



CONVERGENCE AND NUANCES OF NET NEUTRALITY IN SOUTH AMERICA

CONVERGENCIA Y Matices DE LA NEUTRALIDAD EN LA RED EN AMÉRICA DEL SUR

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Abstract

The Internet has become the ultimate platform for convergence, closely associated with network, technology, and media, due to its open and nondiscriminatory architecture. Convergence in telecommunications is propelled by ideas, ideologies, and policies progressively and cyclically, bringing further technological advancement, market, business, and policy changes. As a response to convergence, net neutrality seeks to regulate the relationship between Internet service providers and users to avoid discriminatory practices and ensure the openness of the Internet as a platform for innovation, economic development, and access to information for all. The objective of this work is to analyze the development of convergence in the telecommunications sector and the progress of net neutrality policies in South America, with five specific cases using a qualitative empirical approach. Within the findings, we identify different approaches for legislating net neutrality, controversies concerning the levels of commitment to the principles, ambiguity for effective enforcement of the rules, and commercial arrangements that in practice violate net neutrality.

Keywords: internet, net neutrality, convergence, telecommunications, South America

Resumen

El Internet se ha convertido en la plataforma definitiva para la convergencia, estrechamente asociada con las redes, la tecnología y los medios, debido a su arquitectura abierta y no discriminatoria. La convergencia en las telecomunicaciones es impulsada por ideas, ideologías y políticas de manera progresiva y cíclica, lo que genera más avances tecnológicos, cambios en el mercado, los negocios y las políticas. Como respuesta a la convergencia, la neutralidad en la red busca regular la relación entre los proveedores de servicios de Internet y los usuarios para evitar prácticas discriminatorias y asegurar un Internet abierto como plataforma de innovación, desarrollo económico y acceso a la información para todos. El objetivo de este trabajo es analizar el desarrollo de la convergencia en el sector de las telecomunicaciones y el avance de las políticas de neutralidad en la red en América del Sur, con cinco casos específicos utilizando un enfoque empírico cualitativo. Dentro de los hallazgos, se identifican diferentes enfoques para legislar la neutralidad en la red, controversias sobre los niveles de compromiso con los principios, ambigüedad para la aplicación efectiva de las reglas y acuerdos comerciales que en la práctica violan la neutralidad de la red.

Palabras clave: Internet, neutralidad en la red, convergencia, telecomunicaciones, América del Sur

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1. Introducción

Convergence, in general, refers to the trend or phenomenon where two or more independent technologies, services, or networks integrate and form a new outcome [1]. The term is often thought of as something new, but regulatory and technological convergence has been ongoing in the history of telecommunications. A discussion of convergence in telecommunications in isolation is difficult because is closely associated, with technological, media and network convergence as is shown in Figure 1. Thus, convergence in network, technologies, and media is at the basis of change in innovative offers and new business models in the telecommunications sector; but also, has been facilitated by the opening up of markets to competition, the digitalization of content, the emergence of Internet Protocol, and the adoption of high-speed broadband. This evolution leads to move the classic telecommunication and broadcast environments towards an open and integrated programmable broadband network environment.

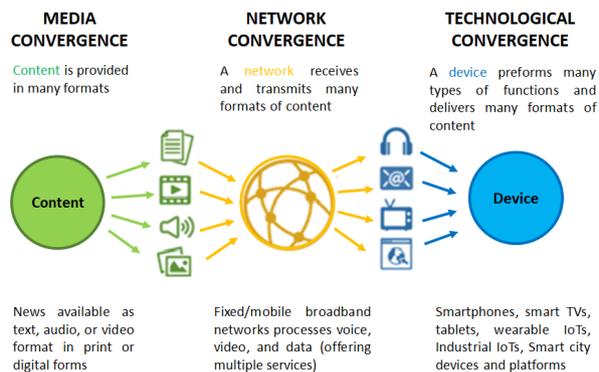


Figure 1. Relationships between technological, media, and network convergences [1]

On the other hand, the growing role of the Internet in the economy and society has enhanced the process of convergence and its rate of change. Although large telecom operators have played a role in the process, new market players have moved rapidly, and often in an unpredictable way, adopting different market models from traditional telecommunication firms. Traditional services (voice and video) are delivered over IP networks and the development of new platforms is facilitating the provision of converged services. In the last years new digital content distributors, such as Over the Top - OTT providers (e.g., Video: Netflix, Amazon video and HBOGo; Audio: Spotify, Deezer; Message: WhatsApp, and Line), now coexist and compete with traditional providers and network access operators, to deliver content and services on Internet [2]. Moreover, a growing number of operators are also focusing on mobile content to offer music, video, or access to applications and online services from mobile devices.

These changes are often taking place as a result of an increasing number of users creating and exchanging their own content on a multiplicity of devices.

Convergence is happening today in South America and tests traditional business models, generates competition between platforms, pressures traditional operators, changes consumer behavior and demand for services, leading to dynamic technology management processes. In turn, these technological and market changes put pressure on regulatory agencies as a challenge to adapt them to the new converging service environment, due to the one-to-one relationship with a regulatory entity is no longer clear, and it may create a new sector where a regulatory entity has not been identified.

In the era of convergence and expansion of network services, it is important to study the impact of policies related to the Internet. Issues such as universal access to network services, freedom to communicate, diversity of the content market, competitiveness, innovation, and the promotion of economic benefits are mayor concerns underlying the debate in the new environment in South America.

Thus, the growing convergence between the telecommunications, communication and media sectors, together with the possibility to (1) transmit different services, content, and applications over the same networks, without major costs for infrastructure owners, operators, or users, and (2) the transmission to different types of terminals without privileging or discriminating content or formats, is precisely the essence of the origin of the debate on Net Neutrality – NN. The term was introduced by Wu [3], and refers to the principle that all Internet data should be treated equally without any discrimination or restriction, independent of the origin and destination, type, content, device, service, or application [3, 4].

The purpose of the NN rules is to ensure that the network infrastructure is neutral by prohibiting internet service providers – ISP block, slow-down, or prioritize traffic [3]. Moreover, traffic management measures should be reasonable, transparent, non-discriminatory, and proportionate, based on objective technical differences, according to legal provisions in place in some countries [5].

The NN has emerged as an important convergence policy tied to technological innovation, economic development, and information access. In the last years, many governments have analyzed the role of those who control the access infrastructure and Internet traffic for their benefits and defined the NN differently in their policies, laws, and regulations [6]. The debate centers on the potential consequences of network owners exercising additional control over traffic in their networks [7].

The analysis of the NN debate and the role of regulators has reached national levels. Country regula-

tors have taken varied positions about NN generating controversies and pressures about what should be considered reasonable Internet traffic management - ITM in a converging world, the type of regulation that should be applied, and control mechanisms to enforce the regulation. All this, have forced government authorities to analyze the conditions offered by ISPs, the responsibilities with their customers, but also its rights to remain free of responsibility for the content, and services that may be considered illegal by third parties [8]. On the other hand, the controversies are concentrated on the degree of freedom that a provider must have to implement ITM techniques, which can discriminate specific data over their networks. Although it may seem a purely technical problem, the ITM is more complex, it might lead to discriminatory practices, in case providers block or degrade online services that compete with their services, also has enormous social, legal and economic implications, which may limit the freedom of expression, access to information, competitiveness, and innovation [9].

The changes caused by the convergence are not unknown to the countries of South America, several countries in the region have already adopted laws that ensure the principle of NN. Thus, the objective of this work is to discuss the progress on NN as a convergence policy and its developments in five South American countries to see where they stand on the NN debate. Even though there are a few studies about NN implementation for countries in South America [9, 10] they are neither comprehensive nor up-to-date. As the States must guarantee the validity of this principle through appropriate legislation, we compare the differences between the regulations/laws in each of the researched countries.

2. Materials and methods

This study relies on an approach that is largely empirical, based on qualitative tools to support the tracing of the NN initiatives in five countries from South America. These countries have been selected in order to generate a rich array of findings from a limited number of cases. The methodology employed for data gathering includes document analysis and archival research comprising: reports and other documents that depict the historical evolution of the NN; content of websites and other relevant documents produced within the context of each initiative studied here. We use a qualitative approach, because there is a need to explore and describe the phenomenon of the convergence, NN and the development of the principle in South America.

2.1. The Telecom Convergence

Historically, in the traditional telecom world, distinct communication networks and their underlying tech-

nologies provided voice, data, radio, and television services. The initial concept of telecommunications, which was based on telephony and diffusion of video and audio, is being replaced by a completely new approach where different types of separate networks for different services have converged to a single network.

Today, communication networks are shifting towards IP based solutions that, together with broadband and developments in terminal devices, allow access to IP based applications on a multitude of devices, in a multilayered process that can be termed convergence.

Telecommunication networks have grown over the last century to become the global infrastructure that it is today. In 2019, there were over 5.19 billion unique mobile phone users worldwide, and Internet has grown to also become a global communications infrastructure that reaches 59% of the world population (4.54 billion people). That same year, South America was the subregion that had the largest Internet penetration rate, with 73% of the population having access to this service [11].

Convergence between traditional telecommunication operators and content providers (e.g. audio and video streaming), has introduced an increasing number of new products and services available on the Internet, and users access them according to their own needs at any time and anywhere. Convergence is encouraging competition, mobility, collaboration, interoperability, content creation, and product and service innovation. At the same time, however, it poses new challenges for businesses, consumers, and governments in the South American region, which fall into three major categories: (1) disruptions of the traditional communications industry, (2) increased choice and new vulnerabilities for consumers, and (3) regulatory boundaries have become less clear.

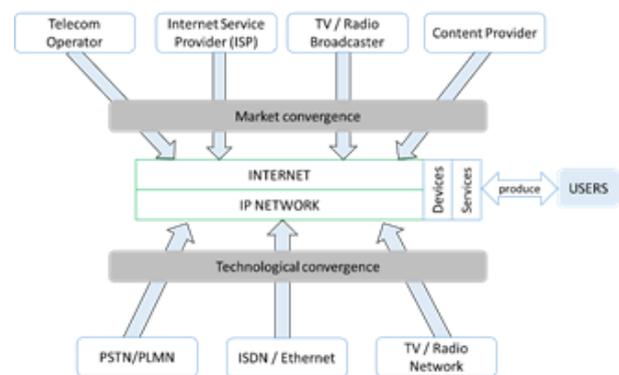


Figure 2. . Convergence of telecommunication to IP base networks and services

Digitalization, technological innovation, and increased connectivity have fused previously separated value chains (e.g., telecommunications/broadcasting)

into mixed-value chains of access, which include content distribution service and device providers [12]. Convergence has encouraged the upgrading and remixing of new configurations of products and services and the nature of media consumption. Even, the emerge of the OTT players has profound implications for the telecoms and broadcasting industries, these new business models have removed the old boundary between fixed/wireless and cellular connectivity, and between broadcasting and Internet services.

On the other hand, the users now have greater control over what they want to access, where, and when on the Internet. They are taking a more active role, creating their content and services (e.g. using YouTube, Instagram, Twitter, or developing apps). The increased availability of broadband and convergence has resulted in the “on-demand” market, which is connecting consumers and producers directly and customizing goods and services.

Before convergence, regulators use to deal only with a few traditional players in specific sectors, but now has eliminated the traditional segmentation of telecom services, with a more integrated value chain, new participants and competition on a global scale; also has given rise to new models for content and services, where users have gained the ability to access them over different networks and devices, and interact with multiple providers using the Internet, as a result, there are new players from different sectors to deal with, reducing regulators’ ability to impose and enforce regulations (see Figure 2). This requires a review of the regulatory approach and levels of intervention, together with greater institutional coordination and flexibility.

Consequently, changes in the telecommunications sector, particularly the exponential growth of Internet traffic, create tensions between regulation and the competitive supply of services in certain segments of the network. In other words, as broadband speeds increase and the networks become more capable of delivering added-value services, policymakers will have to rethink their traditional approaches to deal with issues related to, for example, adapting their management models to convergence trends, treatment of bundles and convergent offers, and Internet openness [12], a function that involves ensuring effective competition, managing scarce resources and protecting consumers’ rights.

2.2. Net neutrality

The Internet’s decentralized nature and openness to new devices, applications, and services have played an important role in advancing convergence and in its success in fostering the free flow of information, innovation, creativity, and economic growth. This openness responds to the continuously evolving interaction and independence from the Internet’s various technical com-

ponents, which enable collaboration and innovation while continuing to act independently of one another. At the international level, the roles, openness, and competencies of the global multi-stakeholder institutions that govern standards for different layers of Internet components have served to expand the decentralized networks that the Internet is made up of today. At the national level, multi-stakeholder arrangements for governing the Internet are also advisable. Moreover, is important to maintain technology neutrality and appropriate quality for all broadband networks and services to ensure an open and dynamic Internet environment [12].

Broadband networks are a key platform for innovation, economic opportunities, and civic engagement. The extent to which these networks are open to facilitating these objectives has thus become the main concern for all stakeholders and requires a review of the regulatory approach and levels of intervention, together with greater institutional coordination and flexibility. In the actual increasingly converged environment, ISPs have become gateways for content and applications, as they control content providers’ final access to consumers. In this scenario, the role played by those who manage the access infrastructure generates a great debate on the application of the principles of openness and non-discrimination at the transport level, and if it should be regulated or not [7], [13] as a means to protect access, innovation and competition on the internet [14].

Around the world, government authorities have been forced to analyze the conditions offered by ISPs and the responsibilities they have with their customers and the free competition. Thus, NN has advanced from thwarted regulatory proposal to actual regulatory action in several advanced and developing nations [15], where have incorporated issues relating not only to traffic management but also to topics such as transparency in the provision of services, the blocking of harmful content, data protection, privacy and service quality. About it, until 2015 both the regulatory frameworks of the European Union and the Open Internet rules proposed by the Federal Communications Commission - FCC of the United States - USA, had also protected this principle, and indicated that NN is a subject of great importance and have a broad regulation scope to guarantee the Internet’s open state [8], [16]. However, in December 2017, the FCC voted to repeal the 2015 NN rules. This decision came into effect in June 2018, rolling back the 2015 rules: blocking, throttling, and paid prioritization.

2.3. Net neutrality in South America

NN is becoming increasingly important as the global debate intensifies and governments worldwide implement and withdraw regulations. Many countries in South

America already have implemented similar rules. These countries have a middle or middle-high percentage of Internet penetration, variable uses focused in big cities, predominant mobile Internet (two or more mobile operators offering content), and content and application providers - CAPs charged by ISPs in violation of NN that could result in lower prices to users and higher adoption of Internet applications and services [17].

Given the multilayered convergence of networks and services, policymakers in South America could have incentives to apply diverse rules when increasing access is a priority. Thus, they are reassessing their policy and regulatory frameworks to adjust them to current and future developments, and appear to be inclined to layout principles to ensure NN. Based on the rationales given by the initial countries to do so, they see NN as essential to stimulate competition, promote innovation and ensure that consumers can access any lawful content or service provided over the Internet [18]. On NN issues in South America, we concentrate in five countries. Notably, Argentina, Chile, Brazil, Colombia, and Ecuador, have taken decisions to prohibit blocking, throttling, and paid prioritization by ISPs; while others are carrying out consultations or still debating on the topic [12].

2.3.1. Chile

In 2010, Chile was among the first countries to enact a specific law to protect NN. The Network Neutrality Act, Law No. 20.453/2010, specifies the NN principle and its exceptions in Article 24H, paragraph A, that (1) promotes transparency by asking for the publication of the characteristic of Internet access, speed, and quality; (2) guarantees of the service; and (3) prohibits blocking, interfering, discriminating or disrupting any content, application or legal service [15]. In this sense, ISPs must offer to each user connectivity and Internet access without distinguishing arbitrarily content or applications based on source or ownership, considering the different configurations in the access contracts [9], [19].

The Act adopts a flexible view of traffic discrimination, letting providers take actions for network and traffic management, but without affect free competition. In 2013, the Secretariat of the Ministry of Transport and Telecommunication - SUBTEL, promulgated Decree No. 368 [20] which forbids the arbitrary blocking of the Internet's content, but according to article 7, traffic shaping is regulated, but not forbidden [9]. ISPs only can affect the quality or execute actions for the traffic shaping and net management, as long as those actions do not affect the free competition, privacy and it is informed through a clear publication.

It is important to mention that, despite the existence of the Law and decree, since 2013 several telecom companies were accused by civil organizations of slow-

ing down applications, and specific contents without justify these practices [9]. There is evidence of the absence of control of the obligations from the law, either due to a lack of technical capacity or political will [21]. In a 2015 report in counterpart, statistics about the level of compliance of the law were presented [22]; it showed around 40 charges between 2011 and 2015 but did not indicate to what type of noncompliance it refers [19].

In recent years non-observance issues are maintained [23], especially with mobile operators that offer access to specific applications and contents with zero rating - ZR, as a sales strategy. For content providers, these strategies undermine free competition and the NN, however, regulatory agents mention that commercial aspects such as ZR offers do not arbitrarily distinguish contents, based on source or owner, and therefore does not apply discrimination since users can still access content and Internet. This interpretation seems to favor the idea that technical aspects must meet the Law, and on the contrary, commercial aspects would be outside the scope of the obligations [19]. So, the SUBTEL only requires to telecom companies and ISPs to eliminate from their plans the so-called free access to applications and content [23, 24].

Since 2018, based on the rollback of the NN rules in the USA, the debate continues and the SUBTEL has set up working groups with the multi-stakeholders to analyze the ZR, OTT services and implications of the USA decision considering that is a power in terms of content generation, as well as hosting 80% of the world's information and data [24, 25].

2.3.2. Colombia

The legislation that addresses the NN is contained in the Article 56 of the Law No. 1450, Chapter II and established the ISPs may not block, interfere with, discriminate against, or restrict the right of any Internet user to use, send, receive or offer any licit content, application or service on the Internet [9], [15] regardless on the origin or ownership. The law also sets the way to make offers according to the needs of the market segments, based on the use and consumption profiles of users, and this shall not be understood as discrimination. Other aspects specify the right of users to (1) use any class of legal devices in the network; (2) be offered parental control services for content that violates the law; (3) the transparency of the information about characteristics and guarantees of the service; (4) have mechanisms to preserve the privacy of users against viruses and network security; and only block access to specific content upon express request of the user [26].

In addition to the Law, Resolution 3502 of Colombia's regulator, passed in 2011 generating criticisms from users, experts, and civic organizations who found in the text of the rule, inaccuracies, gaps, and ambi-

guities that could give operators a way of avoiding certain aspects of the NN. For some critics [27] the controversies in that process were due to the absence of the participation from civil society and academia, and therefore the vision of the operators influenced its development. The resolution itself allows providers to offer Internet access services for a price according to the needs of the market, that is, to offer plans based on contents and applications the ISPs want to offer, through third parties, ZR, or vertical integration. Also allows the implementation of reasonable and non-discriminatory traffic management by establishing quality of services - QoS levels and prioritize traffic types according to latency and delay for access to the Internet, and clarify the conditions for content blocking due to security reasons which meet technical requirements or standards adopted [28]. Aspects banned or controlled in other NN laws [29].

The exception on Internet plans limited by content makes the resolution itself not faithful, ambiguous, and directly contradicts the Law since to limit content, applications, or services according to market deals or consumption profiles is to discriminate or prioritize the data, and make available a "reduced Internet" [19], [27]. Finally, Resolution 3502 regulates the relationship of consumers with ISPs, but not with content or application providers [15].

The Colombian Ministry of ICT started in 2016 multi-stakeholder consultations to develop a new policy and regulatory framework for telecommunications and broadcasting to deal with convergence in communications markets [9]. Nowadays, Colombia has formulated the project "The role of OTT services" within the initiatives of the Regulatory Agenda 2018-2019 to review regulatory trends for the digital economy, where shall analyze and complement the regulatory framework on NN that allow offers and market prices oriented to costs, protection of consumers interests, as well as updating the operating license conditions of existing operators and service providers [30].

2.3.3. Brazil

In 2014, after almost five years of debate, the Brazilian Congress passed the Marco Civil da Internet - MCI, Law No. 12.965/2014 which, among consolidating rights, duties, and principles for the use and development of the Internet in Brazil, enshrined the principle of NN and privacy of Internet users [8]. Its importance lies not only in its principles but also in the way in which it was drafted, based on an open, public, and collaborative consultation process, implemented across the country that helped to construct the text of the Law.

The law sets (1) the of transparency of information, by asking providers for clear and complete information on service contracts, including details of the data

protection, mitigation, and network management; (2) non-blocking, by affirming that the providers must treat, on an isonomic basis any data packages, regardless of content, origin and destination, service, terminal or application; and (3) for anticompetitive practices, by offering services in non-discriminatory commercial conditions [15].

The law goes on to prohibit traffic discrimination or degradation, which can only be implemented as a result of essential technical requirements, and prioritization of emergency services. The Decree No. 8.771/2016 defines the "essential technical requirements" as network security issues, and exceptional situations of congestion or interruption; while "emergency services" as communications destined to the emergency services providers, or communications to inform the population in situations of disaster, emergency risk or state of public calamity [31]. The Decree also sought to regulate that commercial relations between the infrastructure operator - IO and the actors of the logical layer cannot "compromise the public and unrestricted character of Internet access", "prioritize data packages due to commercial arrangements" or privilege applications offered by the IO [19].

The MCI is considered one of the most advanced laws in the world and shows a major effort to adapt fundamental rights and freedoms to the digital world, incorporating aspects to eliminate ambiguities and violations towards the NN that have the potential to stop innovation and competition. As a novelty, the decree prohibits ZR strategies, includes a tripartite system to supervise, and determines that content companies must have legal headquarters in Brazil [32]. However, when in 2018 consumer associations and other civil society organizations evaluate ZR practice as negative and claim that violate NN, private operators and regulatory agents have claimed that NN was specifically limited to the logical level and infrastructure of the Internet, so the market practices do not violate NN [33, 34].

2.3.4. Ecuador

The new Telecommunications Act in Ecuador - LOT, enacted in 2015, embraces the opportunities of convergence and stipulates in its Article 12 that the state will "propel the establishment and exploitation of telecommunication networks and services that promote the convergence of services, in conformity with public interests and with the dispositions of the Act and its normative" [12], [15]; also included clauses specifically addressing the NN and its promotion (Article 3 and 4); and the rights that subscribers, customers, and users of telecommunications services have, indicating that they can access to any application or permitted service available on the Internet (Article 22).

The Act prohibits blocking, throttling, prioritizing or restricting the user's right to use, send, receive or offer any legal content, applications, or service through the Internet, their networks, or other ICT technologies. Also forbids to limit the right to incorporate or use any class of equipment or device on the network, whenever legal, except for cases established under the legal framework and those in which the competent authority decides, or when the client, subscriber or user expressly demands the limitation or blocking of content. Providers are allowed to carry technical actions to manage their networks when considered necessary, and within the exclusive scope of its activities to guarantee the provision of service [35].

According to the new Act, the regulator body AR-COTEL will be responsible for regulations and norms that allow the provision of multiple services on the same network to drive, in an effective manner, the convergence of services and assist with the technological development in the country, following the principle of NN [12]. However, the LOT has omissions such as: not defining what NN is, using the concept issued by the ITU, which is ambiguous and not very applicable. It also ignores the meaning of the principle and allows the Art. 66 of the Law, in which service providers establish "tariff plans constituted by one or several services, or products of service." Besides, unlike the policy that previously defined the NN (TEL-477-16) [36], which included the concepts of non-discrimination, these have not been included in the Law; all those aspects violate the NN and leaves users defenseless against the potential abuses from providers [37]. As an example, there was a lawsuit against mobile operators for offering unlimited and free WhatsApp service, but these offers did not include the voice call functionality that normally is integrated. Regarding the situation, the Minister of Telecommunications stated that this practice of not including that function in WhatsApp's ZR packages went against the principle of NN and will investigate the facts and take actions [38]. However, even today mobile operators still offer unlimited use of some services and certain applications along with their limited data plans.

2.3.5. Argentine

In 2014, the Law 27.078 "Argentine Digital Law" passed, this new law governs telecommunication in the country and replaces the National Law of Telecommunications 19.798 / 72 and Decree 764/00 [36], [39]. The law was an important update and established the state must ensure quality, accessibility, and affordability to the Internet. It also must guarantee the ICT services and ensure their conditions of quality, affordability, and at fair and reasonable prices, encouraging competition between service providers so that consumers can choose the best for them. Article 1 established

and guarantee NN as an objective, while Article 56 states the rights of users to access, use, send, receive, or offer any content, application, service, or protocol without any restriction, discrimination, distinction, blocking, interference, obstruction, or degradation, [40] and Article 57 prohibits ICT operators (1) to block or discriminate access or use of any content, application, or service except by court order; (2) set the price of Internet access by virtue of its content, services, or applications; and (3) arbitrarily limit the user's right to use any hardware or software to access the Internet, as long as those actions do not affect or harm the network.

Although the law was modified in 2015 by the Decree of Necessity and Urgency 267/2015, the changes did not modify the provisions of articles 56 and 57 about NN. However, it generated controversies and criticisms, due to the Law itself ensures ICT services that in practice should be Internet, content, or application providers, but in its disaggregation, it seems to only refer to ISPs. Also, neither the zero-rating aspects are specified nor do procedures to ensure NN [11], issues that undermining free competition.

Since 2017 mobile operators have been offering free traffic for some applications and services, within this strategy providers paid third-party services to position their offer, and even one of them, integrated vertically, favored its content. This practice is an obstacle for other existing applications it creates an entry barrier for new ones, affecting competition and innovation [40]. Finally, it is important to note that in 2018 there was a lawsuit between operators claiming that a video ZR application of one of them, during the Soccer World Cup, violated the NN. The regulatory agent concluded that the promotion of that application was tolerable as long as it is applied to other similar applications as well [40]. This implies that the Argentine regulator is not independent or impartial, being more permeable to the interests and competition of companies.

3. Results and Discussion

The NN is an example of a response to convergence since it is a principle to regulate the relationship between ISPs and users to avoid discriminatory practices over services or applications. Although regulations/laws related to NN have been introduced in South America, their implementation may vary for fixed or mobile networks. Table 1 shows the list of differences among the regulations/laws in the five countries.

The review shows that the different rules in South America focus on access, transparency of information, the arbitrary non-discrimination of the content or services, and the exceptions to the principle. However, most of the time, the ITM practices or terms of services are not clear, as is mentioned in [23], [36].

Table 1. Policies Comparison among countries

Article	Countries				
	CH	BR	CO	EC	AR
NN definition and concepts	•	•	–	–	–
Guarantees to access/use of services/ content	•	•	•	•	•
Prohibits to block or discriminate access/use	•	•	•	•	•
Transparency of the Information	•	•	•	•	•
Use of HW to access	•	•	•	•	•
Set price by content, service or market	–	▲	•	•	▲
Implement ITM techniques	•	▲	•	•	•
Exceptions (technical requirements, emergency)	–	•	–	–	–
Zero Rating	▲	▲	–	–	–
Control of the obligations	•	•	–	–	•

• Specified, – Not Specified, ▲ Prohibits

The integration of multiple legal devices in the network is allowed as long as they do not affect its quality. However, the laws seek to establish exceptions to allow ITM and QoS to users, pending between reasonableness criteria and exceptions explicitly placed in policies. Thus, allow ISPs to interfere with Internet traffic arbitrarily and discriminate or even block new services or platforms (Industry 4.0, OTT, or IoT devices) for commercial or technical reasons. Thus, ITM practices should be transparent since they can significantly affect end-users [41].

The level of compliance with the laws has problems with repeated transgressions [22]. ZR is an example of how NN may be affected, especially in the mobile Internet service, through which companies offer access to specific applications without constituting an expense in the user’s data plan [42]. Since it is not possible to do so without the necessary discrimination of data by origin, destination, or content, this practice acts against the basic NN principles [33], [38]. These plans are offered in the five analyzed countries, creating captive consumers, even when in some of them, this practice is banned [34], [42].

4. Conclusions

Nowadays, convergence plays an important role in society. It can influence how governments develop ap-

propriate policy while looking for social welfare and enterprises competition with new value-added products and services. However, convergence has raised several issues like interoperability, interconnection, neutrality, policy and regulatory framework, consumer rights protection, and nondiscrimination universal access.

Although in South America each nation has a specific market need to deal with, they must adapt. We identified that the five countries demonstrate different approaches to legislating NN and offer the opportunity to examine the relationship between forms of NN legislation and the extent to which it is compromised by traffic management measures or commercial aspects (e.g., ZR).

In theory, ZR constitutes a violation of NN. By extension, ZR may also impede innovation, competition and free speech. Even when it could help to overcome cost barriers to realize the valued goal of increasing Internet penetration in the region, also could locking users into ‘walled gardens’ of content. Thus, regulatory agencies should be cautions that any commercial arrangements should be designed in a manner that ensures the least possible intrusion into the principle of non-discriminatory pricing. On the other hand, this particular topic within NN represent a thorny public policy challenge and needs further research in the region.

Finally, the development of the approaches to implement the NN principle and the number of nations adopting this principle confirms its importance. Regarding the limitations of this research, the data on the NN policies in the five countries examined here represents a snapshot in time, and the available insights are accordingly restricted. Longitudinal studies are needed to assess the impacts of the NN rules on access, innovation, and competition over time. What is also required are studies on ITM practices that should be transparent, regardless of regulations, and large-scale studies that probe the habits of mobile internet users. These would help us better understand the effect of the NN rules, ZR practices, Internet patterns of use, and propose a new regulatory approach in the region.

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