2003 deadline (when this clause would automatically expire) if the goals of the Universal Service Plan were met.

Complementing the objectives of the General Concession Plan, the Universal Service Plan set minimum growth targets of installed fixed lines for concession holders. It thus set the minimum pace of investment for the Telebrás subsidiaries that would be privatised. It mandated that Brazil would need at least 33 million fixed lines installed by 2001. Furthermore, local telephony service had to be available in all localities of more than 300 inhabitants by 2005; line-installation requests for local telephony had to be satisfied within a week.

The Universal Service Plan recognised that public access infrastructure was needed to provide general access to voice telephony. It mandated the installation of at least 981 300 public phones by 2001 and required general availability of the service. By 2005, public phone density had to be at least eight phones per 1 000 inhabitants. All localities with more than 100 inhabitants had to have at least one public phone.

Privatisation of Telebrás

In July 1998, the government privatised Telebrás. The government's 19.3% ownership stake in Telebrás was sold in a sealed-bid auction for USD 19 billion[5] (BRL 22 billion). This was 63.7% above the minimum reference price set by the Brazilian Development Bank (Banco Nacional de Desenvolvimento Econômico e Social), which was in charge of the process. Telebrás was divided into 11 different regional companies (i.e. three fixed-line and eight mobile companies), and one national company (i.e. Embratel). Large international operators entered the market (Telefónica, TIM, BellSouth, MCIWorldCom and Portugal Telecom, among others). This was in keeping with the regionalisation provision set forth by the General Concession Plan and during the B-band auction (i.e. 835-845 MHz, 846.5-849 MHz paired with 880-890 MHz and 891.5-894 MHz).

For each of the four regions defined in the General Concession Plan, Anatel awarded one authorisation through a bidding process in 1999 to provide fixed telephony services. This sought to gradually introduce competition into the fixed telephony market. In contrast to the privatisation of Telebrás, this auction process was not entirely successful. Market players deemed the original reserve prices set by Anatel were too high. Even after these prices were reduced, only two mirror companies were sold during the first round of the auction. The remaining companies had to be auctioned during a second round. The last company to be auctioned in 1999 (i.e. GVT in the Southern region) raised only USD 55 249 (BRL 100 000).[6] While concessionaires were subject to price caps included in their concession contracts, companies with authorisations were not subject to retail price regulation.

The regulatory and policy framework post-privatisation

The emergence of mobile voice services and broadband services

In 2001, Anatel auctioned spectrum licences for mobile services in three regions of the country. These licences were in the "C band" (1.725-1.740 GHz and 1.820-1.835 GHz), the "D band" (1.805-1.820 GHz) and the "E band" (1.835-1.85 GHz)" in the 1.8 GHz frequency band. Although the C band was auctioned twice, no bidders presented offers. The D band was awarded to Oi and TIM. While Oi became a full-service provider within its regional concession area, TIM achieved nationwide spectrum coverage through its participation in the E-band auction. By 2005, all blocks of the E band were assigned. The auction process,

carried out in 2000 and then 2004, awarded the authorisation in 2005. This ensured the transition from a concession model for mobile voice services, classified as Mobile Cellular Service (Serviço Móvel Celular) to an authorisation regime called Mobile Personal Service (Serviço Móvel Pessoal, SMP). This process completed the transition of mobile services from the concession regime – which existed before the LGT – to a new regime, in compliance with the LGT. The concession regime, however, persisted for fixed telephony services.

The first commercial Internet services were launched in 1995, following a policy known as Norm 4 of 1995 issued by the Ministry of Communications. The norm established that two firms would share Internet service provision. On the one hand, the telecommunication service provider (back then, the telephony concessionaire) would be responsible for the "last mile" access to users. On the other, the Internet service provider (ISP) (*provedor de serviço de conexão à Internet*) would be responsible for the Internet service layer (i.e. Transmission Control Protocol/Internet Protocol [TCP/IP] stack or any value-added service) (Ministério das Comunicações, 1995[14]).

This norm had a profound impact on how broadband services evolved in Brazil. Small and local ISPs emerged to provide Internet services using the last mile of the telephony networks. These were still regulated by the public regime and provided by State-owned monopolies at that time. The LGT expressly prohibited concessionaires to offer any service other than those stemming from their original concession. Therefore, a different company (i.e. ISPs) provided access to the Internet as a value-added service. In 1995, several dial-up providers emerged as ISPs.

In 2001, Anatel classified the last mile access layer of the non-dial-up Internet connection as a "multimedia communication service" (Serviço de Comunicação Multimídia, SCM) (Resolution No. 272, 9 August 2001). It established this service would be framed under the private authorisation regime.

Anatel's resolution set the criteria to obtain and transfer such an authorisation. Specifically, it allowed unlimited authorisations, determined quality of service parameters and prohibited use of SCM networks for services similar to fixed telephony. This allowed several smaller ISPs (formerly banned from providing last mile access) to request SCM authorisations. Many did, driving the expansion of broadband in the country (Knight, Feferman and Foditsch, 2016[15]).

Meanwhile, the 1995 norm was still in place. This meant that Internet services provided by ISPs were considered separate from the last mile access services. They were classified by Anatel as value-added services (serviços de valor adicionado, SVAs). As such, these services were not subject to telecommunication regulation. Anatel's oversight was limited to specific consumer-related issues, such as bundling of SVAs and telecommunication services.

The differentiation between multimedia communication services (SCMs) and SVAs used to be a historic driver for the development of broadband services in Brazil. However, it causes a series of legal uncertainties, particularly concerning tax arbitrage. The distinction between SCMs and SVAs for tax purposes is subject to discussions and legal disputes between companies in the sector and tax authorities. This leads to lack of clarity for the sector, affecting administrative resources needed by both companies and tax authorities (Chapter 7).

Updating universal service goals, the regulatory framework and Brazil's National Broadband Plan

The LGT established the end of 2005 as the expiration date for the fixed telephony concession contracts. It allowed the possibility of a one-time extension for an additional 20 years (i.e. until 2025). These conditions were initially stated in the original concession contracts.

The LGT also foresaw establishing new conditions for the concessions, including new universal service targets and quality parameters. The LGT established a minimum of 30 months before the 2005 deadline for concessionaires to express interest in the renewal of contracts. Therefore, negotiations began towards the end of 2002. The revised concession contracts included new conditions and universal service targets, stating that new conditions would be established every five years.

In 2003, new universal service conditions were established under an updated Universal Service Plan (PGMU II, Decree No. 4 769, 2003). These included the installation of urban and rural Public Access Stations for Telecommunication Services (Postos de Serviço de Telecomunicações) throughout Brazil. It also established that concessionaires had to provide a low-cost telephony option called "Special Class Individual Access" (Acesso Individual de Classe Especial, AICE).

In 2008, the obligation to install public access stations for telecommunication services was considered outdated due to technological change. Consequently, part of this obligation (for urban stations) was replaced by the commitment of concessionaires to expand Brazil's national backbone. This occurred in the context of an amendment to the updated Universal Service Plan (PGMU II, Decree No. 6 424, 2008). The change recognised that a national backbone to provide broadband services would have better economic effects than the installation of fixed telephony access points. Such access points required significant investments and would only have limited local benefits.

Anatel issued the General Regulatory Plan in 2008 to update the telecommunication regulatory framework in Brazil (Plano Geral de Atualização da Regulamentação das Telecomunicações no Brasil, Resolution No. 516, 2008). This recognised the need to revise regulation periodically to reflect changes in the market and technology. This plan, which served as a regulatory agenda for Anatel for subsequent years, had the following main objectives:

- increase broadband deployment
- reduce barriers to access and use of communication services by low-income families
- increase quality of services
- encourage development of bundled and convergent offers
- increase availability of specific products at lower prices in rural areas
- guarantee adequate levels of competition
- promote expansion of pay TV services
- foster development of national technologies, and the local information and communication technology (ICT) industry.

In 2010, the government published Brazil's National Broadband Plan (Programa Nacional de Banda Larga, PNBL, Decree No. 7 175, 2010). This set the target to connect 35 million households with broadband by the end of 2014. It also set the conditions so that Telebrás, the former holding of the privatised telecommunication companies, could play a role in implementing the PNBL.

In 2011, the National Broadband Plan was updated (Decree No. 7 512, 30 June 2011) again. This established new objectives for the low-cost telephony option (AICE) and public phones. It foresaw multifunctional stations providing telecommunication services, including Internet access, replacing rural Public Access Multifacility Stations (Posto de Serviço Multifacilidade). It also mandated access for people with disabilities, as well as a

"segmented fixed telephony offer" for rural areas. As well, it ratified obligations for the expansion of backhaul infrastructure set forth in the previous version in 2008. In addition, MCTIC and Anatel established terms of agreement with local telephony concessionaires to provide broadband services at a predetermined price to Brazilian municipalities.

In 2012, Anatel published the General Competition Plan (Plano Geral de Metas de Competição, PGMC) (Resolution No. 600, 2012). This increased competition by introducing interconnection rules, access to wholesale services and infrastructure sharing. Additionally, the Competition Plan put forward the concept of significant market power, based on the definition of relevant markets. It included the possibility of imposing *ex ante* asymmetric regulation based on the outcomes of the market assessment.

In 2013, Anatel updated the "multimedia communication" services' (SCM) regulation regarding broadband services (Resolution No. 614, May 2013). This resolution streamlined authorisation for broadband service to a single SCM (without the strict need of an ISP responsible for the layer of value-added services). It also obliged broadband providers to comply with network neutrality principles and to keep Internet log registries for all connections for one year.

The changes also substantially reduced the price of authorisations for broadband services (from USD 4 167 [BRL 9 000] to USD 185 [BRL 400]),[7] thus reducing an important entry barrier for small ISPs. Furthermore, it exempted small providers (with fewer than 50 000 subscribers) from burdens related to customer service.[8] The changes also allowed the possibility of bundling offers with a predetermined ISP (a commercial arrangement prohibited for larger ISPs).

Anatel introduced additional exemptions for small providers with fewer than 5 000 subscribers. These related to service interruption notice to Anatel, user complaint registry and a call recordings archive. In 2017, Anatel's Resolution No. 680 further simplified the procedure for obtaining an SCM authorisation. It also exempted ISPs with fewer than 5 000 subscribers from the need to obtain an authorisation.

In 2014, Brazil became one of the first countries to adopt an Internet Civil Rights Framework (Marco Civil da Internet) (Brazil, 2014[16]). This framework was an important development in the legal and regulatory environment for broadband services and the use of the Internet in Brazil. It included issues related to network neutrality, freedom of expression, privacy, data protection and the limited responsibility of ISPs.

In 2016, Brazil launched a second phase of the National Broadband Plan (Programa Brasil Inteligente). It sought to cover at least 75% of municipalities with fibre optic infrastructure backhaul. It also aimed to connect 30 000 schools with broadband connection speeds of 72 Mbps. In addition, it would promote investments in the next generation of wireless networks, 5G and the Internet of Things (IoT). Other objectives included covering rural villages with mobile broadband, serving government facilities, increasing international connectivity and making satellite broadband connectivity available for civil and military activities. The Amazônia Conectada programme, created in 2015, was incorporated into this new plan. The government committed to invest USD 115 million (BRL 400 million)[9] by 2020 into Amazônia Conectada.

In 2018, the fourth version of the Universal Service Plan was published (Decree No. 9 619, 20 December 2018), building extensively on previous versions. The main change was inclusion of the obligation to install fixed wireless broadband services in 1 473 localities using 4G technology or higher. In addition, 10% of all localities should have this service available by the end of 2019.

In 2018, Anatel's Resolution No. 694 revised the relevant markets, as well as the players with SMP. According to its Competition Plan, an operator was considered a small provider if it had less than 5% national market share in the segments in which it operated. It also introduced the adoption of cost-oriented models for monitoring prices of wholesale products.

Although the regulatory framework has made it difficult to shift efforts and resources from fixed telephony to other priorities such as broadband, Brazil has managed to foster development of broadband services through other initiatives. In June 2019, Anatel approved a new plan, to be updated yearly. It aimed to increase broadband penetration by promoting co-ordinated efforts and investments between the private and public sectors (Plano Estrutural de Redes de Telecomunicações, PERT). The plan analyses the state of broadband deployment, including mapping broadband access network infrastructure with different technologies (mobile, fixed and satellite), as well as backbone infrastructure (fibre and radio). Additionally, it puts forward projects to reduce gaps. These include expanding the backbones (fibre, radio and satellite); extending mobile broadband coverage to unserved areas, improving mobile coverage (4G and 5G) in cities; developing high capacity networks in cities (e.g. fibre-to-the-home); and further deploying networks to support public services.

As described above, Brazil's telecommunication policy and regulatory agenda has focused on two pillars of the LGT set in 1997, i.e. universal service coverage and competition. The main measures introduced aimed at promoting investment in network deployment to increase coverage and addressing digital divides in underserved areas. Brazil is implementing or analysing several initiatives to reduce entry barriers to communication markets. Other recent government initiatives include modernising the licensing regime, incentivising infrastructure sharing and developing a framework to ease infrastructure deployment. In addition, Brazil is reviewing use of tax levies on emerging technologies (e.g. changes in FISTEL charges for the IoT), as well as measures to increase spectrum availability and improve spectrum management (Chapter 5).

Reforming the LGT and implementing the reform

Discussions around updating Brazil's legal and regulatory framework have been taking place for over a decade. Since 2008, Anatel has sought out mechanisms to update the regulatory framework under its responsibility. Due to these efforts, it has made advances on collecting data from the sector, reporting on access and quality of services, and conducting market reviews. These are all essential activities both to improve effectiveness of regulation and to increase certainty for stakeholders.

Most recently, in October 2019, after four years of discussions in Congress, a substantial reform for the telecommunication sector was approved. Law No. 13 879 (formerly known as Projeto de Lei da Câmara No. 79 of 2016, PLC 79) amended the LGT to allow fixed telephony concessions to migrate to the private authorisation regime (Brazil, 2019[17]). The initial proposal to modify the fixed telephony regime in Brazil was first presented to the Chamber of Deputies in 2015 (Bill No. 3 453) and approved in 2016. The Senate discussed the bill until September 2019, when it was finally approved.

As the main change of Law No. 13 879 (hereafter the "2019 reform"), operators under the public regime (fixed telephony) could apply to migrate their concession into an authorisation, and thus provide their services under the private regime. The reform recognises that fixed telephony is no longer the core of telecommunication services as deemed in the original 1997 framework. Moreover, it recognises the asymmetric regulation established in 1997 on incumbent players due to the privatisation of Telebrás was no longer necessary.

Another important point of the reform consists in addressing the reversion of assets linked to concessions. As a rule, when a concession ends, the assets used to provide public regime services should be returned to the State (i.e. "reversible assets"). This does not apply to services provided under an authorisation. By allowing migration to the authorisation (i.e. private) regime, the reform allows current concessionaires to anticipate the end of their contracts without returning the reversible assets, while nonetheless making investment commitments. Anatel approves the methodology to establish the value of these "reversible assets".

It has long been argued that the reversibility clause within the public regime has deterred further private investment. In a converging communication market, an IP network arguably allows for the provision of multiple services, most of which are provided under the private regime. Since 1994, service authorisations are valid indefinitely (Law No. 9 472 of 1994). One technical restriction is the availability of spectrum, which is usually assigned through auctions.

The 2019 reform allows for an indefinite renewal of spectrum licences without an auction process. The latter change, however, reduces tools available to foster competition in the mobile market. It may hinder new entrants from entering the market through spectrum auctions (Chapter 5). The 2019 reform also opened up the possibility for a secondary market for spectrum.

The 2019 reform further enabled in-kind payments for licences. In other words, concessionaires can make the transition to the private regime by committing to invest in their own network. Anatel will calculate the value of this investment by considering the difference between the value to be created by operating in the private vs. public regime. This calculation will consider the value of all reversible assets (active and essential assets effectively used for fixed telephony). Anatel has to approve these investment commitments. The possibility of replacing fees by investment commitments also applies to spectrum licences.

When calculating the values to be paid or converted into investment, the main issue for Anatel will be how to determine the value of reversible assets. The 2019 reform does not indicate the need of an inventory. Rather, it states generally that Anatel should calculate the value of active and essential assets effectively used to provide public regime services. The Federal Court of Accounts (Tribunal de Contas da União, TCU)[10] had previously defended the position that Anatel should keep a detailed inventory for the valuation of reversible assets. TCU may audit all calculations as the reversible assets in principle belong to the state. Anatel published on 7 February 2020 a public consultation on the methodology to assess the reversible assets (CP No. 5 of 2020).[11]

One of the main historical challenges of Brazil's legal and regulatory framework for telecommunication has been to move from a focus on fixed telephony to convergence, including access to broadband services. The original framework, reflected in both the LGT and other adjacent laws, was built on the need to provide universal voice services. To a certain extent, the development and expansion of all other services was left to the private sector. As convergence started accelerating, and data transmission started to become central, the former universal service objectives quickly became outdated.

The reform of the LGT through Law No. 13 879 is an important first step for Brazil to move from the original framework to one based on convergent communications. Nevertheless, regulations need updating, including use of the Universal Service Fund (Fundo de Universalização dos Serviços de Telecomunicação, FUST) to expand broadband services. A transition process will be needed to minimise disruptions and create the right incentives and conditions for all stakeholders in the entire value chain.

Background on the broadcasting and pay TV sectors in Brazil

A policy framework designed for a national broadcasting market

With over 200 million people, Brazil is the largest Portuguese-speaking market for audio-visual services in the world. Most of its neighbours share Spanish as their official language. This linguistic isolation sets Brazil apart in the region. It is particularly relevant for understanding the background of the production of audio-visual services in the country. It also speaks to why the country creates laws to foster Brazilian and regional culture and promote the Portuguese language.

Brazil launched commercial free-to-air (FTA) television in 1950.[12] In 1962, it adopted the Brazilian Code of Telecommunications (Código Brasileiro de Telecomunicações, CBT), which was implemented a year later (Brazil, 1962[1]). The CBT was the first law to regulate the broadcasting and telecommunication sectors. It is still the main legal framework for broadcasting in the country, despite significant changes in this market.

When the CBT was issued, the broadcasting market in Brazil was dominated by Diários Associados, which owned 17 of around 30 FTA stations. However, the entry of Globo in 1965 soon decreased the market share of Diários Associados. Globo quickly became the broadcaster with the largest audience. To counter this market concentration trend, Decree No. 236 of 1967 stated a given broadcaster could only own five stations. This was inspired by regulations issued by the Federal Communications Commission (FCC) in the United States.[13] Following the American model, Brazil sought to establish a third national broadcasting network to foster competition between the two main commercial players.

In general, different administrations in Brazil based their approach to FTA television on Decree No. 20 047 of 1931. This decree established the principles that broadcasting, understood then as radio broadcasting, was a sector of national interest requiring State supervision. The decree separated regulation of broadcasting infrastructure and content; the State aimed at expanding these services. Moreover, the decree contributed to the understanding that broadcasting regulation depended on the technology in use and not on the services provided. Finally, another inheritance from the decree is the understanding that broadcasters had a set of rights (e.g. licences) that emerged in the 1930s. This included holding spectrum, which was recognised in the regulatory framework of 1931 (Penna Pieranti, 2011[18]).

While the CBT was a first step towards regulating FTA television, it still lacked objective criteria (such as financial requirements) for the concessions for these services. Since then, some economic criteria have become part of the process, such as financial viability. However, broadcasting concessions continue to rely on subjective criteria and to be the prerogative of the President (delegated to a minister). Lack of improvements in the legal framework could be due partly to lack of ministry staff to develop technical or public policy standards for broadcasting (Penna Pieranti, 2011[18]).

The Ministry of Communications only issued the first plan to regulate technical issues related to spectrum interference and coverage for broadcasting services in 1973. Before then, spectrum was a free resource for broadcasters. Each interested party would use it at will, and then register in the ministry without any planning.

While the 1988 Constitution addressed several sectors, it maintained the previous understanding of the State and private agents in the area of broadcasting. It incorporated the already established actors in the new constitutional framework of the country (and consequently, their use of the already assigned spectrum). The Constitution also affirmed the principle of national interest in the area of broadcasting and established a set of policy principles and regulatory guidelines, including the following:

- Article 220 ensures freedom of expression in the media, but allows for regulation to protect minors or to enable individuals or families to protect themselves against advertisement for potential harmful products or services (e.g. tobacco, pesticides).
- Article 221 establishes preferred content in areas such as: i) educational, artistic, cultural and news content; and ii) independent productions that foster national and regional culture, with regional differentiation being envisioned.
- Article 222 establishes strict limitations on ownership and cross-ownership. Audio-visual, radio and print (newspaper) media may only be owned by native Brazilians or those naturalised for more than ten years, or by firms registered and headquartered in Brazil. Native Brazilians or those naturalised for more than ten years must own at least 70% of the voting stock and capital of a firm that owns the media organisation. They must also have exclusive editorial responsibility and selection of programming. As a consequence, foreign direct investment (FDI) is limited to 30%.
- Article 223 states the Executive Power will manage licences. Congress must approve granting or renewal of any licence or concessions (or any decision not to renew). Broadcasting is divided into three systems: public, private and State-owned.

In addition to general provisions in the Constitution, Decree No. 236 of 1967 – established under the Institutional Act No. 4 – further limits economic concentration in the audio-visual market in three ways. First, it prohibits a natural person from controlling more than four medium wave (MW) local radio stations and six frequency modulation (FM) local radio stations. Second, it prohibits more than three regional MW stations and three regional tropical wave (TW) stations, with a maximum of two per state. Third, it prohibits more than ten FTA concessions at the national level; no more than five very high frequency (VHF) television stations are permitted, with no more than two per state.

Decree No. 236 of 1967 established that a single natural person or company is prohibited from owning two stations of the same nature in the location of the service (city or region). However, the provision is not respected. The lack of oversight has enabled broadcasters to bypass this limitation on concentration. Specifically, they use a series of networks and retransmitting stations and report different people as shareholders (Reporters Without Borders and Intervozes, 2017[19]). This enabled a perpetuation of conglomerates that concentrate political and economic power in the broadcasting sector.

Discussions around the privatisation of telecommunication services raised the issue of a converged regulator to oversee both telecommunication and broadcasting. The intention was to have an Agency for Communications instead of Anatel. This plan was never implemented due to pressure from the broadcasting sector.

In the 2000s, several discussions around media plurality took place on the access of minorities and the workers' unions to radio and FTA television. However, they had little practical effect on public policies (Reporters Without Borders and Intervozes, 2017[19]).

Digital terrestrial television transition

Many countries have transitioned to digital terrestrial television (DTT). On the one hand, DTT seeks to free-up the 700 MHz spectrum frequency band used by the analogue television broadcasters. This would allow its use for wireless broadband services (LTE/4G and now 5G). On the other, it acts to modernise broadcasting by providing more channels and higher image quality to viewers. In Brazil, Decree No. 5 820 of 2006 set out the rules for the transition; the DTT switchover started in 2007. By the end of 2018, the analogue signals of

1 379 municipalities had been switched off. Out of 5 570 of total municipalities, this makes about 24% of municipalities, which cover 62% of the Brazilian population. By 2023, all analogue television transmitters are expected to be switched off.

Audio-visual content

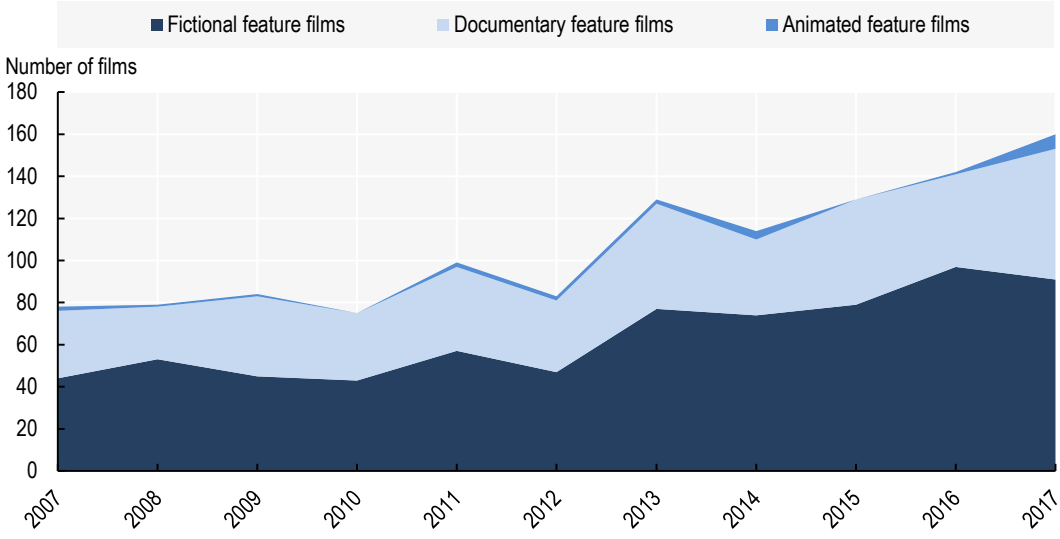
Brazil has historically been active in the production of audio-visual content. Embrafilme, for example, was a State-owned (70%) Brazilian company created in 1969. It functioned both as a producer and distributor, as well as the regulatory authority. Embrafilme produced some 25 new feature films per year, at an average budget of some USD 500 000 to USD 600 000 each (Nogueira, 1998[20]).

In 1990, in a period of privatisation, Embrafilme got out of the production market. The abrupt ending had strong implications for the audio-visual industry in Brazil, given its dependency on Embrafilme for financial support to produce audio-visual content. From 1994 to 1998, Brazil produced only 40 films (UNESCO, 2000[21]). This represented an average of 8 per year instead of 25, a decline of two-thirds from Embrafilme's output. Cinema attendance fell to just 0.8 per person per year (UNESCO, 2000[21]). In 1993, the Brazilian film industry produced only about 0.6% of all films exhibited in the country (Silva and Silva, 2015[22]).

The situation changed in 2001 with Provisional Measure No. 2 228, which created the National Agency for Cinema (Agência Nacional do Cinema, Ancine). This, in turn, established the Programme for Support to the Development of the National Cinema (Programa de Apoio ao Desenvolvimento do Cinema Nacional, PRODECINE) and the Audio-visual Fund to Foster National Cinema (Contribuição para o Desenvolvimento da Indústria Cinematográfica, CONDECINE).[14]

Three main instruments were put in place to foster audio-visual content promotion. First, the Audio-visual Sectoral Fund (Fundo Setorial do Audiovisual, FSA) was established to subsidise the production of Brazilian content. Second, quotas determined when Brazilian movie theatres must show films of Brazilian origin. Third, quotas for Brazilian content were set for television channels.

Figure 2.1. Number of feature films produced in Brazil by genre, 2007-17



Note: For a data dictionary and for background, see http://data.uis.unesco.org/.
Sources: UNESCO (2020[23]), *UIS.stat* (database), http://data.uis.unesco.org/ (accessed on 15 March 2020).

The combined effects of these measures have been substantial. The 160 films produced in Brazil in 2017 equalled four times the combined production from 1994 to 1998. From 2007 to 2017, the Brazilian audio-visual sector produced a large number of fictional feature films, a substantial number of documentary feature films and some animation feature films (Figure 2.1). This level of production is comparable to that of other countries.

Within this growing domestic production, complementary measures were needed. These would ensure sufficient production by suppliers that was independent of broadcasters, as well as a sufficient supply of regional (versus national) content. Moving from the supply side to the demand side, regional and independent audio-visual works also needed to be widely available on Brazilian television and widely exhibited in Brazilian movie theatres.

Recent trends in broadcasting and pay TV

Since the 1988 Constitution, little has changed in broadcasting regulation beyond the revision of technical standards and technical co-operation agreements between the Ministry of Science, Technology, Innovation and Communications (Ministério da Ciência, Tecnologia, Inovações e Comunicações, MCTIC) and Anatel.

Amendments to the Constitution in 1995 allowed for liberalisation of the telecommunication sector. They also produced a stronger separation between telecommunication services and broadcasting services. Previously, these services were understood to be under the same "public telecommunication services" umbrella. Despite the profound changes deriving from the LGT and the creation of the telecommunication regulator in 1997-98, the role of managing broadcasting concessions was excluded from Anatel's mandate. Its only responsibilities in this area included elaboration of spectrum plans and technical monitoring of channel distribution plans for broadcasting (Wimmer and Penna Pieranti, 2009[24]).

Regulation of pay TV services was left in a grey area. Anatel was gradually charged with issuing certain regulatory measures. For historical reasons, including those mentioned above, pay TV had been regulated by the deployed technology, and not by the service provided. In 1995, the cable TV law was approved (Lei do Cabo, Law No. 8 977, 1995). This law was not changed with the publication of the LGT, which regulated other forms of pay TV services (multichannel multipoint distribution service) and satellite TV ("direct-to-home", DTH). It established a limit on foreign ownership of 49% on these services.

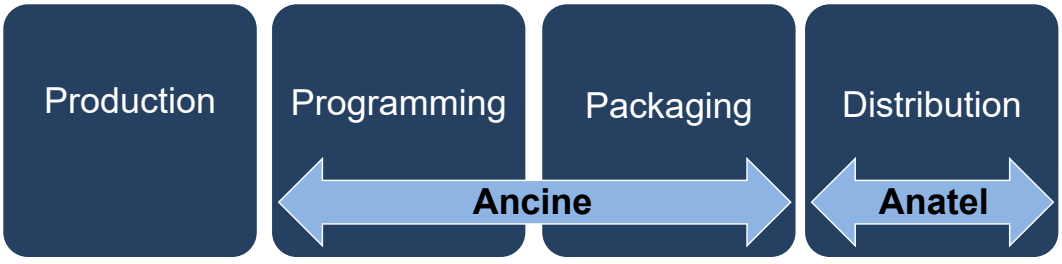
In 2001, Provisional Measure No. 2 228, altered by Law No. 10 454 in 2002, introduced a fee for the film industry. This fee – CONDECINE – was levied on the marketing and promotion, production and distribution of commercial motion pictures and videos.

In 2011, however, a specific pay TV law (Lei do Serviço de Acesso Condicionado, SeAC) was approved (Brazil, 2011[25]). The legal framework transitioned to a framework based on the service provided, and not the technology used. It divided the value chain for pay TV services into four elements: production, programming, packaging and distribution. It also distributed regulatory roles. Ancine would be responsible for programming and packaging, while Anatel would oversee distribution (Figure 2.2).

The SeAC law intended to open the market to new competitors (allowing more foreign ownership of pay TV services) and stimulate the production of Brazilian audio-visual content. However, it also aimed at avoiding excessive vertical integration in the market. In so doing, it sought to protect Brazilian audio-visual producers and programmes from competition by telecommunication or foreign providers. Provisions in articles 5 and 6 are especially relevant:

- Article 5 prohibits Brazilian telecommunication service providers from owning (or controlling) more than 30% of a producer or programmer with headquarters in Brazil, excluding those that produce works exclusively for distribution outside Brazil.
- Article 6 prohibits Brazilian telecommunication service providers and all of their affiliates (with or without headquarters in Brazil) from hiring national artistic talents or licensing events of national interest with a view to producing audio-visual content for distribution by those service providers.

Figure 2.2. Pay TV value chain and oversight according to the SeAC law



In addition, the SeAC law established that CONDECINE had to be collected from telecommunication providers that were offering pay TV services. These fees would help the FSA foster Brazilian audio-visual content. Collected and managed by Ancine, CONDECINE is the most important fund for the promotion of local audio-visual content in Brazil (Chapter 7).

Shortly after enactment of the SeAC law, the Brazilian audio-visual sector again witnessed profound developments. Since 2015, audio-visual services provided by streaming (over-the-top [OTT] services) have been growing exponentially in Brazil. Netflix, for example, has the largest market share among all OTT providers (Chapter 3). New entrants driven by technological developments and new business models have exerted pressure on pay TV providers, which have seen competition increase and subscriptions decline. This shift has also brought into question the regulatory limitations on the integration of the pay TV value chain. OTT providers, for example, are involved in production, programming and packaging. In this respect, recent discussions have emerged around the SeAC law on the fragmentation between Ancine and Anatel; the prohibition against vertical integration; and the strict limits imposed on cross-ownership between telecommunication and pay TV services.

In April 2019, Anatel's president formalised a position in a letter to Congress regarding a potential SeAC reform, noting

> *(the) need to revisit the limitations on cross-ownership between telecommunication service providers and content-producing and programming companies, established in the SeAC law. Besides no longer being useful, such a prohibition today creates non-equal treatment between companies and impedes the emergence of new business models and innovation in the sector, to the detriment of serviced consumers (Anatel, 2019[26]).*

In February 2020, Anatel's Board of Commissioners decided the limitation on cross-ownership was not valid for foreign companies. The decision was informed by the merger case between AT&T and Time Warner.

The telecommunication sector has evolved enormously since the 1960s. However, dichotomies imposed on the regulatory and institutional frameworks for FTA broadcasting and pay TV in Brazil have a legal basis that dates back more than 50 years. At the time of the CBT, it

may have made sense to distinguish between broadcasting (which in many ways functions as a non-excludable national public good), commercial pay TV and the provision of communication services. However, these arrangements may have outlived their usefulness: the ways of distributing audio and audio-visual content proliferate and converge over IP networks. A thorough review is required to foster a more integrated and future-oriented approach. Such a review should encompass several areas such as concessions, spectrum licences, ownership and cross-ownership, FDI and general broadcasting.

References

Anatel (2019), *Anatel apresenta consulta pública do Regulamento de Fiscalização Regulatória em Salvador (BA)*, [Anatel presents Public Consultation of the Regulatory Monitoring Guidelines in Salvador de Bahia], news release, Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/institucional/noticias-destaque/2198-anatel-apresenta-consulta-publica-do-regulamento-de-fiscalizacao-regulatoria-em-salvador-ba. [26]

Batista, V. and F. Ferreira (2004), *Evolução do setor de telecomunicações no Brasil*, [The evolution of the telecommunication sector in Brazil], Faculdade Oswaldo Cruz, São Paulo, https://www.oswaldocruz.br/download/artigos/social10.pdf. [5]

Brazil (2019), "Lei No. 13 879, de 3 de outubro de 2019", [Law No. 13 879 of 3 October 2019], Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/_Ato2019-2022/2019/Lei/L13879.htm. [17]

Brazil (2014), "Lei No. 12 965, de 23 de abril de 2014", [Law No. 12 965 of 23 April 2014], Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/_ato2011-2014/2014/lei/l12965.htm. [16]

Brazil (2011), "Lei No. 12 485 de 12 de setembro de 2011 (Lei do Serviço de Acesso Condicionado)", [Law No. 12 485 of 12 September 2011 (Pay TV law)], Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/_Ato2011-2014/2011/Lei/L12485.htm. [25]

Brazil (2000), "Lei No. 10 052, de 28 de novembro de 2000", [Law No. 10 052 of 28 November 2000], Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/LEIS/L10052.htm. [12]

Brazil (2000), "Lei No. 9 998, de 17 de agosto de 2000", [Law No. 9 998 of 17 August 2000], Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/leis/L9998.htm. [11]

Brazil (1997), "Decreto No. 2 338, de 7 de outubro de 1997", [Decree No. 2 338 of 7 October 1997], Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/decreto/D2338.htm. [10]

Brazil (1997), "Lei No. 9 427, de 16 de julho de 1997", [Law No. 9 427 of 16 July 1997], Presidência da República, Brasilia, http://www.planalto.gov.br/Ccivil_03/leis/L9472.htm. [9]

Brazil (1996), "Lei No. 9 295, de 19 de julho de 1996", [Law No. 9 295 of 19 July 1996], Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/LEIS/L9295.htm. [8]

Brazil (1972), "Lei No. 5 792, de 11 de julho de 1972", [Law No. 5 792 of 11 July 1972], Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/LEIS/L5792.htm. [2]

Brazil (1966), "Lei No. 5 070, de 7 de julho de 1966", [Law No. 5 070 of 7 July 1966], Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/LEIS/L5070.htm. [13]

Brazil (1962), "Lei No. 4 117, de 27 de agosto de 1962", [Law No. 4 117 of 27 August 1962], Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/leis/L4117.htm. [1]

Guerreiro, R. (2006), *Telecomunicações*, [Telecommunications], Universidade Estácio de Sá and Editora Rio, Rio de Janeiro. [3]

ITU (2019), *World Telecommunication/ICT Indicators*, (database), https://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx (accessed on 10 October 2019). [6]

Knight, P., F. Feferman and N. Foditsch (2016), *Banda Larga no Brasil - Passado, Presente e Futuro*, [Broadband in Brazil - Past, Present and Future], Novo Século Livraria e Editora Ltda, São Paulo. [15]

Ministério das Comunicações (1995), "Portaria No. 148, de 31 de maio de 1995", [Ministerial Ordinance No. 148 of 31 May 1995], Ministério das Comunicações, Brasilia, https://www.anatel.gov.br/legislacao/normas-do-mc/78-portaria-148. [14]

Ministério das Comunicações (1995), *Programa de Recuperacao e Ampliacao do Sistema de Telecomunicacoes e do Sistema Postal (PASTE)*, [Programme for the Recovery and Expansion of the Telecommunications and Postal System (PASTE)], Ministério das Comunicações, Brasilia. [7]

Nogueira, R. (1998), "Qualquer coisa é melhor que a Embrafilme", [Anything is better than Embrafilme],13 October, Folha de S. Paulo, https://www1.folha.uol.com.br/fsp/ilustrad/fq13109806.htm. [20]

Penna Pieranti, O. (2011), *O Estado e as Comunicações no Brasil: Construção e Reconstrução da Administração Pública*, [Communications and the State in Brazil: the Building and Re-building of the Public Administration], Abras/Lecotec, Brasilia, https://octaviopieranti.files.wordpress.com/2018/08/o-estado.pdf. [18]

Reporters Without Borders and Intervozes (2017), *Media Ownership Monitor Brazil*, https://brazil.mom-rsf.org/en/. [19]

Silva, C. and S. Silva (2015), *Cinema in Brazil*, Tosta, A.L. de Andrade; Coutinho, E.F., eds, ABC-Clio, Santa Barbara. [22]

Teleco (2019), *Modelo Básico de Assinatura: Evolução das Telecomunicações*, [Basic Subscription Model: Evolution of Telecommunications], webpage, http://www.teleco.com.br/tutoriais/tutorialmbassin/pagina_3.asp (accessed on 10 May 2019). [4]

UNESCO (2020), *UIS.stat (database)*, http://data.uis.unesco.org/ (accessed on 15 March 2020). [23]

UNESCO (2000), *World Culture Report 2000: Cultural Diversity, Conflict and Pluralism*, UNESCO, Paris, https://unesdoc.unesco.org/ark:/48223/pf0000121058. [21]

Wimmer, M. and O. Penna Pieranti (2009), "Serviços públicos de radiodifusão? Incoerências, insuficiências e contradições na regulamentação infraconstitucional [Public Broadcasting Services? Inconsistencies, Insufficiencies and Contradictions in the 'Infra-Constitutional' Regulatory Framework]", *Revista de Economía Política de las Tecnologías de la Información y Comunicación*, No. XI, http://www.eptic.com.br. [24]

Notes

[1] With the exception of Rio Grande do Sul, which did not have a Telebrás company.

[2] Using the exchange rate of 0.918 BRL/USD for the year of 1995 from OECD.stat (https://stats.oecd.org/).

[3] Using the exchange rate of 0.918 BRL/USD for the year of 1995 from OECD.stat (https://stats.oecd.org/).

[4] Permissions also existed, although this legal figure has never been used.

[5] Using the exchange rate of 1.16 BRL/USD for the year 1998 from OECD.stat (https://stats.oecd.org/).

[6] Using the exchange rate of 1.81 BRL/USD for the year 1999 from OECD.stat (https://stats.oecd.org/).

[7] Using the exchange rate of 2.15 BRL/USD for the year 2013 from OECD.stat (https://stats.oecd.org/).

[8] This meant, for example, that call centres could be available at least 12 instead of 24 hours per day, and that call records could be kept for 90 rather than 100 days.

[9] Using the exchange rate of 3.33 BRL/USD for the year 2015 from OECD.stat (https://stats.oecd.org/).

[10] TCU's role is described in detail in Chapter 4.

[11] See https://sistemas.anatel.gov.br/SACP/Contribuicoes/TextoConsulta.asp?CodProcesso=C2305&Tipo=1&Opcao=andamento.

[12] Assis Chateaubriand carried out the first commercial FTA transmission through TV Tupi on 18 September 1950.

[13] The FCC employs a limitation on number of audience rather than number of stations.

[14] This legal act was further amended by Law No. 10 454 of 2002, on the CONDECINE, and Law No. 11 437 of 2006 and Law No. 12 485 of 2011 (SeAC).

3. Market developments

This chapter discusses market developments in the telecommunication and broadcasting sectors in Brazil. It examines telecommunication revenue and investment, as well as the availability and quality of communication access paths. After assessing the availability and quality of communication services, it looks at affordability and usage. The last part of the chapter explores essential inputs to communication infrastructures such as backhaul and backbone connectivity, autonomous systems, Internet exchange points, submarine fibre cable, data centres and spectrum availability. The chapter ends with an overview of competition-related concerns, and recent trends in the broadcasting sector and pay TV.

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

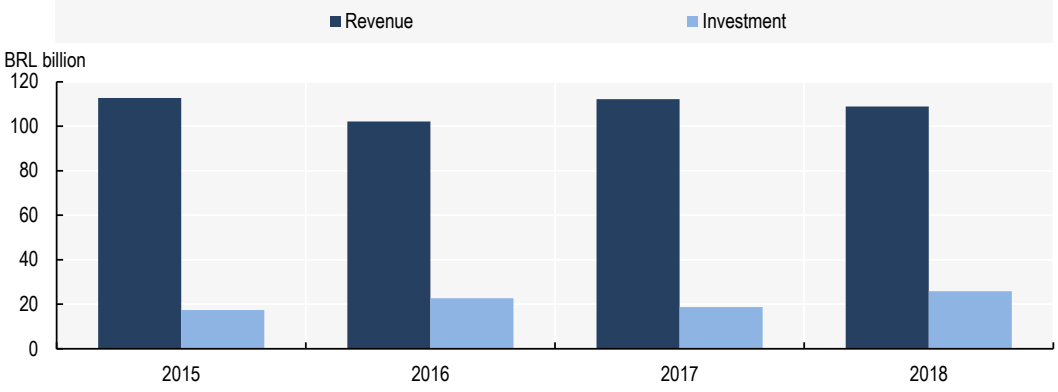
Developments in the communication sector in Brazil

This chapter examines trends and structural features of the communication market in Brazil. The first section provides an overview of investment and revenues in the communication sector, indicators of the evolution of fixed and mobile broadband markets, and developments in machine-to-machine (M2M) subscriptions. The remainder discusses key communication market developments and market structures.

Telecommunication revenue and investment

Revenues and investment in the Brazilian telecommunication market have remained relatively stable since 2015. By 2018, total revenue and investment in the telecommunication sector in Brazil amounted to BRL 108.8 billion (USD 30 billion) and BRL 25.8 billion (USD 7 billion), respectively (Figure 3.1).[1]

Figure 3.1. Total telecommunication revenue and investment in Brazil (2015-18)



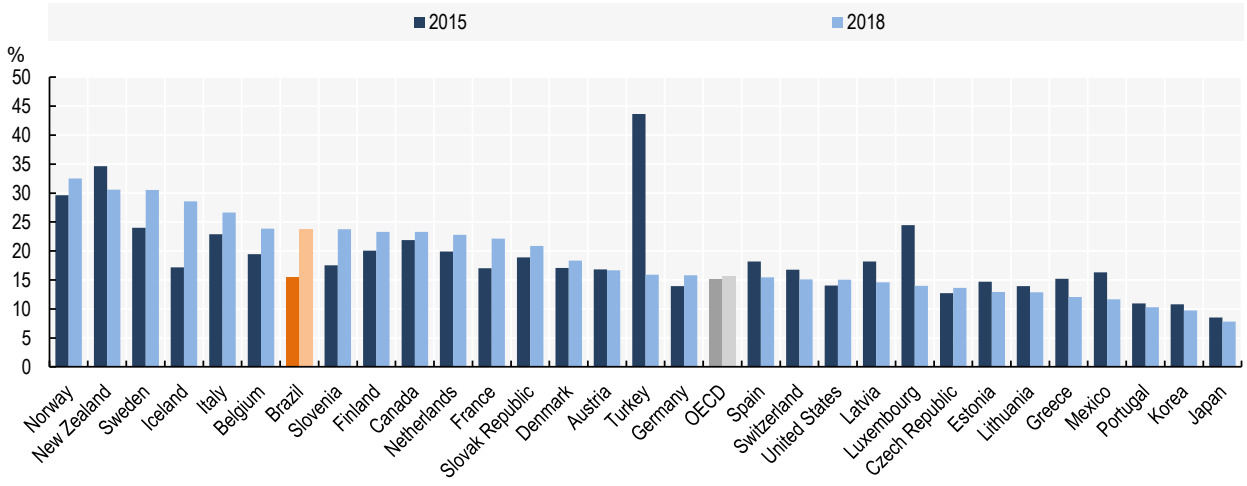
Source: Anatel's response to the questionnaire of the review.

From 2015 to 2018, the growth of telecommunication revenues in Brazil was negative (-3.4%). Conversely, investment grew by 49% (equivalent to an annual compound growth rate of 14%). In the meantime, Brazil's gross domestic product contracted by 1.2% (in constant Brazilian reais) during the same period (The World Bank, 2020[1]). This trend compares to OECD-wide industry growth rates of revenue and investment of 3% and 1.8%, respectively, for 2015-18. The percentage of investment as a proportion of revenues in Brazil in 2018 was around 23.8%. This compares to 15.7% in the OECD area for the same year (Figure 3.2).

Most investment (76%) in the telecommunication sector in Brazil targeted wireless infrastructure in 2017 (i.e. mobile networks and other wireless infrastructure). Only 24% was used for fixed infrastructure deployment. In light of the increased convergence of fixed and mobile networks, and with the advent of 5G, Brazil will need to foster investments in fixed networks to bring fibre closer to customers, irrespective of whether their "last mile" access is fixed or mobile.

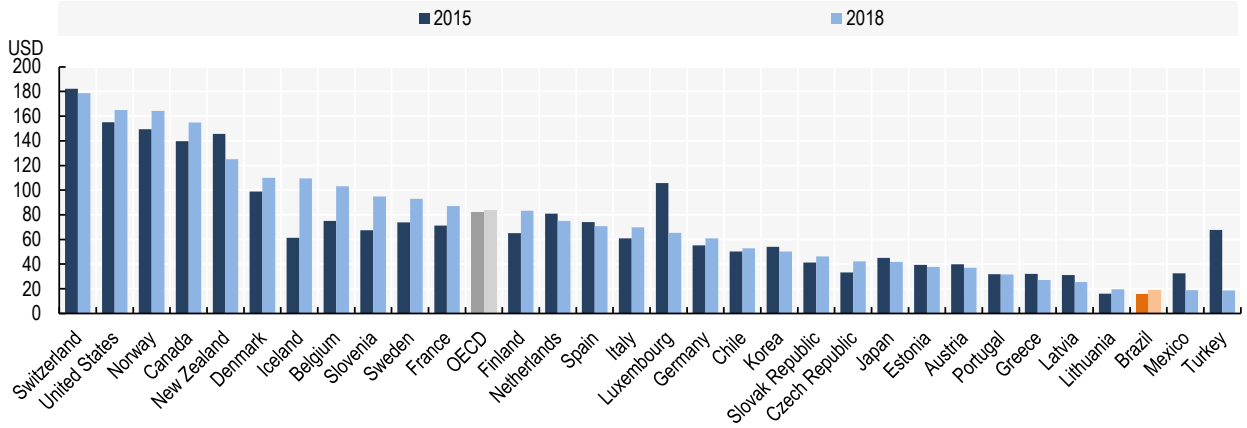
In 2015, telecommunication investment per access path in Brazil was around USD 16, which was lower than the OECD average of around USD 82. This number rose slightly to USD 19.2 by the end of 2018, still below the 2018 OECD average of USD 84. It was well below that of Switzerland, which was the leading OECD country with USD 179 per access path at the end of 2018 (Figure 3.3).

Figure 3.2. Telecommunication investment as a percentage of revenue in OECD countries and in Brazil (2015 and 2018)



Note: Data for Japan are for 2017 instead of 2018.
Sources: OECD (2019[2]), *OECD Telecommunication and Internet Statistics* (database), http://dx.doi.org/10.1787/tel_int-data-en (accessed on 16 March 2020); for data from Brazil, Anatel's response to the questionnaire of the review.

Figure 3.3. Telecommunication investment per access path in OECD countries and in Brazil (2015 and 2018)



Source: OECD (2019[2]), *OECD Telecommunication and Internet Statistics* (database), http://dx.doi.org/10.1787/tel_int-data-en (accessed on 16 March 2020).

These figures may be a lower bound of the actual investment and revenues in the Brazilian telecommunication sector given the surge of regional small Internet service providers (ISPs). There is substantial lack of reporting of small ISPs. As they lack reporting obligations (e.g. on investments and revenues), small ISPs are only partially accounted for in the statistics of the National Telecommunications Agency (Agência Nacional de Telecomunicações, Anatel).

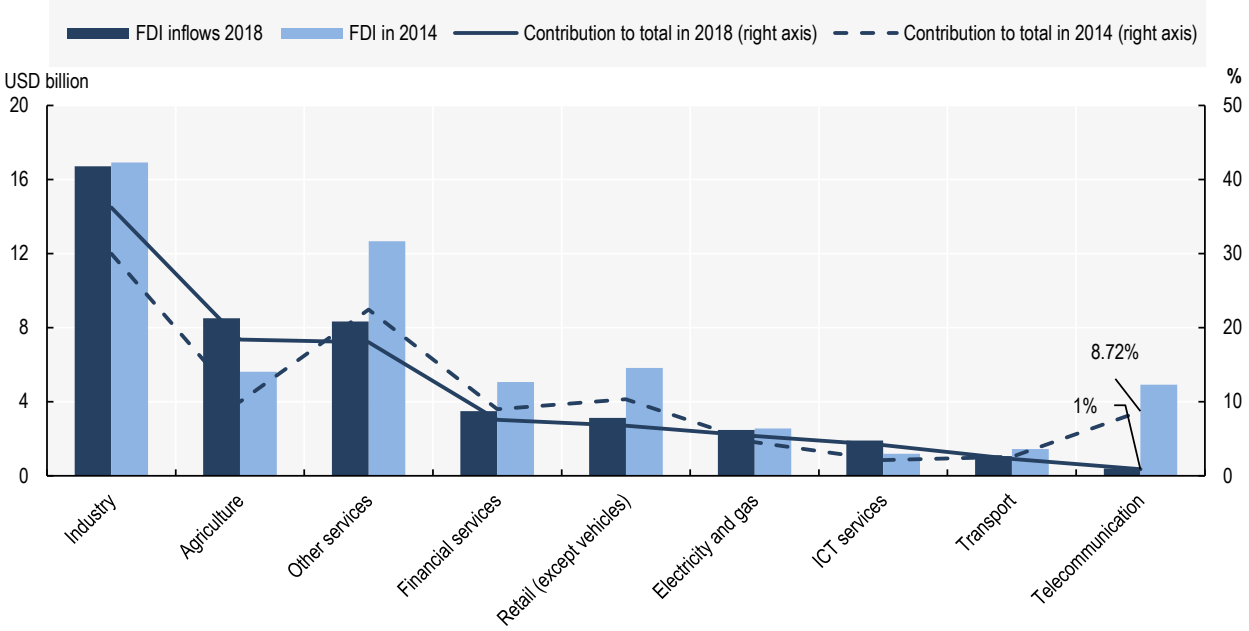
Some estimate that regional ISPs have been responsible for most of the increase in fibre-to-the-home (FTTH) subscriptions in recent years. According to Anatel, small ISPs accounted for 20% of fixed broadband subscriptions in 2019 (Anatel, 2020[3]). In addition, the ICT Providers Survey by CETIC.br/NIC.br provides evidence on the number of small ISPs in Brazil. The survey estimated that Brazil had 6 618 ISPs in 2017, of which 75% were small ISPs with fewer than 1 000 subscriptions (CGI.br, 2019[4]).

In Brazil, total foreign direct investment (FDI) inflows in the telecommunication sector amounted to USD 4.9 billion in 2014 (representing 8.72% of total FDI that year). FDI decreased to USD 404 million in 2018, which was 1% of total FDI that year (Figure 3.4). The two main countries that invested in the Brazilian telecommunication sector in 2018 were the United States (USD 322 million) and the Netherlands (USD 50 million) (Banco Central do Brasil, 2019[5]).

More FDI reflects greater confidence in the governance of the market. As well, it enhances an important channel to foster competition and increase investment in telecommunication networks. FDI also decreased in other sectors of the economy (with the exception of agriculture) from 2014 to 2018, due to the cyclical nature of these investments (Figure 3.5). However, the decrease in the telecommunication sector as a share of total FDI investments seems more pronounced (Figure 3.4). This decrease could reflect movements in mergers and acquisitions. It may also be responding to the nature of FDI, which is sensitive to volatility in the economic cycle of the country. For instance, the period in question contains a peak in investments in the 2014-15 biennium due to preparations related to the World Cup and the Olympic Games. This may partially explain the decrease in FDI.

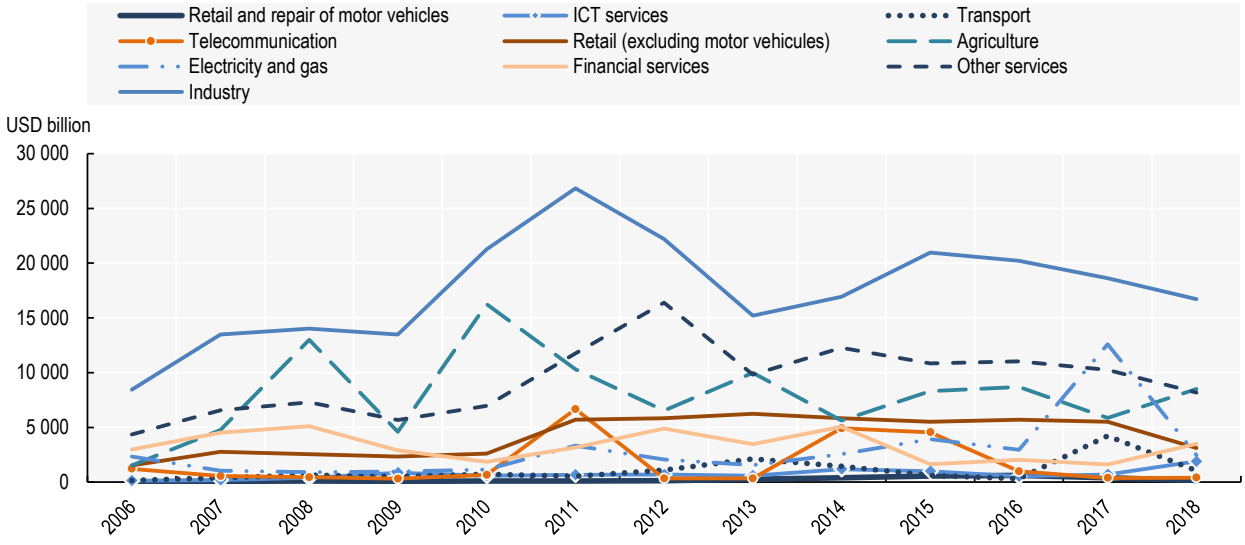
The high level and complexity of taxation in the communication sector in Brazil may influence investment levels, both domestic and foreign. These factors place a higher burden on a sector with many positive spillovers throughout the economy, relative to other sectors without these levies. High taxes in Brazil may be hampering levels of adoption, innovation and investment in the communication sector (Chapter 7).

Figure 3.4. Foreign direct investment in Brazil, by sector (2014 and 2018)



Note: FDI = foreign direct investment; ICT = information and communication technology.
Source: Banco Central do Brasil (2019[6]), *Série histórica dos fluxos de investimento direto – distribuições por país ou por setor* (database), www.bcb.gov.br/acessoinformacao/legado?url=https:%2F%2Fwww.bcb.gov.br%2Fhtms%2Finfecon%2Fserieshistfluxoinvdir.asp (accessed on 22 October 2019).

Figure 3.5. Evolution of foreign direct investment in Brazil, by sector (2006-18)



Note: ICT = information and communication technology.
Source: Banco Central do Brasil (2019[6]), *Série histórica dos fluxos de investimento direto – distribuições por país ou por setor* (database), www.bcb.gov.br/acessoinformacao/legado?url=https:%2F%2Fwww.bcb.gov.br%2Fhtms%2Finfecon%2Fserieshistfluxoinvdir.asp (accessed on 22 October 2019).

Trends in communication access paths

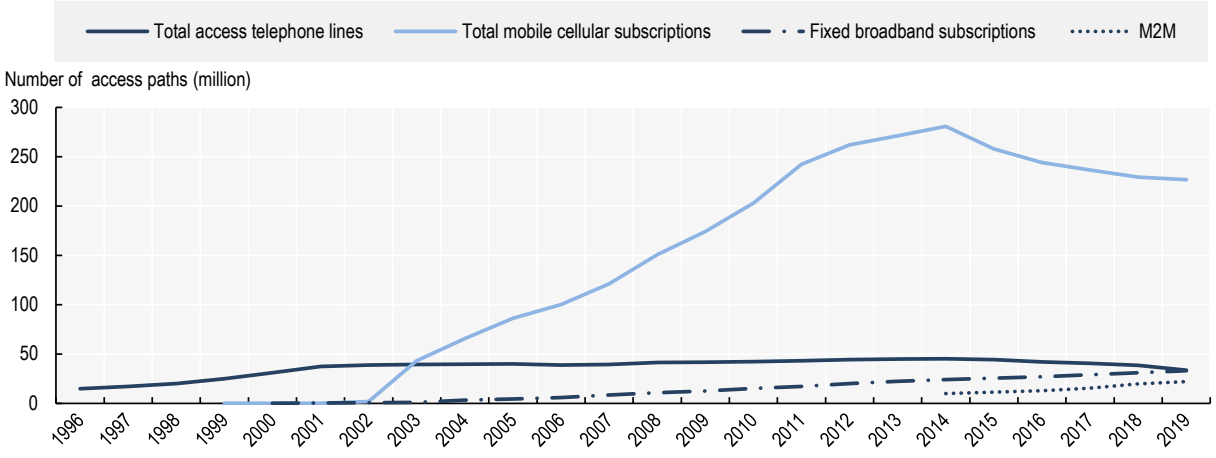
Subscriptions to communication services (i.e. total access paths)[2] have continued to increase. This increase occurred notwithstanding the negative revenue growth (-3.4%) in Brazil during the three-year period between 2015 and 2018; the percentage does not account for the role of small regional ISPs. This follows a similar trend of growth in communication access paths observed in the OECD area, albeit starting from lower penetration rates (Figure 3.6).

In terms of access paths, the most substantial change in the communication market stems from mobile cellular subscriptions, which includes both mobile voice and mobile broadband. In particular, mobile broadband subscriptions more than tripled between the 2012 and 2019 period, passing from 59.2 million to 196.6 million. In contrast, fixed telephony lines have begun to decrease slightly in Brazil since 2014, a trend observed across the OECD as some users replace traditional voice services with mobile telephony.

Still, most of the disconnected Public Switched Telephone Network fixed lines in 2019 were from operators working under the concessions regime (public regime) (Julião, 2019[7]). This may be related to the differential regulatory treatment, recently reformed in October 2019 (Chapters 1, 2, 4 and 5). Fixed broadband subscriptions also grew in Brazil, passing from 19.8 million to 32.9 million access lines between 2012 and 2019 (Figure 3.6). The growth of small regional ISPs in recent years has contributed to the expansion of fixed broadband access in Brazil; their share of subscribers grew from 9.6% to 18.4% between 2015 and 2018 (Anatel, 2020[3]).

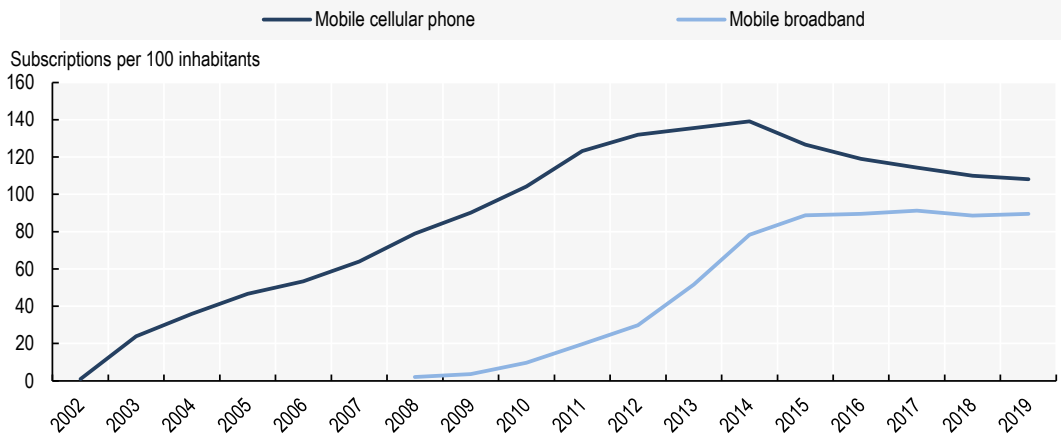
Mobile voice penetration, i.e. the number of subscriptions per 100 inhabitants, has continued to grow over the past 11 years. It passed from 78.8 to 108 subscriptions per 100 inhabitants between 2008 and 2019. Mobile broadband went from 2 to 89.5 subscriptions per 100 inhabitants during the same period (Figure 3.7).

Figure 3.6. Evolution of communication access paths in Brazil (1996-2019)



Note: M2M = machine to machine.
Source: Anatel (2020[8]), *Painéis de Dados: Acessos*, https://www.anatel.gov.br/paineis/acessos (accessed on 28 May 2020).

Figure 3.7. Mobile voice and mobile broadband penetration in Brazil (2002-19)

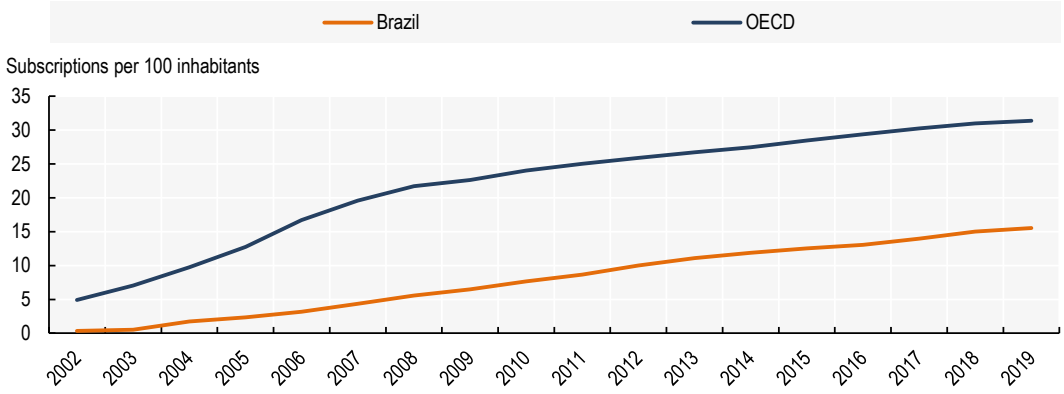


Source: Anatel (2020[8]), *Painéis de Dados Acessos*, https://www.anatel.gov.br/paineis/acessos (accessed on 28 May 2020).

In the past nine years, the use of mobile services has been a primary driver for increasing connectivity in Brazil. From 2010 to 2019, mobile broadband subscriptions rose from 9.7 to 89.5 per 100 inhabitants, which represents a compound annual growth rate (CAGR) of 28%. Subscriptions for mobile voice grew slower than for mobile broadband, rising from 104 to 108 per 100 inhabitants over the same period, which represents a CAGR of 0.42%. The share of subscriptions of 4G (long-term evolution networks) in Brazil reached 67.8% at the end of 2019, up from 9.9% in 2015. This reflects a CAGR of around 61.8%.

The evolution of fixed broadband penetration in Brazil follows a similar trend as the OECD average, albeit departing from a lower level. In 2019, fixed broadband penetration in Brazil reached 15.5%, which compares to an OECD average of 31.4% (Figure 3.8).

Figure 3.8. Evolution of fixed broadband penetration in Brazil and in the OECD (2002-19)



Note: Data for 2019 are for Q2 2019.
Sources: OECD (2020[9]), *Broadband Portal* (database), www.oecd.org/sti/broadband/oecdbroadbandportal.htm (accessed on 20 May 2020); Anatel (2020[8]), *Painéis de Dados: Acessos*, https://www.anatel.gov.br/paineis/acessos (accessed on 28 May 2020).

Communication services can be assessed using a number of key measures. These include the availability of services, their quality and their price levels for businesses and consumers. Regarding broadband availability, indicators include the number of broadband subscriptions per 100 inhabitants (i.e. broadband penetration rates), the number of households or businesses with access to broadband, or geographical coverage of networks (e.g. urban, rural and remote).

A further indicator for broadband assessment is the quality of communication services, such as download connection speeds. Apart from using speed to gauge overall performance, other measures will become increasingly important to measure quality of networks. The need for improved response times (latency)[3] between devices and compute nodes will grow, supporting diverse usage case scenarios for the Internet of Things (IoT). Operators will also increasingly be measured by assurance of delivery (packets loss) across their networks (OECD, 2019[10]).

The affordability of communication services is also key for benefiting from the opportunities created by the digital transformation. The next subsections present indicators of Brazilian broadband markets over these three aspects (i.e. availability, quality and prices).

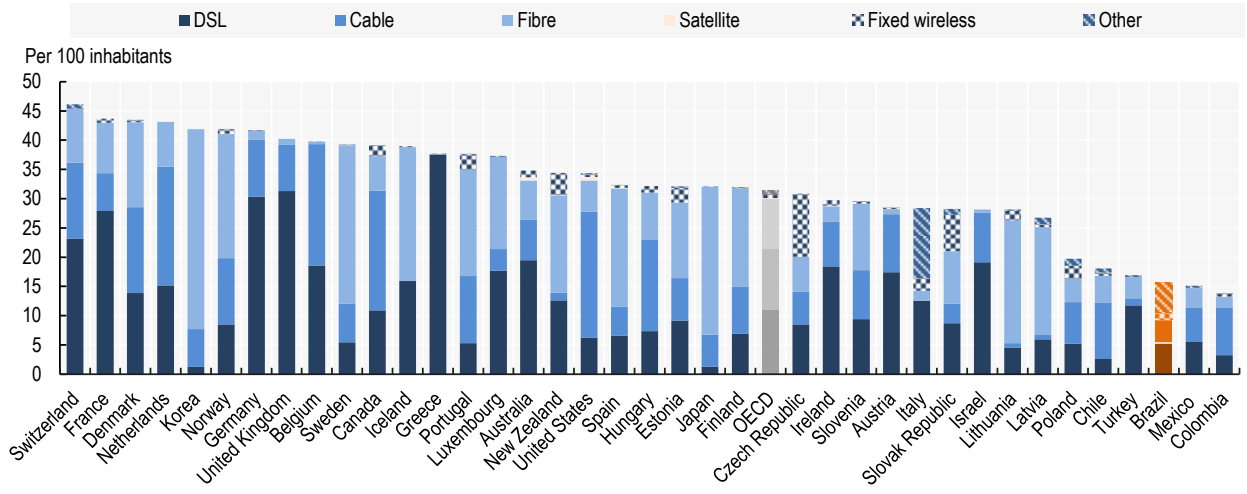
Availability and quality of communication services

Availability of fixed and mobile broadband services

In June 2019, fixed broadband penetration in Brazil (i.e. 15.5%) was similar to countries in the region such as Chile (18%), Mexico (15%) and Colombia (13.8%). However, this level was about half of the OECD average of 31.4%. Indeed, it was well below leading OECD countries in terms of fixed broadband penetration with more than 40 subscriptions per 100 inhabitants (e.g. Switzerland, France, Denmark, the Netherlands, Korea, Norway, Germany and the United Kingdom) (Figure 3.9).

Subscriptions per 100 inhabitants, which is a supply-side indicator, may not entirely reflect use of broadband services by households or individuals (i.e. demand-side indicators). The number of people using the Internet is higher, as Brazilian households tend to be larger than OECD average households. Neighbours also seem to share broadband subscriptions in Brazil. In fact, 20% of Brazilian households declared they shared their Internet connection with one or more neighbours in 2018 (CGI.br, 2019[11]).

Figure 3.9. Number of fixed broadband subscriptions in OECD countries and in Brazil, by technology (June 2019)



Notes: DSL = Digital subscriber line.
Sources: OECD (2020[9]), *Broadband Portal* (database), www.oecd.org/sti/broadband/oecdbroadbandportal.htm (accessed on 20 May 2020); Anatel (2020[8]), *Painéis de Dados: Acessos*, https://www.anatel.gov.br/paineis/acessos/ (accessed on 28 May 2020).

In terms of its technology mix, at the end of June 2019, most (34%) of the fixed broadband subscriptions in Brazil were digital subscriber line (DSL) subscriptions (5.3 subscriptions per 100 inhabitants), followed by those using fibre (3.7 subscriptions per 100 inhabitants), which accounted for 24% of total broadband subscriptions compared to 25% in Chile, 22% in Mexico and 14% in Colombia (Figure 3.9).

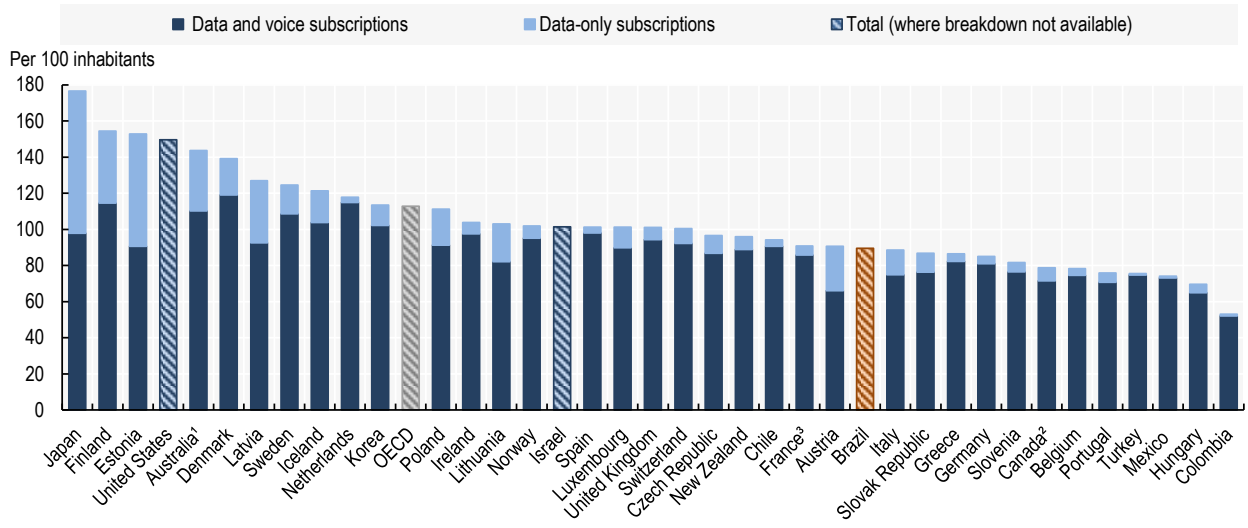
The share of high-speed fibre in fixed broadband connections in OECD countries rose from 12% to 27% between 2010 and June 2019. However, this percentage masks large differences between countries. The share of fibre in total broadband ranges from above 70% in Japan, Korea and Lithuania to below 10% in Austria, Belgium, Germany, Greece, Ireland, Israel, Italy and the United Kingdom (Figure 3.9). As in the OECD, Brazil has experienced an increase in the share of fibre broadband connections over the same period. Its share of fibre over total fixed broadband connections rose from 0.43% to 24%. This is a welcome development as it is one indicator of higher network capabilities stemming from greater fibre deployment. Despite this progress, Brazil lags well behind the OECD average in terms of the percentage of fibre of total fixed broadband subscriptions (although Anatel lacks information from small regional ISPs).

With respect to mobile broadband subscriptions, Brazil had 89.5 per 100 inhabitants in June 2019. This is not far from the OECD average of 112.8 per 100 inhabitants (Figure 3.10). When compared to regional peers, mobile broadband penetration in Brazil is similar to that of Chile (94.2%) and higher than in Mexico (74%) and Colombia (53%).

Mobile broadband networks are more pervasive in Brazil than fixed broadband networks. However, efforts must still be made to ensure that most municipalities have mobile connectivity. In 2018, there was a 4G signal in 4 676 Brazilian municipalities, where 96.7% of the population live, compared to an equivalent "coverage" of 99.8% for 3G networks (Figure 3.11). Some municipalities have a large geographic span with many rural and remote areas. As not all inhabitants of a municipality with 3G or 4G signal necessarily live within the covered area, actual population coverage is likely to be lower. Therefore, this indicator (i.e. existence of a network signal within a municipality) does not provide an estimate of the actual percentage

of the population covered. Nor does it provide a precise measurement of the geographical span of mobile network coverage.

Figure 3.10. Number of mobile broadband subscriptions in OECD countries and in Brazil, by technology (June 2019)

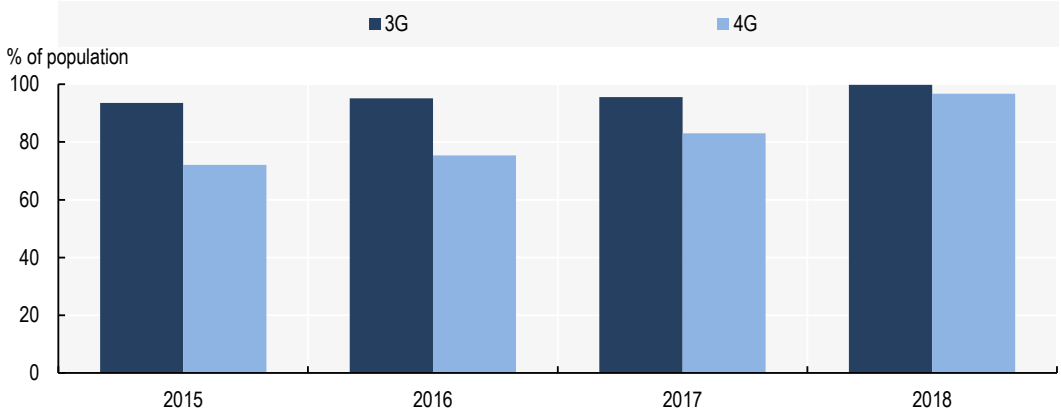


1. A new entity using a different methodology is collecting data reported for December 2018 and onwards.
2. Fixed wireless includes satellite.
3. Cable data includes VDSL2 and fixed 4G solutions.

Notes: Figures reported from December 2018 comprise a series break and are incomparable with previous data for any broadband measures Australia reports to the OECD. Data for Canada, Switzerland and United States are preliminary.

Sources: OECD (2020[9]), *Broadband Portal* (database), www.oecd.org/sti/broadband/oecdbroadbandportal.htm (accessed on 20 May 2020); Anatel (2020[8]), *Painéis de Dados: Acessos*, https://www.anatel.gov.br/paineis/acessos/ (accessed on 28 May 2020).

Figure 3.11. Presence of 3G and 4G signals within municipalities, estimated as percentage of the population[1] in Brazil (2015-18)



1. The indicator represents a network signal in a given municipality. Population coverage is then estimated by the number of inhabitants in the municipality that have presence of a mobile network signal. It provides an estimate of the percentage of the population covered by mobile networks rather than a precise measurement of the geographical span of mobile network coverage.

Source: Anatel (2020[12]), *Telefonia Móvel – Municípios atendidos*, https://www.anatel.gov.br/setorregulado/component/content/article/115-universalizacao-e-ampliacao-do-acesso/telefonia-movel/423-telefonia-movel-municipios-atendidos (accessed on 20 February 2020).

While the number of municipalities where there is presence of mobile networks seems high, many have only been covered by a single operator. This may be related to developments that occurred around the privatisation of Telebrás and the issuing of regional licences. Furthermore, the lack of national roaming agreements among mobile operators may accentuate the presence of a single provider in several municipalities. For example, in the first half of 2018, 3 071 municipalities with fewer than 30 000 inhabitants were almost entirely served by a single provider. They also lacked roaming agreements. According to Anatel, 4 747 roaming agreements are needed across all major mobile service providers to ensure full mobile coverage of these municipalities (Tele.Sintese, 2019[13]).

One of the main challenges in Brazil is rural coverage of broadband services. With a geographical size of 8.5 million square kilometres (km^2), the country is approximately eight times the size of France and Spain measured jointly. In addition, 60% of the Amazon forest lies within Brazil's borders. Many other factors are at play such as competition in communication markets, whether pro-competitive regulation is in place policies to reduce infrastructure deployment costs. However, the geographical dimension creates important challenges to fulfil coverage objectives in rural and remote areas of Brazil. In addition, a large percentage of the population is sparsely distributed, which exacerbates the issue.

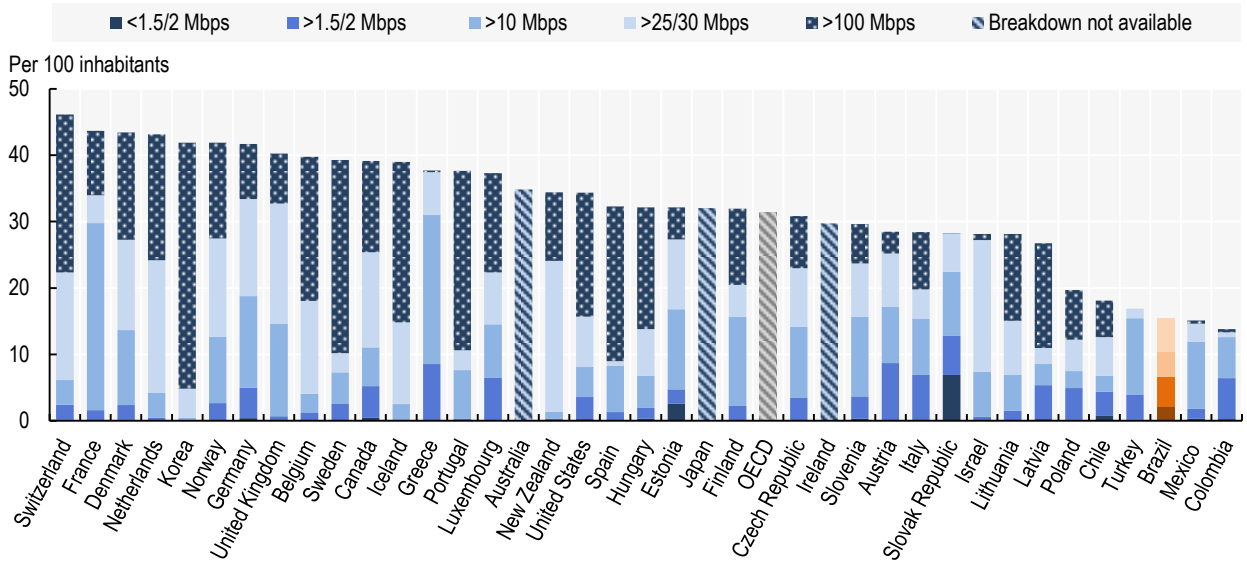
Quality of fixed and mobile broadband networks

A key indicator in relation to fixed and mobile broadband quality is connection speed. A useful measure to complement any assessment of broadband services is to observe penetration rates by speed tiers. In Brazil, more than half of fixed broadband subscriptions (58%) exhibited speeds above 12 Mbps in June 2019. In particular, 25% of fixed broadband subscriptions belonged to the "12-34 Mbps" speed tier; and 33% of subscriptions exhibited speeds above 34 Mbps. Compared to regional peers, 79% and 69% of fixed broadband connections in Mexico and Colombia were in the 3 to 10 Mbps speed tier, respectively. For comparison, in Switzerland – the leading OECD country in terms of fixed broadband penetration – 52% of fixed broadband subscriptions corresponded to subscriptions with speeds above 100 Mbps (Figure 3.12).

Advertised speeds may differ from actual speeds experienced by users. Regulatory authorities across the OECD have increasingly paid attention to the significant gaps between "advertised" and actual speeds experienced. In this sense, it is useful to observe data from different sources measuring actual speeds, such as Ookla, M-Lab and Steam, among others (Figure 3.13, Figure 3.15 and Figure 3.16).

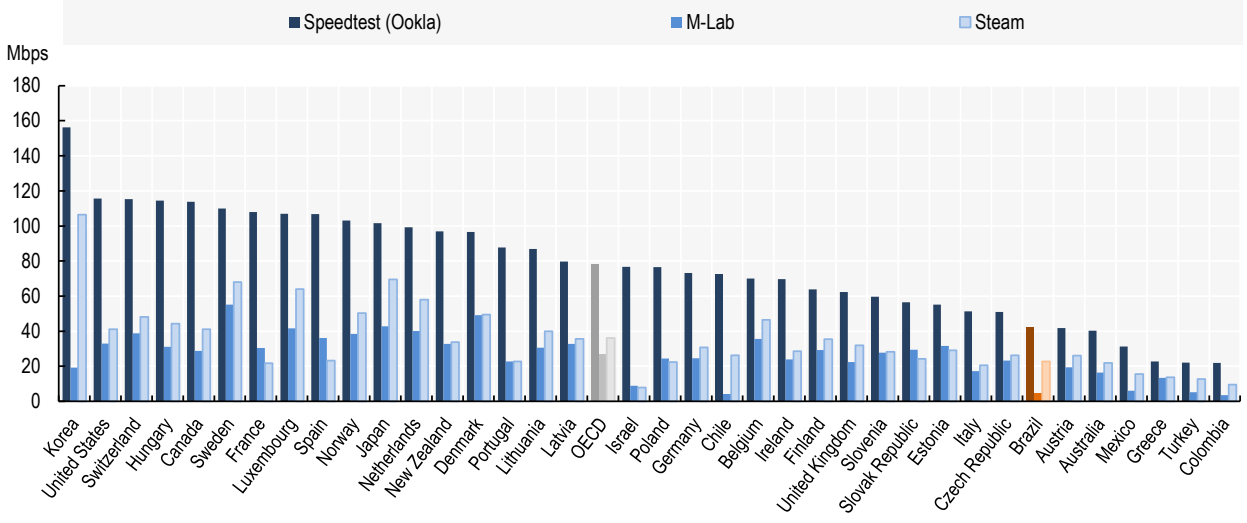
It is worth noting the features of the different tools used for measuring download speeds when drawing conclusions from these data. M-Lab and Ookla compile results from speed tests by users who actively measure their actual speed to access the Internet. Steam data is a further way to consider download speeds across countries, which reflects the speeds of users using one of the most Internet Protocol (IP) intensive applications: online games. According to M-Lab data, the average fixed broadband download speed in Brazil was 4.8 Mbps in May 2019, which compares to an OECD average of 26.8 Mbps. Using Steam data and the population section of gamers as a reference, the average download speed for fixed broadband in Brazil was 22.7 Mbps on the Steam platform in July 2019. Conversely, the OECD average, based on Steam data, was 36.1 Mbps (Figure 3.13).

Figure 3.12. Number of fixed broadband subscriptions in OECD countries and in Brazil, per speed tier (June 2019)



Notes: Mbps = megabits per second. The speed tiers data are for end of 2018, and data on fixed broadband subscriptions per 100 inhabitants are for June 2019. Data for Brazil on speed tiers and fixed broadband subscriptions correspond to June 2019. Brazil uses different speed tiers, which are: <2Mbps, >2 Mbps, >12 Mbps and >34 Mbps.
Sources: OECD (2020[9]), *Broadband Portal* (database), www.oecd.org/sti/broadband/oecdbroadbandportal.htm; data on Brazil is from Anatel (2020[8]), *Painéis de Dados: Acessos*, https://www.anatel.gov.br/paineis/acessos/ (accessed on 28 May 2020).

Figure 3.13. Average experienced download speeds of fixed broadband connections in OECD countries and in Brazil (2019)

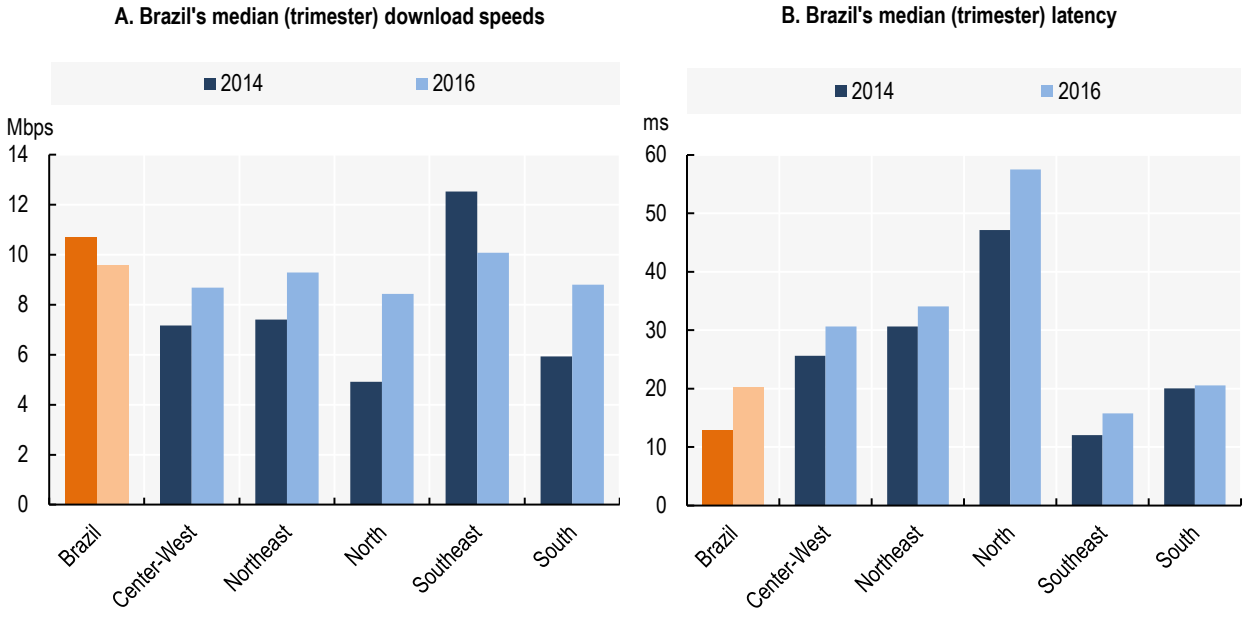


Notes: Mbps = megabits per second. Sorted using Ookla data. Speedtest (Ookla) data are for July 2019; M-Lab (Worldwide broadband speed league) speeds were measured from 9 May 2018 to 8 May 2019; Steam data are for July 2019.
Sources: Ookla (2019[14]), "Speedtest", https://www.speedtest.net/ (accessed on 10 July 2019); M- Lab (2019[15]), "Worldwide broadband speed league", https://www.cable.co.uk/broadband/speed/worldwide-speed-league/ (accessed on 9 May 2019); Steam (2019[16]), *Steam Download Stats*, https://store.steampowered.com/stats/content (accessed on 10 July 2019).

CETIC.br/NIC.br has measured the quality of Brazilian broadband connections through an initiative called SIMET. A 2018 report shows download speeds, latency and jitter upload (stability of the connection) indicators of broadband connections for the different regions in Brazil (NIC.br, 2018[17]). All three quality measures are evaluated at the median calculated by trimester and per region. In 2016, the median of download speeds among regions ranged from 8.4 Mbps (Northern region) to 10.1 Mbps (Southeast region), while the national median was 9.6 Mbps. In terms of latency, there are more accentuated regional differences. The Northern region exhibited latency of 57.5 milliseconds (ms), while the Southeast region was 15.8 ms and the national median was 20 ms (Figure 3.14).

Figure 3.14. Quality of broadband connections in Brazil

Median download speeds and latency per trimester and per region in 2014 and 2016



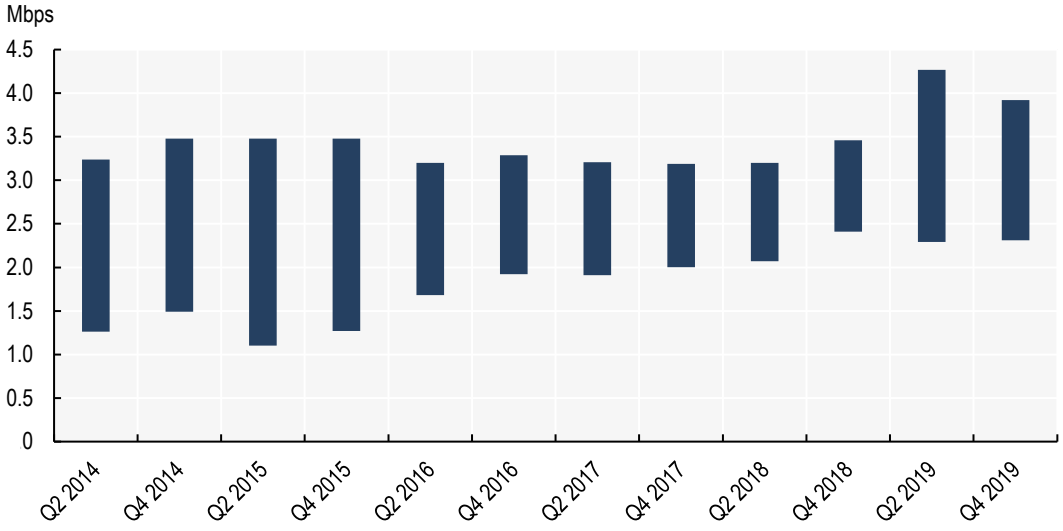
Note: Mbps = megabits per second; ms = millisecond.
Source: NIC.br (2018[17]), "Banda Larga no Brasil: um estudo sobre a evolução do acesso e da qualidade das conexões à Internet", https://cetic.br/media/docs/publicacoes/1/Estudo%20Banda%20Larga%20no%20Brasil.pdf.

Another useful indicator is the "Netflix ISP Speed Index", which measures download speed performance of certain ISPs while users are streaming Netflix content (Netflix, 2019[18]). This provides useful information on speeds experienced by almost 10 million reported Netflix users in Brazil. The speed reported by Netflix of prime-time performance of ISPs in Brazil shows a stable trend of low broadband speeds in 2014-18 (Figure 3.15). For example, lowest speeds ranged from 1.42 Mbps in Q2 2014 to 2.47 Mbps in Q4 2019. Highest reported speeds ranged from 3.08 Mbps in Q2 2014 to 3.76 Mbps in Q4 2019. In September 2019, the three leading ISPs in terms of speeds as reported by Netflix were Vivo Fibra (3.76 Mbps), Algar Fibra (3.62 Mbps) and Oi Fibra (3.61 Mbps).

Data collected by Opensignal, including over different network generations, can provide a perspective on mobile network performance. Opensignal collects real-time data from mobile phone users that have downloaded its application on their smartphone. This is done at different times of the day and from different locations (e.g. indoors, outdoors). For 3G and 4G networks, Opensignal measured average download mobile broadband connection speeds of 13 Mbps for Brazil in May 2019. This was roughly in line with speeds in Chile (12 Mbps) and

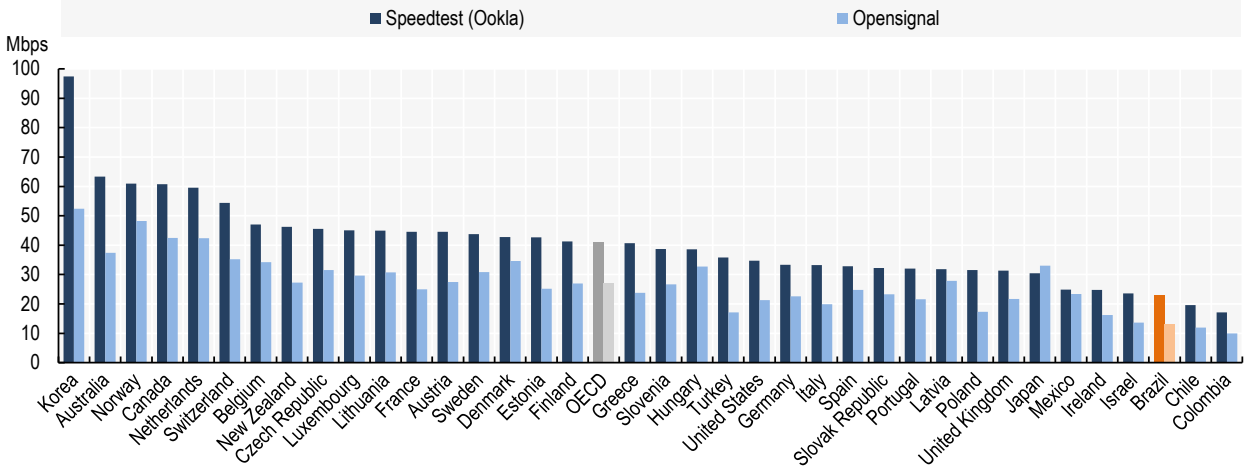
Colombia (10 Mbps) in 2019. When considering the Ookla speed tests for mobile networks of July 2019, Brazil exhibited download speeds for mobile broadband of 23 Mbps. This was similar to regional peers, but below the OECD average of 40.89 Mbps (Figure 3.16).

Figure 3.15. Download speeds experienced by Netflix users in Brazil, peak and lowest speeds (2014-19)



Notes: Mbps = megabits per second. The Netflix ISP Speed Index is a measure of prime-time Netflix performance on particular ISPs around the globe. It does not measure overall performance for other services/data that may travel across the specific ISP network.
Source: Netflix (2019[18]), "ISP Speed Index: Brazil", https://ispspeedindex.netflix.com/country/brazil/ (accessed on 16 September 2019).

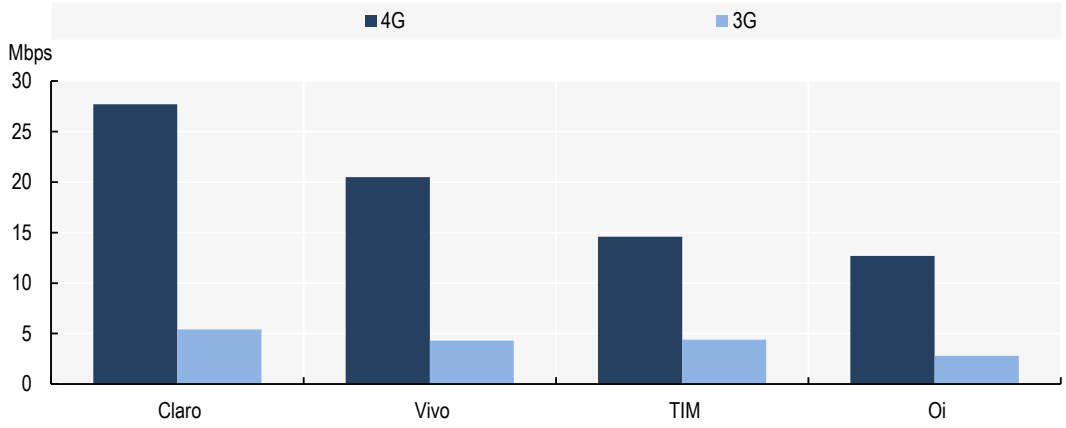
Figure 3.16. Mobile broadband download speeds in OECD countries and in Brazil (2019)



Notes: Mbps = megabits per second. Speedtest (Ookla) data are for July 2019; Opensignal data are for the average download connection speed on long-term evolution networks, May 2019. Opensignal data for Estonia, Latvia, Lithuania, Luxembourg, Mexico and Slovenia are for February 2018 instead of May 2019. The definition of download speeds for Opensignal is "…average download speed experienced by Opensignal users across an operator's 3G and 4G networks".
Sources: Ookla (2019[14]), "Speedtest", www.speedtest.net/global-index; Opensignal (2019[19]), *The State of Mobile Experience, May 2019*, http://dx.doi.org/www.opensignal.com/sites/opensignal-com/files/data/reports/global/data-2019-05/the_state_of_mobile_experience_may_2019_0.pdf.

Opensignal data of the end of 2019 for mobile operators reveal that Claro had the fastest download speeds for 4G (27.7 Mbps). This speed was followed by Vivo (20.5 Mbps), TIM (14.6 Mbps) and Oi (12.7 Mbps) (Figure 3.17). The rollout of networks using the 700 MHz frequency band may be one key factor in the increased quality and coverage of mobile networks in Brazil. By the same token, Oi's lack of lower frequency spectrum may partially explain why it exhibits lower speeds; it did not acquire spectrum in the 700 MHz auction of 2015 (Opensignal, 2019[20]).

Figure 3.17. 4G and 3G download speeds experienced in 2019 in Brazil, by mobile operator



Notes: Mbps = megabits per second. Opensignal data report of January 2020, with data collection spanning over 1 September-29 November 2019, with 5 157 million measurements conducted in around 4 million devices.
Source: Opensignal (2020[21]), *Brazil: Mobile Network Experience Report January 2020*, https://www.opensignal.com/reports/2020/01/brazil/mobile-network-experience.

To improve the performance experienced by users in terms of speed, operators will need to invest in upgrading their networks. To that end, they should extend backbone and backhaul connectivity, as well as pursue other avenues such as enhancing transit and peering relationships. For example, Netflix partners with hundreds of local ISPs in Brazil to localise substantial amounts of traffic. They embed the "Open Connect Appliance" within the ISP servers (at no charge), where they have open peering at these interconnection locations. This improves the experience of Netflix users by minimising delivery of traffic served over a transit provider (Netflix, 2019[22]).

In addition, ISPs across OECD countries that provide the highest speeds to their users often note the prevalence of Internet exchange points (IXPs) as a main attribute to improve broadband quality. The number of IXPs across Brazil is commendable, and still growing. On the other hand, important investments in fixed network infrastructure are still required across the country to improve quality of both fixed and mobile broadband services. These investments can be fostered through market competition.

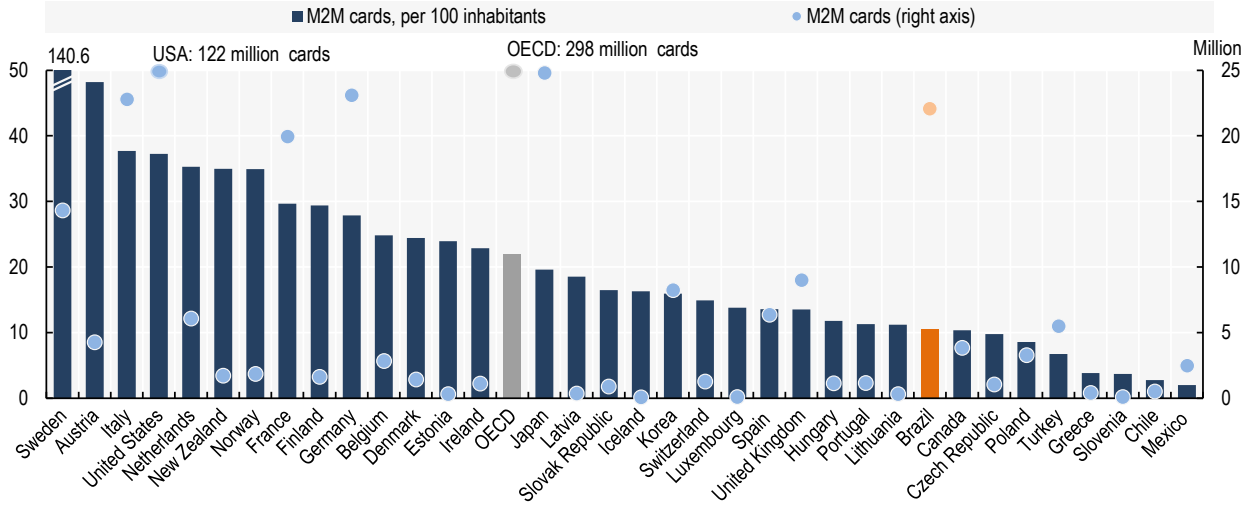
Internet of Things in Brazil

As highlighted in the OECD Cancun Ministerial, following the convergence between fixed and mobile networks and between telecommunication and broadcasting, the IoT represents the next step in convergence between ICTs, economies and societies on an unprecedented scale (OECD, 2016[23]).[4] Given that many connected devices will have different network requirements, the OECD has developed a framework (taxonomy) that breaks down the IoT into categories. For example, critical IoT applications such as remote surgery and automated

vehicles will require high reliability and low latency connectivity. Conversely, massive and disperse M2M sensors (for electrical grids, predictive maintenance, smart agriculture, etc.) may not be that sensitive to latency or network speeds (OECD, 2018[24]).[5]

Since 2012, the OECD has been collecting data on M2M/embedded mobile cellular subscriptions, a subset of the IoT.[6] Between the end of 2014 and June 2019, the number of M2M communication subscriptions in the OECD more than doubled, increasing from 108 million to 298 million. In Brazil, during the same period, the number of M2M connections also more than doubled, passing from 10 million to 22 million. This was likely due to tax breaks on M2M SIM cards (Figure 3.18). In June 2019, the level of M2M SIM cards per 100 inhabitants at the OECD was 22 compared to 10.6 in Brazil (Figure 3.18).

Figure 3.18. Number of M2M/embedded mobile cellular subscriptions in OECD countries and in Brazil (June 2019)



Notes: M2M = machine to machine. Data for Australia reported as of December 2018 are being collected by a new entity using a different methodology. Data for Switzerland are preliminary.
Source: OECD (2020[9]), *Broadband Portal* (database), www.oecd.org/sti/broadband/oecdbroadbandportal.htm (accessed on 20 May 2020).

The IoT for precision agriculture or smart farming (e.g. sensors measuring humidity levels to improve water efficiency or predict better crop yield) may reduce costs, while mitigating environmental consequences. The same is true for sensors for industrial applications that allow predictive maintenance of machines. Therefore, this subcategory of the IoT – massive and disperse M2M – can play a key role in the digital transformation of the industrial and agricultural sectors in Brazil.

As its main features, the IoT for smart farming involves millions of sensors spread over wide areas (in terms of km). However, the amount of data transmitted per device may be small and tends to be less sensitive to latency issues (OECD, 2018[24]). These key features of massive M2M sensors – the need for large-scale deployment coupled with low data transmission per device – may translate into negligible revenue and data traffic per device. Therefore, taxes by the Telecommunications Oversight Fund (Fundo de Fiscalização das Telecomunicações, FISTEL) imposed individually on each M2M SIM card could reduce incentives to roll out the IoT at a larger scale. This, in turn, could impair adoption of massive and disperse M2M (Chapter 7).

Prices and usage of communication services

Communication service prices

In many countries, high prices can be an important barrier for the adoption and use of broadband. In a 2018 study, 61% of households identified affordability as the main reason for not adopting the Internet in Brazil (CGI.br, 2019[11]).[7] Identifying the factors influencing prices of communication services is thus key.

Prices of communication services depend greatly on the competitive conditions of the market in each country. In some instances, they also depend on regulation for specific services. In a sector with high fixed costs and barriers to entry, as is the case for telecommunication, the institutional and regulatory framework weighs heavily on the resulting market structure. As such, it has a direct influence on the affordability of communication services and the disciplines applied to prices by competition. In this sense, the prices of communication services and levels of investment provide useful indicators of competition and framework conditions in Brazilian communication markets.

Apart from the level of competition, the high level of taxes in the sector such as that on commerce and services (Imposto sobre Circulação de Mercadorias e Serviços, ICMS) also influences affordability of communication services in Brazil. Several stakeholders claim the pass-through of these taxes can represent up to half of the retail price of communication services in Brazil (Chapter 7).

The OECD's telecommunication baskets provide detailed information on Brazil's prices for fixed and mobile communication services compared to OECD countries and regional peers. The OECD uses a pricing methodology that designs usage baskets (i.e. low, medium and high usage) for different consumption patterns. It collects the data twice a year, using prices on websites that are shown for consumers at a certain date. This assumes that rational consumers can make decisions based on the information available to them.

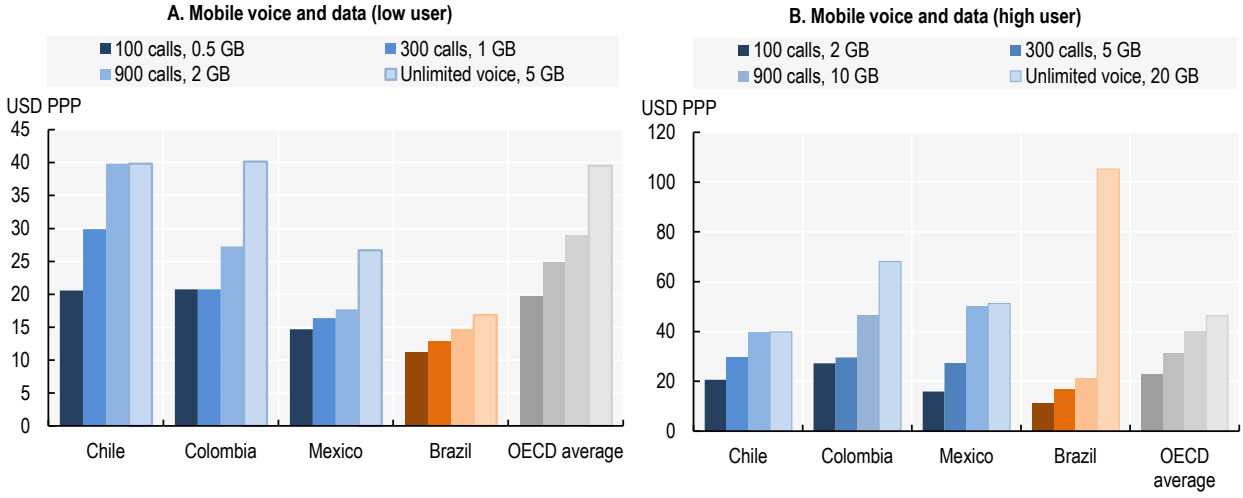
In terms of mobile broadband services (i.e. mobile voice and data plans for smartphones), for a low-usage type of basket (i.e. ranging from 0.5 GB to 5 GB of data volume consumed per month), Teligen data from November 2019 show that Brazil has affordable plans compared to OECD average prices (Figure 3.19). For example, for the basket of 300 calls and 1 GB of data, Brazilian consumers paid USD PPP 12.9, compared to USD PPP 24.9 for the OECD average (purchasing power parities, PPP).

For the high-usage profile of mobile voice and data, Brazil also exhibited low prices except for mobile broadband plans with unlimited voice and 20 GB. These particular plans were twice as expensive in Brazil (USD PPP 105.3) as average plans in the OECD (USD PPP 46.4). Although mobile broadband service plans seem affordable, this indicator should be interpreted along with the actual speeds provided by these plans (Figure 3.16). In other words, both quality and prices of communication services are important dimensions of the competitive dynamics of the market.

The affordability of fixed broadband services is less evident, which may be a result of the lack of transparency in Brazilian advertised offers for fixed broadband services. Operators establish a price cap for fixed services, and register the plan tariffs with Anatel prior to commercialisation. Advertised plans in Brazil appear with time-limited promotional tariffs and with the price cap tariff. The post-promotion tariff is unknown to users, who only observe the price ceiling. This practice generates a lack of transparency in advertised plans for consumers. The regulator is holding a public consultation to eliminate the practice through a revision of the Regulatory Framework for Consumer Rights of Telecommunication Services (Regulamento Geral de

Direitos do Consumidor de Serviços de Telecomunicações). At the moment of writing, plans were advertised with the price cap and promotional prices lasted for a limited time.

Figure 3.19. Mobile broadband prices in Brazil compared to regional peers and the OECD average (November 2019)



Notes: PPP = purchasing power parity; GB = gigabyte. Mobile voice and data baskets range in terms of number of voice calls, SMS included and data allowance (GB per month). For more details on the OECD price basket methodology, refer to OECD (2017[25]), "Revised OECD Telecommunication Price Baskets", http://www.oecd.org/sti/broadband/DSTI-CDEP-CISP(2017)4FINAL.pdf.
Source: OECD calculations based on Strategy Analytics (2019[26]), "Teligen tariff & benchmarking market data using the OECD methodology", https://www.strategyanalytics.com/access-services/service-providers/tariffs---mobile-and-fixed/.

For comparability reasons, the present report applies the OECD price basket methodology for Brazil. It thus relies on the fixed broadband price information available online in December 2019 for Brazilian consumers. This was the price cap tariff and promotional prices, where the promotional price had a clear expiration date. Unlike as in most OECD countries, fixed broadband operators in Brazil do not explicitly state the price that will be in effect after the promotional tariff expires.

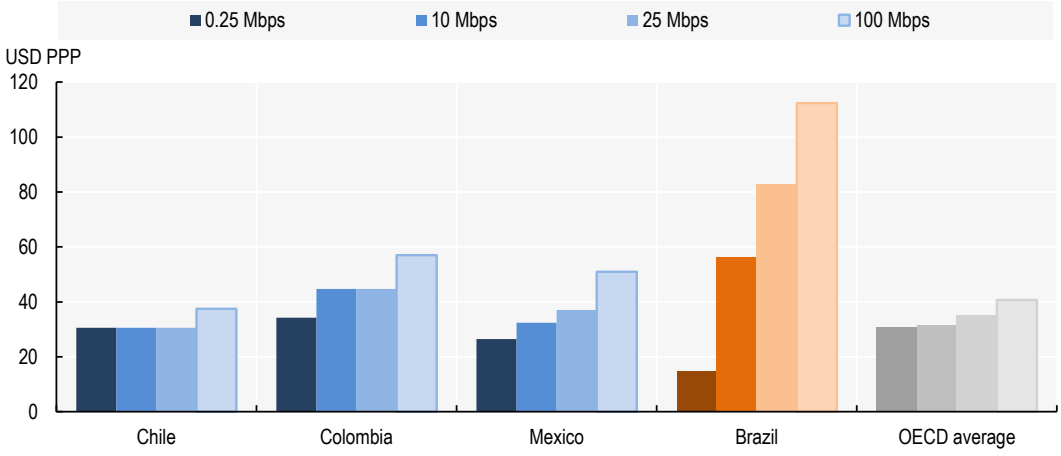
The OECD supposes a 36-month contract to account for potential promotions and to smoothen the installation costs over a sufficiently long period (OECD, 2017[25]). This represents the typical length that consumers usually keep the same contract. This concept differs from the minimum commitment period in some OECD countries after which a consumer may cancel the contract without penalties (e.g. 12 months).

Again, offers in the Brazilian market lack transparency on the "post" promotional price. For comparability reasons, the OECD considered the tariff after the promotional period expired was the price cap. The rationale behind this approach is twofold. On the one hand, these are the only two price elements observable to Brazilian consumers in advertised fixed broadband plans. On the other, a 36-month promotional period would not be comparable with other OECD countries where operators explicitly state the price that will be used when the promotional period ends. While this approach ensures comparability with the OECD methodology, the price basket results presented in this report may be an upper margin of fixed broadband prices in Brazil.

The regulator suspended the use of data caps in commercial offers of the largest players in 2016, making download speeds the leading quality feature of fixed broadband baskets in

the Brazilian market. In December 2019, Brazil had higher prices of fixed broadband compared to the OECD average and its regional peers such as Chile, Colombia and Mexico (Figure 3.20). The exception was for baskets with low download speeds (i.e. 256 kbps) for the rest of the usage profiles (i.e. low, medium and high); these consider data volumes per month (measured in gigabytes) and download speeds (measured in megabits per second). The gap is more pronounced for fixed broadband plans with download speeds up to 10 Mbps. For a medium-usage basket of 30 GB data volume and 10 Mbps, for example, the OECD average price was USD PPP 31.6, while in Brazil it was USD PPP 56.1. This same usage basket was significantly less affordable in Brazil than in Latin American countries such as Chile (USD PPP 30.6), Colombia (USD PPP 44.7) and Mexico (USD PPP 32.4).

Figure 3.20. Fixed broadband prices (medium-usage basket) in Brazil compared to regional peers and the OECD average (December 2019)



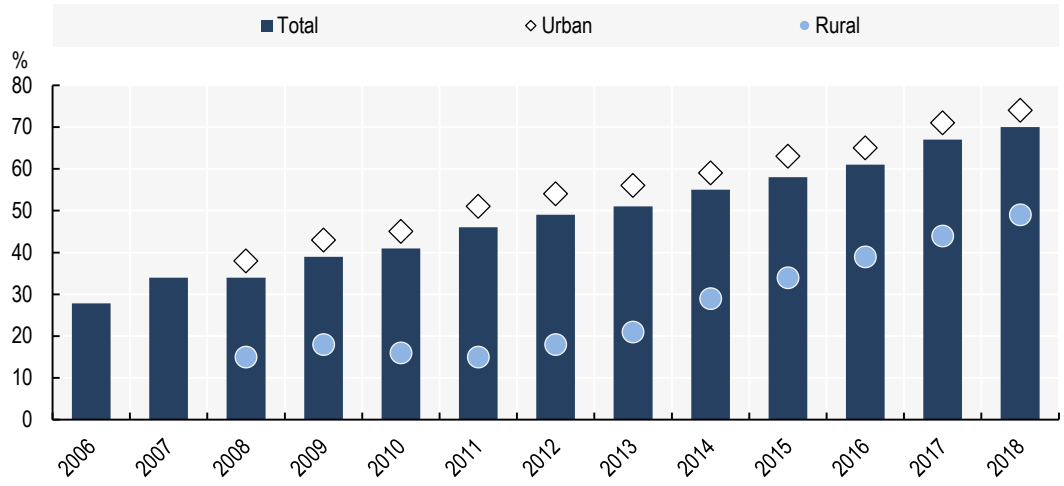
Notes: PPP = purchasing power parity; Mbps = megabits per second. In the low-usage alternative, data allowances of plans range from 5 to 100 GB/month; in the medium data-volume alternative, the data allowance ranges from 15 to 300 GB/month; and in the high-usage alternative, this ranges from 45 to 900 GB/month following the OECD methodology approved by all member countries. For more details on the OECD price basket methodology, see OECD (2017[25]), *Revised OECD Telecommunication Price Baskets*, http://www.oecd.org/sti/broadband/DSTI-CDEP-CISP(2017)4FINAL.pdf. The prices taken into account in Brazil for the OECD baskets consider promotional prices for the valid period of the offers (e.g. 12 months), and revert to the price-cap tariff afterwards.
Source: OECD calculations based on Strategy Analytics (2019[26]), "Teligen tariff & benchmarking market data using the OECD methodology", www.strategyanalytics.com/access-services/networks/tariffs---mobile-and-fixed.

Usage indicators and the digital divide

Broadband subscription (i.e. supply-side) data broken down by rural and urban locations are not readily available. However, usage indicators (i.e. surveys based on demand-side data) provide an idea of the rural digital divide. In this regard, CETIC.br/NIC.br has been collecting ICT household and firm surveys for more than ten years.

Between 2006 and 2018, the percentage of individuals accessing the Internet in Brazil increased from 27.8% to 70% (Figure 3.21). However, this positive trend masks the difference between usage among individuals in rural and urban areas. For example, in 2008, 15% of individuals in rural households had accessed the Internet, compared to 38% of individuals in urban households. Although the number of people using the Internet has increased in absolute terms over the past decade, the rural digital divide has persisted. It was around 20 percentage points up until 2018, where the gap was around 25% in terms of usage between individuals in rural and urban households.

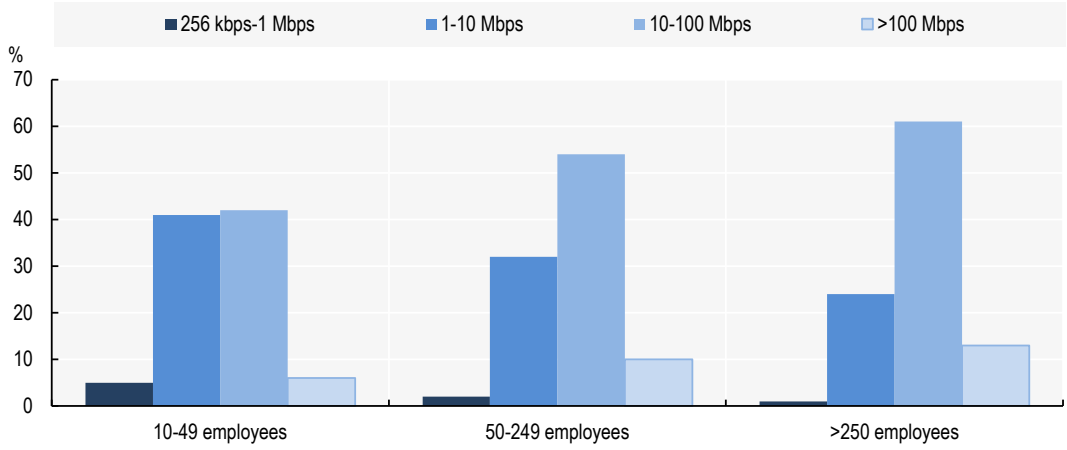
Figure 3.21. Proportion of individuals that have used the Internet in the last three months in Brazil (2006-18)



Source: CGI.br (2019[11]), *Pesquisa sobre o Uso das Tecnologias de Informação e Comunicação nos domicílios brasileiros – TIC Domicílios 2018*, https://cetic.br/arquivos/domicilios/2018/domicilios/ (accessed on 11 September 2019).

Access to broadband can enhance a firm's propensity to engage in trade (Kneller and Timmis, 2016[27]), as well as reduce transaction costs and foster productivity. Therefore, improving access to communication networks and services in Brazil is crucial to foster opportunities for Brazilian firms. Measuring digital divides across firm size helps in understanding whether most people have similar access to opportunities from digital transformation.

Figure 3.22. Firms with higher speed tier broadband access in Brazil, by firm size (2017)



Note: kbps = kilobits per second; Mbps = megabits per second.
Sources: CGI.br (2018[28]), *Pesquisa Sobre o Uso das Tecnologias de Informação e Comunicação nas Empresas Brasileiras*, https://www.cetic.br/media/docs/publicacoes/2/TIC_Empresas_2017_livro_eletronico.pdf; Anatel (2019[29]), *Mapeamento de Redes de Transporte*, https://www.anatel.gov.br/dados/mapeamento-de-redes (accessed on 13 September 2019).

In this sense, CETIC.br/NIC.br has made laudable progress in understanding digital divides across firm size through its ICT Enterprise Survey.[8] In 2017, the digital divide between small and larger firms in Brazil only starts to be evident at higher speed tiers of broadband

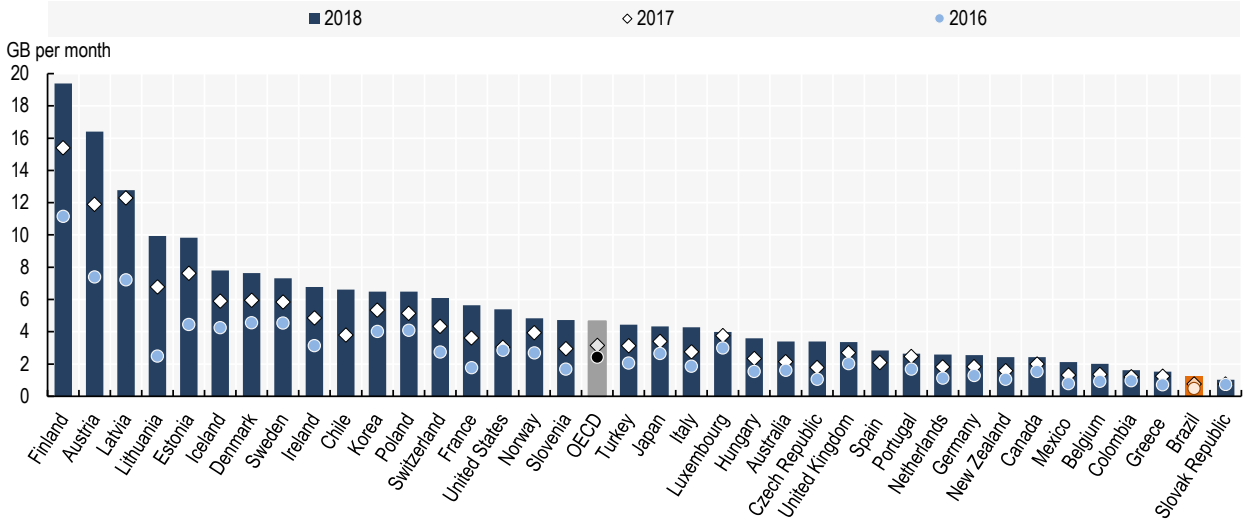
access, i.e. between 10 and 100 Mbps or above 100 Mbps (Figure 3.22). High broadband quality allows taking advantage of data-intensive applications that may deliver the highest returns in terms of productivity (e.g. cloud computing). Closing the access gap to high-speed broadband will play an important role for an inclusive digital transformation.

Complementarity of fixed and wireless networks

Data (Internet Protocol) traffic over mobile broadband networks

The amount of data used by subscribers is an indicator closely linked to affordability of broadband packages. Average mobile data usage per month in the OECD (out of 34 countries for which data were available) was 4.65 GB in 2018, up from 2.42 GB in 2016. The top OECD countries for data usage in 2018 were Finland (19.4 GB), Austria (16.4 GB), Latvia (12.8 GB) and Lithuania (9.9 GB). In comparison, Brazil's average monthly mobile data consumption was 1.25 GB in 2018, up from 0.47 GB in 2016. With respect to regional peers, Mexico and Colombia had higher data consumption per mobile subscription than Brazil in 2018 – around 2.11 GB and 1.62 GB, respectively (Figure 3.23).

Figure 3.23. Mobile data usage per mobile broadband subscription in OECD countries and in Brazil (2016, 2017 and 2018)



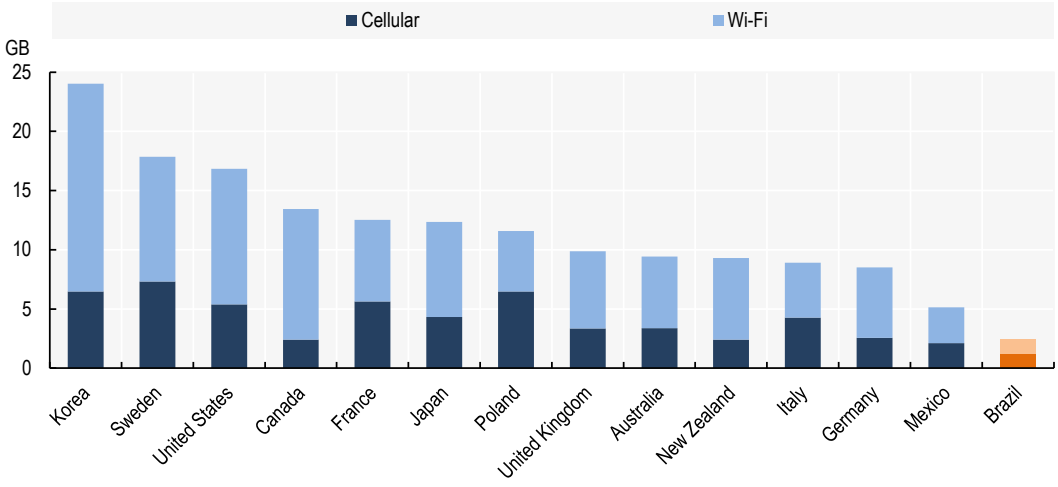
Notes: GB = gigabyte. Methodology – the multiplier 1 024 is used to convert terabytes into gigabytes; the total amount of gigabytes is divided by the yearly average number of mobile broadband subscriptions. Australia: Data reported for December 2018 and onwards are being collected by a new entity using a different methodology. Figures reported from December 2018 comprise a series break and are incomparable with previous data for any broadband measures Australia reports to the OECD.
Sources: OECD (2020[9]), *Broadband Portal* (database), www.oecd.org/sti/broadband/oecdbroadbandportal.htm (accessed on 20 May 2020); for data from Brazil, Anatel's response to the questionnaire of the review.

As more people and devices go online, increasing amounts of data of new applications will place additional demands on communication networks. For example, the Cisco Mobile Visual Networking Index (VNI) estimates that mobile data traffic between 2017-22 will grow sevenfold globally and six-fold in Brazil (a CAGR of 45%) (Cisco, 2018[30]). Investments in both fixed and mobile networks will continue to be crucial to take advantage of the digital transformation in Brazil.

Fixed and mobile networks in OECD countries are complementary as most users are connected to Wi-Fi technology for more than half their day and download far more data over Wi-Fi than on cellular networks. Moreover, the offloading of this traffic improves the performance of cellular access for other users because fixed networks are doing the "heavy lifting" (OECD, 2017[31]). In 2017, about 54% of mobile cellular traffic around the world was offloaded to fixed networks through Wi-Fi or small, low-power cellular base stations (i.e. femtocells). In Brazil, 49% of traffic was offloaded to fixed networks through Wi-Fi (Cisco, 2018[30]). However, the substitution between fixed and wireless networks may be greater in emerging economies than in the OECD. This is likely the case because wireless connectivity may be the primary source of access to broadband, as it is in Brazil.

The amount of traffic in terms of GB generated by mobile devices (Figure 3.24) can be estimated by combining two sources. On the one hand, CISCO VNI data provide the percentage of smartphone data traffic offloaded through fixed networks using Wi-Fi. On the other, the amount of mobile traffic generated per mobile broadband subscription can be identified. Using this approach for 13 OECD countries and Brazil,[9] at the end of 2017, Korea had the largest amount of total data usage per smartphone device (24 GB), followed by Sweden (17.9 GB); Brazil exhibited 2.5 GB of total amount of data usage per smartphone (Cisco, 2018[30]).

Figure 3.24. Total data per mobile broadband user (smartphone) per month in selected OECD countries and in Brazil (2018)[1]



1. Mobile data traffic corresponds to 2018, while CISCO VNI data correspond to the end of 2017.
Notes: GB = gigabyte. Offloaded Wi-Fi traffic is calculated using the Cisco VNI percentage of smartphone offloaded traffic.
Source: OECD using data from OECD (2020[9]), *Broadband Portal* (database), www.oecd.org/sti/broadband/oecdbroadbandportal.htm and Cisco VNI Global Fixed and Mobile Internet Forecasts, www.cisco.com/c/en/us/solutions/service-provider/visual-networking-index-vni/index.html.

Essential inputs for communication infrastructures

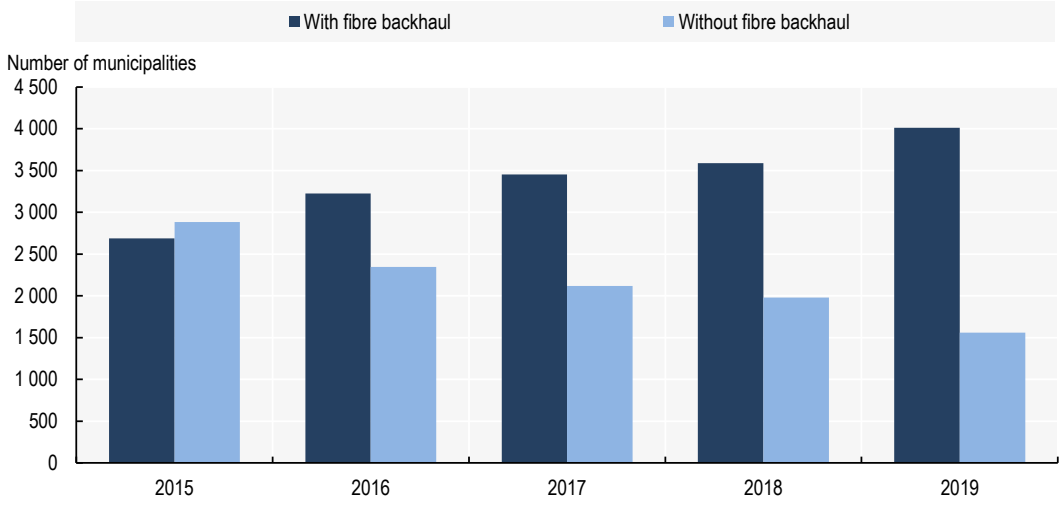
Backhaul and backbone connectivity

As the demand for mobile data traffic surges, wireless networks rely increasingly on fixed broadband infrastructure. In a way, wireless networks become extensions of fixed networks, and this is even more the case when it comes to 5G networks. Thus, it is crucial for Brazil to continue deploying fixed network infrastructure, as there is an increasing need for fibre backhaul and backbone connectivity.

Taking fibre backhaul closer to the end user, whether a business location or residential dwelling, is important for increasing speed across all technologies. This is true for 5G, and also for coaxial cable or copper connections. A growth in fibre backhaul availability should help support projected capacity demands, especially those raised by 5G networks (OECD, 2019[32]).

Anatel has been collecting data that allows a mapping of the transport infrastructure of high capacity networks used to provide telecommunications services, (i.e. backhaul and backbone connectivity). The regulator is working to entice all companies to report availability of backhaul. This aims to prevent the negative competitive effects of subsidising broadband deployment in areas that already have ISPs (Anatel, 2019[29]). An Anatel study showed that only 48.2% of municipalities in Brazil were served by fibre backhaul in 2015. This number reached 70% in 2019, which translates into 3 882 municipalities connected to fibre backhaul (Figure 3.25). However, backhaul connectivity in a municipality does not imply that the wholesale operator has any open access obligations (Anatel, 2019[29]).

Figure 3.25. Number of municipalities with fibre backhaul connectivity in Brazil (2015-19)



Source: Anatel (2019[29]), *Mapeamento de Redes de Transporte*, https://www.anatel.gov.br/dados/mapeamento-de-redes (accessed on 13 September 2019).

Challenges persist in achieving full coverage of backhaul connectivity: 51% of municipalities without fibre are in the North and Northeast regions. The state of Minas Gerais, which has the largest number of municipalities in the country, accounts for 26% of those municipalities without backhaul. However, comparing availability of backhaul connectivity by number of municipalities can be misleading. The largest states are the Amazonas and Pará in the North region, where one municipality in Pará (Altamira), is roughly the size of Portugal with a population of around 110 000. As such, a municipality may have the presence of backhaul in a given area, but given the heterogeneity in the size of municipalities in Brazil, the presence of backhaul is not a measure of geographic coverage of this wholesale input.

Previous OECD research identified a serious obstacle for the development of Internet infrastructure in a given country. If an incumbent dominates the market for backhaul and co-location, it may prevent the emergence of independent co-location facilities (OECD, 2014[33]). In Brazil, 47.7% of municipalities with fibre backhaul have two or more backhaul connectivity providers, whereas 24.2% of them have only one (Table 3.1).

Table 3.1. Number of fibre backhaul providers in municipalities in Brazil (2019)

Backhaul providers (fibre)	Number of municipalities	Share of municipalities (%)
0	1 558	28.0
1	1 350	24.2
2	1 031	18.5
3	593	10.6
4	406	7.3
5 or more	632	11.3

Source: Anatel (2020[3]), *Plano Estrutural de Redes de Telecomunicações (PERT) 2019-2024, Atualizaçao 2020*, https://sei.anatel.gov.br/sei/modulos/pesquisa/md_pesq_documento_consulta_externa.php?eEP-wqk1skrd8hSlk5Z3rN4EVg9uLJqrLYJw_9INcO4m2N1jXIPEu1rXnv7UHJFGKd-jO_xz5ZYqyuXgvKFPZe9U7a4FRauel0Ej_GJ3pzD2sKi_sQQhtHNHQk_javEK.

As reliable connectivity is essential for the digital transformation, ensuring network resilience and capacity becomes increasingly important. Extending fibre deeper into networks is key to ensure these can cope with the increasing demands in IP traffic.

The recent COVID-19 crisis has highlighted the importance of capacity and resilience of the Internet infrastructure. Along the entire Internet value chain, fixed and mobile broadband operators, content and cloud providers, and points where Internet networks connect to each other to exchange traffic, called Internet exchange points (IXPs), are experiencing as much as 60% more Internet traffic than before the outbreak. In this unprecedented situation, the resilience and capability of broadband networks has become even more critical.

In addition to ensuring network resilience and capacity, with the digital transformation of all sectors of the economy through 5G networks and the proliferation of IoT and AI applications, it becomes essential to enhance the digital security of communication networks and ensure "security by design".

Autonomous systems and IPv6

A well-functioning communication infrastructure includes an efficient exchange of Internet traffic. The allocation of autonomous system numbers and IP addresses is the foundation of Internet activities. Autonomous systems are the networks that form the Internet (a network of networks). They range from large ISPs to small local ISPs, academic, military or government networks, or firms with a particular need for network independence (OECD, 2007[34]).

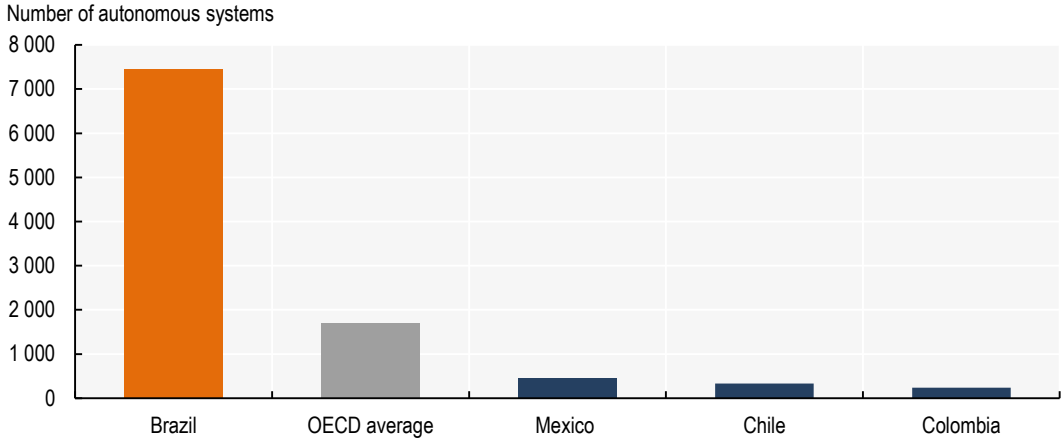
In the last 15 years, Brazil registered a high number of new autonomous systems. As of February 2020, Brazil had 7 451 autonomous systems, 16 times more than Mexico (450) and more than quadruple the OECD average (1 703) (Figure 3.26). The large increase in autonomous systems in Brazil starting in 2008 coincides with measures to deploy the newer version of the Internet Protocol, IPv6.

One potential challenge for the future of the Internet is its ability to scale to connect tens of billions of devices and machines, and a key aspect of that scalability is the use of the Internet Protocol (IP). The IP specifies how communications take place between one device and another through an addressing system. Two versions of the IP are in use. In IPv4, the distribution of unassigned addresses is largely exhausted. While IPv6 is plentiful, adoption has been slower than desired.

Encouraging deployment of IPv6 has been a long-standing goal for OECD countries. With regards to development of the IoT, IPv6 is important for two reasons. In addition to scalability, it could be more conducive to end-to-end encryption. Such encryption could be favourable for the security of industrial IoT applications. In addition, the increase in transaction

costs linked to IPv4 address exhaustion may hinder development of new applications and services (OECD, 2014[35]; OECD, 2018[36]).

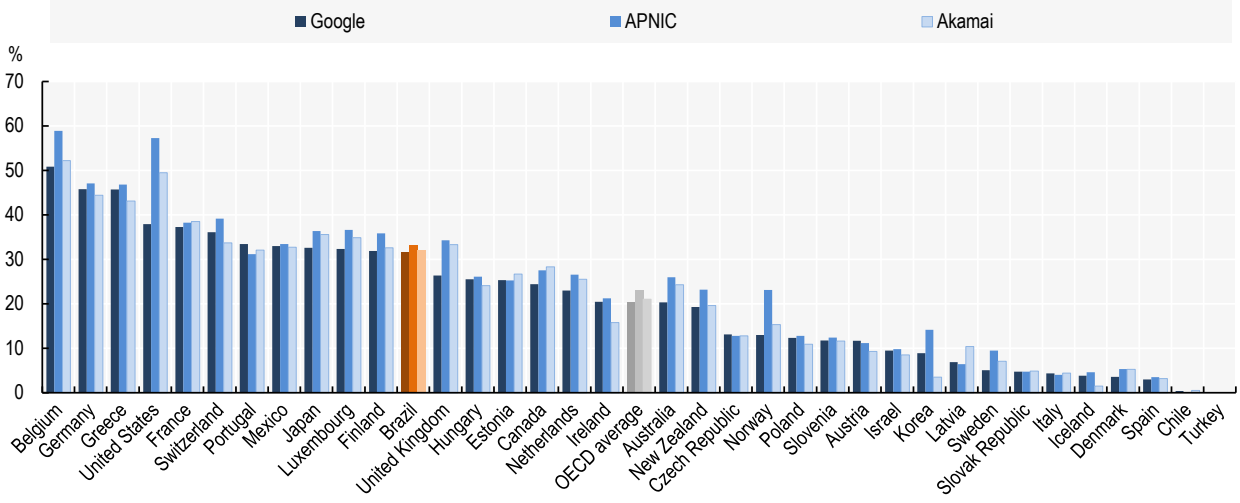
Figure 3.26. Autonomous systems in Brazil compared to regional peers and the OECD average (2019)



Source: Maigron (2020[37]), *Regional Internet Registries Statistics* (database), https://www-public.imtbs-tsp.eu/~maigron/RIR_Stats/ (accessed on 19 February 2020).

As with the number of autonomous systems, Brazil is ranking well compared to OECD countries in terms of IPv6 adoption (Figure 3.27). IPv6 adoption can be measured in different ways. Akamai provides data on the share of traffic transiting its Content Delivery Network that uses IPv6; data from Google indicates the share of users accessing its search engine via IPv6, and data from APNIC presents the share of Internet addresses provided by Regional Internet Address Registries that are IPv6-compliant.

Figure 3.27. Percentage of IPv6 addresses among all registered IP addresses in OECD countries and in Brazil (2020)



Note: Registered IPv6 addresses ranked by Google statistics.
Sources: Google (2020[38]), *Per-country IPv6 adoption*, https://www.google.com/intl/en/ipv6/statistics.html#tab=per-country-ipv6-adoption (accessed on 20 February 2020); APNIC (2020[39]), *IPv6 Measurement Maps*, http://stats.labs.apnic.net/ipv6 (accessed on 20 February 2020); Akamai (2020[40]), *State of the Internet: IPv6 Adoption Visualization*, https://www.akamai.com/us/en/resources/our-thinking/state-of-the-internet-report/state-of-the-internet-ipv6-adoption-visualization.jsp (accessed on 20 February 2020).

The increase in autonomous systems and the adoption of IPv6 addresses have been mainly driven by the Brazilian Network Information Centre (Núcleo de Informação e Coordenação, NIC.br) (Box 3.1). NIC.br decisions and projects are approved by CGI.br, the Brazilian Internet Steering Committee (Comitê Gestor da Internet), the entity that co-ordinates and integrates Internet service in Brazil. In addition, Anatel has an action plan for communication service providers to deploy IPv6 capabilities in all their main network equipment (Anatel, 2014[41]).

Box 3.1. The role of NIC.br in IPv6 deployment

Compared to OECD countries and other Latin American countries, Brazil has a large number of registered IPv6 addresses. NIC.br played a significant role in boosting IPv6 uptake. It worked through the Center for Studies and Research in Network Technology and Operations (Centro de Estudos e Pesquisas em Tecnologia de Redes e Operações). Actions taken to raise awareness and develop capacity among stakeholders, since 2008, in the public and private sectors to promote IPv6 deployment include:

- Co-ordination meetings, involving regional ISPs, communication operators, Anatel and other government agencies, equipment vendors, financial institutions and other actors. These address themes such as IPv4 depletion, problems caused by adoption of Carrier Grade Network Address Translation, strategies to adopt IPv6, etc. These meetings fostered actions towards IPv6 deployment in all participant sectors.
- Events, such as a series of open sessions "Breakfast with IPv6", and technical conferences "Brazilian IPv6 Forum", to reach out to a broad audience.
- Trainings: 200 technical training classes were held between 2008-19, engaging 6 000 professionals from the main regional ISPs, communication operators, universities, government agencies, financial institutions, and other networks and actors. These trainings gave participants enough knowledge about IPv6 to start practical actions to deploy it in their respective networks.
- Other courses, trainings, lectures, etc. For instance, more than 70 lectures were held at universities and academic institutions, and tens of speeches and lectures were given in meetings promoted by ISP associations in Brazil.
- Workshops, such as the 2018 and 2019 Internet Governance Forum.

Source: NIC.br (2020[42]), *NIC.br e CGI.br trabalhando para a melhoria da Internet no Brasil: Activdades*, www.nic.br/atividades/.

Internet exchange points

National fibre backbones, submarine cables and IXPs play a crucial role in IP interconnection. Several national broadband plans in the Latin America and Caribbean (LAC) region, including in Brazil, have focused on extending backbone and backhaul connectivity. Moreover, some analysts have highlighted the importance of regulation to ensure access to backbone and backhaul infrastructure by small and medium-sized network operators (Cavalcanti, 2010[43]). IXPs allow for access providers to interconnect with each other and the national backbone, fostering Internet traffic exchange.

Table 3.2. Internet exchange points in Brazil

City	Name	Participants	Average traffic (Gbps)
São Paulo	PTT Metro São Paulo	1 724	4 870
Rio de Janeiro	PTT Rio de Janeiro	319	967
Porto Alegre	PTT Porto Alegre	202	162
Fortaleza	PTT Fortaleza	181	328
Belo Horizonte	PTT Belo Horizonte	123	9.2
Curitiba	PTT Curitiba	103	103
Recife	PTT Recife	82	8.4
Salvador	PTT Salvador	74	15.4
Campina Grande	PTT Campina Grande	71	12.7
Brasilia	PTT Brasília	62	14.4
Maringá	PTT Maringá	56	3.8
São Paulo	Equinix São Paulo	50	100
Campinas	PTT Campinas	48	14
Florianópolis	PTT Florianópolis	45	3.8
Natal	PTT Natal	36	7.3
Londrina	PTT Londrina	34	17
Belém	PTT Belém	31	6
Manaus	PTT Manaus	30	1
Goiânia	PTT Goiânia	29	3.5
Aracajú	PTT Aracajú	27	0.16
Lajeado	PTT Lajeado	26	17
Vitória	PTT Vitória	23	4.2
Teresina	PTT Teresina	19	2.1
São José do Rio Preto	PTT São José do Rio Preto	18	1.5
Santa Maria	PTT Santa Maria	17	1.9
Cuiabá	PTT Cuiabá	17	0.218
São Luís	PTT São Luís	16	0.5
Foz do Iguaçu	PTT Foz do Iguaçu	15	1.6
Maceió	PTT Maceió	14	1.1
São José dos Campos	PTT São José dos Campos	13	0.227
João Pessoa	PTT João Pessoa	12	7.8
Caxias do Sul	PTT Caxias do Sul	6	0.28
Blumenau	FURB Internet Exchange	3	0.7
Ponta Grossa	UEPG Internet Exchange	3	0.75

Note: PTT = Ponto de Troca de Tráfego (Portuguese for IXP); Gbps = gigabits per second.
Source: Packet Clearing House (2020[44]), *Internet Exchange Directory* (database), https://www.pch.net/ixp/dir (accessed on 18 February 2020).

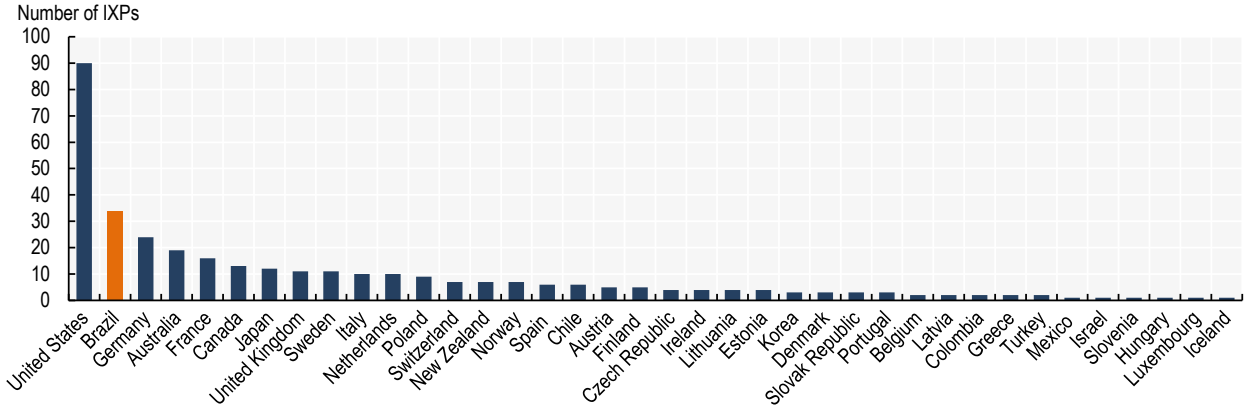
IXPs keep traffic local (Weller and Woodcock, 2013[45]). For an IXP to function well, multiple players would ideally exchange an important amount of traffic in the Internet ecosystem. Websites and content should also be ideally hosted in close proximity. This keeps the exchange of traffic local rather than routing data via other countries, which would increase latency and might be more costly. A significant amount of data routed via other countries often indicates a suboptimal development of the Internet traffic exchange market in a given country.

Brazil has built up a substantial number of IXPs. It is the leading country in the region for the overall number of IXPs, IXP participants and total traffic exchanged. IXPs exist in all major cities throughout the country via the Brazilian IXP System, the PTT (Ponto de Troca de Tráfego) Metro system.

Brazil has 34 active IXPs with more than 3 500 participants that exchange traffic at the national level (Table 3.2). The number of IXPs depends on a range of factors, including the size of the economy and the geography of a country. Brazil has a higher number of IXPs than many OECD countries (Figure 3.28).

The PTT Metro São Paulo is one of the largest IXPs in the world in terms of participants and the third largest IXP in terms of average traffic. It has more than 1 700 participants and an average traffic of around 4.8 Tbps (Packet Clearing House, 2020[44]). For average traffic, it follows only the Deutsche Commercial Exchange Frankfurt, Germany with 5.8 Tbps and the Amsterdam Internet Exchange, Netherlands with 5.6 Tbps (Packet Clearing House, 2020[44]). This enables operators in Brazil to exchange local traffic at the closest IXP with all the attendant benefits. It also helps Brazil avoid shifting traffic to another country and then back again (i.e. IP traffic "tromboning") as many countries still must do. A number of foreign South American providers also rely on the PTT Metro São Paulo, which functions as a continental hub.

Figure 3.28. Number of IXPs in Brazil and in OECD countries (2019)

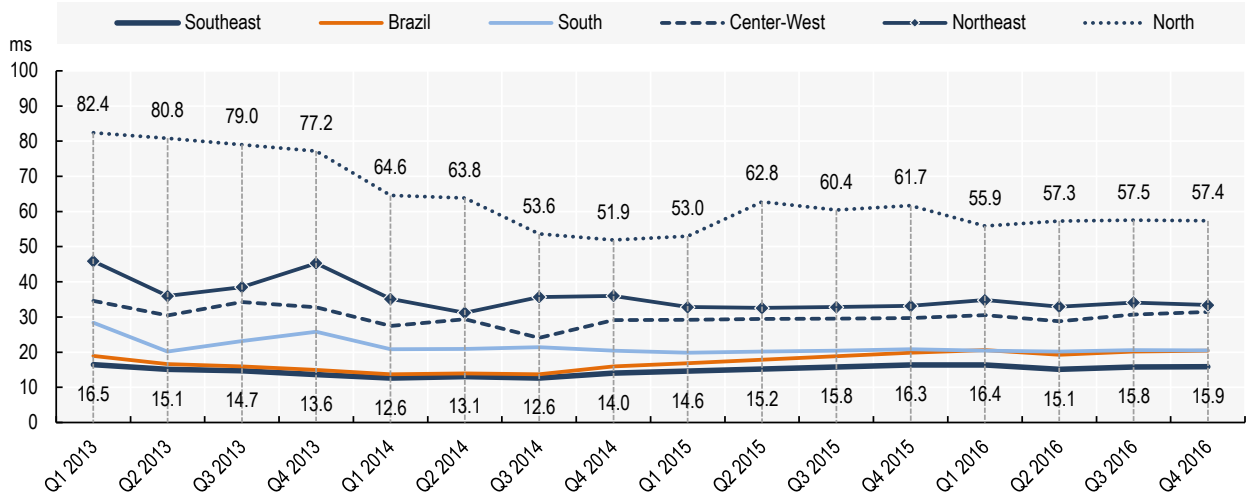


Note: Only IXPs listed with at least three participants are included.
Source: Packet Clearing House (2020[44]), *Internet Exchange Directory* (database), https://www.pch.net/ixp/dir (accessed on 18 February 2020).

As could be expected, latency is lowest in the Southeast Region of Brazil, where most IXPs and the two largest IXPs (São Paulo and Rio de Janeiro) are situated (Figure 3.29). The median latency in the Southeast and the North is 15.9 ms and 57.4 ms, respectively. The elevated latency in the North further demonstrates the low availability of backhaul in the region. Moreover, the low availability of backhaul also results in differences in the amount of traffic interchanged. The Manaus IXP, the largest in the North region with 30 participants, had an average traffic of only 1.3 Gbps. The Aracajú IXP, in the Northeast region, with a comparable number of participants, had a peak traffic of 0.16 Gbps in February 2020 (Packet Clearing House, 2020[44]).

There has to be enough local traffic to exchange significant amounts of traffic at a specific IXP. It is also preferable that websites and content are hosted close (i.e. domestically) to this IXP. To date, around 89% of Brazilian companies use the .br domain and 3% use one of the various Brazilian subdomains (CGI.br, 2018[28]). Nevertheless, high usage of the Brazilian country code top-level domain (ccTLD) ".br", does not necessarily indicate that the respective content is also hosted in Brazil. In fact, data collected in 2013 showed that only 54% of Brazilian websites using the ccTLD ".br" are hosted in the country facilities (OECD, 2014[33]). This may indicate that certain website owners do not perceive it to be cost-effective to store their content locally. There may also be challenges to establish the infrastructure needed to host content locally, as discussed further below.

Figure 3.29. Median latency in Brazil, total and per region (2013-16)



Notes: ms= millisecond. Latency is the time for a message to go to a destination and back.
Source: NIC.br (2018[17]), "Banda Larga no Brasil: um estudo sobre a evolução do acesso e da qualidade das conexões à Internet", https://cetic.br/media/docs/publicacoes/1/Estudo%20Banda%20Larga%20no%20Brasil.pdf.

The PTT Metro system is managed by NIC.br under the mandate of CGI.br, which also manages the ccTLD ".br". An interesting feature of Brazilian Internet infrastructure management is that the revenues from the domain name registration support improvements in Internet management and infrastructure. Among others, this includes programmes to enhance traffic management, measure the quality of broadband connections and support IPv6 adoption. NIC.br also invests its revenues in the implementation and operation of IXPs. The extensive number of active IXPs can therefore be attributed to the establishment of the .br domain, its success and the way its revenues are used (Box 3.2).

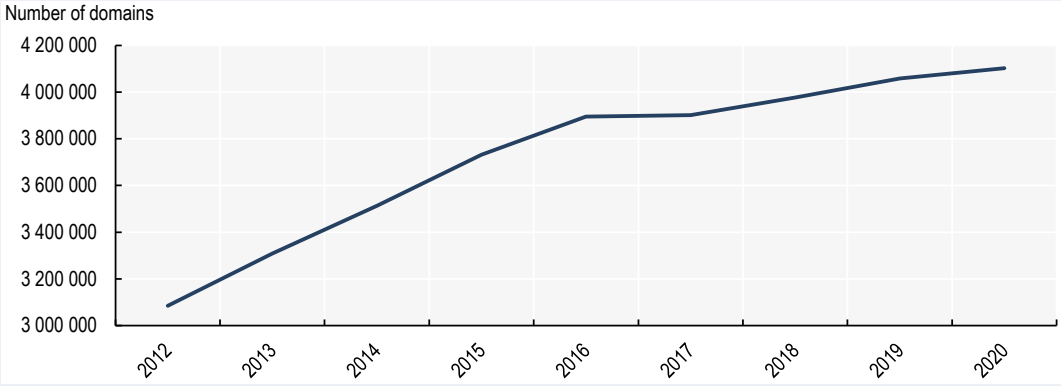
Box 3.2. The .br domain

The year 2019 marked the 30th anniversary of the ccTLD .br, which as of December 2019 had over 4 million registered domains (Figure 3.30). The emergence of Internet exchange points (IXPs) in Brazil is closely tied to the history of the .br ccTLD. Through the revenues generated by the .br domains, NIC.br (under CGI.br) funds activities to deploy IXPs and other projects in Brazil.

Initially, ".br" was used to identify machines in the academic environment, and registrations were few and done manually. In 1989, Jon Postel from the Internet Assigned Numbers Authority, responsible for the assignment of top-level domains, assigned .br to the team that, at the time, operated academic networks at the São Paulo Research Foundation.

In 1991, the subdomains "gov.br", "com.br", "net.br", "org.br" and "mil.br", respectively referring to the government, companies, non-profit organisations and armed forces, were established. Driven by the commercialisation of the Internet at the end of 1994, the ".br" grew rapidly. From 851 domains registered in 1995, it reached more than 7 500 domain names in the month of December 1996. The process started to be automated and the mark of 1 million domains was reached in 2006, only ten years later.

Figure 3.30. Number of .br domains (2012-20)



Note: Estimates as of February 2020.
Source: NIC.br (2020[46]), *Estatísticas: Domínios .br Registrados até o Momento*, https://registro.br/estatisticas.html (accessed on 20 January 2020).

As of April 2019, ".br" is the seventh most popular domain in the world. With the creation of new subdomains, it now provides for more than 120 different options. Among others, there are subdomains to identify specific interests (such as "ong.br", "art.br", "eco.br"), or cities (e.g. "rio.br", "manaus.br", "cuiaba.br", "floripa.br", "foz.br").

Source: Convergência Digital (2019[47]), ".br completa 30 anos com 4 milhões de domínios registrados," https://www.convergenciadigital.com.br/cgi/cgilua.exe/sys/start.htm?UserActiveTemplate=site&infoid=50498&sid=4 (accessed on 20 February 2020).

Submarine fibre cables

Brazil is well-served by multiple submarine fibre cables, which form the backbone of the international communication infrastructure. These cables are deemed less prone to failure than over-land cables and can carry large amounts of data. With around 378 cables in service worldwide as of early 2019 (TeleGeography, 2019[48]), around 99% of all intercontinental Internet data traffic is exchanged via the submarine fibre infrastructure.

Currently, 19 cables land in Brazil, giving the country access to a network of nearly 180 000 km (TeleGeography, 2020[49]). Out of 19 cables, 7 were added between 2017-18, and 5 were planned for service in 2020 or 2021, reflecting the growth of submarine fibre connectivity. The largest cables, South America-1 (SAm-1) and GlobeNet, with 25 000 km and 23 800 km respectively, were deployed in 2000 and 2001 (Table 3.3). Many of the landing stations are in Fortaleza, Santos and Rio de Janeiro, but most land in Fortaleza. This may be for its location, as it represents Brazil's closest point to Africa and Europe.

Table 3.3. Submarine fibre cables in Brazil

Name	Owner	Length (km)	Established/ ready for service	Landing points in Brazil	International landing points
South America-1 (SAm-1)	Telxius	25 000	2001	Fortaleza, Rio de Janeiro, Salvador, Santos	Chile, Colombia, United States, Argentina, Peru, Guatemala, Dominican Republic, Ecuador
GlobeNet	BTG Pactual	23 500	2000	Fortaleza, Rio de Janeiro	Colombia, United States, Venezuela, Bermuda

Name	Owner	Length (km)	Established/ ready for service	Landing points in Brazil	International landing points
South American Crossing (SAC)	Telecom Italia Sparkle, CenturyLink	20 000	2000	Fortaleza, Rio de Janeiro, Santos	Colombia, Panama, Argentina, Peru, Venezuela, United States, Chile
América Móvil Submarine Cable System-1 (AMX-1)	América Móvil	17 800	2014	Fortaleza, Rio de Janeiro, Salvador	Colombia, Mexico, United States, Guatemala, Dominican Republic
BRUSA	Telxius	11 000	2018	Fortaleza, Rio de Janeiro	United States
Seabras-1	Seaborn Group	10 800	2017	Praia Grande	United States
Monet	Angola Cables, Google, Algar Telecom, Antel Uruguay	10 556	2017	Fortaleza, Santos	United States
Atlantis-2	Consortium	8 500	2000	Fortaleza	Portugal, Spain, Senegal, Argentina, Cape Verde
Americas-II	Consortium	8 373	2000	Fortaleza	Venezuela, French Guiana, United States, Martinique, Trinidad and Tobago. Aruba, Bonaire, Curaçao, Saba, Saint Eustatius, Saint Maarten
EllaLink	EllaLink Group	6 200	2020	Fortaleza, Praia Grande	Portugal, French Guiana, Cape Verde
South Atlantic Cable System (SACS)	Angola Cables	6 165	2018	Fortaleza	Angola
South Atlantic Inter Link (SAIL)	Camtel, China Unicom	5 900	2018	Fortaleza	Cameroon
Brazilian Festoon	Embratel	2 543	1996	Aracajú, Atafona, Ilhéus, João Pessoa, Macaé, Maceió, Natal, Porto Seguro, Recife, Rio de Janeiro, Salvador, Sitio, São Mateus, Vitória	x
Malbec	GlobeNet, Facebook	2 500	2020	Praia Grande, Rio de Janeiro	Argentina
Tannat	Google, Antel Uruguay	2 000	2018	Santos	Argentina, Uruguay
Junior	Google	390	2018	Rio de Janeiro, Santos	x

Note: x = not applicable.
Source: TeleGeography (2020[49]), *Submarine Cable Map*, https://www.submarinecablemap.com/#/country/brazil (accessed on 20 February 2020).

Data centres

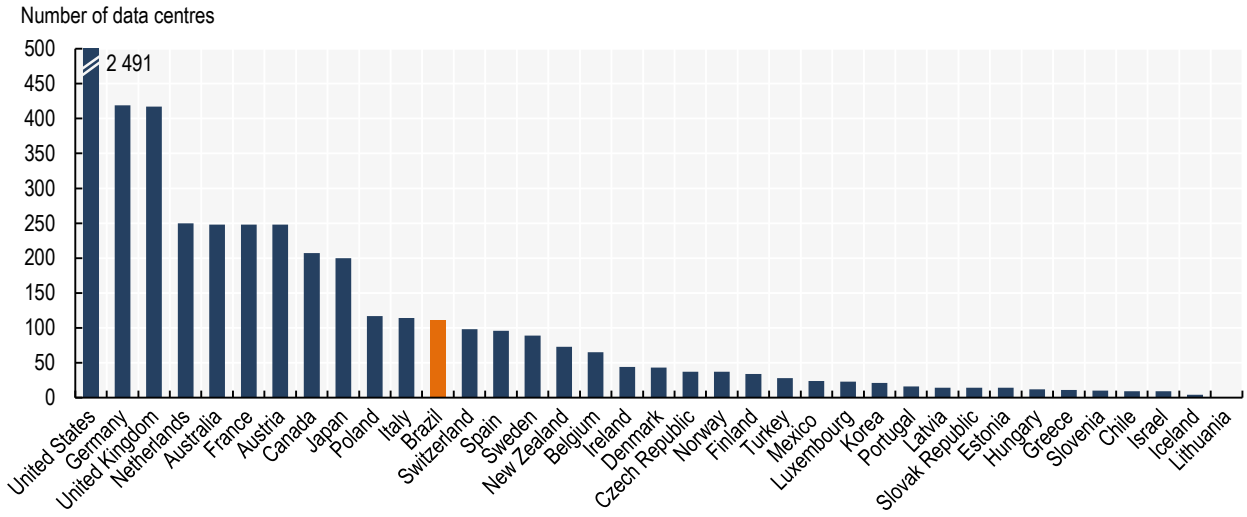
Brazil has a considerable number of data centres (111) (Cloudscene, 2019[50]) compared to OECD countries (Figure 3.31). In addition, Amazon Web Services, the cloud computing arm of Amazon, announced an investment of around USD 230 million over 2020 and 2021 to expand its data centre infrastructure in Brazil (Goodison, 2020[51]).

Data centre deployment can be further improved in Brazil. The low amount of content hosted locally may indicate a non-competitive environment that is not attractive to website owners. In fact, data centre services may be comparatively more expensive in Brazil. Bigger companies may also refrain from deploying in-house data centres in Brazil for a number of reasons.

Energy represents a major input for data centres. Energy prices in Brazil are comparatively high (Figure 3.45) perhaps in part because the energy sector, like the communication sector,

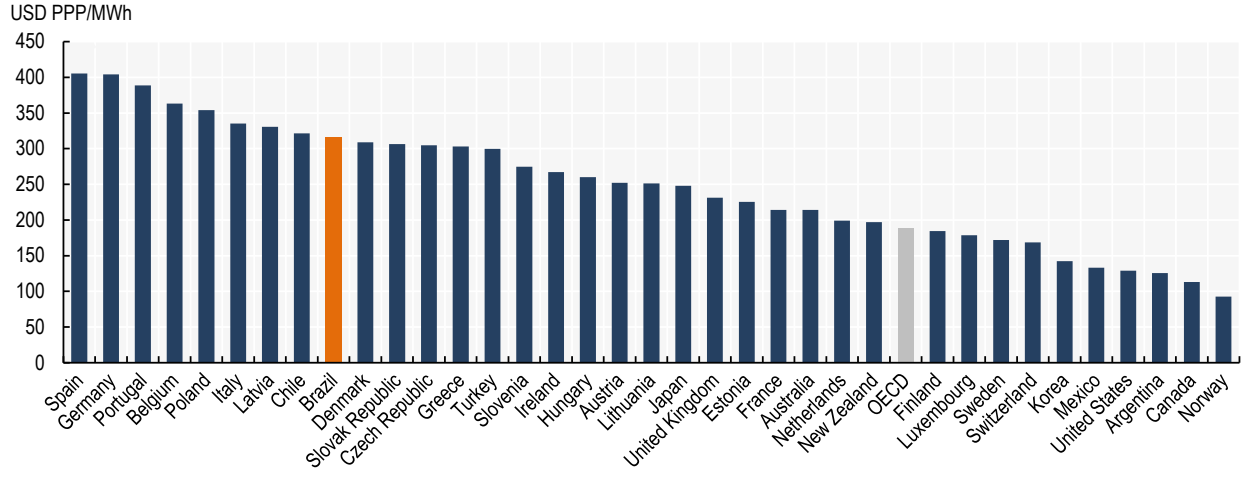
is taxed through the state-level ICMS tax. In 2017, Brazilian companies paid almost twice as much (USD PPP 269) per MWh as the OECD average (USD PPP 143).

Figure 3.31. Number of data centres in OECD countries and in Brazil (2019)



Note: This statistic relies on self-reported data and may therefore only serve as a rough estimate.
Source: Cloudscene (2019[50]), *Markets: Brazil* (database), https://cloudscene.com/market/data-centers-in-brazil/all (accessed on 5 October 2019).

Figure 3.32. Energy end-user prices in OECD countries and in Brazil (2017)



Note: PPP = purchasing power parity; MWh = megawatt-hour.
Source: IEA (2019[52]), "Energy Prices and Taxes for OECD Countries 2019", https://doi.org/10.1787/71612f7e-en (accessed on 18 February 2020).

In addition, communication network quality, capacity and prices may hold investors back from deploying data centres. Prices are especially critical for cloud services, as for its generally high volume/low price business models. Bureaucracy related to land acquisition and permits, as well as municipal approval of construction projects, is also cited as a common hindrance. Furthermore, some experts reported that some Brazilian states may try to classify cloud services as telecommunication services that are subject to ICMS. This, in turn, would make cloud services expensive.

Moreover, capital goods for data centres must often be imported. As discussed, there are high tariffs on imports unless there is no comparable product made in Brazil. Additionally, if a foreign company that aims to establish a data centre in Brazil is designing its own infrastructure and technology, it has to send parts of the infrastructure to Brazil for testing before importing and deploying the data centre (Chapter 7).

Spectrum availability

Availability of spectrum is a key factor and underlying condition of the competitive dynamics of mobile markets in Brazil. Anatel is in charge of spectrum management and licensing. Before the 2019 reform of the General Telecommunications Law (Lei Geral de Telecomunicações, LGT), spectrum licences for mobile services lasted 15 years in Brazil. They were renewable once for the same length of time in line with Anatel Resolution No. 321 of 27 September 2002, which is under review (Anatel, 2002[53]).

For the licensing, Anatel has approved a comprehensive set of regulations and a framework for spectrum valuation. Spectrum caps used in auctions were updated to address demand and, simultaneously, maintain competition in the sector. With the LGT reform in October 2019, Law No. 13 879 allows the successive renewal of spectrum licences indefinitely without an auction (Chapter 5).

The total amount of allocated spectrum for mobile services in Brazil (Serviço Móvel Pessoal) in 2020 amounts to 1 179 MHz in bands below 6 GHz (Anatel, 2020[54]; Anatel, 2018[55]). Namely, 204 MHz have been allocated in frequency bands below 1 GHz; 575 MHz in frequency bands between 1 and 3 GHz; and 400 MHz in the 3.5 GHz band. In addition, Brazil has identified mmWave spectrum to be allocated for international mobile telecommunications (IMT), i.e. 6 400 MHz of spectrum in the 26 GHz frequency band.

Regarding spectrum availability in the market, by 2019, 629 MHz of spectrum had been assigned through auctions. Most of the spectrum assigned is concentrated in the 1.7-2.1 GHz band (also known in some countries as the AWS band), the 2.3 GHz band and the 2.5 GHz band. Regarding the 700 MHz band (i.e. the digital dividend band), 60 MHz was assigned in 2014, with 20 additional MHz planned for the upcoming 5G auction. Furthermore, the government will make an additional 400 MHz available in the 3.5 GHz band, 90 MHz in the 2. 3 GHz band and 3 200 MHz in the 26 GHz band through the upcoming 5G auction expected by the beginning of 2021 (Figure 3.33).

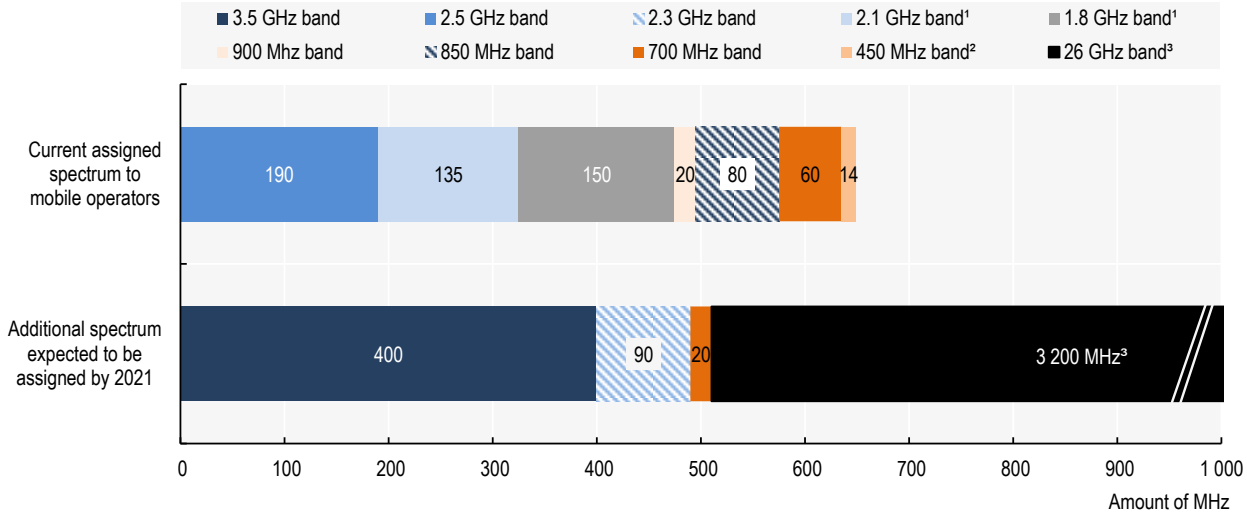
The deployment of 5G commercial networks in Brazil is likely to begin in 2021, after the spectrum auction takes place. The 3.5 GHz and 26 GHz frequency bands were chosen as the pioneer bands for 5G in Brazil.

Spectrum auctions can shape competition dynamics in the telecommunication sector. Specifically, the design of the blocks, along with other factors, can determine how many strong mobile players will prevail in mobile markets in years to come. Thus, the design of spectrum auctions becomes vital for communication markets.

Two key policy objectives should be considered when designing future spectrum auctions in Brazil (e.g. upcoming auction intended for 5G): increasing coverage of communication networks and enhancing competition in mobile markets. The design of spectrum auctions depends on three main elements: reserve prices, coverage obligations and spectrum caps. For example, spectrum caps are widely used in OECD countries for encouraging entry and addressing dominance (OECD, 2014[56]).

Coverage obligations can contribute to a broader coverage of the population in rural and remote areas. However, the extent of coverage obligations should not impede certain actors from bidding in the auction (OECD, 2019[57]). See Chapter 5 for more details.

Figure 3.33. Spectrum availability in Brazil (2019) in MHz assigned through auctions



1. 1.7-2.1 GHz corresponds to the AWS band in other countries.
2. Anatel is revoking the 450 MHz frequency licences, and operators have challenged the decision.
3. The amount of spectrum that will be available in the 26 GHz band corresponds to 3 200 MHz.

Note: GHz = gigahertz; MHz = megahertz.

Sources: Anatel's response to the questionnaire of the review; Amaral (2019[58]), *Com recorde de 3,6 GHz, edital do leilão 5G chega ao conselho na semana que vem*, http://teletime.com.br/22/05/2019/com-recorde-de-36-ghz-edital-do-leilao-5g-chega-ao-conselho-na-semana-que-vem/.

Competition in fixed and mobile markets

Communication market participants

In Brazil, the largest players in the telecommunication market are Telefónica's Brazilian subsidiary, Telefônica Brasil with the brand name Vivo (hereafter "Vivo"); América Móvil's Brazilian subsidiary Claro Brasil with the brand name Claro (hereafter "Claro"); Oi; and Telecom Italia's Brazilian subsidiary, Tim Brasil, with the brand name TIM (hereafter "TIM") (Table 3.4). Leading providers differ depending on the market segment (i.e. fixed voice, mobile voice, broadband, fixed broadband and pay TV).

The main mobile voice and mobile broadband players are Vivo, Claro, TIM and Oi. The main fixed broadband players are Claro, Vivo and Oi. Claro, Vivo and Oi are also present in the pay TV market. A major player in the pay TV market is Sky Brasil, which was acquired by DirectTV in 2010, and has become part of AT&T.

As described in Chapter 2, the telecommunication sector in Brazil liberalised during the 1990s with the support of the LGT. The privatisation of Telebrás, the State-owned company, took place in July 1998. It was split into the long-distance operator (Embratel), three regional fixed-line companies and eight wireless carriers. Telebrás was re-established as a State-owned company in 2010.

Embratel is the historical long-distance fixed incumbent in the private sector. Although created in 1965 as a public company as part of the Telebrás system, Embratel became a

privately owned company in 1998. At first, MCI acquired the controlling stake of the company in the privatisation auction on 29 July 1998. In July 2004, Teléfonos de México S.A. de C.V. ("Telmex") acquired the controlling stake of 98.42%.

Table 3.4. Main players in the Brazilian communication markets

Communication player	Markets where it operates	Ownership structure
Telebrás	Public company to fulfil national broadband policies	Mixed (public ownership re-instated in 2010, where the government owns 89.45% of shares)
América Móvil (Claro)	Fixed voice, fixed broadband, mobile, pay TV	América Móvil (83.72%), others (16.28%)
Embratel	Long-distance fixed incumbent of wholesale access services	América Móvil (98.42%)
Oi	Fixed voice, fixed broadband, mobile, pay TV	Goldentree Asset Management LP (14.95%), York Global Finance Fund LP (11.44), Bratel S.A.R.L. (5.08%), Brookfield Asset Management Inc. (5.92%), Solus Alternative Asset Management LP (3.47%) and others (59.14%)
Telefônica Brasil (Vivo)	Fixed voice, fixed broadband, mobile, pay TV	Telefónica Spain (94.31%), institutional holdings (5.69%)
Telecom Italia (TIM)	Fixed voice, fixed broadband, mobile, pay TV	Telecom Italia (67%), others (33%)
Algar Telecom	Fixed voice, fixed broadband, pay TV	Algar S.A (67.74%), Archy LLC (25.3%), others (6.96%)
Sky Brasil	Pay TV	AT&T (93%), others (7%)
Globo	Media holding (Free-To-Air [FTA] TV and radio broadcasting, pay TV channel and other media)	Grupo Globo
Record	Media holding (FTA TV and radio broadcasting, pay TV channel and other media)	Grupo Record
Band	Media holding (FTA TV and radio broadcasting, pay TV channel)	Grupo Bandeirantes
SBT	Broadcasting (FTA TV)	Grupo Silvio Santos

Dynamics of fixed voice and fixed broadband markets

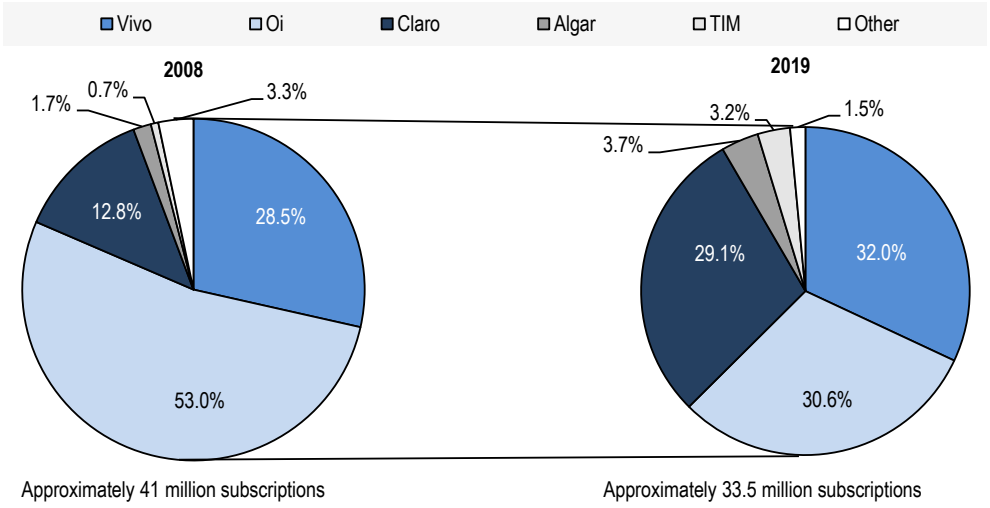
Apart from pricing and investment, the evolution of market shares is a further indicator of the level of competition in the market.

The largest players in the fixed telephony market in 2019 were Vivo, Oi and Claro. Over the past decade, the market share of Oi, measured in terms of subscribers, significantly decreased from 53% to 30.6% between 2008 and 2019. During the same period, Claro more than doubled its market share, rising from 12.8% to 29.1%. The market share of Vivo increased slightly during the period from 28.5% to 32% (Figure 3.34).

The fixed broadband market nearly tripled between 2008 and 2019, with subscriptions moving from some 11 million to 32.9 million. The three largest providers of fixed broadband in 2019 covered 66.4% of the market. They were Claro (29.1% market share), Vivo (21.3%) and Oi (16%) (Figure 3.35). Claro has gained the most market share during the period, passing from 11.2% to 29.1%. Its expansion in fixed networks is related to Claro's ownership of Embratel (the fixed incumbent of wholesale access services in Brazil) and Net (a highly successful cable operator in Brazil).

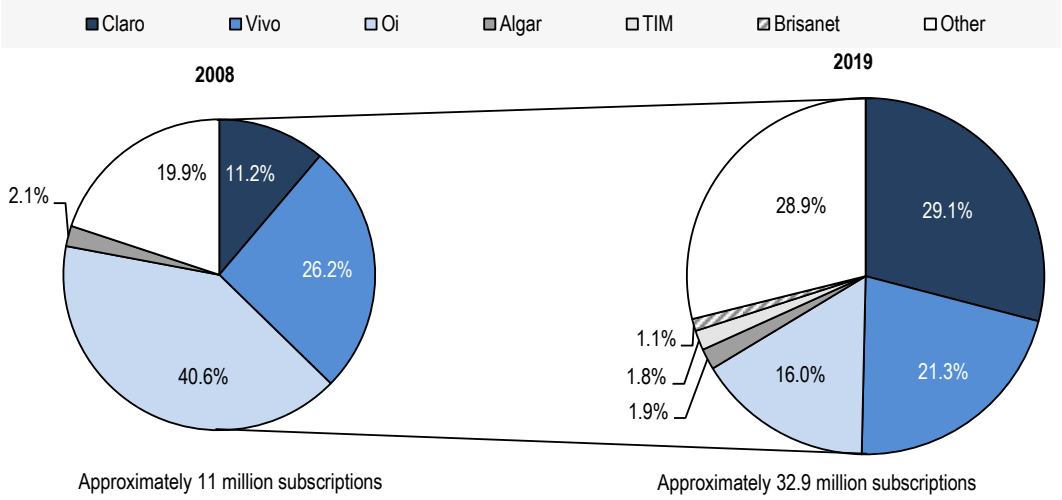
The fixed broadband market in Brazil is largely heterogeneous. There are more than 13 000 ISPs in Brazil, which include both large and small operators. The large ones offer bundles of communication services, while the small ones operate in remote areas not yet commercially attractive to larger ISPs.

Figure 3.34.Fixed telephony market shares as percentage of subscribers in Brazil (2008 and 2019)



Source: Anatel (2020[8]), *Painéis de Dados: Accesos*, https://www.anatel.gov.br/paineis/acessos (accessed on 28 May 2020).

Figure 3.35. Fixed broadband market shares as percentage of subscribers in Brazil (2008 and 2019)



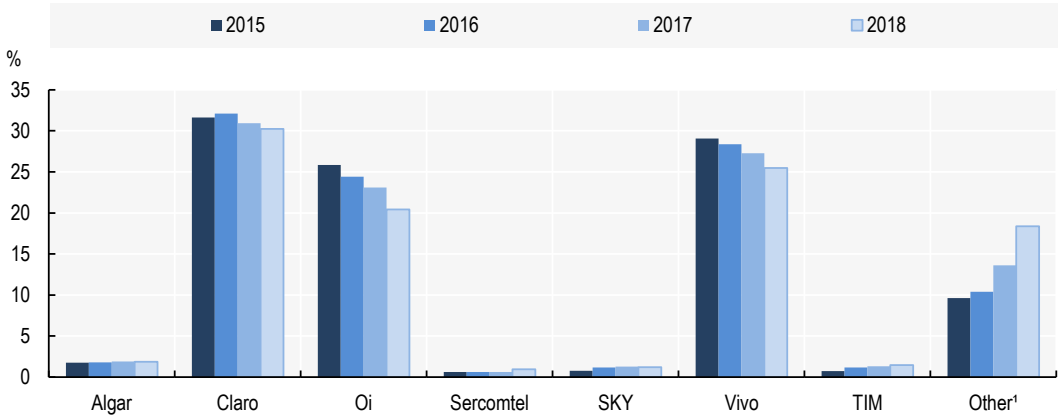
Source: Anatel (2020[8]), *Painéis de Dados: Accesos*, https://www.anatel.gov.br/paineis/acessos (accessed on 28 May 2020).

"Small regional" broadband access providers have grown in recent years ("Others", in Figure 3.36). More than one-third (35.4%) of cities have two or more backhaul providers with fibre in Brazil. This may have also been conducive to the growth of regional providers.

"Small providers" (Prestadores de Pequeno Porte) are defined as ISPs with a national market share of less than 5%. According to Anatel, these providers are expanding their fixed broadband networks, and have been using fibre to expand them. These providers are already present with fibre in 2 451 municipalities; 783 rely solely on these small providers for fibre access (Anatel, 2020[3]).

In 2018, small ISPs accounted for 18.4% of Brazil's fixed broadband subscriptions (Figure 3.36). According to Anatel, this figure rose above 20% in 2019. Overall, those small providers drive competition in the Brazilian market and contribute to deploy fibre deeper into the Brazilian networks.

Figure 3.36. Share of fixed broadband subscriptions per ISP in Brazil (2015-18)

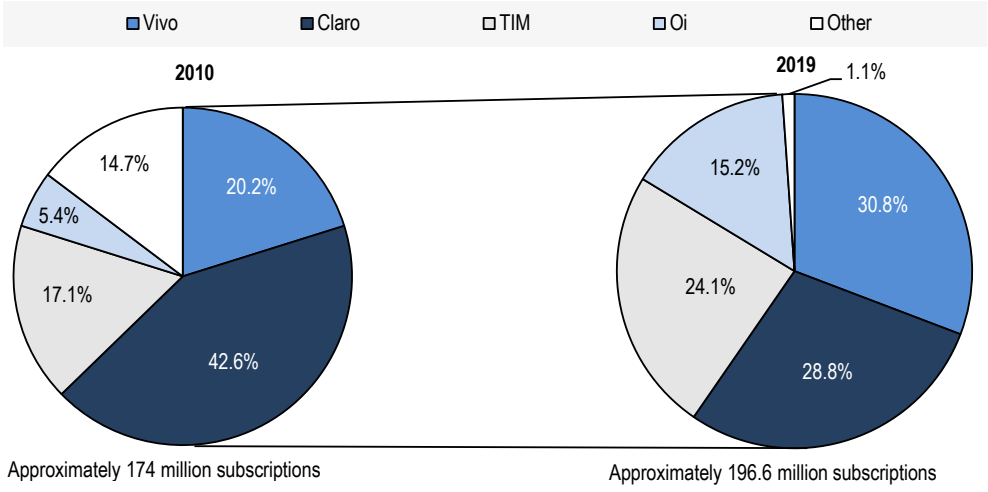


1. Small Internet service providers.
Source: Anatel (2019[59]), *Plano Estrutural de Redes de Telecomunicações (PERT)*, www.anatel.gov.br/dados/pert.

Dynamics of mobile voice and mobile broadband markets

The three largest players in the mobile voice telephony market in 2019 were Telefônica Brasil (Vivo) with around 32.9% market share, Telecom Americas (Claro Brasil) with 25.5% market share and TIM with 24% of total subscribers (Anatel, 2020[8]).

Figure 3.37. Mobile broadband market shares as percentage of subscribers in Brazil (2010 and 2019)



Source: Anatel (2020[8]), *Painéis de Dados: Accesos*, https://www.anatel.gov.br/paineis/acessos (accessed on 28 May 2020).

Mobile broadband market shares in the past nine years have evolved. In 2019, Vivo led the market with a share of roughly 30.8%, followed by Claro (28.8%) and TIM (24.1%). In

2008, Claro was the leading mobile network operator (MNO) with a market share of 42.6%, more than twice than Vivo (20.2%) (Figure 3.37). Claro acquired Nextel in March 2019; Anatel approved the transaction in September 2019. Therefore, Claro's market share in 2019 includes Nextel's subscribers.

During the past nine years, the size of the market has grown from approximately 174 million mobile broadband subscriptions to 196.6 million (Figure 3.37). Meanwhile, other smaller MNOs had a combined market share of 1.1% (e.g. Algar and Sercomtel). Finally, several mobile virtual network operators (MVNOs) accounted for less than 0.01% of the market (Teleco, 2019[60]).

There are 22 MVNOs in Brazil: 8 authorised (either service providers, enhanced service providers or full MVNOs) and 14 certified (branded resellers that do not require prior authorisation by Anatel). The main licenced MVNO is Datora Mobile Telecomunicações with 533 000 users in 2019. The market witnessed the exit of an MVNO, Porto Seguro Telecomunicações, in 2019.

Developments in the broadcasting sector and pay TV in Brazil

Trends in broadcasting and pay TV

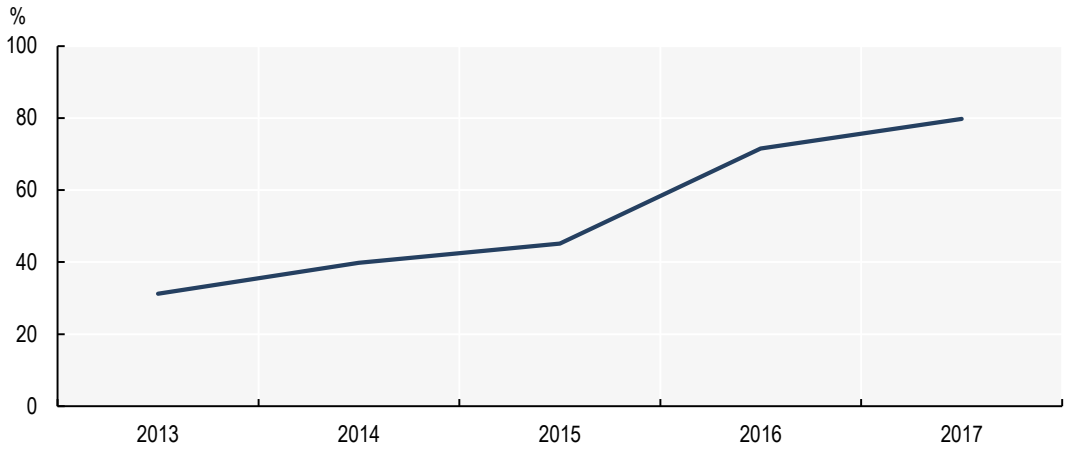
Free-to-air (FTA) broadcasting television remains the audio-visual medium with the most substantial reach in Brazil. Radio and TV signals, together, reach practically 100% of all Brazilian municipalities. In 2017, 96.7% of households in Brazil owned a television, a penetration consistently maintained in the past decades (IBGE, 2018[61]). That corresponds to 68 million of 70 million households of Brazil. This figure is higher than the regional average in Latin America (94% of households with television) and 93% in Mexico in 2016. It is only lower than the television ownership rate of North America, which stands at 98%, but has higher rates of cable television (OECD, 2017[62]).

According to the Brazilian Association for Radio and TV Broadcasting (Associação Brasileira de Emissoras de Rádio e Televisão, ABERT) estimates that FTA television alone stands for 200 000 direct and indirect jobs. It also reports that broadcasting production (not including newscasts) consists of about 70 000 hours per year. The volume of news reports amounts to 180 000 hours per year. Brazil also exports its broadcasting content widely, licensing TV productions to more than 130 countries.

Since Brazil decided to implement digital terrestrial television (DTT) in 2006, many developments have taken place. From 2013 to 2016, the number of households with digital TV jumped from 19 million to 54 million, i.e. from 31% from 79% of households with TV (Figure 3.38). The analogue switch-off, according to ABERT, did not seem to have a significant negative impact on FTA terrestrial TV audiences. This was a particularly important goal, given the vast majority of the population relies on FTA in Brazil.

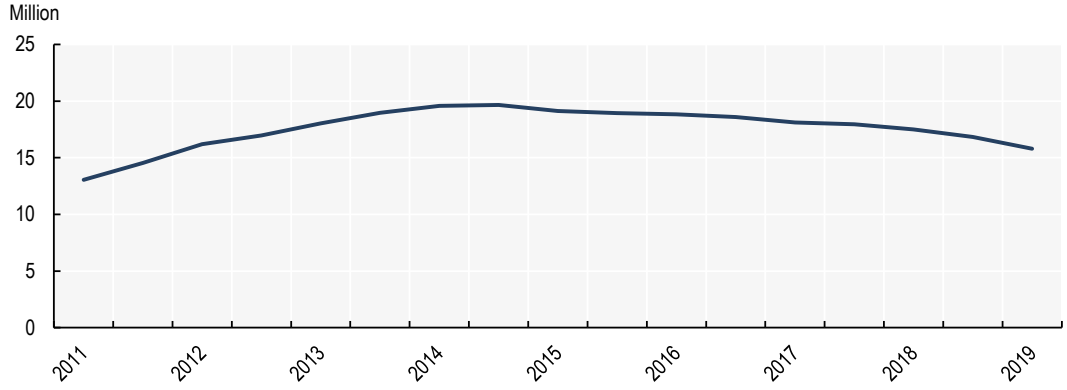
In contrast to the near-universal access to FTA, pay TV services are less common in Brazil. According to a 2017 survey, 32% of households with television subscribed to pay TV services, a decline from 33.7% the year before (IBGE, 2018[61]). Households without pay TV gave several reasons for not having the service: too expensive (55.3%), no interest (39%) and lack of availability (1.6%) (IBGE, 2018[61]). Data reported by pay TV service providers to Anatel show slightly lower subscription numbers. However, they also point to a decline in penetration of total households in the past five years – from a peak of around 30.3% to 22.7% between 2014 and 2019. In this same period, the Brazilian pay TV market contracted from 19.6 million to 15.8 million subscribers (Figure 3.39).

Figure 3.38. Penetration of digital TV in households with a TV set in Brazil (2013-17)



Source: IBGE (2018[61]), "Acesso à Internet e à televisão e Posse de Telefone Móvel celular para Uso Pessoal 2017", https://biblioteca.ibge.gov.br/visualizacao/livros/liv101631_informativo.pdf.

Figure 3.39. Number of total pay TV subscriptions in Brazil, 2011-19



Source: Anatel (2020[8]), *Painéis de Dados: Accesos*, https://www.anatel.gov.br/paineis/acessos (accessed on 28 May 2020).

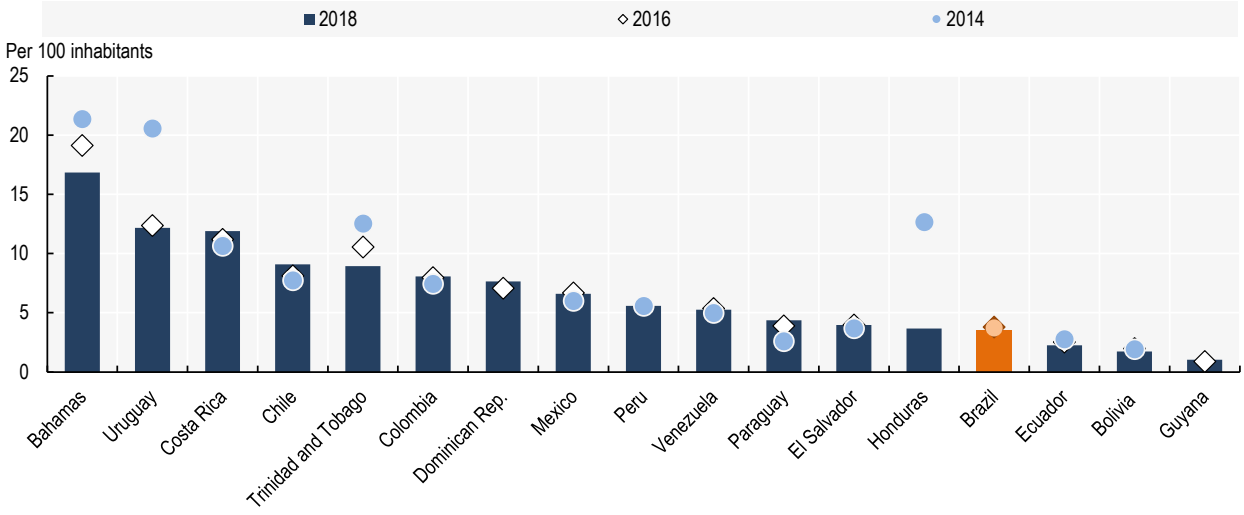
The penetration of pay TV services varies considerably across regions in Brazil. The region with the highest number of pay TV subscriptions per 100 households is the Southeast (31.9%), followed by the South (22.8%) and Centre-West (20.1). The North and Northeast lag considerably behind, with 13.6% and 10.6%, respectively. The percentages are calculated from the number of subscriptions reported to Anatel and the number of households by IBGE.

Pay TV subscriptions per 100 inhabitants in Brazil are lower than for other countries in the region, particularly for cable TV (Figure 3.40 and Figure 3.41).

In terms of preference for type of pay TV services, subscriptions of satellite services have grown, surpassing terrestrial pay TV (cable and FTTH) in 2011. Satellite services continued to dominate until 2018. In 2019, however, the pay TV market was equally shared among subscriptions between satellite and terrestrial pay TV (cable and FTTH) (Figure 3.42).

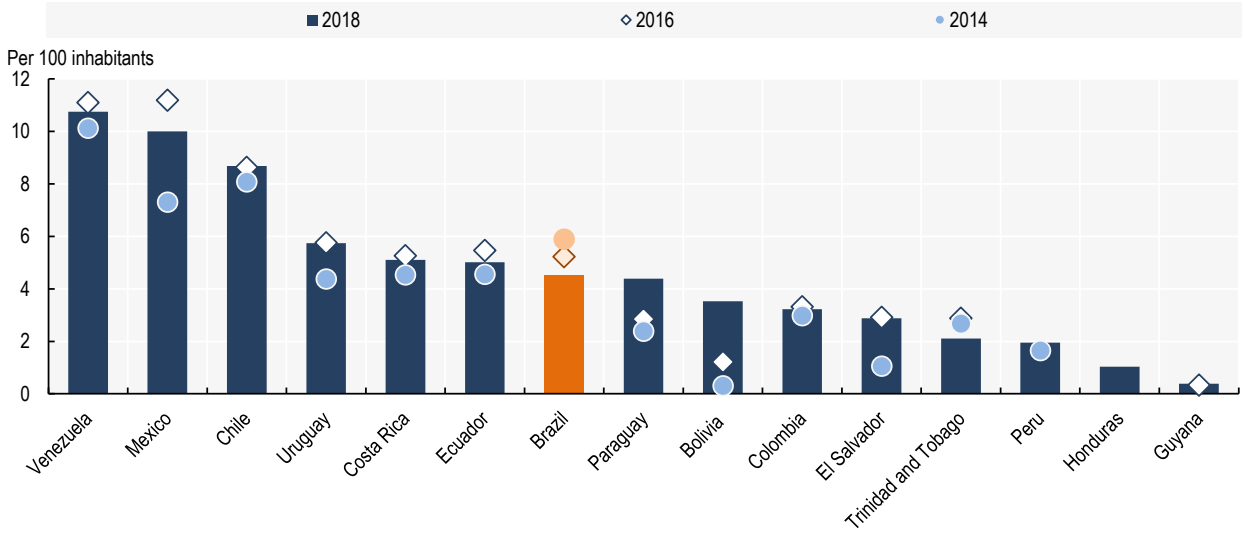
The markets of FTA broadcasting, pay TV and over-the-top (OTT) audio-visual content providers had combined revenues of around USD 12 billion in 2017 (Katz, 2019[63]). The audio-visual sector as a whole, including the movie and video games industries, corresponded to an estimated 335 000 direct and indirect jobs (Katz, 2019[63]).

Figure 3.40. Number of cable TV subscriptions in Latin America (2014, 2016 and 2018)



Source: ITU (2019[64]), *World Telecommunication/ICT Indicators*, https://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx (accessed on 10 October 2019).

Figure 3.41. Number of satellite TV subscriptions in Latin America (2014, 2016, 2018)



Source: ITU (2019[64]), *World Telecommunication/ICT Indicators*, https://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx (accessed on 10 October 2019).

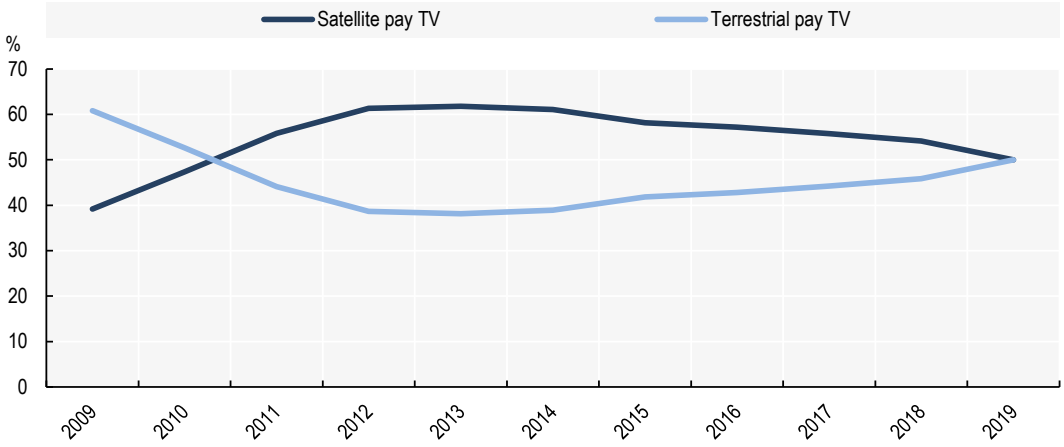
Market participants

This section analyses market structure for both broadcasting and pay TV segments, including an overview of market shares and competition dynamics. It also includes available data on OTT audio-visual content providers.

FTA broadcasting

Brazil has a high number of TV channels. In December 2018, the country had 862 commercial FTA TV nationwide channels, 131 public nationwide ones (generating own content), 20 874 commercial regional channels and 75 public regional ones (as relay stations).

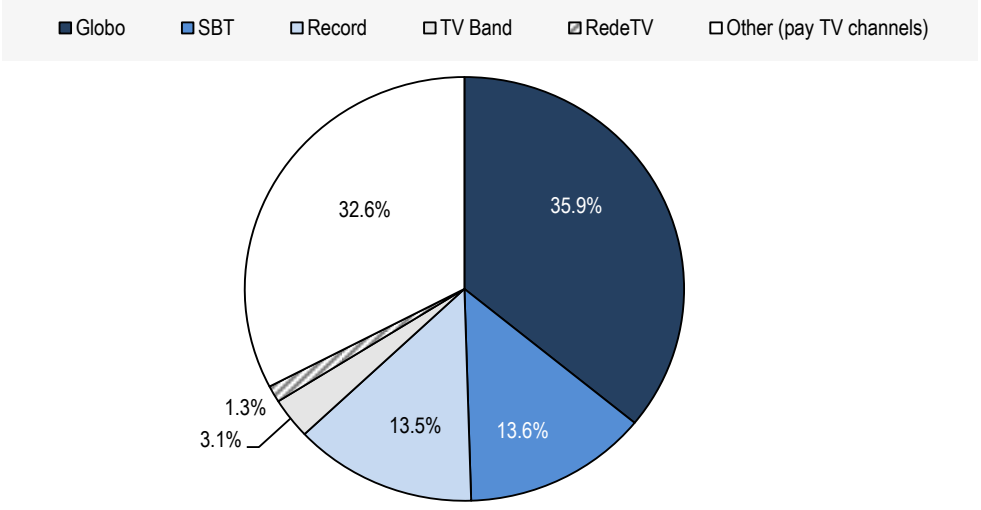
Figure 3.42. Share of terrestrial and satellite pay TV in total pay TV subscriptions in Brazil (2009-19)



Note: Terrestrial pay TV corresponds to both cable and FTTH and satellite pay TV to DTH.
Source: Anatel (2020[8]), *Painéis de Dados: Accesos*, https://www.anatel.gov.br/paineis/acessos (accessed on 28 May 2020).

According to audience ratings from Kantar Ibope Media, Globo is the most-watched channel. It is part of the Globo Group, which is owned by the Marinho family. Among all TV channels, the three most-watched have been Globo, SBT (owned by Silvio Santos Group) and Record (Record Group), which are all FTA channels. These FTA channels surpass by far the most-watched pay TV channels, which do not achieve one point of audience rating each. In November 2019, Globo had 16 audience rating points (an audience share of 35.9%),[10] SBT had 6 points (13.6% audience share) and Record also had 6 points (13.5% audience share). The audience shares of these three main channels correspond to 63% of overall ratings. When all other smaller FTA channels are considered, FTA channels had over 70% of audience shares, while pay TV channels had 29% in 2019 (Figure 3.43 and Table 3.5).

Figure 3.43. Audience shares of FTA and pay TV channels in Brazil (November 2019)



Note: The channels (or group of channels) with the largest market share are highlighted in bold. Data include both paid and FTA channels (VHF and UHF). Each share point stands for 1 of every 100 TV sets tuned to a certain TV channel in comparison to other channels being watched at the same time.
Source: Kantar Ibope Media cited by Feltrin (2019[65]), *Ibope outubro: 70% das TVs no país sintonizaram só canais abertos*, https://www.bol.uol.com.br/entretenimento/2019/11/15/ibope-outubro-70-das-tvs-no-pais-sintonizaram-so-canais-abertos.

Table 3.5. Top ten most-watched TV channels in Brazil (November 2019)

Channel	Audience ratings (points)	Share (%)	Type	Ownership
Globo	16.05	35.89	Commercial	Globo Group
SBT	6.09	13.62	Commercial	Silvio Santos Group
Record	6.02	13.47	Commercial	Record Group
TV Band	1.39	3.12	Commercial	Grupo Bandeirantes Group
RedeTV	0.57	1.28	Commercial	Amilcare Dallevo Group and Marcelo de Carvalho Group
TV Cultura	0.34	0.77	Public	São Paulo State Government
TV Brasil	0.31	0.69	Public	Federal Government
TV Aparecida	0.21	0.47	Commercial	Rede Aparecida de Comunicação
Rede Vida	0.16	0.37	Commercial	Brazilian Institute of Christian Communication
RecordNews	0.13	0.30	Commercial	Record Group
TV Gazeta	0.11	0.24	Commercial	Cásper Líbero Foundation
TV Novo Tempo	0.06	0.13	Commercial	Seventh-day Adventist Church
CNT	0.05	0.11	Commercial	Organizações Martinez
RIT	0.03	0.06	Commercial	International Grace of God Church
TV Escola	0.04	0.04	Public	Federal Government (Ministry of Education)
TV Senado	0.02	0.03	Public	Senate
TV Câmara	0.01	0.03	Public	Chamber of Deputies
Futura	0.01	0.02	Commercial	Globo Group
TV Justiça	0.00	0.01	Public	Federal Supreme Court
Other non-FTA channels (pay TV)	68.4	29.35	Commercial pay TV	x
Total FTA channels	31.6	70.65	x	x

Notes: x = not applicable. Data include both paid and FTA channels (VHF and UHF). Each audience rating point stands for 254 000 households watching a particular TV channel. Each share point stands for 1 of every 100 TV sets tuned to a certain TV channel in comparison to other channels being watched at the same time.
Source: Kantar Ibope Media cited by Feltrin (2019[65]), *Ibope outubro: 70% das TVs no país sintonizaram só canais abertos*, https://www.bol.uol.com.br/entretenimento/2019/11/15/ibope-outubro-70-das-tvs-no-pais-sintonizaram-so-canais-abertos.

The Globo Group, in addition to holding 51% of all FTA audience shares, owns several pay TV channels (e.g. Globo News, Telecine, GNT, Multishow, Canal Viva, SporTV, Megapix, Gloob, etc.). In March 2019, the Globo Group owned 11 of the top 40 most-watched channels, including both FTA and pay TV, i.e. one out of every three channels (Feltrin, 2019[66]).

Pay TV

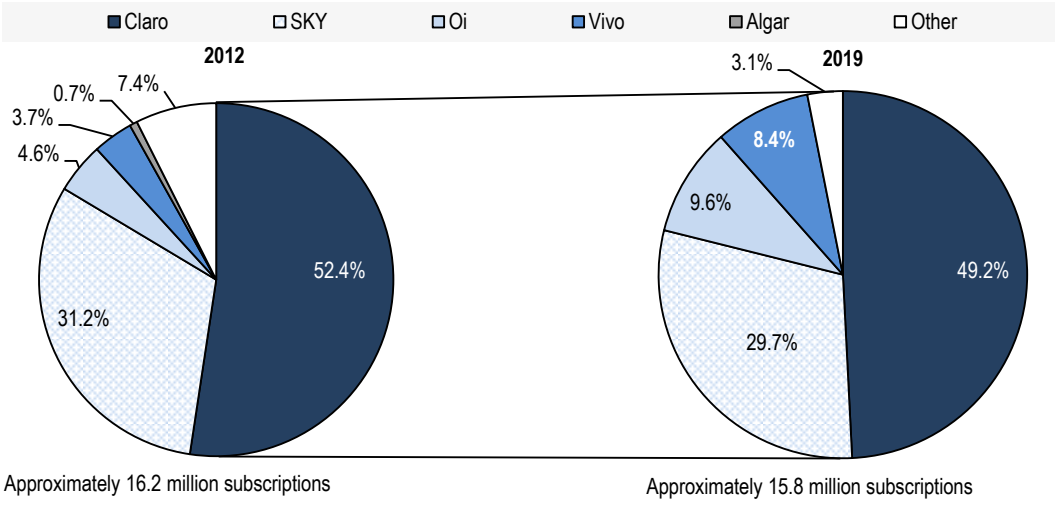
The pay TV value chain can be divided into content production, programming, packaging and distribution. The National Film Agency (Agência Nacional do Cinema, Ancine) regulates the markets of content programming and packaging, while Anatel regulates content distribution markets.

Brazilian regulation characterises the content distribution market as a telecommunication service. Two main groups dominated the Brazilian pay TV market in 2019 with a combined market share of 78.9%. Claro (also owning Embratel and Net) had 49.2% of the market followed by Sky/DirecTV at 29.7%. Two other large groups – Oi, Vivo (also owning GVT) – together shared 18.1% of the market. Algar, which in December 2018 had 0.5% of the pay TV market, exited the market in February 2020 (Figure 3.44). These four main groups also operate in other telecommunication segments.

More than 80 pay TV operators held the remaining 3.1% of market share in 2019, which declined from 7.4% in 2012. According to Ancine, in addition to the asymmetry of market share between companies, there is significant variation among municipalities in which

these operators offer services and in which the technology is adopted. Moreover, the market lost almost 3.5 million pay TV subscriptions from 2014 to 2019.

Figure 3.44. Pay TV market shares as percentage of subscribers in Brazil (2012 and 2019)



Notes: Data are for December 2019. Algar exited the pay TV market in February 2020 and its client base was incorporated to Sky.
Source: Anatel (2020[8]), *Painéis de Dados: Accesos*, https://www.anatel.gov.br/paineis/acessos (accessed on 28 May 2020).

In terms of content production and packaging, the market dynamic is different, but also concentrated. Of total subscriptions of individual pay TV channels in December 2018, 50.4% were divided between only two economic groups, Globo and Warner Media (Ancine, 2019[67]). The same two groups represented 52.5% of the content programmed in all the pay TV channels. They also owned almost all premium channels[11] in the categories "movies and series" and "sports" (e.g. Telecine, Premiere FC and Combate). These are considered to be of high value to subscribers (Ancine, 2019[67]), which may indicate market concentration of content programming. In 2018, Globo had the largest number of individual channels (63), followed by Warner Media (54), Discovery (22), Disney (14), Bandeirantes (6) and AMC networks (6) (Table 3.6).

According to Ancine (2019[67]), concentration in the pay TV market when measured by the number of subscribers by pay TV programmer is not a concern; it has a Herfindahl-Hirschman Index (HHI) of 630, which would indicate lack of market concentration. However, the measurement of pay TV subscribers by economic group shows evidence of moderate concentration (HHI of 1 627). Regulatory measures and policy initiatives to foster competition and media pluralism are discussed in Chapter 6.

Table 3.6. Pay TV programmers by number of channels in Brazil (2018)

Economic Group	Programmer	Channels	
		Number	%
Globo	Globosat Programadora	21	9.4
	Horizonte Conteúdos	18	8.1
	Telecine Programação de Filmes	14	6.3
	NBC Universal Networks International Brasil Programadora	6	2.7
	Canal Brazil	2	0.9
	Globo Comunicação e Participações	2	0.9
Total Globo		63	28.3

Economic Group	Programmer	Channels	
		Number	%
Warner Media	Turner International Latin America	18	8.1
	Brasil Programming	11	4.9
	Brasil Productions	7	3.1
	Set Brazil	4	1.8
	History Channel Brazil Distribution	4	1.8
	A&E Brazil Distribution	2	0.9
	Brasil Advertising	2	0.9
	E! Brazil Distribution	2	0.9
	Lifetime Brazil Distribution	2	0.9
	Warner Channel Brazil	2	0.9
Total Warner Media		54	24.2
Discovery	Discovery Latin America	20	9.0
	FNLA	2	0.9
Total Discovery		22	9.9
Fox	Fox Latin American Channel	19	8.5
The Walt Disney	Espn Do Brasil Eventos Esportivos	9	4.0
	Buena Vista International	5	2.2
Total Disney		14	6.3
Viacom	MTV Networks Latin America	10	4.5
PBI	PBI - Programadora Brasileira Independente	8	3.6
Bandeirantes	Newco Programadora e Produtora de Comunicação	4	1.8
	Companhia Rio Bonito - Comunicações	2	0.9
Total Bandeirantes		6	2.7
AMC Networks	AMC Networks Latin America	2	0.9
	Pramer SCA	2	0.9
	Sundance Channel Latin America	2	0.9
Total AMC		6	2.7
Total Others[1]		21	9.1
TOTAL		223	100

1. Others correspond to 13 distinct economic groups and programmers.
Source: Ancine (2019[67]), "Assinantes no Mercado de Programação na TV por Assinatura 2019", https://oca.ancine.gov.br/sites/default/files/repositorio/pdf/informe_assinantes_no_mercado_de_programacao_-_versao_diagramada.pdf.

OTT audio-visual content providers

The growth of OTT providers has been an important change in many communication markets around the world, including Brazil. Under its legislation, Brazil classifies most OTT applications as value-added services (serviços de valor adicionado, SVAs). They are considered neither a telecommunication nor a broadcasting service.

Several commercial video-on-demand (VoD) services (i.e. OTTs) are available in Brazil. These range from VoD subscription (S-VoD), such as Netflix and Globoplay, to transactional (T-VoD), such as Telecine On and Sky Play App, among others (Table 3.7). Estimates for 2018 indicate the number of unique OTT subscriptions in Brazil was around 21.3 million users, a subscription base growing since 2011 (Katz, 2019[63]). By comparison, total pay TV subscriptions were approximately 17.6 million in 2018.

The multitude of OTT audio-visual content providers in Brazil reflects the diversity of this market in the country. Adding to the presence of pure OTT providers (e.g. Netflix), players from other markets have invested in audio-visual content platforms servicing users directly

over IP-based networks. These other players include broadcasting (e.g. Globo), telecommunication (e.g. Vivo, AT&T, Claro and Oi) and device manufacturers (e.g. Microsoft, Sony and Apple).

In 2018, the Business Consultant Bureau survey indicated that Netflix was the most popular platform among Brazilians for consuming VoD (18%). The other leading on-demand content service providers are Globo Group (Globoplay) with 4% of market share, and Telecine Play and Sky Online, both with 3% of the market.

Audio-visual content is the category most consumed online in Brazil. In a 2017 survey, 71% of respondents reported that watching videos, TV programmes, films or series and listening to music were cultural activities they carried out online, an increase from 58% in 2014 (CGI.br, 2018[68]). In contrast, 55% mentioned reading newspapers, magazines or news online, 34% mentioned gaming and only 11% mentioned viewing exhibitions or museums online.

Table 3.7. OTT audio-visual content providers in Brazil (December 2018)

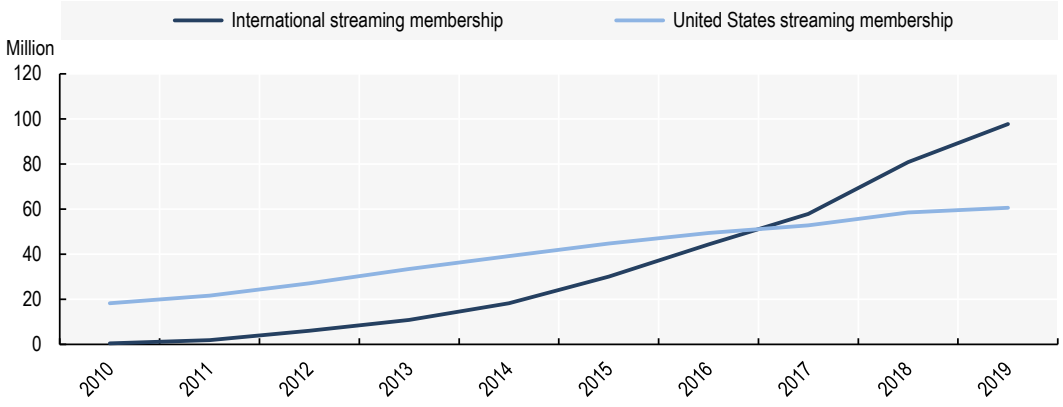
VoD type	Platform	Ownership	Core business	Country based
S-VoD	Netflix	Netflix	Video production/distribution	United States
	Globo Play	Globo	Broadcasting	Brazil
	YouTube Premium	Google	Digital advertising	United States
	Twitch	Amazon	Content production/distribution	United States
	Cartoon Network Ja!	Warner Media	Content Production/pay TV	United States
	Esporte Interativo	Warner Media	Content Production/pay TV	United States
	Claro Video	América Móvil	Telecommunications/Distribution	Mexico
	Amazon Prime Video	Amazon	Content production/distribution	United States
	Playkids.TV	Movile	Apps production/distribution	Brazil
	Sony Crackle[1]	Sony	Content distribution	United States
	Planet Kids (Youyn)[1]	Google	Digital advertising	United States
	Vivo play.net	TVE	Telecommunications/Distribution	Venezuela
	Crunchyroll	Warner	Media Content Production/pay TV	United States
	Serie A Pass	Disney	Content production/distribution	United States
	NetMovies	NetMovies	Content distribution	Brazil
	Filmotech[1]	EGEDA	Content distribution	Spain
	PlayPlUnited States Grupo	Record	Content distribution	Brazil
	Viki	Rakuten Inc.	Content distribution	Japan
	Looke	Looke	Content distribution	Brazil
	Philos TV	Globo	Broadcasting	Brazil
	GuideDoc	Guide Doc	Content distribution	Spain
	Baby TV	Fox Latin America	Broadcasting	United States
	Selecta TV	Selecta Media Ltd.	Content distribution	Mexico
	Noggin	Viacom Int.	Broadcasting	United States
	Caracol Play	Caracol Television	Content production/distribution	Colombia
	EnterPlay	Enter Play	Content distribution	Brazil
	GoldFlix[1]	GoldFlix RCT	Content distribution	Brazil
	GC Flix	Golden Ceiba Prod.	Content Distribution	Mexico
	ClickVeo	ClickVeo	Content distribution	Uruguay
	Mubi	Bazaar Inc.	Content distribution	United States
	TVN Play	TVN de Chile	Content production /distribution	Chile
	Fanatiz	Fanatiz SPA	Content distribution	Chile
	HBO Go	Warner Media	Telecommunications/pay TV	United States
	FOX APP	Fox Latin America	Broadcasting	United States

VoD type	Platform	Ownership	Core business	Country based
T-VoD	Telecine On	Globo	Broadcasting	Brazil
	PlayStation	Video Sony Pictures	Equipment	United States
	SKY Play APP	ATT	Telecommunications/pay TV	United States
	Now VOD	América Móvil	Telecommunications/Distribution	Mexico
	Oi Play	Oi	Telecommunications/Distribution	Brazil
	Google Play Movies	Google	Digital advertising	United States
	Vivo VOD	Telefónica	Telecommunications/Distribution	Spain
	Microsoft Movies & TV	Microsoft Corp.	Equipment	United States
	SmartVOD	Vonetize	Content distribution	Brazil
	iTunes Movies	Apple	Equipment	United States
	Fanatiz	Fanatiz SPA	Content distribution	Chile
	HBO Go	Warner Media	Telecommunications/pay TV	United States
	FOX APP	Fox Latin America	Broadcasting	United States
	Telecine On	Globo	Broadcasting	Brazil
	PlayStation Video	Sony Pictures	Equipment	United States
	SKY Play APP	AT&T	Telecommunications/Pay TV	United States
	Now VOD	América Móvil	Telecommunications/Distribution	Mexico
	Oi Play	Oi	Telecommunications/Distribution	Brazil
	Google Play Movies	Google	Digital advertising	United States
	Microsoft Movies & TV	Microsoft Corp.	Equipment	United States
	SmartVOD	Vonetize	Content distribution	Brazil
	iTunes Movies	Apple	Equipment	United States

1. These platforms have interrupted their services in 2019.
Note: S-VoD = subscription-based video-on-demand (pay per subscription to watch content with no limits); T-VoD = transactional-based video-on-demand (pay per content watched).
Source: Katz (2019[63]), "Alterações nos mercados de audiovisual global e brasileiro: Dinâmica competitiva, impacto no bem estar do consumidor e implicações em políticas públicas e no modelo de concorrência", http://www.teleadvs.com/wp-content/uploads/191014-Katz-Report_FINAL.pdf (accessed 14 February 2020).

The survey pointed to the role of the Internet in providing cultural activities. However, it also noted inequalities in urban vs. rural areas, as well as related to social classes and education levels (e.g. lack of foreign language skills). These reflect broader barriers to Internet access and broader cultural habits (e.g. lack of reading habits and preference for audio-visual content).

Figure 3.45. Number of Netflix subscribers in the United States and globally (2010-19)



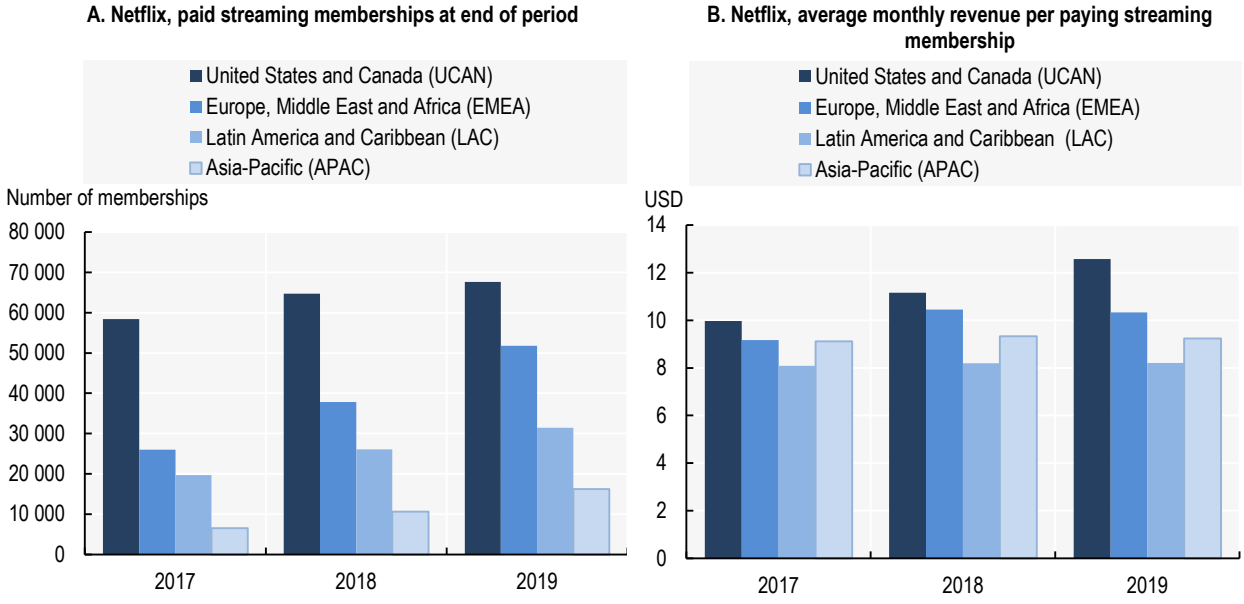
Source: Netflix (2020[69]), *Investors: Quarterly Earnings data*, www.netflixinvestor.com/financials/quarterly-earnings/default.aspx (accessed on 20 May 2020).

Netflix first entered the Brazilian market in 2011, as part of a wider rollout in LAC, and has become the leading streaming platform in the country. In September 2019, out of 158 million global subscribers, the company reported reaching 10 million subscribers in Brazil. This is equivalent to one-tenth of Netflix's international customer base (Cardin, 2019[70]).

The global figures on Netflix point to an increased internationalisation strategy of this OTT provider. For the first time in 2017, the amount of international Netflix subscribers surpassed those within the United States' market. In 2019, it reached 98 million international subscribers compared to around 61 million within the United States (Figure 3.45).

The number of Netflix subscribers in LAC has also been steadily growing. From 2017 to 2019, subscriptions in the region grew from 19.7 million to 31.4 million (Figure 3.46 A). In terms of revenues, the region registered, at the end of 2019, a lower average monthly revenue per subscriber (USD 8.21) than in the United States and Canada (USD 12.57) and in Europe, Middle East and Africa (USD 10.33) (Figure 3.46 B).

Figure 3.46. Number of Netflix subscribers and monthly revenue per subscription, by world region (2017-19)



Source: Netflix (2020[69]), *Investors: Quarterly Earnings data*, www.netflixinvestor.com/financials/quarterly-earnings/default.aspx (accessed on 20 May 2020).

References

Akamai (2020), *State of the Internet: IPv6 Adoption Visualization*, https://www.akamai.com/us/en/resources/our-thinking/state-of-the-internet-report/state-of-the-internet-ipv6-adoption-visualization.jsp (accessed on 20 February 2020). [40]

Amaral, B. (2019), "Com recorde de 3.6 GHz, edital do leilão 5G chega ao conselho na semana que vem", *Teletime*, [With a record of 3.6 GHz, the 5G spectrum auction will arrive to the Board next week], https://teletime.com.br/22/05/2019/com-recorde-de-36-ghz-edital-do-leilao-5g-chega-ao-conselho-na-semana-que-vem/ (accessed on 18 February 2020). [58]

Anatel (2020), *Anatel aprova consulta pública para implementar o 5G*, [Anatel Approves Public Consultation to Implement 5G], news release, 6 February, Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/institucional/component/content/article/171-manchete/2491-anatel-aprova-consulta-publica-para-licitar-faixas-de-frequencias-para-o-5g (accessed on 12 February 2020). [54]

Anatel (2020), *Painéis de Dados: Accesos*, [Data Sets: Subscriptions], Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/paineis/acessos (accessed on 28 May 2020). [8]

Anatel (2020), *Plano Estrutural de Redes de Telecomunicações (PERT) 2019-2024, Atualizaçao 2020*, [Structural Plan for Telecommunication Networks (PERT) 2019-2024: Update 2020], Agência Nacional de Telecomunicações, Brasilia, https://sei.anatel.gov.br/sei/modulos/pesquisa/md_pesq_documento_consulta_externa.php?eEP-wqk1skrd8hSlk5Z3rN4EVg9uLJqrLYJw_9INcO4m2N1jXIPEu1rXnv7UHJFGKd-jO_xz5ZYqyuXgvKFPZe9U7a4FRauel0Ej_GJ3pzD2sKi_sQQhtHNHQk_javEK (accessed on 15 March 2020). [3]

Anatel (2020), *Telefonia Móvel - Municípios atendidos [Mobile Telephony: Municipalities covered]*, https://www.anatel.gov.br/setorregulado/component/content/article/115-universalizacao-e-ampliacao-do-acesso/telefonia-movel/423-telefonia-movel-municipios-atendidos (accessed on 20 February 2020). [12]

Anatel (2019), *Mapeamento de Redes de Transporte*, [Backhaul Network Maps], webpage, https://www.anatel.gov.br/dados/mapeamento-de-redes (accessed on 13 September 2019). [29]

Anatel (2019), *Plano Estrutural de Redes de Telecomunicações (PERT)*, [Structural Plan of Telecommunication Networks (PERT)], Agência Nacional de Telecomunicações, Brasilia, http://www.anatel.gov.br/dados/pert (accessed on 2019 September 20). [59]

Anatel (2018), "Resolução No. 703, de 1 de novembro de 2018", [Resolution No. 703 of 1 November 2018], Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/legislacao/resolucoes/2018/1178-resolucao-703. [55]

Anatel (2014), *GT-IPv6 Grupo de Trabalho para implantação do protocolo IP-Versão 6 nas redes das*, [GT-IPv6 Working Group to implement the Internet Protocol Version 6 (IPv6) on telecommunication providers' networks], Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/Portal/verificaDocumentos/documento.asp?numeroPublicacao=325769 (accessed on 17 March 2020). [41]

Anatel (2002), "Resolução No. 321, de 27 de setembro de 2002", [Resolution No. 321 of 27 September 2002], Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/legislacao/resolucoes/2002/267-resolucao-321. [53]

Ancine (2019), "Assinantes no Mercado de Programação na TV por Assinatura 2019", [Programming Market Subscribers For Subscribers to Pay TV], Agência Nacional do Cinema, Brasilia, https://oca.ancine.gov.br/sites/default/files/repositorio/pdf/informe_assinantes_no_mercado_de_programacao_-_versao_diagramada.pdf. [67]

APNIC (2020), *IPv6 Measurement Maps*, http://stats.labs.apnic.net/ipv6 (accessed on 20 February 2020). [39]

Banco Central do Brasil (2019), "Ingressos Brutos de Investimentos Diretos no País – Participação no Ccapital", [Income from Gross Direct Investment in the Country - Equity shares], Banco Central do Brasil, Brasilia, http://dx.doi.org/www.bcb.gov.br/acessoinformacao/legado?url=https:%2F%2Fwww.bcb.gov.br%2Fhtms%2Finfecon%2Fseriehistfluxoinvdir.asp. [5]

Banco Central do Brasil (2019), *Série Histórica dos Fluxos de Investimento Direto – Distribuições por País ou por Setor (Database)*, [Historical Series of Foreign Direct Investment by Country and/or Sector], (accessed on 22 October 2019), http://dx.doi.org/www.bcb.gov.br/acessoinformacao/legado?url=https:%2F%2Fwww.bcb.gov.br%2Fhtms%2Finfecon%2Fseriehistfluxoinvdir.asp (accessed on 2019 October 22). [6]

Cardin, A. (2019), "Netflix reaches ten million subscribers in Brazil, says newspaper", The Rio Times, 29 September, https://riotimesonline.com/brazil-news/technology/netflix-reaches-ten-million-subscribers-in-brazil-says-newspaper/. [70]

Cavalcanti, D. (2010), *The Role of Internet Exchange Points in Broadband Policy and Regulation*, Proceedings of the 4th ACORN-REDECOM Conference, 14-15 May, Brasilia, http://www.mc.gov.br (accessed on 27 May 2019). [43]

CGI.br (2019), "Pesquisa sobre o Setor de Provimento de Serviços de Internet no Brasil-TIC Provedores 2017", [ICT Providers 2017: Survey on the Internet Service Provider Sector in Brazil], Comitê Gestor da Internet no Brasil, São Paulo, https://cetic.br/media/docs/publicacoes/2/tic_provedores_2017_livro_eletronico.pdf. [4]

CGI.br (2019), "Pesquisa sobre o Uso das Tecnologias de Informação e Comunicação nos domicílios brasileiros - TIC Domicílios 2018", [ICT Households 2018: Survey on the Use of Information and Communication Technologies in Brazilian Households], Comitê Gestor da Internet no Brasil, São Paulo, https://cetic.br/arquivos/domicilios/2018/domicilios/ (accessed on 11 September 2019). [11]

CGI.br (2018), "Pesquisa Sobre o Uso das Tecnologias de Informação e Comunicação nas Empresas Brasileiras-TIC Empresas 2017", [ICT Enterprises 2017: Survey on the use of ICTs in Brazilian firms], Comitê Gestor da Internet no Brasil, São Paulo, https://www.cetic.br/media/docs/publicacoes/2/TIC_Empresas_2017_livro_eletronico.pdf. [28]

CGI.br (2018), "Pesquisa sobre o Uso das Tecnologias de Informação e Comunicação nos domicílios brasileiros - TIC Domicílios 2017", [ICT Households 2017: Survey on the Use of Information and Communication Technologies in Brazilian Households], Comitê Gestor da Internet no Brasil, São Paulo, https://cetic.br/pesquisa/domicilios/indicadores. [68]

Cisco (2018), "Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2017–2022 White Paper - Cisco", webpage, https://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/white-paper-c11-738429.html (accessed on 20 September 2019). [30]

Cloudscene (2019), *Markets: Brazil*, (database), https://cloudscene.com/market/data-centers-in-brazil/all (accessed on 5 October 2019). [50]

Convergência Digital (2019), ".br completa 30 anos com 4 milhões de domínios registrados", *Convergência Digital*, [.br Celebrates 30 Years with 4 Million Registered Domains], https://www.convergenciadigital.com.br/cgi/cgilua.exe/sys/start.htm?UserActiveTemplate=site&infoid=50498&sid=4 (accessed on 20 February 2020). [47]

Feltrin, R. (2019), "GloboNews perde audiência em 2019; Veja ranking dos canais mais vistos", [GloboNews loses ratings in 2019: See ranking of the most watched channels], UOL, https://tvefamosos.uol.com.br/noticias/ooops/2019/04/23/globonews-perde-audiencia-no-ano-veja-ranking-dos-canais-mais-vistos.htm. [66]

Feltrin, R. (2019), "Ibope outubro: 70% das TVs no país sintonizaram só canais abertos", *UOL*, [Ibope October: 70% of TVs in the country tune into FTA channels], UOL, https://www.bol.uol.com.br/entretenimento/2019/11/15/ibope-outubro-70-das-tvs-no-pais-sintonizaram-so-canais-abertos.htm. [65]

Goodison, D. (2020), "AWS Plans Data Center Expansion In Brazil", CRN, 5 February, https://www.crn.com/news/cloud/aws-plans-data-center-expansion-in-brazil. [51]

Google (2020), *Per-country IPv6 adoption*, https://www.google.com/intl/en/ipv6/statistics.html#tab=per-country-ipv6-adoption (accessed on 20 February 2020). [38]

IBGE (2018), "Acesso à Internet e à televisão e posse de telefone móvel celular para uso pessoal 2017", [Access to Internet and television services and mobile phone ownership 2017], Instituto Brasileiro de Geografia e Estatistica, Rio de Janeiro, https://biblioteca.ibge.gov.br/visualizacao/livros/liv101631_informativo.pdf. [61]

IEA (2019), *Energy Prices and Taxes for OECD Countries 2019*, OECD Publishing, Paris, https://dx.doi.org/10.1787/71612f7e-en (accessed on 18 February 2020). [52]

ITU (2019), *World Telecommunication/ICT Indicators*, (database), https://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx (accessed on 10 October 2019). [64]

Julião, H. (2019), "Telefonia fixa perde 281 mil linhas em agosto, mas autorizadas crescem", [Fixed Telephony Loses 281 000 lines in August, But Authorized Numbers Grow], Teletime, 1 October, https://teletime.com.br/01/10/2019/telefonia-fixa-perde-281-mil-linhas-em-agosto-mas-autorizadas-crescem/?utm_source=akna. [7]

Katz, R. (2019), "Alterações nos mercados de audiovisual global e brasileiro: Dinâmica competitiva, impacto no bem estar do consumidor e implicações em políticas públicas e no modelo de concorrência", [Changes in the Global and Brazilian Audiovisual Market: Competitive Dynamics, Impact on Consumer Welfare, and Implications for Public Policy and Competition Model], Telecom Advisory Services, http://www.teleadvs.com/wp-content/uploads/191014-Katz-Report_FINAL.pdf (accessed on 14 February 2020). [63]

Kneller, R. and J. Timmis (2016), "ICT and exporting: The effects of broadband on the extensive margin of business service exports", *Review of International Economics*, Vol. 24/4, pp. 757-796, http://dx.doi.org/10.1111/roie.12237. [27]

Maigron, P. (2020), *Regional Internet Registries Statistics (database)*, https://www-public.imtbs-tsp.eu/~maigron/RIR_Stats/ (accessed on 19 February 2020). [37]

M-Lab (2019), *Worldwide Broadband Speed League*, https://www.cable.co.uk/broadband/speed/worldwide-speed-league/ (accessed on 9 May 2019). [15]

Netflix (2020), *Investors: Quarterly Earnings Data*, http://dx.doi.org/www.netflixinvestor.com/financials/quarterly-earnings/default.aspx (accessed on 20 May 2020). [69]

Netflix (2019), *Netflix | Open Connect*, website, https://openconnect.netflix.com/en/ (accessed on 30 October 2019). [22]

Netflix (2019), "Netflix ISP Speed Index: Brazil", webpage, https://ispspeedindex.netflix.com/country/brazil/ (accessed on 16 September 2019). [18]

NIC.br (2020), *Estatísticas: Domínios .br registrados até o momento*, [Statistics: .br domains registered at present] (database), Comitê Gestor da Internet no Brasil, São Paulo, https://registro.br/estatisticas.html (accessed on 20 January 2020). [46]

NIC.br (2020), "NIC.br e CGI.br trabalhando para a melhoria da Internet no Brasil: Actividades", [NIC.br and CGI.br working to improve the Internet in Brazil: Activities], Comitê Gestor da Internet no Brasil, São Paulo, http://dx.doi.org/www.nic.br/atividades/. [42]

NIC.br (2018), "Banda Larga no Brasil: um estudo sobre a evolução do acesso e da qualidade das conexões à Internet", [Broadband in Brazil: A Study on the Evolution and Access], Comitê Gestor da Internet no Brasil, São Paolo, https://cetic.br/media/docs/publicacoes/1/Estudo%20Banda%20Larga%20no%20Brasil.pdf (accessed on 20 February 2020). [17]

OECD (2020), *Broadband Portal*, http://dx.doi.org/www.oecd.org/sti/broadband/oecdbroadbandportal.htm (accessed on 20 May 2020). [9]

OECD (2019), *OECD Reviews of Digital Transformation: Going Digital in Colombia*, OECD Publishing, Paris, https://dx.doi.org/10.1787/781185b1-en. [57]

OECD (2019), *OECD Telecommunication and Internet Statistics (database)*, http://dx.doi.org/10.1787/tel_int-data-en (accessed on 16 March 2020). [2]

OECD (2019), "The operators and their future: The state of play and emerging business models", *OECD Digital Economy Papers*, No. 287, OECD Publishing, Paris, https://dx.doi.org/10.1787/60c93aa7-en. [10]

OECD (2019), "The road to 5G networks: Experience to date and future developments", *OECD Digital Economy Papers*, No. 284, OECD Publishing, Paris, https://dx.doi.org/10.1787/2f880843-en. [32]

OECD (2018), "IoT measurement and applications", *OECD Digital Economy Papers*, No. 271, OECD Publishing, Paris, https://dx.doi.org/10.1787/35209dbf-en. [24]

OECD (2018), *OECD Reviews of Digital Transformation: Going Digital in Sweden*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264302259-en. [36]

OECD (2017), *OECD Digital Economy Outlook 2017*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264276284-en. [31]

OECD (2017), *OECD Telecommunication and Broadcasting Review of Mexico 2017*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264278011-en. [62]

OECD (2017), *Revised OECD Telecommunication Price Baskets*, http://www.oecd.org/sti/broadband/DSTI-CDEP-CISP(2017)4FINAL.pdf. [25]

OECD (2016), *OECD Cancun Ministerial Declaration on the Digital Economy*, OECD, Paris, http://www.oecd.org/internet/Digital-Economy-Ministerial-Declaration-2016.pdf. [23]

OECD (2014), "International Cables, Gateways, Backhaul and International Exchange Points", *OECD Digital Economy Papers*, No. 232, OECD Publishing, Paris, https://doi.org/10.1787/5jz8m9jf3wkl-en (accessed on 26 July 2018). [33]

OECD (2014), *OECD Review of Telecommunication Policy and Regulation in Colombia*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264208131-en. [56]

OECD (2014), "The Internet in Transition: The State of the Transition to IPv6 in Today's Internet and Measures to Support the Continued Use of IPv4", *OECD Digital Economy Papers*, No. 234, OECD Publishing, Paris, https://dx.doi.org/10.1787/5jz5sq5d7cq2-en. [35]

OECD (2007), "Broadband and Internet Infrastructure", in *OECD Communications Outlook 2007*, OECD Publishing, Paris, https://dx.doi.org/10.1787/comms_outlook-2007-7-en. [34]

OECD (forthcoming), *Going Digital in Brazil*, OECD Reviews of Digital Transformation, OECD Publishing, Paris. [71]

Ookla (2019), *Speedtest*, https://www.speedtest.net/ (accessed on 10 July 2019). [14]

Opensignal (2020), *Brazil: Mobile Network Experience Report January 2020*, Opensignal, London, https://www.opensignal.com/reports/2020/01/brazil/mobile-network-experience. [21]

Opensignal (2019), *Brazil: Mobile Network Experience Report July 2019*, Opensignal, London, https://www.opensignal.com/reports/2019/07/brazil/mobile-network-experience. [20]

Opensignal (2019), *The State of Mobile Experience, May 2019*, Opensignal, London, http://dx.doi.org/www.opensignal.com/sites/opensignal-com/files/data/reports/global/data-2019-05/the_state_of_mobile_experience_may_2019_0.pdf. [19]

Packet Clearing House (2020), *Internet Exchange Directory*, https://www.pch.net/ixp/dir (accessed on 18 February 2020). [44]

Steam (2019), *Steam Download Stats*, https://store.steampowered.com/stats/content (accessed on 10 July 2019). [16]

Strategy Analytics (2019), *Teligen tariff & benchmarking market data using the OECD methodology*, https://www.strategyanalytics.com/access-services/service-providers/tariffs---mobile-and-fixed/. [26]

Tele.Sintese (2019), "Morais: Roaming em cidades pequenas, uma realidade em transformação ["Morais: Roaming in Small Cities, an Ever-changing Reality"]", Tele.Sintese, 1 October, http://www.telesintese.com.br/morais-roaming-em-cidades-pequenas-uma-realidade-em-transformacao/ (accessed on 30 October 2019). [13]

Teleco (2019), *Market Share das Operadoras de Celular no Brasil*, [Market Share of Cellular Operators in Brazil], webpage, https://www.teleco.com.br/mshare_3g.asp (accessed on 30 October 2019). [60]

TeleGeography (2020), *Submarine Cable Map*, https://www.submarinecablemap.com/#/country/brazil (accessed on 20 February 2020). [49]

TeleGeography (2019), *Frequently Asked Questions*, webpage, https://www2.telegeography.com/submarine-cable-faqs-frequently-asked-questions (accessed on 8 September 2019). [48]

The World Bank (2020), "World Bank National Accounts Data, and OECD National Accounts data files", *GDP constant LCU Brazil*, (database), https://data.worldbank.org/indicator/NY.GDP.MKTP.KN?end=2018&locations=BR&start=2006 (accessed on 18 January 2020). [1]

Weller, D. and B. Woodcock (2013), "Internet Traffic Exchange: Market Developments and Policy Challenges", *OECD Digital Economy Papers*, No. 207, OECD Publishing, Paris, http://dx.doi.org/10.1787/5k918gpt130q-en. [45]

Notes

[1] Using the exchange rate of 3.8742 BRL/USD for the year 2018 from OECD.stat (https://stats.oecd.org/).

[2] Total communication access paths = Total access telephone lines + total fixed broadband subscriptions + cellular mobile subscriptions.

[3] Latency is the round trip time for information between two devices across the network.

[4] The OECD has adopted the following definition for the IoT: "The Internet of Things includes all devices and objects whose state can be altered via the Internet, with or without the active involvement of individuals. While connected objects may require the involvement of devices considered part of the 'traditional Internet', this definition excludes laptops, tablets and smartphones already accounted for in current OECD broadband metrics." (OECD, 2018[24])

[5] The definition of "massive M2M communications" is analogous to the definition set forth by the ITU in their vision of the fifth generation of wireless networks, or the IMT 2020 standard, yet to be finalised in 2019 in the ITU's World Radio Communications Conference. This standard is being conceived with IoT in mind with three main usage scenarios (i.e. enhanced mobile broadband, massive machine type communications, and critical communications/applications).

[6] To calculate the number of M2M/embedded mobile cellular subscriptions, the OECD defines M2M on mobile networks as "the number of SIM-cards that are assigned for use in machines and devices (cars, smart meters, and consumer electronics) and are not part of a consumer subscription".

[7] As highlighted in *Going Digital in Brazil* (OECD, forthcoming[71]), which takes a closer look at adoption and use of the Internet by firms and individuals.

[8] Chapter 4 of *Going Digital in Brazil* (OECD, forthcoming[71]) provides more detail of how firms are using information communication technologies.

[9] The countries for which CISCO VNI Mobile Highlights 2017-2018 includes information for are: the United States, Canada, Chile, Mexico, Poland, France, Germany, Italy, Spain Sweden, United Kingdom, Japan Korea, Australia, and New Zealand (Cisco, 2018[30]).

[10] Each audience rating point stands for 254 000 households watching a particular TV channel. Each share point stands for one out of every 100 TV sets tuned to a certain TV channel in comparison to other channels tuned in at the same period of time.

[11] Other premium channels not owner by the economic groups of Globo and Warner Media are Fox Premium 1 and Fox Premium 2 from Fox Latin American Channel.

4. Institutional framework

This chapter provides an overview of the institutional framework related to telecommunication and broadcasting in Brazil. It first examines the role of regulatory authorities such as the National Telecommunications Agency, the National Film Agency and the Administrative Council for Economic Defence. The chapter then discusses government institutions engaged in communication policy design, advocacy for competition and consumer protection, among others. Following a review of judicial institutions and high-level oversight bodies, the chapter looks at decentralised structures, as well as the role of non-governmental organisations and other stakeholders. It also analyses the independence of the regulator, as well as the personal liability of public civil servants by accountability and auditing bodies.

Overview of institutions involved in the telecommunication and broadcasting sectors

Different institutions in Brazil have powers, functions and attributions related to the telecommunication and broadcasting sectors. The Brazilian regulatory framework overseeing the telecommunication and broadcasting sectors is complex with several authorities having different powers. Increased convergence blurs the contours of previously distinct sectors, increasing the inherent complexity of how these institutions interact. In this intricate system, the handling of converged services can be challenging given the lack of certain legal and administrative procedures.

A number of bodies or agencies in Brazil have direct or indirect responsibilities over the communication sector. In 1997, the General Telecommunications Law (Law No. 9 472, Lei Geral de Telecomunicações, LGT) defined the general principles governing communication services. It established the National Telecommunications Agency (Agência Nacional de Telecomunicações, Anatel) as the communication regulator. The Ministry of Science, Technology, Innovation and Communications (Ministério da Ciência, Tecnologia, Inovações e Comunicações, MCTIC) designs public policy to foster the use and adoption of information and communication technologies (ICTs).[1] The competition authority in Brazil, the Administrative Council for Economic Defence (Conselho Administrativo de Defesa Econômica, CADE), promotes competition and investigates antitrust violations in communication markets. It also issues *ex ante* opinions on transactions that may hamper competition.

Roles for different services providing audio-visual content are less clear. For broadcasting, specifically free-to-air television (FTA), MCTIC acts as a public policy maker and a quasi-regulator. To that end, it theoretically monitors and controls the broadcasting sector, directly and indirectly. Concerning pay TV, which is defined as a telecommunication service within the Brazilian legal framework, Anatel and the National Film Agency (Agência Nacional do Cinema, Ancine) co-regulate the service. Ancine, in addition to overseeing certain elements in the value chain for pay TV, also has the mandate to foster competition within the Brazilian film industry; it also regulates development of the industry, including content-related issues.

Regulatory authorities

National Telecommunications Agency

The LGT created Anatel in 1997 "to organise the provision of telecommunication services." The term "organisation" in the LGT includes "the regulation of the performance, commercialisation and use of services, and telecommunication networks' deployment and operation, as well as the use of orbit and radio spectrum resources."

Anatel has responsibilities regarding pay TV services, but does not have oversight over broadcasting services. Anatel regulates content distribution, but not programming or content packaging that fall under Ancine's responsibilities. This falls within the pay TV framework, established in 2011 by the Law of the Conditional Access Service (Law No. 12 485, Lei do Serviço de Acesso Condicionado, SeAC).

Spectrum allocation and management in Brazil is complex, and for broadcasting, spectrum assignment has concurrent powers that make this process highly inefficient. As defined by the law, Anatel is "generally" responsible for spectrum management in Brazil, including spectrum auction design. For both broadcasting and pay TV services (i.e. categorised as Conditional Access Services [Serviço de Acesso Condicionado], SeAC), Anatel is responsible

for spectrum planning. However, when it comes to spectrum assignment for broadcasting services, the licensing follows a complex structure (Chapter 6). Several entities participate in the process (i.e. MCTIC, the President of the Republic and Congress).

In broad terms, while linked to MCTIC, Anatel is an independent regulatory agency. Formally, as an autonomous body, Anatel does not respond to a higher authority. It holds administrative and legal independence, has financial autonomy and its commissioners have a fixed tenure. Independence of the regulator, understood as the separation between regulatory functions and policy-setting and fiscal policy functions, can enhance the role of the regulator in mitigating market failures at minimum cost (OECD, 2016[1]). The OECD recognises that independence is crucial to ensure the regulator can exercise its mandate efficiently with the purpose of promoting widespread access to communication services at competitive prices in the market (OECD, 2016[1]).

As defined in the LGT (art. 8), Anatel has financial autonomy. Its budget is determined by the Annual Budget Law (Lei Orçamentária Annual, LOA), approved annually by Congress. However, until June 2019, prior to this approval in Congress, Anatel had to submit its annual budget proposal to the sectoral ministry (i.e. MCTIC). This ministry would then forward it to the Ministry of Economy, which includes budget plans in the draft LOA. In June 2019, the Law of Regulatory Agencies (Law No. 13 848, Lei das Agências Reguladoras) entered into force. As a result of reforms to regulatory agencies, Anatel now submits its budget proposal directly to the Ministry of Economy (see also Box 4.1). This proposal is accompanied by a multi-annual revenue and expenditure planning that aims to achieve budgetary and financial balance in the five subsequent years (Brazil, 2019, p. art. 49[2]).

Law No. 13 848 improves over the previous framework as it increases Anatel's financial independence from MCTIC. However, all the fiscal contingency measures in the regulator's budget proposal (OECD, 2018[3]) still limit Anatel's independence (Nunes et al., 2017[4]). Fiscal contingency measures refer to the delay or non-execution of part of the expenditures contemplated within the Annual Budget Law due to insufficient national revenues. At the beginning of each year, the federal government issues a decree limiting the amounts authorised in the Annual Budget Law, related to "discretionary or non-legally mandatory expenses (i.e. investments and costing in general)" (Ministério da Economia, 2015[5]). Meanwhile, only a small fraction of the Telecommunications Oversight Fund (Fundo de Fiscalização das Telecomunicações, FISTEL), which was established to cover the costs of monitoring telecommunication services, has been used to finance Anatel (Table 4.1). This artificial budgetary constraint has hampered Anatel's new projects and affected its monitoring and regulatory activities. The collection and allocation of sectoral funds is further discussed in Chapter 7.

In principle, the legal framework is consistent with granting financial autonomy to the regulator. In practice, contingency measures applied by the Executive Power undermine Anatel's ability to carry out its regulatory functions and also compromise its independence. Sectoral fees collected under FISTEL should guarantee Anatel's financial autonomy. However, the limitation, reduction or delay of executing these resources has undermined the effectiveness of this mechanism. Indeed, after approval of Anatel's proposed budget, ministries can impose significant contingency measures. These constrain the regulator from executing the values provided for in the Annual Budget Law. The Federal Court of Accounts (Tribunal de Contas da União, TCU) has raised this concern several times (TCU, 2006[6]; TCU, 2011[7]).

Ensuring adequate funding is vital in enabling the regulator to operate efficiently and to fulfil effectively the objectives set by legislation and the government (OECD, 2014[8]). Given that Anatel does not have direct and autonomous administration over the sectoral

fees collected under FISTEL, its budget should be clearly defined and ring-fenced from the rest of the government budget. This would allow Anatel to minimise the government's ability to use it for other purposes or to withhold it (i.e. achieving fiscal balance with the agency's resources) (OECD, 2008[9]). Likewise, multi-annual budgets are preferable as they are less vulnerable to short-term political influences.

Table 4.1. Impact of fiscal contingency on Anatel (2006-17)

Year	Fee revenue (BRL million)	Expenditure (BRL million)	Share of FISTEL's revenue actually spent by Anatel (%)
2006	1 832.36	229.74	12.5
2007	2 040.56	262.88	12.9
2008	2 685.12	300.26	11.2
2009	2 652.51	325.83	12.3
2010	3 065.95	390.30	12.7
2011	3 712.13	401.15	10.8
2012	3 094.95	443.02	14.3
2013	2 895.44	475.90	16.4
2014	2 880.65	459.45	15.9
2015	3 077.85	449.73	14.6
2016	1 840.51	473.46	25.7
2017	1 666.77	499.19	29.9

Note: From 2016, of the total collected in the inspection fee revenue (FISTEL), 30% of the revenue unbundling has already been deducted in accordance with Constitutional Amendment No. 93 of 2016.
Source: Anatel's response to the questionnaire of the review.

Anatel's internal organisational structure is composed of several departments that oversee different regulatory functions. It is governed by the Board of Commissioners (Conselho Diretor), which is composed of five members. Anatel's commissioners must be Brazilian nationals with a university degree and an excellent reputation in their fields of expertise. They are chosen and appointed by the President of the Republic upon approval by the Senate. Since the changes brought by the Law of the Regulatory Agencies, commissioners can no longer be re-appointed. The Board decides by absolute majority in a collegial manner. It makes official rulings through resolutions, summaries, acts and ordinances. It has a secretariat that undertakes the daily administrative activities of the Board.

The functions of Anatel's presidency (Presidência) are described in Article 135 of Resolution No. 612 of 2013. The presidency is the highest hierarchical body, exercising the corresponding administrative powers and ensuring compliance with the functions granted to the Board of Commissioners. Anatel has the following areas that support and respond directly to the presidency:

- Technical Advisory Office (Assessoria Técnica)
- Parliamentary and Social Communication Affairs Office (Assessoria Parlamentar e de Comunicação Social)
- Institutional Relations Affairs Office (Assessoria de Relações Institucionais)
- Internal Affairs Office (Corregedoria)
- Executive Superintendent (Superintendente Executivo)
- International Affairs Office (Assessoria Internacional)
- Consumer Relations Affairs Office (Assessoria de Relações com os Usuários).

The Advisory Council (Conselho Consultivo), linked to the Board of Commissioners, is the consultative body of Anatel. It is composed of representatives appointed by the Senate, the Chamber of Deputies, the Executive branch and entities representing telecommunication operators, consumers and society. Members of the Advisory Council elect the president for a one-year appointment. The functions of the Advisory Council are established in Article 35 of the LGT. This includes providing an opinion on general communication policy objectives, advising on licensing and authorisation plans, analysing the annual reports of the Board, and proposing actions for the Board. However, recommendations of the Advisory Council are not binding.

Within the organisational structure of Anatel, other bodies oversee its different functions. For instance, the Internal Audit (Auditoria Interna) evaluates the efficiency and effectiveness of internal monitoring. This aims to protect assets and enable compliance with the laws and standards established for the adequate management of resources (Anatel, 2013, p. art. 141[10]). The Ombudsman (Ouvidoria) oversees the quality of regulation put in force by Anatel, and ensures that regulatory measures are timely. Furthermore, it addresses complaints, suggestions, claims and information requests from consumers (i.e. citizens and businesses alike), provided they relate to Anatel's regulatory performance and its compliance with the applicable legislation.[2]

Additionally, different superintendencies carry out regulatory activities and substantiating decisions from the Board related to the following areas:

- competition (Superintendência de Competição)
- consumer affairs (Superintendência de Relações com Consumidores)
- control of regulatory obligations (Superintendência de Controle de Obrigações)
- inspection (Superintendência de Fiscalização)
- internal information management (Superintendência de Gestão Interna da Informação)
- licensing and resources (Superintendência de Outorga e Recursos à Prestação)
- management and finances (Superintendência de Administração e Finanças)
- planning and regulation (Superintendência de Planejamento e Regulamentação).

An important factor relevant to the independence and autonomy of regulatory agencies is the mechanism defined for appointing its governing body (OECD, 2014[8]). Law No. 13 848 intends to limit the risk of capture by eliminating the possibility of reappointment of commissioners (Box 4.1). This law maintains the requirement of Anatel's head to be nominated by the President subject to approval by the legislative branch. Different OECD countries have such a mechanism to limit the political influence over regulatory agencies. Additionally, the five-year appointment is in line with practice in the OECD.

Anatel also has several areas dedicated to consumer protection and user relations. For instance, the Consumer Affairs Superintendence promotes, defends and monitors consumer rights individually and collectively regarding the obligations of the agency and of telecommunications service providers (Anatel, 2013, p. art. 160[10]). Pursuing such a mandate, Anatel has developed an app called "Anatel Consumidor",[3] a website[4] and a call centre[5] to receive consumer complaints against communication operators.

Anatel also relies on external experts to advise on consumer protection. The Consumer Protection Committee for Users of Telecommunication Services (Comitê de Defesa dos Usuários de Serviços de Telecomunicações, CDUST) advises the Board of Commissioners in

matters concerning consumer rights. The CDUST was created in 1999 (Resolution No. 107 of 1999). However, it effectively commenced activities in 2008 when Anatel published new rules for the CDUST, which were amended by Resolution No. 650 of 2015. The CDUST has 16 members: 4 from Anatel, 5 from public and private institutions, and 7 from civil society (e.g. non-profit representatives of telecommunication users or consumer protection entities).

Box 4.1. The Law of Regulatory Agencies

In June 2019, the Law of Regulatory Agencies set forth a new legal framework for agencies such as Anatel to standardise aspects of their administration, organisation and decision-making process. Acknowledging the importance of independence, the law reaffirms that regulatory agencies do not report to higher authorities, and strengthens their functional, administrative and financial autonomy.

The law mandated regulatory impact assessment (RIA) prior to issuing regulatory measures that are of general interest to economic agents. It also established mechanisms for public consultations and hearings. However, there has been no oversight body to monitor how the RIAs are undertaken.

To further improve accountability, the law mandates the preparation of different documents. These include external control and annual activity reports, a strategic plan, an annual management plan and a regulatory agenda. Moreover, the law harmonises the following functions of the internal ombudsman in each regulatory agency:

- ensure the quality and timeliness of the services provided by the regulatory agency
- follow the internal process of interested parties' complaints on the performance of the regulator to which agencies are exposed
- prepare an annual report on the activities of the agency.

Finally, the law promotes co-ordination among governmental entities, including competition agencies, regulatory agencies, consumer and environmental protection agencies, and regulatory bodies at state, district and municipal level.

Source: Brazil (2019[2]), "Lei No. 13 879, de 3 de outubro de 2019", http://www.planalto.gov.br/ccivil_03/_Ato2019-2022/2019/Lei/L13879.htm.

Anatel, in addition to addressing consumer issues internally, has mandated the establishment of external consumer advocacy bodies. These bodies, known as users' advisory boards, were initially conceived in 2008 as one board for each fixed telephony concessionaire (Conselhos de Usuários do STFC, Resolution No. 490 of 2008). This approach was modified in 2013 when Anatel formalised advisory boards for each service that was available to end users.

In keeping with Anatel's Resolution No. 623 of 2013, service providers must implement advisory boards in each region with at least 50 000 subscriptions. At present, 35 boards advocate for consumer rights and obligations, evaluate the quality of services and propose improvements. The boards have up to 12 advisers, split between representatives from consumer protection entities and consumers. They are all elected following rules defined by the service provider, which is responsible for making these boards viable (i.e. holding elections, organising meetings and providing the funding).

Anatel has powers to enforce regulations, but it has collected fewer fines than warranted by Board decisions on fines in recent years. Between 2010 and 2017, Anatel imposed 60 000 fines. Of these fines, only 66% were fully paid by operators, representing 13% of the monetary value of the total fines imposed (Anatel, 2017[11]).

The significant divergence between the fines applied and collected results from several factors. These include the role of the judiciary in the enforcement of regulatory decisions, as well as the high value of the fines. A significant number of companies appeal the fines imposed by Anatel. Such processes can take up to ten years to resolve (Rosa, 2018[12]).

Anatel's administrative decisions can be appealed through administrative or judiciary processes. In 2017, the judiciary suspended 1.2% of the fines imposed by Anatel (Anatel, 2017[11]). Fines contribute to regulatory compliance only insofar as they are a credible deterrent against non-compliance. Anatel intends to modify its oversight regulation to adopt preventive and reparatory measures instead of punitive ones (Anatel, 2019[13]). It would consider a variety of sanctions beyond monetary ones, including remedial conduct and issuance of warnings.

As it prepares this new regulation, Anatel should follow best practice principles. These include rational and proportionate sanctions, and consideration of aggravating and mitigating factors when imposing fines such as the severity of the violation. It should also consider the resulting harm to consumers and prior infringements (OECD, 2018[14]).

According to the OECD Best Practice Principles on the Governance of Regulators, regulators should have enough autonomy to conduct their functions without interference from the Executive, Congress or Parliament. A clear framework for accountability needs to be balanced with effective autonomy of the regulator. The maintenance of certain prerogatives is essential to ensure the technicality, impartiality and predictability of the regulatory function (Moreira, 2004[15]).

To that end, the regulator should adopt internal procedures to guarantee transparency; ensure an open dialogue with the executive and legislative branches, associations, consumers, citizens and non-governmental organisations (NGOs); strengthen *ex post* assessment; and guarantee clear and transparent appeal decisions.

Analysing the costs and benefits of regulatory measures can help improve regulatory outcomes by assessing effects on investment and consumer surplus. Anatel has been one of the most active regulatory agencies in Brazil in promoting regulatory impact assessment (RIA). In 2018, Anatel developed new standards for RIA practices.[6] Although Anatel recognises the importance of RIA, and has conducted several RIAs on qualitative issues, it has limited experience with quantitative RIAs (Aquila et al., 2019[16]). Additionally, Anatel's information related to RIA implementation is difficult to access.

Recently, Anatel has tried to improve accessibility of these reports by consolidating all documents related to regulatory decisions, including the RIA reports, on its website.[7] However, the only available documents are those produced in 2019 and 2020. Earlier reports are only accessible through research in Anatel's general electronic information system. Finally, despite previous OECD recommendations, there is still no independent body in Brazil to oversee the quality of RIA reports. This is necessary to support effective implementation of RIA (OECD, 2016[17]).

Anatel has carried out public consultations systematically since its creation. On its website, Anatel publishes its consultation processes (i.e. documents, related comments, public hearings and final decisions) to ensure an open and constant dialogue with society. Anatel's online platform System for Accompanying Public Consultations (Sistema de Acompanhamento

de Consultas Públicas, SACP)[8] has enabled greater efficiency for engaging the public in its regulatory decisions.[9] The SACP analyses and answers all comments individually.

The National Film Agency (Ancine)

Ancine was created to develop the Brazilian film industry. Since the passage of the SeAC law, Ancine has expanded its functions. It has exclusive responsibility for management of programming and audio-visual content packaging. It is also the regulatory body in charge of audio-visual content distribution of pay TV and FTA TV. As such, Ancine enforces compliance with regulations related to audio-visual content distribution, such as local content quotas, quality and foreign ownership restrictions.

The Collegiate Board of Directors (Diretoria Colegiada), which runs the entity, is composed of a president and three directors. They are appointed by the President of Brazil and then approved by the Senate. All decisions of the Board must be made in a collegial manner, and by simple majority of votes; the president is elected for one year, and runs the meetings. The Board is the final administrative authority and analyses, discusses and decides on Ancine policies, and regulates in the areas of its competence (Ancine, 2014, p. art. 6[18]). In addition, it has a secretariat, which co-ordinates and assists the directorate at the administrative level (Ancine, 2014, p. art. 15[18]).

Ancine has different units that oversee its performance. For instance, the Secretariat of Internal Management Policies (Secretaria de Políticas de Gestão Interna), monitors Ancine officials as well as internal activities. The Internal Audit (Auditoria Interna) carries out internal control actions such as advising on the execution of the government's plans. It also helps implement recommendations by the units of control of the Executive branch and TCU. It must communicate irregularities that could affect the Treasury, and elaborate the annual plan of internal audit activities. The Ombudsman (Ouvidoria) receives petitions and complaints from citizens and institutions related to Ancine and works to resolve issues within the agreed deadlines. It also co-ordinates public consultations and proposes adjustments to administrative procedures to improve institutional performance (Ancine, 2014, p. art. 24[18]).

Ancine is organised into the following superintendencies: registration (Superintendência de Registro), inspection (Superintendência de Fiscalização), promotion (Superintendência de Fomento) and economic development (Superintendência de Desenvolvimento Econômico).

The need for a convergent regulatory approach

According to international principles for good regulatory practices developed by the OECD, regulators should have a well-defined mission and distinct responsibilities. Different actors must clearly know their role and purpose. In this way, they can complement rather than duplicate each other (OECD, 2014[8]).

In the context of growing convergence of media content and communication services, the question of creating a converged regulator arises. In Brazil, distinct regulators for communication markets and broadcasting services make it challenging to clarify roles. Relevant bodies in the communication and broadcasting industries have potentially conflicting and competing functions. For instance, Anatel regulates communication services and audio-visual media distribution. This means that Anatel and Ancine regulate different levels of the audio-visual value chain. Given this arrangement, it is unclear which body should regulate distribution of content over the Internet.

As convergence progresses, it will become more challenging to differentiate operators according to how they deliver services. This will affect the clarity of regulators' roles given

the potential for duplication. In the context of convergence, a number of OECD countries such as Australia, Hungary and the United Kingdom have merged their broadcasting and communication regulators. Others have made it easier for regulators to limit conflicts over co-ordination and to help implement converged regulation (OECD, 2008[9]; OECD, 2017[19]). In this respect, Brazil could respond to the challenge by creating an independent and convergent regulator responsible for communication and broadcasting markets. At the least, it should consider transferring some powers from Ancine and MCTIC to Anatel.

The Administrative Council for Economic Defence

The Administrative Council for Economic Defence (Conselho Administrativo de Defesa Econômica, CADE) enforces antitrust regulation and promotes competition in all economic sectors, including communication and broadcasting. These objectives are complemented by other regulators: Anatel promotes competition in the communication sector through *ex ante* regulation, while Ancine is responsible for programming and audio-visual content packaging. CADE has a co-operation agreement with Ancine, but no formal one with Anatel.

In 2011, the Brazilian competition law (Law No. 12 529, Lei de Defesa da Concorrência, LDC) re-organised the Brazilian competition policy framework. It granted CADE responsibilities for administrative proceedings related to "violations against the economic order", as well as for merger control.

CADE is made up of an Administrative Tribunal, a General Superintendence and a Department of Economic Studies. The Administrative Tribunal makes decisions. The General Superintendence investigates and conducts proceedings to rebuke abuse of economic power and analyse mergers. The Department of Economic Studies prepares economic opinions and studies in all areas related to CADE's competences, including mergers, anticompetitive conduct and promotion of a competition culture. Further details follow below.

CADE's Administrative Tribunal has a president and six commissioners who are Brazilian nationals over the age of 30. The Senate approves the president and the commissioners after they are appointed by the President of the Republic. The president and commissioners hold office for four years, and cannot serve consecutive terms (Brazil, 2011, p. art. 6[20]). They are also prohibited from engaging in the activities of political parties (Brazil, 2011, p. art. 8[20]).

CADE's General Superintendence has a General Superintendent and two deputies. The Senate approves the General Superintendent after appointment by the President of the Republic. The General Superintendent appoints the deputies (Brazil, 2011, p. art. 9[20]).

A specialised Attorney General's office provides legal consultancy and assistance to CADE, and represents it in and out of courts. It promotes the judicial enforcement of CADE's decisions and sentences. It also promotes adoption of judicial measures requested by the tribunal or by the General Superintendence. These could include measures needed to cease "violations of economic order" or to obtain documents for fact-finding purposes, among others.

A Chief Economist, appointed jointly by the General Superintendent and the President of the Tribunal, heads the Department of Economic Studies. The Chief Economist prepares economic studies and opinions, engages in advocacy, ensures technical and scientific accuracy of decisions of the main body, and studies the effects of CADE's decisions in certain markets. Regarding communication issues, CADE has published various decisions of merger control (Chapter 6).

Governmental institutions

Ministry of Science, Technology, Innovations and Communications

MCTIC, established in 2016 by the merger of the Ministry of Communications and the Ministry of Science, Technology and Innovation,[10] is responsible for communication policy design. According to Decree No. 9 612 of 2018, MCTIC promotes implementation of ICT-based infrastructure and services for development of digital and intelligent cities. Additionally, in relation to public communication policies, Law No. 13 844 (art. 25) of 2019 and Decree No. 9 612 of 2018 (art. 7) defines its roles as the following:

- detail communication policy objectives and guidelines, and publish the results of public policy initiatives
- define guidelines, strategies, actions and mechanisms for monitoring
- supervise Anatel's actions resulting from objectives and guidelines
- promote participation of civil society through public hearings and consultations, in addition to other instruments
- establish contracts, agreements, adjustments and other instruments to achieve the objectives.

The powers of MCTIC and Anatel do not regularly overlap and the entities generally co-ordinate activities. If an uncertainty arises with respect to a particular function, the two usually negotiate a consensus. Additionally, MCTIC and Anatel have signed different co-operation agreements.

Regarding broadcasting, MCTIC has classic industrial policy responsibility for the whole sector. It also assigns broadcasting licences, given the absence of an independent regulatory agency for the entire sector. While FTA has no regulatory agency oversight, Anatel and Ancine regulate pay TV services jointly.

MCTIC awards broadcasting licences. In the case of municipal or educational broadcasters, these are awarded upon request. In the case of commercial broadcasters, the award is based largely on public benefit criteria. These include the amount of local content committed and news coverage.

Although licensing commercial TV stations is a competitive bidding process, multiple institutions participate. MCTIC starts the process by publishing an invitation. If valid, the demand for the licence is sent to the President of the Republic for approval and signature. However, the licence will only be valid after final approval by Congress. The procedure continues at Anatel, which issues a permit for use of the radiofrequency spectrum.

To promote efficient spectrum management, Anatel, or a new converged regulator, should be entitled to license and allocate spectrum for commercial broadcasting services. The complex and lengthy process of issuing a broadcasting licence is detailed in Chapter 6.

Secretariat for Competition Advocacy and Competitiveness

The government reform of 2019 re-organised the ministries. The Ministry of Economy was created to integrate the activities of two other ministries (i.e. finance and labour) through Provisional Measure No. 870 of 1 January 2019 (Ministério da Economia, 2020[21]). Within the Ministry of Economy, the Secretariat of Competition Advocacy and Competitiveness

(Secretaria de Advocacia da Concorrência e Competitividade, SEAE) conducts competition advocacy directed towards government agencies and society.

SEAE analyses public policies, self-regulation and normative acts of general interest of economic agents, and consumers through a competition lens. It also evaluates bills presented to Congress and by regulatory agencies, including Anatel, in terms of competition advocacy in all sectors of economic policy.

National Consumer Secretariat

The National Consumer Secretariat of the Ministry of Justice of Brazil (Secretaria Nacional do Consumidor, Senacon) formulates, promotes, co-ordinates and implements the National Consumer Protection Policy. Senacon also represents the interests of Brazilian consumers and the National Consumer Defence System (Sistema Nacional de Defesa do Consumidor, SNDC) in international organisations such as Mercosur and the Organization of American States (Consumer International, 2019[22]).[11]

Senacon has a role in communication policy issues related to the protection of consumer rights and the quality of services. Senacon analyses consumer protection issues that have national repercussions, promotes sectoral dialogues with suppliers and undertakes technical co-operation with regulatory agencies (e.g. Anatel). It also imposes sanctions on practices that go against consumer rights, which include penalties to communication operators. It has formed several working groups with Anatel, such as one created in 2016 within the Internet Civil Rights Framework (Marco Civil da Internet, Law No. 12 965 of 2014). The group addresses issues related to Internet services.

Within Senacon, the Department of Consumer Protection and Defence (Departamento de Proteção e Defesa do Consumidor, DPDC) assesses complaints by consumers or representatives of consumers. DPDC advises consumers about their rights and raises consumer awareness. Moreover, Senacon asks the judicial police to deter breaches of consumer law that may be subject to criminal sanctions. In Brazil, only the judicial police can initiate criminal investigations, which may include issuing judicial warrants for the surveillance of criminal activities. Finally, Senacon has the power to propose improvements of legislation on consumer rights.

In the communication sector, for example, DPDC fined Oi, Claro and Vivo BRL 9.3 million (USD 2.54 billion) in 2018 for violation of the Brazilian Consumer Defence Code.[12] According to DPDC, these communication operators violated consumers' rights in "value-added services." Among other things, the three companies had billed for goods and services that had not been ordered by consumers (Ministério da Justiça e Segurança Pública, 2018[23]).

Anatel protects consumer rights and the quality of telecommunication services, and can impose sanctions. Anatel co-operates with Senacon by providing relevant information on administrative actions and procedures relating to consumer rights. Due to the technical nature of complaints (e.g. mobile service quality) and Anatel's complaint handling procedure being in place longer than Senacon's, Anatel deals with more consumer protection issues in the telecommunication sector than Senacon. In this regard, Anatel has regulated the rights of consumers of communication services. It has also obliged providers to increase transparency for consumers.

Anatel and Senacon require more formal co-ordination to treat consumer-related issues. At present, they exchange information about consumer complaints against communication operators within SNDC, including state and municipal Procons. In addition, Senacon is a formal member of the CDUST and helps draft regulatory measures by Anatel (e.g. most

RIA assessments include Senacon as a crucial stakeholder). In November 2019, Anatel and Senacon established a Memorandum of Understanding, together with the Supreme Court and communicator operators, to foster the adoption of an online portal (consumidor.gov) and establish it as the first resort for dispute resolution of consumer complaints.[13]

Ministry of Justice

Following the mandate established by the 1988 Constitution and the Statute for Children and Teenagers (Law No. 8 069 of 1990, Estatuto da Criança e Adolescente), the Ministry of Justice regulates and monitors the classification of radio and TV content, as well as public entertainment. Its decision No. 1 189 of 2018 details the scope for classification (all audio-visual work, including video-on-demand, role-playing games, electronic games and applications, but excluding browser-based games not stored locally). Content providers self-classify ratings, and the ministry monitors them. Brazil is part of the International Age Rating Coalition (IARC). Ministry authorisation is unnecessary for electronic games and applications for which IARC has established ratings.

Judicial institutions

Federal Supreme Court

The highest level of the Brazilian judiciary is the Federal Supreme Court (Supremo Tribunal Federal, STF). The STF combines competencies of a supreme court (i.e. the court of last resort in civil and criminal cases) and a constitutional court, which considers constitutional issues regardless of concrete litigation. Fundamentally, it protects the Constitution of 1988, analysing cases that involve a violation of the latter.

The STF Board is composed of 11 ministers who must be Brazilian nationals with outstanding legal knowledge and unblemished reputations. The President of the Republic nominates ministers, who must be approved by an absolute majority of the Senate.

The main mandate of the STF includes judging the direct action of unconstitutionality of a federal or state law or act, declaring the constitutionality of a federal law or regulation, dealing with the allegation of non-compliance with a fundamental precept arising from the Constitution itself and extradition requested by a foreign State.[14]

Federal Court of Accounts

Although not strictly a judicial institution, the Federal Court of Accounts (Tribunal de Contas da União, TCU) acts as an independent and autonomous constitutional body. It helps Congress monitor the budget. TCU is composed by nine members: the Chamber of Deputies appoints six members, while the President of the Republic appoints the remaining three. The Senate must approve all nominations.

TCU is the external monitoring organ of the federal government. It helps Congress monitor the budget and finances of the country to promote an effective, ethical, agile and responsible public administration. TCU is responsible for the accounting, financial, budgetary, operational and patrimonial oversight of the country's public bodies and entities regarding legality, legitimacy and cost-effectiveness.[15] TCU is further responsible for overseeing the Fiscal Responsibility Law (Supplementary Law No. 101, Lei de Responsabilidade Fiscal), the Law on Tenders and Contracts (Law No. 8 666, Law on Tenders and Contracts) and, annually, the Annual Budget Law (LOA).

TCU processes may be initiated *ex officio*, or at the request of any person with knowledge of irregularities that fall within its competence. The same procedures take place if the process is initiated by an individual member of Congress. However, approved congressional requests sent to TCU will be classified as a National Congress Request. Thus, they are given preferential treatment pursuant to Resolution TCU No. 215 of 20 August 2008.

TCU imposes administrative penalties related to the misuse of public funds, and conducts the administrative investigation, judgement and sanction (Aranha, 2018[24]). TCU may apply sanctions once an irregularity is found. Possible sanctions include fines, damage reimbursement, asset freezing, disqualification from holding public office and the inability to participate in biddings related to projects within the federal public administration. TCU will forward a copy of the relevant files to the federal Public Prosecutor's Office to initiate civil and criminal actions as deemed appropriate (Gomes, 2006[25]). As a consequence of TCU's judgements, public servants may face prosecution for administrative improbity (Article 11 of Law No. 8 249 of 1992, Law on Administrative Improbity).

TCU issues two types of decisions: determinations, which are mandatory; and recommendations, which are not. Both are made within the framework of TCU powers, such as audit. There is no accountability for not following recommendations. However, they are considered mandatory and usually impose a deadline for compliance (de Azevedo et al., 2019[26]).[16] According to Articles 277-289 of the TCU bylaws (Regimento Interno do TCU), its proceedings can be challenged or appealed.[17]

As TCU representative, the rapporteur oversees legal aspects of the proceedings to produce a decision taken by the collegiate body. In case of an appeal, she or he shall assess its admissibility. TCU carries out all the procedure exclusively. If the appeal is not admissible due to gross error, bad faith or regular postponements, the rapporteur shall submit it to the collegiate body and deny the motion in a substantial way.

Control by TCU is potentially undermining Anatel's independence, limiting its capacity to carry out its functions. As previously acknowledged by the OECD in 2008, performance assessment by national audit offices can protect the public interest. Although TCU usually acts *ex post,* it acts *ex ante* in bidding and privatisation. The extent to which *ex ante* assessment (or simultaneous audit) and advice from TCU is applied to the regulatory agencies in Brazil is unusual (OECD, 2008[9]). In 2007, The World Bank also advised moderation in the monitoring exercised by TCU. Extensive involvement of TCU in reviewing concessions, it said, posed a possible regulatory risk. It seems this advice has not been followed.

TCU's mandate is specified in the Constitution (art. 70 and 71). In addition, Law No. 9 491 of 1997 (art. 18) gives TCU responsibility to "examine the files related to privatization processes," i.e. it may review procurement processes. However, a recent government decision determined that TCU could exert prior control over tender invitations in infrastructure projects (i.e. before establishment of a contractual relationship between the public administration and the private operator) (Jordão, 2014[27]). TCU has thus possibly expanded its scope of action and affected Anatel's decisions (Gomes, 2006[25]). The latter may undermine the independence of the regulatory agency by potentially subjecting it to a hierarchical control.[18]

The recent public guideline "Projeto Crescer" of 2016 (PPI, 2016[28]), further extended TCU's role. It determines the *ex ante* control by TCU of the agencies' administrative acts. This may be paving the way for TCU to play the role of the regulator and influence decisions when developing infrastructure projects (Jordão and Ribeiro, 2017[29]). In principle, the public guideline has no binding force. In practice, however, the regulatory agencies submit their auction and procurement procedures to TCU for prior consideration. They fear being held accountable of any irregularity found in TCU's *ex post* control (Lenzi, 2018[30]).

Box 4.2. The role of TCU in telecommunication issues

In the past few years, there has been a growing discussion on the role of TCU and its likely co-regulatory power in the communication sector. TCU has opened 455 cases on actions by Anatel. Most cases are related to regulation, as well as fiscal and accountability issues.

TCU does performance audits of federal agencies, which include the area of regulation. For example, TCU has questioned issues related to reversible assets and transfers of corporate control of the concessionaires in the communication sector. It also examines Anatel's procedures for hiring external consultants, the criteria for technical studies conducted in spectrum auctions, and the negotiation between Anatel and Telefônica Brasil S.A towards a Conduct Adjustment Agreement (Termo de Ajustamento de Conduta, TAC) (TCU, 2017[31]).

In the negotiation of the TAC between Telefônica Brasil and Anatel, there was not a specific suspension of Anatel's decision to establish the TAC. However, TCU brought up issues to be addressed before Anatel could conclude the TAC with Telefônica Brasil (TCU, 2017[32]). TCU conducted its analysis after the Anatel Board of Directors approved the TAC, and before Anatel and the company signed it. In their analysis, several aspects of the agreement seemed to contradict Anatel's regulations, as well as other applicable legal provisions. TCU issued determinations and recommendations to Anatel. If these determinations had been fulfilled, the agreement could have gone ahead. However, according to Anatel's Board, Telefônica Brasil did not agree to adapt the conditions in the TAC. In the end, TCU's pressure seems to have convinced Anatel's Board to not conclude the agreement, which led to the termination of negotiations (Anatel, 2018[33]).

Viasat – Telebrás

TCU has also exercised control on other agents of the telecommunication sector in the midst of the decision process. It analysed the partnership agreement between the State-owned Telebrás and the American company Viasat for the provision of Internet connection services through the Geostationary Defence and Strategic Communications Satellite (Satélite Geoestacionário de Defesa e Comunicações Estratégicas, SGDC), after the signature of said agreement by both parties. In this case, highly covered by the Brazilian press, TCU approved the Viasat–Telebrás agreement, but ordered multiple modifications. The agreement aimed at a collaboration between Telebrás and Viasat for the use of the SGDC to provide Wi-Fi service in remote areas of Brazil.

This agreement was signed in February 2018, but could not be implemented until May 2019. TCU had issued a decision to adjust some clauses of the contract, without suspending it entirely. The Supreme Federal Court finally suspended the contract (TC No. 022.981 of July 2018). For TCU, the agreement was clearly not well balanced and disadvantageous to the Telebrás; therefore, TCU ordered a renegotiation of those clauses that the court had considered as unbalanced.[1]

1. The provisions that required renegotiation or modification included negotiating reduction of the contractually foreseen value for the monthly payment of Telebrás to Viasat. It also included modifying a clause to allow the possibility of alterations in the agreement between the parties (clause 5.3(a)(ii) should be in accordance with Article 81, VI, of the Lei das Estatais), among others.

Although TCU recognises the public administration's autonomy to act, the entity "seeks to act preventively and act as soon as possible to avoid failures and irregularities" (TCU, 2020[34]). Together with the experiences highlighted in Box 4.2, this may indicate the

entity's preference for simultaneous monitoring of regulatory measures. In this respect, TCU's core tasks should be focused on *ex post* assessment of the effectiveness and efficiency of policies, programmes and processes.

Previous OECD work has highlighted the importance of incorporating *ex post* evaluations as an integral part of the "regulatory cycle" (OECD, 2015[35]). The OECD has also noted that supreme audit institutions like TCU may consider a less audit-like approach towards evaluation. To that end, they can examine if their performance audits and evaluations should be more suggestive and less prescriptive (OECD, 2016[36]).

High-level oversight bodies

Apart from TCU, Brazil has other high-level control bodies in charge of preventing, detecting and sanctioning corruptive practices. These include the Public Prosecutor's Office (Ministério Público, MP), an independent body that does not belong to executive, legislative or judiciary branches. The MP is composed of the Federal Prosecutor's Office (Ministério Público da União, MPU) and the State Public Prosecutor's Office. The MPU, in turn, is composed of the Federal Prosecutor's Office (Ministério Público Federal, MPF), the Labour Prosecutor's Office (Ministério Público do Trabalho), the Military Public Prosecutor's Office (Ministério Público Militar) and the Federal District and Territories Prosecutor's Office (Ministério Público do Distrito Federal e Territórios).

The MPF upholds the legal order, the democratic regime, and social and individual interests, as well as a functional and administrative autonomy. It is a prosecutorial body, with a guaranteed budget (Aranha, 2018[24]) and the function of promoting class actions for the protection of the State's property, the environment, and other collective and diffuse interests. In this respect, the MPF has the legitimacy to promote consumer protection before the federal courts, which in turn, will conduct the judicial judgement and sanction. In the telecommunication area, the MPF has been active in initiating class actions to determine the legality of Anatel's performance. It has also actively requested information from Anatel about the provision of telecommunication services.

Decentralised governmental institutions

State government and prefectures

Brazil has 26 federated states, 5 570 municipalities, including the Federal District. The state governments and prefectures belong to the Executive branch of government and have functions and powers related to the communication sector, namely taxation, consumer matters and infrastructure.

The effective implementation of sectoral regulation sometimes depends on other related laws. This is also the case for the telecommunication and broadcasting sectors, as relevant issues of both industries are handled at a federal, state and municipal level. For example, municipalities legislate the deployment of infrastructure and communication networks in urban areas, in line with environmental, territorial planning standards (Brazil, 1988, p. Arts. 20 and 30[37]) (Brazil, 1997, p. art. 74[38]) (Brazil, 2002, pp. Arts. 1286, 1369, and 1371[39]). The 2008 OECD Review of Regulatory Reform highlighted a significant overlap of functions between federal, state and municipal regulatory agencies in Brazil. Although mechanisms for co-ordination existed, they were not frequently used (OECD, 2008[9]).

There is a lack of co-ordination among federal, state and municipal levels of government in some key issues affecting communication and broadcasting markets. This is illustrated,

among other examples, by the tax on telecommunication services (Imposto sobre Circulação de Mercadorias e Serviços, ICMS). With respect to taxation, inconsistent policy goals may have limited the development of the telecommunication sector due to high taxes (Chapter 7). Other examples include antenna deployment (i.e. power density regulations and licences for the installation of cellular sites). In addition, rights-of-way regulation (i.e. towers, ducts, etc.) for network deployment may include use of public buildings, roads and street furniture (Brazil, 2015[40]). These co-ordination issues at different levels of government may hamper infrastructure deployment, as well as the access and adoption of communication services.

The Brazilian states share the power to legislate on consumer matters, provided they respect the "general clauses" instituted by federal law.[19] Additionally, there are more than 800 state and local departments for consumer protection (Procon) linked to the Executive Power, which also oversee communication companies.

The creation of a Procon is subject to each state or municipality, which leads to different levels of access to consumer protection organisations throughout the country. Procons also gather information that is periodically published in the National Information System for Consumer Protection (Sistema Nacional de Informações de Defesa do Consumidor), created in 2003 and managed by Senacon.

Functions continue to overlap in consumer protection for telecommunication services, including between Senacon, Anatel and Procons. Regarding the latter, Procons promote greater effectiveness in the protection of consumer rights by facilitating line of communication with consumers that require interventions at a local level. Furthermore, the presence of consumer protection bodies in states and municipalities acknowledges the states' heterogeneity in terms of connectivity, consumer awareness and education levels. On the other hand, the plethora of Procons may also lead to some co-ordination issues. Anatel has the technical capabilities and knowledge to protect consumer rights in discussions of specialised issues like signal quality. To promote legal certainty and regulatory coherence, Anatel, Senacon and Procon would gain from actively increasing their co-operation and transparency.[20]

Non-governmental organisations and multi-stakeholder bodies

CGI.br

The Brazilian Internet Steering Committee (Comitê Gestor da Internet no Brasil, CGI.br) was created by Inter-ministerial Order No. 147 of 31 May 1995. The order was amended by Presidential Decree No. 4 829 of September 2003. CGI.br co-ordinates and integrates all Internet service initiatives in Brazil, as well as promotes quality of service, innovation and dissemination of Internet services.

The CGI.br is comprised of members from the government, private sector, civil society, the Internet technical community and academia. As such, it is a unique model for the effective participation of society in decisions involving Internet governance. Based on the principles of multilateralism, transparency and democracy, the CGI.br has elected representatives from civil society since July 2004. They take part in discussions and define priorities for Internet policy together with the government.

NIC.br is the operational body of CGI.br, created to implement its decisions. NIC.br has a General Assembly composed of current and former members of CGI.br. The General Assembly, in turn, elects the Board of Directors consisting of seven members with a two-year term. Four members are from civil society and three from the government. The Board selects the

Executive Directors, who manage and represent the organisation. Membership on the General Assembly or Board is unpaid.

NIC.br is also responsible for domain name registration and administration of the country code top-level domain (ccTLD) ".br", carried out through Registro.br. It also promotes studies and recommends procedures for Internet security through CERT.br. In addition, it produces internationally comparable ICT statistics and indicators, as well as capacity building programmes on survey methodologies through CETIC.br. These allow maintenance of technical quality and innovation in use of the Internet. Under NIC.br, IX.br promotes and manages Internet exchange points in Brazil.

Self-Regulatory Advertising Council

The Self-Regulatory Advertising Council (Conselho Nacional de Autorregulamentação Publicitária, CONAR) is an NGO that promotes freedom of expression and defends the constitutional prerogatives of commercial advertisement (Conselho Nacional de Autorregulamentação Publicitária, 2020[41]). Within its mission, CONAR handles complaints from consumers, authorities, associates and those formulated by CONAR's Board members. The Ethical Council judges the complaints and its recommendations are followed on a voluntary basis.

CONAR applies the ethical rules in the Brazilian Code of Self-Regulatory Advertising, which was developed by the advertisement community. While not legally binding, the document has great influence over economic agents in the advertisement industry. Based on this code, CONAR has four possible responses. First, it could issue a warning. Second, it could make a recommendation to modify an advertisement. Third, it could recommend suspending the disclosure of an advertisement. Fourth, it could issue a public notice announcing its position with regard to the economic agent for non-compliance.

CONAR conducts an *ex post* evaluation of content, excluding prior censorship of advertising content. In most cases, the involved parties (e.g. advertisement or communication agencies) heed CONAR's recommendations (IDEC, 2014[42]).

In 2018, individual consumers initiated 211 of 302 CONAR proceedings. CONAR itself initiated the remaining 91 proceedings. In 2019, most of the 302 proceedings were related to the following industries: telecommunication (8.6%), alcoholic beverages (14.2%), food (13.9%) and health (13.6%). The remainder (49.7%) was related to other industries such as automotive, fashion and electronics (CONAR, 2020[43]).

References

Anatel (2019), *Anatel apresenta consulta pública do Regulamento de Fiscalização Regulatória em Salvador (BA)*, [Anatel presents Public Consultation of the Regulatory Monitoring Guidelines in Salvador de Bahia], news release, Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/institucional/noticias-destaque/2198-anatel-apresenta-consulta-publica-do-regulamento-de-fiscalizacao-regulatoria-em-salvador-ba. [13]

Anatel (2018), "Acordão (TAC) No. 236", [(TAC) Agreement No. 236], Agência Nacional de Telecomunicações, Brasilia, https://sei.anatel.gov.br/sei/publicacoes/controlador_publicacoes.php?acao=publicacao_visualizar&id_documento=3112176&id_orgao_publicacao=0. [33]

Anatel (2017), *Relatório Anual*, [Annual Report], Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/Portal/verificaDocumentos/documentoVersionado.asp?numeroPublicacao=348395&documentoPath=348395.pdf&Pub=&URL=/Portal/verificaDocumentos/documento.asp. [11]

Anatel (2013), *Regimento Interno da Agência Nacional de Telecomunicações*, [Bylaws of National Telecommunications Agency], Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/legislacao/resolucoes/2013/450-resolucao-612. [10]

Ancine (2014), *Regimento Interno da Agência Nacional do Cinema - Ancine*, [Internal Regulations of the National Film Agency], Agência Nacional do Cinema, Brasilia, https://ancine.gov.br/sites/default/files/resolucoes-diretoria-colegiada/RDC%2059%20e%20ANEXO%20-%20REVIS%C3%83O%2007.pdf. [18]

Aquila, G. et al. (2019), "Quantitative regulatory impact analysis: Experience of regulatory agencies", *Utilities Policy*, Vol. 59/100931, https://doi.org/10.1016/j.jup.2019.100931. [16]

Aranha, A. (2018), "The web of accountability institutions and corruption control in Brazil", Presentation at the 2018 OECD Global Anti-corruption and Integrity Forum, Paris, https://www.oecd.org/corruption/integrity-forum/academic-papers/Aranha.pdf. [24]

Brazil (2019), "Lei No. 13 879, de 3 de outubro de 2019", [Law No. 13 879 of 3 October 2019], Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/_Ato2019-2022/2019/Lei/L13879.htm. [2]

Brazil (2018), *Guidelines and Guidebook for Regulatory Impact Analysis - RIA*, Presidência da República, Casa Civil, Brasilia, https://www.gov.br/casacivil/pt-br/assuntos/governanca/regulacao/apresentacao-regulacao-pasta/comite-interministerial-de-governanca-aprova-as-diretrizes-gerais-e-roteiro-analitico-sugerido-para-analise-de-impacto-regulatorio-diretrizes-air-e-o-guia-orient. [45]

Brazil (2015), "Lei No. 13 116, de 20 de abril de 2015", [Law No. 13 116 of 20 April 2015], Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/_Ato2015-2018/2015/Lei/L13116.htm. [40]

Brazil (2011), "Lei No. 12 485 de 12 de setembro de 2011 (Lei do Serviço de Acesso Condicionado)", [Law No. 12 485 of 12 September 2011 (Pay TV law)], Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/_Ato2011-2014/2011/Lei/L12485.htm. [20]

Brazil (2002), "Lei No. 10 406, de 10 de janeiro de 2002 (Código Civil)", [Law No. 10 406 of 10 january 2002 (Civil Code)], Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/LEIS/2002/L10406.htm. [39]

Brazil (1997), "Lei No. 9 427, de 16 de julho de 1997", [Law No. 9 427 of 16 July 1997], Presidência da República, Brasilia, http://www.planalto.gov.br/Ccivil_03/leis/L9472.htm. [38]

Brazil (1988), *Constituição da República Federativa do Brasil*, [Constitution of the Federative Republic of Brazil], Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/Constituicao/Constituicao.htm. [37]

CONAR (2020), *Um Balanço da Autorregulamentação Publicitária em 2019*, [A Balance Sheet of Advertising Self-regulation in 2019], Conselho Nacional de Autorregulamentacao Publicitaria, Brasilia, http://www.conar.org.br/pdf/conar220.pdf. [43]

Conselho Nacional de Autorregulamentação Publicitária (2020), *CONAR*, website, http://www.conar.org.br/ (accessed on 3 August 2019). [41]

Consumer International (2019), *Secretaria Nacional do Consumidor (SENACON) - Brazil - Consumers International*, https://www.consumersinternational.org/members/members/secretaria-nacional-do-consumidor-senacon/ (accessed on 21 May 2019). [22]

de Azevedo, F. et al. (2019), "Institutional reputation and the oversight of Brazilian Federal Court of Accounts over independent regulatory agencies", *Administrative Law Review*, Vol. 278/8, pp. 37-70, http://dx.doi.org/10.12660/rda.v278.2019.80048. [26]

Gomes, E. (2006), "As agências reguladoras independentes e o Tribunal de Contas da União: conflito de jurisdições? [TCU's Intervention on Unpublished Bidding Notices: Comptroller or Administrator?]", *Revista de Administração Pública*, Vol. 40/4, pp. 615-630, https://dx.doi.org/10.1590/S0034-76122006000400006. [25]

IDEC (2014), "O que é o CONAR", [What is CONAR?], webpage, https://idec.org.br/consultas/dicas-e-direitos/o-que-e-o-conar (accessed on 10 January 2020). [42]

Jordão, E. (2014), *A intervenção do TCU sobre editais de licitação não publicados: controlador ou administrador?*, [TCU's Intervention on Unpublished Bidding Notices: Comptroller or Administrator?], RBDP, Vol. 12, pp. 209-230, https://bibliotecadigital.fgv.br/dspace/bitstream/handle/10438/19207/A_intervencao_do_TCU_sobre_editais_de_li.pdf. [27]

Jordão, E. and M. Ribeiro (2017), "Como desestruturar uma agência reguladora em passos simples", *Revista Estudos Institucionais*, [How to Restructure a Regulatory Agency in Simple Steps], Vol. 3, pp. 92, https://estudosinstitucionais.com/REI/article/view/155/132. [29]

Lenzi, R. (2018), "A Independência das Agências Reguladoras Brasileiras", [The Independence of Brazilian Regulatory Agencies], Facultad de Dereito Universidade De Coimbra, Coimbra, https://estudogeral.sib.uc.pt/bitstream/10316/85703/1/Raphael%20Lenzi%20-%20Disserta%c3%a7ao.pdf (accessed on 3 August 2019). [30]

Ministério da Economia (2020), "Sobre — Ministério da Economia, Base Jurídica", [About — Legal Basis of the Ministry of Economy], webpage, http://www.economia.gov.br/acesso-a-informacao/institucional (accessed on 10 March 2020). [21]

Ministério da Economia (2015), "O que é contingenciamento?", [What is Contingency?], webpage, http://www.planejamento.gov.br/servicos/faq/orcamento-da-uniao/elaboracao-e-execucao-do-orcamento/o-que-e-contingenciamento (accessed on 5 August 2019). [5]

Ministério da Justiça e Segurança Pública (2018), *Senacon Condena Operadoras de Telefonia por Serviços Adicionais à Conta*, [Senacon Condemns Telephone Operators for Billing of Additional Services], Ministério da Justiça e Segurança Pública, Brasilia, https://www.justica.gov.br/news/collective-nitf-content-1536776729.18. [23]

Moreira, V. (2004), *Estudos de Regulação Pública - I. Centro de Estudos de Direito Público e Regulação (CEDIPRE)*, [Public Regulation Studies - I. Centre for Public Law and Regulation Studies], Universidade de Coimbra Faculdade de Direito, Coimbra Editora, Coimbra, http://bibliobase.infarmed.pt/Opac/Pages/Document/DocumentCitation.aspx?UID=baa24095-cea4-49b5-88dd-e51a07b15b8f&DataBase=10300_BIBLIO. [15]

Nunes, A. et al. (2017), "Contingenciamento orçamentário e autonomia nas agências reguladoras: O caso da Agência Nacional de Telecomunicações", No. 21, [Fiscal contingency measures and the autonomy of regulatory agencies: The case of the National Telecommunications Agency], http://dx.doi.org/10.18764/2178-2865.v21n1p199-223. [4]

OECD (2018), *Brazil: Strengthening Governance for Growth*, OECD Reviews of Regulatory Reform, OECD Publishing, Paris, https://doi.org/10.1787/9789264042940-en. [3]

OECD (2018), *Regulatory Enforcement and Inspections Toolkit*, OECD Publishing, Paris, https://doi.org/10.1787/9789264303959-en. [14]

OECD (2017), *OECD Digital Economy Outlook 2017*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264276284-en. [19]

OECD (2016), *Digital Convergence and Beyond: Innovation, Investment, and Competition in Communication Policy and Regulation for the 21st Century*, Background report for Ministerial Panel 2.1, https://doi.org/10.1787/5jlwvzzj5wvl-en. [1]

OECD (2016), *Indicators of Regulatory Policy and Governance Latin America 2016: Brazil*, OECD, http://www.oecd.org/gov/regulatory-policy/Brazil-regulatory-policy-ireg-2016.pdf. [17]

OECD (2016), *Supreme Audit Institutions and Good Governance: Oversight, Insight and Foresight*, OECD Public Governance Reviews, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264263871-en. [36]

OECD (2015), *OECD Regulatory Policy Outlook 2015*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264238770-en. [35]

OECD (2014), *The Governance of Regulators*, OECD Best Practice Principles for Regulatory Policy, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264209015-en. [8]

OECD (2008), *OECD Reviews of Regulatory Reform - Brazil: Strengthening Governance for Growth*, OECD Reviews of Regulatory Reform, OECD Publishing, Paris, https://doi.org/10.1787/9789264042940-en. (accessed on 3 August 2019). [9]

PPI (2016), *Projeto Crescer*, [Crescer Project], news release, 4 October, Programa de Parcerias de Investimentos, Brasilia, https://www.ppi.gov.br/projeto-crescer. [28]

Rosa, B. (2018), "Operadoras de telefonia só pagam 25% das multas aplicadas pela Anatel", [Telephone Operators Only Pay 25% of Fines Imposed by Anatel], 20 September, https://oglobo.globo.com/economia/operadoras-de-telefonia-so-pagam-25-das-multas-aplicadas-pela-anatel-23084518. [12]

Speck, B. (2000), *Inovação e rotina no Tribunal de Contas da União: o papel da instituição superior de controle financeiro no sistema político-administrativo do Brasil*, [Innovation and routine at the Federal Court of Accounts: The role of the highest institution for financial control in the political-administrative system of Brazil], Fundação Konrad-Adenauer, São Paulo, https://www.academia.edu/3810444/Bruno_Wilhelm_Speck_Inova%C3%A7%C3%A3o_e_rotina_no_Tribunal_de_Contas_da_Uni%C3%A3o. [46]

TCU (2020), "Dúvidas frequentes: Para publicar edital de licitação, a administração precisa da aprovação prévia do TCU?", [Frequently Asked Questions: In order to publish a bid notice, does the administration need prior approval from TCU?], Tribunal de Contas da União, webpage, https://portal.tcu.gov.br/institucional/conheca-o-tcu/duvidas-frequentes/ (accessed on 10 March 2020). [34]

TCU (2019), "Duvidas frequentes", [Frequently Asked Questions], Tribunal de Contas da União, webpage, https://portal.tcu.gov.br/institucional/conheca-o-tcu/duvidas-frequentes/ (accessed on 13 August 2019). [44]

TCU (2017), "Acórdão No. 2 121", [Decision No. 2 121], Tribunal de Contas da União, Plenário, Brasilia. [32]

TCU (2017), *Representação (REPR): RP 02228020162- Reporte*, [Representation (REPR): RP 02228020162 - Report], Tribunal de Contas da União, Brasilia, https://tcu.jusbrasil.com.br/jurisprudencia/507688827/representacao-repr-rp-2228020162/relatorio-507688887?ref=serp. [31]

TCU (2011), "Acórdão No. 2 261", [Decision No. 2 261], Tribunal de Contas da União, Plenário, Brasilia, https://pesquisa.apps.tcu.gov.br/#/documento/acordao-completo/1269320099.PROC/%2520/DTRELEVANCIA%20desc,%20NUMACORDAOINT%20desc/1/%20?uuid=9a7ca480-f123-11e9-88b4-5bcfdb2e2702. [7]

TCU (2006), "Acórdão No. 1 091", [Decision No. 1 091], Tribunal de Contas da União, Plenário, Brasilia, https://pesquisa.apps.tcu.gov.br/#/documento/acordao-completo/1091%252F2006/%2520/DTRELEVANCIA%20desc,%20NUMACORDAOINT%20desc/0/%20?uuid=9a7ca480-f123-11e9-88b4-5bcfdb2e2702. [6]

Notes

[1] On 10 June 2020, the President of Brazil announced the recreation of the Ministry of Communications (MC). The MC had existed prior to 2016, which then became the Ministry of Science, Technology and Innovation (MCTIC). At the moment of writing, the implications to the institutional framework of this newly re-created Ministry where still to be finalised.

[2] See Article 22, paragraph 1, Lei das Agências Reguladoras (Law No. 13 848 of 25 June 2019) – the matter was previously disciplined (barely, one might say) by Article 45 of LGT (Law No. 9 472 of 16 July 1997). See also Articles 138 and 139 of the bylaws (Resolution No. 612 of 2013).

[3] See www.anatel.gov.br/consumidor/anatel-procon-ou-juizados-especiais/58-atendimento/canais-de-atendimento/483-aplicativo.

[4] See https://sistemas.anatel.gov.br/sis/cadastrosimplificado/pages/acesso/login.xhtml?i=0&codSistema=649.

[5] See www.anatel.gov.br/consumidor/anatel-procon-ou-juizados-especiais/58-atendimento/canais-de-atendimento/153-telefone.

[6] Before the release of the RIA guidelines by the presidency (Casa Civil) in 2018 (Brazil, 2018[45]), Anatel had already developed diverse measures for RIA implementation.

[7]This represents 1.16% if measured in monetary value. See www.anatel.gov.br/setorregulado/agenda-regulatoria/agenda-2019-2020.

[8] See https://sistemas.anatel.gov.br/sacp/.

[9] See https://sistemas.anatel.gov.br/sacp/.

[10] The Ministry of Communications was formally created in 1967. MCTIC was established by Provisional Measure No. 726, and converted into Law 13 341.

[11] Senacon's mandate is established in Article 106 of the Consumer Protection Code (Law 8 078, Código de Defesa do Consumidor, CDC), Article 3 of Decree 2 181 of 1997, and Article 17 of Decree 9 662 of 2019.

[12] Using the BRL/USD exchange rate for the year 2018 of 3.653825 from OECD.stat (https://stats.oecd.org/).

[13] See www.anatel.gov.br/institucional/component/content/article?id=2437.

[14] The STF may hear claims of a statute being unconstitutional in the first or second instance. It depends on whether the party is authorised to raise the specific constitutional claim directly to the STF. This is, for example, the case of the General Federal Prosecutors (Procuradoria Geral da República, PGR).

[15] The constitutional and exclusive powers of TCU are set forth in Articles 33, 70, 71, 72, 74 and 161 of the Constitution of 1988.

[16] An empirical study in 2019 analysed the oversight dynamic between Independent Regulatory Agencies and Federal Court of Accounts. Among other points, the study concluded that "[…] (i) the recommendations are mandatory by nature, since the Federal Court of Auditors expects them to be observed by the Agencies while the latter also feel bound, such that quite often they are referred to as determinations […]". In the same regard, it specifies that recommendations made by TCU "are effectively determinations, and in most cases it imposes a deadline for compliance. It should be noted, however, that no sanctions are imposed for failing to comply with recommendations. Analyzing each phase of the dialogue, there is expectation on the part of the Federal Court of Auditors that its recommendations will be complied with, while the Agencies, with the exception of National Energy Agency (Aneel), feel themselves bound to follow the Court's determinations." (de Azevedo et al., 2019[26])

[17] As TCU decisions are administrative, there is recourse to the judiciary regarding legal and formal aspects. As regards the merits, the main object of the proceedings, there is only recourse to TCU (TCU, 2019[44]).

[18] "[f]ar from being a technical issue, prior control transforms the Court of Auditors in a quasi-administrative body. The practical routing of the prior control is to condition the orders of expenses to the registration by the Court of Auditors, involving this institution in the administrative process itself. In fact, the Court would thus become an ally of the Treasury against the ministers in the containment of expenses. But in other cases, such as the one illustrated above, the Court would be an administrative body with veto powers, even if not inserted in the hierarchy of the Executive Power." (Speck, 2000[46])

[19] See Article 24, numeral "V" and paragraph 1, of the Constitution.

[20] See Article 160, numeral VII of Anatel's Bylaws.

5. Communication policy and regulation

This chapter assesses the communication policy and regulatory framework in Brazil. It analyses public policy initiatives, regulatory measures and the main consumer protection issues. Policy and regulatory topics discussed include licensing, regulatory compliance, spectrum management, interconnection and wholesale access regulation, infrastructure sharing and facilitating rights of way. The chapter also assesses ex ante *regulation for promoting competition and national policies for expanding access and use of broadband services. It concludes with a discussion on regional integration, international co-operation and international mobile roaming.*

Policy and regulatory framework for the communication sector in Brazil

Licensing

Under the 1997 General Telecommunications Law (Lei Geral de Telecomunicações, LGT), telecommunication services in Brazil can be understood as being of "collective" or "restricted interest". Restricted interest refers to services provided over what are commonly known as private networks. Conversely, collective interest services refer to those offered commercially in the market for profit.

The licensing of communication services is inherently linked to their classification, which is based on two dimensions. On the one hand, it considers whether the service is of "collective" or "restricted" interest. On the other, it distinguishes between the legal regime of the licence, i.e. "private" or "public".

While services under the public regime require a concession, services under the private regime only require an authorisation. Concessions are subject to universal service obligations and required to ensure continuity of service; the State is also obliged to guarantee their economic-financial equilibrium. As a rule, when the concession ends, the assets used to provide public regime services must be returned to the State (i.e. "reversible assets").[1] These benefits and obligations do not apply to services provided under an authorisation (i.e. private regime). Authorisations are granted with no expiration date.

The LGT established that fixed telephony needed at least one concessionaire in any given area. However, the law left it to the regulator to decide if any other service of collective interest could potentially be granted through a concession. The government, through a presidential decree in 1997, restricted concessions to fixed telephony and established only one concessionaire in any given area.

The General Concession Plan (Decree No. 2 534 of 1998, Plano Geral de Outorgas, PGO) provided the basis for granting authorisations. It divided the country into three areas for local services, which would each be assigned to a different company through an auction. Incumbent local telecommunication operators became the concessionaires of fixed telephony. Authorisations, one per service area, were granted to new fixed telephony companies (commonly referred to as "mirror companies"). After 2001, there have been no restrictions to the number of fixed telephony providers in any given area.

Some concessions granted before the LGT gradually transitioned from communication services belonging to the public regime to the private regime. This process, for example, allowed for the provision of mobile telephony and pay TV services through the less onerous licensing model of authorisations.

Since 1997 to present, the only public service belonging to the public regime concessions has been fixed telephony; this service can also be provided under the private regime. By October 2019, fixed telephony continued to be a public regime service provided through a concession, although private regime authorisations existed for the same service. Law No. 13 879 of October 2019, which amended the LGT, enabled the migration of the remaining fixed telephony concessions to the private regime (i.e. authorisations).

The National Telecommunications Agency (Agência Nacional de Telecomunicações, Anatel) has gradually simplified its classification and licensing framework over the years. From a framework with more than 60 different types of communication services, it now has four large service categories in Brazil (Table 5.1):

- fixed telephony (Serviço Telefônico Fixo Comutado, STFC)
- mobile telephony (Serviço Móvel Pessoal, SMP)
- "multimedia services" such as fixed broadband (Serviços de Comunicação Multimídia, SCMs)
- pay TV (Serviço de Acesso Condicionado, SeAC).

Table 5.1. Types of communication services provided to end users in Brazil

Classification	Service type	Regime	Licence	Legal instrument
STFC (Serviço Telefônico Fixo Comutado)[1]	Fixed telephony (local, national or international)	Public or private	Concession or authorisation	Law No. 9 472 Law No. 13 879
SMP (Serviço Móvel Pessoal)[2]	Mobile telephony	Private	Authorisation	Anatel's Resolution No. 477
SCM (Serviço de Comunicação Multimídia)	Fixed broadband and leased lines	Private	Authorisation	Anatel's Resolution No. 614
SeAC (Serviço de Acesso Condicionado)[3]	Pay TV (by cable, satellite or radio)	Private	Authorisation	Law No. 12 485 and Anatel's Resolution No. 581

1. Although fixed telephony service (STFC) via an authorisation was already possible, the process of migrating STFC to be provided only through an authorisation (i.e. under the private regime) was recently incorporated through amendments to the telecommunication legislation in October 2019 (Law No. 3 879).
2. The Serviço Móvel Pessoal (SMP) classification replaced the Serviço Móvel Celular (SMC) classification in 2001, migrating all mobile telephony provision from the public (i.e. concessions) to the private regime (i.e. authorisations). In 2015, Anatel approved the migration of Serviço Móvel Especializado (SME), i.e. trunking or push-to-talk services under the private regime, to SMP, given that SME licences had specific restrictions that the SMP licences did not.
3. The SeAC classification unified and updated the regulation of the following pay TV services: cable pay TV (Serviço de TV a Cabo, TVC), previously under the public regime; Multichannel Multipoint Distribution Service (MMDS) (Serviço de Distribuição de Sinais Multiponto Multicanal); direct-to-home (DTH) pay TV service (Serviço de Distribuição de Sinais de Televisão e de Áudio por Assinatura via Satélite); and special pay TV subscription service (Serviço Especial de Televisão por Assinatura, TVA). Only cable pay TV service was granted over concessions (i.e. public regime), whereas MMDS, DTH and TVA are all authorisations (i.e. private regime).

Currently, all new licences for these four categories of communication services (i.e. fixed telephony, mobile service, multimedia service and pay TV) are issued through an authorisation. Under this model, there are no limits on the number of providers. Since 1997, service authorisations have been valid indefinitely (Law No. 9 472 of 1997). The only technical restriction is the availability of spectrum, which is usually assigned through auctions.

Authorisations from Anatel are subject to certain rules. For collective interest services, companies must be legally established in Brazil, and prove their technical and financial capabilities. In the past, the process was cumbersome, lasting around six months. Anatel has recently eliminated several requirements, reducing the timeframe to approximately three weeks. Most authorisation requests are granted. In addition, in 2018, Anatel reduced the granting fee from BRL 9 000 to BRL 400 (USD 2 466 to USD 110).[2]

In 2010, Anatel first regulated mobile virtual network operators (MVNOs), establishing two types (Box 5.1). "Authorised" MVNOs require a licence to operate, whereas certified operators (e.g. resellers) only require a commercial contract with a mobile network operator (MNO).

In the current framework, there are also services that do not require a licence as they are classified as a value-added service (serviço de valor adicionado, SVA). These services

"complement" and "assist" telecommunication activities, and are considered neither telecommunication nor broadcasting services. Value-added services include over-the-top services (OTTs), but also layers of the Internet service provision excluding "last mile" access (Chapter 2). For fixed broadband access, the most common applicable telecommunication service is "multimedia services" (Serviços de Comunicação Multimídia, SCMs).[3] The most prominent example of a value-added service is the Internet connection service (i.e. authentication of the user in the network that originated in the past due to dial-up Internet services).

Box 5.1. Mobile virtual network operators in Brazil

The mobile virtual network operators (MVNO) framework established in 2010 (Resolution No. 550 of 22 November 2010) recognises two types of MVNOs: certified and authorised.

Anatel considers that certified operators, or reseller MVNOs, (e.g. branding, differentiated billing and customer service) do not provide a telecommunication service directly. As such, they are not subject to regulation and the tax on telecommunication services (Imposto sobre Circulação de Mercadorias e Serviços, ICMS) does not apply to their final rates (Chapter 7). Certified operators are bound by the interconnection, transit and roaming agreements signed by the MNO.

Authorised operators, or full MVNOs, have to fully comply with Anatel's regulations. Unlike MNOs, MVNOs do not have a spectrum licence. They can enter into simultaneous agreements with several MNOs, and thus are not restricted by the host's geographic area. For the use of network resources, wholesale regulation applies.

The development of MVNOs in Brazil has been slow. Since 2010, there have been 8 authorised MVNOs and 14 certified MVNOs. In 2012, Porto Seguro and Datora were granted an MVNO authorisation, both using Tim Brasil (TIM) as their host. Porto Seguro, which had reached a subscriber base of 826 000 by October 2018, decided to exit the market. It was concerned about growth in data consumption driven by unlimited offers and unfavourable wholesale agreements. Datora, which has focused on the machine-to-machine/Internet of Things (M2M/IoT) market, has more than 900 000 subscriptions, half of which are M2M data connections.

During 2016-19, six MVNO authorisations were granted. Despite recent developments, MVNOs represent less than 0.1% of the mobile market share. Anatel's regulation on interconnection (Regulamento Geral de Interconexão) from July 2018 (Anatel, 2018[1]) may have positive effects for MVNOs in Brazil. Certified MVNOs are no longer required to commit to an agreement with only one MNO.

Consideration could be given to abandoning the individual authorisations still being used for communication operators, replacing them with a class-licensing regime, except where there are resource scarcity constraints, such as spectrum. In other words, a single licence for all communication providers would move the country from a service-based to a convergent licensing regime.

This move would lower administrative entry barriers to the market. A licence need only subject the carrier to reporting requirements and to operate under Anatel's regulations. In some countries, this is done through a "registry" whereby the operator notifies its intention to provide service and adhere to regulation. Changing the licensing regime would require a modification to legislation in Brazil.

Spectrum licensing requires an authorisation. In cases with more than one party interested in a given spectrum band, the spectrum is awarded through an auction in accordance with an attribution plan published by Anatel. Prior to October 2019, spectrum authorisations would last 20 years at most. They could be renewed only once with an additional payment (i.e. every two years equivalent to 2% of revenue within the authorisation area).

After the first renewal, the spectrum had to be returned and could be re-auctioned. However, with approval of Law No. 13 879 on October 2019, spectrum authorisations can be renewed indefinitely. This may yield undesired consequences on competition in the mobile market. The subsection on spectrum management analyses the implications in more detail. It is unclear whether the new regime of successive renewal of spectrum authorisations would also apply to existing spectrum licences that will expire in the upcoming years.

There are no restrictions to foreign investment in the telecommunication sector. Telecommunication service providers must be incorporated under Brazilian law or controlled by a Brazilian company; this company, however, can be controlled by a foreign company or individual.[4]

In other words, foreign entities cannot directly control companies that hold concessions, permissions and authorisations to exploit telecommunication services, but can do so indirectly. In the broadcasting sector, according to the Constitution, foreign companies or individuals cannot hold more than 30% of the total and voting capital of TV broadcasting companies.[5]

Spectrum management

Anatel is responsible for spectrum management of communication services (i.e. spectrum allocation, planning, monitoring and assignment), including the design of spectrum auctions. Although Anatel is in charge of spectrum planning for broadcasting services, spectrum assignment of these services follows a more complicated licensing process (Chapter 6).

In compliance with international treaties and guidelines, Anatel publishes a spectrum attribution, distribution and destination plan (Plano de Atribuição, Destinação e Distribuição de Faixas de Frequências no Brasil). This plan indicates the frequency allocations for communication services. Spectrum management follows Anatel guidelines originally published in 2001 and then revised in 2010 (Anatel, 2010[2]) and 2016 (Anatel, 2016[3]). Spectrum monitoring[6] is periodically undertaken for spectrum used for communication services (e.g. fixed and mobile telephony, fixed and mobile broadband, pay TV, aeronautical communications), and for different technologies.

Spectrum assignment

Brazil has held 12 spectrum auctions for communication services since 1997 (Table 5.2). The first one (i.e. the B band) was carried out by the Ministry of Communications. This occurred during the liberalisation of the sector, before creation of the regulatory body. Anatel has designed and carried out all other auctions.[7]

Spectrum auctions and their design

Four important elements in spectrum auction design affect its outcome: setting spectrum caps, designing the blocks, coverage obligations and establishing the reserve prices. Spectrum auctions can shape competition dynamics as the design of blocks, together with spectrum caps, can determine how many players will prevail in markets in years to come. Thus, the design of the auctions becomes vital for the sector.

Table 5.2. Spectrum auctions in Brazil (1997-2019)

Band	Year	Amount raised (BRL million)	Auction object and result
B band (850 MHz)	1997/98	10.073	First private licences awarded through an auction (Lei Mínima).
C band (1.8 GHz)	2000	Unassigned	Personal Communications Service (PCS) auction.
D band (1.8 GHz)	2000	2.559	PCS auction.
E band (1.8 GHz)	2000	522	PCS auction.
Previously unassigned spectrum (D and E bands)	2002	522	Unassigned PCS spectrum.
Previously unassigned spectrum (E band)	2004	122	Unassigned PCS spectrum.
Previously unassigned spectrum (D and E bands), and band M (1.8 GHz and extension bands)	2007	..	58 of 105 PCS blocks were assigned.
1.9/2.1 GHz (3G spectrum-F, G, I, J-bands)	2007	5.338	36 blocks in the 1.9/2.1 MHz spectrum were assigned; winners had the coverage obligation to provide service in municipalities with no service.
1.9/2.1 GHz (H band) and previously unassigned spectrum	2010	2.730	Successfully assigned 60 of 165 H band and PCS blocks.
Previously unassigned spectrum	2011	235	15 of 54 blocks in the 800 MHz and 1.8 GHz bands were assigned; no bids for the 30 blocks in the 2.5 GHz frequency band (Time Division Duplex, TDD).
2.5 GHz (intended for 4G) and 450 MHz	2012	2.930	2.5 GHz frequency successfully allocated to four bidders; no bids for 450 MHz, so it was bundled with national 2.5 GHz spectrum; licences included rollout obligations and minimum percentages of national technologies.
700 MHz	2014	5.852	3 national blocks of 10 MHz (paired) awarded plus 1 regional block (Algar); no bids in second round for unassigned spectrum.
Previously unassigned spectrum in the 1.8 GHz, 1.9 GHz and 2.5 GHz bands	2015	852.6	42 of 78 blocks in the 2.5 GHz frequency band (Frequency Division Duplex, FDD) were assigned; 5 479 out of 21 152 of the 5 GHz (TDD) blocks were assigned; blocks were offered per municipality.

Note: ".." = not available.
Sources: OECD based on data from Teleco (2018[4]), *Licitações de frequências de celular*, http://www.teleco.com.br/licitacoes.asp (accessed on 17 May 2019); Anatel's response to the questionnaire of the review.

Anatel sets spectrum caps and designs the blocks that will be auctioned to avoid undue concentration of spectrum that could unbalance competition between players. Spectrum caps are common in OECD countries, where they are widely used to encourage entry and address situations of dominance. Since 2008, most spectrum auctions by Anatel have included coverage obligations in the auction design, especially for municipalities that were poorly served (or not served at all) and rural areas. This approach is common in other OECD countries.

Concerning reserve prices, Anatel calculates them considering a new player's operation, as the regulator has not usually reserved blocks for entrants in past auctions. In the recent public consultation regarding the 5G auction, a set-aside of spectrum is planned for small providers and new entrants. In a few cases, however, Anatel designed auctions that did not allow current players to participate in a first round of bidding. In other cases, spectrum caps limited the participation of current players for some blocks. The reserve prices of spectrum auctions in Brazil have to be audited simultaneously by the Federal Court of Accounts (Tribunal de Contas da União, TCU).

In contrast with most OECD countries, Anatel has also included temporary obligations in the rules of some spectrum auctions related to commitments by operators to the use of equipment and software produced or developed in Brazil. These commitments are a tiebreaker criterion in the event of equivalent offers (i.e. equal prices, timeframe for delivery and technical specifications). Operators within Brazil have viewed this obligation as infeasible.

Two important resolutions that affect spectrum auction design, described below, were updated in 2018.

Resolution No. 703 increased spectrum caps. This allowed players to hold up to 35% and 30% of the spectrum available under and between 1 GHz and 3 GHz, respectively. They substituted specific spectrum caps per band when the resolution was approved.

Resolution No. 695 regarding the right of use of radio frequencies (Preço Público pelo Direito de Uso de Radiofrequência, PPDUR) changed several provisions regarding payment of a spectrum licence. It also changed the elements in the formula used to calculate the reserve price for new auctions (or for renewal of licences). Reserve prices would be preferably calculated using a technical formula, which includes the amount of spectrum, population coverage obligations and spectrum coverage range. As well, the resolution allows for payment of spectrum licences in annual instalments throughout the life of the authorisation.[8] Additionally, the price for renewing licences could be paid in kind by fulfilling coverage obligations assumed by the licence holder.

Both resolutions could affect auction outcomes as they involve changes to spectrum caps and reserve prices. However, these resolutions may be affected by Law No. 13 879 that allows spectrum licences to be perpetually renewed.

In June 2012, Anatel auctioned the 2.5 GHz band, alongside the 450 MHz band, to provide basic voice and data services in both urban and rural areas. Initially, the auction for the 450 MHz band failed to generate bids by the four mobile network operators (TeleGeography, 2012[5]). The government swiftly changed strategy. It bundled this spectrum with the parallel 2.5 GHz band being auctioned simultaneously. Winners of the 2.5 GHz lots could make use of the 450 MHz for rural coverage.

The 2012 auction (No. 004/2012/PVCP/SPV) had several main coverage commitments. These included use of the 450 MHz band to reach 30% of rural areas by June 2014, 60% by December 2014 and 100% by December 2015 (TeleGeography, 2015[6]). However, there was no equipment ecosystem for this band linked to 4G technology in 2012. Moreover, communication equipment vendors were sceptical about using this band for long-term evolution (LTE) (BNAmericas, 2014[7]).

In 2014, it seemed the 450 MHz could finally be used for 4G LTE. However, by then, Brazil was ready to auction the 700 MHz band, which was ideal for rural coverage. Large industry players, including Huawei, Nokia and Qualcomm, formed the 450 MHz Alliance to promote an LTE equipment ecosystem in the 450 MHz band (Gahan et al., 2017[8]). Nevertheless, several operators have been unable to comply with coverage obligations by the deadlines set in the 2012 auction notice; relevant equipment for the 450 MHz band was not available at such time. Some have recurred to the use of satellite technology to comply with these commitments.

The 2012 auction included coverage commitments and temporary obligations regarding the usage of nationally-produced or -developed equipment, a government measure designed to achieve industrial policy objectives. The 2014 auction of the 700 MHz band also included similar provisions with an industrial policy focus.[9] However, the most recent auction in 2015

(remainders in the 1.8 GHz, 1.9/2.1 GHz band and 2.5 GHz bands), did not maintain this obligation. Moreover, auctions planned for 2021 were not expected to include the provision.

For the 3G and 4G auctions in 2014 and 2015 (i.e. 700 MHz, 1.9/2.1 GHz and 2.5 GHz), coverage objectives were taken into account when calculating reserve prices. This aimed to expand broadband throughout the country, including in rural and remote areas.

In 2013, Anatel approved allocation of the 700 MHz band to fixed and mobile services in order to provide voice and data communications (Resolution No. 625 of 2013).[10] On 30 September 2014, Anatel auctioned part of the 700 MHz band for mobile broadband. The auction design included a spectrum cap of 10+10 MHz for the first bidding round. This was to be modified to 20+20 MHz in the second round of bidding if spectrum remained unassigned.

Unlike previous spectrum auctions carried out by Anatel, the 2014 auction design did not include mandatory coverage obligations using the 700 MHz band (CITEL/OEA, 2015[9]). Oi, the fourth national mobile operator in Brazil, was absent from the 700 MHz auction of 2014.

The 700 MHz band was auctioned while the transition from analogue to digital television (DTT) was still being carried out by broadcasters in Brazil. The DTT transition was initially planned to happen in one wave in 2016. However, Decree No. 8061 of 2013 spread the digital switchover plan over 2015-18 (CITEL/OEA, 2015[9]). Ministerial Ordinance No. 3 493 modified the dates again for the digital switchover in some states. It was extended for five more years, to be finalised by 2023 instead of 2018.

Operators created an association in 2014 to ease the transition to digital television services. It aimed to distribute digital television converters and release the band to provide 4G communication services (i.e. to address the "digital dividend"). The 700 MHz auction proceedings established that auction winners would have to form a third-party entity, named EAD (Entidade Administradora do Processo de Redistribuição e Digitalização dos Canais de TV e RTV). EAD was intended to manage the transition and mitigate interference between incomers and the TV broadcasting services (CITEL/OEA, 2015[9]).

Coverage obligations in spectrum auctions have been a successful way to foster network deployment around different areas in Brazil. For example, the 3G spectrum auctions of 2007 and 2010 (i.e. H band)[11] included obligations to expand 3G coverage in the country. This meant coverage for municipalities with fewer than 30 000 inhabitants by December 2019.

The 2012 auction established coverage commitments with 4G networks. It started with host cities for the International Association of Federation Football (FIFA) Confederation World Cup in 2013, ending with cities with more than 30 0000 inhabitants by December 2017. This same auction also included expansion of fixed telephony and broadband services with minimum connection speeds of 1 Mbps in rural communities, where rural schools would be covered and serviced free of charge. Coverage was defined as at least 80% of the area covered within 30 km from the municipality head.

According to Anatel, the auctions' coverage obligations have been one of several factors leading to an increase of mobile broadband in the country. In 2009, the year that marks the beginning of the commitment schedule linked to auctions, 33% of municipalities did not have any mobile network present. Moreover, only 3% had presence of 3G networks. By 2016, 74% of municipalities had presence of 3G networks. By the end of 2019, 100% of Brazilian municipalities had the presence of at least one 3G network. Backhaul connectivity also increased for municipalities over 2016-19 from 57% to 70%.

Anatel coverage figures do not translate into actual geographical or population coverage (Chapter 3). The indicator simply represents a network signal or presence of backhaul in a given

municipality. Some municipalities have a large geographic span with many rural and remote areas. Furthermore, not all inhabitants of a municipality with 3G or 4G signal necessarily live within the covered area. Therefore, actual population coverage is probably lower.

Spectrum for 5G

The commercial deployment of 5G networks in Brazil is likely to begin after 2021, once the auction takes place. The 2.3 GHz, 3.5 GHz, 26 GHz (mmWave) and remainders of the 700 MHz frequency bands were chosen as the pioneer bands for 5G in Brazil. They may be auctioned at the end of 2020 or in 2021. At the moment of writing, the auction was scheduled for the end of 2020. However, in view of the economic consequences of the COVID-19 pandemic and the inherent uncertainty brought to markets, some operators are requesting to postpone the 5G auction to 2021 (Braga, 2020[10]).

The upcoming 5G auction in Brazil has been hailed as the largest ever for 5G spectrum. Industry stakeholders and countries around the world are closely observing the auction design. Due to the 2019 reform, spectrum licences can be renewed in successive terms. This raises the stakes of the auction design as it may predetermine the competition dynamics in decades to come. At the time of renewal, the regulator can impose new obligations and a new licence fee. Still, the players that gain spectrum holdings in this auction might be the ones that can compete in the market in the long term.

In February 2020, Anatel approved a proposal for the 5G auction design and submitted it to public consultation from 17 February to 17 April 2020 (Anatel, 2020[11]). This auction is unprecedented, as it will be the largest spectrum auction ever conducted by Anatel. It will be a multiband auction (i.e. 700 MHz, 2.3 GHz, 3.5 GHz and 26 GHz). In a novel approach, however, the proposal includes extending the 3.5 GHz band from 300 MHz to 400 MHz. This would lead to 100 additional MHz available to auction (Table 5.A.1, for the proposed blocks being made available).

This change comes with the caveat that part of the 3.5 GHz band in Brazil is currently occupied by satellite TV operators (television receive-only, TVRO), which may cause interference. Anatel has approved the proposal of the 5G auction, which was submitted to public consultation on 6 February 2020. The proposal states the intention of creating a similar model as the one used with the 700 MHz to solve the potential interference. Details on how the model would work in practice depend on results of the public consultation (Anatel, 2020[11]).This proposal would be in line with public policy objectives for the auction published by MCTIC (Ministerial Ordinance No. 418 of 2020).

Spectrum licence duration and licence renewals

All licensing regimes require legal certainty to foster long-term investment. Specifically, exclusive spectrum licensing arrangements require strict rules of temporary property rights and protection from interference (OECD/IDB, 2016[12]). In general, spectrum licences should be awarded for periods longer than ten years. At the very least, they should provide mobile players with sufficient certainty that their licences will be renewed. The conditions for renewal should be known well in advance and transparent.

Many countries in the OECD opt to auction the spectrum directly instead of renewing the licences, especially when other market players have interest in the band. In fact, several OECD countries only renew the licence if there is no other party interested in the spectrum (Table 5.B.1).

Most OECD member countries have spectrum licence duration periods ranging from 10 to 30 years, depending on the spectrum band; most periods lasting 15-20 years (Table 5.B.1). For OECD countries within the European Union, the European Electronic Communications Code (EECC) of December 2018 is clear. Article 49 specifies that member states should provide regulatory certainty for at least 20 years. Furthermore, spectrum licences should last at least 15 years with the possibility of an "adequate" 5-year extension (European Commission, 2018[13]).

With regards to licence renewals, Article 50 of the EECC allows regulators to decide against spectrum licence renewal in favour of organising new spectrum awards. This is particularly relevant if there is evidence of market demand from other parties than current licence holders (European Commission, 2018[13]).[12]

The 2019 reform allows spectrum licences to be renewed indefinitely in Brazil without an auction. Periodic renewals require a payment set by the regulator, which operators may exchange for investment commitments. The renewal may be subject to new obligations.

Some mechanisms introduced in the 2019 reform (e.g. spectrum trading, as well as cost-based infrastructure-sharing models) may help mitigate undesired anticompetitive side effects. However, this change towards successive renewal of licences reduces tools available to foster competition. It may also hinder the possibility of new entrants in the mobile market through spectrum auctions. Furthermore, efficient allocation of spectrum in the primary market (i.e. assignment to the player that will use it most efficiently) has implications for the secondary market as well. Inefficient assignment in the primary spectrum market means that efficiency in the secondary market cannot be guaranteed (Milgrom, 2000[14]; Hazlett, Muñoz and Avanzini, 2011[15]).[13] Given the significance of the secondary spectrum market, this is an important consideration.

Spectrum trading in the secondary market is a complementary tool to ensure efficient spectrum management, alongside with spectrum sharing. Although the 2019 reform allows spectrum trading in the Brazilian market, Anatel had not yet defined specificities on how secondary spectrum markets will be regulated. According to common practice in the OECD, spectrum trading could provide additional flexibility for some players in Brazil to optimise their mobile assets. However, spectrum transactions in the secondary market should be subject to case-by-case competitive review to ensure they do not harm competition.

Longer licensing regimes and transparent renewal processes does not mean that regulators cannot revoke licences. The United Kingdom, for example, removed predefined licence terms to increase certainty surrounding spectrum licences. However, the regulator (Ofcom) can revoke any licence for spectrum management grounds, with a five-year notice. That is, "indefinite licences" only mean that Ofcom has limited rights of revocation during an initial term of 20 years. After this period, with proper notice, Ofcom can revoke the licence. Ofcom retained the right to revoke licences due to the risk of specific market failures, including lack of competition. The regulator should be able to retain all possible tools to foster competition in mobile markets. In addition, the regulator should always safeguard the efficient use of spectrum.

It is unclear whether Anatel could revoke a spectrum licence in response to market failures based on changes to the conditions of spectrum licence renewals from Law No. 13 879 (art. 167 of Law No. 9 472 of 1997, modified by art. 2 of Law No. 13 879 of 2019). The law is vague on whether Anatel could revoke a licence to correct for market failures such as lack of competition through a new auction process. It only explicitly states that licences can be revoked in case of infringement of regulation or if the spectrum band will be allocated to another use.[14]

As one argument for successive renewal of licences in Brazil, Anatel already has experience revoking licences for spectrum management reasons. However, revoking spectrum licences, in spite of idle use, can prove more complicated than expected. For example, eight years after the 450 MHz was auctioned in Brazil, the spectrum in this band remained mostly unused in 2020. In 2014, Vivo filed an administrative appeal against Anatel. It disagreed with the decision of the Superintendence of Regulatory Compliance to deny the company the possibility of fulfilling coverage obligations stemming from the 2012 auction through the use of satellite technology.[15]

As its main rationale, Vivo argued the 450 MHz band lacked the necessary equipment ecosystem to comply with coverage obligations. Five years later, in June 2019, the Board of Commissioners agreed to allow all spectrum holders of the 450 MHz band to use satellite technology to meet coverage obligations of the 2012 auction. In exchange, spectrum holders had to increase broadband speeds. They also had to return spectrum back to Anatel if they failed to use such frequencies within the deadline set in the relevant auction notice (Anatel, 2019[16]). Vivo has challenged the decision in the courts. If it loses the appeal, the company may also lose its right to exploit the 450 MHz band (TeleGeography, 2020[17]).

Anatel should carefully monitor how this new spectrum licensing mechanism may impact market entry. Regulators use spectrum auctions as one of their main tools to foster competition in mobile markets. Some changes introduced in the law, such as spectrum trading and infrastructure sharing, may reduce some undesired effects in the competitive dynamics of the market. However, these concerns are heightened due to the juxtaposition of the successive renewal of spectrum licences and the vast amount of spectrum planned to be placed in the market with the upcoming 5G auction. These two factors may shape market dynamics for many decades to come.

Most OECD countries, while they seek to ensure regulatory certainty that strengthens incentives to invest in networks through licences lasting around 20 years, many opt to undertake auctions when other parties show interest in making use of the spectrum.

Interconnection and wholesale access regulation

The LGT and the General Interconnection Rules of 1998 (Regulamento Geral de Interconexão, RGI) set forth the interconnection framework in Brazil. The LGT established that network interconnection on a non-discriminatory basis is mandatory. In some other countries, this is known as an "open network architecture".[16] The RGI implements this frequirement. It was updated in 2005 (Resolution No. 410 of July 2005) and more recently, in 2018 through Resolution No. 693.

The original interconnection framework set different rules based upon a classification of services provided (e.g. fixed and mobile services). It also set up processes to negotiate an agreement on interconnection rates and resolve any disputes among providers. The 2018 update of the RGI framework significantly changed the rules, eliminating the classification of services. It mandates the existence of Public Reference Offers (PRO) and sets additional obligations for those providers deemed to have significant market power. The obligations are set forth in the General Competition Plan (Plano Geral de Metas de Competição, PGMC), approved by Anatel in 2012 and updated in 2018.

The PGMC contemplated the creation of a "wholesale supply supervisor entity" that would accomplish two aims. First, it would manage a wholesale database (i.e. a computer system with demand and supply information of wholesale market products). Second, it would be an intermediary in contracts between communication providers (Anatel, 2012[18]).

Among its features, the 2018 PGMC amendment defines a new market for high capacity data interconnection (*interconexão de dados de alta capacidade*). This market is subject to transparency requirements and wholesale rate control measures.

The PGMC sets criteria to evaluate which communication providers have significant market power. In addition, it issues guidelines to identify the wholesale products in relevant markets to be considered for *ex ante* regulation (i.e. asymmetric measures imposed to players with significant market power) to promote competition.

In response, Anatel has taken concrete steps to address *ex ante* regulation of wholesale access for players with significant market power. For example, such operators must publish a PRO. Anatel defines the wholesale access rates according to a cost model. These measures apply to the following wholesale services:

- leased lines
- passive infrastructure
- fixed interconnection
- mobile interconnection
- roaming
- data links over 34 Mbps
- local loop unbundling of copper lines.

With regards to local loop unbundling, the PGMC requires public regime service providers with significant market power to share their fixed access network infrastructure. Specifically, they must share infrastructure for data transmission through copper wires at transmission rates of up to 12 Mbps. Such providers with significant market power must also share their passive infrastructure at prices determined by bilateral negotiations between operators.

Operators with significant market power in data transmission links over 34 Mbps must submit PRO for leased lines, backhaul connectivity and "Class V interconnection", which includes peering, transit and direct interconnection.

Firms with significant market power in the fixed wholesale interconnection market are Oi, Claro and Vivo. In mobile interconnection markets these firms are Oi, Claro, TIM and Vivo. These markets are subject to rate regulation, as well as transparency requirements.

Following the 2018 PGMC amendment, five companies were declared to have significant power in the market for high capacity data interconnection: Oi, Vivo, Claro, Algar and Copel. This market will have transparency requirements in municipalities according to two classifications. Category 2 represents potentially competitive markets, while Category 3 represents wholesale rate regulation (i.e. a low degree of competition). Anatel defines the categories of municipalities (Nescimento, 2018[19]).

Fixed and mobile termination

The Brazilian model for telephony interconnection divides the territory into more than 4 500 local areas for fixed networks. It also creates 67 "registry areas" for mobile networks, each one defined by the first two digits of the national number. Operators are obliged to interconnect their networks in each of those areas. They create either a virtual or physical interconnection point, which acts as a boundary for delimiting interconnection obligations. As metropolitan areas expand, the number of local areas has been gradually reduced.

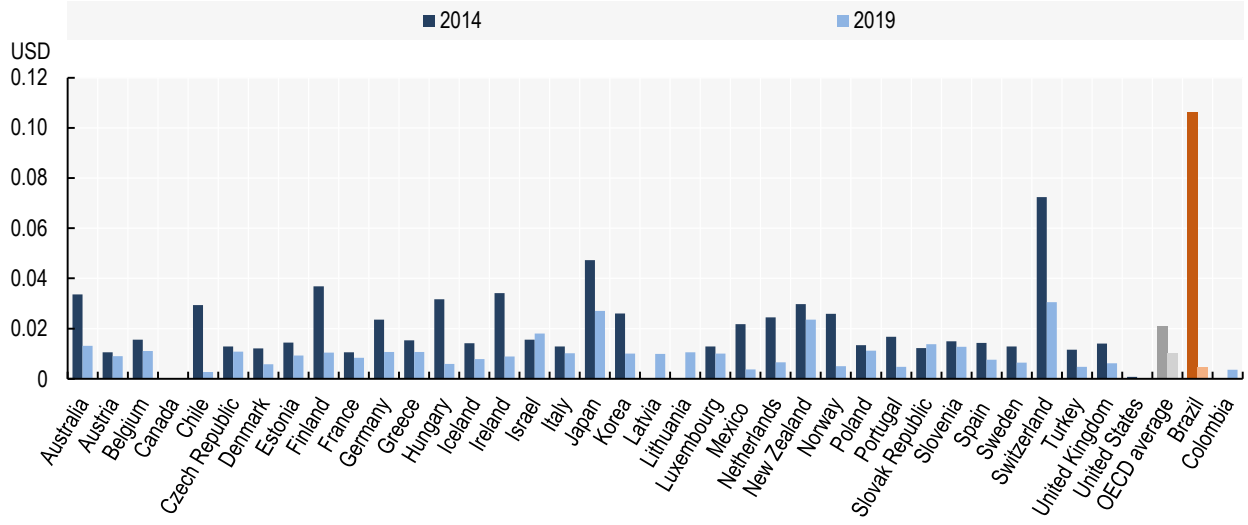
The regulatory interconnection model does not make any technological distinction on how the networks transmit voice calls, except if calls are initiated on the Internet. This means that operators are free to develop their own network architecture for voice services, based on legacy technology or Internet Protocol (IP) networks. Calls from IP networks not initiated from the Internet are regulated in the same way as legacy network calls.

Fixed and mobile termination rates in Brazil are regulated *ex ante* by Anatel and apply to all operators. Asymmetric termination rates existed until July 2018. In other words, the player with significant market power in the retail market paid a termination rate up to 20% higher than those paid by players without significant market power. However, since 2018, *ex ante* interconnection rates determined by Anatel are symmetric.

In 2014, Anatel approved a resolution establishing a glide path from 2014-19 to reduce fixed and mobile termination rates. With Resolution No. 639 of July 2014, Anatel set the maximum reference values for fixed and mobile interconnection tariffs. These included mobile termination rates and dedicated leased lines based on long-run incremental cost models. Traditionally, Anatel had used a top-down fully allocated costs model based on historical accounting costs (FAC-HCA). However, it changed to a bottom-up, long-run incremental cost (BU-LRIC) methodology to establish mobile termination rates (MTR). The MTR glide path was defined to start with the values from the FAC-HCA model and end in BU-LRIC costs.

The glide path to decrease mobile termination rates set by Anatel represents a 93% reduction between 2014 and 2020. In 2014, the average mobile termination rate was BRL 0.25 (USD 0.1064) per minute. By 2020, the average termination rate of all three regions was BRL 0.018 (USD 0.0047). The highest termination rate in region III of the country was BRL 0.027 (USD 0.0068). In this sense, Brazil transitioned from having one of the highest mobile termination rates compared to OECD countries to a country with a rate lower than the OECD average (Figure 5.1).

Figure 5.1. Mobile termination rates in Brazil compared to the OECD area, 2014 and 2019



Note: MTR set by Anatel for 2020 represents an average of three regions and amounts to 0.018 BRL. The exchange rates used are 2.35 BRL/USD in 2014 and 3.927 BRL/USD in 2019.
Sources: OECD (2020[20]), *Broadband Portal* (database), www.oecd.org/sti/broadband/oecdbroadbandportal.htm (accessed on 20 May 2020); Anatel's response to the questionnaire of the review; Possebon (2020[21]), "Anatel revê para baixo valores de interconexão para 2020-2023", https://teletime.com.br/18/02/2020/anatel-reve-para-baixo-valores-de-interconexao-para-2020-2023/?utm_source=Teletime (accessed on 16 March 2020).

National roaming and on-net roaming

National mobile roaming allows mobile users to access communication services using their own access number when outside their home network. In Brazil, this situation occurs when the user is in another operator's network. Moreover, additional charges are applied when users of the same operator are out of the geographical area where it was registered as a home network (on-net roaming).

Since the launch of mobile services in the early 1990s in Brazil, national roaming and charges for on-net roaming (i.e. for calls within the same network) in different registry areas have been common, usually at high prices. Operators were allowed to include an additional charge for calls made or received outside the user's local area, independently of whether the originating and receiving carrier was the same company.

Once Brazil introduced the mobile cellular service authorisation model for licensing in 2001, this policy began to change. Tim Brasil (TIM), which had significantly expanded its coverage through several spectrum auctions, began offering free on-net roaming to its users for intra-network communication (often known in other countries as on-net calls). Oi, the other new entrant, subsequently began following this same strategy.

Since 2012, due to pressure from consumer associations, several bills were discussed in both houses of Congress to address the issue of charges for on-net roaming. The aim was to eliminate all associated charges. In 2015, the Senate approved a law that would forbid these charges (No. 85 of 2013), but the Chamber of Deputies halted the project in 2018.

The issue has not been solved by law, but operators have gradually eliminated charges for on-net roaming in their commercial offers. Anatel also assessed the "on-net" roaming market and found no general market failure to justify symmetrical or asymmetrical regulatory measures. However, the same study found that national roaming charges (i.e. between different networks) were considered harmful for regional operators. Anatel imposed asymmetric measures for players with significant market power in the domestic roaming market, as explained below.

By the mid-2000s, the nature of competition among operators began to change. Operators began considering the size of their national footprint (i.e. network coverage) as their competitive advantage. As they did, operators with spectrum within the same service area (i.e. infrastructure-based competition) did not carry out domestic roaming agreements.[17]

The lack of national roaming agreements became an increasing concern for Anatel. Infrastructure-based competition would ultimately make areas with lower population density less attractive for investment. This, in turn, would disadvantage them in terms of network coverage. Anatel was concerned that some areas could barely support the existence of one network as a reasonable financial investment.

In 2007, the 3G spectrum auction included coverage obligations (i.e. to cover all municipalities with fewer than 30 000 inhabitants). It also included domestic roaming provisions. Specifically, as many of these localities only had one network in place, the auction winner had to offer national roaming to rival networks, However, Anatel did not set the *ex ante* wholesale roaming rate. As a result, all operators set high rates for wholesale roaming. Therefore, roaming in these new areas was insipient.

To remedy this situation, Anatel started intervening in the national wholesale roaming market in 2010. However, it was not until 2012 – with the publication of the PGMC – that all operators were declared MNOs with significant market power in the national roaming market. Under the new rules, all four operators (Vivo, Claro, Oi and TIM) were obliged to submit a PRO to Anatel for approval. Wholesale rates had to be lower than the lowest roaming retail price.

Despite the new rules, challenges regarding compliance remained. Oi and TIM were delaying national roaming services to users from rival networks in municipalities with fewer than 30 000 inhabitants. In response, Anatel fined the two companies in 2013. Oi had to pay BRL 5.6 million (USD 2.6 million), while TIM had to pay BRL 6.9 million (USD 3.2 million).[18]

With the revision of the Competition Plan in 2017, Anatel's approach to competition changed substantially. All four operators were again declared agents with significant market power in the domestic roaming market. Furthermore, the regulator set the wholesale reference rates (Table 5.3) to diminish the differences from existing reference offers. However, wholesale rates were calculated using FAC-HCA modelling. In the same way that Anatel determines *ex ante* mobile termination rates, the regulator could benefit from using LRIC to set wholesale mobile roaming rates.

Table 5.3. Reference wholesale rates for national mobile roaming in Brazil

Product	Operator with significant market power			
	Oi	Vivo	Claro	TIM
Voice (BRL/min.)	0.04	0.07	0.07	0.08
Data (BRL/MB)	0.03	0.02	0.02	0.01
SMS (BRL/SMS)	0.05	0.03	0.06	0.03

Note: MB = megabyte; SMS= short message service.
Source: Anatel's response to the questionnaire of the review.

Infrastructure sharing and co-ordination of deployment

Infrastructure sharing may help reduce network deployment costs. At present, most OECD countries encourage infrastructure sharing, provided the advantages outweigh the drawbacks. In other words, sharing must not be detrimental to competition.

The LGT in Brazil recognises the advantages of infrastructure sharing. Article 73 states that telecommunication operators have the right to access posts, poles, ducts and rights of way owned by other operators or by other public utility providers in a non-discriminatory fashion at "fair" prices and conditions.

This principle of infrastructure sharing among different utility networks in the LGT was first implemented through the Joint Resolution No. 1 of November 1999 by Anatel, the electricity sector regulator (Agência National de Energia Elétrica, Aneel) and the oil sector regulator (Agência National do Petróleo, ANP). The resolution established how operators seeking to use passive infrastructure owned by other public utility networks would work. It specified that infrastructure sharing could only be denied for security or technical reasons.

The Anatel-Aneel-ANP joint resolution of 1999 stated that the parties would negotiate rates and, in case of dispute, the relevant agencies would intervene. The dispute resolution process was defined in 2001, two years after the regulation was issued (Joint Resolution No. 2 of March 2001). It created a commission of two representatives per regulator that would convene in case of disputes. The commission addresses price disputes involving electricity distributors and telecommunication providers, particularly on the occupation of electricity poles.

In practice, communication service providers seeking to access passive infrastructure of other utility networks have faced major hurdles in Brazil. Complaints regarding the price and the number of cables per electric pole increased. In response, a joint resolution between Aneel and Anatel (No. 4 of 16 December 2014) established additional rules regulating pole attachments. Operators were encouraged to enter into price negotiations. However, in case

of dispute, Aneel and Anatel agreed to a reference price of BRL 3.19 (USD 1.36)[19] per month per attachment point in each electric pole. The agreement also set a maximum of one attachment point per pole per operator. Operators occupying more than one attachment point would need to reduce the number to one, except where it was not technically viable.

Despite rulings on specific cases from the joint commission, the issue with respect to pole attachments has not been fully resolved. Some regional providers are paying significantly more than the reference price, often due to lack of enforcement. Moreover, many electric companies around the country continue to cut off cables from telecommunication service providers without the due notification or conflict resolution process.

Presidential Decree No. 9 759 of 11 April 2019 extinguished the joint Anatel-Aneel-ANP commission, along with a series of commissions constituted under the public administration. This decree took effect from 28 June 2019, leaving unresolved cases in limbo and ongoing cases without an authority to resolve conflicts.

Until its abolishment, the joint commission had received 237 cases, and acted to resolve conflicts and avoid long legal disputes (Faria, 2020[22]). A general conflict resolution body on other passive infrastructure, such as roadside ducts, under the responsibility of different regulatory agencies and ministries has never existed in Brazil.

The deployment of communication infrastructure, especially concerning access to rights of way and the installation of cellular sites, has also been cumbersome in Brazil. Operators must comply with federal as well as local regulations, which may vary by municipality.

To alleviate the issue, the Senate started debating in 2012 how to develop a framework to standardise, simplify and streamline the process to obtaining rights of way. This initiative culminated three years later with the approval of the "Antennas law" (Lei das Antennas, Law No. 13 116 of 20 April 2015). This law mandated infrastructure sharing, when technically possible. It also obliged all public interest infrastructure projects (e.g. roads, electrical grid infrastructure) to accommodate deployment of communication infrastructure, commonly known as "dig-once" policies.

However, the concept of what constitutes "public interest infrastructure" remains to be defined; a decree to implement the Antennas law is being developed. This decree will likely define public interest infrastructure as roads, railways, public transport infrastructure, electricity transmission lines, oil and gas pipelines, and water supply and sewerage networks.

The Antennas law included two other important changes, which are described below.

In its first major change, the Antennas law established that each state must streamline procedures under a single point of contact (i.e. "one-stop shop" or "single window") and respond within 60 days. The original project contemplated an automatic tacit approval of requests in case of non-response (i.e. positive administrative silence or *afirmativa ficta*). That idea was ultimately rejected in favour of a rule that transferred the decision from the municipality to Anatel if the former would not respond within 60 days.

This proposal was vetoed by the President's Office (Casa Civil) as such clause was considered a violation of the Constitution since land-use and zoning are the prerogative of municipalities. Congress is still debating the issue. Several bills mandating a tacit approval for antennas have been included, in broad terms, in the law of Economic Freedom (Lei de Liberdade Econômica, Law No. 13 874 of 2019). The law has been implemented by Decree No. 10 178 of 2019. Although there has been progress towards streamlining rights of way, states and municipalities have been slow in adapting local rules to the Antennas law.

In its second major change, the Antennas law established there would be no cost for the rights of way in public roads, even for those operated by private concessionaires. However, the Ministry of Transport, through the National Department of Transportation Infrastructure (Departamento Nacional de Infraestrutura de Transportes) considered such rules applicable only to urban infrastructure. It thus exempted rural roads from such provisions. This issue was still under discussion among different federal agencies. Network operators are responsible for installation, maintenance and operating costs of the deployed infrastructure.

Enforceable regulation that streamlines rights of way would help foster broadband deployment in Brazil. Furthermore, co-ordination of civil works and establishment of a body to support broadband deployment should lower deployment costs. Such a body would harmonise relevant agencies and ministries at the federal level, and also bring together agencies at the state and municipal levels. Streamlining rights of way will be crucial to ensure that coverage targets of affordable and quality broadband are achieved in Brazil. This is especially important in a context of the densification of cells required by 5G. The 5G Fast Plan from the United States offers a good example of co-ordinated efforts across several government levels to reduce delays in deploying infrastructure (Box 5.2).

Box 5.2. The United States 5G Fast Plan

On January 2017, the Federal Communications Commission (FCC) in the United States established the federal Broadband Deployment Advisory Committee (BDAC) to advise it on how to accelerate deployment of high-speed broadband access. BDAC has three working groups: disaster response and recovery; increasing broadband investment in low-income communities; and broadband infrastructure deployment job skills and training opportunities.

Several initiatives resulted from BDAC's advice and broader consultations. States and municipalities, for example, adopted model codes. In addition, the FCC adopted rules to reduce federal impediments to deploying infrastructure needed for 5G and help to expand its reach.

Under the 5G Fast Plan, the FCC also reformed legacy rules to accommodate small cells and banned certain municipal roadblocks for 5G deployment. At the same time, it gave states and localities a reasonable deadline to approve or disapprove small-cell siting applications.

Source: FCC (2020[23]), "The FCC's 5G Fast Plan", https://www.fcc.gov/5G (accessed on 10 March 2020).

Concerning infrastructure sharing among communication providers, in 2001 Anatel published rules that also applied to passive infrastructure, such as rights of way, ducts, poles and towers. This replicated part of the 1999 inter-agency regulation on the subject, with some additional details (Resolution No. 274 of 5 September 2001). Following the 2001 resolution, infrastructure owners would set the conditions for the sharing agreement, provided they were non-discriminatory and that the agreement would not raise anticompetitive concerns. Furthermore, the infrastructure owner's network deployment plans would take precedence over third-party requests. All infrastructure-sharing denials had to be answered in writing with a detailed explanation; any delay would be considered anticompetitive behaviour.

The 2001 resolution set a formula to calculate the reference prices, considering fully allocated costs, including additional expenses incurred due to infrastructure sharing. The rules defined negotiation deadlines and set a dispute resolution mechanism.

In 2017, Anatel's resolution on infrastructure sharing between communication network operators was updated (Resolution No. 683 of 5 October 2017) to incorporate provisions

in the Antennas law. Since then, operators are exempt from sharing in three cases: i) if exposure to electromagnetic fields exceeds legal limits; ii) if there is potential interference between systems; or iii) if it compromises the provision of collective interest services or the safety of the infrastructure. Moreover, the 2017 resolution states that all new infrastructure has to consider future sharing with other operators.

Since these changes were introduced, all communication network operators must publish their infrastructure that is available for sharing. This includes geographic co-ordinates and criteria for pricing. It also includes the timeframe for using an electronic system managed by Anatel named Wholesale Offers Negotiating System (Sistema de Negociação de Ofertas de Atacado, SNOA).[20] The SNOA lists reference offers, approved by Anatel, of equipment that makes up the infrastructure to support broadband services. Typically, players are more likely to reach lower prices together than the ones offered in the SNOA. For that reason, they normally negotiate directly outside of the SNOA. Moreover, some players claim that information in the SNOA about available capacity may be incomplete.

Additionally, the new rules established by Anatel require players with significant market power to publish a PRO, subject to the process defined in the PGMC. Tower sharing is mandatory when base stations need to be closer than 500 metres of each other, except when they are on rooftops or deployed before 2009.

Box 5.3. Infrastructure-sharing agreements among Brazilian operators

In 2013, Anatel and the Administrative Council for Economic Defence (Conselho Administrativo de Defesa Econômica, CADE) approved a Radio Access Network (RAN) sharing agreement between TIM and Oi in the 2.5 GHz band to meet their 4G coverage commitments.

In 2014, TIM and Oi agreed to negotiate joint construction of their respective 2G and 3G networks, which was approved by Anatel. In November 2015, TIM and Telefônica Brasil (Vivo) filed an agreement to share their 3G networks under a multiple operation core network (MOCN), RAN[1] sharing agreement. This includes frequency sharing in certain cities based on their rural coverage obligations in the municipalities where only one network is in place. There is also an agreement for rural coverage between Claro and Vivo.

In March 2018, TIM and Oi entered into a new RAN sharing agreement. This changed the sharing modality set in 2012, evolving it from the multi-operator RAN to MOCN and included part of the LTE radio frequency bands (1.8 GHz bands).

In July 2019, Vivo and TIM announced they would start sharing their 2G spectrum in a single grid model. They would also share their 3G and 4G spectrum in cities with fewer than 30 000 inhabitants. Furthermore, they signalled the possibility of extending such agreements to other parts of the network. The companies involved consider these initiatives offer them operational and financial efficiencies. They will allow their customers to benefit from enhanced user experience stemming from increased traffic capacity and service coverage, with the entry of one of the operators in cities where Vivo or TIM were not present (Telefónica, 2019[24]). More such agreements are being negotiated.

By the end of 2019, in 11% of the small municipalities (where there is only one network), all four operators provided service through active infrastructure-sharing agreements.

1. Radio Access Network (RAN) sharing is a way for multiple mobile network operators to share equipment such as radio network controllers, base station equipment and antennas, and most backhaul equipment. If spectrum is shared, it is considered a multi-operator core networks (MOCN) architecture.

In 2018, Decree No. 9 612 established that backhaul infrastructure promoted by the Ministry of Science, Technology and Innovation (Ministério da Ciência, Tecnologia, Inovações e Comunicações, MCTIC) and Anatel should be available on a wholesale basis to any operator. However, the decree does not cover co-ordination of civil works (such as through dig-once policies) among federal, state and municipal levels.

In July 2019,[21] Anatel published a toolkit detailing relevant aspects of infrastructure sharing, which encouraged the use of its electronic system. However, these are only guidelines, and lack of infrastructure sharing may raise broadband deployment costs in Brazil.

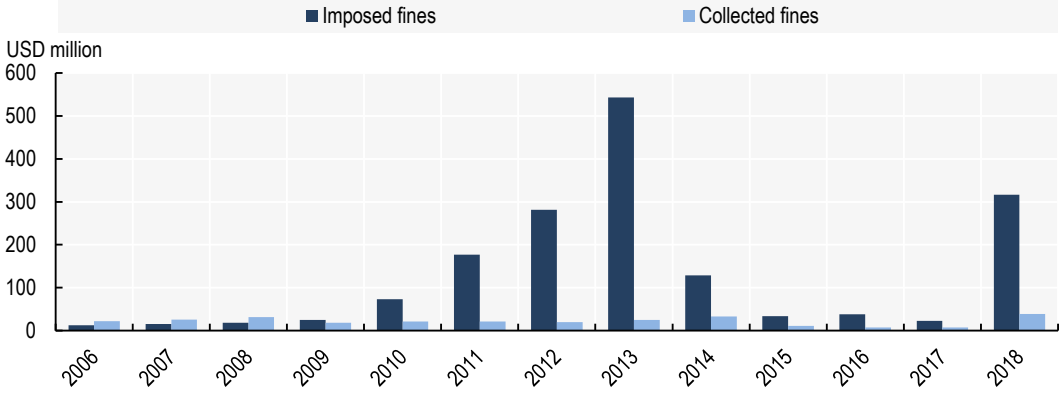
Regarding active infrastructure sharing, during 2013-19, mobile operators started experimenting with innovative approaches by implementing Radio Access Network (RAN) sharing agreements (Box 5.3).

Regulatory compliance

Anatel is required to constantly monitor the regulatory compliance of communication providers, intervening when necessary, and applying fines in certain cases. These functions were established by the LGT in 1997 and by ministerial guidelines concerning regulatory supervision (Ministério das Comunicações, 1997[25]).

The first decade of post-liberalisation saw an exponential increase in demand of telecommunication services. However, the accompanying increase of services did not always meet the quality of service (QoS) standards set by Anatel. From 2007 onwards, Anatel started to enforce its compliance standards on communication providers (Fonseca, 2015[26]). This enforcement, however, was done without a prior standardisation of QoS criteria by Anatel. As a result, the number of applied fines increased dramatically from 2008-13 (Figure 5.2). The shock of incoming fines accumulated in a short time led communication service providers to revise their internal processes related to regulatory compliance. It also resulted in many appeals of Anatel's sanctions.

Figure 5.2. Applied and collected fines by Anatel (2006-18)



Source: Anatel (2019[27]), *Relatório Anual 2018*, https://www.anatel.gov.br/institucional/noticias-destaque/2343-relatorio-anual-2018-ja-esta-disponivel.

Since 1997, Anatel has imposed 63 000 fines, for a total of over USD 1.9 billion (BRL 6.9 billion). However, by 2018, it had only collected USD 225.2 million (BRL 827.7 million). This corresponds to 66% of total processes, but to only 12% of the total value of fines (Table 5.4).

Table 5.4. Total fines imposed by Anatel (1997-2018)

Fines	Value (USD million)	Share of total value (%)	Number of processes	Share of total processes (%)
Collected	225.2	12	41 733	66
Partially collected	1.6	0.09	2329	4
Not collected	1 664	88	18 942	30
Judicially suspended	592.7	31	731	1
Staggered payment	4.4	0.002	884	1
Active debt and/or CADIN[1]	1 066.9	56	17 327	28
Total	1 890.8	100	63 004	100

1. Sum of all the fines in the process of notification of non-payment by debtors or already registered in the Information Registry of Unpaid Credits of the Federal Public Sector (Cadastro Informativo de Créditos não Quitados do Setor Público Federal, CADIN) and/or the Active Debt of the Union (Dívida Ativa da União).
Note: This table uses the exchange rate of 3.65 BRL/USD for the year 2018 from OECD.stat (https://stats.oecd.org/).
Source: Anatel (2019[27]), *Relatório Anual 2018*, https://www.anatel.gov.br/institucional/noticias-destaque/2343-relatorio-anual-2018-ja-esta-disponivel.

The legal challenges and costs involved in the collection of fines from the peak period of fines in Anatel led to study groups and public consultations aimed at standardising regulatory compliance. In 2012, Anatel adopted new rules concerning regulatory monitoring. These included the Sanction Guidelines (Regulamento de Aplicação de Sanções, Resolution No. 589 of May 2012) and the Guidelines of Regulatory Monitoring (Regulamento de Fiscalização, Resolution No. 596 of August 2012). Moreover, Anatel began publishing an Annual Monitoring Plan (Plano Anual de Fiscalização) and an Operational Monitoring Plan (Plano Operacional de Fiscalização).

To foster responsive regulation, promote public policy objectives and reduce the costs involved with collecting fines, Anatel has been implementing alternative solutions for regulatory compliance. For example, Anatel has used the legal instrument of operators' Conduct Adjustment Agreements (Termos de Compromisso de Ajustamento de Conduta, TAC).

Through this approach, an operator non-compliant with regulatory obligations can invest in broadband networks rather than pay fines. In practice, TAC agreements have faced difficulties with TCU audits (Box 5.4. and Chapter 4). In particular, it is challenging for Anatel to observe the counterfactual investment level in broadband networks by operators in the absence of those commitments. This is especially true given that operators choose the localities for investment in the TACs. These agreements raise another relevant issue. The investment in networks negotiated via TACs should comprise open access obligations, which has not been the case at present, in order to foster infrastructure sharing and access by other service providers.

In TACs, arrangements are negotiated *after* communication service providers have already been fined. However, Anatel has also been experimenting with sanctioning providers *before* fines are decided. Specifically, non-monetary sanctions would replace eventual monetary sanctions through "future obligations" (obrigação de fazer).

In February 2019, Nextel was the first service provider to be sanctioned with this type of non-monetary measure. The sanction involved providing coverage to a number of unserved municipalities within 12 months (Possebon, 2019[28]). In this model, if the operator chooses not to accept Anatel's – non-negotiable – terms, a monetary fine would be imposed. Anatel expects this instrument will accelerate the resolution of sanctioning processes.[22]

Box 5.4. Conduct adjustment agreement (TAC)

Anatel first negotiated a Conduct Adjustment Agreement (Termos de Compromisso de Ajustamento de Conduta, TAC) with Vivo in 2013. It enables an exchange of BRL 3.3 billion (USD 1.53 billion)[1] in fines for investments that the operator would, in theory, never have made. It was not well received by other operators and many authorities, delaying its approval until 2017.

At the time, TCU reviewed the negotiation and approved it with certain adjustments. It gave general guidelines for Anatel to follow in future TAC negotiations. These included setting intermediate values for the indicators to be followed and possible sanctions for non-compliance, as well as restrictions on the values of such sanctions.

Eventually, after Anatel complied with TCU's requests, the regulator could not reach an agreement with Telefonica and both desisted in 2018 (Chapter 3). Around the same period, Claro and Oi also entered into negotiations with Anatel to exchange fines for investment commitments, but the regulator did not approve them.

Anatel is persuaded that TACs could help expand broadband infrastructure in underserved areas. In August 2019, Anatel approved a TAC with TIM and Algar for BRL 627 million (USD 159.65 million) and BRL 86.7 million (USD 22 million), respectively.[2] The agreement with TIM foresees the deployment of 4G in 369 municipalities that only have 2G or 3G, and 4G where no other MNO is present.

In March 2020, TCU approved Anatel's TAC with TIM, finding no irregularity in the agreement. Nonetheless, when approving this TAC, TCU included recommendations to both MCTIC and Anatel concerning future TACs (Gondim, 2020[29]):

- MCTIC should define coverage targets to be included in future TACs.
- MCTIC should be able to guide establishment of targets when they are considered to help implement communication public policies.
- Anatel should not include ongoing sanctioning process that have not been fully evaluated.
- Anatel should seek to address inequality between regions when choosing localities and projects that will be part of the TACs.
- Anatel should assess whether the benchmark of 80% of coverage set as acceptable within TIM's TAC is indeed sufficient, and propose a solution for reaching the remaining 20%.

These guidelines were expected to be implemented before the approval of a new TAC with Vivo by the TCU, requested in 2019.

1. Using the average yearly BRL/USD exchange rate of 2.156089 in 2013 from OECD.stat. (https://stats.oecd.org/).
2. Using the exchange rate of 3.93 BRL/USD for the year 2019 from OECD.stat (https://stats.oecd.org/).

Data collection and reporting

Successful implementation of policy and regulatory measures requires data collection. Such data inform the policy-making process and help assess the impact of public projects and regulatory remedies. Among OECD countries, indicators are essential for "evidence-based" policy making.

Various entities in Brazil collect and analyse data to inform public policy. The Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatistica) collects general census data on household usage of information and communication technologies (ICTs) (IBGE, 2020[30]). Anatel collects data regarding access to regulated services, while MCTIC has indicators concerning public policies. CETIC.br, a centre for statistics within the multi-stakeholder organisation CGI.br (Box 5.5), collects data regarding use of Internet-related services and applications in various sectors.

Box 5.5. CETIC.br

The Regional Centre for Studies for the Development of the Information Society (CETIC.br), created in 2005, is a department of the Brazilian Network Information Centre (NIC.br). CETIC.br monitors the access, use and appropriation of information and communication technologies (ICTs) in Brazil. The centre produces indicators on the access, use and appropriation of ICTs in various segments of society, such as households, enterprises, educational, health and cultural organisations. In 2012, CETIC.br became a UNESCO Category II Centre, the first centre related to the development of information and knowledge societies.

Source: CGI.br (2020[31]), "Sobre o CETIC.br", https://cetic.br/pagina/saiba-mais-sobre-o-cetic/92.

Anatel released an ambitious new data portal, the Painéis de Dados, in 2019. This portal compiles and provides public access to a wide set of data on the communication sector. This includes indicators on access, infrastructure coverage and technology, investment, numbering, the allocation of licences, spectrum, competition, product certification, QoS and consumer issues. The portal will also include metrics on regulation, providing a quantitative analysis of the number of regulations in place and those revoked (Box 5.6).

Box 5.6. A single data portal for communication services by Anatel

In 2013, Anatel published for the first time open data on its website and on the government mapping website (Infraestrutura Nacional de Dados Espaciais) (http://inde.gov.br).

In 2016, Anatel acquired self-service business intelligence tools and developed its first Open Data Plan, publishing sectoral data on the open data governmental portal (http://dados.gov.br).

In 2018, Anatel started implementing the second version of its Open Data Plan. This included fostering capacity building, creating a data dictionary and developing data dashboards with the main information and indicators of the telecommunication sector in Brazil.

In 2019, Anatel published its first dashboards; more are expected. The main dashboards concern access, product certification, consumers, spectrum, concessions and licensing, quality and regulation (Anatel, 2020[32]). In each dashboard, users can access the original data, broken down by service and region, and use the system to build their own analysis and figures. More than 30 data dashboards were developed for Anatel's internal use related to data of regulated entities.

Anatel's single data portal is based on open source software, which it hopes other Brazilian agencies and government institutions will also use to develop their own solutions.

Anatel has also been making efforts to improve data collection on backhaul and backbone availability, including from small ISPs, to allow for the mapping of communication infrastructure (Anatel, 2019[33]). Additionally, MCTIC's Department of Digital Inclusion commissioned a detailed study and mapping of broadband networks in Brazil. It assigned the study to the Centre for Strategic Management and Studies (Centro de Gestão e Estudos Estratégicos), a non-governmental organisation with a special statute that enables it to provide public services to MCTIC.

By June 2020, the project was set to deliver an interactive and georeferenced map with granular data (using the same census-level block grid) of transport and "last mile" networks in Brazil. Nevertheless, at the moment of writing, there was no detailed information on fixed broadband networks coverage in Brazil.

Anatel has conducted an annual Satisfaction and Perceived Quality Survey on the major telecommunications providers since 2015.[23] The survey is a key instrument for Anatel to assess QoS. It includes questions on general satisfaction, quality of phone calls, broadband speed, repair, installation and customer service. Its findings have been used as evidence for regulation and are instrumental in shaping Anatel consumer policy. The results of the survey are also made available in Anatel's data portal.

Expanding broadband and promoting its use in Brazil

Extending broadband access to rural and remote areas to achieve digital inclusion is a primary objective of public policy in Brazil. It has been challenging to foster broadband deployment and increase its adoption and use in Brazil for several reasons. Brazil has a large territory, a sizeable population in rural and remote areas and important socio-economic differences both at regional and local levels. Moreover, Brazil, like other emerging economies, does not have extensive fixed broadband networks in contrast to other OECD countries.

National broadband strategies

In 2009, the Brazilian government started developing its first National Broadband Plan (Programa Nacional de Banda Larga, PNBL), which would be published a year later. It prepared a working document that assessed challenges, established a shared vision and set out an action plan with an initial cost assessment (Ministério das Comunicações, 2009[34]). In 2010, 73% of households in Brazil did not have access to the Internet (CGI.br, 2010[35]).

In 2010, the government published the National Broadband Plan, which was approved by Presidential Decree No. 7 175 of 12 May 2010. The plan set the target of providing 35 million households with broadband access by the end of 2014. It also set the conditions so that Telebrás, the previous holder of the privatised telecommunication companies, could help implement part of the plan.

The 2010 National Broadband Plan included initiatives in a number of areas, such as network deployment and pro-competitive regulatory measures. It had three main goals: increasing broadband affordability, increasing coverage and access to broadband, and increasing broadband connection speeds.

It sought to achieve these goals through initiatives along four dimensions: regulation, financial and tax incentives; industrial policy promoting the development of national technology; and infrastructure. In the area of infrastructure, the government decided to set up a new national fibre backbone based on available dark fibre already deployed by government-owned companies. This new backbone aimed to provide additional wholesale transport capacity nationwide. The plan also included several regulatory measures designed to stimulate competition, including a much wider deployment of Internet exchange points (Cavalcanti, 2011[36]).

The 2010 National Broadband Plan considered it strategic for Brazil to own and operate a satellite. This would support the provision of broadband, as well as development of the Geostationary Defence and Strategic Communication Satellite (Satélite Geoestacionário de Defesa e Comunicações Estratégicas, SGDC).

The SGDC satellite was launched in 2017, but has encountered several difficulties: a failed bid to commercialise its capacity, problems in finding a partner and a series of legal issues. These setbacks delayed its use until late 2018. The SGDC satellite is being used to expand broadband in remote areas, mostly serving schools and health centres. Viasat and Telebrás have partnered to ensure the deployment of fixed and mobile (terrestrial) broadband infrastructure through satellite technology. Telebrás also plans to deploy community Wi-Fi antennas, which could provide a low-cost means to provide Internet access (Boxes 5.2 and 5.3).

Law No. 12 715 of 2012 established a special taxation regime for the deployment of broadband (Regime Especial de Tributação do Programa Nacional de Banda Larga para Implantação de Redes de Telecomunicações, REPNBL-Redes) (Brazil, 2012[37]), later regulated by the 2013 Decree No. 7 921 (Anatel, 2013[38]) (see Chapter 7).

In 2016, Brazil launched the second phase of the National Broadband Plan (Programa Brasil Inteligente). It aimed primarily to cover 70% of municipalities with fibre backhaul infrastructure, up from 52% at the time. This second phase contemplated that 60% of the beneficiary municipalities had to be in the North and Northeast of Brazil. Nonetheless, due to the lack of budget and to political changes in Brazil in 2016, the plan did not become effective and was revoked in 2018.

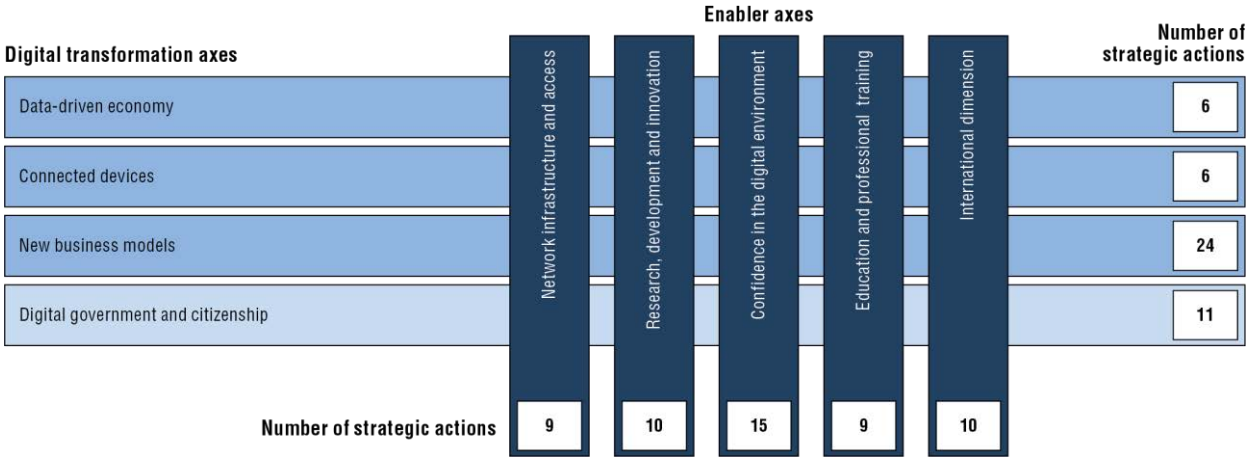
In 2017, the Federal Court of Accounts (Tribunal de Contas da União, TCU) evaluated Brazil's broadband strategies (Document TC 032.508/2017-4 TCU and Agreement 2.053/2018) (TCU, 2018[39]). TCU identified the main pending challenges that needed to be tackled simultaneously to maximise widespread broadband adoption: i) lack of infrastructure; ii) insufficient education; iii) low and unequal income; iv) insufficient relevant content; and v) behavioural barriers.

These challenges were reiterated in document that TCU provided to Congress to inform the federal budget for 2019 (Agreement No. 2 608 of 2018) (TCU, 2018[40]). It noted a lack of adequate diagnosis of policy issues to tackle the digital divide, deficient management and co-ordination between the parties involved, and failures in evaluation of programmes. TCU also mentions lack of co-ordination between different branches of the federal government and states creates redundancies and wastes public resources. This, in turn, hampers digital inclusion. Public telecommunication access points, for example, have been installed in the same municipality by the federal government and by the city.

In March 2018, a new phase of broadband policies in Brazil started with the Brazilian Digital Transformation Strategy entitled E-Digital 2018-20 (Presidential Decree No. 9 319). The strategy aims to co-ordinate different governmental initiatives related to digital issues within a coherent framework. In so doing, it wants to harness the potential of digital technologies for economic, sustainable and inclusive growth through increased innovation, competitiveness, productivity and employment (Brazil, 2018[41]). Infrastructure and access to ICT is one of five enabling axes of the Digital Transformation Strategy (Figure 5.3).

The infrastructure axes of the Digital Transformation Strategy have three main objectives: enable access to backbone connectivity in all municipalities; expand fixed and mobile broadband access in rural and urban areas; and foster initiatives for digital inclusion.

Figure 5.3. Axes of the Brazilian Digital Transformation Strategy



Source: MCTIC (2018[42]), *Brazilian Digital Transformation Strategy: E-Digital*, http://www.mctic.gov.br/mctic/export/sites/institucional/sessaoPublica/arquivos/digitalstrategy.pdf.

The background document of the Brazilian Digital Transformation Strategy sets the stage for action. It provides a diagnosis from relevant studies and available data from Anatel and CGI.br (Chapter 3). It identifies the most important challenges to expand broadband in Brazil, particularly in rural areas. Finally, it provides an overview of ongoing and potential solutions for bridging the connectivity gap in the country (MCTIC, 2018[42]). The following strategic actions for infrastructure were identified:

- Connect 22 000 public schools with high-speed broadband (either with terrestrial or satellite technologies).
- Enable the use of funds for broadband networks (e.g. financial reserves associated with fees or sanctions).
- Set priorities to define new investment obligations for mobile broadband, to be included in spectrum auctions.
- Speed up 4G deployment by accelerating the DTT transition to free-up the 700 MHz band.
- Encourage states to implement tax relief policies focusing on mobile broadband networks.
- Adapt FUST legislation to enable its use for broadband.
- Strengthen participation in R&D and standardisation.
- Promote long-term investments and co-ordinate initiatives on infrastructure deployment, data processing and storage to integrate research, education, health and digital security.

The Brazilian Digital Transformation Strategy was an important step towards establishing a coherent governance model for digital initiatives. It will be analysed in depth by the *OECD Reviews of Digital Transformation: Going Digital in Brazil* (OECD, forthcoming[43]).

For its part, the present review briefly notes several challenges with the strategy. First, with the exception of the number of public schools to be connected, broadband targets are not measurable and rely on aggregate global comparison indexes. Second, while the E-Digital

decree and background document both mention "high-speed broadband", they do not indicate a minimum speed for it. Most OECD countries base their concrete broadband targets with an end date. They also measure in terms of percentage of population, households or business connected with 30 Mbps, 50 Mbps, 100 Mbps or even 1 Gbps (OECD, 2018[44]). Third, the strategy does not organise the patchwork of connectivity initiatives in Brazil. Rather, it simply offers a general vision and list of potential actions for infrastructure for the digital transformation.

Together with the Brazilian Digital Transformation Strategy, the Presidential Decree of 17 December 2018 (Decree No. 9 612) set the tone for the most recent phase of broadband policy in Brazil. The 2018 decree revoked Decree No. 4 733 of 2003, changing the focus of public policy from fixed telephony to broadband. It concluded the two previous phases of the National Broadband Plan. It emphasised the need to deploy both backbone and backhaul networks in underserved areas, as well as mobile communication infrastructure. It also mandated that Anatel should prioritise coverage obligations when setting investment commitments from operators, especially through TAC or spectrum auctions.

In this sense, broadband deployment obligations determined by Anatel must be directed towards three areas. These comprise expanding backhaul and backbone connectivity, increasing mobile network coverage and expanding fixed broadband networks. It also established that new backhaul infrastructure deployed should be made available in an open wholesale access basis to any operator.

In 2019, MCTIC elaborated the Connected Brazil Programme (Programa Brasil Conectado). It had four main axes to bring together ongoing and future initiatives:

- **Connectivity**. Foster connectivity through the following initiatives: i) North and Northeast Connected; ii) Electronic Government Citizen Services (GESAC) and Internet for All; iii) National Education and Research Network (RNP); iv) the Geostationary Satellite Constellation for Defence and Strategic Communications Satellite (SGDC); and v) 5G auctions.
- **Technology and inclusion**. Promote technological diffusion and digital inclusion through the following initiatives: i) Smart cities; ii) Computers for inclusion; iii) Artificial intelligence; and iv) the Internet of Things (IoT).
- **Institutional reforms**. Reform the institutional framework through: i) Brazil's engagement in OECD peer reviews; ii) updating the LGT; iii) reform of fiscal and sectoral funds (FUST and FUNTTEL); and iv) regulation on infrastructure.
- **Sectoral partnerships**. Prioritise co-operation among different ministries and stakeholders in education, health, agriculture and national defence.

The present review focuses on initiatives related to connectivity and institutional reform related to telecommunication and broadcasting. Technology and inclusion, as well as sectoral partnership initiatives, except for issues related to connectivity of the IoT, are addressed in the *OECD Reviews of Digital Transformation: Going Digital in Brazil* (OECD, forthcoming[43]).

For the connectivity axis, many initiatives are a continuation of previously established governmental actions. While the Connected Brazil Programme provides a better overview of ongoing initiatives, measurable targets and detailed information on progress continue to be unavailable for most of them. The main initiatives for connectivity are analysed below.

Electronic Government Citizen Services and Internet for All

Since 2002, the Electronic Government Citizen Services programme (Governo Electronico – Serviço de Atendimento ao Cidadão, GESAC) has promoted universal Internet access, targeting primarily the most vulnerable groups (Ministerial Ordinance, Ministry of Communications, No. 256 of 2002, amended by Order No. 2 662 of 2014). MCTIC leads the programme in partnership with other ministries, particularly the Ministry of Education. GESAC is serviced by Telebrás (Box 5.7), through SGDC, the Brazilian geostationary satellite for civil and military use launched in 2017 (Box 5.8).

Box 5.7. Telebrás

Telebrás is a partially State-owned company founded in 1972. Before the liberalisation process, it controlled the 27 regional operators and the long-distance operator (Embratel), providing fixed and mobile telephony services in Brazil. In 1998, during the privatisation, Telebrás was broken into 12 separate different companies (i.e. *Baby Bras* firms) that were auctioned to private agents.[1]

In 2010, Telebrás was re-established as a State-owned company linked to the Ministry of Communications (now MCTIC). It primarily managed the National Broadband Plan (Programa Nacional de Banda Larga, PNLB), which includes provision of infrastructure and the support of networks needed for telecommunication services. It also aims to offer broadband services in areas with low coverage at affordable prices.[2]

As Telebrás implemented the National Broadband Plan, it managed the expansion of public network fibre backhaul and backbone connectivity. It also holds exclusive rights over the SGDC satellite to provide connectivity to isolated populations, health and education centres and governmental institutions.

The role of Telebrás has changed since its reactivation in 2010. This role has not always been in line with the company's main purpose to promote the universalisation of Internet services. For instance, during the FIFA World Cup Championship in 2014, Telebrás provided all official broadband services and image transmission of the games. In 2013, Telebrás was mandated to provide all data communications and transmissions for all federal public institutions;[3] however, this policy goal was removed in 2018.[4] Discussions are ongoing regarding the privatisation of Telebrás (Sabina, 2019[45]).

1. For more details, see OECD (2008[46]), *OECD Reviews of Regulatory Reform – Strengthening Governance for Growth in Brazil*, https://doi.org/10.1787/9789264042940-en.
2. Article 4 of Decree No. 7 175 of 2010.
3. Decree No. 8 135 of 2013.
4. Decree No. 9 612 of 2018.

GESAC offers free-of-charge broadband services through satellite and terrestrial broadband connections. These connections are available in schools, public health clinics, indigenous villages, international border stations and "quilombola" communities (i.e. traditional African-Brazilian communities), as well as telecentres. Participants in the GESAC programme are institutions selected by the public administration (either local or national) that establish a co-operation agreement with MCTIC.

The original programme foresaw the installation of 3 500 access points in 2 700 municipalities. The federal government pays for the broadband connections, which are supplied by private companies. These companies benefit from an exemption of state-level taxes imposed on

telecommunication services (ICMS) through an agreement with the Brazilian National Council of Finance Policy (Conselho Nacional de Política Fazendária, CONFAZ). CONFAZ is the government agency composed of all states to promote unity among them regarding the ICMS tax (Chapter 7).

The GESAC programme was broadened in 2017 (Ministerial Ordinance No. 7 154 of 2017) under the name Internet for All (*Internet para Todos*). This programme intends to include broadband access at lower prices for people living in communities with inadequate or no access to broadband. It primarily targets most vulnerable communities in rural and remote areas, as well as in urban peripheries.[24]

The Internet for All programme foresees tax incentives for ISPs (i.e. exemption of the ICMS tax). However, the tax exemption arrangement with CONFAZ would only cover, in principle, satellite connections. Therefore, MCTIC is revising the GESAC/Internet for All programme.

The proposed solution is to separate once again the GESAC programme from the Internet for All programme. The government would pay connections for GESAC, while Internet for All would incentivise ISPs to provide Internet access in remote locations at affordable prices. Internet for All will restart once MCTIC finishes negotiating a separate ICMS exemption for the programme with CONFAZ.

Internet for All, which operates through partnerships between MCTIC and municipalities, is implemented by operators accredited by the ministry. To participate in the programme, municipalities must sign an agreement with MCTIC. This agreement defines the municipality's obligations, such as the guarantee to provide the basic infrastructure for network deployment.

The municipalities indicate the places to be covered by the programme. Residents at these municipalities can contract Internet connection services offered by operators directly, without contact with the ministry (although companies have to be accredited).

Internet for All does not offer free services for individuals, but companies have to provide services "at a fair and reasonable price".[25] Operators have the freedom to define such prices, and municipalities may supervise service provision.

The GESAC programme is in its fifth edition (i.e. Brazilian law allows service contracts for a maximum of five years). By mid-2018, it had 4 500 access points and was served by Oi, Embratel and Vivo. In 2018, the contract was transferred to Telebrás so it could serve schools, health centres and border points through its satellite.

By 14 February 2020, GESAC provided broadband services to approximately 11 218 institutions and public places. Most were served by a 10 Mbps connection with no data cap. Of all serviced institutions, 80% were rural public schools, covering about 3 million students.

According to MCTIC, GESAC aimed to cover, from 2019 onwards, 5 000 additional public spaces, with more than half belonging to the Ministry of Education. The GESAC connections hired by the Ministry of Education are part of the Connected Education programme (Programa de Innovação Educação Conectada).

The Connected Education programme was established in 2017 (Decree No. 9 165). It aims to make high-speed Internet access available to all through subsidies and to promote use of digital technologies in basic education. The Ministry of Education continues to lead the programme with support of MCTIC, Anatel and the Brazilian Development Bank. Several education institutions are also involved. These include the Innovation Centre for Brazilian Education, the National Board of Secretaries of Education and the National Union of Municipal Education Leaders.

The programme aims at creating an environment in schools to receive an Internet connection (partially supported by GESAC), open new avenues of educational content and allow elementary school students contact with new technologies. It is being rolled out in three phases. Phase 1 (2017-18) developed the plan and reached 44.6% of students; phase 2 (2019-21) aims at reaching 85% of the student base and to start the programme evaluation; phase 3 (2022-24) aims to reach 100% of students.

GESAC also provides connectivity to telecentres. These are public spaces with computers, IT equipment and broadband connections, which promote digital and social inclusion among the communities they serve. These telecentres primarily foster social and economic development to reduce the digital divide and create opportunities for the population.[26]

Proposal of a Geostationary Satellite Constellation for Defence and Strategic Communication

The SGDC satellite was conceived in 2012 and launched in 2017. After several judicial hurdles, the SGDC became operational in 2019, particularly to support GESAC (Box 5.8).

Box 5.8. The Geostationary Satellite for Defence and Strategic Communication (SGDC) launched in 2017

During the privatisation of Telebrás in 1998, the government divested all its shares in satellite communication. At this time, X-band communications, reserved for the military, was transferred to Embratel Star One. Several ministries joined forces to regain control of these communication services and support the 2010 National Broadband Plan to provide Internet services to remote areas. The Ministry of Communications, the Ministry of Defence and the Ministry of Science, Technology and Innovation developed a joint plan for a Brazilian, State-owned satellite.

The Geostationary Satellite for Defence and Strategic Communication (Satélite Geostacionário de Defesa e Comunicações Estratégicas, SGDC) was created through Decree No. 7 769 of 28 June 2012. Telebrás would work with a steering committee to plan and manage the budget. The committee was composed of five stakeholders to plan and manage the budget: Ministry of Defence, Ministry of Communications, Telebrás, the Brazilian Space Agency and National Institute of Spatial Research. The steering committee would be formed by a member of each of the parties involved in developing the plan.

The first step towards implementation of the SGDC was the creation of Visiona Tecnologia Espacial, in July 2012, as a public-private partnership between Embraer and Telebrás. In 2013, Visiona signed a BRL 1.3 billion (USD 600 million)[1] contract with Telebrás. The original launch date was set for 2016. Thales Alenia Space was selected as the satellite manufacturer, and Ariane Space would conduct the launch.

The contract with these providers, signed by Visiona, included technology transfer clauses that would be co-ordinated by the Brazilian Space Agency. After two delays, the SGDC was launched in May 2017, becoming fully operational two months later. The complete operations centre, together with five gateways, a tier four data centre, and eight carrier monitoring system stations, commenced operations in December 2018. The investment in the project surpassed the budget of BRL 2.7 billion (USD 697 million).[2] The satellite has 50 kiloampere (kA) transponders with a capacity of 58 Gbps and 7 X-band transponders for military usage. The Ka-Band would be used to meet part of the National Broadband Plan goals.

After several delays, the two blocks were put up for auction in October 2017, both including National Broadband Plan obligations. The winner of the largest block would also be required to furnish all equipment for Telebrás to exploit its capacity. However, no bids were received. As equipment for Telebrás' own use was subject to having a winning bidder, the company could not start the widespread deployment of its terrestrial network. It took Telebrás another four months to find a new partner.

In February 2018, it entered into a revenue-sharing agreement with Viasat, a United States-based company. Viasat would help meet the National Broadband Plan goals. At the same time, it would explore satellite services for enterprise and commercial aviation markets, as well as satellite-enabled Wi-Fi hotspots and residential services (Viasat, 2018[47]).

Nevertheless, the agreement was temporarily suspended in March 2018 by the judicial power in response to a demand from Via Direta, a Brazilian company. Via Direta argued it had been in conversation with Telebrás to operate one of the blocks from the void tender. Meanwhile, the Association of Fixed and Mobile Telecommunications Companies (Sinditelebrasil) and the Association of Satellite Communications Operators filed their own court complaints. The first argued that Telebrás had been directly assigned the GESAC contract without a bidding process. The second argued the agreement between Telebrás and Viasat was substantially different than the conditions stipulated on the original tender.

In July 2018, the courts authorised the contract between Telebrás and Viasat. In the meantime, in response to a Sinditelebrasil request, TCU evaluated the legality of the contracts between Telebrás and MCTIC regarding the GESAC programme, and between Telebrás and Viasat. While TCU approved both acts, it requested Telebrás to renegotiate several clauses in the contract that it deemed unfavourable against Telebrás. The revised conditions were approved in May 2019.

1. Using the exchange rate of 2.160 BRL/USD for the year 2013 from OECD.stat (https://stats.oecd.org/).
2. Using the end of year (2018) exchange rate of 3.8742 BRL/USD from OECD.stat (https://stats.oecd.org/).

In addition to the SGDC, MCTIC proposed a new project in 2019 called the "Brazilian Geostationary Satellite Constellation for Defence and Strategic Communication" (Sistema de Satélites Geoestacionários de Defesa e Comunicações Estratégicas). It proposed launching a second satellite, SGDC-2 to have a Brazilian satellite constellation.

Telebrás entered into an agreement with Visiona, its joint venture with Embraer, to select providers for the construction and launching of the satellite. Nevertheless, TCU found this agreement might not fully comply with legislation.[27] Therefore, MCTIC and Telebrás are redefining the strategy. Several issues under discussion may affect implementation. These include the cost-effectiveness of producing and maintaining national satellites with public funding to expand affordable broadband in underserved communities compared to using other technologies.

National Education and Research Network

The National Education and Research Network (Rede Nacional de Ensino e Pesquisa, RNP) is Brazil's academic broadband network (backbone). Created in 1989, it was deployed in 1991 and continues to be expanded each year. The RNP, through the Ipê Network (Rede Ipê), has 27 points of presence (i.e. one in each of the 26 Brazilian states and in the Federal District). It connects 15 state networks and over 1 522 education, research and health institutions in more than 40 cities, benefiting more than 3.5 million users (RNP, 2020[48]).

Moreover, the Telemedicine University Network (Rede Universitária de Telemedicina) connects 138 universities, allowing for the exchange of technical information on healthcare and science. The RNP is connected to RedCLARA, the network that links academic networks in Latin America. It is also connected to the AmLight Exp (Americas Lightpaths Express and Protect) network, which links science and engineering research and education communities in the United States and the Western hemisphere.

North and Northeast Connected Initiatives

MCTIC is developing two initiatives to connect the North and Northeast regions of Brazil, the most underserved regions in the country. Through the Connected Science initiative (Ciência Conectada – Ciência Forte), officially announced in August 2019, MCTIC plans to expand the RNP fibre backhaul and backbone connectivity. The first phase will cover the North and Northeast regions aiming to increase backhaul connectivity in 77 localities, 16 cities and 64 research institutions. The plan is to deploy 16 metropolitan networks by 2021, connecting 1 317 education centres. The RNP would manage and maintain the fibre.

For the Northeast region, Connected Science will provide broadband access to 16 localities (in the Paraíba, Pernambuco, Rio Grande do Norte, Bahia and Ceará states). This will connect 52 research institutions and 824 urban schools through agreements with municipal governments and local ISPs.

For the Northern region of Brazil, MCTIC is planning to expand the Connected Amazon project (Projeto Amazônia Conectada). This was launched in 2015 as a joint initiative between the Ministry of Defence, and the Ministry of Communications and Ministry of Science, Technology and Innovation before they merged into MCTIC in 2016. It aims to expand communications infrastructure to help meet the National Broadband Plan.

By 2017, 849 km of sub-fluvial optical backbone cables had been deployed along the Solimões River from Manaus to Tefé (i.e. 690 km). The Negro River from Manaus to Novo Airão (i.e. 127 km) was joined by another 24 km of terrestrial links. Only 1 of the 12 pairs of fibre has been lit. The deployment and maintenance of this kind of infrastructure has been challenging. A ring architecture does not provide redundancy of the cable. Therefore, cable cuts, which have happened in 12 points so far, have been hard to repair.

In 2019, the Connected Amazon project was reconfigured as the Integrated and Sustainable Amazon Programme (Projeto Amazônia Integrada e Sustentável). The new objective is to deploy around 10 000 km of sub-fluvial fibre backbone from Macapá to Tabatinga. The project will also branch out to Porto Velho, Boa Vista and Rio Branco, repairing and linking with the previously deployed fibre (from Manaus to Tefé). The project aims to also link Peru and French Guiana. RNP will be involved in the management of the cable, but eventually a private investor, through a public-private partnership, will assume all responsibilities for operating the sub-fluvial infrastructure.

Regulatory measures to promote broadband expansion

In addition to the ministerial initiatives, other important measures to foster broadband access in Brazil were established through Anatel regulations (Chapter 2). In 2008, Anatel suggested an amendment to the Universal Service Plan goals in fixed telephony (Amendment to PGMU goals, Decree No. 6 242 of 4 April 2008). In response, the regulator highlighted that a national backbone, able to support high volumes of data traffic, was a key condition to the further adoption of broadband in Brazil.

In 2018, the fourth version of the Universal Service Plan was published (PGMU 4, Decree No. 9 619 of 20 December 2018), building on previous versions. The main change was the obligation to install fixed wireless broadband services in 1 473 localities using 4G technology or higher. In addition, this service had to be available to at least 10% of all localities by the end of 2019.

The most recent effort by Anatel to foster widespread deployment of broadband is the Structural Plan of Broadband Networks 2019-24 (Plano Estrutural de Redes de Telecomunicações, PERT). The PERT diagnoses broadband networks in the country, emphasising the role of regional ISPs in broadband deployment. It identifies gaps and areas where deployment is not profitable, proposes seven broadband infrastructure projects and suggests possible financing mechanisms.[28] The projects focus mostly on expanding backhaul connectivity in underserved municipalities, as well as fostering deployment of mobile networks. As the PERT was published recently, most proposed initiatives have not been implemented.

Due to the growth of small ISPs, Anatel has been implementing several regulatory measures to encourage them to provide broadband coverage in underserved areas. Through the Small Telecommunications Service Providers Committee (Resolution No. 698 of 2018), Anatel expects to advance on regulatory measures favouring small ISPs. Through the resolution, it also hopes to gather more information about demand in areas where these operators are present. In January 2020, Anatel explicitly recognised Community Networks as an option for Internet access in Brazil (Anatel, 2020[49]). In so doing, it explicitly linked its decision to an outcome of the Internet Governance Forum 2018 – "The Community Network Manual: How to build the Internet yourself" (Belli et al., 2018[50]).

Moreover, Anatel has also been trying to expand mobile broadband coverage through auctions (reserve prices with coverage obligations, see subsection on spectrum auction design) and through the TACs (see subsection on monitoring regulatory compliance). Auctions have proven to be a powerful tool for investment, coverage and expansion; the TACs are still being designed to fully meet Anatel's expectations.

Fostering the Internet of Things

The IoT is expected to grow exponentially, connecting many billions of devices in a relatively short time (OECD, 2015[51]). It represents the next step in digital convergence – on an unprecedented scale – after the convergence of fixed and mobile networks and the telecommunication and broadcasting sectors. Moreover, the IoT holds the promise to contribute substantially to further innovation, growth and social prosperity (OECD, 2018[52]). It also brings about increased demands for networks and challenges for traditional communication regulatory frameworks.

Together with the potential benefits of the IoT, new policy and regulatory challenges may emerge in some areas (e.g. privacy/security concerns, as well as interoperability, numbering and standardisation issues). To foster the IoT ecosystem, several issues become crucial: interoperability; spectrum management; extra-territorial use of numbers; and solutions to help users switch providers and avoid lock-in. Likewise, privacy, security, liability and reliability around the use of the IoT need to be built (OECD, 2018[52]).

In addition to increased requirements around quality and ubiquitous networks, another challenge regarding IoT development concerns international mobile roaming. International mobile roaming was intended for communication devices used by people travelling to and from countries. It was not initially conceived for devices permanently deployed across borders as is the case of the IoT.

When it comes to massive and dispersed connected devices, and as supply chains become more sophisticated, the IoT has evolved to provide new solutions, particularly at a global scale. Many IoT devices may be initially activated in one country and exported to another permanently. In those cases, for example, many IoT solutions across industries (i.e. logistics, automotive and aerospace, among others) require devices to access networks in a co-ordinated manner, independently of location. That is, many IoT applications and services transcend borders.

IoT devices that are activated in one place, but used or sold in another country, may require permanent connectivity. Permanent roaming would allow IoT devices to use data internationally without restriction. Among other benefits, IoT connections under permanent roaming are frequently more reliable than local connections. This is the case because these devices can access, most of the time, any available network, with coverage not being limited to one specific network. It can also simplify contracting and billing solutions for IoT service providers, as connections in different networks can be contracted for and billed only once via a single provider-to-customer relationship. Permanent roaming may arguably lead to market distortions, as differential conditions (i.e. taxation, coverage and rates) may place local operators at a disadvantage. However, it can also create significant opportunities for expanding innovative IoT services, and is already successfully employed in countries around the world.

In 2017, the International Telecommunications Union (ITU) issued international mobile roaming strategic guidelines. These encouraged regulators to explore solutions regarding IoT and M2M services to promote measures to apply permanent roaming services, and the application of specific prices and conditions for IoT/M2M traffic" (ITU, 2017[53]).

With the objective of promoting innovative services, many countries allow, or do not explicitly prohibit, permanent roaming for the IoT. However, a few countries (e.g. Brazil, and Turkey) have banned it completely. In 2012, Anatel ruled that foreign-based carriers using foreign SIM cards may not offer services in Brazil on a permanent basis. Doing so would be considered to be providing an unauthorised telecommunication service, which the LGT explicitly prohibits. Anatel has also argued there are important consumer protection issues as the foreign IoT service providers would not be under its regulatory reach. This implies that only locally licenced carriers with local SIM cards can offer M2M and IoT services in Brazil.

Brazilian network operators generally oppose permanent roaming. They argue that national networks are dimensioned and built to host domestic SIM cards. Therefore, permanent roaming devices could create network capacity and management problems. They also regard any such international providers as unfair competition as they would not be subject to local regulation and taxation (Chapter 7). However, such concerns may be mitigated if permanent roaming arrangements are subject to freely negotiated commercial rates between Brazilian network operators and international providers.

Intermediaries provide many international IoT services to comply with regulation in Brazil as permanent roaming is not allowed. These are mostly MVNOs specialised in M2M and the IoT. More recently, Anatel has argued the advent of the eSIM (embedded SIM) has made the permanent roaming issue outdated.[29] On the one hand, several players have already launched this solution in Brazil.[30] On the other, eSIMs can host multiple connectivity providers, but do not solve the integration costs and contractual complexities of multi-operator relationships for some industry stakeholders.

As discussed in Chapter 7, the taxation system for telecommunication services is burdensome and complex. For the development of the IoT, it has become a considerable bottleneck. Countries such as Brazil that pay a fixed fee per connection (once on activation or

recurrently) have increased the IoT connection costs compared to countries that apply taxes or fees based on usage.[31]

In Brazil, all active lines must pay the Telecommunications Oversight Fund (Fundo de Fiscalização das Telecomunicações, FISTEL) – not only when the line is activated, but also annually. For low average revenue per user (ARPU) communication services, such as many IoT connections, this levy could make the service unprofitable or simply unviable.

Numbering is also a relevant issue. IoT devices are projected to grow exponentially, surpassing personal communications. Using the current numbering plan for mobile telephony (a scarce resource) may not be the appropriate solution. Establishing separate numbering plans and fostering deployment of the numbering protocol IPv6 could alleviate this issue.

The Brazilian government has taken several steps to promote deployment of the IoT. It created the IoT Chamber in 2014 (Decree No. 8 234 of 2 May 2014). This, in turn, elaborated the National IoT Plan published in June 2019 (Decree No. 9 854 of 25 June 2019). Prior to the IoT Plan, MCTIC launched two public consultations on the issue in December 2016 and March 2017. Permanent roaming and taxes have been two of the contentious issues at stake.

Following publication of the National IoT Plan, Anatel has accelerated the review of the regulation of IoT devices and services. It launched a public consultation in August 2019, focusing on licensing, taxation, numbering, QoS, spectrum and MVNO regulation.[32] Anatel has stated it would not consider the IoT a new communication service and would exempt its connections and devices from QoS regulation. Additionally, Anatel is considering rendering MVNO regulation more flexible to help such operators to become IoT enablers. Decisions around changes on IoT regulation were expected by the end of 2020.

According to the National IoT Plan, the IoT is "the infrastructure that integrates the provision of value-added services with capabilities for physical or virtual connection of things with devices based on existing information and communication technologies and their developments" (Brazil, 2019[54]). It follows from the plan that IoT services are value-added services inherently bundled with a communication service. This has created a definition problem that is still in debate. The definition is relevant not only because of varying degrees of regulation, but also because of taxation (Chapter 7). If IoT devices are exempt from certain taxes (i.e. ICMS and FISTEL), end-user prices would be substantially lower. This, in turn, could lead to higher adoption rates.

The National IoT Plan wants to reduce FISTEL for the IoT, but this depends on legal reform in the FISTEL law. Congress has been debating whether to eliminate FISTEL charges for IoT connections since 2016, but no agreement has been reached. The Executive Power is considering a provisional measure that would set this fee equal to zero for the IoT; however, the Ministry of Finance has requested an impact evaluation on foregone revenue.

Consumer protection

Two main institutions, Anatel and the National Consumers Secretariat (A Secretaria Nacional do Consumidor, Senacon), have a mandate over communications for consumer protection (Chapter 4). Anatel defines the rules and processes that govern consumer protection in the sector. It also enforces legal clauses that outline the rights and obligations of telecommunication providers (including pay TV providers, under the Brazilian definition of telecommunication services).

Anatel regulates consumer contracts indirectly, i.e. usually *ex post*, by monitoring and inspecting processes put in place by the regulated entities. The regulator verifies providers'

compliance with the Consumer Defence Code and other legal provisions. These include the LGT and the Regulatory Framework for Consumer Rights of Telecommunication Services (Regulamento Geral de Direitos do Consumidor de Serviços de Telecomunicações) (Anatel, 2014[55]). Senacon is in charge of planning, elaborating, co-ordinating and executing the general policies of relationships between consumers and providers, including telecommunications. Both agencies share information on administrative actions and procedures regarding consumers' rights.

Fines imposed by Senacon – as well as those imposed by Anatel when related to consumer protection – are deposited in the Federal Fund for the Defence of Collective Rights (Fundo de Direitos Difusos), administered by the Ministry of Justice. Prior to 2012, all fines imposed by Anatel were deposited in FISTEL. In several cases, Anatel has also mandated compensations for incorrect billing or damages to be payed directly to end users.

In 2014, Anatel consolidated all consumer protection regulation in a single act, the Regulatory Framework for Consumer Rights of Telecommunication Services (Resolution No. 632 of 2014). This regulation brought together and updated all the norms that govern the relationship between providers and consumers. This included rules established by Anatel or general consumer rules established by Senacon.

The Regulatory Framework for Consumer Rights of Telecommunication Services applies to all services. The rules require providers to cancel a service automatically when requested (via a customer centre, call centre or web portal). It also states that billing complaints must be solved within 30 days; prepaid top-up balances should have a minimum validity of 30 days; and users must be notified in advance of their credit expiration. Operators must include standard service contracts on their websites, as well as past bills and historical usage (available upon request). Call centre support should be available free of charge at any time, and these calls must be recorded and stored for six months. Moreover, the act mandates that all promotional offers must be available to all consumers, not only to new subscribers. Furthermore, bundled offers should provide disaggregated prices for individual services and components.

Historically, a substantial part of communication issues for consumers in Brazil relate to how services are priced and advertised. Most complaints frequently relate to billing, payments and contract clauses. Recently, though, new issues in consumer protection have emerged. In 2016, for example, fixed broadband operators began enforcing data caps on their offers. This resulted in an ongoing debate about allowing commercial offers to develop versus protecting consumer rights. Anatel has acted upon this, and partially suspended data caps by the largest ISPs.

Consumer protection issues in Brazil also relate to concerns about reducing counterfeited phones and re-use of stolen devices. These practices affect both consumers and local industries. Multiple entities in Brazil have co-ordinated their response to this issue. Anatel, the Department of Federal Revenue of Brazil, the federal police and the Ministry of Justice, for example, have implemented the Legal Mobile Phone initiative (Celular Legal). It promotes use of certified devices and information sharing among providers and the process required to deactivate stolen devices. This initiative also makes it easier for consumers to reactivate their number when using a different device.

Moreover, as in OECD countries, consumer issues have started to overlap with concerns around use of personal data. This is particularly true for consumer protection and information sharing among communication service providers. This issue will be further addressed in *Going Digital in Brazil* (OECD, forthcoming[43]). It will include an evaluation of the

implementation of the Personal Data Protection Act (Lei Geral de Proteção de Dados Pessoais, Law No. 13 709 of 14 August 2018).

The standard process for consumer complaints about communication services in Brazil starts with users reaching out to their service provider. If consumers do not receive a satisfactory response, they can contact Anatel via the web portal, app or call centre. If the issue has not been resolved, Anatel can re-open the complaint ticket or users can contact their local departments for consumer protection (Procons) or Senacon's e-compliant portal.

Service providers must have an internal ombudsman by June 2020. If consumers are not satisfied with the provider's reply, they can contact the Ombudsman. If the issue is not solved by the Ombudsman, they can contact Anatel. These practices are established in the Telecommunication Quality of Service Guidelines (Regulamento de Qualidades dos Servicios de Telecomunicações, Resolution No. 717 of 23 December 2019).

Communication operators consistently rank at the top of consumer complaints, but in recent years have resolved complaints to greater satisfaction. These complaints, collected by several Procon offices and managed by Senacon, are published by the National Information System for Consumer Protection (Sistema Nacional de Informações de Defesa do Consumidor, Sindec). Since 2015, five of the top ten providers with the largest number of claims have consistently been communication operators (i.e. Claro, Oi, Vivo, Sky and TIM).

Overall, the total number of tickets reported by Sindec has been decreasing slightly since 2015. Until 2017, telecommunication ranked as the sector with the largest number of consumer issues, both as overall tickets and complaints across Procon offices. Since 2018, the financial sector has been leading Sindec's measures on numbers of tickets and complaints. Telecommunication operators, however, have performed better than the overall average in terms of resolution rates of complaints (Table 5.5).

Table 5.5. Consumer complaints and resolution in Brazil through consumidor.gov.br (2015-19)

	Tickets				Average resolution rate (% of complaints)	
Year	Total	Complaints (share of tickets [%])	Telecommunication (share of tickets [%])	Finance (share of tickets [%])	Telecommunications operators[1]	Total
2015	2 646 941	84.3	32.6	23.8	79.7	76.8
2016	2 457 167	83.6	29.1	25.3	81.6	77.6
2017	2 287 459	84.3	28.2	26.8	82.1	76.8
2018	2 274 395	85.1	25.9	29.8	85.8	80
2019	1 589 006	85.9	26.2	30.1	84.3	79.3

1. Resolution rates for telecommunication operators refer to telecommunication operators included in the top 60 companies with the largest number of complaints reported by Procon offices in Sindec.
Note: Data for 2019 were retrieved in October 2019.
Source: Senacon (2019[56]), *Sistema Nacional de Informações de Defesa do Consumidor (Sindec)*, https://sindecnacional.mj.gov.br/ (accessed on 15 March 2020).

Anatel also monitors the status and number of consumer complaints on service providers. The scale of complaints received by Anatel surpasses those filed through Procon offices by almost twofold (Table 5.6).

Communication operators had the highest rates at resolving conflicts in a recently created e-complaint portal. In 2014, Senacon launched the e-complaint portal (www.consumidor.gov.br)

to help resolve conflicts between consumers and providers. Providers register voluntarily and must accept the terms of participation. All the largest communication operators actively participate in the portal. In 2014, the portal received 37 151 complaints.

Table 5.6. Consumer complaints filed through Anatel (2015-19)

Year	Number of telecommunication consumer complaints
2015	4 072 464
2016	3 891 209
2017	3 383 374
2018	2 920 737
2019	2 963 22

Source: Anatel's response to the questionnaire of the review.

By 2018, the number had reached 609 644, with 40.3% related to communication operators and 22.2% to financial institutions. Consistent with data from Sindec, complaints in the e-complaint portal also show that telecommunication operators had the highest conflict resolution rates (89.9%). They were followed by banks, at 76.9% (Brazil, 2019[57]).

In November 2019, Anatel launched a new e-complaint portal, Anatel Consumidor (https://apps.anatel.gov.br/AnatelConsumidor/). Consumers can evaluate the providers' replies and see rankings related to various topics. These include average satisfaction with each provider, complaint resolution, average response time and other performance indicators.

An alternative approach to consumer rights and protection developed by Anatel has significantly reduced complaints related to value-added services. Since 2017, Anatel has been using a dialogue with telecommunication operators centred on solving issues that present potential or actual harm to end users. This responsive approach helped reduce the number of complaints related to contracts with value-added services. Between the end of 2016 (before Anatel's action) and the end of 2019, complaints dropped from 7 500 to just over 1 500 per month. This represents an 80% decrease in three years.

Regional and international issues

International and regional co-operation

As a result of globalisation, international co-operation has become a key part of the regulatory agenda. Regulatory institutions in Brazil have been investing in regional and international co-operation to avoid duplication, benefit from possible synergies and embrace best practices in regulation and competition policy.

The Brazilian Cooperation Agency (Agência Brasileira de Cooperação, ABC) is in charge of international co-operation between Brazil and other countries or international organisations. ABC is affiliated to the Ministry of Foreign Affairs (Ministério de Relações Exteriores). It negotiates, co-ordinates, implements and monitors technical co-operation projects and programmes that stem from agreements signed between Brazil and other countries and international organisations.[33]

Regarding the communication sector, the Secretary of Telecommunications of MCTIC is responsible for the interaction with national and international bodies. It also manages participation in international fora focused on ICT development.[34] Anatel has the legal mandate to represent Brazil in international telecommunication organisations, under the co-ordination of the Executive branch (art. 19 of the LGT).[35] In this regard, Anatel has been

co-ordinating participation of the Brazilian delegation in international telecommunication discussions. This includes, among others, ITU, the Inter-American Telecommunications Commission (CITEL) and the LAC Forum of Telecommunication Regulators (Regulatel).

Brazil has adopted several OECD recommendations related to the digital economy. These include the 2016 *OECD Ministerial Declaration on the Digital Economy* (OECD, 2016[58]), the 2012 *Recommendation of the Council on International Mobile Roaming Services* (OECD, 2012[59]) and the 2004 *Recommendation of the Council on Broadband Development* (OECD, 2004[60]). As one of its four main axes, Brazil's Digital Transformation Strategy of 2018 emphasised the international aspects for promotion of regional integration and the integration of Brazilian firms into global value chains.

For competition policy, in particular, Brazil has adhered to OECD recommendations. It has also adopted templates suggested by the International Competition Network for mergers and cartels. Additionally, CADE has established relevant co-operation agreements with other competition agencies to foster exchange of data and information, promote mutual learning and avoid conflicts over jurisdiction.[36]

International mobile roaming

International mobile roaming allows mobile users to access communication services in foreign countries, extending the coverage of the consumer's operator. This coverage extension is usually possible through a wholesale agreement between the consumer's home operator and the foreign mobile operator. Although new technological developments are enabling alternatives, international mobile roaming charges remain a challenge. Many substitutes developed may require subscribers to change their mobile number or do not provide enough mobility (Bourassa et al., 2016[61]).

As is the case in OECD countries, international roaming has been historically contentious in Brazil. As international mobile roaming is provided through commercial agreements with foreign operators, these services fall outside of Anatel's jurisdiction. Therefore, in the absence of a supra-national regulatory body, a top-down regulation of rates is hard to impose.

Such regulation depends on the conditions of the negotiation between national and foreign operators. In such a context, no operator usually has an incentive to reduce rates. In addition, double taxation is a concern: users end up paying taxes in the country of roaming, as well as in Brazil.

In Brazil, international mobile roaming was not used as a significant lever to compete in the market until 2008. In 2008, Claro – whose rates varied by technology (GPRS, EDGE and 3G) and originating operator – reduced its price per MB to a flat fee. TIM followed, offering discounts up to 30% on its basic rate. This resulted in comparable prices between operators. In 2011, offers including international roaming services for both mobile voice and data started to be widespread, with discounts of up to 80% on retail prices. In 2012, Brazil launched unlimited voice and data international roaming packages for a daily fixed rate.

Though the price decrease responded mostly to competitive dynamics in Brazil, both Anatel and consumer associations had been exerting significant pressure. Anatel has already incorporated a bill shock rule concerning roaming within its Regulatory Framework for Consumer Rights of Telecommunication Services. It states that consumers should be informed before the expiration of the roaming packages or credit, preferably by text message. Moreover, in 2012, Brazilian operators, together with most operators in Latin America through the GSMA, launched an initiative to make data roaming more transparent and easier to understand for consumers.

Brazil adhered to an OECD recommendation in 2018 to balance the needs of different parties with an interest in international mobile roaming services. In 2012, the OECD Council adopted the *Recommendation of the Council on International Mobile Roaming Services*. The recommendation aims to ensure effective competition, consumer awareness and protection, and a fair price level in international mobile roaming services. Therefore, it sets out a number of measures – from the least to the most interventionist – that governments should consider to address challenges related to international mobile roaming markets (OECD, 2012[59]).

Brazil has been participating in international discussions concerning international mobile roaming. Brazil proposed a more proactive regulation of international mobile roaming at the International Telecommunication Union's 2012 World Congress on Information Technology in Dubai (WCIT-12). While Brazil's proposal for full multilateral regulation was not successful, four provisions were included in the International Telecommunication Regulations in the conference agreements:

- Countries should take measures to ensure that the operators provide accurate, up to date, transparent and timely information to consumers on international roaming rates.
- Countries should promote competition in the provision of international roaming services and foster policies leading to competitive roaming rates.
- Satisfactory QoS should be provided to roaming consumers.
- Countries should take measures to mitigate any inadvertent roaming charges in border zones, where users could inadvertently get served by the operator on the other side of the border.

Brazil started taking advantage of these provisions soon after WCIT-12. By the end of 2013, Peru and Brazil agreed to consider calls between border towns as local. However, this agreement was not implemented until 2016. It was to be addressed in the 2020 Vice-Ministerial Commission for Border Integration Brazil-Peru.

Since WCIT-12, several developments on international mobile roaming have occurred. The European Union, after many years of discussions, agreed to fully eliminate international mobile roaming charges in 2017 ("Roam Like at Home" initiative). Due to the pressure of competition, roaming charges between the United States, Mexico and Canada have been rapidly disappearing. In 2016, the Study Group 3 of the Telecommunications Standardization Bureau of the ITU (ITU-T SG3) made an important recommendation. It proposed that countries reach agreements to build pricing models. At the same time, it said countries should establish price caps for wholesale and retail roaming prices. The 2016 World Telecommunication Standardization Assembly of the ITU held in Tunisia adopted these recommendations.[37]

Brazil continues to negotiate international roaming agreements with its neighbours. Negotiations with Argentina, Uruguay and Paraguay started in 2017. In March 2018, CITEL signed the Declaration of Buenos Aires. In so doing, it agreed "to encourage measures to promote greater transparency, affordability and elimination of additional charges to the end user of international roaming services, focusing especially on the realities and needs in border areas" (OAS, 2018[62]).

The region reached several milestones in reducing international roaming in 2019. In July 2019, Chile and Brazil signed a free trade agreement with the commitment to eliminate these charges at the 54th Mercosur Summit Meeting (54a Cúpula do Mercosul). The agreement, which involves Argentina, Paraguay and Uruguay, is still awaiting approval of the Brazilian Congress.

Annex 5.A. Upcoming 5G spectrum auction in Brazil

Table 5.A.1. Design of blocks for the upcoming 5G spectrum auction in Brazil

Frequency band	Block design by rounds	Coverage obligations
700 MHz	**1st round**	
	1 national block of 10 MHz paired (10+10 MHz)	Extending mobile coverage in localities without 4G and highways
	2nd round	
	2 national blocks of 5 MHz paired (5+5 MHz)	Extending mobile coverage in localities without 4G and highways
3.5 GHz	**1st round**	
	1 regional block of 60 MHz exclusive for small ISPs	Extending mobile coverage in municipalities up to 30 000 inhabitants, preferably without 4G (Note: Coverage obligations can be discounted from reserve price [up to 90%])
	2nd round	
	2 national blocks of 100 MHz and 1 national block of 80 MHz	Extending backhaul in municipalities without backhaul
	3rd round	
	1 regional block of 60 MHz (with restrictions to those operators who acquire national blocks in the band)	Extending backhaul in municipalities without backhaul
2.3 GHz	**1st (and only) round**	
	Regional block of 50 MHz and regional block of 40 MHz	Extending coverage in localities without 4G
26 GHz	**1st round**	
	5 national blocks and 3 regional blocks of 400 MHz	No coverage obligations
	2nd round	
	Up to 10 national blocks and 6 regional blocks of 200 MHz that were not sold in the previous round	No coverage obligations

Source: Anatel (2020[11]), *Anatel aprova consulta pública para implementar o 5G*, https://www.anatel.gov.br/institucional/component/content/article/171-manchete/2491-anatel-aprova-consulta-publica-para-licitar-faixas-de-frequencias-para-o-5g.

Annex 5.B. Spectrum licence duration and renewal policy in OECD countries

Table 5.B.1. Typical duration of current spectrum licences in OECD countries

Country	Duration of current spectrum licences	Can licences be extended upon request?	General policy for licence renewal	How does the regulator calculate extension or renewal fees?
Australia	15 years	Yes (upon request)	Spectrum licences last up to 15 years, and do not renew automatically. Two years before the licence expires, the licence holder should express interest to renew it. ACMA decides whether to reissue the licence or allocate the frequency band for other purposes.	Renewal fee at an administratively determined price, or through a new auction.
Austria	16-20 years	No	New auction.	New licence fees determined by auction.
Belgium	15-20 years	No	New auction.	New licence fees determined by auction.
Canada	10 years with high expectation of renewal for 10 subsequent years (i.e. up to 20 years)	Yes (upon request for subsequent 10 years)	The Framework for Spectrum Auctions in Canada states that licencees will have a high expectation of renewal for an additional 10 years unless a breach of licence condition has occurred, a fundamental reallocation of spectrum to a new service is required or an overriding policy need arises.	Auction or licence renewal fee. For licences issued through a renewal process, a separate consultation determines the spectrum licence fee so they reflect market value.
Chile	30 years	No	New comparative selection procedure.	New comparative selection procedure.
Colombia	20 years	Yes[1] (for current licences)	The ICT Modernisation Law extends the spectrum licence period from 10 to 20 years.	Auction.
Czech Republic	10-15 years	Yes	The regulator is obliged to renew the licence on request of the licence holder.	The regulator appoints an independent expert to determine the price of the renewal.
Denmark	15-23 years	No	New auction.	New licence fees determined by auction.
Finland	13-20 years	Unspecified	New comparative selection procedure.	No specific renewal fee.
France	12-20 years	No	Licence extension[2] or auction.	Arcep, the French regulator, usually conducts auctions. No specific renewal fee.
Germany	15-19 years	No	New auction.	General policy: new licence fees determined by auction.
Hungary	15 years	Yes	..	..
Ireland	15 years	No	New auction.	New licence fees determined by both the auction and “annual spectrum fees”.
Italy	15-20 years	Yes	..	No specific renewal fee; however, a revision of annual spectrum fees.
Japan	5 years with possibility of renewal	Yes	If examination by ministry (MIC) shows the application conforms to Radio Regulatory Laws, the licence will be renewed.	Fees determined by comparative selection.
Korea	5-10 years	Yes	Ministry (MSIT) and operators discuss renewal.	Usually price determined by auction.
Mexico	20 years	Yes[3] (if there is no interest in the band by other players, otherwise auction)	Auction or licence extension.	Renewal fee determined by the regulator (IFT) or through an auction.
Netherlands	20 years	No	New auction.	New licence fees determined by auction.
Poland	15 years (older licences up to 30 years)	Yes	Licence extension based on operator's application.	Calculated based on the price per megahertz applied in the latest previous award of a band, with an inflation adjustment.
Portugal	15 years	Yes	Licence extension.	ANACOM does not disclose amounts.

Country	Duration of current spectrum licences	Can licences be extended upon request?	General policy for licence renewal	How does the regulator calculate extension or renewal fees?
Slovak Republic	10 years	Yes	Licence extension.	Fee for licence renewal depends on regulator.
Slovenia	15 years	Yes	New auction.	New licence fees determined by auction.
Spain	16-30 years	Yes	..	No general policy on renewal fees.
Sweden	10-25 years	No	New auction.	New licence fees determined by auction.
Switzerland	12-16 years	No	New auction.	New licence fees determined by auction.
United Kingdom	Indefinite licence[4] (i.e. 20 years in the initial term, after which Ofcom can revoke licence for spectrum management reasons with 5-years' notice)	Yes	Renewal or auction.	In 2015, Ofcom calculated the renewal fee of the 900 MHz and 1.8 GHz bands by: i) analysing the sums paid in the 4G auction of February 2013; ii) comparing the amounts bid in foreign spectrum auctions; and iii) assessing the technical and commercial characteristics.
United States	10 years[5]	Yes, (only if there is no mutually exclusive applications for initial licences)	The Balanced Budget Act of 1997 requires the FCC to use auctions to resolve mutually exclusive applications for initial licences unless certain exemptions apply (e.g. exemptions for public safety radio services, digital TV licences to replace analogue licences, and non-commercial educational and public broadcast stations).	Auction or renewal fees.

1. After changes brought about the ICT Modernisation Law, current licences may continue for one additional term.
2. Exceptionally, the government agreed with MNO investment commitments to accelerate mobile coverage (i.e. 900 MHz, 1 800 MHz and 2 GHz bands) for a ten-year renewal period without an auction (i.e. "the new deal" of November 2018).
3. Spectrum licences can be renewed for an additional period. The licencee has to manifest interest in renewal a year before the licence term. The Federal Telecommunications Institute (IFT) has a year to resolve whether there is public interest in recuperation of the frequency band, and if so, it will notify the licencee of the licence revocation. If there is no public interest, then the IFT may grant the renewal (art. 114 in Chapter VI of the LFTR).
4. Indefinite licences mean that Ofcom has limited rights of revocation during an initial term of 20 years, after which Ofcom can revoke the licence for spectrum management reasons, provided they have given the licencee at least five years' notice. The right to revoke licences on spectrum management grounds was retained because of the risk of specific market failures.
5. Licences for service areas will be granted for ten-year terms from the date of original issuance or renewal. In 1993, Congress passed the Omnibus Budget Reconciliation Act. This gave authority to the Federal Communications Commission (FCC) to use competitive bidding to choose from among two or more mutually exclusive applications for an initial licence.

Notes: .. = not available; ACMA = Australian Communications and Media Authority; FCC = Federal Communications Commission (United States).

Sources: Australia: Australian Government (1992[63]), "Radiocommunications Act of 1992", www.legislation.gov.au/Details/C2019C00262; ACMA (2020[64]), *Modernising the Management of Spectrum*, www.communications.gov.au/departmental-news/modernising-management-spectrum. Canada: Government of Canada (2019[65]), *Policy and Licensing Procedures for the Auction of Spectrum Licences in the 2 300 MHz and 3 500 MHz Bands*, www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08621.html. Chile: Subtel (2005[66]), *Manual de Trámites de Autorizaciones*, www.subtel.gob.cl/manual_autorizacion/manual/manual_autorizaciones.pdf. Colombia: OECD (2019[67]), *OECD Reviews of Digital Transformation: Going Digital in Colombia*, https://doi.org/10.1787/781185b1-en. European Union: Cullen International (2019[68]), *Licence Extension and Renewal Policy*, www.cullen-international.com/radiospectrum.html. Japan: MIC (2019[69]), *Process of Frequency Assignment*, www.tele.soumu.go.jp/e/adm/proc/type/again/index.htm. Korea: MSIT (2019[70]), *A Public Notice for the 5G Frequency Auction*, www.msit.go.kr. Mexico: Government of Mexico (2014[71]), *Ley Federal de Telecomunicaciones y Radiodifusión*, www.dof.gob.mx/nota_detalle.php?codigo=5352323&fecha=14/07/2014. United Kingdom: Ofcom (2017[72]), *The Award of 2.3 and 3.4 GHz Spectrum Bands*, www.ofcom.org.uk/__data/assets/pdf_file/0030/81579/info-memorandum.pdf. United States: FCC (2020[73]), *About Auctions*, www.fcc.gov/auctions/about-auctions; FCC (2017[74]), *Wireless Licence Renewal and Service Continuity Reform*, http://transition.fcc.gov/Daily_Releases/Daily_Business/2017/db0713/DOC-345790A1.pdf. All sources were accessed on 12 February 2020.

References

ACMA (2020), *Modernising the Management of Spectrum*, The Australian Communications and Media Authority (ACMA), http://dx.doi.org/ww.communications.gov.au/departmental-news/modernising-management-spectrum (accessed on 12 February 2020). [64]

Anatel (2020), *Anatel aprova consulta pública para implementar o 5G*, [Anatel Approves Public Consultation to Implement 5G], news release, 6 February, Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/institucional/component/content/article/171-manchete/2491-anatel-aprova-consulta-publica-para-licitar-faixas-de-frequencias-para-o-5g (accessed on 12 February 2020). [11]

Anatel (2020), *Painéis de Dados: Accesos*, [Data Sets: Subscriptions], Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/paineis/acessos (accessed on 28 May 2020). [32]

Anatel (2020), *Redes Comunitárias*, [Community Networks], news release, Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/setorregulado/component/content/article/2-uncategorised/528-redes-comunitarias. [49]

Anatel (2019), "Acordão No. 292, de 4 de junho de 2019, processo No. 53500.025122/2014-48", [Anatel Agreement No. 292 of 4 June 2019], Agência Nacional de Telecomunicações, Brasilia, https://sei.anatel.gov.br/sei/publicacoes/controlador_publicacoes.php?acao=publicacao_visualizar&id_documento=4829714&id_orgao_publicacao=0 (accessed on 10 March 2020). [16]

Anatel (2019), *Mapeamento de Redes de Transporte*, [Backhaul Network Maps], webpage, https://www.anatel.gov.br/dados/mapeamento-de-redes (accessed on 13 September 2019). [33]

Anatel (2019), *Relatório Anual 2018*, [Annual Report 2018], Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/institucional/noticias-destaque/2343-relatorio-anual-2018-ja-esta-disponivel. [27]

Anatel (2018), "Resolução No. 693, de 17 de julho de 2018 (Regulamento Geral de Interconexão)", [Resolution No. 693 of 17 July 2018 (General Interconnection Rules)], Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/legislacao/resolucoes/2018/1142-resolucao-693. [1]

Anatel (2016), "Resolução No. 671, de 3 de novembro de 2016", [Resolution No. 671, 3 November 2016], Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/legislacao/resolucoes/2016/911-resolu%C3%A7%C3%A3o-671. [3]

Anatel (2014), "Resolução No. 632, de 7 de março de 2014 (Regulamento Geral de Direitos do Consumidor de Serviços de Telecomunicações - RGC)", [Resolution No. 632 of 7 March 2014 (Regulatory Framework for Consumer Rights of Telecommunication Services)], Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/legislacao/resolucoes/2014/750-resolucao-632 (accessed on 10 March 2020). [55]

Anatel (2013), *Regimento Interno da Agência Nacional de Telecomunicações*, [Bylaws of National Telecommunications Agency], Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/legislacao/resolucoes/2013/450-resolucao-612. [38]

Anatel (2012), "Resolução No. 600, de 8 de novembro de 2012", [Resolution No. 600 of 8 November 2012], Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/legislacao/en/?catid=0&id=759. [18]

Anatel (2010), "Resolução No. 548, de 8 de novembro de 2010 (Regulamento para Avaliação da Eficiência de Uso do Espectro de Radiofrequências)", [Resolution No. 548 of 8 November 2010 (Regulation on the Evaluation on the Efficient Use of Radiofrequency Spectrum)], Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/legislacao/resolucoes/2010/47-resolucao-548. [2]

Australian Government (1992), *Radiocommunications Act of 1992*, http://dx.doi.org/www.legislation.gov.au/Details/C2019C00262 (accessed on 12 February 2020). [63]

Belli, L. et al. (2018), *The Community Network Manual : How to Build the Internet Yourself*, FGV Digital Repository, https://bibliotecadigital.fgv.br/dspace/handle/10438/25696. [50]

BEREC (2017), "BEREC's views on duration, on renewal of rights and on coordinated timing of assignments: Articles 49, 50 and 53", No. 28 March, BoR (17) 90, Body of European Regulators for Electronic Communications, Riga, https://berec.europa.eu/eng/document_register/subject_matter/berec/opinions/7036-berec-views-on-duration-on-renewal-of-rights-and-on-coordinated-timing-of-assignments-articles-49-50-and-53. [78]

BNAmericas (2014), "Could 4G in 450MHz finally be rolled out in Brazil?", BnAmericas, 7 August, https://www.bnamericas.com/en/news/could-4g-in-450mhz-finally-be-rolled-out-in-brazil. [7]

Bourassa, F. et al. (2016), "Developments in International Mobile Roaming", *OECD Digital Economy Papers*, No. 249, OECD Publishing, Paris, https://dx.doi.org/10.1787/5jm0lsq78vmx-en. [61]

Braga, L. (2020), *Claro diz que 5G não está maduro para o Brasil e quer leilão em 2021*, [Claro says that 5G is not ripe for Brazil and wants auction in 2021], Technoblog, https://tecnoblog.net/337348/claro-diz-que-5g-nao-esta-maduro-para-o-brasil-e-quer-leilao-em-2021/ (accessed on 21 May 2020). [10]

Brazil (2019), "Decreto No. 9 677, de 2 de janeiro de 2019", [Decree No. 9 677 of 2 January 2019], Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/_Ato2019-2022/2019/Decreto/D9677.htm. [57]

Brazil (2019), "Decreto No. 9 854 de 25 de Junho de 2019", [Decree No. 9 854 of 25 June 2019], Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/_Ato2019-2022/2019/Decreto/D9854.htm (accessed on 15 May 2020). [54]

Brazil (2018), "Decreto No. 9 612, de 17 de dezembro de 2018", [Decree No. 9 612 of 17 December 2018], Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/_ato2015-2018/2018/decreto/D9612.htm. [41]

Brazil (2012), "Lei No. 12 715 de 17 de setembro de 2012", [Law No. 12 715 of 15 September 2012] , Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/_Ato2011-2014/2012/Lei/L12715.htm. [37]

Cavalcanti, D. (2011), *A Deployment Strategy for Internet Exchange Points as Part of a National Broadband Plans*, http://www.acorn-redecom.org/papers/acornredecom2010cavalcanti.pdf. [36]

CGI.br (2020), "Sobre o CETIC.br", [About CETIC.br], webpage, https://cetic.br/pagina/saiba-mais-sobre-o-cetic/92. [31]

CGI.br (2010), "Pesquisa sobre o Uso das Tecnologias de Informação e Comunicação nos domicílios brasileiros - TIC Domicílios 2010", [ICT Households 2010: Survey on the Use of Information and Communication Technologies in Brazilian Households] Comitê Gestor da Internet no Brasil, São Paulo, https://www.cetic.br/tics/domicilios/2010/domicilios/A4/. [35]

CITEL/OEA (2015), *Auction of the 700 MHz in Brazil: Item 3.2 on the Agenda*, XXIII Meeting of Permanent Consultative Committee II: Radiocommunications, 17-21 March, Organization of American States, Cartegena de Indias, Colombia, http://www.oas.org/es/citel/Terminado/P2!R-3775_i.doc. [9]

Cullen International (2019), *Licence Extension and Renewal Policy*, http://dx.doi.org/www.cullen-international.com/radiospectrum.html (accessed on 12 February 2020). [68]

European Commission (2018), "Directive (EU) 2018/1972 establishing the European Electronic Communications Code", European Commission, Brussels, https://www.europeansources.info/record/directive-eu-2018-1972-establishing-the-european-electronic-communications-code/ (accessed on 26 March 2019). [13]

Faria, A. (2020), *A extinção da Comissão Conjunta de Resolução de Conflitos formada pela ANATEL, ANEEL e ANP*, [The Extinction of the Joint Conflict Resolution Commission formed by ANATEL, ANEEL and ANP], https://www.ispblog.com.br/2020/01/13/a-extincao-da-comissao-conjunta-de-resolucao-de-conflitos-formada-pela-anatel-aneel-e-anp/ (accessed on 10 March 2020). [22]

FCC (2020), *About Auctions*, http://dx.doi.org/www.fcc.gov/auctions/about-auctions (accessed on 12 February 2020). [73]

FCC (2020), "The FCC's 5G Fast Plan", webpage, https://www.fcc.gov/5G (accessed on 10 March 2020). [23]

FCC (2017), *Wireless Licence Renewal and Service Continuity Reform*, http://transition.fcc.gov/Daily_Releases/Daily_Business/2017/db0713/DOC-345790A1.pdf (accessed on 12 February 2020). [74]

Fonseca, H. (2015), *Uma Abordagem Econométrica e de Teoria de Contratos à Regulação do Setor de Telecomunicações: Ensaios sobre Investimento*, [An Econometric and Contract Theory Approach to Regulation of the Telecommunications Sector: Essays on Investment], Universidade de Brasília. [26]

Gahan, P. et al. (2017), *The 4G and 5G Spectrum Guide 2017*, PolicyTracker, https://www.policytracker.com/wp-content/uploads/2017/10/4G-and-5G-spectrum-guide-2017-sample.pdf. [8]

Gondim, A. (2020), "Área Técnica do TCU faz ressalvas, mas recomenda aprovação do TAC da TIM", ["TCU's Technical Area Makes Amendments, But Recommends Approval of TIM's TAC"], Tele.Sintese, 21 February, http://www.telesintese.com.br/area-tecnica-do-tcu-faz-ressalvas-mas-recomenda-aprovacao-do-tac-da-tim/. [29]

Government of Canada (2019), *Policy and Licensing Procedures for the Auction of Spectrum Licences in the 2 300 MHz and 3 500 MHz Bands*, http://dx.doi.org/www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf08621.html (accessed on 12 February 2020). [65]

Government of Mexico (2014), *Ley Federal de Telecomunicaciones y Radiodifusión*, [Federal Law of Telecommunications and Broadcasting], Mexico City, http://dx.doi.org/www.dof.gob.mx/nota_detalle.php?codigo=5352323&fecha=14/07/2014 (accessed on 12 February 2020). [71]

GSMA (2019), *Rethinking mobile taxation to improve connectivity*, https://www.gsma.com/publicpolicy/resources/rethinking-mobile-taxation-to-improve-connectivity. [79]

GSMA and Deloitte (2012), *Brazil Mobile Observatory 2012*, GSMA, London, https://www.gsma.com/latinamerica/wp-content/uploads/2012/10/gsma_brazil_mobile_observatory_eng.pdf. [76]

Hazlett, T., R. Muñoz and D. Avanzini (2011), "What really matters in spectrum allocation design", *Northwestern Journal of Technology and Intellectual Property*, Vol. 10, https://heinonline.org/HOL/Page?handle=hein.journals/nwteintp10&id=100&div=&collection=. [15]

IBGE (2020), *Pesquisa Nacional por Amostra de Domicílios Contínua - PNAD Contínua*, [Continuous National Household Survey (PNAD)], webpage, https://www.ibge.gov.br/estatisticas/multidominio/condicoes-de-vida-desigualdade-e-pobreza/17270-pnad-continua.html?=&t=o-que-e (accessed on 10 March 2020). [30]

ITU (2017), *International Mobile Roaming Strategic Guidelines 2017*, International Telecommunication Union, Geneva, https://www.itu.int/dms_pub/itu-d/opb/pref/D-PREF-EF.MIR03-2018-PDF-E.pdf. [53]

ITU (2011), *Spectrum Monitoring*, International Telecommunication Union, Geneva, https://www.itu.int/dms_pub/itu-r/opb/hdb/R-HDB-23-2011-PDF-E.pdf (accessed on 17 December 2019). [77]

MCTIC (2018), *Brazilian Digital Transformation Strategy: E-Digital*, Ministry of Science, Technology, Innovation and Communications, Brasilia, http://www.mctic.gov.br/mctic/export/sites/institucional/sessaoPublica/arquivos/digitalstrategy.pdf. [42]

MIC (2019), *Process of Frequency Assignment*, Ministry of Internal Affairs and Communications of Japan, http://dx.doi.org/www.tele.soumu.go.jp/e/adm/proc/type/again/index.htm (accessed on 12 February 2020). [69]

Milgrom, P. (2000), "Putting Auction Theory to Work: The Simultaneous Ascending Auction", *Journal of Political Economy*, Vol. 108/2, pp. 245-272, https://doi.org/10.1086/262118. [14]

Ministério das Comunicações (2009), *Um Plano Nacional para Banda Larga: O Brasil em Alta Velocidade*, [A National Broadband Plan: Brazil at high speeds], Ministério das Comunicações, Brasilia, http:/livroaberto.ibict.br/handle/1/810. [34]

Ministério das Comunicações (1997), *Diretrizes de Fiscalizacao*, [Guidelines on Monitoring], Ministério das Comunicações, Brasilia. [25]

MSIT (2019), *A Public Notice for the 5G Frequency Auction*, Ministry of Science and ICT of Korea, Seoul, http://dx.doi.org/www.msit.go.kr (accessed on 12 February 2020). [70]

Nescimento, L. (2018), *Regras de Competição para Setor de Telecomunicação Já Estão em Vigor*, [Competition Rules for the Telecommunications Sector are Already in Effect], Agência Brasil, Brasilia, http://agenciabrasil.ebc.com.br/economia/noticia/2018-07/regras-de-competicao-para-setor-de-telecomunicacao-ja-estao-em-vigor. [19]

OAS (2018), *Declaration of Buenos Aires*, 14 March, CITEL/doc.555/18 rev. 2, https://www.citel.oas.org/en/SiteAssets/Assembly/Declarations/DeclarationofBuenosAires_i.pdf. [62]

OECD (2020), *Broadband Portal*, http://dx.doi.org/www.oecd.org/sti/broadband/oecdbroadbandportal.htm (accessed on 20 May 2020). [20]

OECD (2019), *OECD Reviews of Digital Transformation: Going Digital in Colombia*, OECD Publishing, Paris, https://dx.doi.org/10.1787/781185b1-en. [67]

OECD (2018), "Bridging the rural digital divide", *OECD Digital Economy Papers*, No. 265, OECD Publishing, Paris, https://doi.org/10.1787/852bd3b9-en. [44]

OECD (2018), "IoT measurement and applications", *OECD Digital Economy Papers*, No. 271, OECD Publishing, Paris, https://dx.doi.org/10.1787/35209dbf-en. [52]

OECD (2016), *OECD Ministerial Declaration on the Digital Economy: Innovation, Growth and Social Prosperity*, OECD, Paris, https://www.oecd.org/internet/Digital-Economy-Ministerial-Declaration-2016.pdf. [58]

OECD (2015), *OECD Digital Economy Outlook 2015*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264232440-en. [51]

OECD (2012), *Recommendation of the Council on International Mobile Roaming Services*, OECD, Paris, https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0388. [59]

OECD (2008), *OECD Reviews of Regulatory Reform - Brazil: Strengthening Governance for Growth*, OECD Reviews of Regulatory Reform, OECD Publishing, Paris, https://doi.org/10.1787/9789264042940-en. (accessed on 3 August 2019). [46]

OECD (2004), *Recommendation of the Council on Broadband Development*, OECD, Paris, https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0322. [60]

OECD (forthcoming), *Going Digital in Brazil*, OECD Reviews of Digital Transformation, OECD Publishing, Paris. [43]

OECD/IDB (2016), *Broadband Policies for Latin America and the Caribbean: A Digital Economy Toolkit*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264251823-en. [12]

Ofcom (2017), *The Award of 2.3 and 3.4 GHz Spectrum Bands*, http://dx.doi.org/www.ofcom.org.uk/__data/assets/pdf_file/0030/81579/info-memorandum.pdf (accessed on 12 February 2020). [72]

Possebon, S. (2020), "Anatel revê para baixo valores de interconexão para 2020-2023", [Anatel reviews downwards interconnection tariffs for 2020-2023], Teletime, 18 February, https://teletime.com.br/18/02/2020/anatel-reve-para-baixo-valores-de-interconexao-para-2020-2023/?utm_source=Teletime (accessed on 16 March 2020). [21]

Possebon, S. (2019), "Nextel é a primeira operadora punida com 'obrigação de fazer'", [Nextel is the First Operator sanctioned through 'Future Obligations'], Teletime, 5 April, https://teletime.com.br/05/04/2019/nextel-deve-ser-primeira-operadora-punida-com-obrigacao-de-fazer/. [28]

Rehak, A. and I. Freire (2019), *eSIM Solutions Drive New Opportunities for Global IoT Connectivity*, OVUM, London, https://ibasis.com/wp-content/uploads/2019/02/iBASIS_IoT_White_Paper_02082019.pdf. [75]

RNP (2020), "Rede Nacional de Ensino e Pesquisa", [National Teaching and Research Network], webpage, https://www.rnp.br/en (accessed on 10 March 2020). [48]

Sabina, M. (2019), "Governo incluirá novos projetos no programa de concessões e privatizações", [Government will include new projects in the concession and privatization programme], Poder360, 18 November, https://www.poder360.com.br/governo/governo-incluira-novos-projetos-no-programa-de-concessoes-e-privatizacoes/. [45]

Senacon (2019), *Sistema Nacional de Informações de Defesa do Consumidor (Sindec)*, [National Consumer Protection Information System], (database), https://sindecnacional.mj.gov.br/ (accessed on 15 March 2020). [56]

Subtel (2005), *Manual de Trámites de Autorizaciones*, [Guidelines for Authorisation Procedures], Subsecretaría de Telecomunicaciones, Santiago (Chile), http://dx.doi.org/www.subtel.gob.cl/manual_autorizacion/manual/manual_autorizaciones.pdf (accessed on 12 February 2020). [66]

TCU (2018), "Acórdão No. 2 608", [Agreement No. 2 608], Tribunal de Contas da União, Plénario, Brasilia, https://www.camara.leg.br/internet/comissao/index/mista/orca/orcamento/OR2019/TCU-2018/Acordao26082018-TCU-Plenario.pdf. [40]

TCU (2018), *Para o TCU, Política Pública de Banda Larga Desconsidera as Desigualdades Sociais*, [For TCU, Broadband Public Policies Disregard Regional and Social Inequalities], press release, 8 September, Tribunal de Contas da União, Brasilia, https://portal.tcu.gov.br/imprensa-1/noticias/para-o-tcu-politica-publica-de-banda-larga-desconsidera-as-desigualdades-regionais-e-sociais.htm. [39]

Teleco (2018), *Licitações de Frequências de Celular*, [Auctions for Mobile Spectrum], webpage, http://www.teleco.com.br/licitacoes.asp (accessed on 17.05.2019). [4]

Telefónica (2019), *Notice to the Market Mobile Network Sharing Agreement Between VIVO and TIM*, http://ri.telefonica.com.br/en/documentos/1954-Notice-to-the-Market-Mobile-Network-Sharing-Agreement-Between-VIVO-and-TIM.pdf. [24]

TeleGeography (2020), *Submarine Cable Map*, https://www.submarinecablemap.com/#/country/brazil (accessed on 20 February 2020). [17]

TeleGeography (2015), "Anatel extends Claro 450MHz usage until 2027", TeleGeography, Comms Update, 15 July, https://www.commsupdate.com/articles/2015/07/01/anatel-extends-claro-450mhz-usage-until-2027/. [6]

TeleGeography (2012), "Big four secure frequencies in Brazil's 4G auction, but 450MHz band fails to excite", TeleGeography, Comms Update, 13 June, https://www.commsupdate.com/articles/2012/06/13/big-four-secure-frequencies-in-brazils-4g-auction-but-450mhz-band-fails-to-excite/ (accessed on 10 March 2020). [5]

Viasat (2018), "Telebras and Viasat enter strategic agreement to connect the unconnected in Brazil", press release, 26 February, Viasat, Brasilia and Carlsbad Springs, California, https://www.viasat.com/news/telebras-viasat-enter-strategic-agreement-connect-unconnected-brazil. [47]

Notes

[1] The recent legal changes brought about with Law No. 13 879 on October 2019 allows concessionaires to anticipate the end of their contracts without returning the reversible assets, while nonetheless making investment commitments.

[2] Using the exchange rate of 3.65 BRL/USD for the year 2018 from OECD.stat (https://stats.oecd.org/).

[3] Both concepts are laid out in Law No. 9 472 of 1997, Articles 60 and 61: "Art. 60. Telecommunication services is the set of activities that enables the offer of telecommunication. §1° Telecommunication is the transmission or reception of symbols, characters, signs, writings, images, sounds or information of any nature, by wire, radio-electricity, optical means or any other electromagnetic process [...].

Art. 61. Added value service is the activity that adds to a telecommunication service that supports its utilities related to access, storage, presentation, movement or retrieval of information, but shall not be confused with the telecommunication service itself. §1º Added value service does not constitute telecommunication service and its provider can be classified as a user of the telecommunications service that supports it, with the rights and obligations inherent to this condition."

[4] Decree No. 2 617 of 1998.

[5] Constitution art. 222, § 1º.

[6] According to the ITU-R: "Spectrum monitoring is one of the essential tools of spectrum management. Spectrum monitoring techniques are developed to ensure that technical parameters and standards for radiocommunication systems are adhered to. In addition, spectrum monitoring assists in promoting the efficient utilisation of the radio frequency spectrum and the satellite orbit." (ITU, 2011[77])

[7] The history of mobile telephony in Brazil began on 30 December 1990, when the first concessions of Cellular Mobile System (Serviço Móvel Celular, SMC) began operations in the city of Rio de Janeiro, with a capacity for 10 000 terminals. The A-band (i.e. 850 MHz and 900 MHz) was first assigned to the Brazilian public fixed incumbent, Embratel (GSMA and Deloitte, 2012[76]).

[8] Art. 14 of the resolution mentions: "The charge referred to in this Regulation shall apply, when applicable, upon the issuance or extension of the term of validity of the authorization to use radio frequency and may be paid in up to 3 (three) equal half-yearly instalments, provided that the value of the instalments is equal to or higher than R $ 500.00 (500 reais) and the authorization term is greater than the term granted for the payment of the last instalment."

[9] According to Brazil's 2015 document submitted to CITEL, the 700 MHz auction included "proceedings established that investments to build 4G networks need to include a minimal percentage of technology developed in Brazil (15% until 2016 and 20% until 2022) and a minimal percentage of equipment produced by Brazilian companies (50%)".

[10] Anatel Resolution No. 625/2013. Available at http://legislacao.anatel.gov.br/resolucoes/2013/644-resolucao-625.

[11] The spectrum auctions No. 002/2007/SPV – ANATEL ("3G"), and No. 002/2010/PVCP/SPV – ANATEL ("H Band").

[12] In 2017, when the Body of European Regulators for Electronic Communications (BEREC) reviewed the European Commission's initial proposal to set a minimum spectrum licence duration of 25 years, (which later was amended to 15 years with a 5-year extension), it highlighted the importance of spectrum auctions as tools to enhance competition. Namely, regarding Article 50 on licence duration, BEREC mentioned: "setting a minimum licence duration may result in entrenching market structures and limit the potential for market entry. For example, the process of re-awarding spectrum at regular intervals can allow for the possibility of new entrants to enter the market, which is particularly important if markets across the Union face structural competition problems. Even the 'threat' of new market entry has positive impacts on competition. This is especially the case in markets where the number of operators is limited or where there is no longer effective competition." (BEREC, 2017[78])

[13] Paul Milgrom, an economist specialised in auction design, has made a strong case against using administrative selection. He points out that if the good is initially allocated to the "wrong hands" in the primary market, there is no way of designing a private bargaining process (i.e. secondary market) without delays or failures (Milgrom, 2000[14]; Hazlett, Muñoz and Avanzini, 2011[15]).

[14] Article 167 of Law No 9 472 of 1997 amended through Article 2 of Law 13 879 of 2019: "In the case of authorized services, the term will be up to 20 (twenty) years, extendable for equal periods, being necessary that the authorized party has fulfilled the obligations already assumed and expresses prior and express interest."

§ 1 The extension, always onerous, may be requested up to three years before the expiration of the original term, and the application must be decided in a maximum of twelve months.

§ 2 The rejection will only occur if the interested party is not making rational and adequate use of the radio frequency, if there have been repeated violations in regulatory compliance or if it is necessary to modify the allocated use of the radio frequency.

§ 3 In the extension provided for in the caput, investment commitments must be established, according to Executive Power guidelines, alternatively to the payment of all or part of the public price amount due for the extension. (Included by Law No. 13 879, of 2019)." See http://www.planalto.gov.br/Ccivil_03/leis/L9472.htm.

[15] Administrative Act SEI 53500.025122/2014-48.

[16] That is, the requirement of communication service providers to make their networks available for interconnection on a non-discriminatory basis if it is technically feasible.

[17] Following the B band spectrum auction in 1997, there were ten mobile service areas in Brazil.

[18] Using the exchange rate of 2.160 BRL/USD for the year 2013 from OECD.stat (https://stats.oecd.org/).

[19] Using the exchange rate of 3.330 BRL/USD for the year 2015 from OECD.stat (https://stats.oecd.org/).

[20] Further details in: https://www.anatel.gov.br/setorregulado/snoa.

[21] Agreement No. 371 – regarding process number 53500.078714/2017-13 of 17 July 2019.

[22] Anatel has also collaborated with private sector stakeholders to promote responsive regulation. One example is ABR Telecom (Associação Brasileira de Recursos em Telecomunicações), the association of operators in charge of managing the technical aspects of portability, fraud, lists for consumers to block telemarketing and consultation if their identity numbers have been associated with a prepaid account (Cadastro de Pessoa Física).

[23] For more information on the survey framework, see Resolution 654 of 13 July 2015. See also: www.anatel.gov.br/paineis/consumidor/pesquisa-de-satisfacao.

[24] MCTIC estimated the number of such communities at 30 000 in 2017, although the criteria used for this estimate are not clearly defined in the legal act establishing the programme.

[25] Article 5 paragraph 1 (a) of the Ministerial Ordinance No. 7 154 of 2017.

[26] Two programmes support telecentres throughout the country: Telecentros.BR, launched in 2009, and the Community Telecentres programme, which started in 2014 (Decree 6 991 of 2009).

[27] TCU Agreement AC-1796-28/19-P.

[28] The seven projects include: i) high-capacity fibre backhaul networks to cover unserved municipalities; ii) high-capacity backhaul network, with any technology, where fibre optic is not financially viable; iii) 3G or more recent technology in underserved districts (i.e. 2 012 out of 4 929 municipalities, not including capitals), iv) 4G or higher infrastructure in all underserved municipalities with fewer than 30 000 inhabitants; v) expansion of last mile fibre optic infrastructure in municipalities commercially unattractive and in peripheral areas of large cities with low average internet access speeds; vi) deployment of "essential public networks", referring to networks that serve public interest services (e.g. education, research, health, public security and defence); and vii) deployment of 3G networks or higher in motorways and underserved rural areas.

[29] Embedded universal integrated circuit card (EUICC). eSIMs represent the next generation of SIM technology, replacing physical cards with software capable of remotely switching a device between operators. The technology allows one device to host multiple connectivity providers and is designed for use across the whole spectrum of wireless devices, including smartphones and IoT modules.

[30] Some advantages of eSIMs include the simplification of global deployment logistics. A single programmable eSIM can be embedded into all IoT devices and shipped to any market in which the eSIM has a home agreement with the MNO, which would mitigate the need to use permanent roaming (Rehak and Freire, 2019[75]).

[31] Other countries that apply taxes and fees on activation are the Dominican Republic, Egypt, Italy, Nicaragua, and Turkey. Some – such as Italy – have made exceptions for IoT devices (GSMA, 2019[79]).

[32] The public consultation submitted in August 2019 can be found here: https://www.anatel.gov.br/institucional/noticias-destaque/2333-anatel-aprova-consulta-publica-para-diminuir-barreiras-a-expansao-de-iot-e-m2m-no-brasil.

[33] http://www.abc.gov.br/training/informacoes/abc_en.aspx.

[34] Decree No. 9 677 of 2019.

[35] Art. 19 Lei Geral de Telecomunicações (LGT), Law No. 9 472/1997: "The Agency is responsible for adopting the necessary measures to serve the public interest and for the development of Brazilian telecommunications, acting with independence, impartiality, legality, impersonality and publicity, and especially:
I - implement, within its sphere of competence, the national telecommunications policy;
II - represent Brazil in international telecommunications organizations, under the coordination of the Executive Branch; […]."

[36] These agreements have been signed with different countries and institutions: Russian Federation (hereafter "Russia"), Argentina, United States, Portugal, Canada, Chile, the European Commission, France, Peru, Colombia, People's Republic of China (hereafter "China"), Ecuador, Japan, International Development Bank, The World Bank and BRICS (Brazil, Russia, India, China and South Africa).

[37] Recommendation D.97 of the ITU Study Group 3 of the Telecommunication Standardization Bureau of the ITU (ITU-T SG3).

6. Convergence

This chapter assesses the policy and regulatory framework for broadcasting and pay TV services in Brazil. It looks at licensing of both free-to-air broadcasting and pay TV services, as well as related data collection. Must-carry rules, the digital terrestrial television transition and issues related to public service and community broadcasting are covered. A section on local content examines subsidies and licensing, content quotas and pluralism, and new platforms and services. The second half of the chapter examines competition policy related to mergers and acquisitions, significant market power and advocacy. It also analyses specific competition cases in the communication and broadcasting sectors in light of a convergent environment.

Policy and regulatory framework for the broadcasting sector and pay TV in Brazil

Licensing of FTA services

Free-to-air (FTA) broadcasting services are considered public services in Brazil. As such, private broadcasting stations operate through a delegated act from the State, as defined by the Constitution of 1988, to provide services through a concession. The licensing process of broadcasting services is mainly regulated by Decree No. 52 795 of 1963, and by subsequent decrees amending the text. Namely, Decree No. 236 of 1967 limits the number of concessions per region and the ownership structure, while Law No. 13 424 of 2017 defines the renewal process of broadcasting licences.

The assignment process for broadcasting licences (*outorga de concessão para serviço de radiodifusão*) is administered by the Ministry of Science, Technology and Innovation (Ministério da Ciência, Tecnologia, Inovações e Comunicações, MCTIC). The process depends on whether the licence is for television or radio, and on whether the station will be used for commercial or educational purposes.

The licensing for commercial TV stations is conducted through a public procurement process with competitive bids, which is regulated by the General Procurement Law No. 8 666 of 1993. The licensing process is lengthy, with multiple steps, and may take many years (Figure 6.1). While official and reliable data are not readily available, some stakeholders claim that obtaining a commercial TV broadcasting licence may take 10-15 years.

The process starts with MCTIC publishing a call for tenders, in accordance with the National Broadcasting Licensing Plan (Plano Nacional de Outorgas, PNO). The PNO is a non-binding document published by MCTIC with the upcoming calls for tender in each region. The call for bids is rare; the last call for commercial TV licences was published in 2010. There have also been specific calls for educational TV broadcasting stations (2011), educational radio stations (2011-12), community radio stations (2011 and 2012-13) and television retransmission (2012) (MCTIC, 2020[1]).

The process after the public call for bids close is extensive. After a 60-day window for bids, a commission within MCTIC analyses the bids according to the criteria of best economic offer and best technical conditions to operate. The winning entity then has 120 days to specify all the technical operational details and the physical location of the station.

If all required documents are properly submitted and deemed valid, the licence application is sent to the President of the Republic for approval. Once the President approves, and after the entity has paid for its offer, the entity and MCTIC sign a concession contract; an extract is published in the official federal gazette. However, the contract will only be valid after obtaining final approval of Congress, as mandated in Article 223 of the Constitution.

The procedure continues at the National Telecommunications Agency (Agência Nacional de Telecomunicações, Anatel), which authorises use of the radiofrequency spectrum. After Anatel's technical approval and registration, the station must be operational within 12 months or the licence will automatically expire. Licences for television stations are valid for 15 years and can be renewed indefinitely without another bidding process.

MCTIC and Anatel seem to co-operate, but the process remains complex and entails high transaction costs. For example, Anatel checks for irregularities in the application, but MCTIC determines how to deal with any that turn up.

In addition to steps between MCTIC and Anatel, approval by the President's Office can add up to two years to the process. Approval by Congress is said typically to take around

four months. Interaction between the federal government and the states can also introduce delays. For example, clearance from the federal tax revenue office only remains valid for only 30 days. This is often not enough time for the states to respond. As a result, the process often expires before it is complete.

Figure 6.1. Licensing process for commercial TV stations in Brazil

Source: OECD based on MCTIC (2020[2]), *Espaço do Radiodifusor: Radiodifusão Comercial*, https://www.mctic.gov.br/mctic/opencms/comunicacao/SERAD/radiofusao/detalhe_tema/radiodifusao_comercial.html (accessed on 2 April 2020).

Brazil allows retransmission of signals in certain circumstances. The signal of the main television station may not reach all locations near border areas or if it does it may be inadequate. In such cases, other entities can operate stations dedicated to retransmitting (Retransmissão de Televisão, RTV). They can also repeat the signal (Repetição de Televisão RpTV) produced by a content-generating station (i.e. television retransmission).

Any interested party can request an RTV or RpTV broadcasting authorisation, which MCTIC issues according to Decree No. 5 371 of 2005, which is subject to the availability of spectrum managed by Anatel. This authorisation does not grant the right to create content. Rather, it enables retransmission of content from a main television station.[1]

In contrast to a broadcasting licence, the RTV and RpTV broadcasting authorisation has no predetermined period of validity, can be revoked at any time by a ministerial decision, and does not require approval of the President or Congress.[2] There are 8 470 digital television retransmission authorisations in Brazil, which compares to 680 television licences (MCTIC, 2020[1]).

Licensing for commercial radio stations follows the same process as the one for television stations (Figure 6.1) except the Minister of Communications approves applications rather than the President (Decree No. 52 795 of 1963, art. 6). Licences for radio stations are valid for ten years. They can then be renewed successively by ministerial decision, followed by presidential sanction. No other bidding process or approval by Congress is needed (Brazil, 1972[3]).

Licences for educational radio and television stations with no commercial purposes are exempt from a bidding process (Decree No. 52 795 of 1963, art. 13 and Law-Decree No. 236 of 1967, art. 14). Hence, only MTCIC needs to analyse demands for licences. It approves licences for radio stations, while the President approves licences for television stations. Afterwards, they are sent to Congress for final approval. Public institutions or universities are the only ones entitled to set up educational television stations.

The Law-Decree No. 236 of 1967 (art. 12) limits the number of radio or television station licences for an entity at any given locality. For television stations, the limit is ten licences, with a maximum of two in each state. Only five of the ten licences may use the very high frequency (VHF) spectrum. For radio stations, the number depends on the technology and coverage area (i.e. local, regional or national). This limitation effectively requires entities to use retransmitting or repeating services to cover greater geographical areas. It also means that larger television groups work through affiliates rather than exercising direct control and ownership.

There is also a large number of community radio broadcasters in Brazil. Community radio broadcasting service is regulated by Law No. 9 612 of 1998 and by Decree No. 2 615 of 1998. Ministerial ordinances specify the rules of the public concession and service provision. The process also requires the publishing of a PNO, an invitation for public bidding and assessment of the files. When more than one party is interested in the licences, a selection process is carried out. MCTIC validates documents and publishes results, which are then reviewed by the President and Congress. Cancelling the licence before the end of this period is only possible if authorised by a final court decision, as established in art. 223 of the Constitution (Brazil, 1988[4]).[3]

In addition to this complex procedure, community radio broadcasting must meet requirements for local community coverage. This includes site installation; a board of directors formed by local residents; and use of low power (i.e. not more than 23 watts in the transmission of their programming). They may not insert commercial advertising; licences are valid for ten years.

MCTIC collects a licence fee for commercial broadcasting television, but the methodology for calculating the price was not complete at the time of writing. Anatel collects additional fees for use of spectrum, station licence, installation and operation fees (Chapter 7). The renewal of any type of broadcasting licence is not onerous.

Technical initiatives to improve the broadcasting licensing process to adopt proven automated approaches are currently under consideration or being implemented. Decree No. 9 138 from 2017 reduced the number of documents needed to renew broadcasting licences from 23 to 17. This move is expected to shorten the licensing request period to one year.

Substantial automation of the entire system is envisioned through Mosaico, a unified digital platform to manage spectrum resources developed and managed by Anatel (Anatel, 2020[5]). The intent is to consolidate Anatel data from many different systems and databases (e.g. on grants, coverage and billing) and to make the data accessible to the public. This initiative would benefit from automation processes used for similar projects by OECD countries such as Mexico.

Anatel is laying the foundation to improve spectrum management for broadcasting services, but reforms will require legislative approval. Anatel Resolution No. 721, published on 12 February 2020, has two aims. First, it seeks to modernise the allocation and assignment of radio frequency spectrum bands. Second, it aims to assign channels for radio and television broadcasting services to better accommodate the use of digital technology. These proposed reforms would require revision of legislation for broadcasting and ancillary services.

Brazil has a complex process for granting broadcasting licences compared to other countries. This complexity pertains to separate approvals required, typical time required to obtain a licence and number of applications awaiting processing. In the United Kingdom, for instance, the regulator Ofcom seeks to award licences in 25 days; in Brazil, stakeholders mention decisions that take 8-15 years. Estimates of the waiting lines for broadcasting licence applications vary widely. However, lines can reach more than 5 000 when licences for community broadcasting are excluded. Overall, the backlog of broadcasting licence applications can reach into the tens of thousands, although not all of these are for new licences. Some are requests for renewal, or for increased power.

Licensing of pay TV services

The Brazilian legal framework distinguishes sharply between broadcasting and pay TV. Broadcasting is defined as public and commercial FTA services and radio, while pay TV is defined by the SeAC law (Lei do Serviço de Acesso Condicionado, Law No. 12 485 of 12 September 2011) (Brazil, 2011[6]). In this respect, the definition of broadcasting excludes delivery of content over cable or satellite since consumers must pay for it.

The SeAC law covers paid TV content irrespective of how technology is delivered. It thus includes cable, microwave (i.e. multichannel multipoint distributions service [MMDS], also known as "wireless cable"), and satellite delivery of content. The SeAC law identifies four distinct activities in the value chain: production, programming, packaging and distribution (Box 6.1). These activities are overseen by Anatel and the National Film Agency (Agência Nacional do Cinema, Ancine).

The SeAC licensing process, which lies wholly within Anatel, is becoming more efficient. Anatel previously took about a year to license pay TV services. However, recent improvements, such as use of the Mosaico system, have shortened the process to about six months.

The pay TV licensing process is not particularly cumbersome, but disparities may undermine convergence. A large disparity exists between SeAC licences and those that apply to FTA broadcasters, educational broadcasters and community broadcasters which are not well suited for a convergent environment.

Box 6.1. Value chain of pay TV according to the SeAC law

With the enactment of the SeAC law in 2011, all modalities of pay TV services (i.e. cable, satellite, multichannel distribution service, and pay TV services using ultra-high-frequency [UHF] channels) were incorporated within a common pay TV services framework. The law distinguishes among four activities that collectively comprise the value chain:

- Production: elaboration, composition, constitution or creation of audio-visual content.
- Programming: selecting, organising or formatting audio-visual content presented in the form of programming channels.
- Packaging: organising programming channels to be distributed to the subscriber.
- Distribution: delivery, transmission, broadcasting, distribution or provision of packages or audio-visual content to subscribers by any electronic means.

Ancine has responsibility for content programming and packaging, while Anatel oversees content distribution.

Legislation that prohibits vertical integration may undermine the move towards convergence. As mentioned in Chapter 2, the SeAC law resulted from the desire of the audio-visual sector for support to produce independent content, among other objectives.

The law also brought vertical ownership restrictions related to telecommunication and pay TV services in Brazil. Namely, Articles 5 and 6 prohibit *de facto* vertical integration of content distribution (i.e. communication providers) with content producers or programmers. Article 5 stipulates that communication service providers cannot own more than 30% of a content producer or programmer. Article 6 prohibits communication service providers from hiring national artistic talents or licensing events of national interest to produce content.

Vertical integration should be studied on a case-to-case basis. A blanket prohibition may raise competition issues in a convergent environment. The issues related to that ownership restriction, for example, became a critical point in the merger procedure between AT&T and Time Warner (Warner Media) (see subsection on competition).

Efforts are being carried out to simplify regulations concerning pay TV services. Ancine, for example, approved the Instructive Norm No. 153 of 18 March 2020 based on a regulatory impact assessment (Ancine, 2020[7]). This has resulted in the largest reform on pay TV since the SeAC law (Possebon, 2020[8]). The most significant change with respect to compliance revolved around the national content quota. The reform reduced redundancy on requirements from pay TV channels from the same economic group, and increased the validity of the use of the same content for quota purposes to seven years. It also allowed compensation of national quotas from one week to the other. Moreover, as a result of the changes, Ancine also simplified regulations. For example, it revised guidelines on prior disclosure of programming; it reduced reporting requirements from sports and news channels; and it matched advertisement time rules to FTA regulations with the Instructive Norm No. 153 (Ancine, 2020[7]).

Brazil needs a coherent approach to convergence. Anatel and Ancine are both currently investigating, albeit separately, how over-the-top (OTT) services are changing the dynamics of the pay TV market. They are both taking targeted measures and responding to merger cases to help both foreign and national service providers to adapt to a new technological context. However, they are working independently. Brazil needs a coherent institutional and regulatory framework to promote convergence.

Data collection of pay TV and broadcasting services

Greater efforts are needed to collect and analyse data for broadcasting services. Anatel, following its mandate, only collects data on pay TV services. It provides data for subscriptions on pay TV by technology and by state. Some information on concessions and frequencies assigned for broadcasting is also available on Anatel's data portal.

However, MCTIC is responsible for the collection and publication of FTA broadcasting data. Most pending licensing applications are paper-based and not digitised. Therefore, data from pending applications are still based on estimates. MCTIC does not collect data rigorously or classify them appropriately.

Starting in 2019, MCTIC began introducing business intelligence systems to improve the process of licence applications by broadcasters, as well to streamline its analysis routines. MCTIC is looking into automating the analysis of licence applications. However, substantial efforts are still needed to improve data collection, monitor the quality of service and streamline data governance in the broadcasting sector.

Must-carry rules

"Must-carry" rules apply to the compulsory transmission of certain channels (canais de programação de distribuição obrigatória) by both cable and satellite TV services defined by the SeAC law. Anatel regulates must-carry rules through Resolution No. 581 of 26 March 2012 and its amendments (Anatel, 2012[9]). Must-carry rules establish that pay TV operators must carry at least one channel from recognised national FTA broadcasters unless they can prove technical or economic unviability. As of February 2019, Anatel recognised 16 national footprint FTA broadcasters: Band, Canção Nova, Globo, Ideal TV, TV Aparecida, Record, Record News, Rede Brasil de Televisão, Rede Internacional de Televisão, Rede CNT, Rede RBI, Rede TV!, Rede Vida, SBT, TV Cultura and TVCI) (Anatel, 2019[10]).

Must-carry rules are typically applied according to the transmission technology. This is because cable TV is considered a local service, while satellite TV is considered a service with a national footprint. Satellite TV services are only required to carry one channel for each of the 16 national networks. Networks that cover more than one-third of the population and at least five regions of Brazil are considered to be "national"; as a result, direct-to-home (DTH) satellites are obliged to carry the signal.

There are likewise differences between analogue and digital channels for must-carry. Satellite and cable distribution platforms are obliged to carry analogue channels, but not obliged to pay. For digital channels, they typically negotiate a price. FTA broadcasters may wish not to have their signals carried over, but in Brazil, all main national channels have signed agreements to have pay TV operators distribute their channels. Copyright contracts typically anticipate transmission of content conducive to these agreements.

Must-carry rules also include the transmission of public channels, as established by SeAC, without any type of financial compensation in return:

- analogue channels of local broadcasters
- channels of the federal legislative powers (TV Senado and TV Câmara) and of municipal and state assemblies
- Federal Supreme Court channel (TV Justiça)
- Executive power channels (TV Brasil/EBC and NBR)
- educational and cultural channels from the federal government (reserved but not implemented)
- community channel (reserved for shared use by non-governmental organisations, but not implemented)
- citizenship channel (reserved for shared use by the federal, state and municipal governments, but not implemented)
- university channel (reserved for shared use by high-level education institutions, but not implemented).

Digital terrestrial television

Brazil began to set standards for digital terrestrial television (DTT) in the 1990s. Working groups were set up by the Ministry of Communications (1991), the Brazilian Association of Radio and Television Broadcasters (Associação Brasileira de Emissoras de Rádio e Televisão, ABERT) and the Brazilian Society of Television Engineering (Sociedade Brasileira de Engenharia de Televisão) (1994).

In 1998, Anatel and the Ministry of Science and Technology joined the process, which resulted in technical support for the Japanese ISDB-T standard. This standard was chosen largely on the basis of the quality of its mobile reception (CNTV, 2018[11]).

In 2003, Presidential Decree No. 4 901 officially established the Brazilian System of Digital Television (Sistema Brasileiro de Televisão Digital, SBTVD). It announced several public objectives for digital television in Brazil (Brazil, 2003[12]):

- promoting social inclusion and cultural diversity
- creating a universal network for long-distance education
- fostering Brazilian technology and the national industry of ICT.

The SBTVD Committee oversaw a series of public events and consultations. Subsequently, Decree No. 5 820 of 2006 (Brazil, 2006[13]) announced that the digital television transition would be achieved by 2013 with the analogue switch-off by 2016. The decree officially adopted the ISDB-Tb standard. This is the ISDB-T with a few modifications enabling interactive middleware applications such as Ginga.[4] It also mandated that commercial broadcasters would have 6 MHz for ten years for simultaneous analogue and digital transmissions. Commercial broadcasters had until 2011 to express interest for a "mirror" digital channel (CNTV, 2018[11]).

Despite these plans, the analogue switch-off was delayed. In 2013, the government issued a ministerial ordinance to accelerate the digital TV transition and to release the 700 MHz band for IMT (Ministério das Comunicações, 2013[14]). This was accompanied by Presidential Decree No. 8 061 of 2013 that modified the timeline, establishing the analogue television switch-off between 2015 and 2018 (Brazil, 2013[15]).

From 31 August 2013, only digital broadcasting licences were granted. The plan for television channels was modified, and by the end the 2013, part of the 700 MHz band was auctioned (Chapter 5). Winning bidders had to ensure the successful completion of the digital switchover by carrying out different activities. These ranged from communication campaigns to distribution of digital TV reception set-top boxes for low-income families to ensure that 90% of the affected households could receive digital TV before the analogue switch-off.

Difficulties with the analogue switch-off in Rio Verde city and in the State of Goiás prompted the government to divide its initial plan into two stages. The first phase (2016-18) would perform the switch-off in all the state capitals, metropolitan areas and other areas required to rapidly release the 700 MHz band. The second phase (up to 2023) would perform the switch-off in the remaining regions of the country. The project budget would be primarily used to complete the first phase, including communication campaigns and the distribution of digital TV (DTV) reception set-top boxes to expand coverage.

In the first phase of the switch-off process, 1 379 cities, distributed in 62 different clusters, went through the analogue switch-off. This represented nearly 130 million people (63% of the population). More than 12 million DTV set-top boxes were distributed for low-income families. The second stage of the plan, running from 2019-23, aims to cover the remaining 37% of the population (more than 77 million people), distributed in 4 191 cities.

As in the first phase, individual broadcasters rather than municipalities are implementing the switch-off in the second phase. The cost of set-top boxes has varied given that many parts need to be imported and that technical specifications were reformulated. By the end of the first phase in 2018, unit costs were around USD 45.7 (BRL 167) before distribution expenses. Television transmitters linked to local governments pose a particular challenge as many are still broadcasting in analogue mode.

Going forward, there will be little need for set-top boxes. Since 2012, all flat-panel TVs have been required to have a DTV receiver. By 2023, all TV sets in Brazil will likely have one.

Brazil has fallen short of achieving all of its goals for the digital transition. The country has allocated and assigned the 700 MHz band in a timely fashion and distributed set-top boxes for low-income populations. Despite these successful technical accomplishments, the 2003 objectives for a more inclusive and diverse television ecosystem were not attained. For example, Brazil has not awarded any new commercial broadcasting licences since the digital transition took place, despite the ample availability of spectrum.

The digital transition was a missed opportunity to transform the sector. With all the spectrum available, the DTT transition in Brazil could have been used to reform the broadcasting sector. Specifically, it could have helped reduce market concentration, promote media plurality with the entry of new actors, streamline administration and foster transparency in licensing. Ultimately, however, it served to reproduce the same economic and institutional structures (CNTV, 2018[11]).

Multiprogramming (i.e. the transmission of multiple sub-channels of content within a single 6 MHz digital channel slot) is technically feasible in the Brazilian digital TV system. However, Brazil has only authorised its deployment to four public channels within the federal branch of government. These were explicitly named in the law that implemented digital television to be used for specific public purposes (Brazil, 2006[13]). Specifically, commercial, educational and community broadcasters are not allowed to use multiprogramming.

In the context of the COVID-19 crisis, Brazil has temporarily expanded the scope of multiprogramming. It now enables commercial broadcasters that partner with federal, state or municipal entities to provide content related to education, science, technology, innovation, citizenship and health (Brazil, 2020[16]).

Overall, Brazil has made only limited use of multiprogramming capabilities to date. This must be viewed as an additional missed opportunity of the digital transition. Full exploitation of multiprogramming could potentially enable a huge increase in the number of channels available. This, in turn, could represent a gain both in competition and in media pluralism.

Public service broadcasting

The 1988 Constitution (Article 223) establishes the principle of complementarity between the commercial, public and government broadcasting regimes. This means these three services should co-exist and not substitute each other. However, sectoral laws have not made this principle explicit or explained the difference between public and government broadcasting.

In many OECD countries, public broadcasting may serve as an important complement to the programming, providing content that satisfies interests not otherwise addressed. Where such broadcasters are independent of government, they are called public service broadcasters (PSBs). Typically, PSBs provide educational, children, religious, cultural and minority interest programming, which might not be commercially attractive. At their best, these broadcasters also provide a trusted and quality news service and high-quality universal service content (Mendel and Salomon, 2011[17]).

The primary PSB in Brazil is the Empresa Brasil de Comunicação (EBC). EBC was created by Decree No. 6 246 of 24 October 2007, which was subsequently converted into Law No. 11 652 of 7 April 2008. EBC consolidated and expanded on various institutions that already existed and sought to provide an integrated structure (Box 6.2).

Box 6.2. The Brazilian Broadcasting Company

The Brazilian Broadcasting Company (Empresa Brasil de Comunicação, EBC) was created in 2007 by Provisional Measure No. 398 and Decree No. 6 246. EBC inherited the radio and TV channels managed by the State-owned Radiobrás and the Educational Communication Association Roquette-Pinto (Associação de Comunicação Educativa Roquette-Pinto). EBC was in charge of unifying and managing federal public broadcasters, establishing the Public Communication System and articulating a vision for the National Public Communication Network (Rede Nacional de Comunicação Pública, RNPC).

The entity, headquartered in Brasilia, has regional offices in Rio de Janeiro and São Paulo. EBC has a budget of around USD 178 million (BRL 650 million). Of this amount, USD 109 million (BRL 400 million) is used to operate the network. EBC is staffed with 800 journalists, 500 employees in other content activities and 500 technicians. Part of EBC's budget comes from the Contribution to Foster Public Broadcasting (Contribuição para o Fomento da Radiodifusão Pública, disbursed by the Telecommunication Fund (Fundo de Fiscalização das Telecomunicações) (Chapter 7).

The television broadcasting channels that are part of EBC include TV Brasil and TV Brasil Internacional. In April 2019, the TV NBR channel was shut down and merged under TV Brasil.

The RNPC network has 4 main broadcasting stations and more than 40 partner stations. EBC also provides governmental communication services through TV Brasil (previously TV NBR) group and the radio broadcast programme "A Voz do Brasil".

Source: EBC (2020[18]), "Sobre a EBC", http://www.ebc.com.br/institucional/arquivo/sobre-a-ebc (accessed on 10 March 2020).

EBC was created with an intent similar to that of other national public broadcasting systems. Specifically, it sought to strengthen democracy in Brazil by adding another voice to the public discourse. This voice would complement commercial broadcaster content, and be independent of government control.

The resources of the EBC to achieve its goals have always been modest compared to some of the best-known national public broadcasting systems. In 2019, for example, EBC had some 2 000 employees, and a budget of USD 158 million. By comparison, the United Kingdom's BBC had more than 22 400 employees in 2019, and revenues of USD 6 209 million. In the same year, Canada's CBC had 7 400 employees and revenues of USD 438 million. The BBC and the CBC have greater resources even though both serve countries with far fewer residents than Brazil.

In 2016, the government implemented changes in the governance structure of EBC by means of Provisional Measure No. 744. It enabled the President to dismiss the Director of EBC, who under previous law could not be removed from office before the expiration of his or her four-year term (Toffoli, 2016[19]). In addition, Provisional Measure No. 744 sought to abolish the Executive Board of the agency. It also abolished the Curator Committee, replacing it with an Editorial and Programming Committee.

The provisional measure was subsequently converted into Law No. 13 417 of 2017 (Brazil, 2017[20]). All of the changes reduced the independence of EBC, placing it directly under the control of the President. Civil society stakeholders, journalists and EBC employees criticised these measures for undermining the editorial autonomy of EBC (Intervozes; Reporters without Borders, 2020[21]) (Herrera, 2019[22]).

In 2019, Decree No. 9 660 attached EBC to the Special Secretary of Communications of the Presidency (Brazil, 2019[23]). In April 2019, a decision from EBC unified the main public channel in the country, TV Brasil, with the government channel TV NBR, rebranded as the new TV Brasil.

The Federal Prosecutor's Office (Ministério Público Federal, MPF) has questioned the constitutionality of this restructuring. MPF argues it may be a possible infringement of the separation between commercial, public and governmental broadcasting regimes. It has also expressed concerns about the impact of the restructuring on social participation and plurality of views (Ministério Público Federal, 2019[24]).

Decree No. 5 820 of 2006 (Brazil, 2006[13]) established the assignment of broadcasting spectrum, as well as the framework for the transition to digital television. For each digital commercial channel, the firm awarded the concession must be assigned a channel of 6 MHz for digital transmission. This is in addition to any spectrum the firm may have already held for analogue transmission. The decree also obliges MCTIC to ensure that at least four channels of 6 MHz each are available to the federal government in each of the significant municipalities identified in Anatel's Basic Plan for Digital TV Channels (Plano Básico de Canais de TV Digital, PBTVD). These four channels are intended to transmit i) sessions of the Executive branch; ii) educational programmes for long-distance learning; iii) cultural programmes; and iv) local community programmes (the "citizenship" channels). Out of the four reserved channels, only the Executive branch channel was implemented.[5]

Additionally, Anatel included in its spectrum planning the digital channels to serve the existing public broadcasting channels of the EBC (Box 6.2), the Chamber of Deputies, the Senate and the Federal Supreme Court (Anatel, 2011[25]).

There are seven public FTA channels with significant national coverage in Brazil (Table 6.1).

Table 6.1. Public broadcasting channels with national coverage in Brazil

Channel	Founded	Type of broadcasting	Owner
TV Brasil	2007	Digital FTA, satellite, cable and online	EBC
TV Justiça	2002	Digital FTA, satellite, cable and online	Federal Supreme Court
TV Câmara	1998	Digital FTA, satellite, cable and online	Chamber of Deputies
TV Senado	1996	Digital FTA, satellite, cable and online	Senate
TV Cultura[1]	1960	Digital FTA, satellite, cable and online	State of São Paulo
TV Escola[2]	1996	Digital FTA, satellite, cable and online	Ministry of Education
Canal Saúde	1990	Digital FTA, satellite, cable and online	Ministry of Health

1. TV Cultura is not a federal public broadcaster, but a state-level broadcaster with a national footprint.
2. TV Escola is operated by ACERP, an association. Its contract with the Ministry of Education was not renewed in December 2019. Therefore, continuation of the channel is uncertain (as of March 2020). Digital FTA services of TV Escola are only available in Brasilia.

In 2009, the government established a plan to deploy a common integrated broadcasting infrastructure to be used by all public channels (including TV Câmara, TV Senado, and the Executive Power channel [currently under EBC]). The other public channels were also to use this same infrastructure.

The integrated public broadcasting provider, which would have been cost-effective for covering rural areas, has been implemented to a limited extent. In 2012, MCTIC authorised the use of multiprogramming for the four digital channels identified in the decree that implemented digital television (Brazil, 2006[13]). The federal entities responsible for those

channels are permitted to share them with other federal agencies, and with state and municipal authorities, but only for limited purposes. These include educational, artistic and cultural purposes; dissemination of cultural productions and local or regional programmes; and production of independent content.

In 2015, as part of the effort to foster multiprogramming among public channels, TV Brasil, NBR, TV Escola and Canal Saúde launched a system in Brasilia (RNP, 2015[26]). They planned to make this service available in 460 municipalities by the end of 2019, but implementation appeared to be falling short.

Meanwhile, the Legislative Digital Television Network promotes infrastructure sharing by providers of congressional public channels. It brings together over 60 public broadcasters using the same multiprogramming technology to share sub-channels. This arrangement covers TV Câmara, TV Senado and a range of state and municipal assemblies (Câmara dos Deputados, 2020[27]).

Financial autonomy is a crucial condition for a sustainable public service broadcasting system, but EBC appears to lack stable funding. The public service broadcasting system should not be subject to inappropriate financial or political pressures in its editorial decisions. Predictable funding, independent of the political cycle, is essential to journalistic and programming independence. In the United Kingdom, for example, the BBC is mainly funded by a service fee paid by consumers, which goes directly to the BBC's budget. In the United States, PBS is supported by cultural grants and donations from viewers and listeners. In Brazil, Law No. 11 652 of 2008 (Brazil, 2008[28]), as amended, provides several sources of funding, including normal budget allocations for EBC. In addition, the amendment to the law obliges telecommunication service providers to contribute funds to EBC. The defined funding sources, however, do not appear to provide EBC with a stable source of funding.

EBC needs stable and sufficient funding, as well as editorial autonomy, to function well. PSBs can play an important role in informing citizens. This is particularly relevant if the objective is to provide verified and reliable content that follows strict journalistic standards. PSBs could potentially serve Brazil well as services are widely available. To function well, however, they need to be independent and well- funded. Some sources indicate EBC has never been resourced at the level needed to fulfil its full potential (Mendel and Salomon, 2011[17]).

Community broadcasting

Community broadcasting refers to broadcasting stations based in civil society that operate for social objectives rather than for profit. These broadcasters have a strong link to a particular community, whether based on geography or an interest (Mendel and Salomon, 2011[17]). Community broadcasting is widely recognised for its important contribution to diversity and pluralism (Mendel and Salomon, 2011[17]). It typically depends on special licensing procedures, reserving spectrum for this purpose and often relying on targeted financial schemes and subsidies.

In Brazil, as in other OECD countries – such as the United Kingdom, Canada and France – community broadcasting is regulated differently than its commercial counterpart. Regulations concerning community radio and community television in Brazil are fragmented and treated within entirely different frameworks.

In Brazil, community radio was created by Law No. 9 612 from 1998 (Brazil, 1998[29]). It is regulated by Decree No. 2 615 of 1998 and Ministerial Ordinance No. 462 of 2011, which establish the criteria for the granting and renewal of community broadcasting licences. These laws prohibit community radio broadcasters from forming any network, which limits considerably how community broadcasters could share infrastructure. This, in turn, limits

how they can leverage each other's resources to reduce costs to each of their respective communities. They may not carry any advertisements and no public funding has been made available for them.

In sum, community radio broadcasters face many hurdles under Brazilian law, despite the known benefits of allowing these broadcasters to service their community for a small fee. For example, they act as local messengers with information about births, marriages, local products (Mendel and Salomon, 2011[17]).

Community television is framed under a family of regulations in Brazil that is distinct from those used for community radio. The existence of community television is foreseen in the legal instruments that have regulated pay TV since 1995. Specifically, as part of their must-carry provisions, broadcasters must create a "basic channel" (*canal básico*) that contains "community channels for the free and shared use by non-governmental and non-profit organisations" (Brazil, 1995[30]). These provisions were later incorporated into the 2011 SeAC law. Since then, community television in Brazil reaches audiences through must-carry obligations on pay TV service providers, and not through FTA broadcasting. In February 2020, there were 4 607 community FTA broadcasters in Brazil.

The DTT transition in Brazil risks leaving community television behind. Brazil has made advances to provide community television through pay TV technologies, such as cable and satellite TV. TV COM Brasil, for example, brings together 120 community television channels.[6] However, little has been done concerning community television through digital broadcasting. The 2006 decree for digital television broadcasting did not reserve any channels for community television in its vision for the DTT transition.

Community and commercial television broadcasters in Brazil compete on the same playing field, but without the same tools. In practice, to access FTA broadcasting frequencies, community and commercial television broadcasters compete for public bids. It is unclear how community broadcasters can do this effectively given legal limitations on their fundraising. Community broadcasters in Brazil are expected to present applications under a complex, inflexible and opaque system. They then wait up to a decade for a broadcasting licence.

The government needs to engage with civil society and relevant stakeholders to develop, implement and monitor public policy for community broadcasting. Brazil could also benefit from studying how other countries in the region have integrated community needs into FTA broadcasting. Uruguay, the Plurinational State of Bolivia, Ecuador, Chile and Argentina provide examples of good practices for recognising and promoting community FTA television, including the reservation of digital channels (CNTV, 2018[11]).

Local content

Brazil has long been concerned about promoting its national and regional culture through its cinema. The 1988 Constitution, for example, emphasises the importance of local content. Article 220 calls for the "promotion of national and regional culture of fostering independent productions aimed at their diffusion, and regional differentiation of cultural, artistic and press production" (Brazil, 1988[4]).[7]

Over the past decade, Brazil has enacted legislation to strengthen local content in its cinema in response to several setbacks. Embrafilme – the government-owned film producer, distributor and regulatory authority – closed in the 1990s. Coupled with the economic crisis, the loss of Embrafilme resulted in fewer Brazilian films on national screens. In 1993, for example, the Brazilian film industry produced only about 0.6% of all films exhibited in Brazil (Silva and Silva, 2015[31]). These concerns over local content became increasingly prominent around 2009-11. They are notably reflected in laws enacted in 2001, 2006 and 2011 (SeAC).

The situation has improved considerably over the past 20 years, but there is much room to enhance acceptance of Brazilian national productions. It is positive that 81.1% of film launches in Brazil in 2018 were of national productions, but those productions reached only 22.8% of theatre audiences and generated only 19.8% of revenues. In terms of revenues, the five leading studios in Brazil in 2018 were Disney, Warner, Sony, Universal, and Fox (Ancine, 2019[32]).

While FTA and pay TV services are treated differently, successive laws and regulations address the importance of local content consistently. The regulatory framework in Brazil has a sharp dichotomy between FTA broadcasting services and pay TV (including satellite and cable). Despite this split, successive legislative and regulatory instruments have treated local content concerns in a consistent manner. The most notable instruments to foster local content are the following:

- an Audio-visual Sectoral Fund (Fundo Setorial do Audiovisual, FSA) to subsidise the production of Brazilian content, together with a fee to support the national film industry (Contribuição para o Desenvolvimento da Indústria Cinematográfica Nacional, CONDECINE)
- a minimum number of days per year when Brazilian movie theatres (as a function of the number of screens per theatre) must show Brazilian films, and subject to additional requirements to ensure diversity
- package quotas whereby a third of TV channels must show Brazilian content, and a third of these must show independent content of Brazilian origin.

Subsidies and financing mechanisms

Over the past two decades, Brazil has enacted a series of measures to support and stimulate national film production. The country first established subsidies and quotas for national film production in Provisional Measure No. 2 228-1 of 2001 (Brazil, 2001[33]). These arrangements were further refined by Law No. 11 437 of 2006, and again by Law No. 12 485 of 2011 (SeAC).

These same laws created Ancine, which took on the regulatory roles of Embrafilme. Among its responsibilities, Ancine aims "to stimulate the diversification of national cinematographic and video-phonographic production and the strengthening of independent production and regional productions with a view to increasing their offer and constantly improving their quality standards" (Brazil, 2011, p. art. 6[6]).

The above-mentioned laws also created a funding mechanism to support development of the national film industry. Brazil created a fee known as CONDECINE (Contribuição para o Desenvolvimento da Indústria Cinematográfica Nacional) imposed most notably on the "placement, production, licensing and distribution of cinematographic and video-phonographic works for commercial purposes" (Brazil, 2011, p. art. 32[6]). It is imposed by market segment, which is defined to include both broadcasting and pay TV (Brazil, 2011, p. art. 1[6]).

The distribution of CONDECINE funds has evolved since the laws were first enacted. In the 2001 legal text, CONDECINE funds were directed to the general Treasury and then redirected to Ancine to finance the agency. Following the amendments of 2006, the funds were allocated to a new Audio-visual Sectoral Fund (Fundo Setorial do Audiovisual, FSA) within the national culture fund (Fundo Nacional de Cultura) (Brazil, 2011, p. art. 34[6]). However, in some cases, Ancine still collects the funds (Chapter 7). CONDECINE funds are disbursed exclusively for the audio-visual sector through several specific programmes.

The FSA expanded the forms of funding of the audio-visual sector, emphasising investment. It invests in audio-visual content production and participates in its returns. However, if the project does not yield the expected returns, the producer is not indebted to the fund.

Key programmes to support audio-visual content production in Brazil are:

- a programme to support film development (Programa de Apoio ao Desenvolvimento do Cinema Brasileiro, PRODECINE)
- a programme to support the development of Brazilian audio-visual content, including TV programmes and series (Programa de Apoio ao Desenvolvimento do Audiovisual Brasileiro, PRODAV)
- a programme to support the development of cinema and audio-visual infrastructure (Programa de Apoio ao Desenvolvimento da Infraestrutura do Cinema e do Audiovisual, PROINFRA)
- financing mechanisms for the cinema industry (Fundo de Financiamento da Indústria Cinematográfica Nacionao, FUNCINE), which serves as additional support schemes with their own financing methods (Brazil, 2011, pp. art. 42-46[6]).

Content quotas

In parallel with subsidies for film, Provisional Measure No. 2 228-1 of 2001 (Brazil, 2001[33]), which is the same law that established Ancine, introduced quotas for national productions. For cinema exposition in theatres (art. 55), the quota is expressed as a number of days per year, as a function of the number of screens provided by the theatre. For domestic video distribution companies (art. 56), quotas for national content are expressed in terms of the channel's qualified space. **Distribution** has the same meaning here as in the SeAC law, and thus includes cable, satellite and MMDS. **Qualified space** is defined in the SeAC law (Brazil, 2011[6]) as the "total space of the programming channel, excluding religious or political content, sports events and events, competitions, advertising, teleshopping, infomercials, electronic games, mandatory political propaganda, audio-visual content broadcast in free voting hours, journalistic content and show host anchoring programs." For purposes of quotas, however, Ancine Normative Instructions define *qualified space* as "serial or non-serial audio-visual works of the types fiction, documentary, animation, reality show, video-musical and variety" (Ancine, 2012[34]).

An Ancine Normative Instruction from March 2020 sets current quotas, which are updated annually by decree (Ancine, 2020[7]). Summarising, there are three main quotas established for pay TV channels:

- To be classified as a qualified space Brazilian channel under the SeAC law (Brazil, 2011[6]), a distribution channel must provide at least 21 prime-time hours per week of Brazilian audio-visual content (slightly more for a channel for children or adolescents), half of which must be produced by an independent Brazilian producer.
- For other channels, a minimum of 3 hours and 30 minutes per week of content aired on prime-time must be Brazilian and must constitute qualified space, and half of these must be by independent Brazilian production companies.
- For packages or bundles consisting of multiple channels, Ancine Normative Instructions likewise establish quotas (art. 28) on the mix of channels and the content of each in terms of qualified space, Brazilian content and independent content (UNESCO, 2016[35]; Ancine, 2012[34]).

Media pluralism

Media pluralism is generally viewed in two ways. First, it requires a multiplicity of voices that reflect, for example, differences in geography, ethnicity, religion, political perspective and gender. This is sometimes called the *internal* aspect of pluralism. Second, it must be possible to hear those voices over a multiplicity of different media. This is sometimes called the *external* aspect of pluralism. Ensuring that local concerns and preferences are addressed is an important aspect of media pluralism.

Film production in Brazil has increased, but regional and independent content lag behind. Since 2007, Brazil has seen an increase in domestic audio-visual content, including regional and independent productions. This has been driven, among several factors, by market demand, trends in competition among new and existing content distributors, and increased choices for consumers. In addition, subsidies and the financing mechanism and quotas, for example, led to more film production in Brazil during the last decade. Despite ongoing efforts to foster national content, regional and independent content remain insufficient.

For FTA broadcasting, content production remains concentrated in the largest cities in Southeast Brazil (Valente et al., 2009[36]). Namely, these broadcasters are concentrated in Rio de Janeiro (i.e. Globo and TV Brasil) and São Paulo (i.e. SBT, Bandeirantes, Record, RedeTV! and CNT). Valente et al. (2009[36]) found the average FTA broadcasting programming time dedicated to regional content production was only 10.83% (Box 6.3). Another assessment from 2011 identified the insufficient development of Brazilian independent content production (Mendel and Salomon, 2011[17]). The lack of current data on FTA broadcasting is itself a symptom of the fragmented legal and regulatory system in Brazil. Neither Ancine nor Anatel have regulatory responsibility for FTA broadcasters. As a result, there is no systematic gathering of data on market structures, nor developments over time.

Box 6.3. Regionalised FTA programming

In 2009, the Observatório do Direito à Comunicação studies the diversity of content in FTA television in Brazil in terms of the proportion of regional content within FTA programming. In reflecting on these questions, it considered the continental proportions of the country. It concluded that "regionalisation of production emerges as a central issue in order for Brazilians to be able to recognise themselves in this important space of mediation, debate, values and opinions that are the media" (Valente et al., 2009[36]).

The study measured the presence of regionalised programming in broadcast stations in 11 Brazilian capitals: Porto Alegre, Curitiba, Belo Horizonte, Rio de Janeiro, Brasilia, Cuiabá, Salvador, Natal, Recife, Fortaleza and Belém. They measured the percentage of regional production by considering the hours of regional content broadcast per day by each of the 58 broadcasters. These broadcasters represented nearly all of the FTA broadcasting offer in the 11 cities. The study further tabulated results according to the broadcasters' own list of genres, such as journalism, entertainment, sports, culture and more.

The study found the large majority of programming in Brazil is not dedicated to regional content. Most affiliated regional broadcasters analysed simply tend to reproduce content from the large national networks of broadcasters. Data from this 2009 study indicate that only 10.83% of average programming time was dedicated to regional production.

There were considerable differences between networks and across regions. TV Brasil, the public broadcaster, ranked at the top in terms of percentage of hours of programming with regional content (25.55%). Commercial networks had a distinctly lower fraction of time dedicated to regional programming, with an average of 9.14% (Table 6.2).

Table 6.2. Average programming time dedicated to regional content in FTA broadcasting in Brazil (2009)

Broadcaster	Type	Share of hours with regional content (%)
TV Brasil	Public	25.55
Rede TV!	Commercial	12.20
Record	Commercial	11.20
CNT	Commercial	9.14
SBT	Commercial	8.60
Band	Commercial	8.56
Globo	Commercial	7.00
Overall average		10.83
Commercial average		9.14

Source: Valente et al. (2009[36]), *Produção Regional na TV Aberta Brasileira: Um estudo em 11 capitais brasileiras*.

The study sheds light on the economies of scale enjoyed by national productions compared to regional productions. Moreover, it indicates that large national networks often limit their affiliates to showing local or regional programming at specified times.

Legislation and other factors have stimulated creation of Brazilian content on pay TV, but it is in decline. Legislative measures for pay TV introduced in 2001, together with sectoral developments, as well as new trends in market demand coupled with emerging forms of competition among new and existing content distributors and programmers, resulted in an increase of local audio-visual content.

Table 6.3. Percentage of hours of pay TV programming by type of producers in Brazil (2015-17)

Type of producers	2015		2016 (%)	2017 (%)	2018 (%)
	Non-children content (%)	Children content (%)			
Advertisement	5.3	3.6	17.1	19.7	16.1
Foreign	78.9	79.3	52.3	47.4	55.4
Brazilian	5.4	6.4	12.5	17.7	13.8
Brazilian independent	x	x	8.1	10.9	9
Brazilian affiliated	x	x	4.4	6.8	4.8
Others	10.5	10.7	18	15.2	14.7

Notes: x = not applicable. Advertisement is commercial content produced by either foreign or Brazilian producers. Brazilian independent producers are those without any ties to pay TV packaging or distribution service providers. "Brazilian affiliated" may have commercial ties or exclusivity agreements with pay TV packaging of distribution service providers. Others correspond to all content not classified as qualified content (religious, political, sports and journalistic), either foreign or Brazilian, and all content not identified by Ancine.
Sources: Ancine (2017[37]), *Uma nova política para o audiovisual: Agência Nacional do Cinema, os primeiros 15 anos*, https://www.ancine.gov.br/pt-br/conteudo/uma-nova-pol-tica-para-o-audiovisual-ag-ncia-nacional-do-cinema-os-primeiros-15-anos; Ancine (2018[38]), *Informe Anual da TV paga 2018*, https://oca.ancine.gov.br/sites/default/files/repositorio/pdf/tv_paga.pdf.

The percentage of programming hours dedicated to Brazilian content on pay TV grew from 2015 to 2017. It reached a peak of 17.7% of programming hours in pay TV in 2017, well beyond the established quota. However, the proportion of Brazilian content in pay TV declined in 2018 to 13.8% (Table 6.3). This downward trend is likely to reflect the diminishing subscription base of pay TV services in Brazil (Chapter 3).

New platforms and services

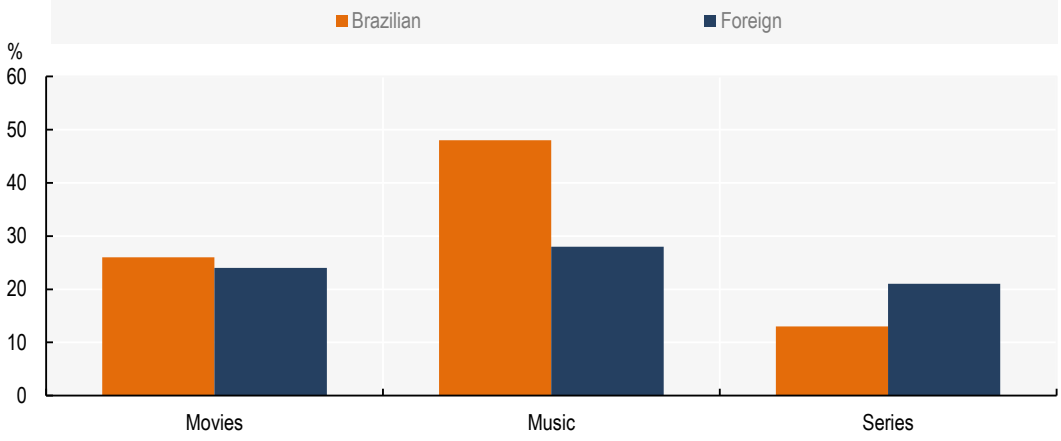
Demand for local and original content has led OTT players to invest in Brazilian productions and expand the Brazilian audio-visual titles included in their libraries, despite the fact that there is no local content quotas applicable for OTT services. Netflix, for example, had ordered the production of 11 original Brazilian titles by 2019. Amazon Prime, which entered the Brazilian market in 2016, ordered its first original Brazilian title in 2019.

Table 6.4. Local content produced by OTT in Brazil

	Movies			Series		
	Unique titles[1]	National titles	Share of library (%)	Unique titles[1]	National titles	Share of library (%)
Netflix	2 757	88	3.2	1 188	39	3.3
Amazon Prime Video	2 750	17	0.6	513	2	0.4
Globo Play	272	83	30.5	314	232	73.9
Claro Video	2 696	63	2.3	189	62	32.8
HBO GO	590	5	0.8	128	13	10.2
Vivo Play	4 310	469	10.9	614	244	39.7
Oi Play	3 930	358	9.1	1 388	408	29.4

1. Only considered unique titles without considering repeated titles (excluding titles under premium packages).
Source: Business Bureau MPC cited by Katz (2019[39]), "Alterações nos mercados de audiovisual global e brasileiro: Dinâmica competitiva, impacto no bem estar do consumidor e implicações em políticas públicas e no modelo de concorrência", http://www.teleadvs.com/wp-content/uploads/191014-Katz-Report_FINAL.pdf.

Figure 6.2. Percentage of individuals consuming online audio-visual content in Brazil (2017), by content origin (foreign or domestic)



Note: Data in the figures reflects answers to these survey questions: "In the past 3 months, did the respondent listen to foreign music [movies/series] on the Internet?", and "In the last 3 months, did the respondent listen to Brazilian music [movies/series] on the Internet?"
Source: CGI.br (2018[40]), "Pesquisa sobre o Uso das Tecnologias de Informação e Comunicação nos domicílios brasileiros - TIC Domicílios 2017", https://cetic.br/pesquisa/domicilios/indicadores.

More Brazilian series than movies were available online. In terms of local content within OTT audio-visual platforms, Brazilian movies represented about 6.3% of the movies' library in the seven main OTT platforms. Meanwhile, Brazilian series accounted for 23.1% (Table 6.4). Moreover, the 2017 ICT household survey in Brazil (CGI.br, 2018[40]) shows that Brazilian content tends to play an important role in the audio-visual content consumed online in the country (Figure 6.2).

Media literacy

Media literacy enables people to have the skills and understanding to make full use of the opportunities presented by both traditional and new communications services, while raising awareness of the potential risks associated with using these services (Ofcom, 2020[41]). While media literacy in important in the traditional audio-visual element, it is even more important in a converged and increasingly online environment. In the latter, content diversity and media plurality may take a different shape than when content is transmitted via traditional channels. Online channels may lead to a "hyper-personalisation" of media content.

Therefore, at present, some converged regulators within the OECD, such as Ofcom in the United Kingdom, are looking into the question of preserving the integrity of user choice in an online environment, by increasing media literacy. According to Ofcom, "in an online environment where the possibility for direct content regulation diminishes, the need for a media-literate public increases. Consumers and citizens need to be aware of the risks and opportunities offered across an array of online and mobile service activities, while stakeholders need to understand and monitor to what extent people are aware of changes and developments (Ofcom, 2020[41])." Looking ahead, an important element for Brazil to consider when designing a new integrated and overarching policy approach to audio-visual content, is how to foster media literacy.

Competition policy and cases in the telecommunication and broadcasting sectors in Brazil

Generally, competition in the communication sector is protected and promoted via *ex ante* sectoral regulation and *ex post* antitrust regulation. *Ex ante* regulatory measures in the communication sector are justified by the existence of market failures that reduce competition. For example, these market failures include network externalities, economies of scale and scope, barriers to entry, existence of essential facilities and switching costs.

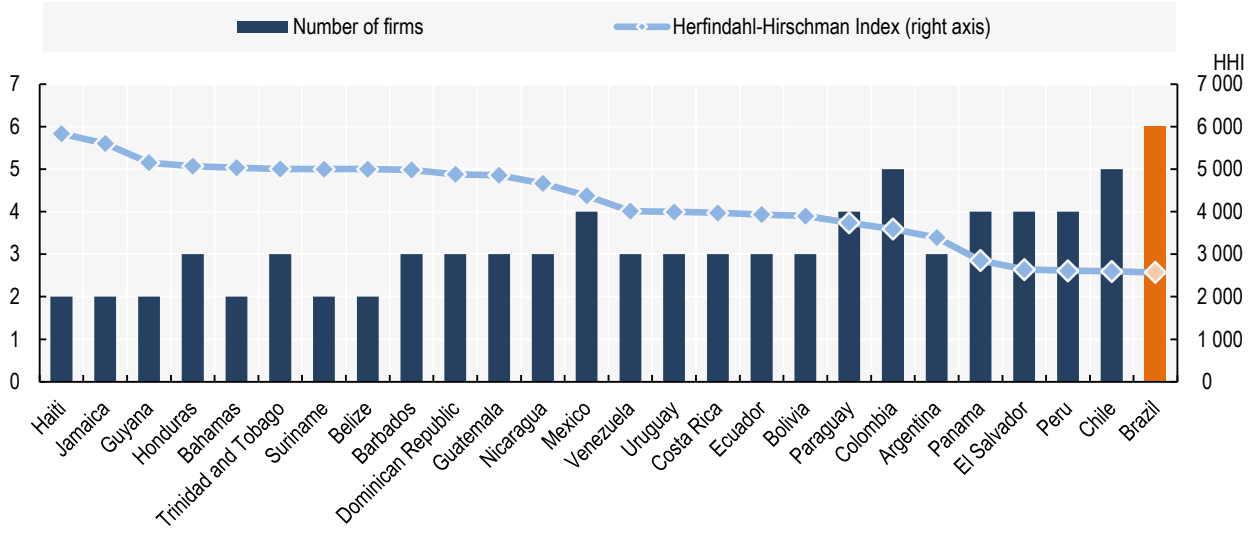
Brazil has adopted this style of *ex ante* and *ex post* safeguarding of competition. The general antitrust regime is complemented by sectoral regulation. In this regard, the Administrative Council for Economic Defence (Conselho Administrativo de Defesa Econômica, CADE), has independent jurisdiction over competition in the telecommunication sector. Anatel, the telecommunication regulator, has also specific *ex ante* competition duties in this sector as well.

The competitive dynamics of the communication sector in Brazil, at a national level, has been relatively stable over time when measured by market shares. Particularly in the mobile telephony market, the level of concentration, measured by number of operators and the Herfindahl-Hirschman Index (HHI) Index, is lower than other countries in the Latin American region (Figure 6.3).

Despite concentration levels in communication markets, such as in the mobile telephony (Figure 6.3), and the vertical integration among network operators and service providers, competitive challenges arise in the communication sector in relation to access to essential infrastructure and potential anticompetitive conducts tending to foreclose the market. Market

conditions vary throughout the country, determined by the circumstances in each municipality. As a result, the intensity of these challenges varies from municipality to municipality.

Figure 6.3. HHI Index for the mobile telephony market in Latin America (2019)



Notes: HHI = Herfindahl-Hirschman Index. Data are for Q4 2019. For Brazil, the six operators included with their respective market shares in terms of connections are: Sercomtel (0.03%); Algar (0.72%); América Móvil, which includes Claro and Nextel (24.9%); Oi (17.2%); TIM (25.18%); and Vivo (31.96%).
Source: GSMA Intelligence (2020[42]), *Data and Analysis for the Mobile Industry* (database), https://data.gsmaintelligence.com/ (accessed on 20 March 2020).

The roles of BCPS, Anatel and Ancine

CADE is the antitrust authority that monitors, prevents and investigates abuses of economic power. Meanwhile, the Secretariat of Competition Advocacy and Competitiveness (Secretaria de Advocacia da Concorrência e Competitividade, SEAE) advocates for competition on behalf of government agencies and society.

CADE's responsibilities are related to the control of anticompetitive conduct on a case-by-case basis. For its part, the sectoral regulator Anatel can impose asymmetric regulations on players with significant market power and declare facilities as essential; this is more in line with *ex ante* regulatory measures.

Both agencies use different instruments to promote and protect competition. On the one hand, Anatel established a regulatory framework based on asymmetric measures to mitigate the possibility of exercising abuse of dominance by an undertaking with significant market power. On the other, CADE can impose appropriate sanctions when an economic agent is found to being engaged in anticompetitive behaviour. It can also review and approve mergers in the communication sector.

CADE does not have a co-operation agreement with Anatel, although the two agencies have co-operated extensively over the years. Eventually, CADE may urge Anatel to provide supporting data and/or analysis on the specificities of the Brazilian communication market. This would inform CADE's investigations into anticompetitive conduct and mergers. Anatel and CADE co-operation agreements would thus help create common ground in the assessment of competition issues in the communication sector.

For audio-visual services, Ancine and CADE have a formal co-operation agreement. In competition cases, Ancine has exclusive responsibility as an expert for content programming and packaging, while Anatel is responsible for content distribution markets. One of the explicit goals of the SeAC law is the "defence of competition through free, fair and wide competition and the prohibition of monopoly and oligopoly in the activities of audio-visual communication of conditioned access". However, the role of Ancine in competition cases is not explicit in the SeAC law. Nor does it appear to be explicit in the enabling measure for Ancine (Provisional Measure No. 2 228-1 of 2001). Still, Ancine clearly can and does play a role in mergers, as seen in the AT&T/Time Warner case.

Multiple regulatory agencies have led to diverse regulations depending on the technology, even though their services overlap. The presence of different agencies without authority to resolve conflicts has created challenges. This creates both incoherent regulations and legal uncertainty.

Moreover, under this fragmented scenario, traditional audio-visual services and new digital service providers such as OTTs, face a different regulatory treatment. For instance, new OTT providers do not have vertical integration restrictions such as the one faced by pay TV service providers. Similarly, consumer protection regulation, regulatory fees and tax schemes are generally more stringent on traditional service providers.

Substantive issues

Mergers and acquisitions

The Brazilian Competition Policy System (BCPS) is composed of CADE and SEAE. It prosecutes any act that seeks to, or can, produce anticompetitive effects, even if such effects are not produced. The legal framework is set out mainly in the 2011 competition law (Law No. 12 529 of 2011). The law applies across all economic sectors, including communication.

Active companies in the communication market must request prior authorisation to conduct a merger. They must meet two criteria:[8]

- At least one of the companies involved in the deal belongs to a group that has posted, on the latest balance sheet, an annual gross revenue or total turnover in the country that is equal to or above BRL 750 million (USD 205 million)[9] in the year prior to the transaction.
- A second agent involved in the deal and belonging to another group has posted, on the last balance sheet, an annual gross revenue or total turnover in the country equal to or above BRL 75 million (USD 20.5 million)[10] in the year prior to the transaction.

CADE analyses and approves mergers, consulting as needed with Anatel. CADE has issued different merger guidelines to provide technical background and certainty to its decisions. Additionally, it uses guidelines from the European Commission and the United States Federal Trade Commission (Horizontal Merger Guidelines) to help analyse potential mergers. This implies assessment of potential anticompetitive effects deriving from the merger, as well as potential efficiencies, both dynamic and static (Possas, Ponde and Fagundes, 1997[43]).

Significant market power

Since the liberalisation of the communication sector in Brazil, one of the main objectives of the regulatory framework has been the promotion of competition. For example, the restructuring of Telebrás established some provisions, including ownership restrictions and

asymmetric regulation, to outweigh first-mover advantages. Under this scenario, incumbents had more duties than did entrants. These included universal service targets, compliance with a price cap control, stricter fulfilment of non-interruption of the service and accounting separation. Meanwhile, entrants had rights conferred on them that were not shared by the incumbents. For example, entrants could use wireless local loop technology and acquire cable TV companies.

CADE does not conduct regular market analysis of the communication sector to assess whether there is dominance or significant market power of certain players. Such analysis is done on a case-by-case basis. The administrative process may be initiated either *ex officio* or through a complaint filed by any economic agent. On the basis of periodic studies, Anatel declares the significant market power of certain agents and establishes asymmetric regulatory measures to balance competitive conditions.

Anatel's adopts regulatory measures to ensure free, ample and fair competition between all providers in the telecommunication sector. These measures are based on the identification of players with significant market power. The methodology for defining *ex ante* asymmetric regulatory measures is established through the Competition Plan (PGMC), adopted through Resolution No. 600 of 2012, and subsequently amended in 2018. This methodology comprises four steps: i) analysis of retail markets; ii) analysis of wholesale markets; iii) definition of asymmetric regulatory measures; and iv) designation of groups with significant market power. Following this methodology, Anatel analyses whether the agent has significant market power at the retail level. If so, it can impose an asymmetric regulation in the wholesale market upon the agent (Chapter 5).

The amendment to the PGMC offers different approaches to solve competitive issues. First, it classifies geographical areas in four different categories depending on the competition level in each area. Similarly, it adopts regulation according to the companies' size. On the one hand, this includes the application of specific regulatory measures to companies with significant market power. On the other, it includes the concept of "Prestadores de Pequeno Porte", small ISP suppliers that hold a maximum participation of 5% in the national retail market (Chapter 3).

Anatel seeks to amplify the deregulation of small ISPs. To that end, it analyses different criteria to determine the significant market power of an economic agent in a defined relevant market. These include holding a market share greater than 20%; the stability of the market share over time; and the difference between the agent's market share and its competitors, such as the ability to exploit economies of scale in the relevant market.

Similarly, Anatel analyses an ISP's ability to exploit economies of scope based on the PGMC. It considers two factors in determining the significant market power of an economic agent. First, it looks at control over infrastructure whose duplication is not economically viable (essential facilities). Second, it examines concurrent operations in the wholesale and retail markets (vertical integration) (Anatel, 2018[44]).[11]

Given current market conditions, the asymmetric regulatory measures imposed on participants with significant market power are related to transparency and price control. Regulatory measures have also focused on the sharing of passive infrastructure (i.e. ditches, ducts, poles) and other network facilities that are bottlenecks for the entrance and growth of communication service providers. Anatel re-evaluates relevant markets, asymmetric regulatory measures and significant market power every four years.

Competition advocacy

The 2011 competition law (Law No. 12 529) that modernised CADE also established SEAE as the governmental unit responsible for competition advocacy. Article 19 obliges SEAE to provide non-binding advice on the following, among others: promotion of competition; proposals for novel or modified normative acts of general interest to economic agents; and, when pertinent, drafts of normative acts submitted to public consultations.

SEAE's analysis is usually informed by the OECD's Competition Assessment Toolkit. Since 2011, SEAE has analysed more than 2 100 normative proposals from Anatel, as well as draft bills. SEAE opinions have ranged from issues concerning the mandatory distribution of hybrid set-top boxes in 2016.[12] For example, SEAE suggested that DTH companies should not be obliged to supply the hybrid box to receive local open channels. It also suggested a veto to some anticompetitive aspects of the Antennas law in 2015.[13]

Recent and ongoing cases in telecommunications and adjoining services

After restructuring of the BCPS in 2012 (Law No. 12 529 of 2011), CADE became solely responsible to follow-up, instruct and adjudicate conduct that violates the economic order.

For example, CADE sanctioned Telemar Norte Leste on March 2015 for abuse of its dominant position in the telecommunication industry. The company had controlled more than 90% of the fixed telephony market in the denominated Region I of the General Concession Plan. CADE found that Telemar monitored its customers' calls to the call centre of its only competitor (Vésper, a "mirror" company of Oi). In this way, Telemar offered its customers' specific service plans to impede their migration to the competitor.[14]

In 2013, CADE conditionally approved the acquisition of 50% of Brasilcel (owned by Portugal Telecom and PT Móveis) by Vivo (Merger file No. 53500.02137/2010). The conditions aimed at preventing Vivo from obtaining full control of Brasilcel. This was because Brasilcel was the majority shareholder of Vivo, which held share in Telco (an indirect holder of TIM). Therefore, CADE established that Vivo would either need to sell its shares in Telco, or have a new shareholder with experience in the telecommunications industry and without shares in other communication operators in Brazil.

In a second decision, CADE fined Vivo BRL 15 million (USD 6.9 million)[15] for violating their Merger Settlement Agreement (Termo de Compromisso de Desempenho, TCD). This agreement, reached with CADE in 2010, was a condition for approving the 2007 Telco transaction (Merger file No. 53500.012487/2007). At the time, this merger authorised Telco's participation with 23.7% of the ordinary shares in Telecom Italia (controller of TIM). This approval was based on a TCD that obliged Vivo to keep Telefônica Brasil's (Vivo) and Telecom Italia's (TIM) activities separate and independent in Brazil. Besides the fine, CADE imposed the reversal of the increase of Telefônica Brasil's stake in Telco.[16]

Regarding zero-rating practices, MPF presented in 2016 a claim against Claro, TIM, Oi and Vivo, which together control almost the entire mobile broadband market. MPF argued these ISPs were restricting competition through their offer of zero-rating deals as they led to a discriminatory treatment. Essentially, the deals offered Internet access plans with privileged conditions for certain content and applications such as Facebook and WhatsApp. After preliminary investigations, however, CADE's General Superintendence did not find enough evidence that these behaviours could generate anticompetitive effects in the markets to justify a formal proceeding. As a result, the case was closed (Case No. 08700.004314/2016-71) (Kira, 2018[45]).

Recent and ongoing cases in audio-visual and convergent services

FTA services

The 1988 Constitution established that "media cannot be directly or indirectly object of monopoly or oligopoly" (art. 220, paragraph 5), but it seems not to have been well enforced. The only competition case concerning broadcasting relates to sports content. The case, which lasted 13 years, involved TV Globo Ltda., Globo Comunicações and the Brazilian Association of Brazilian football clubs. Since the mid-1980s, Brazil's leading broadcaster, Globo, has been the sole broadcaster of content from the country's most important sports organisation, the Brazilian Football League.

In 1997, a legal complaint about the broadcasting rights contract then in effect was brought before the Secretary of Economic Law (Secretaria de Direito Economico, SDE).[17] The three main issues were: i) the exclusive purchase of the broadcasting rights of the BFL by the largest FTA TV broadcaster in Brazil, Globo; ii) the joint sale of those rights by the biggest Brazilian football teams, the "Club of 13," allegedly constituting a cartel; and iii) control by a single player (Globo) of the bundling of rights across all five commercial media formats (i.e. FTA TV, pay TV, pay per view, mobile and Internet).

The SDE investigated and then proposed that CADE create two separate packages for FTA TV broadcasting rights. It also recommended to unbundle the five media formats and sell them separately. However, the SDE found the joint sale of rights by the Club of 13 to be efficient, recommending against any intervention by CADE. In Brazil, football is extremely popular. It has the power to attract and maintain broadcasting audience share not only for football matches, but also across all programming. Therefore, it is a major source of competition among broadcasters. Moreover, Globo held almost half of all audience share and earned about 75% of all advertising revenue in the FTA sector.

The amounts paid by Globo to the participating clubs are indicative of the Brazilian Football League's importance. In 2005, Globo paid more than 3.5 times the combined total paid for FTA rights to the São Paulo State Championship, the National Football Cup (Copa do Brasil) and the South American Cup.

A preference clause may have helped Globo to remain the lone broadcaster of the Brazilian Football League from 1997 to 2011. Under that clause, rival broadcasters had to submit every bid to Globo. If Globo matched the bid within 30 days, it won the contract. Accordingly, the overarching antitrust issue in the case was whether and to what degree the contract between Globo and the Club of 13 foreclosed competition from rival broadcasters.

In 2010 (13 years after the complaint was filed) CADE settled the case. The settlement involved four components:

- Globo unilaterally waived the "preference clause" for renewal of the 2012-14 Brazilian Football League broadcasting contract. The clause was deemed unreasonably costly to competition. Furthermore, the Club of 13 pledged not to reintroduce the preference clause in future contracts.
- The Club of 13 undertook to award the broadcasting rights to the Brazilian Football League through an auction with clear and objective rules.
- The Club of 13 committed to award separate contracts for the five relevant media platforms to facilitate entry.
- The winner of the FTA TV auction would be allowed to sub-license its broadcasting rights, enabling (sub)licencees to exercise the right to choose which games to broadcast.

Nonetheless, the settlement would prove ineffective. Globo and the individual teams simply engaged in bilateral negotiations outside the framework of the Club of 13, thereby circumventing the settlement. Two other broadcasters did express interest after the settlement and submitted offers to individual teams. Ultimately, every club signed with Globo again.

Mattos (2012[46]) concludes the circumvented settlement reflects a shared view among the clubs about Globo. Essentially, it demonstrates that Globo's offer is well beyond its competitors' capacities in terms of audience share, quality of the broadcasts and ability to generate advertising revenues.

While that may be true, the key question remains. Did Globo foreclose competition through exclusive dealing arrangements, regardless of whether they are embedded in a single contract with the Club of 13 or in several contracts with individual clubs? The market would be much less competitive if two conditions persist: lengthy contracts that mean rivals rarely have an opportunity to enter; and preference clauses between Globo and individual clubs. The market would be much more competitive if the contracts were relatively short with no preference clauses.

Pay TV

In the pay TV realm, the most recent and relevant competition case involved a merger review related to AT&T's intended acquisition of Time Warner (Warner Media) in 2016. This proposed merger encountered resistance by a number of authorities in different countries. The proposed entity would control AT&T, HBO, Turner (e.g. TNT, CNN and Cartoon channels) and Sky. Several Brazilian stakeholders raised objections, including broadcasters through their association ABERT. As mandated by the SeAC law, CADE notified both sector regulators, Anatel and Ancine.

The parties involved in the merger argued for the acquisition based on activities of the businesses in the United States. The proposed merger would combine Time Warner's media content with AT&T's fixed telephony, mobile telephony, broadband and television businesses in the United States. The parties contended that the merger would hasten AT&T's ability to develop and distribute the next generation of consumer video services in the United States through multiple platforms. They said that American consumers would benefit from a greater choice of plans and packages (e.g. pay TV, broadband and telephony); more access to content across their devices; and a better alternative to other pay TV companies. Over time, AT&T hopes for opportunities to obtain additional revenues through innovations in new products and services. Overall, AT&T expects the merger would generate USD 1 billion in annual cost synergies in the United States.

The parties also emphasised that FTA broadcasters have 60-70% of the market in Brazil, as well as the relatively low price of service in Brazil. They contended that the monthly price of pay TV services in 2015 was on average less than USD 40. This price was much lower than the approximate prices in Argentina (USD 70), Japan (USD 55) and the United States (USD 50).

The parties added that pay TV operators have progressively faced pressure from OTT providers. They argued that providers such as Netflix and YouTube, for example, have lower operating costs for three reasons. First, they do not have to invest in SeAC infrastructure (cable, satellite, etc.). Second, they are covered by a more favourable tax regime. Third, they are not subject to Ancine's regulatory obligations (e.g. content quotas). Thus, OTT vendors could freely choose which content they want to make available to users and therefore are in a clear competitive advantage.

As their final argument, the parties described intense competition in the programming and pay TV markets. They further pointed to increasing competitive pressure from direct-to-consumer services via the Internet (e.g. Netflix). As a result, the parties asserted the merger presented no competitive concerns.

Within CADE's merger review, Ancine's technical note, however, identified several reports of price discrimination between agents. Ancine and Anatel also observed that, despite the presence of at least five suppliers, two groups control the bulk of the market: in 2018, the Sky group and Claro/Net had joint market shares of 79.1%. Although they bundle other communication services, the large, traditional communication groups had not managed to erode the market position of Sky or Claro/Net.

Ultimately, in October 2018, CADE ruled in favour of allowing the merger without requiring divestiture, but subject to conditions. The following remedies were imposed: i) the companies must continue to operate separately, without exchanging sensitive information; and ii) the merged entity must not discriminate in relation to prices and contract term. The conditions appear to address Ancine's concerns over possible price discrimination in the licensing of channels and possible limits on access to pay TV packages by competitors.

While the CADE ruling addressed the conventional competition issues, SeAC rules on vertical integration (Chapter 2) added another hindrance to the merger in Brazil. Under Brazilian law, the merged entity cannot own both distribution and content production companies operating in Brazil. In light of their regulatory mandate over SeAC, both Anatel and Ancine must separately approve the merger.

Anatel has been analysing the legality of the case under pay TV regulations in Brazil. It pays particular attention to Article 5 of the SeAC law. This article prohibits pay TV operators that distribute content from also producing content (see licensing of pay TV subsection).

AT&T claimed the merger did not violate Article 5 of the SeAC law because HBO and the Turner channel have their headquarters outside of Brazil and do not produce directly in the country. During the process, AT&T addressed issues related to Brazilian sports content rights owned by Turner, which would violate Article 6 of the SeAC law. Specifically, the article prohibits telecommunication service providers and all of their affiliates, with or without headquarters in Brazil, from hiring national artistic talents or licensing events of national interest. In response to these concerns, AT&T removed Esporte Interativo's channels from Sky's programming.

On 6 February 2020, Anatel's Board decided to allow AT&T (owner of Sky) to offer its pay TV services in the country, even after having acquired Warner Media. It argued that SeAC law does not apply given that Time Warner does not have headquarters in Brazil. The decision also entailed that Anatel would study the relevant market for distribution of audio-visual content. In addition, Anatel and Ancine would develop a joint regulatory proposal to reduce risks related to increased market power in the relevant markets (Anatel, 2020[47]).

Prohibiting *de facto* vertical integration may hinder the competitive dynamics of the sector in a convergent communication environment. This is why Articles 5 and 6 of the SeAC law should ideally be reformed. Nevertheless, as regulations stand, Anatel's decision could be questioned given it takes a different approach based on whether the firm is a domestic or foreign firm.

In fact, several stakeholders believe the decision could be legally challenged given differing interpretations on applicability of the SeAC law. This is particularly true because the decision was taken against advice of Anatel's technical and legal units (Urupá, 2020[48]). Official complaints on the validity of Anatel's decision have already been presented to the Federal

Court of Accounts (Tribunal de Contas da União, TCU) and MPF. Furthermore, a bill presented in the Chamber of Deputies would allow Congress to suspend Anatel's decision (Urupá, 2020[49]).

At the moment of writing, Ancine's decision on the legality of the merger in light of SeAC was pending. After its technical units issued a report against the merger, Ancine's Board re-started the entire merger review process. Before taking a final decision, Ancine will produce a new study on the production and programming markets. To that end, it will consult the involved parties, develop a new technical and legal report, and then submit to the Board (Aquino, 2018[50]).

If Ancine's Board decides against Anatel's understanding, it would lead to an institutional impasse. SeAC law or other regulatory instruments make no provision for further review by a superior authority or a process to resolve the conflict. In the absence of a converged regulator, which would be the ideal solution, two actions are needed. The SeAC law should be amended to allow any market player (foreign or national) to provide convergent services. It should also establish clear conflict resolution procedures among regulators (i.e. Anatel and Ancine).

Platform competition

Given the allegations filed by competitors in the online search market, CADE has initiated different administrative proceedings to investigate Google Inc. and Google Brazil Internet Ltda. As a popular online search engine for Internet users in Brazil, Google's investigations were related to a potential abuse of its dominant position.

In 2011, CADE investigated Google for giving anticompetitive advantage to its price comparison service, Google Shopping, within its online search platform. This ostensibly violated the neutrality of the algorithm in its search engine (Proceeding No. 08012.010483/2011-94).

Additionally, CADE investigated claims of potential anticompetitive effects related to two aspects of organic and sponsored searches. The first related to the distribution of space between the two searches. The second related to conduct that made it difficult for users to distinguish between the results of organic and sponsored searches.

In November 2018, CADE's General Superintendence suggested dismissal of the case for lack of sufficient evidence. CADE's Tribunal maintained this opinion in its final decision. CADE noted that interventions should be careful not to limit innovative incentives that improve the user experience in markets with such intense innovation.

Proceeding No. 08700.009082/2013 investigated Google for improperly appropriating (scraping) content from competing price comparison sites to improve the results of its own comparison shopping engine. This content was related particularly to user reviews in other comparison sites.

In May 2018, CADE's General Superintendence issued its opinion that found no evidence of any harm caused to consumers. It also noted that competing price comparison sites had declared that similar conducts had not affected them. CADE's Tribunal agreed with this opinion.

Another administrative proceeding (Proceeding No. 08700.005694/2013) was also initiated against Google in 2013. It was related to the potential application of abusive clauses by Google in its AdWords tool. These clauses allegedly prevented advertisers from transferring data from Google's platform to the sponsored search platforms of competitors. In so doing, they prevented multi-homing. After modifications of the Terms of Service of the AdWords' application program interface, Google and Microsoft reached a settlement. CADE's Tribunal closed the investigation.

References

Anatel (2020), "Acordão No. 46, de 17 de Fevereiro de 2020", [Agreement No. 46 of 17 February 2020], Agência Nacional de Telecomunicações, Brasilia, http://www.in.gov.br/web/dou/-/acordao-n-46-de-17-de-fevereiro-de-2020-243806906. [47]

Anatel (2020), *Tutorial do Sistema Mosaico*, [Tutorial of the Mosaic System], Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/Portal/verificaDocumentos/documento.asp?numeroPublicacao=346631&assuntoPublicacao=null&caminhoRel=null&filtro=1&documentoPath=346631.pdf. [5]

Anatel (2019), *Canais Obrigatórios*, [Mandatory Channels], Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/consumidor/tv-por-assinatura/direitos/canais-obrigatorios (accessed on 26 May 2020). [10]

Anatel (2018), "Resolução No. 694, de 17 de julho de 2018 (Altera o Plano Geral de Metas de Competição)", [Resolution No. 694 of 17 July 2018 (altering the General Competition Plan)], Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/legislacao/resolucoes/2018/1151-resolucao-694. [44]

Anatel (2012), "Resolução No. 581, de 26 de março de 2012", [Resolution No. 581 of 26 March 2012], Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/legislacao/resolucoes/2012/139-resolucao-581. [9]

Anatel (2011), *TV Digital alcança 46% da população brasileira*, [Digital TV reaches 46% of the Brazilian population], press release, Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/Portal/exibirPortalPaginaEspecialPesquisa.do?acao=&tipoConteudoHtml=1&codNoticia=22469. [25]

Ancine (2020), "Instrução Normativa No. 153, de 18 de março de 2020", [Normative Instruction No. 153, of 18 March 2020], Agência Nacional do Cinema, Brasilia, https://www.ancine.gov.br/pt-br/legislacao/instrucoes-normativas-consolidadas/instru-o-normativa-n-153-de-18-de-mar-o-de-2020. [7]

Ancine (2019), "Assinantes no Mercado de Programação na TV por Assinatura 2019", [Programming Market Subscribers For Subscribers to Pay TV], Agência Nacional do Cinema, Brasilia, https://oca.ancine.gov.br/sites/default/files/repositorio/pdf/informe_assinantes_no_mercado_de_programacao_-_versao_diagramada.pdf. [32]

Ancine (2018), *Informe Anual da TV paga 2018*, [Annual report of pay TV 2018], Agência Nacional do Cinema, Brasilia, https://oca.ancine.gov.br/sites/default/files/repositorio/pdf/tv_paga.pdf. [38]

Ancine (2017), *Uma nova política para o audiovisual: Agência Nacional do Cinema, os primeiros 15 anos*, [A new audiovisual policy: Ancine, the first 15 years], Agência Nacional do Cinema, Brasilia, https://www.ancine.gov.br/pt-br/conteudo/uma-nova-pol-tica-para-o-audiovisual-ag-ncia-nacional-do-cinema-os-primeiros-15-anos. [37]

Ancine (2012), *Instrução Normativa No. 100, de 29 de maio de 2012*, [Normative Instruction No. 100 of 29 May 2012], Agência Nacional do Cinema, Brasilia, https://www.ancine.gov.br/pt-br/legislacao/instrucoes-normativas-consolidadas/instru-o-normativa-n-100-de-29-de-maio-de-2012. [34]

Aquino, M. (2018), "Ancine vai recomeçar do zero análise de compra da Time Warner pela AT&T/Sky", [Ancine will start from scratch the analysis of the Time Warner and ATT&T/Sky merger], Telesintese, 4 September, http://www.telesintese.com.br/ancine-vai-recomecar-do-zero-analise-de-compra-da-time-warner-pela-att-sky/. [50]

Brazil (2020), "Decreto No. 10 312, de 4 de abril de 2020", [Decree No. 10 312 of 4 April 2020], Presidência da República, Brasilia, http://www.in.gov.br/web/dou/-/decreto-n-10.312-de-4-de-abril-de-2020-251139882. [16]

Brazil (2019), "Decreto No. 9 662, de 1 de janeiro de 2019", [Decree No. 9 662 of 1 January 2019], Presidência da República, Brasilia, http://planalto.gov.br/ccivil_03/_Ato2019-2022/2019/Decreto/D9662.htm#art11. [23]

Brazil (2017), "Lei No. 13 417, de 1 de março de 2017", [Law No. 13 417 of 1 March 2017], Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/_Ato2015-2018/2017/Lei/L13417.htm. [20]

Brazil (2013), "Decreto No. 8 061, de 29 julho de 2013", [Decree No. 8 061 of 29 July of 2013], Presidência da República, Brasilia, https://www2.camara.leg.br/legin/fed/decret/2013/decreto-8061-29-julho-2013-776604-norma-pe.html (accessed on 2 April 2020). [15]

Brazil (2011), "Lei No. 12 485 de 12 de setembro de 2011 (Lei do Serviço de Acesso Condicionado)", [Law No. 12 485 of 12 September 2011 (Pay TV law)], Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/_Ato2011-2014/2011/Lei/L12485.htm. [6]

Brazil (2008), "Lei No. 11 652 de 7 de abril de 2008", [Law No. 11 652 of 7 April 2008], Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/_Ato2007-2010/2008/Lei/L11652.htm. [28]

Brazil (2006), "Decreto No. 5 820 de 29 junho de 2006", [Decree No. 5 820 of 29 June 2006], Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/_Ato2004-2006/2006/Decreto/D5820.htm (accessed on 2 April 2020). [13]

Brazil (2003), "Decreto No. 4 901 de 26 de novembro de 2003", [Decree No. 4 901 of 26 November of 2003], Presidência da República, Brasilia,, http://www.planalto.gov.br/ccivil_03/decreto/2003/D4901.htm (accessed on 2 April 2020). [12]

Brazil (2001), "Medida Provisória No. 2 228-1, de 6 de Setembro de 2001", [Provisional measure No. 2 228-1 of 6 September 2001], Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/mpv/2228-1.htm. [33]

Brazil (1998), "Lei No. 9 612 de 19 de fevereiro de 1998", [Law No. 9 612 of 19 February 1998], Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/leis/L9612.htm. [29]

Brazil (1995), "Lei No. 8 944 de 6 de janeiro de 1995", [Law No. 8 944 of 6 January 1995], Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/LEIS/L8977.htm. [30]

Brazil (1988), *Constituição da República Federativa do Brasil*, [Constitution of the Federative Republic of Brazil], Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/Constituicao/Constituicao.htm. [4]

Brazil (1972), "Lei No. 5 785 de 23 de junho de 1972", [Law No. 5 785 of 23 June 1972], Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/LEIS/L5785.htm. [3]

Câmara dos Deputados (2020), *Rede Legislativa de Rádio e TV*, [Legislative radio and TV network], webpage (accessed 10 March 2020), https://www2.camara.leg.br/comunicacao/rede-legislativa-radio-tv (accessed on 10 March 2020). [27]

CGI.br (2018), "Pesquisa sobre o Uso das Tecnologias de Informação e Comunicação nos domicílios brasileiros - TIC Domicílios 2017", [ICT Households 2017: Survey on the Use of Information and Communication Technologies in Brazilian Households], Comitê Gestor da Internet no Brasil, São Paulo, https://cetic.br/pesquisa/domicilios/indicadores. [40]

CNTV (2018), *Transición a la TV Digital y Diversidad en Latinoamérica*, [Transition to Digital TV and Diversity in Latin America], Consejo Nacional de Televisión, Santiago (Chile). [11]

Com Brasil (2020), *Com Brasil*, website, https://www.tvcombr.com.br/ (accessed on 12 March 2020). [51]

EBC (2020), "Sobre a EBC", [About the EBC], webpage, http://www.ebc.com.br/institucional/arquivo/sobre-a-ebc (accessed on 10 March 2020). [18]

GSMA Intelligence (2020), *Data and Analysis for the Mobile Industry (Database)*, https://data.gsmaintelligence.com/ (accessed on 20 March 2020). [42]

Herrera, A. (2019), "The dismantling of Brazil's public media", Public Media Alliance, 24 June, https://www.publicmediaalliance.org/the-dismantling-of-brazils-public-media/. [22]

Intervozes; Reporters without Borders (2020), *Media Ownership Monitor Brazil*, https://brazil.mom-rsf.org/en/owners/companies/detail/company/company/show/empresa-brasil-de-comunicacao-ebc/. [21]

Katz, R. (2019), "Alterações nos mercados de audiovisual global e brasileiro: Dinâmica competitiva, impacto no bem estar do consumidor e implicações em políticas públicas e no modelo de concorrência", [Changes in the Global and Brazilian Audiovisual Market: Competitive Dynamics, Impact on Consumer Welfare, and Implications for Public Policy and Competition Model], Telecom Advisory Services, http://www.teleadvs.com/wp-content/uploads/191014-Katz-Report_FINAL.pdf (accessed on 14 February 2020). [39]

Kira, B. (2018), *Estudo sobre Concorrência e Economia Digital Processo Nº 08700.004462/2018-58*, [Study on competition and the digital economy, Process No. 08700.004462/2018-58],Conselho Administrativo de Defesa Econômica, Brasilia, https://sei.cade.gov.br/sei/controlador.php?acao=documento_download_anexo&acao_origem=protocolo_pesquisar&id_anexo=356187&infra_sistema=100000100&infra_unidade_atual=110000960&infra_hash=424137e832878c0630a2d77a19a3f0d58372c7cd7bdd29a9e3d8690f0f3534fb. [45]

Mattos, C. (2012), "Broadcasting football rights in Brazil: The case of Globo and the 'Club of 13' in the antitrust perspective", *Estudos Econômicos (São Paulo)*, Vol. 42/2, pp. 337-362. [46]

MCTIC (2020), *Espaço do Radiodifusor: Radiodifusão Comercial*, [Broadcasting Space: Commercial Broadcasting], Ministério da Ciência, Tecnologia, Inovações e Comunicações, Brasilia, https://www.mctic.gov.br/mctic/opencms/comunicacao/SERAD/radiofusao/detalhe_tema/radiodifusao_comercial.html (accessed on 2 April 2020). [2]

MCTIC (2020), *Espaço do Radiodifusor: Retransmissão de Televisão*, [Broadcasting Space: Television Retransmission], Ministério da Ciência, Tecnologia, Inovações e Comunicações, Brasilia, https://www.mctic.gov.br/mctic/opencms/comunicacao/SERAD/radiofusao/detalhe_tema/retransmissaoDeTelevisao.html (accessed on 2 April 2020). [1]

Mendel, T. and E. Salomon (2011), *The Regulatory Environment for Broadcasting: An International Best Practice Survey for Brazilian Stakeholders*, UNESCO, Geneva, http://www.unesco.org/new/en/communication-and-information/resources/publications-and-communication-materials/publications/full-list/the-regulatory-environment-for-broadcasting-an-international-best-practice-survey-for-brazilian-stakeholders/. [17]

Ministério das Comunicações (2013), *Portaria No. 14 de 5 de fevereiro de 2013*, [Ministerial Ordinance No. 14 of 6 February of 2013], Ministério das Comunicações, Brasilia, https://www2.camara.leg.br/comunicacao/rede-legislativa-radio-tv/arquivos/legislacao-arquivos/portarias-ministerio/Portarian1406FEV2013Desocupaodafaixa700MHz.pdf. [14]

Ministério Público Federal (2019), *Oficio No. 127/2019/PFDC/MPF: Solicita à EBC informações sobre a unificação dos canais TV Brasil e TV Nacional Brasil*, [Official Letter No. 127/2019/PFDC/MPF: MPF Asks EBC for information on the unification of the TV Brasil and TV Nacional Brasil channels], Ministério Público Federal, Brasilia, http://pfdc.pgr.mpf.mp.br/atuacao-e-conteudos-de-apoio/oficios/oficio-127-2019-pfdc-mpf/view. [24]

Ofcom (2020), *About Media Literacy - Ofcom*, (webpage), https://www.ofcom.org.uk/research-and-data/media-literacy-research/media-literacy (accessed on 3 June 2020). [41]

Possas, M., J. Ponde and J. Fagundes (1997), *Regulação da concorrência nos setores de infraestrutura no Brasil: elementos para um quadro conceitual*, [Regulation of competition in infrastructure sectors in Brazil: elements for a conceptual framework], Instituto de Economia da UFRJ, Rio de Janeiro, https://www.scribd.com/document/333098691/Regulacao-Da-Concorrencia-Nos-Setores-de-Infraestrutura-No-Brasil (accessed on 10 March 2020). [43]

Possebon, S. (2020), "Ancine promove reforma na regulamentação de TV por assinatura", [Ancine Promotes Reform in Pay TV Regulation], Telaviva, 17 March, https://telaviva.com.br/17/03/2020/ancine-promove-reforma-na-regulamentacao-de-tv-por-assinatura/. [8]

RNP (2015), *TVs públicas vão usar sinal digital e multiprogramação*, [Public TV stations will use digital signals and multiprogramming], RNP, Brasilia, https://www.rnp.br/noticias/tvs-publicas-vao-usar-sinal-digital-e-multiprogramacao (accessed on 9 August 2019). [26]

Silva, C. and S. Silva (2015), *Cinema in Brazil*, Tosta, A.L. de Andrade; Coutinho, E.F., eds, ABC-Clio, Santa Barbara. [31]

Toffoli, D. (2016), *Mandado de Segurança 34.205 Distrito Federal*, ["Writ of Mandamus No. 34 205 Federal District"], Presidência da República, Brasilia, http://www.stf.jus.br/arquivo/cms/noticiaNoticiaStf/anexo/MS34205.pdf. [19]

UNESCO (2016), *Quota Policy for the Brazilian Audiovisual Output*, UNESCO, Geneva, https://en.unesco.org/creativity/policy-monitoring-platform/policy-quota-brazilian. [35]

Urupá, M. (2020), "Paulo Teixeira quer suspender decisão que autorizou fusão ATT&T/WarnerMedia", [Paulo Teixeira wants to suspend the decision that authorized the ATT&T-Warner Media merger], Teletime, 3 October, https://teletime.com.br/10/03/2020/paulo-teixeira-quer-sustar-decisao-da-anatel-que-autoriza-fusao-da-att-e-time-warner/ (accessed on 11 March 2020). [49]

Urupá, M. (2020), "Publicado acórdão que autoriza fusão da AT&T e WarnerMedia", [Published decision authorizing merger of AT&T and WarnerMedia], Teletime, 18 February, https://teletime.com.br/18/02/2020/publicado-acordao-que-autoriza-fusao-da-att-e-warnermedia/. [48]

Valente, J. et al. (2009), *Produção Regional na TV Aberta Brasileira: Um estudo em 11 capitais brasileiras*, [Regional Production on Brazilian Open TV: A study in 11 Brazilian capitals], Research Gate. [36]

Notes

[1] RTVs cannot relay signals of more than one station, unless needed to cover a shadowing area. Shadowing is the effect that of signal loss or fluctuation due to obstacles in the propagation path between transmitter and receiver.

[2] Given that the RTV and RpTV authorisations have no guaranteed period of validity, the entity responsible for the station has no right to seek damages in case the authorisation is revoked, provided that the reasons for revoking the authorisation are made explicit in a public process. Unlike broadcasting licences (which cannot be transferred), authorisations can be transferred from one entity to another, with or without payment, once three years have elapsed after the initial issuance of the authorisation. Any transfer depends on the technical approval of MCTIC and Anatel. For secondary retransmission services, as a general rule, their emissions are not protected from interference, and they may not cause harmful interference on primary sources.

[3] In practice, because legal cases in Brazil may take several years to be decided, it has been practically impossible to suspend broadcasting licences in Brazil.

[4] Ginga is a middleware technology developed by Brazilian researchers and embedded into the Japanese ISDB-T standard. It was adopted to enable bidirectional digital communication. Tax exemption policies are in force for the production of television sets with Ginga, known as the PPBs (Processos Produtivos Básicos). In addition, there has been an effort within the Brazilian Digital TV Forum for the improvement of the Ginga standard specification, which led to the release of the publication of the "Ginga version D" by the Brazilian standard setting organisation (Associação Brasileira de Normas Técnicas, ABNT). However, the promise of interactivity, enabled by Ginga, has not delivered to date and broadcasters have not made use of Ginga. Two-way communication depends on a return channel; however, not all cities have a return channel available. There were plans in the past for the federal government to promote the creation of GINGA applications, but these plans were not carried out.

[5] Although with a related objective, TV Escola is not considered to be the realisation of the education channel foreseen in the Decree N. 5 820 of 2006, given its more limited scope of offering content directly to schools.

[6] TVCOMBR is a union of 120 community television channels in Brazil created by the Braziliand Association of Community Channels (Associação Brasileira de Canais Comunitários, ABCCOM), established in 2011. The first transmission from TVCOMBR took place on 21 November 2018, in Channel 28 of OiTV (cable). On 21 May 2019, the channel was included in the programming of Sky (satellite). Its linear programming can also be accessed online in their website (Com Brasil, 2020[51]).

[7] It also calls for "preference for educational, artistic, cultural and informative purposes" and "respect for the ethical and social values of the person and the family".

[8] As noted in OECD Competition law and Policy Peer Review in Brazil, CADE has a residual jurisdiction for reviewing non-notifiable mergers. In this sense, CADE is also competent to review mergers that do not meet the filing thresholds. This competence should be exercised within a year following the merger and there are no specific criteria for selecting the mergers CADE wants to review despite not meeting the minimum size thresholds.

[9] Using the exchange rate of 3.65 BRL/USD for the year 2018 from OECD.stat (https://stats.oecd.org/).

[10] Using the exchange rate of 3.65 BRL/USD for the year 2018 from OECD.stat (https://stats.oecd.org/).

[11] Article 14 of Resolution No. 694 of 17 July 2018.

[12] Analytical Opinion on Regulatory Rules No. 165 / COGPC / SEAE / MF, of 10 June 2016.

[13] Opinion 06121/2015/DF/COGPC/SEAE/MF, of 10 April 2015. Some time later the Presidency signed Law No. 13 116 of 2015, known as the Law on Antennas, including the veto proposed by SEAE.

[14] See: http://en.cade.gov.br/press-releases/cade-condemns-telemar-for-abuse-of-dominant-position.

[15] Using the exchange rate of 2.160 BRL/USD for the year 2013 from OECD.stat (https://stats.oecd.org/).

[16] See: https://www.conjur.com.br/2013-dez-05/cade-multa-telefonica-15-mi-impoe-restricoes-compra-vivo.

[17] This case summary is drawn from (Mattos, 2012[46]).

7. Taxation of communication and broadcasting services

This chapter analyses the taxation of communication and broadcasting services in Brazil. It looks at taxes and fees applied to the communication sector, which affect both operators and consumers, before reviewing broadcasting and pay TV. In addition to discussing taxes and fees, it sheds light on the complexities of the system by examining related import duties, and administrative and compliance costs. It also examines tax incentives to encourage investment in the sector, both at the federal and state level.

Taxation of communication and broadcasting services in Brazil

Communication companies in Brazil face a multitude of taxes and fees. Some taxes are specific to the communication sector, while others apply to all sectors. The overall tax burden in Brazil is high compared to other countries, and similar or even greater than in some other OECD countries. In 2017, overall tax revenue to gross domestic product (GDP) in Brazil was 32.3%, while it was 16.2% in Mexico, 20.2% in Chile and 27.1% in the United States. Nevertheless, tax revenue to GDP is still lower than the OECD average of 34.2% (OECD, 2019[1]).

General taxes, i.e. not specific to the telecommunication sector, include:

- the corporate income tax (Imposto sobre Renda de Pessoa Jurídica, IRPJ) with a standard tax rate of 15% and a surtax of 10% for profits above BRL 240 000 (USD 61 069)[1]
- the social contribution on profit (Contribuição Social sobre o Lucro Líquido, CSLL) with a levy of 9% on profits (before provisions for IRPJ) for other than financial companies
- the contribution to the social integration programme (Programa de Integração Social, PIS; Programa de Formação do Patrimônio do Servidor Público, PASEP) with a 0.65% tax rate applied to turnover
- the contribution to the social security financing (Contribuição para o Financiamento da Seguridade Social, COFINS) with a 3% tax rate on turnover.

Companies in the communication sector tend to be large and formal. This contrasts with other sectors, such as food and beverage, where informal micro companies and small and medium-sized enterprises often prevail. Tax collection of large communication operators can therefore be carried out easier, but is not necessarily efficient or inexpensive.

Brazilian communication companies face a number of taxes and fees additional to the ones listed above. If these costs are passed on to consumers, they may influence the prices of communication services. In a 2017 survey, Brazilian households reported the costs of Internet access were the most important reason for not having it (CGI.br, 2018[2]). Thus, high fees and taxes in the sector may risk hampering levels of adoption of communication services, as well as innovation and investment. This is especially problematic since the communication sector creates many positive spillover effects throughout the economy.

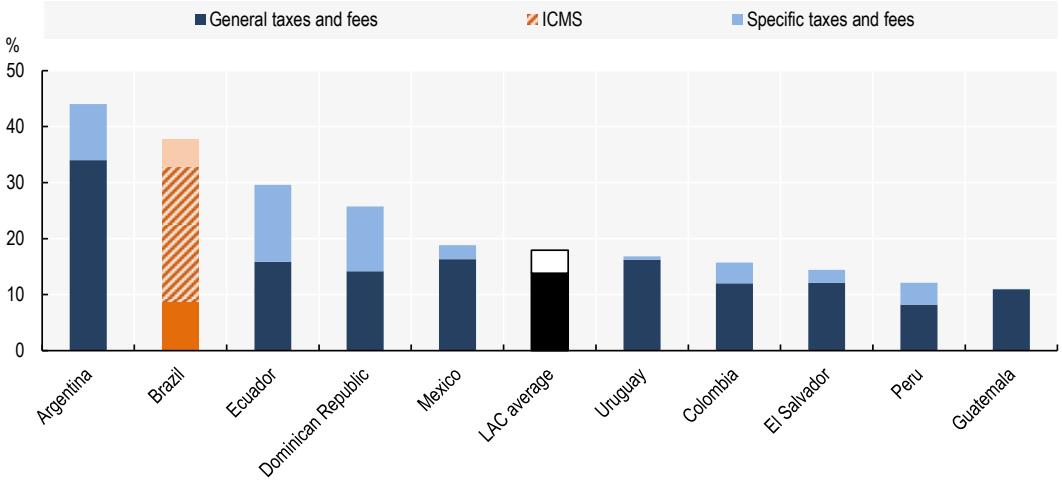
Taxes and fees applied to the communication sector

The Brazilian communication sector faces a wide variety of taxes, both on consumers and on operators. Consumers of mobile services in Brazil are subject to a substantial tax burden. Mobile devices are taxed at purchase, when services are activated and when they are used. Brazil is one of the countries in the region with the highest usage tax, as a result of significant sector-specific taxes (Figure 7.1).

ICMS

Brazil is fiscally decentralised, one of the countries where subnational governments have the highest tax revenue to GDP ratios (OECD, 2016[3]). Brazilian states have a greater level of own-source revenue than the international average (OECD, 2018[4]).

Figure 7.1.Level of taxation on communication services, as a percentage of mobile sector revenues, in Brazil and Latin American countries



Notes: Data based on actual tax payments as a percentage of mobile sector revenues. The ICMS is a dedicated Brazilian tax. It is levied on the movement of goods and transport and telecommunication services (see below). Data have been collected in 2018 for Brazil; in 2017 for Ecuador; in 2016 for Argentina; in 2015 for Mexico, Colombia and El Salvador; and in 2014 for the Dominican Republic, Uruguay, Peru and Guatemala.
Source: GSMA Intelligence (2020[5]), *Data and Analysis for the Mobile Industry* (database), https://data.gsmaintelligence.com/ (accessed on 20 March 2020).

The country does not have a general value-added tax system. However, Brazilian states levy the Imposto sobre Circulação de Mercadorias e Serviços (ICMS), which applies to the movement of goods and transport and telecommunication services. It represents one of the heaviest fiscal burdens to the communication sector. The rate, which lies between 25% and 37%, is determined by each state separately. Therefore, rates depend on where the services are consumed (Table 7.1).

Table 7.1. ICMS by federative unit (states and Federal District)

State	ICMS (%)
Acre, Espírito Santo, Piauí, Roiraima, Santa Catarina and São Paulo	25
Maranhão and Minas Gerais	27
Bahia and Federal District	28
Amapá, Goiás, Mato Grosso do Sul, Paraná and Tocantins	29
Alagoas, Amazonas, Ceará, Pará, Pernambuco, Paraíba, Rio Grande do Norte, Rio Grande do Sul and Sergipe	30
Mato Grosso and Rio de Janeiro[1]	30
Rondônia[1]	37

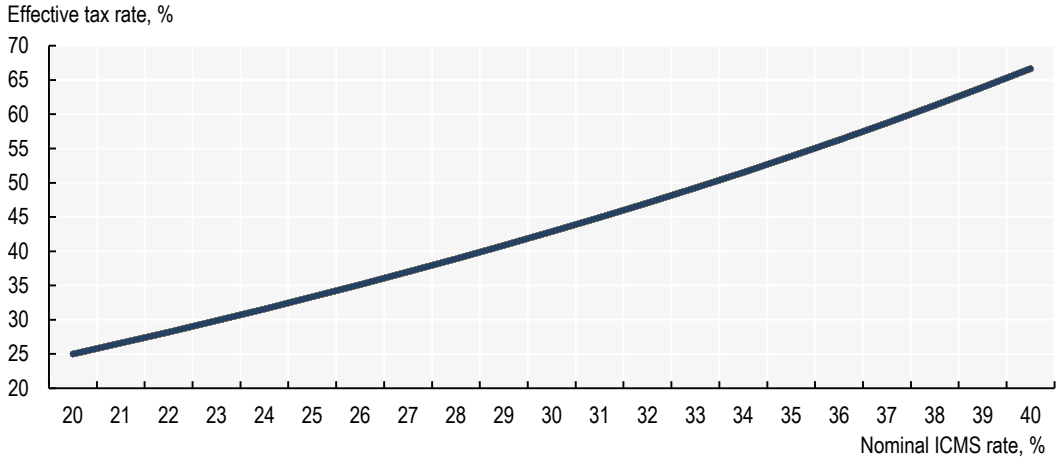
1. In Rio de Janeiro and Rondônia, the aliquot includes 2% of a state fund to fight poverty.
Note: ICMS = Imposto sobre Circulação de Mercadorias e Serviços.
Source: MCTIC's response to the questionnaire of the review.

Designated ICMS tax rates can reach up to 37%, but may be misleading. The official ICMS rate does not represent the effective tax burden on customers. Unlike conventional taxation methodology where a certain percentage is levied on a base price, ICMS rates are applied to the sum of both the tax base and tax amount to be paid. In other words, the ICMS integrates its own tax base when goods and services that are charged with it are purchased (in Portuguese referred to as *imposto por dentro*, in contrast to conventional taxation methodology, or *imposto por fora*).[2]

The effective tax rate is therefore higher than the designated tax rate. In addition, the tax base for the ICMS is further increased as it incorporates contributions to the social integration programme (PIS) and the social security financing (COFINS). This artificial increase of the tax base prior to levying the ICMS rate results in a higher effective tax rate.

Moreover, the designated ICMS rate and the effective ICMS rate have a convex relationship. In other words, the effective tax rate increases proportionally faster than the nominal rate increases. Therefore, the effect of the "tax from within" weighs even heavier on states with higher rates (Figure 7.2).

Figure 7.2. Nominal and effective ICMS rate in Brazil



Notes: ICMS = Imposto sobre Circulação de Mercadorias e Serviços. The graph shows the effective tax rate when the nominal ICMS rate is considered (integrated into the tax base).

The availability and adoption of communication services usually have positive effects on the development of a country (Auriol and González Fanfalone, 2014[6]). Nevertheless, some poorer Brazilian states have high ICMS rates.[3] Such high rates are further aggravated by the convex relationship between nominal and effective ICMS rates. Hence, effective ICMS rates tend to be disproportionately higher in some lower income states. This may be a significant barrier for poorer parts of the population. It could prevent them from being able to connect to the Internet and participate in the digital economy.

Value-added services and telecommunication services

Due to historic reasons as described in Chapter 2, Brazilian law distinguishes between what is called value-added services (serviços de valor adicionado, SVAs) and telecommunication services. SVAs are all services that, in any way, "complement" and "assist" telecommunication activities. For fixed broadband access, the most common example of telecommunication services in Brazil are "multimedia communication services" (Serviços de Comunicação Multimídia, SCMs).[4] The most prominent example of an SVA is the Internet connection service (essentially, the authentication of the user in the network).

Anatel generally does not regulate SVAs. They are also not subject to the ICMS because they are not considered telecommunication services. Thus, for example, the connection service of Internet access providers is not subject to the ICMS.[5] On the other hand, SCMs facilitate the emission or reception of information. Thus, they establish simultaneous communication between peers, like any telecommunication service. As such, they are

considered communication services. Multimedia communication services are regulated, supervised by Anatel and subject to the ICMS.

Adding to the complexity of the ICMS, the distinction between SCMs and SVAs for tax purposes is subject to legal disputes between companies of the sector and tax authorities. Government bodies have been unable to provide clear guidance on the exact delineation between SCMs and SVAs or, for example, where Internet connection services end and telecommunication services start. MCTIC is currently conducting a public bidding process to commission the work of clarifying some of the technical and fiscal issues around SMCs and SVAs.

Lack of clarity between SCMs and SVAs is an added burden on the communication sector. It may affect the administrative resources needed by both companies and tax authorities, and also market structure. For example, the confusion may complicate the market entry, ongoing business and growth of smaller operators. These smaller operators may not have the financial and/or human resources for associated legal and administrative costs. However, smaller operators may also go under the radar of regulation and tax authorities, which might benefit them.

In both cases, the complexity of the ICMS leads to a loss of economic surplus. In light of convergence, a single-class licensing regime eliminating the distinction among different communication services (SCM, SeAC, SMP, STFC, SVAs) could minimise administrative burdens, legal costs and the potential for tax arbitrage.

Besides taxes, operators are obliged to contribute to sector-specific funds, which translate into additional levies for operators. Namely, they must contribute to the Telecommunications Oversight Fund (Fundo de Fiscalização das Telecomunicações, FISTEL), the Universal Service Fund (Fundo de Universalização dos Serviços de Telecomunicações, FUST), and the Telecommunication Technological Development Fund (Fundo para o Desenvolvimento Tecnológico das Telecomunicações, FUNTTEL).

FISTEL

FISTEL was established through Law No. 5 070 of 1966. It aimed to provide resources to cover administrative expenses of the federal government with respect to the monitoring of telecommunication services. The fund is financed through two complementary fees. An installation fee (Taxa de Fiscalização de Instalação, TFI) is charged once for every new radiocommunication station deployed.[6] Meanwhile, an operational fee (Taxa de Fiscalização de Funcionamento, TFF) is charged yearly for every station.

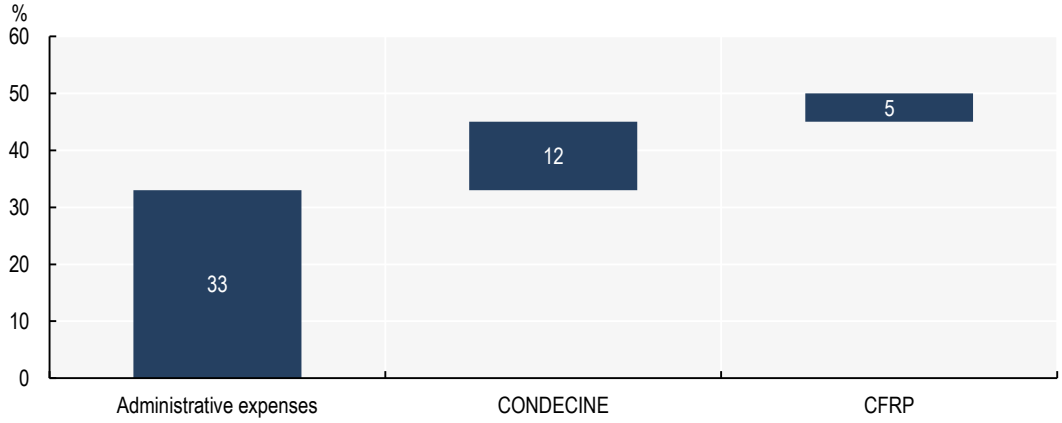
The annex of Law No. 5 070 determines the value of each TFI and TFF subject to FISTEL. It also determines the corresponding fee value in a table according to the technical characteristics of the station type, e.g. mobile versus base station.[7] The TFI value corresponds to the value presented in the table, while the TFF amount corresponds to 33% of the TFI. Due to its level of detail, the annex of the FISTEL law has implications for the respective fees to be paid. It also has implications for definitions of types of services listed in the annex.

Revenues from station licensing are also used to promote the national film industry and public television. In 2011, the SeAC law (Lei do Serviço de Acesso Condicionado) established that telecommunication operators must also help develop Brazil's domestic film industry. Specifically, they contribute an additional 12% of the TFI annually through the Contribution for the Development of the National Film Industry (Contribuição para o Desenvolvimento da Indústria Cinematográfica Nacional, CONDECINE),[8] which was created in 2001.

In addition, revenues from station licensing are used for the Contribution to Foster Public Broadcasting (Contribuição para o Fomento da Radiodifusão Pública, CFRP).[9] This fund aims to improve public broadcasting services and increase their penetration through use of communication services. Telecommunication operators contribute 5% of the TFI yearly to CFRP.

Both CONDECINE and CFRP add to the regular burden stemming from FISTEL. Thus, the yearly contribution of the communication service providers for each licenced station corresponds effectively to half of the installation fee (Figure 7.3).

Figure 7.3. Annual fees for administrative expenses as a percentage of TFI in Brazil



Before September 2014, the TFI was imposed equally on all new SIM cards and the TFF on all active SIM cards. Under the FISTEL system, machine-to-machine (M2M) SIM cards were taxed at the same rate as traditional SIMs. However, M2M technologies and services represent a lower share in the average revenue of operators. Therefore, this tax rate hampered adoption of M2M technologies, as it became too expensive to provide related services.

This taxation policy was changed through Law No. 12 715 of 2012 and Decree No. 8 234 of 2014 to promote investment in M2M services. The changes reduced taxes imposed on M2M SIM cards. Specifically, the TFI on each M2M device was reduced from BRL 26.83 (USD 11.42) to BRL 5.68 (USD 2.42). Meanwhile, the TFF was reduced from BRL 8.94 (USD 3.80) to BRL 1.89 (USD 0.80).[10] This policy reduced economic barriers to expand use of M2M technologies that are essential to develop and promote Internet of Things technologies.

Decree No. 9 854 of 2019 later defined the application of the tax break to "telecommunications networks, including access devices, that transmit data to remote applications for the purpose of monitoring, measuring and controlling the device itself, the environment around it or data systems connected to it through such networks". This new definition helps to avoid uncertainty with respect to how much human interaction is allowed for devices to still classify as being part of the M2M category.

In September 2019, the Constitution, Justice and Citizenship Commission of the Chamber of Deputies approved Bill No. 7 656 of 2017, which reduces the TFI and TFF imposed on M2M SIM cards to zero. The bill was awaiting Senate approval.

FUST and FUNTTEL

FUST, established by Law No. 9 998 of 2000, aimed to expand the universal service coverage and provision of telecommunication services (voice) in areas that do not attract sufficient private investments.[11] FUST represents 1% of the gross revenues of telecommunication

operators (ICMS and other taxes deducted). The FUST law was amended recently, clarifying that the contribution is not levied on broadcasting services.

FUNTTEL, established by Law No. 10 052 of 2000, aimed to foster technological development and research in Brazil. FUNTTELamounts to 0.5% of the gross revenues of telecommunication operators (other taxes deducted). The fund supports technological innovation, provides training, fosters job creation and provides small and medium enterprises with access to capital.

FUNTTEL is administered by a management council, composed by representatives of Anatel; the Ministry of Development, Industry and Foreign Trade (Ministério da Economia, Indústria, Comércio Exterior e Serviços); the National Bank for Economic and Social Development (Banco Nacional de Desenvolvimento Econômico e Social); and the Funding Authority for Studies and Projects (Financiadora de Estudos e Projetos).[12]

Brazil should consider integrating FISTEL, FUST and FUNTTEL into one single contribution. Recently, for example, Colombia consolidated different sectoral contributions (OECD, 2019[7]). An integration of all fund contributions into one single contribution may furthermore reduce administrative costs and increase efficiency.

In the long run, all sectoral contributions and funds in the communication sector should be abolished. At the same time, the sectoral regulator should have solid funding. Specifically, resources should be available for specific broadband deployment projects in areas where private funding may prove to be insufficient. The plethora of contributions that has to be paid compromises the sector's potential for innovation and investment. In consequence, it hinders the adoption and affordability of communication services.

Revenues and use of funds

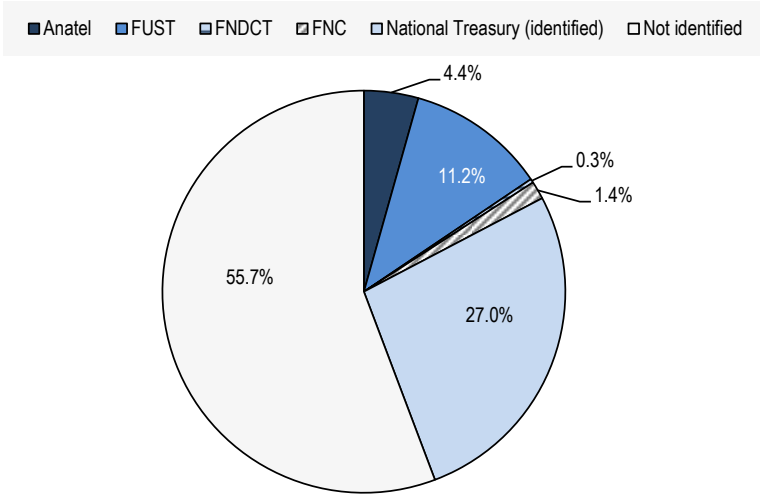
From January 1997 until December 2019, FISTEL's revenue amounted to BRL 93.59 billion (USD 23.8 billion). FISTEL's revenue for 2019 was BRL 2.6 billion (USD 0.66 billion) (Anatel, 2020[8]). It should be noted that from 2016 onwards, these amounts consider the discount of the "Untying of Union Revenues" (Desvinculação de Receitas da União, DRU) instituted through Constitutional Amendment No. 93 of 2016. The DRU is a mechanism that allows the federal government to use 30% of all federal funds.

Total revenues from FUST amounted to BRL 22.2 billion (USD 5.7 billion), considering the period from 2001 until October 2019. Up to October 2019, FUST collected BRL 1.2 billion (USD 0.31 million) (Anatel, 2020[9]).

In 2017, the Federal Court of Accounts (Tribunal de Contas da União, TCU) indicated that the actual destination and usage of revenues generated by FISTEL, FUST and FUNTTEL had deviated historically from their legally defined destination and usage. Between 1997 and 2016, FISTEL collected BRL 85.45 billion (around USD 26.8 billion) in fees and fines. However, Anatel only used about BRL 3.73 billion (around USD 1.17 billion) or 4.4% to cover administrative expenses (*fiscalização de telecomunicações*) (TCU, 2017[10]). Around 11.2% have been transferred to FUST, while around 27% have been identified to have been moved to the National Treasury. TCU assumes the remaining 55.7% have also been transferred to the National Treasury (TCU, 2017[10])(Figure 7.4).

TCU stated that for resources channelled through FUST, actual usage deviates even more from the designated usage for universal service. Only around BRL 341 000 (around USD 106 897) has effectively been used for universalisation of telecommunication services, i.e. less than 0.002% (TCU, 2017[10]). This stems from the fact, that to date, there has been only one plan for using the fund (Plano de Metas para a Universalização I).

Figure 7.4. Usage of FISTEL in Brazil, 1997-2016



Notes: FNDCT = Science and Technology Fund (Fundo Nacional de Desenvolvimento Científico e Tecnológico); FNC = National Culture Fund (Fundo Nacional de Cultura). Funds transferred to the National Treasury were first identified in 2008.
Source: OECD based on TCU (2017[10]), "Acórdão No. 1 427", https://pesquisa.apps.tcu.gov.br/#/documento/acordao-completo/1427%252F2017%2520/%2520/DTRELEVANCIA%20desc,%20NUMACORDAOINT%20desc/0/%20?uuid=9a7ca480-f123-11e9-88b4-5bcfdb2e2702.

This plan, established by Decree No. 6 039 of 7 February 2007, aimed at supporting institutions assisting hearing-impaired persons. However, most of the fund's resources between 2004 and 2016 (BRL 20.6 billion [around USD 5.9 billion]) were used for other, only remotely related expenses. These include payment of the domestic public securities debt and social security benefits.

FUNTTEL resources have historically gone beyond technological development and research. Between 2001 and 2016, around 28.1% of the BRL 7.18 billion (around USD 2.06 billion) was transferred to the Science and Technology Fund (Fundo Nacional de Desenvolvimento Científico e Tecnológico) and the Telecommunications Research and Development Centre (Centro de Pesquisa e Desenvolvimento em Telecomunicações). Around 35% remains in the fund for investments, while the rest of the money collected is channelled towards other purposes not directly linked to the fund's (TCU, 2017[10]).

There is currently a proposal for an amendment of the Constitution to reform public funds, which could lead to the abolishment of sectoral fees. The proposal, which was sent to Congress in November 2019, establishes that all funds will need to be recreated by law within two fiscal years after the enactment of the constitutional amendment. If the funds are not recreated, the sectoral funds would be automatically extinguished. This, however, would not cease the collection of revenues from service providers. Instead, it would effectively transform a fee into a tax.

Meanwhile, MCTIC is planning a specific amendment to the FUST law. It would modify use of funds generated through FUST, allowing them to be used to expand broadband in the country. Additionally, the Chamber of Deputies is discussing Bill No. 1 481 from 2007, which proposes to use FUST to provide broadband in schools. The Senate would have final approval.

As resources collected through FISTEL, FUST and FUNTTEL have largely not been used for the purposes for which they are designated, the actual use of the fund contributions

exclusively for the development of Brazil's digital economy is highly recommended. Contributions could be reduced or used more effectively to develop digital transformation in Brazil, particularly through expansion of broadband services.

It is important to note that especially law proposals aiming at abolishing the sectoral funds for communication services but keeping sectoral fees cannot be recommended under any circumstance. Such proposals imply the transformation of fees into a *de facto* tax and would lead, again, to a double taxation of the communication sector.

In sum, fees and special taxes in the communication sector represent around 40.2% of the tax burden for fixed and mobile broadband services (Anatel, 2020[11]). Table 7.2 summarises all sector-specific taxes and fees applying to the communication sector in Brazil.

Table 7.2. Taxes and fees applying to the telecommunication sector in Brazil

	Fee/tax	Description	Amount	Base
Regulatory/policy fees at national level	FISTEL/TFI	Installation fee	Between BRL 27 (USD 7.74) and BRL 34 000 (USD 9 742); single payment	New stations and subscribers
	FISTEL/TFF	Operation fee	33% of TFI	TFI
	CONDECINE	Fee to foster content production	12% of TFI	Stations and subscribers
	CFRP	Fee to foster public broadcasting	5% of TFI	Stations and subscribers
	FUST	Fund for the universalisation of telecommunications	1%	Gross operating revenue (other taxes deducted)
	FUNTTEL	Fund for innovation and technological development	0.50%	Gross operating revenue (other taxes deducted)
General taxes at national level	IRPJ	Corporate income tax	15% + 10%	Profit
	CSLL	Social contribution	9%	Profit
	PIS/PASEP	Social integration programme	0.65%	Revenues
	COFINS	Social security financing	3%	Revenues
State level	ICMS	Circulation of goods and services, paid by consumer	25-37%	Revenues
Municipal level	ISS	Specific services, not under the scope of ICMS yet	2-5%	Revenues

Notes: Listed taxes and fees are recurring annually. This is with the exception of the installation fee within the FISTEL regime, which allow for payment in instalments.
Source: OECD based on MCTIC's response to the questionnaire of the review.

Taxes and fees applied to the broadcasting and pay TV sector

FISTEL, PPDUR, CONDECINE and CFRP also apply to the broadcasting sector, in addition to IRPJ, CSLL, PIS and COFINS (Table 7.3).

CONDECINE is levied on the "placement, production, licensing and distribution of cinematographic and video-phonographic works for commercial purposes" (Brazil, 2011, p. art. 32[12]). A fixed amount must be paid for every audio-visual production registered with Ancine once every five years. The respective amount depends on the nature (advertisement/ non-advertisement), length and origin of the title (domestic/non-domestic). Depending on the characteristics of the title, fees range between BRL 300 (around USD 82) and BRL 250 211 (around USD 68 551)[13].[14]

In addition to the sector-specific CONDECINE, pay TV service providers may be subject to the ICMS. However, as with the communication sector, the ICMS creates market distortions as the services subject to it are uncertain. Additionally, new services may not be taxed in the same manner. For example, the ICMS is not applied to over-the-top services that provide expenses (*fiscalização de telecomunicações*) (TCU, 2017[10]). Around 11.2% have been transferred to FUST, while around 27% have been identified to have been moved to the National Treasury.

Furthermore, CONDECINE often excludes VoD. Currently, CONDECINE is applied only to two categories: "CONDECINE Teles" and "CONDECINE Remessa". "CONDECINE Teles" is paid by telecommunication providers (holding a concession or an authorisation) to distribute audio-visual content. "CONDECINE Remessa" is applied to remittances that stem from the income of the commercialisation of audio-visual content abroad, content acquisition or import.

A working group formed by the Superior Cinema Council (Conselho Superior do Cinema) is discussing whether CONDECINE should be applied to VoD in a third category (CONDECINE Titulo). This category refers to the commercialisation of audio-visual content in any segment of the market, i.e. exhibition rooms, home video, pay TV, FTA television and others.

One study estimated the price elasticity of demand for pay TV to be -1.95 (FIPE, 2015[13]). This represents a highly elastic demand, meaning that anything that inflates price by 1% can be expected to depress usage of pay TV services by nearly 2% (FIPE, 2015[13]). In consequence, if taxes are passed on to the market, they could have a direct influence on consumer behaviour. However, compared to telecommunication services, the overall broadcasting tax burden of broadcasting services is proportionally lower.

Table 7.3. Taxes and fees applying to the broadcasting sector

Taxes and fees	VoD	Pay TV	Free-to-air television
FISTEL	No	Yes	Yes
CONDECINE	Yes[1]	Yes	Yes
CFRP	No	Yes	Yes
IRPJ	Yes	Yes	Yes
CSLL	Yes	Yes	Yes
PIS	Yes	Yes	Yes
COFINS	Yes	Yes	Yes
PPDUR	No	Yes	Yes
ICMS	No	Yes	No
ISS	Yes	No	No

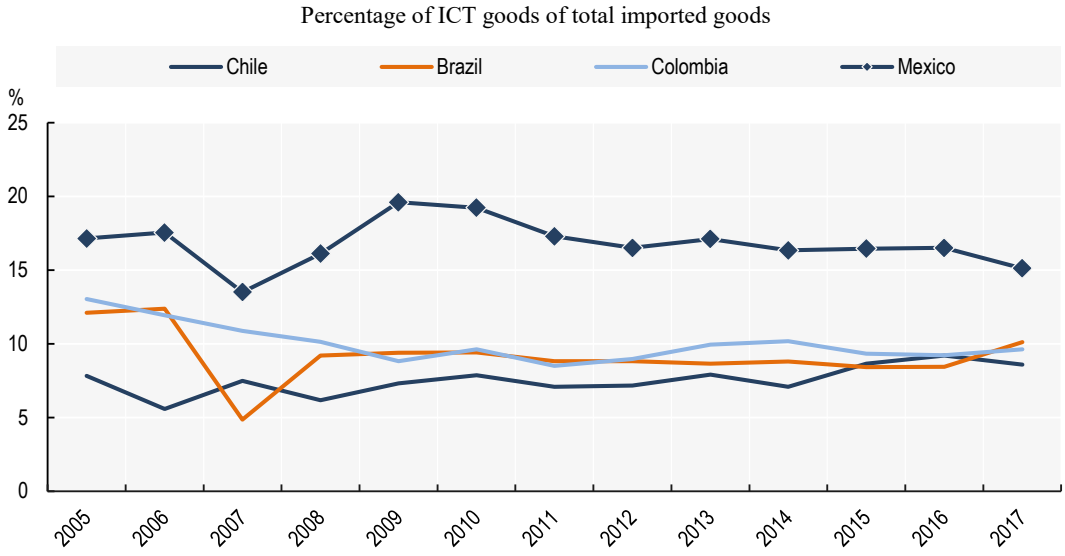
1. CONDECINE is applied to VoD in the case of distribution and remittances that stem from the income of the commercialisation of audio-visual content abroad, content acquisition or import.
Source: OECD based on responses to the questionnaire for the review by MCTIC and Anatel.

Import duties

The share of information and communication technology (ICT) goods in total imported goods has been stable over the past ten years. It amounted to 8% on average, with a slight increase to 10.11% in 2017 (Figure 7.5).

Import duties for those goods have been relatively high in Brazil. In 2017, effectively applied duties on imported goods amounted to around 12.1% of the imported value. They amounted to 0.7% in OECD countries (Figure 7.6).

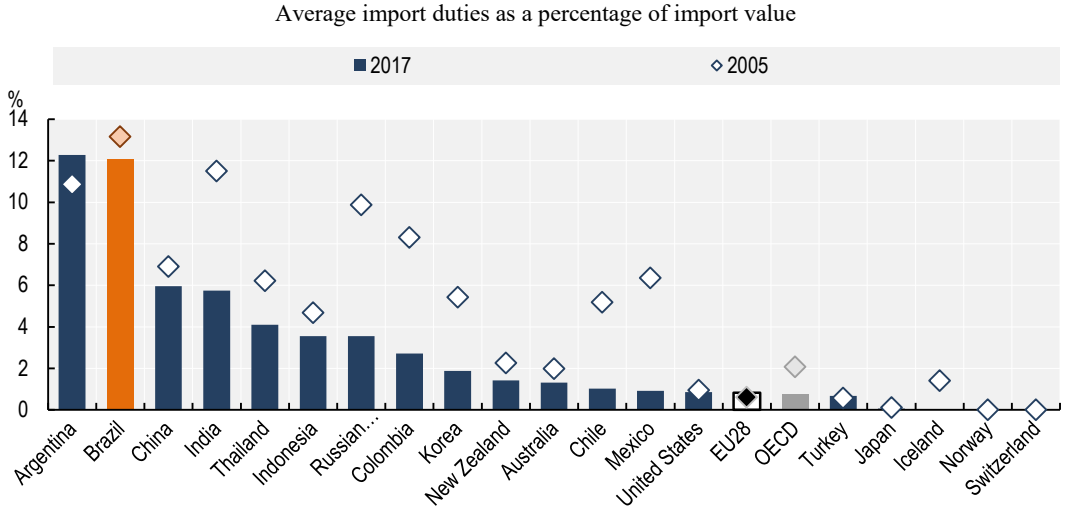
Figure 7.5. Share of ICT imports in Brazil among total imports, in Brazil and regional peer countries (2005-17)



Source: The World Bank (2019[14]), "ICT goods imports (% total goods imports), Brazil, Chile, Mexico, Colombia", https://data.worldbank.org/indicator/TM.VAL.ICTG.ZS.UN?locations=BR-CL-MX-CO (accessed on 20 April 2020).

The Brazilian government has acted to reduce duties, especially for goods unavailable from Brazilian producers. A regime called Ex-Tarifário provides the legal framework for temporary reductions in import duties when there is no equivalent national production. The rules for the concession of the Ex-Tarifário regime have been established by the Brazilian Foreign Trade Chamber (Câmara de Comércio Exterior) Resolution No. 66/2014 (Michelon, 2018[15]).

Figure 7.6. Effectively applied duties on ICT goods in Brazil and selected countries, 2017



Note: For Thailand, data refer to 2015 instead of 2017.
Source: OECD (2019[16]), *Measuring the Digital Transformation: A Roadmap for the Future*, https://dx.doi.org/10.1787/9789264311992-en, based on UNCTAD, *Trade Analysis Information System* (December 2018).

Products must meet a number of requirements to take advantage of the tax reduction. Detailed forms must be completed to justify the rate reduction, which can only be claimed for capital goods, ICT goods or automotive supply. Among data required are technical information, how much will be imported, the price of the product and why it has no equivalent in Brazil. This complex application process feeds the administrative and compliance costs discussed below.

While the tax reduction measures are steps in the right direction, the basket of goods exempted from import tariffs is still limited. With only 34 ICT goods falling under the new regime, import duties still apply to other, potentially crucial components (Global Trade Alert, 2020[17]). Brazil should therefore actively promote the entry of Mercosur countries into the World Trade Organization's (WTO) Information Technology Agreement (ITA). This agreement would create a credible schedule for the reduction of tariffs on an increasing number of ICT goods.

One estimate suggests that access to the ITA could increase GDP growth by 0.08 percentage points in the first year alone. The increase in tax revenues from higher growth, including in the ICT sector, would exceed the loss in import tariffs from the fourth year onwards (Ezell and Foote, 2019[18]).

Anatel requires all telecommunication products and equipment for sale in Brazilian territory to be tested and certified by designated bodies. This rule applies to both imported and national products. This policy may protect consumers from fraudulent devices, low-quality ones or stations not adapted to the Brazilian environment. However, it may also lead to compliance costs and delays for foreign products to reach markets.

The entire process can take from one to two months, and can have an effect not only on the costs of the product supplier, but also competition as this may delay market entry.

In October 2019, a new conformity assessment framework for telecommunication products was approved (Resolution No. 715/2019). This regulation gives Anatel more flexibility to establish technical requirements and operational procedures for assessing conformity of equipment. After the resolution's entry into force, the agency started to review the framework, which was expected to be replaced in 2020. Proposed changes include a new list of requirements. A conformity assessment model, for example, would approve low-risk products through presentation of a Supplier Declaration of Conformity.

Tax incentive mechanisms

In Brazil, several tax incentive mechanisms expand the supply of and demand for telecommunication services. Many of these mechanisms entail a partial or full deduction of the ICMS. Some extend connectivity and foster digital inclusion, especially for vulnerable parts of society.

In 2012, Law No. 12 715 established a special taxation regime for deployment of broadband (Regime Especial de Tributação do Programa Nacional de Banda Larga para Implantação de Redes de Telecomunicações, REPNBL-Redes). Regulations were put into place in 2013 by Decree No. 7 921.

The decree stated that tax incentives would be given to projects presented by operators and approved by the Ministry of Communications (before it became MCTIC in 2016). Regarding equipment acquisition, operators would be exempt from the payment of PIS/PASEP, COFINS and the Industrialised Products Tax (IPI). However, obligations on minimum national content were imposed. The law expired at the end of 2016.

According to MCTIC estimates, REPNBL implied a waiver of tax revenues of about BRL 502 million (USD 144 million). Investments in broadband networks for the projects amounted to BRL 4.1 billion (USD 1.2 billion), distributed in 847 municipalities across the country. Some 110 000 km of fibre optic cables were purchased, in addition to 14 million other items, such as modems, radios, antennas, multiplexers, amplifiers and routers.

Another example at the national level is the Electronic Government Service for Citizens (Governo Eletrônico – Serviço de Atendimento ao Cidadão, GESAC). This was established through Ordinance No. 256 of 2002 and co-ordinated by MCTIC. GESAC aims to provide Internet access to vulnerable communities around Brazil, mainly through satellite connections. This, in turn, seeks to promote digital inclusion and encourage use of e-government programmes. The federal government pays for the services, which are supplied by private companies, without the ICMS tax of the respective state. As of 14 February 2020, GESAC provided broadband services to approximately 11 218 institutions and public sites (Chapter 5).

Tax incentives have also been used at the state level. Some state governments have developed programmes to encourage deployment of infrastructure in sparsely populated regions, as well as in regions with low coverage. For example, states such as Minas Gerais and Ceará have used tax incentives based on ICMS reductions to deploy antennas for 3G mobile services in municipalities. Anatel has documented how a lower ICMS rate has helped expand coverage. Between 2014 and 2016 in Minas Gerais, for example, coverage expanded rapidly after ICMS reductions compared to Bahia (Anatel, 2016[19]).

Administrative and compliance costs

The inherent complexity of fees combined with state, federal and municipal taxes of the Brazilian fiscal system increase the financial burden of compliance. The federal government, the 27 states and 5 570 municipalities are all involved in the collection process.

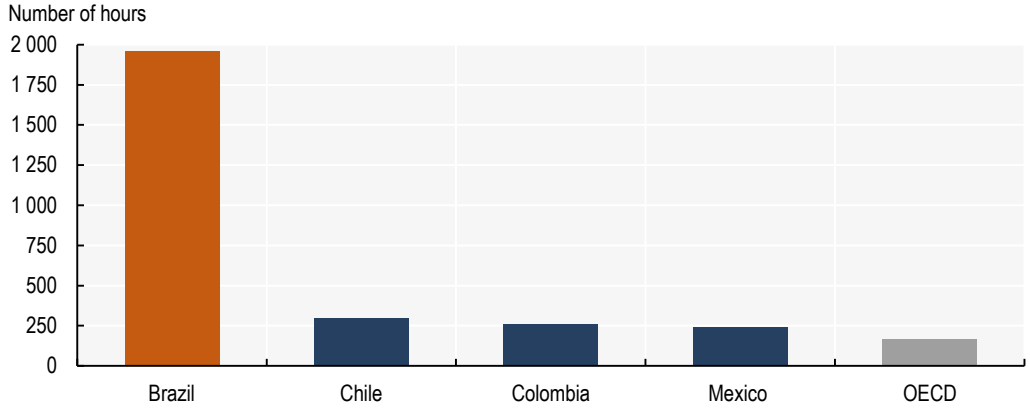
Frequent legislative and regulatory changes and demanding reporting requirements add to these compliance costs (The World Bank, 2018[20]). For example, a medium-sized company in Brazil requires more than 6.5 times more time to comply with tax reporting and collection than peers in OECD countries such as Chile, Colombia and Mexico (Figure 7.7).

Compliance costs for companies in the communication sector are probably even higher due to the high number of sector-specific fees. High compliance costs may be associated with larger informal sectors and lower levels of investments (Djankov et al., 2010[21]). Thus, high compliance costs in the communication sector may have contributed to lower levels of investments (Chapter 3).

Congress is reviewing two proposals to reduce the administrative burden by unifying different taxes into one single tax. In addition, the government sent a proposal to Congress that, among other aims, seeks to unify the social integration and social security contributions (PIS and COFINS).

The proposal consists of four phases. In the first phase, the government would put forward a bill that unifies PIS and COFINS. In the second phase, scheduled for the beginning of 2020, it would turn IPI into a selective tax that applies only to goods such as cigarettes, beverages and vehicles. The third phase, which was to be sent to the legislature by the end of the first quarter of 2020, would concentrate on income tax for individuals. To that end, it would increase the exemption range and create a new tax rate for high-income brackets. The last stage, planned for mid-2020, would exempt companies' payrolls (Fucs, 2019[22]).

Figure 7.7. Hours spent by companies to comply with the tax regime in Brazil compared to regional peer countries and the OECD average (2019)



Note: The graph shows the number of hours needed by a medium-sized case study company to comply with profit, labour and consumption tax legislation in the respective country.
Source: OECD based on PWC (2019[23]), *Paying Taxes 2019: Overall Ranking and Data Tables* (database), https://www.pwc.com/gx/en/services/tax/publications/paying-taxes-2019/overall-ranking-and-data-tables.html?WT.mc_id=CT13-PL1300-DM2-TR2-LS1-ND30-TTA4-CN_payingtaxes-2019-ranking-data-table-button (accessed on 10 September 2019).

References

Anatel (2020), *Anatel aprova consulta pública para implementar o 5G*, [Anatel Approves Public Consultation to Implement 5G], news release, 6 February, Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/institucional/component/content/article/171-manchete/2491-anatel-aprova-consulta-publica-para-licitar-faixas-de-frequencias-para-o-5g (accessed on 12 February 2020). [8]

Anatel (2020), *Redes Comunitárias*, [Community Networks], news release, Agência Nacional de Telecomunicações, Brasilia, https://www.anatel.gov.br/setorregulado/component/content/article/2-uncategorised/528-redes-comunitarias. [9]

Anatel (2020), *Relatório de Nível de Carga Tributaria e Custo de Serviços de Telecomunicações*, [Report on the Level of Tax Burden and Cost of Telecommunication Services], Agência Nacional de Telecomunicações, Brasilia, https://sei.anatel.gov.br/sei/modulos/pesquisa/md_pesq_documento_consulta_externa.php?eEP-wqk1skrd8hSlk5Z3rN4EVg9uLJqrLYJw_9INcO749ZU8ZBGqV8kq12EGBtZ1IHF52JvEnYmAN5rZfOeuv5M080Av6KUM0moZuZ7Tm0-0dHpzq0tstYZxofwhLfzQ. [11]

Anatel (2016), *Estudo sobre o Impacto da Tributação nos Serviços de Telecomunicações [Study about the impact of taxes on telecommunication services]*, https://cloud.anatel.gov.br/index.php/s/dfP3f1Dih1UOZg6. [19]

Auriol, E. and A. González Fanfalone (2014), "Benefits and costs of the infrastructure targets for the post-2015 development agenda. Post-2015 consensus", *Working Paper*, Copenhagen Consensus Centre, https://www.copenhagenconsensus.com/sites/default/files/infrastructure_-_assessment_-_auriol_fanfalone.pdf. [6]

Brazil (2011), "Lei No. 12 485 de 12 de setembro de 2011 (Lei do Serviço de Acesso Condicionado)", [Law No. 12 485 of 12 September 2011 (Pay TV law)], Presidência da República, Brasilia, http://www.planalto.gov.br/ccivil_03/_Ato2011-2014/2011/Lei/L12485.htm. [12]

CGI.br (2018), "Pesquisa sobre o Uso das Tecnologias de Informação e Comunicação nos domicílios brasileiros - TIC Domicílios 2017", [ICT Households 2017: Survey on the Use of Information and Communication Technologies in Brazilian Households], Comitê Gestor da Internet no Brasil, São Paulo, https://cetic.br/pesquisa/domicilios/indicadores. [2]

Djankov, S. et al. (2010), "The effect of corporate taxes on investment and entrepreneurship", *American Economic Journal: Macroeconomics*, Vol. 2/3, pp. 31-64. [21]

Ezell, S. and C. Foote (2019), *Assessing how Brazil would benefit from joining the ITA*, Information Technology and Innovation Foundation, Washington, DC, http://www2.itif.org/2019-brazil-ita.pdf?_ga=2.158135738.1630844014.1583859596-1037633162.1583859596. [18]

FIPE (2015), *Efeitos da Alteração do Convênio ICMS 57/99 Sobre o Mercado de TV por Assinatura*, ["Effects of the Amendment to the ICMS 57/99 Agreement on the Pay TV Market"], Fundação Instituto de Pesquisas Econômicas, São Paolo. [13]

Fucs, A. (2019), *Governo Envia ao Congresso Proposta de Reforma Tributária com Imposto sobre Consumo*, [Government Sends Proposal for Tax Reform with Consumption Tax to Congress], Estadao blog, https://economia.estadao.com.br/noticias/geral,reforma-tributaria-comeca-ate-fim-de-novembro-com-imposto-sobre-consumo,70003093126?utm_source=estadao%3Afacebook&utm_medium=link. [22]

Global Trade Alert (2020), "Brazil: Elimination of import duties on 34 IT and telecommunications products", webpage, https://www.globaltradealert.org/intervention/73409/import-tariff/brazil-elimination-of-import-duties-on-34-it-and-telecommunications-products (accessed on 11 March 2020). [17]

GSMA Intelligence (2020), *Data and Analysis for the Mobile Industry (Database)*, https://data.gsmaintelligence.com/ (accessed on 20 March 2020). [5]

Michelon, J. (2018), *Brazilian Government Reduces Import Tariffs on ICT and Capital Goods*, Aldeotaglobal blog, https://aldeotaglobal.com/2018/03/07/brazilian-government-reduced-import-tariffs-on-capital-and-ict-goods/. [15]

OECD (2019), *Global Revenue Statistics (database)*, (accessed 20 Februrary 2020), https://www.oecd.org/tax/tax-policy/global-revenue-statistics-database.htm. [1]

OECD (2019), *Measuring the Digital Transformation: A Roadmap for the Future*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264311992-en. [16]

OECD (2019), *OECD Reviews of Digital Transformation: Going Digital in Colombia*, OECD Publishing, Paris, https://dx.doi.org/10.1787/781185b1-en. [7]

OECD (2018), *Regulatory Enforcement and Inspections Toolkit*, OECD Publishing, Paris, https://doi.org/10.1787/9789264303959-en. [4]

OECD (2016), *Indicators of Regulatory Policy and Governance Latin America 2016: Brazil*, OECD, http://www.oecd.org/gov/regulatory-policy/Brazil-regulatory-policy-ireg-2016.pdf. [3]

PWC (2019), *Paying Taxes 2019: Overall Ranking and Data Tables*, (database), https://www.pwc.com/gx/en/services/tax/publications/paying-taxes-2019/overall-ranking-and-data-tables.html?WT.mc_id=CT13-PL1300-DM2-TR2-LS1-ND30-TTA4-CN_payingtaxes-2019-ranking-data-table-button (accessed on 10 September 2019). [23]

TCU (2017), "Acórdão No. 1 427", [Decision No. 1 427], Tribunal de Contas da União, Plenário, Brasilia, https://pesquisa.apps.tcu.gov.br/#/documento/acordao-completo/1427%252F2017%2520/%2520/DTRELEVANCIA%20desc,%20NUMACORDAOINT%20desc/0/%20?uuid=9a7ca480-f123-11e9-88b4-5bcfdb2e2702. [10]

The World Bank (2019), "ICT goods imports (% total goods imports), Brazil, Chile, Mexico, Columbia", *UNCTADstat*, (database), https://data.worldbank.org/indicator/TM.VAL.ICTG.ZS.UN?locations=BR-CL-MX-CO (accessed on 20 April 2020). [14]

The World Bank (2018), *Brazil: Options for Tax Reform. A Policy Note for Discussion*, World Bank, Washington, DC, http://pubdocs.worldbank.org/en/980881536598168344/Policy-Note-Tax.pdf. [20]

Notes

[1] Using the exchange rate of 3.93 BRL/USD for the year 2019 from OECD.stat (https://stats.oecd.org/).

[2] Suppose, for example, a customer purchases a voice and data plan for BRL 100. If the customer purchases this plan in the state of São Paolo, an indicated ICMS rate of 25% means that one would pay BRL 25 of ICMS. In consequence, the effective ICMS rate for São Paulo is 33% (i.e. BRL 25/BRL 75 = 33%). It is 42.8% (i.e. BRL 30/ BRL 70 = 42.8%) for Rio de Janeiro.

[3] For example, the ICMS rate in Alagoas, Ceará and Pará is 30%, which corresponds to an effective rate of 42.8%.

[4] Both concepts are laid out in Law No. 9 472 of 1997, Articles 60 and 61: "Art. 60. Telecommunication services is the set of activities that enables the offer of telecommunication. §1° Telecommunication is the transmission or reception of symbols, characters, signs, writings, images, sounds or information of any nature, by wire, radio-electricity, optical means or any other electromagnetic process. [...]

Art. 61. Added value service is the activity that adds to a telecommunication service that supports its new utilities related to access, storage, presentation, movement or retrieval of information, but shall not be confused with the telecommunication service itself. §1º Added value service does not constitute telecommunication service and its provider can be classified as a user of the telecommunications service that supports it, with the rights and obligations inherent to this condition."

[5] Precedent No. 334 of the Superior Court of Justice (Superior Tribunal de Justiça – STJ): "The service of Internet access providers is not subject to ICMS."

[6] "Station'' refers to equipment or devices necessary for the realisation of telecommunications (Article 60, paragraph 2, of the General Law of Telecommunications – LGT).

[7] For details, see Annex I to Law 5070/1966: www.planalto.gov.br/ccivil_03/LEIS/L5070.htm.

[8] Law No. 12 485 of 2011.

[9] Established by Article 32, of Law No. 11 652/2008.

[10] Using the exchange rate of 2.35 BRL/USD for the year 2014 from OECD.stat (https://stats.oecd.org/).

[11] www.planalto.gov.br/ccivil_03/LEIS/L9998.htm.

[12] www.planalto.gov.br/ccivil_03/LEIS/L10052.htm.

[13] Using the exchange rate of 2018 of 3.65 BRL/USD for the year 2014 from OECD.stat https://stats.oecd.org/.

[14] Amounts to be paid for advertisements can be found at https://www.ancine.gov.br/sites/default/files/CONDECINE%20Obras%20Publicit%C3%A1rias.pdf; amounts to be paid for non-advertisements can be found at https://www.ancine.gov.br/sites/default/files/CONDECINE%20Obras%20N%C3%A3o%20Publicit%C3%A1rias.pdf.

OECD Telecommunication and Broadcasting Review of Brazil 2020

Connectivity is the backbone of the digital transformation, and as such, policies and regulatory measures that foster access to high-quality communication services at competitive prices are key. This review provides a comprehensive examination of Brazil's communication and broadcasting sectors, highlighting areas for regulatory and policy reform that can help ensure a successful and inclusive digital transformation. It analyses market performance of the communication and broadcasting sectors, as well as underlying policies and regulations. Based on its findings, the report recommends actions in five key areas: improving the policy and regulatory framework; overhauling the taxation, fees and tariff framework; improving market conditions; fostering competition in communication and broadcasting markets; and strengthening national policies and evidence-based policy making. These areas should be addressed simultaneously, in order to ensure a holistic approach to reform.

This publication is a contribution to the OECD Going Digital project which aims to provide policymakers with the tools they need to help their economies and societies prosper in an increasingly digital and data-driven world.

For more information, visit ***www.oecd.org/going-digital***

#GoingDigital

PRINT ISBN 978-92-64-31744-4
PDF ISBN 978-92-64-93255-5