LÍLIAN MANOELA MONTEIRO CINTRA DE MELO

Internet Regulation and Development: The Battle Over Network Neutrality

Ph.D. Thesis
Supervisor: Professor Carlos Portugal Gouvêa

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Committee

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To my parents – for their deep roots and solid wings.

To my brothers, Levi and Davi.

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Any errors that remain are my sole responsibility.

ABSTRACT

CINTRA DE MELO, Lílian. **Internet Regulation and Development**: The Battle Over Network Neutrality. 2018. 300 p. Ph.D. Thesis, University of São Paulo Law School, São Paulo, 2018.

We have arrived at crossroads in the debates about the future of the internet governance. It is high time to address the reasons why policy choices have not been sufficient to preserve the internet's promise to bring about development, democratic engagement, and social justice. Network neutrality is central to this debate since it intersects the most critical governance issues and how it will shape future of the internet. Network neutrality debate has produced a wide variety of work embedded within economic and legal studies regarding what would be necessary to guarantee a free and innovative internet. Although this work has often been disguised under the mask of technique, it is widespread influenced by the evolutionary economics and denies network neutrality's effects on ongoing struggles for social and economic justice. My assumption is that network neutrality's failures are not an unintended consequence of the regulatory system but is as much part of the problem as the solution. My core hypothesis is that network neutrality's limits mainly occur because of its decontextualized focus on innovation on the internet's last mile, and its insufficiency to secure all envisioned goals. My proposition is that network neutrality debate has failed because it proved unable to address the problems related to concentrated power structures on the internet and increasing inequalities. To achieve this dissertation objective, we offer an alternative framing – historically grounded and globally aware – of the ongoing debate. We investigate network neutrality debate over the last decades in the United States and Brazil, identifying processes and mechanisms by which its sterile arrangements came to take a specific form, focusing on what such arrangements might inform about contemporary policy efforts. In Chapter 1, prevalent internet governance myths are deconstructed, presenting how specific architecture design and the corresponding network neutrality outcomes came to prevail in particular periods. Chapter 2 analyzes both competing and collaborator relations between intergovernmental bodies and internet organizations aiming at better understanding how the interplay between public and private actors redefines the

role of organizations and creates new spaces for regulation and pressures. Following, Chapters 3 and 4 identify specific contingencies over the past decades by which a dynamic set of evolving actors, events, and institutions converged (or not) and gave rise to current network neutrality rules and dissent in the United States and Brazil. At the center of the analysis is the identification of structures and power struggles. Chapter 5 introduces the institutional framework of network neutrality debate and maps its political and economic arrangements. Finally, Chapter 6 presents a critique of network neutrality debate, considering its potential distributive effects in the global economy, taking technology not as deterministic but embedded and being embedded in all the building blocks of what we term the social.

Keywords: network neutrality; internet governance; freedom of speech; innovation; network efficiency; internet access; equality; economic power; law and development; STS

RESUMO

CINTRA DE MELO, Lílian. **Regulação da Internet e desenvolvimento: A disputa da neutralidade da rede**. 2018. 300 p. Tese (Doutorado em Direito). Faculdade de Direito, Universidade de São Paulo, São Paulo, 2018.

A governança da internet vive um momento crítico. Por isso, é imprescindível abordar as razões pelas quais as escolhas feitas até então não foram suficientes para preservar a promessa da internet de promover o desenvolvimento econômico, o engajamento democrático e a justiça social. Nesse sentido, a análise do debate da neutralidade da rede é fundamental, uma vez que está relacionado às questões mais atuais que definirão o futuro da internet. O debate da neutralidade da rede produziu uma ampla variedade de trabalhos que incorporaram estudos jurídicos e econômicos nos os quais se delibera sobre o que seria necessário para garantir uma internet livre e inovadora. Embora essa produção tenha sido frequentemente desenvolvida sob os auspícios do discurso técnico, a influência da economia evolutiva é marcante e ignora os efeitos da neutralidade da rede nos dilemas atuais sobre justiça social e desenvolvimento econômico. A hipótese do presente trabalho é a de que os limites da neutralidade da rede não são uma consequência indesejada, mas tanto parte do problema quanto da solução. Tais limitações da neutralidade da rede ocorrem principalmente em razão de ela ser incapaz de garantir todos os objetivos a que se propõe e do seu deliberado foco em inovação na última milha da internet, desconsiderando a realidade em que se insere. Nesse sentido, propõe-se que o debate da neutralidade da rede fracassa porque não endereça os problemas relacionados às estruturas concentradas de poder e ao aumento das desigualdades. Para tanto, oferece-se um enquadramento alternativo – internacionalmente situado e historicamente fundamentado – do debate da neutralidade da rede. Investiga-se o debate da neutralidade da rede nos Estados Unidos e no Brasil nas últimas décadas, identificando os processos e os mecanismos pelos quais seus arranjos estéreis tomaram forma específica, dando destaque ao seu significado frente aos esforços recentes de elaboração de políticas públicas. No Capítulo 1, os mitos da governança da internet até então disseminados são desconstruídos, apresentando a forma pela qual o desenho e a arquitetura específicos da internet, bem como seus correspondentes resultados no debate da neutralidade

da rede, prevaleceram em determinados períodos. No Capítulo 2, analisa-se as relações de competição e de colaboração entre os órgãos intergovernamentais e as sociedades técnico-profissional internacionais com o objetivo de compreender como a interação entre os atores públicos e privados redefine o papel dessas entidades e cria novos espaços para regulamentação e pressões externas. Na sequência, os Capítulos 3 e 4 identificam as contingências específicas das últimas décadas pelas quais um conjunto dinâmico de atores, eventos e instituições convergiu (ou não) e deu origem aos atuais consensos e dissensos sobre a neutralidade da rede nos Estados Unidos e no Brasil. Tal análise objetiva identificar historicamente as estruturas e os conflitos de poder. No Capítulo 5, introduz-se o enquadramento institucional do debate da neutralidade da rede, mapeando seus arranjos políticos e econômicos. Por fim, no Capítulo 6, busca-se apresentar um novo arcabouço para a análise da neutralidade da rede e de seus efeitos potencialmente distributivos na economia global, afastando-se do determinismo tecnológico e considerando que a internet não só enraíza, como também é enraizada em todos os blocos de construção do que denominamos de sociedade.

Palavras-chave: neutralidade da rede; governança da internet; liberdade de expressão, inovação; eficiência de redes; acesso à internet; igualdade; poder econômico; direito e desenvolvimento; tecnologia e sociedade.

RÉSUMÉ

CINTRA DE MELO, Lílian. **Règlement de l'internet et développement: La dispute sur la neutralité du réseau**. 2018. 300 p. Thèse (Doctorat en Droit). Faculté de Droit de l'Université de São Paulo, São Paulo, 2018.

Nous sommes arrivés à la croisée des chemins dans les débats sur l'avenir de la gouvernance de l'internet. Il est impératif d'examiner les raisons pour lesquelles les choix faits jusqu'à présent ne sont pas suffisants pour préserver la promesse d'internet et fomenté le développement économique, l'engagement démocratique et la justice sociale. L'analyse du débat sur la neutralité du réseau est indispensable parce qu'il recoupe les questions de gouvernance les plus actuelles qui définiront le futur d'internet. Le débat sur la neutralité du réseau a produit une grande variété de travaux intégrés dans les études économiques et juridiques concernant ce qui serait nécessaire pour assurer un internet libre et innovant. Bien que ce débat ait souvent été réalisé sous les auspices du discours de la technique, il est largement influencé par l'économie évolutionniste, qui ignore les effets de la neutralité du réseau sur les dilemmes actuels de la justice sociale et du développement économique. L'hypothèse du présent travail est que les limites de la neutralité du réseau ne sont pas une conséquence involontaire du système de réglementation, mais ils sont autant parties du problème que de la solution. Ces limitations de la neutralité du réseau se produisent principalement en raison de son incapacité de garantir tous les objectifs envisagés et sa concentration délibérée sur l'innovation dans le dernier kilomètre de la chaîne de distribution de l'internet, sans tenir compte la réalité dans laquelle il opère. En ce sens, il est proposé que le débat sur la neutralité du réseau ait échoué parce qu'il ne répond pas aux problèmes liés aux structures de pouvoir concentrés sur l'internet et à la croissance des inégalités. À cette fin, un cadre alternatif - situé au niveau international et historiquement fondé - du débat en cours est proposé. Nous examinons le débat sur la neutralité du réseau aux États-Unis et au Brésil au cours des dernières décennies, en identifiant les processus et mécanismes par lesquels leurs dispositions stériles ont pris une forme spécifique, mettant l'accent sur le sens des efforts récents de politiques publiques. Dans le Chapitre 1, les mythes répandus sur la gouvernance de l'internet sont déconstruits, présentant comment la conception de l'architecture de l’internet et les résultats correspondants de la neutralité du réseau ont prévalu à certaines périodes. Le Chapitre 2 analyse les relations de concurrence et de collaboration entre les organismes intergouvernementaux et les sociétés techniques et professionnelles internationales afin de comprendre comment l'interaction entre les acteurs publics et privés redéfinit le rôle de ces entités et crée de nouveaux espaces de régulation. Ensuite, les Chapitres 3 et 4 identifient des contingences spécifiques au cours des dernières décennies dans lesquelles un ensemble dynamique d'acteurs, d'événements et d'institutions en évolution a convergé (ou non) et a donné lieu au consensus et à la dissidence actuelle sur la neutralité du réseau aux États-Unis et au Brésil. Au centre de l'analyse est l'identification des structures et des conflits de pouvoir. Le Chapitre 5 présente le cadre institutionnel du débat sur la neutralité du réseau et dresse la carte de ses arrangements politiques et économiques. Enfin, le Chapitre 6 présente une critique du débat sur la neutralité du réseau, considérant ses effets distributifs potentiels dans l'économie mondiale, prenant la technologie non pas comme déterministe, mais intégrée et étant intégrée dans toutes les composantes de ce que nous appelons la société.

Mots-clés: neutralité du réseau; gouvernance de l'internet; liberté d'expression; innovation; efficacité du réseau; accès à l’internet; égalité; pouvoir économique; droit et développement; technologie et société.

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LIST OF ABBREVIATIONS

ANATEL	Brazilian National Telecommunications Agency
ANCINE	Brazilian National Agency of Cinema
ANEEL	Brazilian Electric Power Agency
ANP	Brazilian Petroleum Agency
ANS	Advanced Network Services
AP	Application Programming Interfaces
ARPA	Advanced Research Projects Agency
AS	Autonomous Systems
BCR	Brazilian Civil Rights Framework
BEREC	Body of European Regulators for Electronic Communications
BGP	Border Gateway Protocol
BOC	Bell of Operating Companies
CADE	Brazilian Administrative Council for Economic Defense
CAP	Content and Application Providers
ccTLD	Protocol Identifiers, the Country Code
CDA	Communications Decency Act
CDN	Content Delivery Network
CEI	Comparably Efficient Interconnections
CERN	European Organization for Nuclear Research Center
CGI.br	Brazilian Internet Steering Committee
CIX	Commercial Internet eXchange
CLEC	Competitive Local Exchange Carriers
CONDECINE	Contribution for the Development of the National Cinema Industry
DDN-NIC	Defense Data Network-Network Information Center
DDoS	Denial-of-Service Attacks
DNS	Domain Name System
DOD	U.S. Department of Defense,
DPI	Deep Packet Inspection
ECLAC	U.N. Economic Commission for Latin America and the Caribbean
ECO 92	U.N. Conference on Environment and Development of 1992
EFF	Electronic Frontier Foundation
FAPESP	Research Foundation of the State of São Paulo
FCC	U.S. Federal Communications Commission

FTC	U.S. Federal Trade Commission
FUNTTEL	Brazilian Fund for the Technological Development of Telecommunications
FUST	Brazilian Telecommunications Services Universalization Fund
GATT	General Agreement on Tariffs and Trade
GIR	General Interconnection Regulation
GIS	Global Information Society
Gtld	Protocol Identifiers, the Assignment of Generic
HDI	Human Development Index
HTTP	Hypertext Transfer Protocol
IANA	Internet Assigned Numbers Authority
IBGE	Brazilian Institute of Geography and Statistics
ICT	Information and Communication Technologies
IETF	Internet Engineering Task Force
IGF	Internet Governance Forum
ILEC	Local Exchange Carriers
IP	Internet Protocol
IRTF	Internet Research Task Force
ISI	Import Substitution Industrialization Policies
OSI	International Organization for Standards
ISOC	Internet Society
ISP	Internet Service Providers
ITU	U.N. International Telecommunication Union
IXP	Internet eXchange Points
LGT	Brazilian General Telecommunications Act
LNCC	Brazilian National Laboratory of Computer Science
MAC	Media Access Control Address
MMDS	Multichannel Multipoint Distribution
NAFTA	North American Free Trade Agreement
NBP	National Broadband Plan
NetMundial	Global Multistakeholder Meeting on the Future of Internet Governance
NSF	U.S. National Science Foundation
NTIA	National Telecommunications and Information Agency
OECD	Organization for Economic Co-operation and Development
ONA	Open Network Architectures

OSI	Open-Systems Interconnection
OTT	Over-The-Top Services
PDU	Protocol Data Unit
PGMU	General Plan for Universalization
PNAD	National Household Sample Surveys
PNBL	Brazilian National Broadband Program
PST	Stations for Collective Use
R&D	Research and Development
RFC	Request for Comments
RIR	Regional Internet Registries
RNP	National Teaching and Research Network
SAC	Service for Conditional Access
SCD	Digital Communication Services
SCM	Multimedia Communication Service
SGDC	Brazilian Geostationary Defense and Strategic Communications Satellite
SMP	Personal Mobile Service
STMP	Simple Mail Transfer Protocol
STS	Science and Technology Studies
TCP	Transmission Control Protocol
UDP	User Datagram Protocol
UFRJ	Federal University of Rio de Janeiro
UNE-P	Unbundled Network Element Platform
URL	Uniform Resource Locator
VAS	Value-Added Services
VoIP	Voice of IP
W3C	World Wide Web Consortium
WEF	World Economic Forum
WSIS	U.N. World Summit on the Information Society
WWW	World Wide Web

SUMMARY

INTRODUCTION

Today, the internet[1] faces significant challenges, including the concentrated power of a few global companies and the governments they work with, the widespread commodification of personal information, unprecedented surveillance, digital exclusion, and high rates of unemployment caused by automation.[2] Meanwhile, society watches it with bitter disappointment, if not utter disillusionment. The enthusiastic chronicles of technology and progress have faded away, and the internet revealed its dark sides. In this context, the internet governance[3] is at a crossroads. Contemporary discussions and academic inquiry surrounding the role of the internet in society are dominated by words such as surveillance, cybersecurity, internet freedom, and, most prolifically, network neutrality. Since 2002-2003, when Tim Wu introduced the concept in his seminal works, "A Proposal for Network Neutrality" and "Network Neutrality, Broadband Discrimination,"[4] network neutrality advanced and became one of the most prominent debates in communications and internet law and policy. It has received considerable attention from legislators, regulators, technical-scientific bodies, multilateral agencies, academia, presidential candidates, and even the

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[1] The term "internet" emerged in 1974 as a simple abbreviation for "internet-work" between multiple computers or a "network of networks." Here, the term means a global computer network providing a variety of information and communication facilities, consisting of interconnected network using standardized communications protocols. Since its creation, the technical community (including IETF, ICANN, W3C and the Internet Society) has spelled "Internet" with an initial capital letter, treated as a proper noun in English. However, this dissertation adopts the 17th Edition of the Chicago Manual of Style, which recommends writing "internet" lowercased.

[2] For more about these topics, *see* Shoshana Zuboff, "Big Other: Surveillance Capitalism and the Prospects of an Information Civilization," *Journal of Information Technology* 30, no. 1 (2015): 75–89; Frank Pasquale, *The Black Box Society: The Secret Algorithms That Control Money and Information* (Harvard University Press, 2015); Cathy O'Neil, *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy*, 2016; Susan Crawford, *Captive Audience: The Telecom Industry and Monopoly Power in the New Gilded Age*, *Yale Press University* (New Haven: Yale University Press, 2013); Jeffrey L Blevins and Sarah Barrow, "The Political Economy of Free Speech and Network Neutrality: A Critical Analysis," *Journal of Media Law & Ethics* 1, no. 1/2 (2009): 27–48; Shawn M. Powers and Michael Jablonski, *The Real Cyber War: The Political Economy of Internet Freedom*, *Journal of Broadcasting & Electronic Media*, vol. 61 (University of Illinois Press, 2015).

[3] Following Milton Muller's internet governance concept, the term is adopted as "the simplest, most direct, and inclusive label for the ongoing set of disputes and deliberations over how the Internet is coordinated, managed, and shaped to reflect policies." *See* Milton L. Mueller, *Networks and States* (The MIT Press, 2010), 9.

[4] Tim Wu, "Network Neutrality, Broadband Discrimination," *Journal on Telecommunications & High Technology Law* 2, no. 2001 (2003): 141–76; Tim Wu, "Net Neutrality FAQ," 2004. Tim Wu, "A Proposal for Network Neutrality," 2002. According to Wu, network neutrality is a network design principle best protected by an anti-discrimination rule.

popular media.[5] However, far from consensus, they all converge in devotion. From its origins in the United States of America, the debate gradually spread to other countries and international policy forums, although the specific issues alter in response to national policies that govern internet access.

Defining network neutrality's meaning is arduous.[6] In general terms, it is a non-discrimination principle, which provides that internet service providers (ISP) should treat all internet traffic equally. First, the term "neutrality" is ambiguous and contested. It aspires to imply a state of being in which an entity or artifact does not take sides. There is an expectation that technology remains neutral. Nevertheless, it is never neutral. It is always political and continually expresses and reinforces patterns of domination and hierarchy. The term itself derived from the word *neuter*, which in Latin means "neither" and refers to "non-discrimination" or "equality." Also, ideals of equality embrace a broad spectrum of normative morality, including status and distributional equalities. While the former evokes the ethics of equal status of human beings entitled to political freedoms, the latter recalls to material commitments of social and economic rights. Therefore, the use of "neutrality" in network neutrality coining is not value-free, it has a meaning influenced by the set of ethical values embedded in its political and economic arrangements.

Second, network neutrality concept changes according to the set of policy options, which might be anchored in its technical history, languages, and balance of powers within the information and communications industries. In this sense, network neutrality's fuzzy interpretations and misconceptions depend on political and economic assumptions. The struggle is not new; it is as old as the communications technologies. Anxieties about traffic management practices have echoed past discussions about telephony, broadcast, and cable

[5] In the United States, network neutrality issue found its way into places where media policy discussions rarely were tread, such as into mainstream venues like "The Daily Show" with Jon Stewart and "Last Week Tonight" with John Oliver. In 2012, the U.S. President Barack Obama even campaigned for office on a platform that included explicit support for network neutrality.

[6] Different meaning of network neutrality include: "no different quality grades ('fast lanes') for internet service"; "no price discrimination among internet providers"; "no monopoly price charged to content and applications providers"; "nothing charged to the providers for transmitting their content"; "no discrimination on content providers who compete with the carriers' content"; "no selectivity by the carriers over content they transmit"; and "no blocking of the access of users to some websites." *In* Romina Bocache, Andrei Mikheyev, and Virginia Paque, "The Network Neutrality Debate and Development," *Internet Governance and Policy Discussion Papers*, 2007.

regulations. Even more ancient, the "common carriage" principle was born in transportation infrastructures, which require roads' owners to provide services without unreasonable discrimination.[7] The principle has been recurrently adapted, and adopted, in diverse industries, such as electricity, post offices, and telecommunications services.

The first years of the twenty-first century witnessed the meteoric growth of information flows, mainly related to new content and applications, such as user-generated data, the voice of IP (VoIP) and video streaming, that made the problem of network congestion reappears. Along with that came the need to efficiently allocate existing network capacity and support investment to upgrade networks to the next-generation infrastructure. As part of the solution, traffic management practices aiming at increase network performance and circumvent network congestion took place. The most common of them is the deep packet inspection (DPI) practice, which identifies and prioritizes network traffic through the identification of the sender, recipient, and content. The introduction of such practices has opened the door not only to efficiency in network capacity allocation but also to unjustified discrimination and abuses against content and application providers (CAP) and users, including censure and unauthorized surveillance. As traffic management has become more indispensable, the difference between justified practices and discrimination has become subtler.

Vis-à-vis the need for investments in next-generation of internet access networks, a considerable shift occurred when profits started to migrate to application and service.[8] As a result, network operators, which traditionally did not have a presence in application and service markets, began to integrate vertically. This movement brought the attention to ISP's

[7] Common carries have been regulated in the United States since 1887 when Congress declared railroad companies to be "common carriers" in the Interstate Commerce Act of 1887. Common carrier freight rail entities cannot discriminate based on the type of good being shipped. Common carriage obligations also apply to many other types of businesses: shipping companies, taxis, municipal transit, and even amusement park rides in some cases. Common carrier laws required entities to not discriminate based on the goods being transported or the person to whom they are providing service and publish their rates in advance. By the time the Communications Act of 1934 was signed into law in the United States, telephone services were already considered as common carriers. *See* Cannon, "The Legacy of the Federal Communications Commission's Computer Inquiries," 204.

[8] In 2017, according to Forbes Magazine, among the world's most valuable brands were Apple, Google, Microsoft, Facebook, and Amazon. All of them are application and services companies. Information is available at https://www.forbes.com/powerful-brands/list/#tab:rank. Accessed on 5 January 2018.

ability to act as gatekeepers, preventing consumers from using the applications of their choice without disclosing what they were doing.[9] Additionally, investments in internet access are also related to bridging the digital divide, to bring the next billion users to the internet.[10] For instance, the dynamics of material inequality exacerbates the disparities between the haves and the have-nots, who are disconnected and unskilled.

In this context, network neutrality arose as a non-discrimination principle aiming at solving the discrimination practices related to prices and services – including but not limited to blocking, throttling, and manipulating content and application – promoting investments in next-generation of internet access, and closing the digital divide. For proponents of network neutrality, market efficiency, positive externalities, incentives for innovation, economic growth, freedom of speech, privacy, and increased civic and democratic participation should be incorporated into the analysis of regulation. These authors argue the antitrust enforcement is insufficient to guarantee the open internet architecture and to prevent network operates from abusing its privileged position. On the opposite side, authors argue network neutrality's regulatory approach condemns *ex-ante* traffic management practices regardless their effects on the market. For opponents of network neutrality, authorizing differential treatment of data packets, whether in the form of tiered services or fast lane, is necessary to provide investment in infrastructure and incentives for internet innovation. The antitrust enforcement is also often mentioned as the solution for abuses related to market power. According to this approach, network neutrality does not address main problems associated with the telecommunications market, which faces high barriers to entry, vertical integration, and economic concentration. The introduction of competition would ensure the best services.

The overarching nature of network neutrality, thus makes clear its broad range of economic and political concerns. From the economic standpoint, the efficiency of vertically integrated network markets is in question and intersects all internet layers.[11] From the

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[9] The term "gatekeeper" means an intermediary between a consumer and an upstream seller.

[10] The term "digital divide" represents the measurement of inequalities in accessing and using information and communication technologies among individuals and populations between and within countries and regions.

[11] The internet layered model is further described in Section 1.2.

political perspective, network neutrality's concerns include freedom of speech, privacy, and civic and democratic participation. The rupture between economic and political goals has its roots in the effort to pursue economics and politics on different scales. While the economy has become global, the political order remains attached to local and territorial structures. As David Kennedy poses "the machinery for a territorial politics and a deterritorialized economics is technical and legal."[12]

Additionally, network neutrality multiplicity is not only in its goals but also in its normative foundations. Self-regulation, legal and regulatory provisions, and antitrust enforcement are all present. Policymakers might tailor their approach according to the place specifies and interests. Most recently, the U.S. Federal Communications Commission (FCC) reassessed network neutrality debate through a proposal called "*Restoring Internet Freedom Order*," which antagonizes the *2015 FCC Open Internet Order*, upheld by the D.C. Circuit Court of Appeals in 2016. The *2015 Open Internet Order* is a regulatory provision that asserted for the first time FCC's statutory authority to address the ISPs traffic exchange practices and reclassified broadband internet access as telecommunications services (or "common-carriers"), under Title II of the *1996 Telecommunications Act*. This ruling introduced network neutrality provision in the United States, which prohibit carriers from blocking or throttling lawful content, charging for prioritized delivery, and unreasonably interfering with the content transmission. In December 2017, Order, the FCC explicitly proposed a re-reclassification of broadband as information service, ending network neutrality rule in the United States.[13]

Also, in 2016, the European Union Parliament and the E.U. Council adopted the *Regulation EU 2015/2120*, which establishes communitaire rules to safeguard equal and non-discriminatory treatment of traffic in the provision of internet access services and related end-users' rights. According to the *Regulation EU 2015/2120*, internet traffic must be treated equally, subject to strict and identified public-interest exceptions and the necessary, day-to-day network management of ISPs, enshrining the principle of network neutrality into law.

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[12] David Kennedy, "Law and the Political Economy of the World," *Leiden Journal of International Law* 26, no. 1 (2013): 12.

[13] For a more detailed analysis of network neutrality debate in the United States, see Chapter 3.

The E.U. provision is the result of the adoption of network neutrality as a policy objective and a regulatory principle in 2009. The E.U. rule came into effect in 2016, and the Body of European Regulators for Electronic Communications (BEREC) produced the guidelines for its implementation.[14]

In turn, in Brazil, the *Law No. 12,965 of 2014*, known as the "Brazilian Civil Rights Framework" (BCR), provides a general legal framework for the use of the internet within the country. Adopted in April 2014, the BCR protects network neutrality in Brazil into law, prohibiting unilateral practices and agreements between ISPs which compromise the public and open character of internet access or promote data and applications packets to the detriment of other offers. The Brazilian President sanctioned the BCR during the opening ceremony of the NetMundial, an event promoted by global internet governance entities, shortly after the Edward Snowden revelations about U.S. surveillance schemes.[15] Brazil's adoption of the BCR had the broader goal to call the world's attention to the United States control over the internet. The Brazilian network neutrality provision came in the form of a principle, later regulated by the *Decree No. 8,771 of 2016*.[16]

Behind the rhetoric of network neutrality is ongoing battles over the opposing technical, economic, and political forces that are transforming the internet and its historical governance arrangements. Network neutrality debate is centered on the conflict between political and economic goals and how gains and losses will be distributed among stakeholders. We propose to rethink network neutrality debate identifying why it has not been sufficient to preserve the internet's promise to bring about economic development, democratic engagement, and social justice. Network neutrality debate has produced a wide variety of work embedded within legal and economic studies regarding what would be necessary to guarantee a free and innovative internet. Although this work has often been disguised under the mask of technique, it is widespread influenced by the evolutionary

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[14] "Guidelines on the Implementation by National Regulators of European Net Neutrality Rules," 2016.

[15] Edward Snowden revealed that U.S. surveillance systems targeted Brazilian networks, citizens, as well as the government itself. The Snowden revelations raised concerns globally, and specifically in Brazil, it pressured the enactment of the Brazilian Civil Rights Framework during the NetMundial event. *See* Shawn M. Powers and Michael Jablonski, Powers and Jablonski, *The Real Cyber War: The Political Economy of Internet Freedom*.

[16] For a more detailed analysis of network neutrality debate in Brazil, see Chapter 4.

economics and denies network neutrality's effects on ongoing struggles for social and economic justice.

My assumption is that network neutrality's failures are not an unintended consequence of the regulatory system, but is as much part of the problem as the solution. My core hypothesis is that network neutrality's limits mainly occur because of its decontextualized focus on innovation on the last mile its insufficiency to secure all envisioned goals. Thus, network neutrality debate is both unambitious in theory and ineffectual in practice. My proposition is that network neutrality debate has failed because it proved unable to address the problems related to concentrated power structures on the internet and increasing inequalities To achieve this dissertation objective, we offer an alternative, historically grounded, and globally aware framing of this ongoing debate. We investigate network neutrality debate over the last decades in the United States and Brazil, identifying processes and mechanisms by which its sterile arrangements came to take a specific form, focusing on what such arrangements might inform about contemporary policy efforts.

Neither traditional legal analysis nor its chastened combination with economics can respond to the existing challenges of network neutrality in all its complexity. For this reason, this dissertation is placed within an integrated framework of the law and society tradition. It is grounded in the interdisciplinary framework of science and technology studies (STS) and critical political economy, aiming to outline the legal stakes involved in ongoing debates over network neutrality in the United States, Brazil, and the global internet governance. In so doing, it places questions of power, as opposed to rights and institutions, at the center of debates about information and communication technologies (ICT).

Law and society tradition provides the tools for the investigation of "law in action," addressing the effects of enacting specific measures upon the interests and conduct of diverse groups and institutions in society.[17] For this, we rely on heterogeneous traditions in social theory and legal scholarship, which have opened the window on the study of the politics

[17] Victoria Nourse and Gregory Shaffer, "Varieties of New Legal Realism: Can a New World Order Prompt a New Legal Theory?," *Cornell Law Review*, 2009.

embedded in technology and society. The adopted sociolegal research apparatus here supports unpacking the fuzzily defined black box of network neutrality to ask whether it has, in practice, achieved its stated objectives.

For this, we primarily turn to the STS lens, which addresses the role of technology in society. According to Sheila Jasanoff, technology and social order are produced contemporaneously, avoiding both technological and social determinism.[18] In contrast to classical social theory, STS scholars also consider the social an effect generated by heterogeneous means.[19] In this context, ICT governance is broadly understood as social ordering, which does not happen exclusively in politically designed institutions but is also enacted through daily practices of people engaged in maintaining or challenging the social order.[20] Also, STS encompasses a rich set of theoretical and methodological perspectives directed toward the investigation of how scientific discovery and its technological applications link up with other social developments, in law, politics, economics, ethics, and culture.[21]

Politics is not external to technical architectures, as first introduced by Langdon Winner in his pioneered piece "Do Artifacts Have Politics?" Winner explained that "at issue is the claim that the machines, structures, and systems of modern material culture can be accurately judged not only for their contributions to efficiency and productivity and their positive and negative environmental side effects but also for how they can embody specific forms of power and authority."[22] Most recent representative examples of legal scholarship exploring the effect of the internet's architecture on economic, social, cultural, or political

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[18] Sheila Jasanoff, "The Idiom of Co-Production," in *States of Knowledge: The Co-Production of Sciences and Social Order*, 2004, 2.

[19] Vincent Mosco, *Becoming Digital: Toward a Post-Internet Society* (Emerald Publishing, 2017), 16.

[20] Powers and Jablonski, *The Real Cyber War: The Political Economy of Internet Freedom*; Laura DeNardis, *The Global War for Internet Governance* (New Haven: Yale University Press, 2014).

[21] Sheila Jasanoff, "The Idiom of Co-Production," in *States of Knowledge: The Co-Production of Sciences and Social Order*, 2004, 1–12.

[22] Paul Schiff Berman, ed., *Law and Society Approaches to Cyberspace* (Ashgate Publishing Limited, 2007), xiii.

systems are Lawrence Lessig,[23] Tim Wu,[24] Yochai Benkler,[25] Jonathan Zittrain,[26] Barbara van Schewick,[27] and Laura DeNardis.[28]

Furthermore, we turn to the political economy analysis to comprehend the power relations that mutually constitute the production, distribution, and consumption of resources.[29] Its main components are politics and economic processes, and how they influence one another. The first is understood as contestation and bargaining between interest groups with competing claims over rights and resources, and the latter is related to wealth production. Crucial to this study, political economy analysis considers that the core elements of political and economic activities are law and institutions. Law constitutes the actors, places them in structures and helps set the terms for their interaction.[30] In this sense, the frail dichotomy of law-versus-politics is not only undertheorized but also falsely dichotomized; the two always interact and operate in parallel, simultaneously.[31]

The political economy analysis allows the study of historical legacies, social trends, and prior experience, as well as informal institutions and cultural and social practices, and how these factors affect or obstruct the adoption of a particular technology. The history of political and economic life is, therefore, a history of institutions and laws.[32] Network

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23 Lawrence Lessig, "The Law of the Horse: What Cyberlaw Might Teach," *Harvard Law Review* 113, no. 2 (1999): 501; Mark A. Lemley and Lawrence Lessig, "The End of End-to-End: Preserving the Architecture of the Internet in the Broadband Era," *UCLA Law Review* 48 (2001): 925–72; Lawrence Lessig, *The Future of Ideas*, 1st ed., vol. 52 (Random House, 2001).

24 Tim Wu, *The Master Switch: The Rise and Fall of Information Empires* (Vintage Books, 2011); Wu, "Network Neutrality, Broadband Discrimination."

25 Yochai Benkler, *The Wealth of Networks. How Social Production Transforms Markets and Freedom* (New Haven and London: Yale University Press, 2006).

26 Jonathan Zittrain, *The Future of the Internet and How to Stop It*, *Yale Press University* (Yale University Press, 2008).

27 Barbara van Schewick, "Internet Architecture and Innovation in Applications," *Handbook on the Economics of the Internet*, 2016, 288–322.

28 DeNardis, *The Global War for Internet Governance*.

29 Vincent Mosco, *The Political Economy of Communication*, 2nd ed. (Sage Publications, 2009), 74.

30 David Kennedy, "Law and the Political Economy of the World," *Leiden Journal of International Law* 26, no. 1 (2013): 7–48.

31 Lawrence Lessig, "The Law of the Horse: What Cyberlaw Might Teach," Harvard Law Review 113, no. 2 (1999): 501.

32 As the "adapted" institutional economic analysis, developed by Milton Mueller, proposes the internet governance manifests itself primarily in the form of institutional arrangements: organizations of various sorts create and enforce rules and standards on how the internet shall operate. *See* Milton L. Mueller, *Ruling the Root: Internet Governance and the Taming of Cyberspace* (The MIT Press, 2002).

neutrality debate is centered in an institutional problem that encompasses finding and implementing a set of governance mechanisms that advances the benefits of the internet as its technological, economic, and political settings continue to evolve.[33] The current debate is a reaction to transformations that are changing the internet, its traditional arrangements, and telecommunications law and policy.

According to critical legal scholars,[34] the law is not free because structures support the repeated play of the haves against the have-nots. This approach places emphasis on the dynamics of inequality, the distribution of growth, and the reproduction of hierarchies. As stated by Calixto Salomão Filho, "these structures are historical, economic, and legal constructs – in the past, introduced through the rules of domination of colonial monopoly, reinforced in the present through the possibilities of domination provided by the globalized economy."[35] As well, Carlos Portugal Gouvêa states "increases in economic inequality may create barriers for the integrations of the poorer individuals in the poorest countries into the global economy."[36]

From a developing country perspective, critical scholars argue that "the difference between the First and Third Worlds has eroded because all nations now face political, social, and economic challenges once typical of the Third World."[37] In this vein, Salomão Filho argues that "at the end of the twentieth century, social characteristics if underdeveloped countries (mostly ex-colonies) tended to spread and eventually did spread to once developed countries. (…) The reality of monopolized markets and social and economic underdevelopment, once a phenomenon concentrated in the Southern Hemisphere, turn out to be global."[38] Therefore, the present dissertation adopts a broader meaning for the "center"

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[33] Johannes M. Bauer and Jonathan A. Obar, "Reconciling Political and Economic Goals in the Net Neutrality Debate," *The Information Society: An International* 30, no. 1 (2014): 1–19.

[34] The term "critical" refers to traditions of critique as well as values of investigating and questioning arrangements. It also alludes to values of critique in intellectual enquiries, such as questioning, interrogating, and challenging the adequacy of phenomena explanations.

[35] Calixto Salomão Filho, *Monopolies and Underdevelopment: From Colonial Past to Global Reality* (Edward Elgar, 2015), 157.

[36] Carlos Portugal Gouvêa, "Equity Cost Analysis: A Contribution to Institutional Theory in Face of Increasing Global Inequalities." (Harvard University, 2008), 240.

[37] Kennedy, "Law and the Political Economy of the World," 2013, 10.

[38] Salomão Filho, *Monopolies and Underdevelopment: From Colonial Past to Global Reality*, 5–6.

and “periphery” dualism,[39] according to which this relationship represents an extensive view of the dynamic of inequality and reciprocally influences among unequal actors.

For the Crits, the law is used to protect and promote winners, while indefinitely promising to compensate losers.[40] This recognition, in turn, requires critical engagement with the analysis of structural changes for accomplishing law’s distributive role in the global political economy. Moreover, for them, dominant modes of legal reasoning pretend to afford neutral and objective treatment of claims while shielding structures of power from fundamental reconsideration. For this reason, they argue that dominant legal doctrines and conceptions perpetuate patterns of injustice and dominance.[41] Henceforth, it is imperative to contest inequality in the ICT sector and its current mainstream legal reasoning of network neutrality debate. As stated by Olivier Sylvain “formal neutrality in access to bandwidth is meaningless without greater attention to inequality in the constitutive elements of network itself.”[42] In this sense, this dissertation builds on Sylvain’s important research, called “Network Equality,” according to which network neutrality shall foster distributional equality of broadband resources.[43]

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[39] During the 1970s, Latin America was profoundly influenced by the U.N. Economic Commission for Latin America and the Caribbean (ECLAC) and its structuralism. The works of Raul Prebisch and others criticized comparative advantages in international trade, as well as the support of an economic system based on the “center-periphery” relationship. For ECLAC’s advocates, underdevelopment is not a capitalist phase, but a structure determined by the process of industrial development. *See* Ricardo (Org.) Bielschowsky, *Cinqüenta Anos de Pensamento Na CEPAL*, *Cinqüenta Anos de Pensamento Na CEPAL. Vol I.* (Record, 2000).

[40] Kennedy, “Law and the Political Economy of the World,” 2013, 11.

[41] Marc Galanter, “Why the ‘Haves’ Come out Ahead: Speculations on the Limits of Legal Change,” *Law & Society Review* 9, no. 1 (1974): 95.

[42] Olivier Sylvain, “Network Equality,” *Hastings Law Journal* 67 (2016): 7.

[43] Ibid.

The remainder of this chapter introduces the methods and materials implemented in this dissertation, as well as outlines the research's limitations, the contribution to the field, and the organization of the chapters. A comparative study between the United States and Brazil is developed to facilitates more critical, questioning attitudes towards law by undermining the "taken for granted" positions on legal provisions and practices. It does so by highlighting the relative peculiarities and distinctive features of network neutrality debate in both countries. Although a comparison between the United States and Brazil is unusual because of the disparities between common law and civil law, those countries have essential similitudes, such as continental territories, high rates of inequality, the concentrated market for internet access, strong patterns of digital exclusion, and others. More important, the United States was the internet precursor and exported not only its technology but also the design and institutional arrangements embedded on the internet.

This dissertation also draws upon and integration of distinct types and source materials. In the first three sections, it reveals an extensive analysis of bibliographical research and official documents related to the evolution of network neutrality debate and the political, legal, and economic contexts in which the United States and Brazil have discussed and adopted their rules over the last twenty years. [44] The existing literature easily misleads one seeking to deepen the analysis on network neutrality debate: it is massive, saturated with commonplace and shallow ideas that provide the illusion of increasing knowledge related to communications and internet policy.

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[44] Official documents include: (i) the FCC Protecting and Promoting the Open Internet proceedings; the FCC Preserving the Open Internet proceedings; the FCC Restoring Internet Freedom proceedings; the FCC Computer Inquiries; the FCC Framework for Broadband Access to the Internet Over Wireline Facilities; Implementation of the Local Competition Provisions in the Telecommunications Act of 1996 Inquiry; High-Speed Access to the Internet over Cable and Other Facilities Inquiry; Deployment of Advanced Telecommunications Capability to All Americans Inquiry; (ii) merger proceedings: America Online, Inc. and Time Warner Inc., WL 1836342 F.T.C. (Docket No. C-3989) (2000); AT&T Inc. and BellSouth Corporation Application for Transfer of Control, Memorandum Opinion and Order, 22 FCC Rcd. 5662, 5814 (2007); MediaOne Group, Inc. to AT&T Corp. 15 F.C.C. Rcd. 9816 (Order) (1999); SBC Communications Inc. and AT&T Corp. Applications for Approval of Transfer of Control, Memorandum Opinion and Order, 20 FCC Rcd. 18290, 18392 (2005); (iii) other FCC proceedings: Formal Complaint of Free Press & Public Knowledge Against Comcast Corp. for Secretly Degrading Peer-to-Peer Applications, 23 FCC Rec. 13028 (2008); Madison River Commc'ns, LLC, Order and Consent Decree, 20 FCC Rcd. 4295 (2005); and (iv) U.S. Bills referring to "net neutrality" or "open internet" available at the U.S. Congress website.

For this reason, primary materials, such as official documents and case law, are fundamental to this research. In the United States, documents set includes a series of relevant court decisions,[45] the FCC proceedings regarding broadband internet access, and significant telecommunications merger proceedings. Additional empirical data related to the United States demographics, broadband internet reachability, and its effects are briefly analyzed. In Brazil, the document set encompasses official documents produced by Brazilian authorities during the discussions of the *Bill No. 2,126 of 2011*, the *Law No. 12,965 of 2014*, and the *Decree No. 8, 771 of 2016*.[46] Also, a selection of supporting documents from the Brazilian National Telecommunications Agency (ANATEL), and the Brazilian Internet Steering Committee (CGI.br) was examined. This work uses data representative of the Brazilian population from the National Household Sample Surveys (PNAD), conducted by Brazilian Institute of Geography and Statistics (IBGE), to illustrates the internet access' reachability and its effects. The Gini index is used to explore the evolution of the digital divide and its determinants.[47] Finally, surveys developed by the Organization for Economic Co-operation and Development (OECD), the U.N. International Telecommunication Union (ITU), ANATEL and CGI.br related to global internet access were also included in the present analysis.

Having described some useful theoretical and methodological approaches utilized in the present research, some of its research limits also deserves attention. The first and most relevant of these limits is the spuriousness of the data related to traffic management practices. Many assumptions about the relationship between network neutrality rules and investment

[45] AT&T, et. al. v. City of Portland, U.S. Court of Appeals, 9th Circuit, Appeal No. 99-35609 (1999); Bell Atlantic Telephone Companies v. F.C.C 206 F.3d 1, 340 U.S.App.D.C. 328, 199 P.U.R.4th 458, D.C.Cir.," 2000; Brand X Internet Servs. v. FCC, 345 F.3d 1120 (9th Cir. 2003), rev'd and remanded sub nom. Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs., 545 U.S. 967 (2005).; Comcast Corp. v. FCC, 600 F.3d 642 (D.C. Cir.) (2010); Computer and Comm. Indus. Ass'n v. FCC, 693 F.2d 198, 203 (D.C. Cir.) (1982); Hush-A-Phone Corp. v. U.S. 238 F.2d 266 United States Court of Appeals District of Columbia Circuit (1956); Carterfone Device in Message Toll Tel. Serv., 31 F.C.C.2d 420 (1968); Time Warner Telecom, Inc. v. FCC, 507 F.3d 205 (3d Cir.) (2007); Verizon v. FCC, 740 F.3d 623 (D.C. Cir.) (2014); United States Telecom Ass'n v. FCC, 825 F.3d 674 (D.C. Cir) (2016).

[46] The BCR Public Hearings Reports, regarding Bill No. 2,126 of 2011, Law No. 12,965 (2014); Decree No. 8,771, Pub. L. No. 8,771 (2016); CADE Technical Note No. 02 (2015); CADE Technical Note No. 34 (2017); CGI.br "Principles for the Governance and Use of the Internet," Pub. L. No. Resolution CGI.br/Res/2009/03/E (2009); NetMundial "Multistakeholder Statement" (2014).

[47] Gini index measures the degree of inequality in the distribution of family income in a country. The more nearly equal a country's income distribution, the lower its Gini index.

in internet access infrastructure are hard to prove since variables may be related to each other but have no causal relationship. Also, any causal link between innovation and investment in internet access would require the presentation of hard-to-measure data. However, this limitation is not restricted to the present work but applies to any research in the field.

Another limitation of the present research is related to the proposal of a new agenda for internet governance focusing on economic and social justice. In this sense, perils of reductionism shall be avoided, recognizing one-size-fits-all models under the facade of harmonization or universality cannot address the structural challenges posed by countries. The present framework proposal focuses on the experiences of the United States and Brazil and does not pretend to exclude others that might be complimentary. Therefore, presenting such a framework has also the purpose of increasing future research in the field, as explained in Chapter 6.

This dissertation unfolds through six chapters. In Chapter 1, prevalent internet governance myths are deconstructed, presenting how specific architecture design and the corresponding network neutrality outcomes came to prevail in particular periods. It assumes history can reframe our understanding of specific problems, permitting to think anew about what the present denies. With the objective of deconstructing widespread myths, we present how specific internet architecture design and the corresponding network neutrality outcomes came to prevail in specific periods. Chapter 2 analyzes both competing and collaborator relations between intergovernmental bodies and internet organizations aiming at better understanding how the interplay between public and private actors redefines the role of organizations and creates new spaces for regulation. Internet governance studies have often neglected a structural perspective on the political economy of new markets creation about emerging technology, such as the internet. Global markets do not emerge out of private initiative only; they depend on a preexisting global institutional framework. [48] Thus, in this section, we investigate the interplay between global public and private actors to understand how it creates new spaces for regulation.

[48] Michael Woolcock, Simon Szeter, and Vijayendra Rao, "How and Why History Matters for Development Policy," in *History Historians and Development Policy: A Necessary Dialog*, ed. Rayly et al., 2011, 13–18.

Drawing upon the integration of distinct source materials, Chapters 3 and 4 identify the specific contingencies over the past decades in the United States and Brazil by which a dynamic set of evolving actors, events, and institutions converged (or not) and gave rise to current network neutrality rules and dissent. At the center of the analysis is the identification of structures and power struggles of network neutrality in both countries. History also has a strong influence on Chapters 3 and 4. The historical research demonstrates the significant role played by the United States in network neutrality debate, succeeding its central contribution to the internet's creation and development, as well as its governance. Specific comparisons between the United States and Brazil shall consider their complex and overlapping set of problems. These considerations get some inspirations from the now enduring concept of "path dependence,"[49] according to which a set of historical events and institutions in a country's past have exerted an influence upon its subsequent history. Although the concept of path dependency is influential to this work, its meaning is not narrow perceived as a deterministic influence upon history or technological change. Here, we comprehend the past as constitutive of the present, nor determinative of it.

Chapter 5 introduces the institutional framework of network neutrality debate and maps its arrangements. We describe network neutrality's political and economic goals, explain their normative foundation, and detail the available legal instruments. Also, this section summarizes the waves of scholarship beyond the dichotomy of proponents and opponents of network neutrality. The role played by technical expertise in institutional struggles is described,[50] considering its importance to the significant shift in the debate from

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[49] The term "path dependence" was initially coined by economic historian Brian Arthur to refer to the way certain technological choices persisted, because they had become engrained in everyday practices. The key idea is that in a sequence of events, the latter events are not completely independent from those that occurred in the past. *See* Michael Woolcock, Simon Szeter, and Vijayendra Rao, "How and Why History Matters for Development Policy," in *History Historians and Development Policy: A Necessary Dialog*, ed. Rayly et al., 2011, 3–27.

[50] In "A World of Struggle" David Kennedy states that "[p]ower is everywhere legitimated by knowledge practices that rationalize, explain, interpret and associate exercises of power, powerful people and powerful institutions with myths, ideologies, and other large ideas about values and interests. At the same time, ideals and values are rendered persuasive, enforced and trained into people through the institutional machinery of power and the mechanics of force. (...). Understood in this way, the operations of power are expertise all around." *See* David Kennedy, *A World of Struggle: How Power, Law, and Expertise Shape Global Political Economy* (Princeton and Oxford: Princeton University Press, 2016), 8.

open access to innovation and status equality. In this vein, we expand the debate over network neutrality and outline the historical genesis of the "open internet" movement.

Finally, Chapter 6 presents a critique of network neutrality debate. The devil is in the details. First, network neutrality fails to bridge its political and economic goals in only one rule, as proposed by its proponents. By doing so, it ignores the vicious cycle of innovation and investment, the effects of oligopolies in the markets for internet access and services, and the distributional inequality. Second, network neutrality institutional arrangements are insufficient to secure all envisioned goals, and it is guideline easily circumvented. Aiming at presenting a new framework, we sustain the redefinition of network neutrality, considering its potential distributive effects in the global economy. We take technology not as deterministic but embedded and being embedded in all the building blocks of what we term the social.

CHAPTER 1. UNVEILED MYTHS AND THE INTERNET ARCHITECTURE

The internet was born in the midst of a technological euphoria permeated with idealism. The internet's pioneers were enthusiastic and described triumphant chronicles of technology and progress.[51] When recent research started to focus on the origins of the internet, it became influenced by a utopian rhetoric and technological determinism, both representative of this early period. Although illuminating, these accounts are usually adulatory and degenerate into a bunch of clichés.[52] The internet is highly disruptive, but it does not represent a complete rupture with the past. Its evolution is not merely a technological process determined by scientific innovation. The internet shapes, and is also shaped by, struggles for power and control representatives of society.

Currently, to go further, we need to look back. The internet's history needs to be revisited and pioneers' chronicles challenged. A critical view should step back from technological determinism, acceptance of the *status quo,* and the existing power structure. This Chapter aims at contributing to this debate, by departing from the initial laudatory studies of the internet's origins and drawing on a critical view that brings in important aspects of the internet development since its early beginning. Emphasis is put on the development of institutions and market structures that define today's internet, emphasizing the foundational role of government policies have in its establishment.

Understanding network neutrality debate requires some acquaintance of the basic of technology and the regulatory history of the internet. This chapter explains the internet's technological and market ecosystem and presents significant issues for better understanding the context in which network neutrality concept arose. First, we discuss the emergence of several internet policies circumstances at the internet's core, including the prioritization of individual market incentives over technical efficiency,the uneven distribution of IXPs and

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[51] Barry M Leiner et al., "Brief History of the Internet 1997," Internet Society, 1997, https://www.internetsociety.org/internet/history-internet/brief-history-internet/.

[52] Milton L. Mueller, *Ruling the Root: Internet Governance and the Taming of Cyberspace* (The MIT Press, 2002); Lawrence Lessig, *The Future of Ideas*, 1st ed., vol. 52 (Random House, 2001).

associated interconnection challenges in emerging markets, and interconnection points as sites of control and disruption for government censorship and outages as a result of peering disputes. Following, we dive into the internet original architecture and its lawyer-crossing model.

1.1. The Internet Evolution

This section revisits the history of the internet divided into three distinct periods: beginning with the incubation, followed by the commercialization and the integration periods. The so-called "incubation period" is characterized by the internet's management by North-American universities, the U.S. government, initially through the U.S. Department of Defense (DOD) and later through the U.S. National Science Foundation (NSF), and research institutes around the world. Next, the commercialization period experiences the internet exponential growth, generating huge optimism and the gloss of "cyberspace," an independent space from reality based only on "consensus and running code." During these years, the internet is marked by the end of public subsidies, the beginning of networks' privatization and commercial operations, and the acceptance of online-behavior regulation. Lastly, the integration period is market by media convergence and the network congestion that gave birth to traffic management practices and cross-platform concentration, problems that were directly discussed in network neutrality roundtables.[53]

1.1.1. The Incubation Period: "Intergalactic Network"

Starting in the early 1940s, the U.S. government invested in building public-private partnerships in the information technology sector that enabled the rise of computers and the internet. Through various policy mechanisms, including subsidy, domestic and international policy reform, direct investment, and guidance, the U.S. government facilitated the rise of modern ICTs, funded their advanced technological development, and pushed for governance

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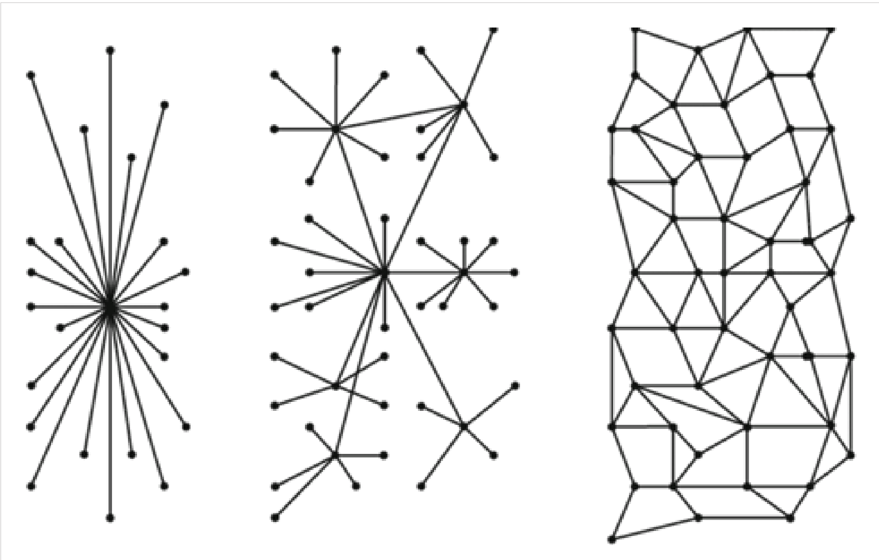
[53] For more on the history of the internet, s*ee* Rob Frieden, "Conflict in the Network of Networks : How Internet Service Providers Have Shifted From Partners to Adversaries" 1, no. 1 (2016); Rob Frieden, "The Debate Over Network Neutrality in the United States," in *Net Neutrality in Europe*, ed. Alain Strowel (Bruylant, 2013), 25–45; Leiner et al., "Brief History of the Internet 1997."

structures enabling their global reach. In response to the Soviet launching of the Sputnik satellite, the DOD established the Advanced Research Projects Agency (ARPA) in 1958 to ensure the future of U.S. technological superiority. ARPA's mission was to pursue innovative research and development (R&D) projects having significant potential for both military and commercial applications.

Figure 1 - Baran's diagrammatic categorization of communications networks: Centralized, decentralized, and distributed networks



Source: Baran, "On Distributed Communications (Memorandum RM 3450 PR)," 2

Computer scientist Paul Baran, from RAND Group, began to envision a distributed network of host computers, without a central switchboard, that could withstand Soviet attack and even continue to function if a nuclear attack was to cripple part of the nation's communications system. Baran's idea was to build a communications system in which data could travel several different routes to get to its destination so that no one part was dependent on the functioning of another.[54] As DeNardis explains, the information transmitted over the internet is broken into packets, which contain the actual content of information to be transmitted along with overhead administrative information contained within the packet header. Routers read the destination address contained within the header of each packet and determine how to route each packet, based on routing algorithms designed to optimize

[54] Powers and Jablonski, *The Real Cyber War: The Political Economy of Internet Freedom*, 22.

certain characteristics such as minimizing latency, or the delay that a packet experiences from source to destination. When the packets reach their destination, they are reassembled in the correct order.[55]

Figure 1 illustrates the centralized (or star) and the distributed (or mesh) networks. Initial research focused on the theoretical feasibility of communications using "packets" rather than "circuits." The packet-switching approach was completely different from the traditional telephone network circuit-switching approach, which is centralized and hierarchical to conserve the then scarce resources of transmission capacity and intelligent switching capacity. Developed in an electrical-mechanical age, these resources were expensive to create and to expand and ways to interconnect different networks.[56] In contrast, in the packet-switching approach, network nodes are widely distributed, and bandwidth is relatively inexpensive and plentiful, in accord with Moore's Law.[57, 58]

In 1962, computer scientist J.C.R. Licklider "proposed that if the whole world could be interconnected [ed] through an 'intergalactic network,' ideas could be shared easily and rapidly."[59] The internet first arose in the United States, in 1969, at the Cold War zenith. The first network created was ARPANET,[60] an early packet-switching network intended to be an experimental backbone[61] capable of ensuring the integrity of information and research. The

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[55] Paul Baran, "On Distributed Communications (Memorandum RM 3450 PR)," 1964, 2.

[56] Peter F. Cowhey, Jonathan D. Aronson, and Donald Abelson, eds., *Transforming Global Information and Communication Markets: The Political Economy of Innovation*, vol. 13 (The MIT Press, 2009), 217.

[57] The term "analog" describes the various methods of transmitting information in such continuous waveforms. The term "digital," in contrast, describes long streams of 1s and 0s "decoded" into a digital transmission, known as bits, short for "binary digits." *See* Robert Zelnick and Zelnick Eva, *The Illusion of Net Neutrality: Political Alarmism, Regulatory Creep, and the Real Threat to Internet Freedom*, *Hoover Institution Press Publication* (Stanford, California: Hoover Institution Press, Stanford University, 2013), 73.

[58] Moore's Law focuses on silicon capacity, on how semiconductor firms entice customers to their more powerful chips. According to it, processors would double their price-to-performance ratio every eighteen months. *See* Jeremy Rifkin, *The Zero Marginal Cost Society: The Internet of Things, the Collaborative Commons, and the Eclipse of Capitalism* (Palgrave Macmillan, 2014); David S. Isenberg, "The Rise of the Stupid Network," 1997, http://isen.com/.

[59] J.C.R. Licklider *apud* Barry M. Leiner et al., "Brief History of the Internet 1997," Internet Society, 1997, https://www.internetsociety.org/internet/history-internet/brief-history-internet/.

[60] The original ARPANET consisted of four networks based on the University of California, Los Angeles (UCLA); University of California, Santa Barbara (UCSB); the Augmentation Research Center at the Stanford Research Institute; and University of Utah School of Computing.

[61] The term "backbone" is used to identify the primary network through which all internet data travels. It is the infrastructure that connects all points of a network.

demand for research on internetworking also culminated in the creation of the Transmission Control Protocol (TCP) by Robert E. Kahn and Vint Cerf in 1974. The TCP was developed to tie together separated data networks on a "best-effort" basis served by "first-come-first-served" (also known as "first-in, first-out," FIFO) scheduling in routers and a design preference for intelligence at the ends. According to TCP, if a packet did not make to the destination, it would shortly be retransmitted. Later the TCP was divided into two parts: a connectionless Internet Protocol (IP) that would be used to move packets between devices, and a connection-oriented TCP that would organize communications between hosts in an end-to-end mode.[62] Both technologies became known as "TCP/IP," the technical foundation of the internet. Since then, the internet is based on standard treated as public and common protocols.

The early internet was designed to accomplish objectives, such as packet-switching and internetworking. In practice, the initial design of the internet bore the imprint of military objectives according to which the network was difficult not only to "take out" but also to control. The ARPANET's success sparked investments in NSFNET, a civilian spinoff of the DOD's electronic network, which was also foundational in sparking greater interest in the creation of the "intergalactic network." In the mid-1980s, the NSF began planning it expand the high-speed network, and ISPs embraced the goals of expanding the number of users and points of communications.[63] NSF began to build the NSFNET, the first nationwide dedicated backbone, which would connect to regional networks. NSF developed a hierarchical industrial structure of ISPs categorized into Tier 1, Tier 2, and Tier 3 providers,[64] as illustrated in Figure 2. The Tier 1 to Tier 3 categories indicates the degree of networks' reachability and the way ISPs connected to other networks. This arrangement opened the

[62] RFCs 790 and 791 (1981) documented official specifications of Internet Protocol and were authored by Jon Postel.

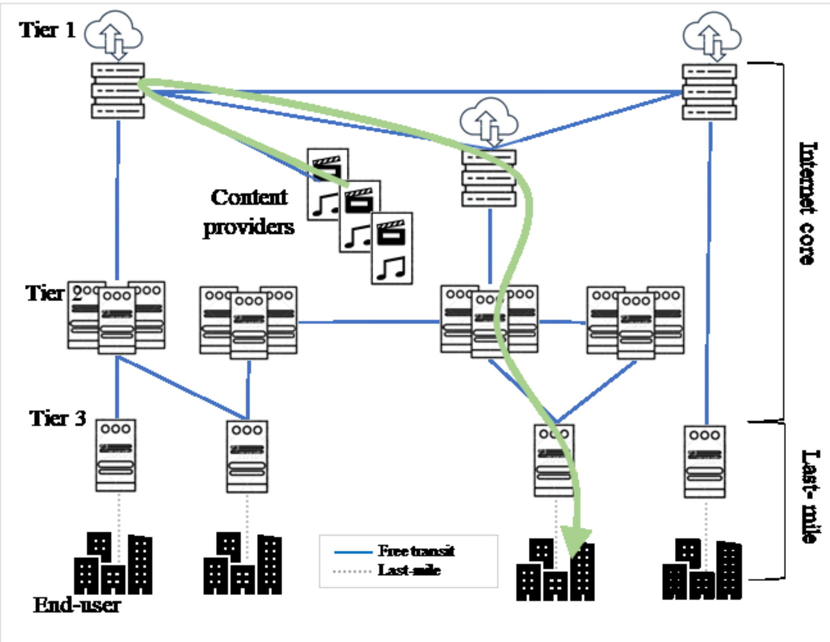
[63] Frieden, "Conflict in the Network of Networks : How Internet Service Providers Have Shifted From Partners to Adversaries," 64.

[64] As DeNardis explains, "[t]his terminology is useful as a taxonomy and has a basis in history but it overemphasizes hierarchical network relationships when, in practice, Internet interconnection is now much messier, complicated, and flatter than this simple hierarchy would suggest." *In* Laura DeNardis, *The Global War for Internet Governance* (New Haven: Yale University Press, 2014), 110.

internet to almost all universities in the United States, dramatically increasing the number of users.[65] It also created the tiered structure of the internet that has persisted for decades.

For instance, during the 1980s, the status of the TCP/IP protocol as the main basis for computer network communication was challenged by the International Organization for Standards (ISO), which had started in the late 1970s to develop a network reference model called Open-Systems Interconnection (OSI). The ISO proposed to replace TCP/IP with OSI. Many of the major computer vendors of the time subscribed to the proposal. Critics of OSI maintained, on the other hand, that OSI was bureaucratic and abstract, and more complicated and compartmentalized in its design than TCP/IP. The TCP/IP was open—software was freely available. Also, a simple mail transfer protocol (STMP) was brought out. Together, these factors made TCP/IP come out on top as the preferred way to communicate.

Figure 2 – The historical model of hierarchical internet interconnection with Tier 1, Tier 2, and Tier ISPs



Source: Author's elaboration.

[65] Lee W. McKnight and Peter Cukor, "Knowledge Networks, the Internet, and Development," *28th Annual TPRC Knowledge*, 2006.

Computer scientists' communities also mediated the objectives of military sponsors of the internet.[66] Consequently, the values of academic science became the second formative influence on the development of the internet. According to Barry M Leiner *et al.* "the Internet is as much a collection of communities as a collection of technologies, and its success is attributable to both satisfying basic community needs as well as effectively utilizing the community to push the infrastructure forward."[67] This community tradition gave rise to the cooperative development of networking protocols, their open release, and reciprocity that became part of the founding design of the internet. However, the "openness" supported by scientists never referred to opening the internet to far-reaching consumers, it instead took the form of expert disclosure and standard commons.[68]

The NSFNET project signaled a transition from military and research-based network to a broader education-oriented one.[69] Due to its success, the NSF started to work on the transition of ownership of the internet infrastructure to the private sector. The increase in the scale of the internet was associated with management issues. As a solution, hosts were assigned names. Originally, there were a limited number of hosts. With the increased number of independently managed networks, the Domain Name System (DNS) was implemented to define top-level domains. The first top-level domain introduced was ".arpa." In 1978, RFC 1032 defined that the Defense Data Network-Network Information Center (DDN-NIC) would become the "registrar of top-level and second-level domains, as well as administrator of the root domain name servers"[70] for both the military and civilian parts of the internet.[71]

The increasing size of the internet also challenged the capabilities of the routers. Originally, there was a single uniformly distributed algorithm for routing that was

[66] When a serious clash of priorities between scientists and the military occurred, this was cordially resolved through the ARPA-Internet split into two: the ARPANET would continue to link academically based researchers supported by the military, while a separate, more restricted and secured MILNET would connect military users.

[67] Barry M. Leiner et al., "Brief History of the Internet 1997," Internet Society, 1997, 11, https://www.internetsociety.org/internet/history-internet/brief-history-internet/.

[68] The internet is based on open protocols and non-proprietary standards at the logical layer. Public goods or common resources are nonrivalrous goods for which it is impossible to exclude anyone from using.

[69] Takahashi, *Livro Verde-Sociedade Da Informação No Brasil*, *Brasília: MCT*, 2000.

[70] RFC 1032 (1987).

[71] Mueller, *Ruling the Root: Internet Governance and the Taming of Cyberspace*.

implemented by all the routers on the internet. The first design was replaced by a hierarchical model of routing, implemented via a standard created in 1989 called the "Border Gateway Protocol" (BGP), with an Interior Gateway Protocol (IGP) used inside, and an Exterior Gateway Protocol (EGP) used to tie the regions of the internet together.[72] The internet assumed its distinctive technological attributes of interactivity, global reach, cheapness, speed, networking facility, storage capacity, and alleged uncontrollability. All attributes that made enthusiasts believe the information superhighway would change the world beyond all recognition.

In parallel, the 1980s and 1990s saw the internationalization of internet development that had previously been centered in the United States. A pivotal moment of change came when the European Organization for Nuclear Research Center (CERN), led by researchers Tim Berners Lee and Robert Cailliau, adopted IP and, in 1991, created the World Wide Web (WWW). It enabled the organization of content by information of websites, facilitating compatibility between computers via hypertext transfer protocol (HTTP), and the standardization of digital addresses through the uniform resource locator (URL).[73] With these tools freely available,[74] it was possible to develop the Mosaic browser, which shaped Netscape, the most famous browser of the first decade of the internet. Progress followed, and the internet has advanced to find the characteristics that today are remarkable to it: the international reach and global expansion.[75]

The internet arrived in Brazil, in September of 1988, when researchers from the Federal University of Rio de Janeiro (UFRJ), the Research Foundation of the State of São Paulo (FAPESP), and the National Laboratory of Computer Science (LNCC) managed to

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[72] RFC 985 described the requirements for Internet Gateways, which initially ensured the internet's interoperability. In 1989, the first version of the BGP routing protocol was formalized in the RFC 1105. BGP's current version, called BGP-4, has been in effect since 2006 and is documented in RFC 4271.

[73] Lessig, *The Future of Ideas*, 52:42–45.

[74] The intellectual property rights of technologies developed at CERN have been made available to the public domain.

[75] The internet reached Asia by the late 1980s, though it was not until 1995 that Africa established its first home-grown internet services. By 1998 the internet reached every populated country in the world. *In* James Curran, "Rethinking Internet History," in *Misunderstanding the Internet*, ed. James Curran, Natalie Fenton, and Des Freedman (Routledge, 2012), 35.

construct networks that connected them to the American BITNET.[76] Those academic networks were the forerunners of the internet in Brazil. In 1990, the network became an object of state policy, when the Ministry of Science and Technology created the National Teaching and Research Network (RNP). The United Nations Conference on Environment and Development that took place in Rio de Janeiro in 1992 (ECO 92) encouraged investments on the internet, and by 1993 the RNP had already connected 11 of the states in the federation.[77] The following year, Brazil had its first national backbone. The RPN was reconfigured and expanded to serve as a backbone for both commercial and academic use.

Contrary to the libertarian tale of the internet, usually diffused by its pioneers, the reason such technology initially succeeded was not only because of its design principles for the original architecture but also because of government interventionist policies (both in the United States and Brazil). Regulation created the solid ground that made the commercial internet possible in the first place. Historically, the role of government was central. The state was extraordinarily proactive and entrepreneurial in the development and commercialization of the internet.[78] It has not merely created the conditions for innovation, but actively funded the early radical research and created the necessary networks that facilitated its next commercial development.[79] Also, while the internet was born in the United States, the WWW was created by Tim Berners-Lee and impregnated with the European welfarist tradition.

Moreover, it was a regulatory concern that brought together the internet's technical and academic community that creates standards for internet's design until today. The ARPA project brought together the people who played a continuous role in the technical development and governance of the internet for the past forty years. The first phase of development of the internet is marked by organizational structures based on coordination,

[76] The BITNET was a co-operative U.S. university computer network founded in 1981. Its name meant "Because It's Time Network." It was very popular in South America, where about 200 nodes, all educational institutions, were implemented in the early 1990s.

[77] Takahashi, *Livro Verde-Sociedade Da Informação No Brasil*; Mueller, *Ruling the Root: Internet Governance and the Taming of Cyberspace*.

[78] Mariana Mazzucato, *The Entrepreneurial State: Debunking Public vs. Private Myths in Risk and Innovation* (Anthem Press, 2013).

[79] Ibid.

starting with electronic mail, and adding file sharing, remote access, and eventually World Wide Web capabilities. ARPANET protocols were implemented by the Network Working Group, which started an open method for documenting standards, the Request for Comments (RFC) series sat the Internet Engineering Task Force (IETF). Meanwhile, individuals involved in ARPANET formed the Internet Society (ISOC) and the Internet Assigned Numbers Authority (IANA).[80] Also, Task Forces were structured, each focused on a particular area of the technology. The IETF and Internet Research Task Force (IRTF) were created in this period. The growth in the commercial sector brought with it increased concern regarding the standards process itself, which eventually led to the formation of the ISOC in 1991. The World Wide Web has brought with it a new community, the World Wide Web Consortium (W3C).

During the incubation phase of the internet in the U.S., despite common perceptions, far from restraining innovation and retarding the economic system, regulation fostered innovation and dynamism, with the private sector often taking the back seat.[81] In this sense, the incubation period of the internet provides a far more accurate tale of technological and social change than what is offered by mainstream discussions. The U.S. government has cultivated a close and codependent relationship with companies involved in information production, storage, processing, and distribution, referred to here as the "information industries." Regular cooperation between U.S. government and private-sector actors has furthered the rise of a global economy driven by information and communication technologies while simultaneously placing U.S. companies at its center.[82]

1.1.2. The Commercialization Period: "Cyberspace"

In the years following, NSF helped navigate the road to a commercially viable internet during a period of remarkable growth. Commercial networks emerged in early 1990, but they could not exchange traffic through the NSFNET. The Advanced Network Services

[80] Mueller, *Ruling the Root: Internet Governance and the Taming of Cyberspace*.

[81] Indeed, in 1972, the telecommunication giant AT&T declined the government's offer to take over ARPANET because it would be unprofitable. *See* Curran, "Rethinking Internet History," 37.

[82] Powers and Jablonski, *The Real Cyber War: The Political Economy of Internet Freedom*, 51.

(ANS) operated the NSFNET at the time and established a commercial backbone service to sell interconnection to nascent commercial networks. In parallel, the Commercial Internet eXchange (CIX) was created to exchanged traffic through the BGP on a settlement-free basis, as illustrated in Figure 2 above. The basic rationality underlying the CIX's was the increase in connectivity. In the jargon of economics, connectivity produces positive feedback in demand that enhances the social value of the network. It is the so-called "network effect."[83] It is the birth of commercial interconnection. The CIX model became central to future developments, while ANS became obsolete.[84] In 1995, NSFNET was officially retired, ending the U.S. government ownership of the internet infrastructure.[85]

The commercialization of the internet, then, involved the development of interoperability protocols and the diffusion of information and appropriate training.[86] The internet has become a platform for the support of other commercial services, and the society received it as an open public space, decentralized, diverse and interactive. The large reception of the internet during the mid-1990s met with the ethos of the time. Even the language used to discuss the internet changed. The metaphor of the "information superhighway," gave way to the utopian image of "cyberspace." Everything seemed astonishing, transformative, and confident. With this enthusiasm, a new phenomenon emerges media convergence. The internet was initially set up to boost technological advance in different sectors and since then has always been aggressively mission oriented. The internet was designed to carry limitless forms of information, including data, voice, and video.

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[83] The network effect describes the event when the value of the network increases or decreases, respectively, with every addition or subtraction of other users to the network. According to Nicholas Economides "[t]he Internet was not the first or last of electronic networks, but it is definitely the largest on earth in terms of hosts (computers) connected to it, content stored in them, and bits of traffic traversing it every day." *See* Nicholas Economides, "The Internet and Network Economics," in *Internet and Digital Economics: Principles, Methods and Applications*, ed. Eric Brousseau and Nicolas Curien (Cambridge University Press, 2007), 239.

[84] Robert Cannon, "The Legacy of the Federal Communications Commission's Computer Inquiries," *Federal Communications Law Journal* 55, no. 2 (2003): 167.

[85] Mueller, *Ruling the Root: Internet Governance and the Taming of Cyberspace*; Rob Frieden, "What's New in the Network Neutrality Debate," *Michigan State Law Review* 297, no. 814 (2015): 739–86.

[86] Leiner et al., "Brief History of the Internet 1997."

During the late 1990s, companies adopted the prefix ".com" on the U.S. stock market and recited mantras such as "get big fast" and "get large or get lost." The combination of speculative investing and surplus of venture capital funding for startups culminated in the "dot-com" bubble.[87] After the crash, the belief that internet technology had transformed the very nature of capitalism was replaced, by more sober assessment and companies shifted their awareness how to survive and make money. ISPs providing traffic delivery services started to monitor internet traffic closely and had little tolerance for settlement-free basis agreement that comparatively generated more downstream traffic or lacked the network capacity upstream to route traffic it receives from a peer. In parallel, the rise of bandwidth-intensive and time-sensitive applications, such as VoIP and online games, required investments to upgrade the infrastructure for internet access, creating an incentive for ISPs to change the terms and conditions for both upstream and downstream services. The technological change, in its turn, was followed by legal changes.

a. Internet Exchange Points, Content Delivery Network, and Convergence Technologies

As part of the transition to a commercial internet, the NSF formulated a new architecture in which regional networks could interconnect for interregional or national connectivity through Internet Exchange Points (IXP). IXPs physical and virtual infrastructures that enabled ISPs to interconnect by providing reciprocal access to subscribers in a free traffic exchange. These first agreements were identified as "peering" and sought primarily to achieve better geographical reach and more users with little regard to the costs of access.[88] IXPs primary role was to keep traffic local and reduce costs associated with traffic exchange between networks. They also built a local internet community, develop better network management, and drove internet access demand by reducing delay and improving end-user experience. IXPs have shared interconnection sites that serve as essential nodes interconnecting the internet's backbone through private contractual arrangements.

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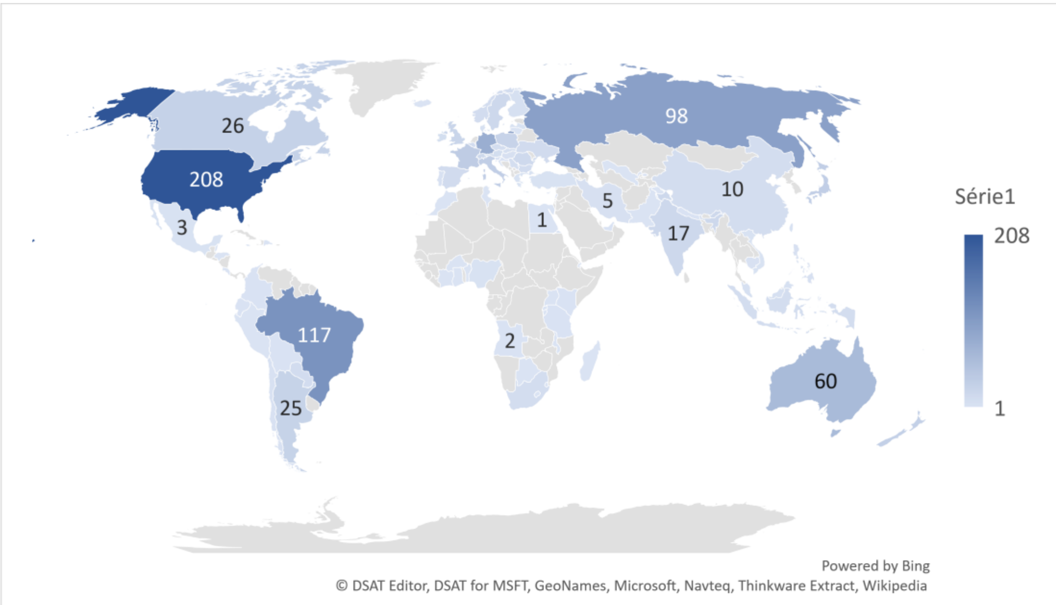
[87] Frieden, "The Debate Over Network Neutrality in the United States."

[88] Mueller, *Ruling the Root: Internet Governance and the Taming of Cyberspace*.

With the rise of interconnection, ISPs were no longer directly connected to end-users at the bottom of the network but interconnected to IXPs to achieve local providers and end-users. Many of the organizations running IXPs were nonprofit organizations with the unique mission of enabling unlimited information exchange. Requirements to become a member of an IXP includes the payment of membership fee and compliance with specific technical, administrative, and legal requirements. Over the years, the number of IXPs exponentially grew around the globe. Map 1 below illustrates today's number of installed IXPs around the world. While peering agreements used to dominate as the primary form of interconnection during the NSFNET, the commercialization of the internet created opportunities for market entry and new incentives for charging network access. ISPs expanded regarding bandwidth availability, geographical reach, and subscribership. Also, ISPs proliferation made widespread peering unsustainable.

Map 1 - Number of installed IXPs per country in 2018



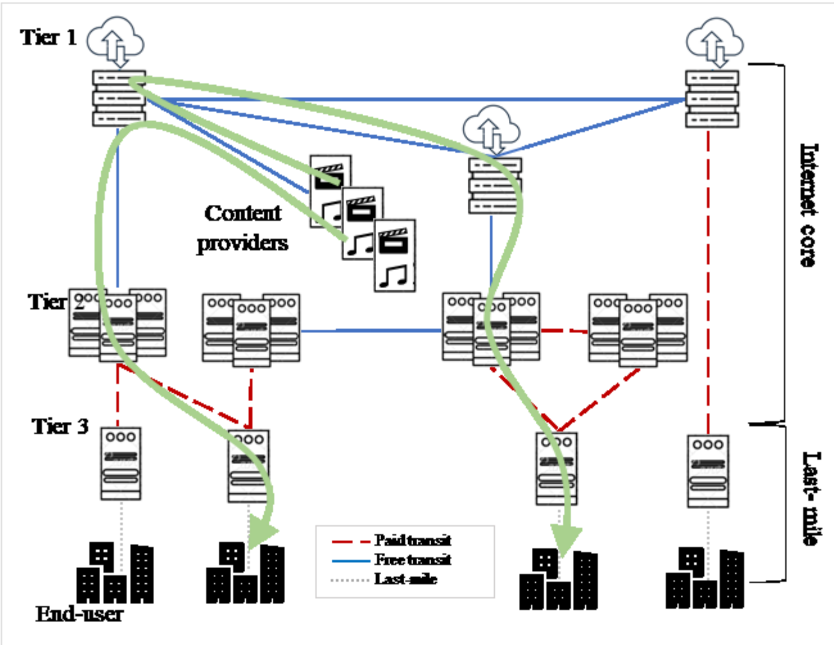
Source: www.internetexchangemap.com. Data gathered in January 2018.

In this scenario, paid interconnection emerged.[89] Figure 3 below demonstrates ISPs' hierarchical relation, emphasizing the most common type of peering and transit agreements.

[89] The internet transit agreements differed from telecommunications transit agreements, which secured an indirect link for a carrier in one location, mainly because this carrier might not have sufficient traffic volume to secure a direct link. In internet service, transit provides access to a vast array of networks.

Tier 1 ISPs reach any part of the global internet exclusively via mutual peering agreements with other networks. Tier 2 ISPs engage in some mutual peering agreements but also purchase transit interconnection. Tier 3 ISPs do not sell connections to other networks but purchase transit from Tier 2 ISPs and reach the global internet. Above internet traffics flow both from end-user to CAPs and through the opposite route.

Figure 3 - Peering, transit interconnections, and internet routing

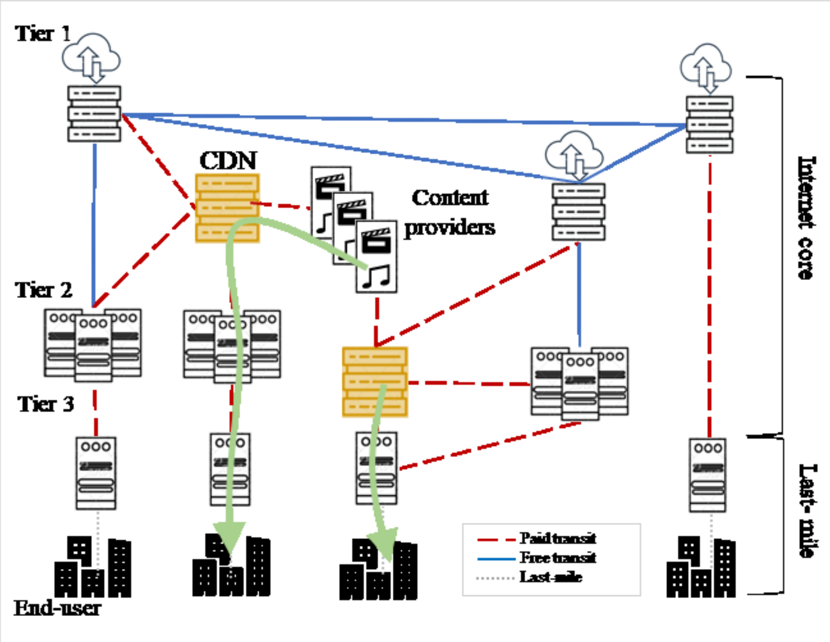


Source: Author's elaboration.

The exponential growth of demand for internet access stimulated the creation of new types of ISPs. Content Delivery Network (CDN) are virtual networks connecting content providers with local caches near end-users, reducing the use of long-distance networks. CDNs, in practice, are servers that caches and replicates content distribution, offering faster traffic routes. They have still considered autonomous systems and established peering and transit relationships. Its goal is to decrease CAPs' costs, and mitigate the data packets' losses since it caches and serves content close to the end-user, reducing the amount of upstream bandwidth required by ISPs. Therefore, ISPs can reduce their upstream bandwidth costs or maintain traffic ratios that could make them newly eligible for peering.

Moreover, interconnection agreements significantly lower barriers to entry because they exempt a new entrant from the need to build a ubiquitous network before competing for the dominant carrier's users. Note that although interconnection agreements reduce any advantage that incumbents derive from network effects, they do not ensure new entrants will benefit from the large-scale economies[90] enjoyed by a provider with a large, established user base. This is a huge potential loophole that allows big players to play favorites or punish rivals. Interconnection disputes are precisely the same as network neutrality problems, just up a notch.[91]

Figure 4 - CDNs, interconnection and internet routing



Source: Author's elaboration.

Figure 4 exemplifies how CDNs work ensuring a shorter route. These networks are built and operated both by large content companies, like Google and Netflix and by standalone CDNs, like Akamai. Also, with the introduction of CDNs, CAPs started to construct and rent server space around the world, performing peering agreement to bypass the backbone and to save on transit and regulatory costs.[92] Over this path, the interconnection industry has evolved with minimal government oversight. Agreements were limited to

[90] Increasing the scale of a firm's operations improves the ratio of the value of the firm's services to each customer, and thus the revenues the firm can obtain from that customer, to the per-customer cost to the firm of providing those services. *See* Nicholas Economides, "The Internet and Network Economics," in *Internet and Digital Economics: Principles, Methods and Applications*, ed. Eric Brousseau and Nicolas Curien (Cambridge University Press, 2007), 239–67.

[91] Susan Crawford, "The AT&T-Time Warner Merger Must Be Stopped," *Wired*, 2016.

[92] Maureen K. Ohlhausen, "Net Neutrality vs. Net Reality: Wha an Evidence-Based Approach to Enforcement, and Not More Regulation, Could Protect Innovation on the Web," *Telecommunications & Electronic Media*, no. February (2013): 81–87.

private parties and subject to little transparency. Therefore, interconnection's move towards market arrangements impacts not only the architecture of the internet but also the public interest.[93]

With the internet's popularization, new applications and content started to boost technological advance in different sectors and along with that came network congestion. Typical effects of congestion include latency and jitter. Latency refers to a time interval in which upstream or downstream traffic arrives at its intended destination. Some applications, including VoIP,[94] requires fast response times to service requests and therefore very low latency.[95] Jitter is a signal distortion that occurs when packets from the same source reach the destination with different delays or packet losses.[96] These effects have created the need for traffic management practices, which introduced considerable new challenges for ISPs attempting to manage existing network capacity and support investment in next-generation infrastructures.

Traffic management is a set of techniques and instruments used by ISPs to control the traffic of data packets in telecommunication networks,[97] to increase network performance and avoid network congestion. DPI is the most common traffic management practice. It identifies and prioritizes certain types of network traffic. On the one hand, these practices allow the desirable management of latency, jitter, and filtering of malicious traffic. On the other, it allows the identification of the packet's sender, content, and recipient, opening doors for future abuses and discrimination against users and competitors with severe consequences for privacy and freedom of speech.[98] The difference between unjustified traffic management and discrimination is quite subtle, and the lack of transparency of ISPs makes it difficult to understand the criteria adopted, making it impossible to distinguish

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[93] Zelnick and Eva, *The Illusion of Net Neutrality*.

[94] VoIP is the most complicated application because it is bidirectional and network congestion cannot be tolerated for a conversation to be successful.

[95] Frieden, "What's New in the Network Neutrality Debate," n. 33.

[96] Douglas A. Hass, "The Never-Was-Neutral and Why Informed End Users Can End the Net Neutrality Debates," *Berkeley Technology Law Journal* 22 (2007): 1565–1635.

[97] The term "telecommunications" is broadly defined as the transmission of information by means of electro-magnetic signals: over copper wires, coaxial cable, fiber-optic strands, or the airwaves.

[98] Steven J. Bauer, "Congestion on the Internet: Operator Responses, Economic Analysis, and Improving the Network Architecture" (Massachusetts Institute of Technology, 2008), 2.

clearly between practices that follow purely technical standards and those in which there is predatory financial interest.

Also, the dispute enlarged as the technical community began to pressure for internet with intelligence at the end-user's device, not in the network. In this sense, David Isenberg in his famous essay "The Rise of the Stupid Network" stated that "the internet should be engineered for 'always-on' use, not intermittence and scarcity. Moreover, the network would be engineered to 'deliver the bits, stupid' not for fancy network routing or 'smart' number translation." In this context, Isenberg's idea echoed the end-to-end principle that the internet is a "dumb pipe," and the only information we should read in a packet is its headers, not the payload.[99] Isenberg described that a stupid network would facilitate more innovation, while a smart, or intelligent, network would be optimized for users, but its sophistication would inhibit different or new uses, locking and filtering practices into the internet.

The first-generation of blocking and filtering practices included subtler and diversified forms of DNS, IP, or URL monitoring. Although these practices were initially considered to be the exclusivity of authoritarian states, later it became public democratic states participate in extensive monitoring of the internet.[100] These highly controversial practices have proved the importance of discussing ways of regulating the internet, and precisely network neutrality, as follows. Many states also use registration, licensing, and identity requirements to control what people do online merging legal controls and surveillance technics. However, single states cannot directly implement the level of control on the internet that they covet, so their control strategies have expanded to include private entities.

Together traffic vigilance and proliferation of bandwidth-intensive applications motivated ISPs to diversify the nature, type, terms, and conditions for network interconnection. Rather than a strict dichotomy "peering *v.* transit," interconnection

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[99] In a "dumb network," the data tells the network where it needs to go. In contrast, in a circuit network, the network tells the data where to go. *See* David S. Isenberg, "The Rise of the Stupid Network," 1997, http://isen.com/.

[100] Jack Goldsmith and Tim Wu, *Who Controls the Internet? Illusions of a Borderless World*, 1st ed. (New York: Oxford University Press, 2006); Lawrence Lessig, *Code And Other Laws of Cyberspace: Version 2.0* (Basic Books, 2006).

agreements span a continuum between these two categories. As a result, most of the agreements that had previously assumed a free exchange of traffic transitioned to a paid agreement. Therefore, in the opening decade of the commercial phase of the internet, the historical model of hierarchical internet interconnection, as illustrated in Figure 1 above, did not match interconnection anymore.

In fact, the network design of the internet's core infrastructure has migrated to an architecture based on market arrangements rather than technical standards for redundancy, efficiency, and reliability. Long haul transport exponentially decreases. The interconnection moves from a backbone arrangement to an arrangement between access networks and CDNs at IXPs near ISPs. Access networks successfully negotiate access fees. The relation between state and private actors was strengthened not only by the incentives for technology innovation to increase connectivity but also by the emergence of new forms of control. At the time, the prevailing assumption was that the internet would replace the old media (telephony and broadcast). However, the reality dismissed such claims and old and new converged. Issues related to the cross-platform competition created by the broadband internet access are fundamental to network neutrality debate.

b. From the "Declaration of Independence of Cyberspace" to the Telecommunication Deregulation waves in the United States and Brazil

In 1996, the *Communications Decency Act* (CDA) was signed into law.[101] The CDA sought to regulate indecency and obscenity on a new part of the world's communications infrastructure, the internet, and to criminalize the circulation of pornographic content to people under 18 years of age.[102] Its vague definition of "indecency" caused great distress and fear for censure. As a reaction, in the same year, the founder of the Electronic Frontier Foundation (EFF), John Perry Barlow, published his famous sixteen-paragraph "Declaration of Independence of Cyberspace," in which he proclaimed that cyberspace is and ought to be

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[101] The CDA is also known as "Title V" of the Telecommunications Act of 1996, codified at 47 U.S.C. § 230.

[102] Child safety and illegal access to pornographic content is referred as the first concern about internet regulation.

beyond the tentacles of government control. [103] Modeled after the American Declaration of Independence, Barlow addresses

> "Governments of the Industrial World, you weary giants of flesh and steel, I come from Cyberspace, the new home of Mind. On behalf of the future, I ask you of the past to leave us alone. You are not welcome among us. You have no sovereignty where we gather. (…) Your legal concepts of property, expression, identity, movement, and context do not apply to us."[104]

At first, the idea of cyberspace immunity sounded extreme, but EFF reasoned the First Amendment to the U.S. Constitution limits the government's ability to regulate speech. Reasoning that on the internet everything is potential "speech," the EFF joined forces with the American Civil Liberties Union to challenge the *CDA* as a violation of the First Amendment. The case Janet Reno, Attorney General of the United States, et al. v. American Civil Liberties Union, et al. (*ACLU v. Reno*)[105] quickly ascended to the U.S. Supreme Court.[106] On June 26, 1997, the Supreme Court declared the *CDA* to be an unconstitutional violation of the First Amendment. The Court agreed with the ACLU and EFF that the law was too vague and, therefore, unnecessarily "chilled" the freedom of speech and embraced the concept of cyberspace. Therefore, Barlow's Declaration and the *ACLU v. Reno* case opened the full circle to the original cyberlaw debates between exceptionalists and unexceptionalists.

On the one hand, cyberspace exceptionalists argued that online medium itself create radically recent problems requiring new analytical work to be done. On the other hand, cyberspace unexceptionalists argued online medium did not significantly alter the legal framework to be applied.[107] By means of these early discussions, a series of studies had emerged pointing to the need (or not) to apply legal rules on the internet. The most famous early-skeptical author, the U.S. Court of Appeals Judge Frank Easterbrook, coined the

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[103] John Perry Barlow, "A Declaration of the Independence of Cyberspace.," 1996, https://perma.cc/LMC5-6ZAA.

[104] Ibid.

[105] 521 U.S. 844 (1997).

[106] Goldsmith and Wu, *Who Controls the Internet? Illusions of a Borderless World*, 19–21.

[107] Berman, *Law and Society Approaches to Cyberspace*, xvi.

expression "law of the horse" to claim that the internet is only an object of enforcement of existing rights and does not need its own legal regime.[108] However, this was a false dichotomy because both sides were concerned with the cyberspace as a place of freedom of speech. Even unexceptionalists accepted general principles of law that can be applied to new legal settings without alteration. *ACLU v. Reno* case also illustrates this acceptance since unexceptionalists used the First Amendment to defend the cyberspace separation. Thus, in a pure sense, the unexceptionalist position is difficult to maintain.

During the late 1990s, debates centered on freedom were replaced by behavior regulation.[109] The role of the state change and policy approaches started to focus on nudging private actors with incentives.[110] In 1999, Lawrence Lessig published his seminal book "Code and Other Laws of Cyberspace," in which he suggests that the network architecture has a complementary potential regarding legal rules in the control of human behavior. Code-based regulation is potentially more efficient than a coercive command because its enforcement mechanisms are embedded in the technological architecture. Furthermore, not only sovereign governments but also private entities can wield this code-based power. In this sense, the second-generation of scholars resurrected the Legal Realism - focusing on the state enforcement of property and contract law – and migrated from the concept of cyberspace based on freedom to the online world where privacy is non-existent and private filters limit access to information.[111]

However, the academic and theoretical debate again did not match the reality. During the 1990s, the world witnessed waves of liberalization, which pushed for competition and deregulation of telecommunications. In the U.S., deregulation came in the form of more regulation.[112] In the communications sector, provisions for equipment interoperability and

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[108] Easterbrook provocatively argued that studying cyberlaw as a separate field of study would be no different from studying the "law of the horse" in the nineteenth century. *See* Frank H. Easterbrook, "Cyberspace and the Law of the Horse," *U Chi Legal F* 207 (1996).

[109] Berman, *Law and Society Approaches to Cyberspace*, xiv.

[110] The term "nudges" is related to policies that steer people directions, but that also allow them to go their own way, as defined by Cass Sunstein. *See* Cass R. Sunstein, "Nudging : A Very Short Guide," *Journal of Consumer Policy* 37 (2014).

[111] Berman, *Law and Society Approaches to Cyberspace*, xviii.

[112] See Section 3.1.2 below.

access services between local and long-distance network were undertaken. The significant effort came with the *1996 Telecommunications Act*, which abolished all exclusive franchises and ordered all telecommunications carriers to interconnect with any requesting carrier.[113] Under enormous pressure, the U.S. Congresses granted new entrants rights to lease capacity on the facilities owned by the AT&T, enabling them to participate in the incumbent's economies of scale by availing them the same low per-unit costs. However, the U.S. Congress did not detail how the leasing agreements should perform, leaving major decisions to federal and state regulators.

Also, Courts played a marginal role as far as issues were concerned in the first two decades of the internet development. It changed with the commercialization of the internet when judicial rulings emerged as one of the leading forces shaping online freedom of expression and communications regulation. This evolution made clear the increasing confidence of judges and Tribunals in challenging technical mantras, championed by engineers and corporations. By "deregulating" communications, the U.S. gave more powers to regulators, bureaucracy, and judges.

Along with the *CDA* and the *Telecommunications Act of 1996*, the U.S. also enacted the *Digital Millennium Copyright Act of 1998*,[114] regarding the protection of intellectual property rights, and the FCC established the *Computer Inquiries*, focusing on the interconnection arrangements. In *Computer Inquires*, the FCC required telephone companies, among other things, to sell essential transmission services to ISPs on the same terms those companies provide their own enhanced service operations. Telephony's transmission services were price-regulated, and its network was long considered an indispensable bridge between enhanced service providers and users.

In the late 1990s, however, the emergence of broadband high-speed internet access began drawing that into question. Cable companies started to provide broadband internet access over the same facilities they use to provide regular cable television service. Similarly,

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[113] Jonathan E. Nuechterlein and Philip Weiser, *Digital Crossroads: American Telecommunications Policy in the Internet Age*, *Technical Communication Quarterly*, 1st ed. (Lodon: The MIT Press, 2005), 15.

[114] The Free and Open-Source Software (FOSS) movement was born as a reaction to the surveillance and control regulatory tendencies of the time, specially, the rules of the DMCA.

telephone companies began to provide DSL internet services over ordinary telephone lines. The convergence of these two services, previously seen as market substitutes, created a fierce head-to-head competition between telephone and cable companies. Law, again, has a prominent role, since telephone, and consequently, DSL services, was subject to burdensome wholesale regulations, while cable companies providing cable modem services were not subject to burdensome rules.

In parallel, in May 1995, the commercial operation of the internet was introduced in Brazil. Embratel started to offer internet access through the Global Internet Exchange, a CIX-based in the United States. Brazil also witnessed waves of liberalization of government control over telecommunications. During this time, forces of economic globalization pushed for competition, deregulation, and privatization of telecommunications. The discourse in favor of telecommunications privatizations was strongly influenced by the rise of neoliberal ideas promoted by multilateral organizations, which urged Latin American governments to implement pro-market reforms to overcome the economic crisis. These economic policy recommendations became recognized as the "Washington Consensus" and were formulated by international financial institutions, such as the IMF and the World Bank.[115]

Also in 1995, the Brazilian government decided to privatize Telebrás System as the first step towards the liberalization of the entire telecommunication sector. The Telebrás System was composed by a state-owned company, Embratel, and mixed-economy company, Telecomunicações Brasileiras S.A. (also named "Telebrás"). They were both responsible for long-distance and local services respectively. Telebrás had twenty-seven subsidiaries that functioned as local operators. Due to the high barriers to entry because of the costs to access the national and the international internet backbones, the Brazilian marketplace observed a rapid concentration into a small number of ISPs with nationwide coverage. The result of the liberalization process and deregulation in Brazil was the shift from a public-owned monopoly to a market with few powerful actors and oligopolistic structures.

[115] John Williamson, "What Washington Means by Policy Reform," *Latin American Adjustment: How Much Has Happened?* (Institute for International Economics, 1990).

Many regulatory, political, and economic struggles that have arisen in the United States and Brazil from this period remains unsolved up until now. We will specifically address these issues in Chapters 3 and 4.

1.1.3. The Integration Period: The "Multiplatform" Internet and OTT Services

The internet's most recent period matches the rise of over-the-top media services (OTT) and multi-interface devices in the early 2010s. OTT content is the on-demand service offered by CAPs, such as Netflix and YouTube.[116] The most popular OTT are video, voice calling and text messaging. In the first quarter of 2017, the number of Netflix streaming subscribers in the United States passed the 50 million subscribers. This means that 54 % of all TV households in the country had a Netflix subscription in 2017, up from 28 % in 2011.[117] The OTT content providers have begun to experiment with alternative distribution options that eliminate intermediaries, such as local broadcast stations, and cable television providers.[118] They started to purchase their own communications links to points very close to the user. In turn, ISPs have become less cooperative, even setting up their own OTT, resulting in disputes over what constitutes fair compensation for switching, routing, and delivering of high volumes of traffic. Traffic management became indispensable in today's internet, but at what cost?

The structure of the traffic flows varies significantly from the hierarchical internet model, as illustrated in Figure 2. Internet exchange practices and private agreements for peering and transit re-draw routing worldwide. The structure today is more modular and "platformized," as Figure 5 illustrates. The idea of CAPs passively accessing transport networks has given way to the reality of proactive approaches in which content provider develop individualized solutions and relationships for advanced, dynamic delivery and competitive differentiation. CAPs benefit themselves from managed traffic. The

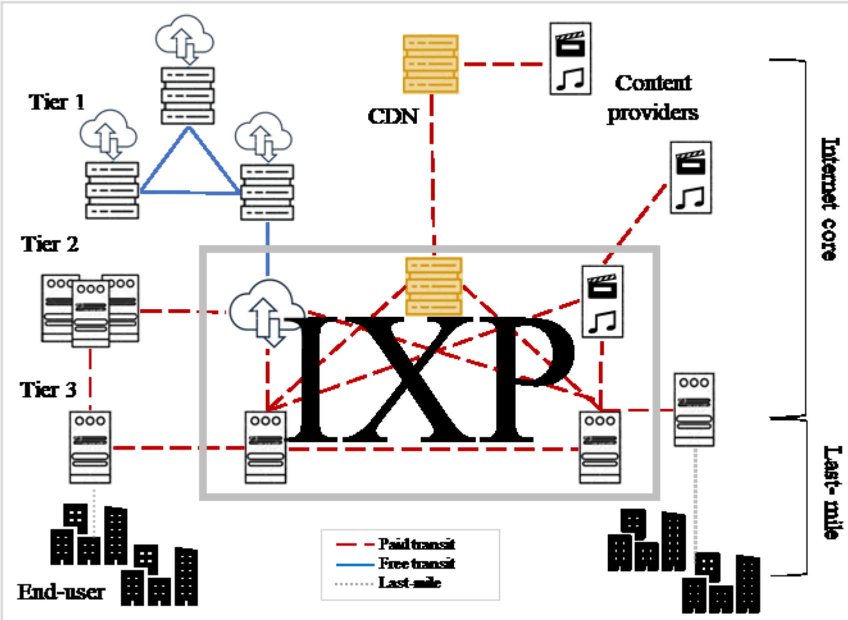
[116] The term "OTT," in the broadcasting vernacular, refers to media content delivered without the involvement of an operator in the control or distribution of content.

[117] Leichtman Research Group. Available at: https://www.leichtmanresearch.com/82-of-u-s-tv-households-have-a-dvr-netflix-or-use-vod/ Accessed on 10 December 2017.

[118] Frieden, "Conflict in the Network of Networks : How Internet Service Providers Shifted From Partners to Adversaries," 80.

combination of increased OTT traffic, demand for low latency web applications, and reliable network and financial resources of hybrid platforms, altered interconnection arrangements among CAPs, retail ISPs, and backbone transit providers.[119] Differential treatment of traffic is the norm, but it has impacts to end-users beyond potentially severe consequences for privacy and against freedom of speech.

Figure 5 - OTT modular and "platformized" interconnection model



Source: Author's elaboration.

Unlike the interconnection arrangements of the past, these are typically asymmetrical; much more data flows from the content originator to the ISP than the reverse.[120] The existence of massive intermediaries enables distorting practices. The growing privatization of global power and the embedded politics of technical architecture moves the battle for the future of the internet to a black box, where public interest has minor consideration.[121] Facing this transformation, the third generation of scholarship emerged combining the previous two perspectives. For them, the internet generated innovative opportunities for creativity while increased concerns about power and control. All the

[119] John Harris Stevenson, "Hacking the Master Switch: The Role of Infrastructure in Google's Network Neutrality Strategy in the 2000s" (University of Toronto, 2017), 201.

[120] Ibid.

[121] DeNardis, *The Global War for Internet Governance*, 2.

problems that arise in offline space find their way into the online environment, and in turn, give rise to control strategies.[122]

In reaction, regulation became the motto again, also encouraged by the global internet governance community. At the core of this discussion is network neutrality debate, addressing the cross-platform market for providing internet access and its potential discriminatory practices, which threaten the open and free internet. Despite the enormous the policy attention it gathers, network neutrality focuses on a minuscule part of internet architecture, the connection between the user and local provider, whether via wireless or landline broadband - the so-called "last mile."[123] Thus, network neutrality rule does not address interconnection agreements between ISPs and CAPs. In this sense, advocates of network neutrality can both be the winners of network neutrality in a formal perspective and still be the losers of the internet struggle, as we will describe in the following chapters.

1.2. The Internet Architecture and Economics in a Nutshell

This section briefly introduces basic concepts that are necessary for understanding issues associated with the architectural design and the economics in the context of communication networks. Networking technologies studies are critical to our discussion less because of the minutiae of technological developments matters but because the architectural principles by which they have been crafted have trespassed their boundaries into policy decision. Here, we adopt the word "architecture" to refer to "the fundamental structure of a complex system (…) it is a description of the system s basic building blocks," as defined by van Schewick. [124] The concepts of "layering" principles and "end-to-end arguments" are pivotal in this regard. In this sense, policy proposals that choose to appropriate the architecture metaphor will inevitably escape its bounds and adopt its political and economic assumptions. The original architecture of the internet is defined as opened because it adopted

122 Jonathan Zittrain, *The Future of the Internet and How to Stop It*, *Yale Press University* (Yale University Press, 2008).

123 DeNardis, *The Global War for Internet Governance*, 2.

124 van Schewick, "Internet Architecture and Innovation in Applications," 20.

open standards for the core protocols. Thus, the internet is "open" in the sense that no one owns the TCP/IP, HTTP, and other protocols at the logical layer. [125]

1.2.1. Layering Principles and End-to-End Arguments

Layering is a distinct form of modularity[126] that restricts the interactions between network's components hierarchical organized in layers.[127] The idea is to separate bits of code necessary to run a system into connected but separate entities that work together, connected via standard application programming interfaces (API). Interworking has been at the core of this design by allowing protocols' communication between different architectural layers. There are enormous variants of the layering principle.

As Figure 6 below demonstrates, the architecture of the internet is based on a variant called "relaxed layering with a portability layer." The internet is designed in four layers: the lowest layer is the link layer, followed by the internet layer, the transport layer, and the application layer. While the lower layers are implemented on end hosts and computers in the core of the network, the higher layers are implemented on end hosts. In this version, "one of the lower layers is chosen as the portability layer. The layers above the portability layer can use the services of all layers between them and the portability layer. In the internet, layering operates both horizontally (through the exchange of messages between protocol peers located on different computers) and vertically (using lower-layer protocols)."[128]

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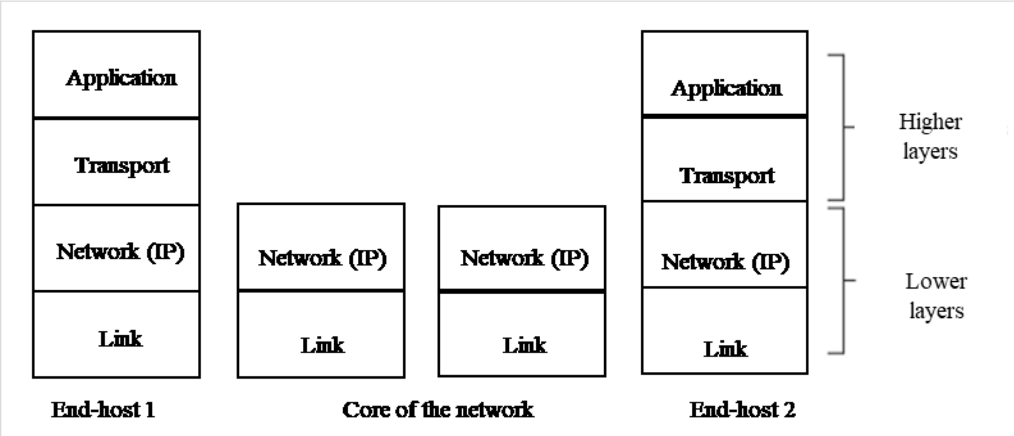
[125] Zelnick and Eva, 88.

[126] Modularity is a design principle that manages complexity by enabling different products to work together through well understood sets of rules. The objective of modularity is to create architectures whose components can be designed independently but still work together. Components of modular designs are called modules. *See* Nuechterlein and Weiser, *Digital Crossroads: American Telecommunications Policy in the Internet Age*, 118.

[127] The term "layers," in this sense, is entirely metaphorical, a set of modular design principles.

[128] van Schewick, "Internet Architecture and Innovation in Applications," 47.

Figure 6 - Layers, end hosts, and core in the internet architecture



Source: Author's elaboration.

In addition, end-to-end arguments is a design principle that guides the placement of functionality in a multi-layer system. RFC 1958, published in 1996, determines "[t]he network's job is to transmit datagrams as efficient and flexible as possible. Everything else should be done at the fringes."[129] Although the end-to-end arguments were first identified, named, and described by Jerome Saltzer, David Reed, and David Clark in 1981,[130] it has gained relevance only after the famous article "The End of End-to-End: Preserving the Architecture of the Internet in the Broadband Era" written by Mark Lemley and Lawrence Lessig in 2001.[131] According to the authors, end-to-end says to keep intelligence in a network at the ends, or in the applications, leaving the network itself to be relatively simple.[132]

It is worth noticing that the internet was not the first network to follow an end-to-end design. The electricity grid and roads are also end-to-end systems. Despite the frequent controversy, misinterpretation, and misuse, the end-to-end arguments have a significant role in network neutrality debate.[133] For as in the chapters that follow we will outline its closed

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[129] RFC 1958 is considered an informational document about the original architectural principles of the internet.

[130] J. H. Saltzer, D. P. Reed, and David D. Clark, "End-to-End Arguments in System Design," *ACM Transactions on Computer Systems* 2, no. 4 (1984): 277–88.

[131] Lemley and Lessig, "The End of End-to-End: Preserving the Architecture of the Internet in the Broadband Era."

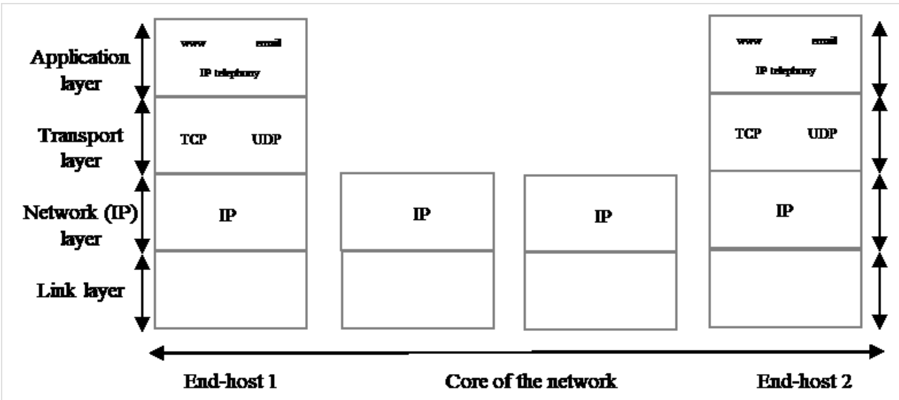
[132] Lessig, *The Future of Ideas*, 52:34.

[133] van Schewick significantly contributes to the end-to-end debate by elucidating the historical existence of two versions of the arguments. They are design architectures and not anti-discrimination principles,

relation to the concept of the internet as an "innovation commons,"[134] where innovators can develop and deploy new applications or content without the permission of anyone else.[135]

During the internet's origins, architects decided to remove application-specific functions - such as reliable and connection-oriented data transfer - from the internet layer. Thus, the IP, the only protocol at the internet layer, provides unreliable connectionless data delivery. Some applications can use the TCP,[136] which provides connection-oriented reliable data transfer, while others can use the User Datagram Protocol (UDP), which offers unreliable connectionless data delivery. - Distribution of functionality in the internet's original architecture is represented in Figure 6 below. Because of the use of the layering principle and the extended version of the end-to-end arguments, the internet's original architecture was application- blind.[137] Note that "non-discrimination" is an effect of following a design decision, rather than a clear objective.

Figure 7 - The internet's original architecture and distribution of functionality



Source: van Schewick, Internet Architecture and Innovation, p. 100.

although it can be put to such a purpose. *See* Barbara Van Schewick, *Internet Architecture and Innovation* (The MIT Press, 2010).

134 The term "commons" is often present in economics or political sciences and it is determined not only by a test of rivalrousness, but also by the character of the resource and how it relates to a community. For useful analyses of the commons, *see* Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action* (Cambridge University Press, 1990).

135 Lessig, *The Future of Ideas*, 52:37–40.

136 TCP is what is called a connection-oriented protocol in that it seeks a digital "handshake" with the same protocol at the other end of the connection sought, enabling it to detect errors in transmission as it passes the information along. UDP is connectionless protocol that does not pay attention to whether all packets have been correctly receive. IP is a forwarding protocol that is "connectionless."

137 van Schewick, "Internet Architecture and Innovation in Applications."

Any data onboard the internet commences its path at the *content* layer, which could be the contents of an email or a picture on a web page. This, in turn, exists within some application that resides at the *application* layer, each of which has a specific way of handling content. Content and applications comprise the top two layers of the internet. The application layer connects with the *transport* layer (also known as layer 4) which includes the TCP or UDP. As data passes to the transport layer, a header is added identifying the application or, more specifically, what *port* is targeted. The resulting named Protocol Data Unit (PDU) passes down to the *internet* layer (or layer 3), which encapsulates it with specific information. The PDU for internet layer, also branded as *packets*, passes utilizing routing tables contained in routers. Gateway routers perform the functions of route discovery at networks' ends. The internet layer hands off packets to the *link* layer (also identified as layer 2), which is responsible for giving end-devices the ability to transfer information across communications' links.

Up to this point, all activities have occurred at the user's machine. Now packets are handed off. Here occurs the physical connection between the user's device and the network infrastructure, where thousands of miles of transmission facilities, including traditional twisted pair copper. These backbone facilities aggregate internet traffic and transmit bits. Once the data is given both a front-prepending and postpending of coded information, the packet is now transformed into a *frame* for transport through the network infrastructure. While all data frames are headed to IP addresses, each packet is given yet another address of origin, called a media access control address (MAC), which is coded to the device.

At the bottom of the layer flow, is the *physical* layer (or layer 1), through which signal passes and the protocols that enable this signal is transmitted. Frame hit the edge of its home-network at a *router*, which receives and reads the data's header information to calculate how to route packets to the next best router (also called *hop*). The router then reads the bits which encapsulate the packet to determine how to forward the information further. Once decided, the router re-encapsulates the packet with information about the next hop on its way across the internet and passes the packet back down the layer flow to the link layer where it is prepended and appended to become a frame once again.

At the end-destination, the frame passes up the layer flow one by one with each protocol reading the bits contained as part of that packet's encapsulation, looking for information as to where to pass it. The link layer reads and removes the prepending and appending and passes it up to the internet layer. Following, the IP protocol suite reads the information contained in the prepended information and strips of the packet, passing it to the transport layer, which in turn reads and removes the encapsulating material left by its distant peer at the other end of the network to determine which application, by means of a port, receives the packet.[138] Then the application performs whatever functions need to be performed to make the useful data for the end-user.[139] This is the "best-effort" delivery, often present in today's debates over network neutrality and based on end-to-end arguments, which forward data packets towards the recipient until final delivery, maintaining the intelligence of the network in its ends, leaving it relatively simple at its center.[140]

Traditional network operators responsible for content delivery during the incubation phase include telecommunications companies, ISPs, wireless services, and cable companies, also described as autonomous systems (AS). Not every network is an AS. The key defining characteristic of an AS is that it presents a consistent *routing* policy. Routing protocols are standard specifications that instruct routers how to interact with each other and exchange information. On the one hand, Each AS uses interior routing protocols also called IGP, which communicates routing information to all networks within the AS. Each router within the AS uses this internal protocol to calculate how to route packets to the next "hop" to forward packets to their destination. On the other hand, EGP dictates how routing occurs between AS. All internet interconnections among AS occur via BGP.[141] BGP's elementary function is to allow networks to exchange information about reachability, which means which systems each AS can reach. In this sense, BGP, like the TCP/IP, is one of the fundamental technologies of the internet.[142]

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138 Russell A. Newman, "The Paradoxes of Network Neutrality" (University of Southern California, 2015).

139 Demi Getschko, "As Origens Do Marco Civil Da Internet," in *Marco Civil Da Internet*, ed. George Salomão Leite and Ronaldo Lemos (São Paulo: Atlas, 2014), 14.

140 Lessig, *The Future of Ideas*, 52:34–35.

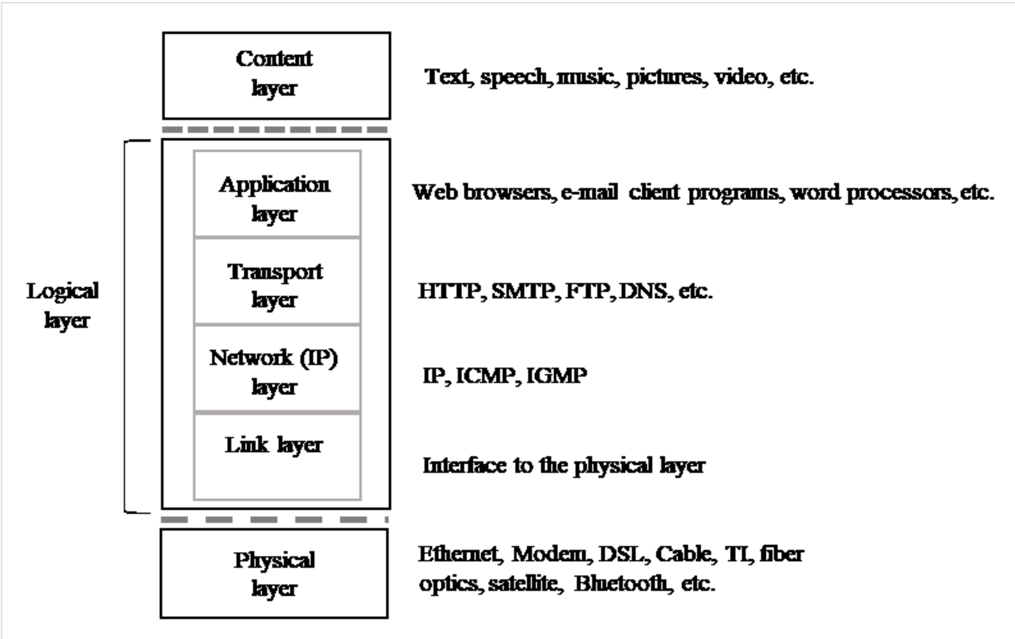
141 In 1989, the first version of the BGP routing protocol was formalized in the RFC 1105. BGP's current version, called BGP-4, has been in effect since 2006 and is documented in RFC 4271.

142 See Section 1.1.1. above.

1.2.2. The Internet's Layer-Crossing Model

The layered architecture of the internet can be illustrated by several models, including the four-layer model, developed by Tim Berners-Lee's, the OSI seven-layer model,[143] and the three-layer model, by Yochai Benkler.[144] Each model focuses on distinctive characteristics of the network, being the first mostly employed in the architecture of the web, the second, in the network design, and the last in the regulation of communications respectively. The three-layer model extends, generalizes, and abstracts the notion of layers, enabling the conceptualization of content, logical, and physical layers. At the bottom is a physical layer, in the middle a logical layer, and at the top a content layer. The logical or the code layer, as Lessig calls it, is a software layer that includes the TCP/IP protocol layers, application software, and services.[145] This idea is illustrated in Figure 8:

Figure 8 - Communication System the three-layer model



Source: Solum and Chung, The Layers Principle: Internet Architecture and the Law, p. 848,

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143 In 1979, the ISO Technical Committee concluded the Reference Model of Open Systems Interconnection, RM-OSI, according to which the internet had seven layers. In 19845, the ISO norm 7948 published the RM-OSI as an official standard.

144 Yochai Benkler, "From Consumers to Users: Shifting the Deeper Structures of Regulation Toward Sustainable Commons and User Access," *Federal Communications Law Journal* 52, no. 3 (2000): 562–63.

145 Ibid., 562.

The three-layer analysis builds upon and extends two fundamental insights that have been presented in the work of Lawrence Lessig.[146] The first is called the "code" theory, which means the notion that the architecture of the internet has profound implications for its legal regulation. The second is the end-to-end principle, as described above. Thus, the layers normative content is a superset of the normative content of the end-to-end principle. According to Benkler, in each one of these layers, we have seen the emergence of significant policy battles and decisions being made at each layer will impact the others.[147] Many authors have defended the use of the layer model in legislative and regulatory debates. by conceptualizing the policy as layers, the analyst is enabled to identify markets, clarify issues, create boundary regulations that are effective, and, in so doing, target solutions where issues reside without interfering with other industries and opportunities.[148]

However, it would be a massive mistake if one regulates the internet based on restricting and narrow views of each lawyer. Under the layers framework, each layer, directly and indirectly, affects the others. So, by targeting the physical layer, policy-makers may interfere with the content or logical layers. They may be aimed at blocking access to specific content, applications, and services, filtering specific data packets, bandwidth throttling, and traffic prioritization. Blocking access to specific content, applications and services may be put in place to comply with national legislation, may be used for security purposes, e.g., blocking ports to prevent spam or other harmful traffic, but also implemented to inhibit competing services. To this latter extent, some network operators have been inhibiting protocols exploited by competing services, such as VoIP, to preserve their business model. Blocking practices prevent communications without inspecting data packets, whereas filtering techniques imply that the content of communications must be inspected before being blocked.

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[146] Lawrence Lessig, *Code and Other Laws of Cyberspace*, 3rd ed. (Basic Books, 1999); Lessig, "The Law of the Horse: What Cyberlaw Might Teach."

[147] Yochai Benkler, *The Wealth of Networks. How Social Production Transforms Markets and Freedom* (New Haven and London: Yale University Press, 2006).

[148] Cannon, "The Legacy of the Federal Communications Commission's Computer Inquiries," 195; Lawrence B. Solum and Minn Chung, "The Layers Principle: Internet Architecture and the Law," *79 Notre Dame L. Rev.* 79 (2004): 815–948, https://doi.org/10.2139/ssrn.416263.

Filtering specific data packets aims at granularly analyzing internet traffic to identify specific content and apply a treatment, such as blocking, throttling or prioritization. Hence, this technique requires installing content inspection equipment so that internet traffic is analyzed when passing through the filtering equipment. This technique can be used to preserve network security and integrity, for instance filtering out spam or limiting the effect of malicious attacks, but may also be used for censorship purposes and has the potential to jeopardize the privacy of end-users' communications.

Bandwidth throttling is induced by operator downgrades of a specific type of internet traffic (e.g., all video traffic) or bandwidth-greedy applications (e.g., peer-to-peer) to limit the congestion, they generate. However, bandwidth throttling may also be exploited to reduce the quality of competing applications. Such technique may be applied temporary and exceptionally but can also be applied on a general basis, to discriminate against a specific type of traffic or applications, despite the existence of congestion.[149] Differently, from bandwidth throttling, traffic prioritization technique gives, preferential treatment to specific types of traffic, e.g., by prioritizing time-sensitive applications, such as VoIP, or to guarantee the quality of service of specific services. This latter case may happen when operators implement pay-for-priority schemes, allowing specific CAPs to purchase preferential treatment, or when operators deploy specialized services (such as IPTV or e-health services) with no separation from internet access services. It is important to note that the quality of the non-prioritized applications—or of the general internet access service, in case of non-separated specialized services—may be degraded, due to sharing resources.

Therefore, layer-crossing regulations shall intend regulatory actions based on a holistic approach to the network. Network neutrality debate, in its turn, benefits from the layer-crossing regulation approach, since its targets discriminatory traffic management practices that occur in each one of these layers and affect the way we experience the internet. Network neutrality debate reflects the notion of how internet protocols operate. Internet

[149] In practice, the content layer offers services, applications, and content provisioned by applications service providers, content providers, and a host of other players, all regulated by copyright and First Amendment provisions. The logical layer encompasses TCP/IP provisioned by ISPs who directly and intentionally benefit from the Computer Inquiry safeguards, as we will explore in Section 3.1.1. In turn, the physical layer's regulation resides in Title II and Title I of the Communications Act in the U.S. *See* Solum and Chung, "The Layers Principle: Internet Architecture and the Law."

traffic congestion can occur at or between any layer. Convergence and vertical integration have nudged the network away from its end-to-end, user-centric model to one designed to increase power control.

CHAPTER 2. INTERNET GOVERNANCE WARS: RISE AND FALL OF CONTROL POINTS AND GLOBAL PRESSURES

Globalization and the ICT technological revolution have significantly changed the instruments and strategies traditionally used by states to govern.[150] The international organizations and nation-states face the new challenge of adjusting to a world where "the economy has become global while the political order remains lashed to local and territorial government structures."[151] In this context, globalization can only happen if legal and institutional arrangements are in place to support it. A basic understanding of global governance principles and practices is necessary to create a better understanding of internet governance. Global governance is often called for to manage shared resources, coordinate cross-border actions, and promote and protect core values. Internet governance started initially at the technical and standards level through standards bodies. Subsequently, internet governance became more complicated due to increased globalization and commercialization of the internet, demanding additional governance mechanisms and forum.

For instance, internet policymaking has been the most controversial issue in supranational communication in recent years.[152] It refers to making regulations for the management of the domain name system, IP address allocation, management of the DNS, and ensuring access to the internet and internet security. Thus, the internet governance reflects the reality of the current coexistence of a state-centered system along with a system of powerful "multi-centered" transnational actors. It is a large, complex, and ambiguous topic.[153] This Chapter, historical in focus, addresses the power struggle in the global internet governance over the technical, institutional, and organizational systems of the internet.

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[150] Joseph S. Nye Jr., "The Regime Complex for Managing Global Cyber Activities," 2014, 9.

[151] Michèle Rioux and Kim Fontaine-Skronski, "Conceptualizing Institutional Changes in a World of Great Transformations: From the Old Telecommunications Regime to the New Global Internet Governance," in *Global Governance Facing Structural Changes: New Institutional Trajectories for Digital and Transnational Capitalism*, ed. Michèle Rioux and Kim Fontaine-Skronski (New York: Palgrave Macmillan, 2015), 59–78.

[152] Kennedy, "Law and the Political Economy of the World," 12.

[153] The term "governance" is used very heterogeneously by scholars in different disciplines and even geographic regions. A fair number of researchers, including many in the Internet governance field, use the

2.1. Approaches to Internet Governance

The very first attempts to institutionalize Internet governance in the mid-1990s already addressed the core issues that are still discussed today. The proposals by the "technical community" restricted the idea that the network could be self-regulated by its users, and particularly those with sufficient technical knowledge.[154] Internet governance was envisaged mostly as the technical issue of allocation of unique domain names and IP addresses. Other aspects were bound to be "determined, and coordinated, by contractual agreements between private interests."[155] However, the attempt to gather several stakeholders and to root the legitimacy of internet governance in the United Nations system has continuously influenced the debates in the following years. The proposed institutionalization of internet governance foresaw an overarching role for the International Telecommunication Union, the specialized agency which had been in charge of the regulation of most telecommunication networks since its creation in 1865.

The project of creating a new governance system backed by the ITU and located outside the US triggered strong reactions by U.S. internet entrepreneurs and by the U.S. administration.[156] The U.S. Department of Commerce started its process of consultations to design a private and bottom-up regulation system for internet domain names. This process explicitly excluded intergovernmental organizations and (other) national governments from the management of internet names and addresses. The creation of the Internet Corporation for Assigned Names and Numbers was the final step, but it is not put an end to the debates around the core questions of legitimacy and respective roles of the United States and the UN System in internet governance. In the following section, we will revisit the creation of ITU and ICANN and how their battles over in internet governance shifted to the multistakeholder approach.

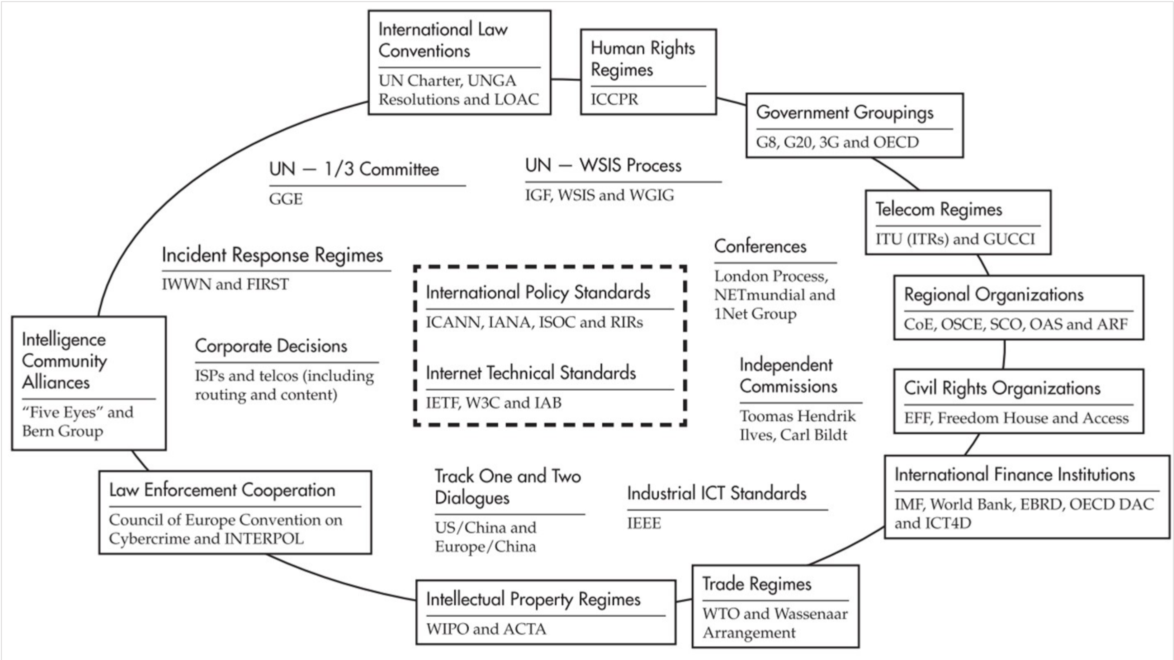
term to refer to nongovernment forms of coordination. However, this definition of Internet governance is simply too broad and ill-define.

[154] Leiner et al., "Brief History of the Internet 1997."

[155] Jon Postel, "Draft Specifications for Administration and Management of gTLDs," in *Internet Draft. Network Working Group, IETF*, 1996, 1–26.

[156] Mueller, *Ruling the Root: Internet Governance and the Taming of Cyberspace*.

Figure 9 - Global Internet Governance Community



Source: Joseph S. Nye Jr., "The Regime Complex for Managing Global Cyber Activities," in Who Runs the Internet? The Global Multi-Stakeholder Model of Internet Governance, ed. Global Commission on Internet Governance, 2016.

A wide variety of actors are involved in the process of governing and operating the internet. Specific technical standards related to IPs are set by consensus among the technical community involved in the non-governmental IETF, the W3C, and others. Their informal procedures eschew voting and are sometimes summarized as "rough consensus and running code." Country or regionally based network groups provide forums for internet network operators to discuss matters of mutual interest – the CGI.br is an example. There are various associations of ISPs, IXPs, CDNs, DNS and root zone operators. The ISOC with 96,000 members and 170 chapters around the world, engages in advocacy, capacity development, and related activities. At the national level, governments, as well as other stakeholders, also participate in discussions.[157] The increased internet governance forums resulted in both increased participation and "principle buying," where actors simply chose the principles they liked to justify their behavior.

[157] "UNCTAD Information Economy Report: Digitalization, Rrade and Development," 2017.

2.1.1. Models of Internet Governance

In 1996, John Perry Barlow published his "Declaration of Independence of Cyberspace," in which he defended the traditional state sovereignty, and therefore positive law established by countries, should not be applied to online acts. Against this argument, a series of studies emerged that pointed to the need to apply state rules also on the internet basing their arguments on the risks that the practice of certain acts could bring harm to society.[158] Since then, authors have argued that a new analytical framework was needed to satisfactorily understand the aspects of this new technology, culminating in the creation of new specific forms of regulations to address problems that previous regulation was not able to solve. For instance, when problems seem global, they require a global solution, whatever the tools to be deployed. However, the idea that a problem needs a "global solution" usually says more about the tools to be used and the jurisdiction to be held responsible than about the nature of the problem itself." [159]

Internet governance is not a single-issue area. Its governance encompasses a constellation of administrative and technical coordinating tasks necessary to keep the internet operational and to enact related public policy. In 2005, the UN-sponsored World Summit on the Information Society (WSIS) defined internet governance as "the development and application by governments, the private sector and civil society, in their respective roles, of shared principles, norms, rules, decision-making procedures, and programs that shape the evolution and use of the internet."[160] Therefore, internet governance institutions implicate questions of institutional design and normative frameworks. Even if the participants in the process have technical backgrounds, governments and firms are unlikely to allow internet governance to operate without a consideration of their interests when the stakes are high. In the next section, we describe five models of internet governance, following Lawrence

[158] Kennedy, *A World of Struggle*, 97.

[159] Laura DeNardis, "Five Destabilizing Trends in Internet Governance," *I/S: A Journal of Law and Policy* 12 (2015): 113.

[160] Abu Bhuiyan, "Global South and Supranational Internet Policymaking," in *Internet Governance and the Global South: Demand for a New Framework* (Palgrave Macmillan, 2014), 1-20-168.

Solum's ideal types of governance in relation to the interaction between internet architecture and conventional policy analysis.[161]

This section borrows from Lawrence Solum's work "Models of Internet Governance" and explore five models of internet governance. Five such models are analyzed. One model is based on a view of the internet as a self-governing realm of individual liberty beyond the reach of government control. Another model takes as its point of departure the inherently cross-border nature of the internet and sees transnational, quasi-private cooperatives or international organizations based on treaty arrangements as the most relevant institutions for internet governance. A third model is based on the notion that many regulatory decisions are made by the code and architecture of the internet. A fourth model is premised on the idea that as the internet grows in importance, fundamental regulatory decisions will be made by national governments through legal regulation. Finally, there is the model of market regulation and economics which assumes that market forces drive the fundamental decisions about the nature of the internet.

The Cyberspace and Spontaneous Ordering model considers the internet as a self-governing sphere, which is beyond the reach of government control. This model strongly associates the cyberspace as a separate space outside the reach of either national governments or market forces. David Johnson and David Post are the main contributors in designing and proposing this model.

> "Cyberspace requires a system of rules quite distinct from the laws that regulate physical, geographically-defined territories. Cyberspace challenges the law's traditional reliance on territorial borders; it is a 'space' bounded by screens and passwords rather than physical markers. Professors Johnson and Post illustrate how 'taking Cyberspace seriously' as a unique place can lead to the development of both clear rules for online transactions and effective legal institutions."[162]

[161] Lawrence B. Solum, "Models of Internet Governance," in *Internet Governance: Infrastructure and Institutions*, ed. Lee A Bygrave and Jon Bing (Oxford University Press, 2009).

[162] David R. Johnson and David G. Post, "Law and Borders: The Rise of Law in Cyberspace," *Stanford Law Review* 48, no. 5 (1996): 1367–1402.

When Johnson and Post wrote “Law and Borders: The Rise of Law in Cyberspace,” in the mid-1990s, the cyberspace vision may have seemed believable. However, today it is difficult to consider the cyberspace as a sort of “independent space.”. Governments and large multinational firms now have visible presences on the internet. On the other hand, there is a root of important truth in the model of cyberspace and spontaneous ordering. The architecture of the internet as opposed to purely national control. Because the internet is a global network of networks capable of transmitting any information that can be digitized, it would be costly for any national government to attempt to monitor all of the content on the internet inside its national boundaries. Monitoring telephone calls are much easier as compared to the interception of data on the internet because data are broken into packets and sent on different routes.

The internet governance goes beyond the limits of national borders. According to the Transnational Institutions and International Organizations model, the most appropriate institutions are transnational quasi-private cooperatives or international organizations based on treaty arrangements between national governments. Closely related to the idea that cyberspace is an independent space outside the control of national governments is the belief that the internet should be governed by specialized transnational institutions that are outside the control of national governments and instead answer to the ‘internet community’ or the ‘community of network engineers.’ This model has never established substantial authority to engage in internet governance.

In turn, the fundamental idea behind the Code and Internet Architecture model is the claim that the code determines the nature of internet or cyberspace. In this sense, the code is the prime regulator in cyberspace. In Lawrence Lessig’s famous phrasing, ‘the Code is Law,’ he points out that software or code has regulative effects on human behavior.[163] Following this framework, DeNardis argues that internet governance is “the administration and coordination of the technologies necessary to keep the internet operational and the enactment of substantive policy around these technologies.”[164] In this sense, he calls his the “turn to

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[163] Lawrence Lessig, *Code And Other Laws of Cyberspace: Version 2.0* (Basic Books, 2006), 6.

[164] World Summit on the Information Society, “Tunis Agenda for the Information Society, WSIS-05/TUNIS/DOC/6(Rev. 1)-E,” 2005, http://www.itu.int/wsis/docs2/tunis/off/6rev1.html. In this sense, DeNardis divides the governance ecosystem into six functions: the administration of critical Internet

infrastructure in Internet governance. (…) choosing to examine governance by Internet infrastructure, rather than governance of Internet infrastructure.”

Lessig has further argued that the primary characteristic of the internet architecture that enables innovation is the end-to-end principle.[165] The network should merely forward or route the data packets and cannot by architecture discriminate or differentiate traffic generated by different applications. The software at the transport and internet protocol layers just does not include code that would allow the internet to associate data packets with application file types. This characteristic is often referred to as transparent and non-discriminatory nature of the internet and is in the core of network neutrality debate.

The National Governments and Law model is based on the proposal that the importance of the internet related activities makes it necessary to regulate it on the same pattern and equal importance as other human activities are regulated. National regulation may prove successful where all of the parties to the regulated activity are within the physical territory of a particular country. Nonetheless, national regulation of the internet is expensive and unsuccessful when the object of regulation is either the architecture of the internet or content that originates outside of national boundaries. Thus, the said model cannot provide a complete solution to the problems of Internet governance

Lastly, the Market and Economics model attempt to describe the internet as markets for products and services. The economic approach to internet governance can be illustrated by returning to ICANN and its regulation of the DNS. At the heart of the DNS is the root directory of the part of the system that allows the creation and utilization of top-level domains. In the economic sense, we may consider root service in short supply. In an economic sense, the root is a limited resource for two separate and independent reasons. First, the root server system itself is economically scarce. Second, the namespace is economically limited. If either of these assumptions is true, then root service is a limited resource from the economic point of view.

resources such as names and numbers; the establishment of Internet technical standards (e.g. TCP/IP, HTTP); access and interconnection coordination; cybersecurity governance; the policy role of private information intermediaries; and architecture-based enforcement.

[165] Section 1.2. above addresses the internet architecture and the end-to-end principle.

Nonetheless, no single model provides the solution to all the problems that internet regulation can address. As Solum affirms, "the best models of Internet governance are hybrids that incorporate some elements from all five models. Internet governance is a complex task requiring a complex set of regulatory mechanisms. As a result, the optimal system of governance is a combination of regulation by transnational institutions, respect for the architecture that creates transparency, national regulation, and markets."[166]

2.1.2. Major Internet Governance Actors: ITU and ICANN

The International Telecommunication Union, originally named the International Telegraph Union, was founded in 1865, in Paris, and is the world's longest surviving intergovernmental organization. It had been formed to resolve difficulties arising when national telegraph systems using incompatible protocols and equipment attempted to connect across national borders.[167] In 1947, the ITU became a specialized United Nations intergovernmental agency, codifying a system whereby governments collaborate to ensure a reliable and accessible system of international ICTs. The ITU's membership includes sector members and governments, which are the only ones that have full membership and voting rights.[168]

The traditional international telecommunications regime had its head at the ITU. By the time the internet appeared, the ITU understanding of telecommunications was based on confined sectors that include information technologies, broadcasting, and the telephony over fixed-line networks (the so-called "silos") and the traditional approach of international law grounded on national systems. Telecommunications bodies had a clear division of labor between actors, ministries, and agencies, at both national and international levels, and its

[166] Solum, "Models of Internet Governance," 87.

[167] Powers and Jablonski, *The Real Cyber War: The Political Economy of Internet Freedom*.

[168] Today, ITU claims membership of 193 countries and more than seven hundred private-sector entities. Although sector members are not allowed to vote, the majority of ITU decisions are made at the level of the committee and do not require formal voting by all member states. Available at https://www.itu.int/en/membership/Pages/default.aspx. Accessed on 10 December 2017.

market was considered a natural monopoly.[169,170] The ITU favored national monopolistic structures linked to it by national interstate cooperation based on monopolistic principles of sovereignty and organization in this sector. [171] In the 1970s, debates around the efficiency of the monopolistic system raged, and the United States decided to allow competition in the sector monopolized by the private company AT&T and the Bell System. Many decisions followed to liberalize services until basic telecommunications were liberalized in 1996. While governance in silos was still effective on paper, it was facing increasing challenges because of media convergence and the blurring of traditional boundaries and barriers, from which old ways of regulating were developed.

In 1994, ITU organized the World Telecommunication Development Conference, and the United States presented the Global Information Infrastructure project, later known as the Global Information Society (GIS). In this occasion, the information society ceased to be a technical-scientific term to be introduced into global policies, creating standards, and uniting the most diverse concepts related to ICTs. With the liberalization, international pressures started to promote a new governance model that contradicted the letter and spirit of the ITU-centered international telecommunications regime. Given the history of U.S. dominance in the ITU and the robust presence of its private sector in its decision-making processes, one would assume the government's support for a renewed ITU mandate. This, however, was not the case. The United States adopted the strategy of "forum shifting,"

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[169] In the economic jargon, industries with high fixed costs and low marginal costs that lead to large scale economies are said to be a "natural monopoly." In that context, because a single firm can serve the whole market with lower overall costs per customer than could multiple firms, the market is heavily regulated to ensure exclusive rights that ensures the existence of a monopoly company. *See* Nuechterlein and Weiser, *Digital Crossroads: American Telecommunications Policy in the Internet Age*.

[170] As Richard Posner once explained, in describing a similar phenomenon in the cable television business: "You can start with a competitive free-for-all—different cable television systems frantically building out their grids and signing up subscribers in an effort to bring down their average costs faster than their rivals—but eventually there will be only a single company, because until a company serves the whole market it will have an incentive to keep expanding in order to lower its average costs. In the interim, there may be wasteful duplication of facilities. This duplication may lead not only to higher prices to cable television subscribers, at least in the short run, but also to higher costs to other users of the public ways, who must compete with the cable television companies for access to them. An alternative procedure is to pick the most efficient competitor at the outset, give him a monopoly, and extract from him in exchange a commitment to provide reasonable service at reasonable rates." *In* Richard A. Posner, "Taxation by Regulation," *Bell Journal of Economics and Management Science* 2, no. 1 (1971): 22–50.

[171] Rioux and Kim Fontaine-Skronski, "Conceptualizing Institutional Changes in a World of Great Transformations: From the Old Telecommunications Regime to the New Global Internet Governance," 65.

entering into successive agreements with the North American Free Trade Agreement (NAFTA), and the Agreement on Basic Telecommunications at the WTO in 1997.

During the 1900s, the ITU faced three shifts. Monopolies under the strong public regulation became competitive markets, national boundaries of telecommunication technologies expanded with the exponential development of the internet, and traditional international regime gave place to global governance of transnational and global networks. Traditionally treated as separate industries falling under different regulatory regimes, the telecommunications and audiovisual sectors increasingly started to converge into one single communications sectors. The result was new, overlapping sites of governance and the institutional complexity resulting from the converging of regulatory schemes.

Since then ITU and ICANN have fought a long battle for the control over the internet. ITU's strategy included the WSIS, which provided for a hybrid solution involving a process of multistakeholderism within the logic of intergovernmentalism. The central question was how actors, old and new, could advance their interests within the emerging institutional trajectories. How they could shape the new models of governance in the face of the significant challenges that lay ahead as these new models emerged from the confrontation between actors resistant to change and policymakers facing new power struggles. It was the end of the Westphalian system and its replacement by global transnational networks that required new sets of institutions and rules.[172]

The United States started to promote a new model of governance by delegating policy authority over the DNS and the root server system to the ICANN.[173] The ICANN is a public-private partnership that was established on 18 September 1998, as a nonprofit, private corporation under the law of the U.S. State of Californian with responsibilities over critical internet management functions[174]. Among its primary objectives are preserving the

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[172] Michèle Rioux and Kim Fontaine-Skronski, eds., *Global Governance Facing Structural Changes. New Institutional Trajectories for Digital and Transnational Capitalism* (Palgrave Macmillan, 2015).

[173] Manuel Castells, *The Rise of the Network Society: The Information Age: Economy, Society, and Culture* (Wiley, 2011), 84.

[174] ICANN's Board of Directors had nine representatives from the private sector and the technical-scientific community and nine representatives from internet users and civil society in general on the ICANN institutional chart. UN member countries meet on a Governmental Advisory Committee (GAC) to the Board.

operational stability of the internet; promoting competition; achieving broad representation of the global internet community; and developing policies appropriate to its mission through bottom-up, consensus-based processes. ICANN manages the allocation of IP addresses, assignment of protocol identifiers, the assignment of generic (gTLD) and country code (ccTLD) top-level domain names, and management of the root-server system. The root zone file is the database that allows the internet to function, acting as a global address book for data, containing an authoritative list of the names and IP addresses of all top-level domains.

The ICANN has been in the spotlight for its special relationship with the U.S. Department of Commerce. Through its creation, the United States constituted its own transnational and global regime governed by multistakeholderism.[175] Many discussions about technical, institutional, and legitimating problems gave the entity the reputation of a "governance without government." For instance, ICANN is a multi-stakeholder body that operates at the international level. The five Regional Internet Registries (RIR) manage the distribution of number identifiers allocated by the IANA. ICANN possessed the "master switch," called the root file. It developed, published, and enforced rules regarding the management of internet domain names and addresses. Its IANA subdivision exercised operational control over those resources, while a third U.S. company, VeriSign, operated the root file itself, although all changes had to be approved by the National Telecommunications and Information Agency (NTIA) in the Department of Commerce.

The IANA functions are a set of different technical tasks that are foundational for the operation of the internet, functions over which the U.S. government currently maintains an oversight or stewardship role.[176] At their base, the IANA functions are a set of activities that offer a coordination service for the upper-most level Internet identifiers. These functions work to ensure the secure, stable, and reliable allocation, assignment, and distribution of those identifiers, their uniqueness concerning a clear identifier space, and the recording of to whom and for what purpose they are assigned. One of these vital stewardship functions is the oversight of changes to the authoritative root zone file.

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[175] Mueller, *Ruling the Root: Internet Governance and the Taming of Cyberspace*.

[176] Initially, the IANA functions were performed under a contract between an agency of the US government and the University of Southern California (USC), as part of a major research project.

2.2. The Internet Governance Wars

The 1998 ITU plenipotentiary organized two World Summit on the Information Society meetings to discuss issues resulting from diverse abilities of countries to acquire and use communication technologies, particularly the internet. The first meeting took place in Geneva, in 2003, and became a forum criticizing the U.S. domination of ICANN. The criticism continued at Tunis, in 2005. Developing countries complained about the perceived loss of sovereignty as a result of a private corporation making decisions that controlled the operation of communication technology within a country. The choice of meeting sites reflected a growing understanding that a divide existed between the global North and the global South. ITU framed the meetings as technical discussions of issues such as network connectivity and the effect of new technologies, but the agenda broadened to consider human rights and cultural issues in 2001 when UNESCO joined.

2.2.1. The UN World Summit on the Information Society (WSIS) and the Internet Governance Forum (IGF)

WSIS faced two significant challenges: the transnationalities process and media convergence. The transnationalization process challenged the traditional separation between national and international issues, which undermine sovereignty principle and interdependence relationships. The media convergence and the new functional regulation, which substitutes the regulation in silos, blurred frontiers separating governance and regulation. In 2003 and 2005, WSIS fomented the institutional framework for the emergence of the multisectoral governance. The WSIS 2005 defined the internet governance as "the development and application of principles, norms, rules and decision-making procedures that shape the evolution and use of the internet by governments, the private sector, and civil society, within the framework of their skills.

WSIS advocated for a governance model that prioritizes multilateral, transparent and democratic participation, involving the full involvement of governments, the private sector, civil society and international organizations. Internet governance also should ensure a fair distribution of resources, facilitate access for all and ensure a stable and secure functioning of the internet, considering multilingualism. Governance, in the digital age, was no longer restricted to market regulation nor international cooperation for managing interdependence or between national systems. It has encompassed market integration or interconnection processes as well as transnational network coordination and bottom-up, transparent, and consensus-driven processes would lead the way from now on. The WSIS I formed the Working Group on Internet Governance (WGIG) to prepare recommendations for the Tunis meeting. WSIS II was inconclusive: it did not formally adopt the model urged by the United States, but it did not reject it either.

As a result of the discussions of the two WSIS, in 2006, the United Nations announced the establishment of the Internet Governance Forum (IGF) with the mission of bringing together stakeholders interested in the subject and documenting the consensus and dissent among them to guide the decisions taken by organizations at multiple levels. The IGF is based on the Art.19 of the U.N. Universal Declaration of Human Rights, that states "[e]veryone has the right to freedom of opinion and expression; this right includes freedom to hold opinions without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers."[177] Since 2006, IGF has become the place for debate on the principles of internet governance. By the early 2010s, there were over twenty-five different documents with principles about internet management. All of them are non-mandatory because the IGF has no decision-making power. Some see this lack of power as beneficial since it allows participants to discuss and network at the IGF in a low-pressure environment. However, the absence of any recommendation or standards makes the IGF a "just talk" approach with no real impact.

In 2013, the IGF approved the Dynamic Coalition on Network Neutrality, an open and multi-stakeholder group, which was created to foster a cooperative analysis of network neutrality debate and promote the elaboration of policy suggestions related to critical elements of Internet governance.[178] In 2015, the U.N. IGF Dynamic Coalition on Network Neutrality produced a policy statement on network neutrality, based on its model framework, that may be used as supporting material for policy-making and (self) regulatory efforts.

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[177] The Universal Declaration of Human Rights.

[178] Dynamic Coalitions represent a structural element of the IGF as foreseen by the Tunis Agenda for the Information Society. *In* Luca Belli and Primavera De Filippi, eds., *Net Neutrality Compendium: Human Rights, Free Competition and the Future of the Internet* (Springer, 2016).

According to it, "network neutrality is the principle according to which Internet traffic is treated without unreasonable discrimination, restriction or interference regardless of its sender, recipient, type or content."[179] The Preamble of the Policy Statement states as follow.

> a) The Internet should be open, secure and accessible to all people.
> b) Network Neutrality plays an instrumental role in preserving Internet openness; fostering the enjoyment of Internet users' human rights; promoting competition and equality of opportunity; safeguarding the generative peer-to-peer nature of the Internet; and spreading the benefits of the Internet to all people.
> c) Managing Internet traffic in a transparent and non-discriminatory manner compatible with the Network Neutrality Principle serves the interests of the public by preserving a level playing field with minimal barriers to entry and by providing equal opportunity for the invention and development of new applications, services and business models.
> d) Competition among broadband networks, technologies and all players of the Internet ecosystem is essential to ensure the openness of the Internet.
> e) All individuals and stakeholders should have the possibility to participate in the elaboration of any Network Neutrality regulatory instrument. Network Neutrality regulatory instruments should, at a minimum, provide the following safeguards.[180]

Based on a human rights approach, the Coalition proposes a general rule of non-discriminatory treatment with exceptions to preserve security and integrity, mitigate effects of temporary and exceptional congestion, and prioritize emergency services. Regarding congestion, it makes clear that first protocol-agnostic, then protocol-specific measures shall be implemented.[181] In 2016, the U.N. IGF Dynamic Coalition on Network Neutrality dedicated the annual session to the discussion of "zero-rating" practices related to network neutrality and, more specifically, the effects that such practices may have on end-user

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[179] Ibid, 295.

[180] Ibid.

[181] According to Barbara van Schewick, "[a]n application-blind network is unable to distinguish among the applications on the network, and, as a result, it is unable to make distinctions among data packets based on this information. Unlike an application-blind network, an application-agnostic network may have information about the applications on the network, but, like an application-blind network, it does not make distinctions among data packets based on this information. (…) Thus, from a policy perspective, the focus on application agnosticism balances the public interest in protecting users and application providers from interference from network providers on the one hand and the needs of network providers on the other hand." *In* Barbara van Schewick, "Network Neutrality and Quality of Service: What a Nondiscrimination Rule Should Look Like," *Stanford Law Review* 67 (2015), 25.

control, competition, consumer protection, innovation and free expression. Far from a consensus. the Coalition concluded “zero-rating” practices remain highly debatable and a case-by-case approach might be beneficial.

2.2.2. Global Multistakeholder Meeting on the Future of Internet Governance (NetMundial)

Many efforts had been put to reach an agreement on how to globalize and multissetorialize the process of forming principles for internet governance. With the considerable scandal involving mass surveillance by the U.S. government revealed by Edward Snowden, a temporary middle-agreement was reached in 2014, the Global Multistakeholder Meeting on the Future of Internet Governance (NetMundial). The NetMundial meeting, held in Brazil, brought together governments, the private sector, civil society, technical community, and academia. It was led by ICANN, the CGI.br, and the World Economic Forum (WEF), not act as a policy-making body, but to complement and support existing internet governance dialogue, processes, and institutions, including the IGF and the global internet technical community (such as IEEE, W3C, IETF and others). In the end, the NetMundial Initiative was more of the same: a set of core principles for network governance to guide the building of an internet governance ecosystem. Interesting to note that, although not officially part of NetMundial but a topic of discussion at the meeting, President Dilma Rousseff signed the BCR in the opening session. The Framework codified the internet governance principles into law in Brazil, including the principle of network neutrality.

The NetMundial Initiative received may criticism or its lack of transparency, bottom-up inclusion, and consultation. It called for governance based on democratic, multi-stakeholder processes, but in practice, it was a centralized, top-down approach. Also, suspicion arose about ICANN, currently in charge of the technical issues of naming and numbering (DNS), has an agenda regarding the establishment of an institutional framework for broader internet public policy issues equivalent to the IGF. The Initiative ran into trouble when it was revealed that the three lead organizers, ICANN, CGI.br and the WEF, had decided to award themselves permanent seats on the member council. Many internet organizations rejected the Initiative and added concern over the disproportionate involvement of powerful private actors via WEF[182]. Just before the deadline, both ICANN and the WEF withdraw from the project, and it ended. The NetMundial incident exposes the hidden perils of multistakeholderism.[183]

Regarding network neutrality, the NetMundial Multistakeholder Statement identified it as an issue to be better understood and further discussed in appropriate fora. According to the Statement, "[T]here were very productive and important discussions about the issue of network neutrality at NETmundial, with diverging views as to whether or not to include the specific term as a principle in the outcomes. The principles do include concepts of an Open Internet and individual rights to freedom of expression and information. It is important that we continue the discussion of the Open Internet including how to enable freedom of expression, competition, consumer choice, meaningful transparency and appropriate network management and recommend that this is addressed at forums such as the next IGF."[184] Therefore, the NetMundial also reinforced its failure on the discussion about network neutrality.

2.3. Origins of Information Freedom and the Promotion of U.S. Interests

Concern over the U.S. hegemony set up the debate over whether ITU and ICANN should govern operations on the internet. However, the conflict is not between these organizations. The debate is over policy. U.S. policy argues that the network governance should be privatized, ideally by ICANN, which the United States dominates. Participation by national governments in ICANN is restricted; nations seeking greater equity in telecommunications policymaking, therefore, favor ITU. In this sense, the ICANN creation shaped an appearance of international cooperation in the governance of the internet while reserving to the United States ultimate authority. Even if we cannot predict the nature of the

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[182] The adoption of multi-stakeholder processes has been slow because many governments and intergovernmental bodies do not feel comfortable with the growing influence of specific stakeholders, viewing them as unelected representatives who lack legitimacy.

[183] Julia Pohle, "Multistakeholderism Unmasked: How the NetMundial Initiative Shifts Battlegrounds in Internet Governance," 2015, http://blogs.lse.ac.uk/mediapolicyproject/2015/01/15/multistakeholderism-unmasked-how-the-netmundial-initiative-shifts-battlegrounds-in-internet-governance/.

[184] NETmundial, "NETmundial Multistakeholder Statement," *Global Multistakeholder Meeting on the Future of Internet Governance*, 2014, 12.

governance structures that will evolve in next years, we can be sure the U.S. information policy will continue to have a profound effect on them and, ultimately, on the ability of people to access information online.

Here, we revisit how the U.S. government shaped the international norms governing information technologies and flowed for its geopolitical gain. Far from a systematic history of the U.S. information policies, we aim to describe a trend of using telecommunications laws and information-technology related exports to promote U.S. political, economic interests around the world. Central to each example is the view of information as something apolitical, culturally neutral, and able to be bought and sold as part of the global exchange of goods and services. By normalizing information as a commodity, the United States sought to expand markets for its products, including content, software, and hardware. By placing information into the realm of free trade and open markets, the United States was more able to export U.S.-centric media freedoms, regulations, technologies, programming, and infrastructure, enhancing its global influence. Most of the twentieth century, demonstrating a consistent pattern of utilizing a narrative of the freedom of information to bypass state boundaries and sovereignty.[185]

2.3.1. The WTO, GATT, and the Commodification of Information

As presented, the WSIS reflected long-standing dissension about the governance of telecommunications. Dissonance within ITU motivated the United States to seek alternative policies regarding telecommunications. The United States began treating information as a resource that could be governed by trade agreements. In 1947, the United States sought simultaneous execution of bilateral agreements among multiple countries to counter trade preferences extended by Britain. The resulting accord, later called the General Agreement on Tariffs and Trade (GATT), reduced trade barriers and abolished preferences among twenty-three signatories. Unlike ITU, where the possibility of a formal vote influences

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[185] Powers and Jablonski, *The Real Cyber War: The Political Economy of Internet Freedom*, 22.

negotiations, GATT established the "most favored nation" and reached decisions by consensus instead of majority votes.[186]

The United States favored the WTO over the ITU because the United States could exploit structural differences. Telecommunications infrastructure investment by developing countries, often encouraged by the United States, inflated the number of smaller countries belonging to the organization. ITU regulations mandate that each member is treated as an equal, with each casting one vote on all issues. As a result, developing countries exercise more power as a group than do developed countries. The Uruguay Round of trade negotiations that began in 1986 created the WTO as the administrative agency for an expanded GATT as well as a newly developed General Agreement on Trade in Services (GATS). GATS reduced barriers interfering with commercial services just as GATT had done with merchandise. The WTO was created to facilitate free markets across the world. WTO negotiations proceed when one country gives a concession in one area and receives a reciprocal concession from another country in another area.

After the establishment of the WTO, the United States suggested exempting telecommunications from "most-favored-nation" status to allow bilateral negotiation of telecommunication agreements. Since a bilateral agreement would not automatically extend reciprocal benefits to all signatories, U.S. multinationals could operate in a country with which the United States had agreed without fear of a foreign multinational setting up shop on equal terms in the United States. Negotiations over the proposed Telecommunications Annex to GATS broke down as the United States continued to resist the application of most-favored-nation treatment to telecommunications services. WTO members finally concluded a basic agreement in 1997 that subjected telecommunications to GATS market-access regulations.[187] The terms of the agreement were interpreted differently by the United States

[186] Ibid., 43.

[187] The WTO was successful in reaching an agreement on basic telecommunication. Sixty-nine countries signed a WTO telecommunication agreement in 1997 to liberalize their telecommunication markets to facilitate international trade in telecommunication, with more countries joining later. This agreement, popularly known as the WTO Telecommunication Agreement, established a framework for multilateral trade in telecommunication services.

than by other countries, in that the United States took a very restrictive stance on what constituted "basic" telecommunications services.[188]

Trade negotiations with Mexico and Canada that resulted in the NAFTA included access to data provisions that rewarded large, private networks transcending international borders. Giant transnational corporations could operate in any of the three countries with minimal regulation by any of them. NAFTA effectively established a telecommunications trade protocol independent of rules governing the rest of the world.[189] This was not the first time the United States maneuvered to insulate its market from global regulation. In 1973, the United States signed agreements adopted by the rest of the world at the 1952 ITU Plenipotentiary meeting and specifically excluded provisions controlling telephone and telegraph connection with Mexico and Canada.

At the outset, the truth is that there is nothing natural about neoliberal globalization. It requires extensive changes in government policies and an increased role for the state to encourage and protect certain types of activities. The massive and complex negotiations surrounding NAFTA and the WTO provide some idea of how unnatural and artificially constructed the global neoliberal economy is.[190] While the application of trade policy to international communication embodies the shift toward treating information as a commodity, the United States continued to play the WTO against the ITU, and multinational agreements like NAFTA against all.

2.3.2. Leading and Lagging Countries Battles for International Communication

Governance wars are about legitimizing existing institutions and norms governing internet industries to assure the U.S. continued market dominance and profitability. Today's international communication system requires the transfer of wealth from lagging to leading countries and sectors and multistakeholder institutions that reflect dominant political and

[188] Powers and Jablonski, 57.

[189] Ibid., 55.

[190] Robert W. McChesney and Dan Schiller, "The Political Economy of International Communications," *Technology, Business and Society Paper Number 11*, no. 11 (2003): 33.

economic interests to legitimize arrangements benefiting powerful, established actors like the United States and its robust ICT private sector.

The World Bank controlled countries where it did business both by requiring deregulation reforms and by increasing the indebtedness of the customer country in the global south.[191] Bank operations tended to benefit the United States, such as when loan conditions opened markets. The U.S. ventures to build up underdeveloped countries constituted a policy of creating new markets for U.S. products and services. Development policies imported by lagging countries promoted U.S. interests, although the rhetoric surrounding it channeled the modernization paradigm, framing access issues regarding freedom to communicate and the right to expression. The economic need for global communications became intertwined with the motto that free flow of information enhanced freedom and democracy around the world.

U.S. private sector framed obstructions to information flow as trade barriers; developing countries limited data access to safeguard various national interests such as privacy but also political stability or censorship. As countries discovered that infrastructure development using U.S. or World Bank money increased economic dependency, they began to believe that sharing information exacerbated the problem. It is part of a century-long battle between North and South over "terms of trade." Developing countries favored ITU, where they exercised more influence than at ICANN, for the governance role. The United States opposition to any dilution of its power guaranteed that few changes would be made. Its "one state, one vote" governance regime, as opposed to the existing multistakeholder model, offers a potential check on the private sector's ability to influence governance.

The World Bank, ITU, and WTO have been the key international bodies to spearhead telecommunications neoliberalism. The World Bank established telecommunications deregulation as a development priority, the WTO Telecom Agreement enlisted specific commitments from many states for deregulation, and the ITU promoted deregulation by placing an increased weight on the opinion of business in telecommunication policymaking. The global south has "neoliberalized" its telecommunication sectors as a part of the

[191] Bhuiyan, "Global South and Supranational Internet Policymaking," 33.

commitments to the WTO. Although the degree of neoliberalization varies among the states, the typical features of this process include privatization of the state-owned telecommunication carrier, liberalization of the market to allow additional companies to provide telecommunication services, and creation of a separate regulator for telecommunication. Although the global south opposed unilateral U.S. control of internet policymaking, it did not challenge the ideological foundation of U.S. power over the internet, that is, the doctrine of neoliberalism.

For instance, Brazil privatized its state-owned telecommunication carrier, Telebras, opened its market to new local and foreign companies, and created a new regulatory body, ANATEL, in the 1990s. The Brazilian government broke Telebras into pieces for privatization. It sold Telebras' long-distance arm, Embratel, to MCI, merged its local units in sixteen states into a single company, called "Telemar," and sold the company to local conglomerates. The World Bank estimates Brazil as the top recipient of telecommunication foreign direct investment with 51 billion U.S. dollars during the period between 1990 and 2003. The perverse effects of deregulation and privatization in Brazil, including dependency and increased inequality, are still to be solved. [192]

Accessing international bandwidth constitutes a significant bottleneck for internet development in the developing countries. Connections established between many developed countries, where most of the internet's content is hosted, have established private-sector arrangements, such as peering agreements, that allow for a mutual and free transfer of data. Developing countries, however, continue to pay the full cost of the interconnection links and ports for the access to this network while operators in developed countries use these facilities for carrying their traffic without paying anything in return. From this perspective, ISPs and users in the developing world are in effect subsidizing the maintenance and growth of the global, Western-owned internet backbone. Increasingly, the twenty-first century is looking like the twentieth, as monopoly service providers are allowed to dictate the cost, terms, and range of services provided. As a result, the extraction of abnormal profits from consumption

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[192] For more information about the Brazilian telecommunications privatization, see Chapter 4.

is expanded.[193] In the internet governance realm, some are too big to fail and others too small to count.[194] Therefore, too often internet governance operates as an unsatisfying cover for economic dominance and political dysfunction. In this sense, the application of general international law, behind a unified façade, is, in practice, dependent on the affiliation of legal subjects to a certain category of states or nations, with the result that some nations in practice are less equal than others, resulting in massive inclusive or exclusionary implications in a seemingly universalized legal practice.[195]

An examination of the development of network neutrality debate is revealing of the manner in which neoliberalism renews and reconstitutes itself. Network neutrality debate is an example of how information can be considered as something apolitical, culturally neutral, able to be bought and sold as part of the global exchange of goods and services. As stated by Edmunds and Wollenberg, "powerful groups often manipulate seemingly neutral terms that are quickly agreed to in meetings, but then are used in ways that meet each stakeholders' own needs."[196] Under the mask of neutrality, consensus building, and multistakeholderism established groups can further their strategic interests. In network neutrality debate, the internet-freedom narrative is used to legitimize the U.S. geo-strategic vision of the internet and the neoliberal project.

2.3.3. The Multistakeholder Myth

This section focused on the current and historical efforts of established actors with clear-cut economic interests in maintaining existing regulatory ambiguity, favoring large, dominant actors, all through the language of supporting a multistakeholder process predicated on the promise of global economic growth. The term "multistakeholderism" refers to the coordination of private-sector and nonprofit actors with government authorities

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193 Calixto Salomão Filho, *A Legal Theory of Economic Power: Implications for Social and Economic Development* (Edgar Elgar, 2011), 15.

194 Kennedy, "Law and the Political Economy of the World."

195 Martti Koskenniemi, *The Gentle Civilizer of Nations: The Rise and Fall of International Law 1870-1960* (Oxford University Press, 2001).

196 David Edmunds and Eva Wollenberg, "Disadvantaged Groups in Multistakeholder Negotiations," *CIFOR Programme Report*, no. June (2002): 28.

and has become central to debates over internet governance since 2003 when the term emerged during WSIS and was formalized in the 2005 Tunis Agenda. The United States, in particular, has adopted the discourse of multistakeholderism as its starting point for any discussion over internet governance.

The multistakeholderism is grounded in a Habermasian conception of rational, ethical, public arguments among interested parties as a means of resolving legitimate ideational differences. It presumes that strategic actors, in the right setting and by embracing shared norms, can disregard their political motivations and pressures to deliberate, listen, adjust perspectives, and come into an agreement regarding a matter of public concern. However, this model is just a theoretical construct. Minority groups often criticize Habermasian approaches as being elitist and exclusionary, failing to account appropriately for disenfranchised stakeholders unable to participate

Edmunds and Wollenberg observe that "multistakeholder negotiations mask abuses of power and more structural, enduring inequity. In doing so, they are prone to exaggerate the level of consensus reached through negotiations and exposed disadvantaged groups to greater manipulation and control by more powerful stakeholders."[197] In fact, powerful actors are likely to use the veil of consensus "to mask continuing differences in perspective and discount the input of disadvantaged groups."[198] Moreover, the multistakeholder approach also fails to guarantee information and transparency. An ideal negotiation process requires the full disclosure of information by all parties involved, a condition that is not met in the multistakeholder governance. For example, one could argue that the open, deliberative nature of debates over the encryption online enabled the U.S. National Security Agency to weaken international security standards and, eventually, crack the encryption altogether.[199]

ICANN's emergence as the central actor in modern internet governance, which was supported by narratives of privatization and self-regulation, and avoidance of alleged potential heavy-handed, top-down, bureaucratic international control, offers a cautionary

[197] Edmunds and Wollenberg, 24.
[198] Ibid., 25.
[199] Powers and Jablonski, *The Real Cyber War: The Political Economy of Internet Freedom*.

tale about the language of multistakeholderism. According to Mueller, the "self-regulatory regime" being constructed by ICANN is far more centralized and controlling in nature than the pre-ICANN internet.[200] In 2016, the multistakeholder approach received a new ally. The contract between ICANN and the U.S. government has officially expired and marked the transition of the coordination and management of DNS to the private-sector, demonstrating the U.S. support for the multi-stakeholder model of internet governance.

By incentivizing inclusion and consensus, multistakeholder approaches risk stifling legitimate dissent from external actors who have no interest in lending legitimacy to the facade of an apolitical negotiation. Participation, thus, creates legitimacy, even in the absence of actionable mechanisms of accountability. Over time, ICANN, ISOC, IETF, and other multistakeholder organizations have provided legitimacy for a process that has allowed continued U.S. control over the many critical aspects of the internet.[201] When the existing internet governance institutions were challenged by developing countries – which have proposed shifting international policy responses to ITU – the United States and other stakeholders deeply invested in the *status quo* processes labeled the alternatives disparagingly as trying to "take over the internet" and "placing the internet under the control of non-democratic countries."

Until recently, most controversies about internet governance were the result of a dichotomy between the "traditional" proponents of regulation through intergovernmental authority and those of an "open and democratic" multistakeholder approach, considered the hypothetical middle ground between a free-market model, a cyberlibertarian idea of self-regulation and the classical governmental approach. This simplistic and dichotomic approach rarely reveal that most implementations of the multistakeholder approach are far from open and democratic. A new myth has emerged: the "bottom-up, transparent, and

[200] Mueller, *Networks and States*.

[201] For more about the relationship between legitimacy and expertise *see* Olivier Sylvain, "Internet Governance and Democratic Legitimacy," *Federal Communications Law Journal* 33 (2010): 96–107; Olivier Sylvain, "Legitimacy and Expertise in Global Internet Governance," *Colo. Tech. L. J.* 13:1, no. 2010 (2014): 31–44.

consensus-driven processes" would mask many interests from now on. Although the internet dissolves many borders, it is naive to think it is not deeply rooted in power struggles.

Today, we are in the middle of the internet governance wars, a transformation process that will define who controls the internet. How actors will adjust their policies and strategies will not only shape our institutions, but it will also distribute gains and losses across a broad spectrum of actors, institutions, and interests. In fact, while multistakeholderism may have so far allowed various non-state actors to participate in internet governance processes, it does not necessarily lead to a broader range of views or a more global representation of interests and concerns. In several instances, a multistakeholder approach for internet governance neglects the emblematic specificities and structures of developing countries. We are experiencing a new wave of international pressure, this time through internet governance actors, to implement "one-size-fits-all" measures and overcome a problem that is completely detached from poor countries realities. If we take history seriously, this kind of pressures is not a novel problem. In the 1990s, during the hegemony period of liberalization, Latin American countries were adopted pro-market reforms, influenced by the neoliberal "myths," which became known as the "Washington Consensus." The results were disastrous.

CHAPTER 3. NETWORK NEUTRALITY IN THE UNITED STATES: PAST AND PRESENT

The history of network neutrality debate as an argument, taken as the object of analysis in its unicity, provides the key to understand its development. Several vital struggles preceded the emergence of network neutrality concept. The U.S. discussion of network neutrality focuses on competition and protection of the internet access that the U.S. population currently enjoys. The FCC Open Internet disputes are the latest iteration of an old debate regarding "common carriage" obligations aboard telecommunications infrastructure. What is now called "network neutrality" is a restatement of a classic question: how should a network's owner treat the traffic it carries?

Here, we explore some facets related to this question in a historical perspective of the U.S. regulatory environment. First, the *Computer Inquiries*, which provided the regulatory foundation for the operations of networks, and the *Telecommunications Act of 1996*, as a new set of policy focused on opening the market competition. Second, we revisit the open access battle as network neutrality prelude and the shift from openness to neutrality, which also swang attention from structural to behavior solutions. Third, we analyze the FCC Open Internet Orders, as well as the 2017 FCC Restoring and Preserving the Internet Freedom. Lastly, we investigate the internet access market structure in the United States, the digital exclusion, and the economic power concentration trend of the last decades.

3.1. Early Communications Law and Policy in the U.S.

Network neutrality debate has a long history in the United States that predates the internet by many years. What we now call network neutrality has two old ancestors that predate the age of interconnected computer network: the "common carrier" and the "open internet" disputes.[202] Under iron cage progressivism, a telecommunications network was

[202] A historically accurate understanding of legal developments in the United States reveals the importance of common law principles of common carriage and public utility law, which include imposition of *ex ante* requirements on providers in the retail market-in generating the desired emergent properties of widely available, affordable, and reliable transportation and telecommunications infrastructures.

either owned and managed by a government-owned monopoly, as in most of the world, or was a monopoly service, as in the United States, following President of AT&T Theodore Vail's famous motto: "one system, one company, universal service." After the 1970s, the neoliberal answer was to push for deregulation and competition. Uncertainty could be solved not through centralized, hierarchical control over all aspects of the network, but by altering the legal environment to make possible robust competition among competitors in as many aspects of the communications service as possible. In the United States, that meant the breakup of AT&T and vigorous antitrust enforcement to force it to compete fairly. [203] In 1966, the FCC initiated *Computer Inquiries* are comprised of three proceedings conducted by the FCC aimed at updating the U.S. regulation to address the development of computing. The first proceeding was launched in 1966; the second, in 1976; and the third, in 1985. They all accomplished essential outcomes to network neutrality debate.

The first inquiry, which came to be known as *Computer I*.[204] The FCC considered for the first time the appropriate regulatory treatment of telephone company participation in the newly emerging, competitive industry of delivering data processing services over telephone lines. The FCC's goals were to prevent regulated carriers (such as AT&T) from obtaining unfair advantages in the provision of the new services. By 1970, the FCC had put in place the first rules meant to protect computing services from discriminatory or unfair treatment:

> "It is our view that any regulatory safeguards promulgated with respect to the sale of data processing services by communications common carriers should seek to assure (a) that such services will not adversely affect the provision of efficient and economic common carrier services; (b) that the costs related to the furnishing of such services will not be passed on, directly or indirectly, to the users of common carrier services; (c) that revenues derived from common carrier services will not be used to subsidize any data processing services; and (d) that the furnishing of such services will not inhibit free and fair competition between communication common carriers and data processing companies or otherwise involve

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[203] Yochai Benkler, "Network Pragmatism: Towards an Open Social Economy," in *Towards a Participatory Society: New Roads to Social and Cultural Integration*, ed. P. Donati M. Archer and M. Sánchez Sorondo, 2017, 15.

[204] Regulatory and Policy Problems Presented by the Interdependence of Computer and Communication Services and Facilities 1966 WL 13713 , 8 Rad. Reg. 2d (P & F) 1567 , 7 F.C.C.2d 11 , F.C.C. (No. 16979, FCC 66-1004) (1966).

> practices contrary to the policies and prohibitions of the antitrust laws. We believe that these objectives will be achieved best by a maximum separation of activities which are subject to regulation from nonregulated activities involving data processing."[205]

Therefore, the outcome of the *Computer I* was a regime called "maximum separation," that prohibited carriers to enter the market for providing these new services except through the creation of a separate corporate subsidiary, which would operate at arms-length from the carriers. The issue FCC was trying to solve is called "media convergence," which means the technological progression towards a single network for communications services. Robert Cannon, in his work "The Legacy of FCC Computer Inquiries;" notes that the FCC took aggressive regulation aiming at fomenting the development of computer networks.[206]

Communications technology continued to advance rapidly, and the FCC's regulatory approach soon needed an update. [207] The *Computer I* scheme had been premised on a distinction between "communications" and "data processing," but the continued infiltration of computers into the telecommunication infrastructure meant that that distinction could not be maintained. In 1976, the FCC initiated a new proceeding, referred to as *Computer II*, to redefine regulated communications services and unregulated data processing. The FCC affirmed to be "concerned with the possibility that common carriers might favor their own data processing activities through cross-subsidization, improper pricing of common carrier services, and related anticompetitive practices which could result in burdening or impairing the carrier's provision of its other regulated services."[208]

In 1980, the FCC yielded a novel approach: a division between "basic" services (transmitting voice or data without making any changes to it) and "enhanced" services (data

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[205] Regulatory and Policy Problems Presented by the Interdependence of Computer and Communication Services and Facilities 1970 WL 17225, 18 Rad. Reg. 2d (P&F) 1713, 28 F.C.C.2d 291, F.C.C. (No. 16979) (Computer Inquiry) (1970) ¶¶ 34-36.

[206] Cannon, "The Legacy of the Federal Communications Commission's Computer Inquiries," 195.

[207] *Computer I*'s structural separation was not initially regarded as applying to AT&T and its local exchange affiliates (the Bell System), because those companies were thought to be barred from offering data processing services by an antitrust consent decree.

[208] Second Computer Inquiry 1980 WL 356789, 35 P.U.R.4th 143, 77 F.C.C.2d 384, F.C.C. (No. 20828, FCC 80-189) (1980).

processing).[209, 210]While the basic service remains the same, the enhanced service is layered on top, creating a new service for the edge user. By creating a regulatory distinction between basic and enhanced services, the FCC sought to draw a bright line between activities that would be regulated as common carrier offerings and those that would not. In addition, although the FCC in *Computer II* continued to rely on structural separation as the principal means of preventing discriminatory access and cross-subsidization, it restricted the structural requirement to members of the Bell System and removed it from other carriers. Thus, only AT&T and its Bell subsidiaries were required to form separate corporate subsidiaries to provide enhanced services

AT&T remained a heavily regulated monopoly until 1984 when the U.S. government forced the divestiture of the company into AT&T, Bell Labs, Western Electric, and the myriad of 22 local exchange telephone companies, called Bell of Operating Companies (BOC) or "Baby Bells." The structural breakup came mostly as the result of a 1974 antitrust lawsuit filed by the U.S. Department of Justice. Upon divestiture, the 22 BOCs were grouped into seven independent regional holding companies. Following the previous Computer Inquires, BOCs had been prohibited from providing enhanced services without structural separation requirements.

However, in 1999, the landscape entirely changed when the FCC published *Computer III* and abandoned structural safeguards allowing BOCs to provide enhanced services once again by arguing that certain developments in telecommunications markets and technologies have materially changed circumstances in the industry. In connection with its abandonment of structural separation, the FCC established numerous nonstructural safeguards to reduce the danger of cross-subsidization and anti-competitive action by the BOCs, including the imposition of Comparably Efficient Interconnections (CEI) and Open Network Architectures (ONA) requirements.[211] CEI requires that if a carrier offers an

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[209] Ibid.

[210] The Telecommunications Act of 1996 presented the new terminology of "telecommunications service," and "information service," ignoring the terms "basic" or "enhanced services."

[211] This "unbundling" was intended to permit enhanced service competitors to purchase only those elements necessary to a specific type of enhanced service. The network was to be open to prevent the BOCs from limiting access, and the unbundled elements were to be tariffed to prevent overcharges.

enhanced service, it should be required to offer network interconnection (or collocation) opportunities to others that are comparably efficient to the interconnection that its enhanced service enjoys. ONA differs from CEI only because it deals with the overall design of a carrier's primary network facilities. ONA requires that all users of the underlying network be allowed to interconnect to specific basic network functions and interfaces on an unbundled and equal access basis.

In the early 1990s, the Ninth Circuit Court vacated and remanded *Computer III*, arguing that "it was arbitrary and capricious for the FCC to abandon structural separation of enhanced and basic telecommunications services and rely on cost accounting regulations to provide regulatory protection for ratepayers and competitors against harmful effects of cross-subsidization."[212] Following, the FCC interpreted the decision vacated only the ONA requirements, so it granted an Interim Waiver Order that permitted BOCs to provide enhanced services under previously approved CEI plans.[213] With regards to CEI requirements, the FCC stated:

> "[P]ublic disclosure of how a BOC is complying with CEI facilitates the successful operation of the CEI requirements themselves. (…) We believe that competitive ISPs will themselves monitor CEI compliance vigilantly, and will call the Commission's attention to any failure by a BOC to follow through on its CEI responsibilities. Thus, the BOCs' compliance with the Commission's CEI requirements can be easily monitored by the parties whom they most concern, and we can expect to be informed through the section 208 complaint process of any failure to provide either the necessary information or the promised access."[214]

Therefore, *Computer III* is permeated with FCC's concerns for anticompetitive behavior and maintaining an open communications platform in the face of media convergence. However, as Cannon notes, these arrangments are pervaded with oddities. First, an unregulated industry, with little knowledge of the FCC, is asked to watch a regulated

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[212] People of State of Cal. v. F.C.C. 905 F.2d 1217, 67 Rad. Reg. 2d (P&F) 1230, 113 P.U.R.4th 92 , 9th Cir. (No. 87-7230, 87-7233, 87-7265, 87-7361, 87-736 , 87-7441, 87-7451) (1990).

[213] Re Computer III Remand Proceedings 1990 WL 488949, 118 P.U.R.4th 419, F.C.C. (No. 90-623) (1990).

[214] Computer III Further Remand Proceedings: Bell Operating Company Provision of Enhanced Services 14 FCC Rcd. 4289 (F.C.C.), 14 F.C.C.R. 4289, 16 Communications Reg. (P&F) 149, WL 125819 (1999)¶¶ 15.

industry. Second, small companies are asked to watch the giant corporations in the United States. Third, ISPs are placed in a position of filing complaints against their sole supplier of an essential facility. Fourth, contrary to usual jurisprudence, the party that lacks the information has the burden of moving.[215]

Also, *Computer III* repeats a pattern presented in all Computer Inquires: too much weight was placed on the perceived efficiencies, and too little on the protection it offers to consumers and competition. Although much contested, the FCC chose the lens of behavior to regulate cross-subsidization and discrimination. These preferences mark a shift away from structural safeguards and the rise of compensatory measures that would sow the seeds for the *Act of 1996*. Thus, the Computer Inquiries are reasonably described as the direct ancestor of today's network neutrality rules.

3.1.1. The U.S. 1996 Telecommunications Act and the Arrival of the Internet

By the 1990s, the policy *de jour* was deregulation. Private markets boomed under a series of deregulatory efforts. The *Telecommunications Act of 1996*, which amended the *Communications Act of 1934*, codified what had already been the practice of the FCC between 1980 and 1996 while making numerous compromises to appease the likes of newly-defined categories of a telecommunications provider. The *1996 Act* defines two categories of entities subject to the FCC's regulatory jurisdiction: providers of "telecommunications" and "information" services. The services relying on the existence of the network were to be classified under Title I of the *Communications Act*, as information services, and the transmission of those services over the existing telephone network would remain classified under Title II.[216]

Title II of the *Communications Act* gives broad authority to the FCC and regulates the common carrier obligations.[217] Among other things, common carriers are subject to "the

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[215] Cannon, "The Legacy of the Federal Communications Commission's Computer Inquiries," 204.

[216] 47 U.S.C. §153(51).

[217] The *Communication Act of 1934* replaced the replaced the Federal Radio Commission, with the FCC and gave this new regulatory body expanded powers to regulate emerging technologies of the day such as broadcast TV, and telephony. Among the powers granted to the FCC was the ability to classify a

obligation to charge 'just and reasonable' rates, to file detailed rate tariffs, and to refrain from 'unjust or unreasonable discrimination.'" In turn, ISPs are subject to FCC's ancillary jurisdiction under Title I, allowing the FCC to exercise the statute's substantive grants of authority. The scope of the ancillary jurisdiction is cabined by that of the substantive grants of authority and is consequently much more limited than common-carrier regulation. According to the new classification of the *1996 Act*, internet access via either dial-up or DSL service would use the telecommunications facility to provide information services to its subscribers. Since the telecommunications service provider was regulated as a common carrier, it could not engage in discrimination against competing providers of information services.

The *1996 Act* itself attempted to open local telephony to competition, by introducing resellers between the local exchange carriers and consumers. The *1996 Act* expressly instituted competition as a regulatory goal, as well as "the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans." Also, it stipulates as national policy the promotion of the continued development of the internet "to preserve the vibrant and competitive free market that presently exists for the internet and to encourage the development of technologies which maximize user control over what information is received by individuals, families, and schools who use the internet and other interactive computer services." The regulatory tools it implemented to accomplish these goals included unbundled network practices and the elimination of regulatory barriers to entry to in both telecommunications and broadband services by softening the laws of the previous regime as set in the *Communications Act*.

The *1996 Act* attempted to deal simultaneously with network effects, scale economies, and monopoly leveraging which lingered after years of localities having no real choice in telephone provider for local service. The most significant share of controversy fell on the specified obligations of Incumbent Local Exchange Carriers (ILEC), company in a locale that owned the single telephone line to local residences and enterprises (BOCs comprised the largest of these). These companies were required to provide non-discriminatory

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communication organization as a "common carrier" under Title II of the Act. *See* Nuechterlein and Weiser, *Digital Crossroads: American Telecommunications Policy in the Internet Age*.

interconnection to other providers, often via co-located equipment housed in the company's central office but owned by a competing network. In addressing the advantages local players held from their scale economies due to years of monopoly, Competitive Local Exchange Carriers (CLEC) were granted rights to lease capacity from elements of the incumbent network, the components which were required for a signal to reach from the company's central office to an end-user, as would be defined by the FCC.[218]

Also, competitors had the option to forgo picking specific elements, instead of being granted rights to resell incumbents' retail services entirely at discounted rates. This arrangement would allow a competitor service to "build up customer loyalty, develop an established base of customers for a particular geographic area, and only then – when the economies of scale are great enough – serve these customers using at least some facilities of its own."[219] Leasing network elements were often more favorable to competitors, as the FCC sets rates lower than what a telephone company would likely offer for wholesale access in cooperation with state public utility commission. The *1996 Act* also included provisions to allow the BOCs to re-enter the long-distance market, once they had demonstrated that a condition of effective competition existed in their home markets via a checklist of requirements. As Nuechterlein and Weiser describe, it was now a race between the BOCs and the long-distance operators to bundle local and long-distance services.[220]

Additionally, the *1996 Act* was a tangle of definitions whose application and interpretation would form the foundation the dilemma that networked services face up until now. The term "telecommunication services" were equivalent to "common carriers," which, as opposed to "private carriers," face regulatory obligations to act as common carriers whether they would like to do so in a particular context or not.[221] These services would be distinct from "information services" which are "enhanced services" as defined by the FCC in the *Computer Inquiries*. Nonetheless, the over-simplified dichotomy applied at the time

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[218] The most prominent CLECs were the long-distance companies, such as AT&T and MCI. The most prominent ILECs were the "Baby Bells."

[219] Nuechterlein and Weiser, *Digital Crossroads: American Telecommunications Policy in the Internet Age*, 85.

[220] Ibid., 5.

[221] Ibid., 76.

did not keep up with technological development. Traditionally, telephony operated in two directions, while cable functioned in one-way. The rise of enhanced broadband internet services permitted cable providers to accommodate two-directions transmissions, consequently opening the competition between cable and telephony.

Telephone companies were regulated under Title II and had to comply with common carrier obligations with regards to intermediaries, first to dial-up ISPs, and then to broadband CLECs. However, the *1996 Act* abstained from classifying cable broadband internet services, leaving this entirely new industry unregulated. Meanwhile, cable companies remained isolated in its own Title VI of the *Communications Act*.[222] With media convergence, the FCC's attempt to keep services in different regulatory silos proved ineffective and costly. Voice, data, and video, historically carried over distinct networks, started to converge into a single network, transforming not only services but also questioning the traditional regulation division between carriers and broadcasters. In such a scenario, questions that were first addressed in the 1970s reborn with new shapes: how would the infrastructure's owners treat applications that ran over their wires? This question will be further explored in section 3.1.2 below.

In its *Local Competition Order of 1996*, the FCC established federal guidelines granting new entrants in local telephone markets essentially unlimited rights to lease the Unbundled Network Element Platform (UNE-P), and the incumbents went to court to challenge that decision on some grounds. The strategy involved a continued legal attack on the FCC's impairment standard.[223] The U.S. Supreme Court, in *Iowa Utilities Board*., sent the FCC's *Local Competition Order* back on remand, demanding to start from scratch and apply a more rigorous understanding of the impairment standard.[224] When the FCC returned a new order in 1999, the so-called *UNE Remand Order*, taking away some aspects from the list of network elements to be offered at favorable unbundled rates, but added others not part

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[222] Cable services were regulated by local municipalities operating under legal and regulatory guidelines propounded by Congress, the FCC, and state legislatures. Municipalities awarded franchises in exchange for cable services and cable providers operated as a carrier of television signals.

[223] Implementation of the Local Competition Provisions in the Telecommunications Act of 1996 11 FCC Rcd. 14171 (1996).

[224] Corp. v. Iowa Utils. Bd., 525 U.S. 366 (1999).

of the original platform.[225] The text of the Commission's order paid at least superficial obeisance to the impairment standard as interpreted by the Supreme Court. However, that was not enough. In 2002, the Order faced a challenge in the D.C. Circuit Court of Appeals, brought by the U.S. Telecommunications Association. The case, known as *USTA I*, is the beginning of a series of fights in which D.C. Circuit Court of Appeals would play the dominant role in dismantling the unbundling regime.

In 2002, the FCC's second attempt to pacify the impairment standard was thwarted by the D.C. Circuit Court of Appeals for being still too generous to competitors: specifically, it accused the FCC of seeing unbundling as the end, still providing inadequate justification for the terms it offered. The FCC's *UNE Remand Order* was sent back again.[226] This third attempt to appease the Court was responded with the *Triennial Review Order*, in 2003.[227] It was a chaotic procedure, announced months ahead of its issuance, and including the uncommon feature of dissent from the FCC's Chairman. The impairment standard was reviewed to introduce a determination of whether "all potential revenues from entering a market exceed the costs of entry, taking into consideration any countervailing advantages that a new entrant may have."[228]

The *Telecommunications Act* restricted unbundling to facilities, not services. Making this difference clear, in the dial-up system, a user seeking to connect to the internet placed a telephone call via her modem to the ISP, which then provided access to the internet. This ISP would require backhaul[229] to the long-line internet connections, and it would lease these via an arrangement termed "special access." ISP could reach a user over a line that the user was paying. The ISP was not required to have direct access to that user's locations. The situation changes with DSL high-speed services. DSL utilizes the 'high frequency' portion of the copper line that is also used for telephone services. The *1996 Act* restricts providers

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225 Nuechterlein and Weiser, *Digital Crossroads: American Telecommunications Policy in the Internet Age*, 101.

226 Ibid., 102.

227 Report and Order and Order on Remand and Further Notice of Proposed Rulemaking, Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers, 18 FCC Rcd 16,978 (2003).

228 Ibid.

229 The backhaul portion of the network comprises the intermediate links between the backbone network and the last-mile of the network.

of telecommunications carriers to lease their lines for competitors, and since ISPs are outside that class, they benefit from any "leasing rights only indirectly, by purchasing telecommunications services from CLECs that exercise those rights directly."[230] In this instance, an entirely different regime, a policy called "open access," would be necessary to allow a competitor ISP to lease access to the service rather than lease outright the entire facility.

Moreover, the *Triennial Review Order* posed a fundamental question: is open access a network element? Should competitors be allowed to supply business over a leased high-speed line with connectivity to the broader internet at the more generous unbundling rate, or should it be considered simple resale at less favorable rates for competitors? According to the same *Triennial Review Order*, "special accesses" are the wholesale portion of telecommunications services. These are high-speed lines bought with the intent to serve as dedicated access to the long-haul of telecommunications infrastructure. The question arose because the FCC removed the highest-capacity lines from the list of unbundled elements, but left a presumption of impairment for all remaining transport and loop facilities, delegating to state commissions the question of whether potential competitors within their jurisdictions were not impaired.

Further, in an attempt to stimulate the next-generation fiber optic cable by overbuilders to premises already served by regular copper wires, the FCC released incumbents from having to share broadband access to new fiber facilities. Incumbents would be able to effectively eliminate any opportunity for competitors to gain access to a household by building fiber close to the household but finish with the old copper technology. The FCC's reasoning considered that the impairment of CLEC business plans need not be the only consideration in deciding to 'unbundle' fiber; given cable access usually existed at end-premises, an end-user would at least have the ILEC and cable.

The losers in this struggle, the Bell companies, were soon back before the D.C. Circuit Court of Appeals, claiming the *Triennial Review Order* violated *USTA I*. In March 2004, the

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[230] Nuechterlein and Weiser, *Digital Crossroads: American Telecommunications Policy in the Internet Age*, 181.

Court again vacated FCC on two grounds, one procedural and one substantive, in a decision shorthanded as *USTA II*. Addressing the previous issue of inadequate grounding for the FCC's impairment standard, FCC had decided to pass specific data collection duties to state public utility commissions, determining the degree of impairment suffered on all elements, not just exclusive access. The Court rejected this reasoning based on concern that FCC had not been explicitly given the authority to delegate such duties to anybody. However, the Court further incapacitated the FCC by reversing the presumption of impairment; the FCC could no longer delegate its measurement authority to state commissions and determine if some areas were not impaired. The general presumption would be that a competitor was not impaired by default unless the FCC could find otherwise. So, even if a local commission found impairment, other factors could still contradict the analysis. To everyone's skepticism, despite earlier cases indicating the Supreme Court would have overturned the D.C. Circuit Court of Appeals' ruling, the FCC did not challenge the decision.

Furthermore, the Section 254(b) of the *Telecommunications Act* adopts the universal service guarantees, which includes affordable rates for quality services and access to advanced telecom services everywhere in the country. The Act introduces social and economic inclusion awareness upon which universal service is about finding ways of meeting the needs of those remaining few whom the unregulated market might choose not to serve. This contrasts with the primary meaning of this concept, recurrently used by the Bell system to bond the telephone system so that all users could call all others.[231] The purpose at that time was completely different; Bell companies wanted to compete against other companies without interconnection enforcement.

Driven by this change, the U.S. government set up five programs. The Lifeline Program aimed to reduce the monthly subscription rate for low-income households; the Link-Up Program designed subsidies via installation charge for low-income households; the High-Cost Area Assistance Program funded from long-distance carriers through the Universal Service Fund; the Long-Term Support Program to high-cost companies funded by local companies; and the High-Switching Cost Program for companies with high switching

[231] Milton L. Mueller, *Networks and States* (The MIT Press, 2010).

costs funded by long-distance carriers. The exception to the rule, the U.S. extended the concept to internet services. The *Telecommunications Act*, accordingly, included subsidies for schools, libraries, and health service facilities to access the internet.

Therefore, the *1996 Act*, reaffirmed the legacy model of monopoly franchises to be negotiated locally with each provider and introduced the concept of the universal servicer. Combined with the Computer Inquiries, the Act inaugurated a dichotomic and far-from-reality model, with local exchange *v.* long distance; enhanced *v.* basic services; information *v.* telecommunications services. These outcomes enabled the controversy around open access and network neutrality that forms the core of this dissertation.

3.1.2. Open Access Disputes: The Roots of the Open Internet

Succeeding the *1996 Act*'s debate, the open access disputes centered on the question of whether owners of the new broadband networks should be required to offer common carriage to unaffiliated ISPs over their infrastructure. In this section, we seek to outline that the first battle of this Post-Telecommunications Act reveals more than a shift in the rhetorical and the political strategy adopted right before the emergence of network neutrality debate as we know it. Also, if one wants to comprehend how future set of battles may lead to different outcomes, one should understand the transitional period between open access debates and network neutrality.

The *Telecommunications Act* kept cable and telephone companies with no credible challenges to each other's' supremacy. Although the Act was premised on the notion that "breaking down barriers to market entry would unleash a barrage of facilities-based competition," video remained cable's strong suit, and telephony ensured the same for telecommunications. Results in the competition were disappointing. Rather than compete, cable and telephony merged into conglomerates forming tight national oligopolies.[232] The open access debated officially started when AT&T announced its plan to acquire TCI, then

[232] See also Section 5.3.1 below. By the time the local telephone industry is also consolidating. The seven regional Baby Bells condensed into five: SBC Communications, Ameritech, Southern Bell, Atlantic Bell, and U S West

s largest cable operator in the U.S., and changing the telecommunications landscape in the face of a phenomenon called convergence. AT&T quickly followed this merger with the acquisition of MediaOne, another large cable operator. In announcing the acquisitions, AT&T made clear it intended to upgrade these cable systems to provide high-speed access to the internet. By purchasing TCI, AT&T acquired a significant interest in Excite@Home, an ISP, and CAP partially owned by TCI that pioneered high-speed cable access to the internet in the U.S.

In 1999, despite requests from competing ISPs and consumer advocates to impose open access obligations, the FCC approved *AT&T-TCI merger*. The FCC concluded AT&T-TCI would not deny customers "the ability to access the Internet content or portal of his or her choice," noting further that given this, "open access issues would remain equally meritorious (or non-meritorious) if the merger were not to occur."[233] Following, the FCC also approved *AT&T-MediaOne merger.* Around the same time, some municipalities declined to condition their cable franchise agreements with an open access requirement. The most notable exception was the city of Portland, Oregon, which did impose such a condition on AT&T's franchise. [234]

Municipalities concerned with the availability of non-commercial and other unprofitable content called for the choice of ISPs on these conduits rather than a single vertically integrated ISP.[235] These cities based their demand on localism and diversity, both principles that have long formed the foundation of the public interest standard underlying the U.S. broadcast regulation. [236] Diversity as a policy objective is related to the

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[233] Mark A. Lemley, Lawrence Lessig, and Mark A. Lemley, "Application for Consent to the Transfer of Control of Licenses MediaOne Group, Inc. to AT&T Corp. CS Docket No. 99-251," 1999.

[234] Alissa Cooper, "How Regulation and Competition Influence Discrimination in Broadband Traffic Management : A Comparative Study of Net Neutrality in the United States and the United Kingdom" (University of Oxford, 2013), 15.

[235] Fourteen U.S. local States even discussed legislatures attempting to move on open access. Among them, Maryland, Michigan, Utah, Pennsylvania, Ohio, New Hampshire, Vermont, and Massachusetts. *See* Newman, "The Paradoxes of Network Neutrality."

[236] Under sections 307 and 309 of the Communications Act (47 U.S.C. §§ 307, 309), the FCC may grant the use of a broadcast frequency to an applicant that demonstrates it would serve "the public interest, convenience, and necessity." In addition, according to the Public Broadcasting Act of 1967, "states that local public TV and radio stations are "valuable local community resources" that can and should be used "to address national concerns and solve local problems through community programs and outreach programs." In 1975, the FCC adopted the *Newspaper/Broadcast Cross-Ownership* (NBCO) *Rule* to

dissemination of information from non-discriminated sources. Is goals it to promote informed decision-making, guaranteeing cultural pluralism, citizen welfare, and a well-functioning democracy. Localism, in turn, is not an end, but a policy that pursues broader social goals, and the two folded values: a political one based on the distribution of political power, and a cultural one implemented on institutional design essential to the preservation of unique cultural values and traditions within communities.

The Ninth Circuit Court of Appeals held in the *AT&T Corp. v. City of Portland*[237] that local municipalities could require open access since cable operated an essential facility, an argument quite away from regulating cable as a common carrier. The Portland's decision resulted in a victory for the cable since it created rights for ISPs, not users.[238] The Third Circuit Court of Appeals, *in Time Warner Telecom v. FCC*, applying Chevron deference, upheld a similar determination. One of the three principal arguments advanced by the challengers was that the FCC's determination conflicted with its 1998 decision in the Advanced Services Order that DSL Internet access is a combination of an "information service" and a "telecommunications service." The court dismissed this argument with the observation that an agency is not bound forever by its previous determinations, and in fact "must consider varying interpretations and the wisdom of its policy on a continuing basis."[239]

Having individual courts decide the regulatory classification of a single cable broadband service urgently demonstrated the need for a nationwide policy on the matter. In 2002, eight years after the Telecommunications Act of 1996, the FCC was spurred to action that culminated with the *Internet Over Cable Declaratory Ruling,* in which the agency classified cable broadband as an "information service," under Title I (not subject to common carriage obligations). The FCC also declined to extend to cable broadband operators the

preserve and promote a diversity of viewpoints at the local level. The bargain was: broadcaster providers serve the public interest, ensuring diversity and localism, in exchange for the free and exclusive use of the nation's valuable and scarce spectrum. Diversity remained the main basis for newspaper/broadcast cross-ownership restrictions for over forty years. In November 2017, the FCC proposed a Review of the NBCO. *See* in the Matter of Review the Commission's Broadcast Ownership Rules and Other Rules Adopted Pursuant to Section 202 of the Telecommunications Act Of 1996, WL 5623028, F.C.C. (MB Docket Nos. 14-50, 09-182, 07-294, 04-256, 17-289) (2017).

[237] AT&T, et. al. v. City of Portland, U.S. Court of Appeals, 9th Circuit, Appeal No. 99-35609 (1999).

[238] Tim Wu, "Network Neutrality: Competition, Innovation, and Nondiscriminatory Access," 2004.

[239] Time Warner Telecom, Inc. v. FCC, 507 F.3d 205 (3d Cir.) (2007).

unbundling rules that applied to telephone companies.[240] These provisions solidified cable broadband's position as an unregulated industry. [241]

Seven different petitions challenged the Internet Over Cable Declaratory Ruling for review, which was consolidated in the Ninth Circuit Court of Appeals.[242] The Ninth Circuit held itself bound by a prior determination that cable service was both telecommunications and information services.[243] In *Brand X Internet Services*, the U.S. Supreme Court upheld FCC's determination based on *Chevron* deference.[244] Shortly after that, the FCC attributed in its *Wireline Broadband Order* cable's classification to wireline broadband internet service offered via DSL,[245] creating parity with cable and ending the telephony's decades-long struggle to free its provision of data and broadband internet services from regulation under Title II (and, hence, unbundling).[246] As a result, broadband internet services offered over cable networks was officially classified as an information service, moving away from unbundling in favor of inter-platform competition. Since then, most U.S. broadband customers have had at most two choices of fixed-line broadband ISP, one telephone company, and one cable provider.[247]

The open access disputes reappeared when the Federal Trade Commission (FTC) took up the review of the *AOL-Time Warner merger*. In its consent decree, the FTC forced AOL to allow other ISPs access to Time Warner cable conduits before it could offer its service. However, this decree was much less strict than what telephone carriers were subject to under Title II provisions.[248] In reviewing the proposed merger, the FCC raised concerns

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[240] Inquiry Concerning High-Speed Access to the Internet over Cable and Other Facilities, 7 FCC Rcd. 4798 (F.C.C.), 17 F.C.C.R. 4798, WL 407567 (2002).

[241] In 2005, the FCC reclassified cable broadband providers under Title II. *See* Section 3.3.

[242] Brand X Internet Servs. v. FCC, 345 F.3d 1120 (9th Cir. 2003), rev'd and remanded sub nom. Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs., 545 U.S. 967 (2005).

[243] Ibid.

[244] Chevron, U.S.A., Inc. v. Natural Res. Def. Council, Inc., 467 U.S. 837 (1984).

[245] The "deregulatory" steps taken in the Wireline Broadband Order were only counterbalanced, in 2005, when the FCC issued its Internet Policy Statement. See Section 3.3.1 below.

[246] Wireline Broadband Internet Access Services Order, 20 FCC Rcd at 14853. 18 Id., (2005).

[247] "Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 199," 2016. hereinafter *2016 Broadband Progress Report*.

[248] America Online, Inc. and Time Warner Inc., WL 1836342 F.T.C. (Docket No. C-3989) (2000).

about potential harm to the high-speed internet access market, including the possibility that AOL-Time Warner could use its market power to block access by other ISPs to AOL-Time Warner's cable facilities or otherwise discriminate against these ISPs. To address these concerns, the FCC adopted the following conditions on its approval of the merger:

> "(1) prohibited AOL Time Warner from entering into any agreement with AT&T that gave AOL or any other AOL Time Warner ISP exclusive carriage rights on AT&T's cable systems and further prohibited AOL Time Warner from entering into any agreement with AT&T for the purpose of limiting in any way AT&T's ability to enter into agreements with non-AOL Time Warner ISPs; (2) required AOL Time Warner to certify annually its compliance with the foregoing condition; and (3) required AOL Time Warner to annually certify compliance with section 631 of the Communications Act, which requires cable operators to inform subscribers of, among other things, the nature of personally identifiable information the cable operator will collect and how the information will be used."[249]

The history of network neutrality debate and its ancestry, the open access, is full of contradiction. After a long time of denning, FCC applies open access requirements upon AOL-Time Warner merger. Therefore, the FCC's decision of "doing nothing," was one of "doing harm." The biggest lie of deregulation was that communication markets could exist without government's interventions, ruled only by the market's "invisible hand." On the contrary, as Robert McChesney affirms "all the communication markets were created or decisively shaped by the government and based on government monopoly licenses or privileges. (…) What deregulation did was remove or severely lessen the idea of government action in the public interest."[250] Thus, it is ironic that the FCC in the name of deregulation created more regulation to help firms maximize their profits.

Th open access disputes starred a battle over the idea of encouraging competition at the retail level through unbundling and resale arrangements. Open access proponents, also known as "Openists," were mainly concerned with the function that broadband networks

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[249] Applications for Consent to the Transfer of Control of Licenses and Section 214 Authorizations by Time Warner Inc. and America Online, Inc., Transferors, to AOL Time Warner Inc., Transferee, Memorandum Opinion and Order, 16 F.C.C. Rcd 6547 (2001).

[250] Robert W. McChesney, *Digital Disconnect: How Capitalism Is Turning the Internet Against Democracy* (The New Press, 2013), 107.

would serve in terms of democratic norms for social justice and innovation.[251] Their primary focus was on the social value of the internet, based on principles of universal service, flexible regulation, private investment, and competition. In this sense, Andrew J. Schwartzman, representing the Consumers Union, in 2000, during the FCC Cable Services Bureau's public forum on the application of AT&T and MediaOne merger, affirmed that "[o]pen access involves citizens, the customers who have a right to speak in an interactive medium and to receive information. It is not just their ability to have two or more ISPs to choose from as a customer. It's about their rights as citizens to use the internet as a medium of open expression."[252]

On the other hand, opponents, also named "Deregulationists," based their arguments on media convergence. They argued that open access requirements would deter investment in infrastructure, reducing the value of broadband last-mile transports. Similarities with arguments presented in network neutrality debate are not accidental.[253] We will deeply explore the arguments used by Openists and Deregulationist in Section 3.2.1 below. Following the economic trend of the 1990s, opponents argued that innovation would be assured if the government simply stayed out of the way. AT&T, in its turn, deliberately spoke out of both sides. In the U.S., AT&T advocated against open access, but in Canada, it had pushed for open access policies. Mark Lemley and Lawrence Lessig directly quoting AT&T in the FCC's docket regarding the AT&T-MediaOne merger states that "the most important action the Commission can take to speed deployment of advanced telecommunications services is to vigorously implement and enforce the market-opening obligations that Section 251 [unbundling and non-discriminatory interconnection clause] imposes on incumbent LECs."[254]

The FCC sat bewildered on the sidelines. It adopted the policy of waiting and watching. FCC Chairman William E. Kennard publicly declared:

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[251] Newman, "The Paradoxes of Network Neutrality," 34.

[252] Transcript: Before the Federal Communications Commission In Re Applications of: Cable Service Bureau, AT&T-MediaOne Public Forum, MM CS Docket No. 99-251 (2000).

[253] See Section 3.2 below.

[254] Lemley, Lessig, and Lemley, "Application for Consent to the Transfer of Control of Licenses MediaOne Group, Inc. to AT&T Corp. CS Docket No. 99-251."

> "Some call it open access. Some call it forced access. Sometimes it's just a pain in the access. …Everyone I talk to about this issue - leaders in your industry, the ISP industry, franchising authorities - all embrace the concept of openness. Everyone seems to agree that openness and choice are what consumers want and will demand. This debate is really about how to get there. There are two choices: we can rely on the market to facilitate openness; or we can try to regulate our way there. For now, I'm putting my faith in the marketplace."[255]

Although the FCC adopted the "hands-off" policy, largely motivated by the prevailing neoliberal ideology that also influenced 1996 Telecommunications Act, in the open access debate, "hands off" was never indeed deregulation. François Bar, in the FCC's public forum on the application of AT&T and MediaOne merger, also affirmed that:

> "The success of the internet in the first two phases fundamentally rested on the network openness. Throughout these first phases, policy intervention was key to the success. (…) It was not the unregulation of the Internet, but active involvement by policy makers that guaranteed openness of the underlying infrastructure which was the telephone network, and made competition possible in order to spur the development of the Internet. (…) So, the fundamental question we are facing today is what forces do we want to unleash to shape the third generation of the internet. Do we want to continue the successful policy of the past of promoting openness, or instead, would you rather -- we rather trust the owners of infrastructure to shape and determine the uses of the infrastructure?"[256]

Critics of the FCC's policy declared it would harm the evolution and functioning of the internet. In this sense, a comment submitted into the FCC's docket regarding the AT&T-MediaOne merger by Mark Lemley and Lawrence Lessig:

> "The architecture proposed by AT&T/MediaOne for their broadband cable service threatens this vertical competition. By bundling ISP service with access, and by not permitting users to select another ISP, the architecture removes ISP competition within the residential broadband cable market. By removing this competition, the architecture removes an important threat to any strategic behavior that AT&T might engage in once a merger is complete. The architecture thus represents a significant change from the

[255] William E. Kennard, FCC Chairman, before the California Cable Television Association, December 16, 1999.

[256] Transcript: Before the Federal Communications Commission In Re Applications of: Cable Service Bureau, AT&T-MediaOne Public Forum, MM CS Docket No. 99-251 at 66–67.

> existing End-to-End design for a crucial segment of the residential Internet market. Further, there is in principle no limit to what AT&T could bundle into its control of the network. As ISPs expand beyond the functions they have traditionally performed, AT&T may be in a position to foreclose all competition in an increasing range of services provided over broadband lines."[257]

Also, in a brief piece, Jerome Saltzer, one of the authors of the first paper outlining end-to-end architecture, emphasized the numerous ways that cable broadband providers were exercising gatekeeper control already. Saltzer lists five examples of gatekeeping video limits, server restrictions, fixed backbone choice, filtering, and no home network, and finishes by stating that gatekeeping restrictions, as well as the service bundling is at direct odds with the internet architecture.[258] With these experts' contribution, open access shifted as a concept more centered on technical issues. While the first open access concept privileged an open, competitive, and democratic internet, focusing on structural interventions and consumer empowerment, the second concept is semantic overflowed with a "free" internet, as first advocated by Lawrence Lessig.[259] This displacement unintentionally supported a shift from the open access debate to network neutrality.

By 2004, the unbundling scheme as well as the open access debate was all but dead in the U.S. Requiring a provider to lease control of physical infrastructure would require legislative action. Alternatively, requiring that network operators provide transit to all parties equally could be done with regulations. However, neither solution was adopted. Partly because of the relative defeat of open access in the U.S., attention has shifted to the alternative policy of "network neutrality." In the US, network neutrality works as a successor of policies that had earlier been eliminated to secure more competitive access to markets. Journalist Emily Stewart directly quoting Johannes Bauer affirmed that "[i]f the US had left unbundling rules in place, for example, network neutrality would not have to fulfill this goal

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[257] Lemley, Lessig, and Lemley, "Application for Consent to the Transfer of Control of Licenses MediaOne Group, Inc. to AT&T Corp. CS Docket No. 99-251."

[258] Jerome H. Saltzer, "'Open Access' is Just the Tip of the Iceberg," 1999.

[259] Lessig, *The Future of Ideas*.

of controlling market power locally, it could have been done with unbundling instruments, which is much better suited to control market power."[260]

In this sense, David Clark affirmed, in 2007, "one could speculate that the reason for [the emergence of network neutrality] is that we have abandoned the idea of increasing competition through facilities unbundling, and see (to some extent) the outcome of that decision, whereas other parts of the world are following the path of encouraging competition at the retail level through unbundling, and are thus hoping that the issues of market power at the retail level will be less pronounced"[261] Clark also added that "[m]any advocates of network neutrality are fighting to defend openness. But not everyone in the debate is fighting over the social value of the Internet."[262]

3.2. Network Neutrality Prelude: The Shift from "Openness" to "Neutrality"

Although "network neutrality" is commonly confused with "open access," they are different concepts developed in the face of distinct challenges. Open access refers to a policy centered on decreasing intermediaries' barriers to entry, guaranteeing unrestricted access to conduits. Network neutrality, on the other hand, focuses on content at the end of the supply chain. Thus, while the first does not necessarily increase content available to consumers, the second could reduce intermediaries' profits and market entry.[263]

3.2.1. The "Open Access" Battle: Openists *v.* Deregulationists

The open access disputes starred a battle over the idea of encouraging competition at the retail level through unbundling and resale arrangements. Proponents, also known as "Openists" were mainly were concerned with the function that broadband networks would

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[260] Emily Stewart, "Net Neutrality Isn't the Only Way to Keep the Internet Fair. It's Just the Only Way in America," Vox, December 14, 2017, https://www.vox.com/policy-and-politics/2017/12/14/16692318/net-neutrality-local-loop-broadband-internet-access.

[261] David D Clark, "Network Neutrality: Words of Power and 800-Pound Gorillas," *International Journal of Communication* 1 (2007): 704.

[262] Ibid., 702.

[263] Christiaan Hogendorn, "Broadband Internet: Net Neutrality versus Open Access," *International Economics and Economic Policy* 4 (2007): 185–208.

serve regarding democratic norms for social justice and innovation.[264] Their primary focus was on the social value of the internet, based on principles of universal service, flexible regulation, private investment, and competition.

It is persistence that the essential purpose of a communications network is as public infrastructure, with meaning attached to that concept. It means that the principal value of the network is indirect: it as a source of positive spillovers, or externalities, which enable the work of others. One way of understanding this vision of the network as ‘‘infrastructure’’ is to contrast it directly with its foil, the idea that a network is a ‘‘service’’ or ‘‘product’’ sold by a company. The second principle is the neutrality principle. It holds that to reach its highest potential, a communications infrastructure must not discriminate as between uses, users, or content. The third principle is the end-to-end principle. Whatever its meaning elsewhere, in broadband policy end-to-end principle stands for a theory of innovation is an evolutionary process. Open access proponents rejected technological determinism. The internet remains a network open to market entrants.

On the other hand, opponents, also named "Deregulationists," based their arguments on media convergence. They argued that open access requirements would deter investment in infrastructure, reducing the value of broadband last-mile transports. Similarities with arguments presented in network neutrality debate are not accidental. First, the supported property rights protection and "tragedy of the commons." Property owners can be expected to maintain and steward only what they have the right to exclude others.[265] As Frank Easterbrook famously put ‘‘we need to bring the Internet into the world of property law, without which welfare-increasing bargains cannot occur."[266] Second, they focused on incentive, which is just a simple reminder that communications networks are expensive investments and that companies will only build when given the prospect of a reasonable return on investment.[267]

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[264] Newman, "The Paradoxes of Network Neutrality," 34.

[265] Garrett Hardin, "The Tragedy of the Commons," *Science* 162 (1968): 1243–48.

[266] Easterbrook, "Cyberspace and the Law of the Horse," 207, 212–13.

[267] Adam D. Thierer, "'Net Neutrality' Digital Discrimination or Regulatory Gamesmanship in Cyberspace?," *Cato Policy Analysis Series*, no. 507 (2004): 28.

Deregulationistis were suspicious of government regulation outside of the assignment of property rights. They interpreted the greatest factor in the success of the internet was the fact that the FCC and Congress stayed out of the way. Deregulationists generally did not accept technological determinism, believing that power determined the course of internet history. Solutions were often based on QoS, allowing broadband ISPs to increase revenue and profit by selling applications bundled with a basic connection. Stated in industry jargon, broadband ISPs using 'next-generation technologies can offer their customers a host of value-added services. Deregulationists predict that the next great wave of innovation will occur at the center of the network, not the edges.[268]

Regarding the Open Access debate and its merits and demerits, its description and some of its normative elements were not only accurate but still useful and important to the present day. The exception would be for the assertions that the cyberspace represented an environment separate from "real" space and that its qualities made it impossible or too difficult to regulate. This notion was useless because nothing in technology is disconnected from human behavior. Th internet is a hybrid reality, which is both virtual and analog and can be regulated.

3.2.2. The Proposed Communications Policy's Reconciliation: Network Neutrality Rises and Innovation Rules

The shift from open access to network neutrality reveals much more than a shift in rhetorical and political strategy. It enables us to analyze present understandings of network neutrality and the illusion these understandings portend. For one, some efforts seek to take Wu's initial concept[269] and nuance it or complicate it. For another, others sought to evaluate its necessity in law from either a technological standpoint or an economic one (what option would render greatest total welfare and minimal deadweight loss? Is the unpredictability of emerging pricing models sufficient to render any decision on the issue premature?).

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[268] Tim Wu, "The Broadband Debate, a User's Guide," *Journal on Telecommunications & High Technology Law* 3 (2004): 77.

[269] Wu, "Network Neutrality, Broadband Discrimination."

In 2002, Tim Wu first coined the "principle of network neutrality" or "non-discrimination," as a user's right to guarantee that, within a network, all types of information are transmitted equally, and the widest variety of applications can be supported, which would enable democratic participation in the social processes that are based on it.[270] For Wu, network neutrality rule "would forbid broadband operators, absent a showing of harm, from restricting what users do with their internet connection while giving the operator general freedom to manage bandwidth consumption and other matters of local concern. The principle achieves this by developing 'forbidden' and 'permissible' grounds for discriminating among packets on its network."[271] The first draft of network neutrality rule was proposed by Wu and Lessig, on 22 August 2003, in an Ex Parte Submission to the FCC Appropriate Regulatory Treatment for Broadband Access to the Internet Over Cable Facilities, Notice of Proposed Rulemaking.[272]

Wu understands both sides are not precise opponents. "Openists are primarily focused on the ends – the innovation commons. Deregulations care most about the means, most of all wanting to prevent disastrous and long-lasting governmental intervention. There is room, in other words, for reconciliation."[273] However, Wu narrowed the open access debate and mistakenly considered Openinsts and Deregulationists shared faith in evolutionary economics. Wu states Openists and Deregulationists consider themselves Schumpeterians, with few exceptions. However, he forgets the Portland merger condition at issue in the original AT&T open access case its focused on the positive social externalities created by the internet. Wu argued that network neutrality work as a reconciliation of communications policy after the battle between Openists and Deregulationists.[274] However, the open access debate was based on structural interventions for social and economic and could not be replaced by a principle aiming at nudging private actor into innovation.

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[270] Tim Wu, "A Proposal for Network Neutrality," vol. 268, 2002.
[271] Ibid.
[272] See Appendix 1.
[273] Wu, "The Broadband Debate, a User's Guide," 79.
[274] Wu, "The Broadband Debate, a User's Guide."

3.3. The FCC "Open Internet" Debates: Network Neutrality Regulations and Its Defeats

As presented in section 3.1 above, network neutrality debate grew out of forty years of regulatory skirmishes over the extent to which common carriage obligations should apply to data services offered by telephone companies. "Deregulatory" measures previously taken by the FCC created an environment of distress. The emergence of new digital technologies directly competing with the carriers' telephone or video offerings and the decline in operator competition catalyzed concerns with broadband ISPs' potential to discriminate against sources of content and applications.

In the early 2000s, Wu coined the term "network neutrality" and presented a draft of network neutrality rule to FCC in an Ex Parte Submission to the FCC Appropriate Regulatory Treatment for Broadband Access to the Internet Over Cable Facilities.[275] On 8 February 2004, FCC Chairman Michael Powell gave a speech in Boulder, Colorado, later titled "*Four Internet Freedoms*," according to which internet users should have:

> "Freedom to Access Content. First, I believe consumers should have their choice of legal content. (…)
> Freedom to Use Applications. Second, consumers should be able to run applications of their choice. (…)
> Freedom to Attach Personal Devices. Third, consumers should be permitted to attach personal devices they choose to be the connections that they pay for in their homes. (…)
> Freedom to Obtain Service Plan Information. Finally, and most importantly, consumers must receive clear and meaningful information regarding their service plans and what the limits of those plans are. (…)"[276, 277]

Essentially, Powell advocated for consumer choice and open market entry. In this sense, his internet freedoms were "critical to unlocking the vast potential of the broadband Internet,'' and "essential to nurturing competitive innovation." Although Powell's Four

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[275] See Section 3.2.2 above and Appendix 1.

[276] Michael Powell, "Preserving Internet Freedom: Guiding Principles for the Industry," 2004.

[277] Powell restates the non-discrimination rules set forth in *Hush-A-Phone* and *Carterfone* with regards to networks' attachments. *In* Hush-A-Phone Corp. v. U.S. 238 F.2d 266 United States Court of Appeals District of Columbia Circuit (1956); Use of the Carterfone Device in Message Toll Tel. Serv., 31 F.C.C.2d 420 (1968).

Internet Freedoms and Wu's network neutrality were contemporaneous, it is often misconstrued as the first endorsed by the second. As Wu pointed out "Powell made clear at the time that he thought that the evidence did not justify mandating network neutrality and that his words were offered simply as a statement of a set of best practices to which he thought the industry should adhere." [278]

In November 2005, broadband ISPs' incentive and means to discriminate against content and application were memorably captured, when Edward Whitacre, CEO of SBC (now AT&T) was interviewed about large intermediaries, like Google, and famously made a claim:

> "Now what [the internet intermediaries] would like to do is use my pipes free, but I ain't going to let them do that because we have spent this capital and we have to have a return on it. So there's going to have to be some mechanism for these people who use these pipes to pay for the portion they're using (…) Why should they be allowed to use my pipes? The Internet can't be free in that sense because we and the cable companies have made an investment and for a Google or Yahoo! or Vonage or anybody to expect to use these pipes free is nuts!"[279]

The blunt message was clear: AT&T would charge internet CAPs for using its last-mile broadband facilities. Indeed, cable and telephone companies intended to use their control of the physical architecture. However, the most intense test of the tension between broadband ISPs and the internet industry arose when new applications, like Skype and Vonage, allowed users to make telephone calls using voice over IP (VoIP) services either for free or for a fraction of the cost of traditional phone service. These services competed directly with the offerings of the phone and cable companies, and hence represented a potential erosion of revenue. The reaction from customers and CAPs was immediate and loud.

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[278] Christopher S. Yoo, "Keeping the Internet Neutral? Tim Wu and Christopher Yoo Debate," Federal Communications Law Journal 59, no. 3 (2007): n. 14. Interestingly, first, Wu believed FCC Chairman Michael Powell have endorsed principles of network neutrality in his Four Internet Freedoms speech. *See* Tim Wu, "The Broadband Debate, a User's Guide," *Journal on Telecommunications & High Technology Law* 3 (2004): 91.

[279] "At SBC, It's All About 'Scale and Scope,'" Bloomberg Businessweek, November 2005, https://www.bloomberg.com/news/articles/2005-11-06/online-extra-at-sbc-its-all-about-scale-and-scope.

As Tim Wu predicted, since then regulators have passed "increasing time on conflicts between the private interests of broadband ISPs and the public's interest in a competitive innovation environment centered on the Internet."[280]

3.3.1. 2010 FCC Preserving the Open Internet Order

Shortly after the Four Internet Freedom speech by FCC Chairman Michael Powell, in 2005, the FCC quietly issued a slightly revised version of these freedoms in the *Internet Policy Statement*. The statement called on all providers to allow access to applications and devices that did not harm the network:

> "To encourage broadband deployment and preserve and promote the open and interconnected nature of the public Internet, consumers are entitled to access the lawful Internet content of their choice.
> To encourage broadband deployment and preserve and promote the open and interconnected nature of the public Internet, consumers are entitled to run applications and use services of their choice, subject to the needs of law enforcement.
> To encourage broadband deployment and preserve and promote the open and interconnected nature of the public Internet, consumers are entitled to connect their choice of legal devices that do not harm the network.
> To encourage broadband deployment and preserve and promote the open and interconnected nature of the public Internet, consumers are entitled to competition among network providers, application and service providers, and content providers."[281]

Referencing the congressional policy "to preserve the vibrant and competitive free market that presently exists for the Internet" and "to promote the continued development of the Internet," and relying on its authority under Section 706(a) of the *Telecommunications Act* to encourage the deployment of "advanced telecommunications capability," the FCC set forth "guidance and insight into its approach to the Internet" and broadband internet access.

On the same day, the *Internet Policy Statement* was an issue; the FCC also released the *Wireline Broadband Order* concluding that DSL broadband internet access would be considered an information service, under the Telecommunications Act of 1996.[282] As such,

[280] Wu, "Network Neutrality, Broadband Discrimination," 141.
[281] Policy Statement, 20 FCC Rcd 14986 (2005).
[282] Wireline Broadband Internet Access Services Order, 20 FCC Rcd at 14853. 18 Id.

they were not subject to common-carrier regulation under Title II of the *Communications Act.* Hence, between 2005 and 2007, the FCC determined that all broadband Internet access technologies, including DSL, cable, mobile, and others, were information services. A cautionary note was included in the *Wireline Broadband Order* informing that future action might be taken to address violations of principles by providers. This note implies the *Internet Policy Statement* was not intended to address such violations.

The *Internet Policy Statement* was not meant to be part of the legislative rule, but instead, a general statement of principles and intent carrying no legal force.[283] Although the statement was not a change to any specific rules, it was intended as a sort of counterweight. The FCC signalized to ISPs that their new classification would give them a lighter regulatory touch, while it warned if they did not comply with the principles outlined in the statement, it would not hesitate to take enforcement actions. From 2005 to 2011, the principles embodied in the *Internet Policy Statement* were incorporated as conditions by the FCC into several merger orders,[284] spectrum licenses, and enforcement proceedings aimed at addressing anti-competitive behavior by service providers.

In 2005, a small phone company and DSL service provider in North Carolina, named Madison River Communications, began blocking Vonage, then a popular VoIP telephone calls program. This conduct was contrary to the second principle of the Internet Statement Policy, which explicitly consumers had the right "to run applications and use services of their choice." The FCC and Madison River entered a settlement in which the latter paid a fine (USD 15,000.00) and agreed to stop blocking access to ports necessary for VoIP applications.[285]

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[283] The U.S. Congress requires an administrative agency to follow specific procedures in adopting regulatory rules. It exempted from these procedures, however, general policy statements. *See* Jerry Brito and Jerry Ellig, "A Tale of Two Commissions: Net Neutrality and Regulatory Analysis," *CommLaw Conspectus* 16 (2007): 1–51.

[284] SBC Communications Inc. and AT&T Corp. Applications for Approval of Transfer of Control, Memorandum Opinion and Order, 20 FCC Rcd. 18290, 18392, ¶ 211 (2005) (noting the companies' commitment to "the Commission's Internet Policy Statement") and AT&T Inc. and BellSouth Corporation Application for Transfer of Control, Memorandum Opinion and Order, 22 FCC Rcd. 5662, 5814 (2007) (stating as a condition of approval that the merged entity "commits that it will maintain a neutral network and neutral routing in its wireline broadband Internet access service").

[285] Madison River Commc'ns, LLC, Order and Consent Decree, 20 FCC Rcd. 4295 (2005).

The subsequent time the FCC enforced the *Internet Statement Policy* had an unfortunate outcome from the agency's perspective. In 2007, consumer complaints and press reports suggested that Comcast was interfering with its subscribers' use of Bit Torrent, a technology that facilitates peer-to-peer sharing of large data files such as videos. At the time, Bit Torrent had earned a bad reputation for being the protocol of choice for pirating software, movies, and other media, although there are plenty of legitimate uses for the protocol. Advocacy groups Free Press and Public Knowledge filed a complaint with the FCC and, along with other interest groups, filed petitions for a declaratory ruling from the FCC. After some denials, Comcast admitted that it had, in fact, interfered with these transmissions. Technically, Comcast had sent "reset packets" to Bit Torrent users' transmissions, signaling that there has been an error in data transmission and causing the transmissions' end, and preventing files transfer.[286]

The FCC issued an Order against Comcast for interfering with peer-to-peer file sharing, according to which Comcast significantly impedes consumers' ability to access the content and use the applications of their choice, violating the *Internet Policy Statement*.[287] The FCC affirmed, "[t]he record leaves no doubt that Comcast's network management practices discriminate among applications and protocols rather than treating all equally."[288] Also, the FCC concluded that Comcast's motivation was to inhibit an avenue of competition with its video-on-demand service, and, accordingly, ordered Comcast to submit a plan describing how it would make a "transition from discriminatory to non-discriminatory network management practices by the end of the year."[289] Later, Cox Communications was also found practicing reset packets to Bit Torrent.[290] Through the actions, the FCC had transformed the *Internet Policy Statement* into a legally binding regime.

286 Formal Complaint of Free Press & Public Knowledge Against Comcast Corp. for Secretly Degrading Peer-to-Peer Applications, 23 FCC Rec. 13028 (2008). vacated, Comcast Corp. v. FCC, 600 F.3d 642 (D.C. Cir.) (2010).

287 Formal Complaint of Free Press & Public Knowledge Against Comcast Corp. for Secretly Degrading Peer-to-Peer Applications, 23 FCC Rec. 13028.

288 Ibid., 13050¶ 41.

289 Ibid., 13061¶ 54.

290 Bauer, "Congestion on the Internet: Operator Responses, Economic Analysis, and Improving the Network Architecture."

Comcast challenged the FCC's Order, arguing FCC lack authority for regulating an ISP's network management practices. In *Comcast Corp. v. FCC*, the D.C. Circuit Court of Appeals agreed with Comcast, holding that the FCC could not rely on its authority under Section 706 of the *Telecommunications Act*[291] to issue the Order against Comcast. While this provision "could at least arguably be read to delegate regulatory authority to the Commission*,*" the Court found that the FCC had foreclosed this interpretation by determining that Section 706 not be an independent grant of regulatory authority. According to the D.C. Circuit Court of Appeals, there was no express statutory authority for the FCC's exercise of ancillary authority to provide consumers basic protections in using broadband.[292]

While Comcast's appeal was still pending, the FCC initiated a rulemaking proceeding in which it proposed to issue rules implementing the *Internet Policy Statement* principles.[293] While lauding the role that the principles had played in preserving the internet's openness, the FCC declared that "the time has now come to build on past efforts and to provide greater clarity regarding the Commission's approach to these issues." The FCC sought to overcome the court's decision by revising its stance on the meaning of its Section 706 powers, stating that that section "provides the Commission a specific delegation of legislative authority to promote the deployment of advanced services, including using the open Internet rules adopted today."[294]

In December 2010, eight months after the *Comcast Corp. v. FCC* decision, the FCC adopted the *Preserving the Open Internet Order*, a codification that closely resembled the principles contained in the *Internet Policy Statement* and identified as the first network neutrality rule in the U.S.[295] According to the Order, the FCC "takes an important step to preserve the Internet as an open platform for innovation, investment, job creation, economic

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[291] Section 706 of the 1996 Telecommunications Act, which provides that "[t]he Commission shall encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans by utilizing measures that promote competition in the local telecommunications market, or other regulating methods that remove barriers to infrastructure investment." *See* 47 U.S.C. § 1302(a).

[292] Comcast Corp. v. FCC, 600 F.3d 642 (D.C. Cir.).

[293] Preserving the Open Internet, Notice of Proposed Rulemaking, 24 FCC Rcd. (2009).

[294] Ibid.

[295] Preserving the Open Internet Broadband Industry Practices 25 FCC Rcd. 17,905, 2010 WL 5281676, 25 F.C.C.R. 17,905, 52 Communications Reg. (P&F) 1, F.C.C. (No. FCC10-201, GN09-191, WC07-52) (2010). hereinafter "2010 Open Internet Order."

growth, competition, and free expression." [296] Three basic rules, with a corresponding application of the reasonable network management principle, were adopted:

> i. Transparency. Fixed and mobile broadband providers must disclose the network management practices, performance characteristics, and terms and conditions of their broadband services;
> ii. No blocking. Fixed broadband providers may not block lawful content, applications, services, or non-harmful devices; mobile broadband providers may not block lawful websites, or block applications that compete with their voice or video telephony services; and
> iii. No unreasonable discrimination. Fixed broadband providers may not unreasonably discriminate in transmitting lawful network traffic.

The *2010 Open Internet Order* banned fixed broadband ISP from blocking "lawful content, applications, services, or non-harmful devices,"[297] and from "unreasonably discriminat[ing] in transmitting lawful network traffic over a consumer's broadband Internet access service."[298] The no-blocking and no-unreasonable-discrimination rules were both made subject to "reasonable network management," to accommodate an ISP's legitimate efforts to manage its services that might otherwise conflict with the prohibition. Also, the rules also included a transparency provision, requiring an ISP to "publicly disclose accurate information regarding the network management practices, performance, and commercial terms of its broadband Internet access services."[299] Similar rules applied to mobile broadband ISP, but with a more limited anti-blocking rule[300] and exemption from the prohibition of unreasonable discrimination.[301]

The *2010 Open Internet Order* also declared that:

> "[T]he Internet is a "*general purpose technology*" that enables new methods of production that have a major impact on the entire economy. (…) The Internet's openness is critical to these outcomes, because it enables a *virtuous circle of innovation* in which new uses of the network--including new content, applications, services, and devices--lead to

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[296] Ibid., 17906.
[297] Ibid., 17942¶ 63 .
[298] Ibid., 17944¶ 68.
[299] Ibid., 17937¶ 54.
[300] Ibid., 17959¶ 99.
[301] Ibid., 17962¶ 104.

> increased end-user demand for broadband, which drives network improvements, which in turn lead to the further innovative network uses. Novel, improved, or lower-cost offerings introduced by content, application, service, and device providers spur end-user demand and encourage broadband providers to expand their networks and invest in new broadband technologies. (…) These network improvements generate new opportunities for edge providers, spurring them to innovate further. (…) Openness also is essential to the Internet's role as a *platform for speech and civic engagement*."[302] (Emphasis is ours).

The FCC Commissioners Robert M. McDowell and Meredith A. Baker dissented the Preserving the Open Internet Order, arguing it was unnecessary, beyond the FCC's statutory authority, and harmful. 18049-76 [303] The FCC Commissioners Michael Coops and Mignon L. Clyburn, while concurring in the Preserving the Open Internet Order, arguing it did not go far enough in requiring network neutrality.[304] Many at the time saw these rules as weak and full of loopholes. Referring to consumer advocates' reactions, Russell Newman states that the *2010 Open Internet Order* was "particularly frustrating. (…) noncommittal in their commitments, disappointing in their outcome, declaring the agency's weak commitment to 'one Internet' while carving it into wired and wireless segments with different rules applied to each with loopholes yet to be explored." [305]

The non-discrimination rule contained in the *2010 Open Internet Order* operated on a case-by-case basis, with the FCC evaluating the conduct of fixed broadband ISP based on several factors, including conformity with industry best practices, harm to competing services or end users, and impairment of free expression. Although the Order did not entirely rule out the possibility of paid prioritization agreements, it made clear that such deals and practices were likely to be problematic because of the "no-unreasonable-discrimination" rule. Lastly, the Order did not prohibit broadband ISP from offering specialized services such as VoIP; instead, the FCC would continue to monitor such arrangements.

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[302] Ibid., 17911¶ 14.

[303] Ibid., 18049-76 (Dissenting Statement of Comm'r Robert M. McDowell); 18084-98 (Dissenting Statement of Comm'r Meredith A. Baker).

[304] Ibid., 18044-48 (Dissenting Statement of Comm'r Michael Coops); 18082-83 (Dissenting Statement of Comm'r Mignon L. Clyburn).

[305] *In* Newman, "The Paradoxes of Network Neutrality," 2.

Immediately after the *2010 Open Internet Order* became public, Verizon challenged it, claiming the FCC did not have the authority to enforce its new rules. This legal battle took an extended period and, in 2014, the D.C. Circuit Court of Appeals vacated and remanded the *2010 Open Internet Order* back to the FCC, mainly in Verizon's favor. In *Verizon v. FCC*, the Court invalidated the FCC's "no-unreasonable-discrimination" and "no blocking" rules, because of its lack of authority. Although the FCC lost the case, it also received it as good news. The Court held that Section 706(a) of the *Telecommunications Act* is an affirmative grant of power that justifies regulation aimed at implementing a network neutrality policy. Following the FCC's interpretation of Section 706(a) set forth at some length, the Court determined that the *2010 Open Internet Order* constitute a "reasoned explanation for its changed understanding" of the provision. Under the Supreme Court's decision in *Chevron*[306] the court was required to defer to the agency's interpretation if it represented "a reasonable interpretation of an ambiguous statute." Finding that this was indeed such an interpretation, the Court concluded that the FCC had successfully conferred upon itself the authority to regulate in a manner aimed at, as stated in Section 706(a), "encourag[ing] the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans."[307]

The Court nevertheless held the *2010 Open Internet Order* could not stand because the specific rules it contained contravened *the Communications Act* by regulating ISPs as common carriers. The touchstone to determining whether the rules treat ISPs as common carriers is whether they require a provider to "hold [it]self out to serve the public indiscriminately," under Title II, or a provider is permitted "to make individualized decisions, cases, whether and on what terms to deal." The Court concluded the FCC's *2010 Open Internet Order* fall on Title II of this division since they remove from carriers the discretion to choose to serve some edge providers by allowing their transmissions to go through, but not others, by blocking their transmissions or carrying them only upon negotiated terms. Nevertheless, the Court upheld the FCC's disclosure rules, which even Verizon did not contend were common-carrier regulations.

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[306] Chevron, U.S.A., Inc. v. Natural Res. Def. Council, Inc., 467 U.S. 837.

[307] Verizon v. FCC, 740 F.3d 623 (D.C. Cir.) (2014).

In 2014, four months after *Verizon v. FCC* decision, the FCC issued the *Notice of Proposed Rulemaking in the Matter of Protecting and Promoting the Open Internet*.[308] Now, per the blueprint offered by the D.C. Circuit Court of Appeals in its decision in *Verizon v. FCC*, and Section 706 of the *Telecommunications Act*, FCC had the authority to implement a network neutrality policy. Thus, in *Protecting and Promoting the Open Internet*, the FCC proposed to issue reformulations of the rules, defining ways to prevent and punish the practices that threaten an open internet. The "no blocking" rule was re-promulgated unchanged, but "with a clarification that it does not preclude broadband providers from negotiating individualized, differentiated arrangements with similarly situated edge providers." The "no-unreasonable-discrimination" rule would be converted into a rule prohibiting "commercially unreasonable practices." Both reformulations were designed to allow ISPs to offer individualized terms, thereby insulating these regulations from the charge that they constituted a common-carrier regulation, in the inevitable next court challenge.

Suddenly, on the way to the final rule, FCC changed the way to a novel, sophisticated "hybrid" approach. The White House released a statement and a two-minute video in which the U.S. President Barack Obama spoke in favor of network neutrality and urged the FCC to "reclassify Internet service under Title II of a law known as the Telecommunications Act."[309] The President's intervention had an immediate and dramatic effect. FCC Chairman Tom Wheeler abandoned the approach laid out in the *2014 Notice of Proposed Rulemaking* and started the development of the hybrid proposal, centered on the reclassification of broadband internet access service as a telecommunications service, subject to common-carrier regulation under Title II.

In February 2015, the FCC issued its "Clear, Bright-Line Rules" in the *Protecting and Promoting the Open Internet.*[310] The Order set rules to ban blocking, throttling, and paid

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[308] Protecting and Promoting the Open Internet, Notice of Proposed Rulemaking, 29 FCC Rcd. 5561 (2014).

[309] President Barack Obama, "Statement on Keeping the Internet Open and Free," 2014, https://www.whitehouse.gov/the-press- office/2014/11/10/statement-president-net-neutrality; President Barack Obama, "Statement on Net Neutrality," 2014, https://obamawhitehouse.archives.gov/the-press-office/2014/11/10/statement-president-net-neutrality.

[310] Protecting and Promoting the Open Internet, Report and Order on Remand, Declaratory Ruling, and Order, 30 FCC Rcd. 5601 (2015). hereinafter "2015 Open Internet Order" or "Title II Order."

prioritization practices, applying the same rules to both fixed and mobile broadband ISPs. Thus, this Order adopted straightforward bans:

> "A person engaged in the provision of broadband Internet access service, insofar as such person is so engaged, *shall not block* lawful content, applications, services, or non-harmful devices, subject to *reasonable network management*.
> A person engaged in the provision of broadband Internet access service, insofar as such person is so engaged, *shall not impair or degrade* lawful Internet traffic on the basis of Internet content, application, or service, or use of a non-harmful device, subject to *reasonable network management*.
> A person engaged in the provision of broadband Internet access service, insofar as such person is so engaged, *shall not engage in paid prioritization*.
> 'Paid prioritization' refers to the management of a broadband provider's network to directly or indirectly favor some traffic over other traffic, including through use of techniques such as *traffic shaping, prioritization, resource reservation, or other forms of preferential traffic management*, either (a) in exchange for consideration (monetary or otherwise) from a third party, or (b) to benefit an affiliated entity.
> (…) Any person engaged in the provision of broadband Internet access service, insofar as such person is so engaged, *shall not unreasonably interfere with or unreasonably disadvantage (i) end users'* ability to select, access, and use broadband Internet access service or the lawful Internet content, applications, services, or devices of their choice, or (ii) *edge providers'* ability to make lawful content, applications, services, or devices available to end users. *Reasonable network management shall not be considered a violation of this rule.*"[311] (Emphasis is ours).

The *2015 Open Internet Order* included three prohibitions. First, the FCC adopted a "no-blocking" rule nearly identical to the one it had promulgated as part of the 2010 Open Internet Order. Second, it supplemented the "no-blocking" rule with a "no- throttling" rule, forbidding carriers to impair or degrade lawful Internet traffic based on internet content, application, or service, or use of a non-harmful device. The two first rules are subject to the reasonable network management exception. Third, it adopted a "no paid prioritization" rule, prohibiting providers of broadband internet access from favoring some internet traffic over other traffic in exchange for payment from a third party or to benefit an affiliated entity. The FCC also enhanced the transparency rule.

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[311] Ibid., 5608.

Contrary to the *2010 Open Internet Order*, the rules were made applicable to mobile carriers to the same extent as to fixed carriers. The *2015 Open Internet Order* considered internet access constitutes a single, integrated service, combining data transport with data storage and manipulation services. The FCC found that "[t]he trajectory of technology in the decade since the Brand X decision has been towards greater and greater modularity," and "providers today market and offer consumers separate services that are best characterized as (1) a broadband Internet access service that is a telecommunications service; and (2) 'add-on' applications, content, and services that are generally information services."[312] The FCC, consequently, came full circle back to its 1998 determinations in which internet access (by then, via dial-up and DSL) consisted of separate offerings of a telecommunications service and an information service.[313]

Declaring that changed factual circumstances required a reconsideration of its previous determinations that internet access via DSL, cable modem, powerline, and wireless constituted an information service, the FCC reclassified broadband internet access, via all those technologies, as a telecommunications service. Given Title II, the FCC exercised its authority to forbear from thirty statutory provisions and render over seven hundred codified rules inapplicable and to establish a light-touch regulatory framework tailored to preserving those provisions that advance our goals of more, better, and open broadband. The FCC did not forbear from "a limited number of sections necessary to ensure consumers are protected, promote competition, and advance universal access, all of which will foster network investment, thereby helping to promote broadband deployment."[314] Last, the *2015 Open Internet Order* following its predecessor base their actions on a theory that broadband adoption is driven by a "virtuous cycle," whereby d the provider development increases end-user demand for internet access services, which drive network improvements, which in turn lead to the further innovative network uses and innovations.[315]

[312] Ibid., 5615.

[313] See more about *Computer Inquires* in Section 3.1 above.

[314] In the consumer protections, FCC did not forbear from included: privacy (Section 222); infrastructure access (Section 224); disabilities access (Sections 225.255.2551); and universal broadband (Section 254). *In* Ibid., 5617.

[315] Ibid., 5604.

The FCC Commissioners Ajit Pai and Michael O'Reilly[316] dissented. The first asserted in his statement that he dissents "from the FCC's decision to adopt President Obama's plan to regulate the internet"[317] Among the reasons presented, the FCC Commissioners alleged the *2015 Order* was part of the U.S. government's plan to control the internet, micromanage virtually every aspect of how the internet works, regulation will make broadband services more expensive and slower, reducing competition and expelling small providers from the market.

Several broadband carriers and other entities quickly challenged the *2015 Open Internet Order*. The challenges were consolidated before the D.C. Circuit Court of Appeals, under the case *United States Telecom Association v. FCC*.[318] In 2016, a divided panel of the D.C. Circuit Court of Appeals upheld the 2015 Open Internet Order, concluding that the FCC's classification of broadband internet access service was permitted under *Chevron*[319] step two. The Court denied petitions for rehearing of the case *en banc*,[320] and petitions for certiorari remain pending with the Supreme Court.[321]

In parallel to the Open Internet disputes, the *Recovery Act of 2009* required FCC to develop a National Broadband Plan (NBP), which should seek "to ensure that all people of the United States have access to broadband capability" and should "establish benchmarks for meeting that goal." The FCC started the drafting process of the NBP with the publication of a *Notice of Inquiry and Notice of Proposed Rulemaking*. On 2010, FCC submitted to U.S. Congress the document "Connecting America: The National Broadband Plan."[322]The NBP

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[316] Dissenting Statement of Comm'r Michael Orally 2015WL 6404996.

[317] Dissenting Statement of Comm'r Ajit Pai's, 2015 WL 1120107.

[318] United States Telecom Ass'n v. FCC, 825 F.3d 674 (D.C. Cir) (2016).

[319] Chevron, U.S.A., Inc. v. Natural Res. Def. Council, Inc., 467 U.S. 837.

[320] "United States Telecom Ass'n v. FCC, 825 F.3d 674 (D.C. Cir) (2016), Reh'g En Banc Denied, No. 15-1063, 2017 WL 1541517, at *1 (D.C. Cir.)," 2017.

[321] United States Telecom Association, et al. v. Federal Communications Commission, et al. 17 U.S.504; TechFreedom, et al. v. Federal Communications Commission, et al. 17 U.S. 503; NCTA - The Internet and Television Association v. Federal Communications Commission, et al. 17 U.S. 502; CTIA -The Wireless Association, et al. v. Federal Communications Commission, et al. 17 U.S. 501; American Cable Association V. Federal Communications Commission, et al. 17 U.S. 500; AT&T Inc. v. Federal Communications Commission, et al. 17 U.S. 499; and Daniel Berninger v. Federal Communications Commission, et al. 1 7 U.S. 498.

[322] Connect Am. Fund A Nat'l Broadband Plan for Our Future High-Cost Universal Serv. Support, 25 F.C.C. Rcd. 6657 (2010).

contains over 200 recommendations grouped into goals and recommendations. It defined six long-term goals, to be achieved by 2020[323] and recommended the following actions: fostering competition policies; ensuring efficient allocation and use of government-owned and government-influenced assets; creating incentives for universal availability and adoption of broadband; and updating policies, setting standards, and aligning incentives to maximize use for national priorities.

U.S. rural inhabitants have made considerable gains in adopting digital technology in recent years, but they remain less likely than nonrural adults to have home broadband, smartphones, and other devices. Nearly two-thirds (63%) of U.S. rural inhabitants said they have a broadband internet connection at home, up from about a third (35%) in 2007, according to a Pew Research Center survey conducted in 2016. U.S. rural inhabitants are now 10 % points less likely than Americans overall to have home broadband.[324] Even though rural areas are more wired today than in the past, substantial segments of rural America still lack the infrastructure needed for high-speed internet, and what access these areas do have tends to be slower than that of nonrural areas. The FCC recently announced the formation of a Rural Broadband Auctions Task Force to serve unconnected areas and expand mobile coverage to the rural communities in the U.S.

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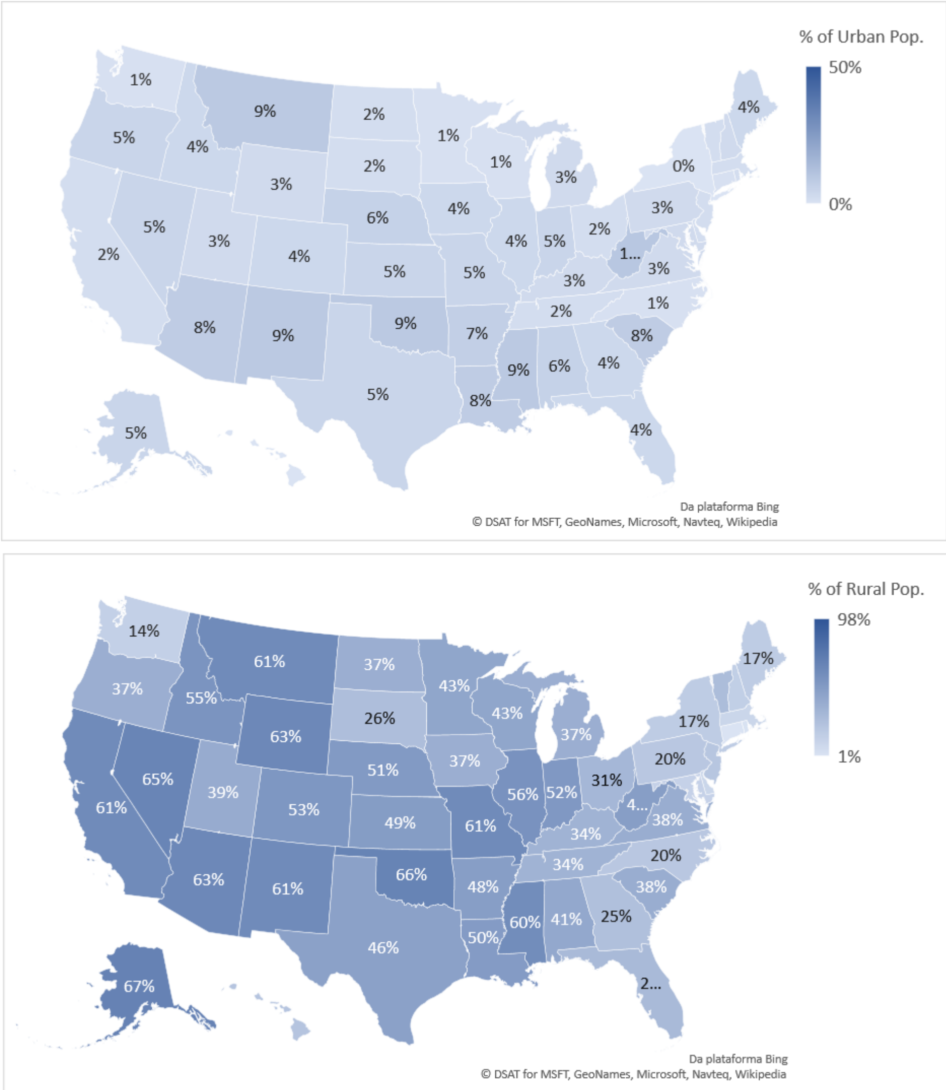
[323] NBP's goals: (i) at least 100 million U.S. homes should have affordable access to actual download speeds of at least 100 megabits per second and actual upload speeds of at least 50 megabits per second; (ii) The U.S. should lead the world in mobile innovation, with the fastest and most extensive wireless networks of any nation; (iii) every citizen should have affordable access to robust broadband service, and the means and skills to subscribe if they so choose; (iv) every North-American community should have affordable access to at least 1 gigabit per second broadband service to anchor institutions such as schools, hospitals and government buildings; (v) the safety of citizens shall be ensures, every first responder should have access to a nationwide, wireless, interoperable broadband public safety network; and (vi) the U.S. shall lead in the clean energy economy, every American should be able to use broadband to track and manage their real-time energy consumption.

[324] Pew Research Group Survey. Available at http://www.pewresearch.org/fact-tank/2017/05/19/digital-gap-between-rural-and-nonrural-america-persists/ Accessed on 9 January 2018.

Map 2 - Total of American Urban and Rural Population without Access to 25 Mbps/3 Mbps service (%) in 2016



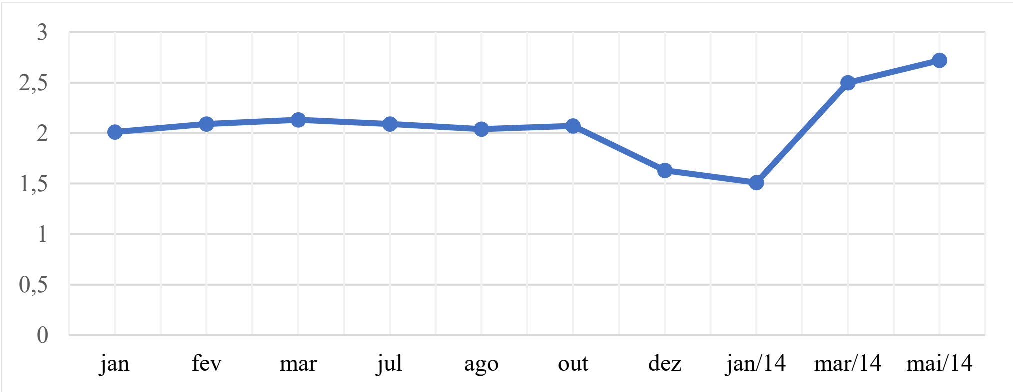
Source: FCC Data available at https://www.fcc.gov/reports-research/reports/broadband-progress-reports/2016-broadband-progress-report
Data gathered in December 2017.

a. Netflix-Comcast Deal

Beginning in 2012, some broadband ISPs, led by Comcast, refused to upgrade the ports that carried Netflix traffic, even though the cost was trivial. The ports overflowed, causing buffering and delays, and putting into question Netflix's underlying business model. Comcast, Time Warner Cable, and others demanded and received payments in the form of interconnection fees from Netflix in exchange for allowing its traffic to proceed as before.

The controversy between Comcast and Netflix is paradigmatic in exhibiting opportunities for discriminatory traffic management at the core of the internet. The agreements between Google and Verizon of also represent the shift towards the privatization of conflicts related to the infrastructure of the internet.

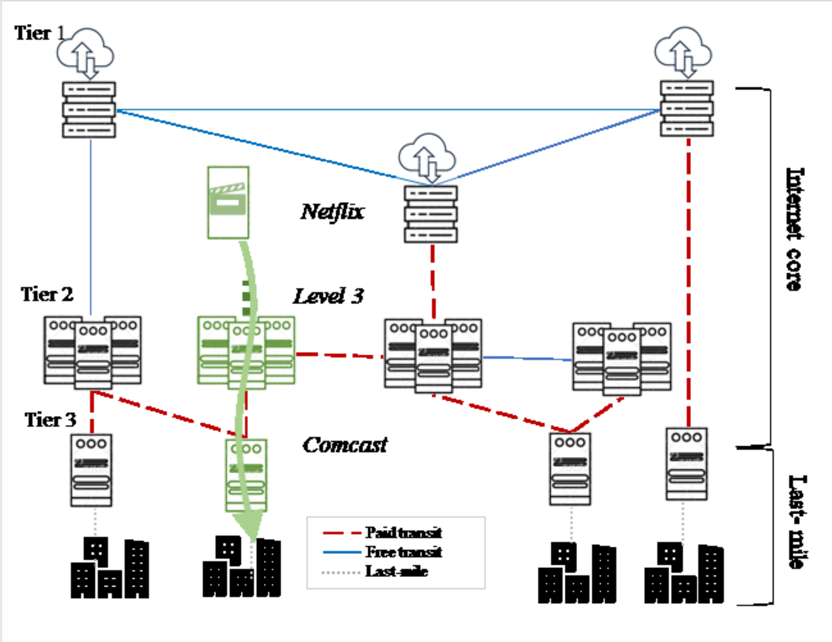
Chart 1 - Netflix-Comcast Deal (2013-2014)



Source: Author's elaboration. Data available at www.netflix.com
Data gathered in December 2017.

This practice was evidenced in the U.S. in 2014 when Comcast clients who were Netflix users were experiencing poor connection quality when accessing Netflix content. In response, Comcast said systemic congestion in their networks caused the low quality of access to its users of Netflix content since the end of 2013, and that direct connection was the only way to resolve this congestion problem. In February 2014, Netflix agreed in the direct connection between the company's servers and the Comcast networks, as illustrated in Figure 10. Data suggest that Comcast would have intentionally caused a reduction in the quality of the internet of its users and that soon after signing the agreement, the quality of access to Netflix servers increased suddenly, as shown in Chart 1.

Figure 10 - Netflix average connection speed for Comcast subscribers



Source: Author's elaboration

Network neutrality rule focuses on the last-mile and neglects issues at the internet's core, as demonstrated in Figure 10. It does not regulate direct connection agreements between ISPs and CAPs in the U.S. According to network neutrality rules; the ISPs cannot price discriminate against CAPs by creating fast lanes that would allow some OTTs to supply better download and upload quality to every single consumer. Network neutrality demand that consumers be offered the ability to choose different CAPs based on features other than speed. Under network neutrality rules CAPs cannot offer consumers a better experience by helping them pay for speed/bandwidth; under network neutrality rules, consumers can only negotiate speed/bandwidth with the ISP. So under network neutrality rules poor people cannot get subsidized and better content access because OTTs have paid ISPs to offer them more bandwidth (to get improved access to their content only): This would give said OTTs leverage as compared to those that, although offering better products, cannot subsidize their consumers' bandwidth (to get access to their content).

Network neutrality, in this sense, is but a trade-off between a better application-specific experience on the internet vis-à-vis more and better options subject to worse application-specific experiences on the internet. Moreover, important to say, it also protects freedom of speech, as mentioned earlier. Those who oppose network neutrality usually claim that it leads to a poor experience to all. That could not be further from the truth, though: because network neutrality rules forbid that OTTs pay the ISPs for the bandwidth in lieu of the consumers, only wealthy consumers of low-speed internet countries can get high-speed internet access and effective QoS after all – actually, they are the only ones who can pay for it.

3.3.2. 2017 FCC Restoring Internet Freedom Order

In May 2017, FCC the issued the *Restoring Internet Freedom Notice of Proposed Rulemaking* [325] to propose slight-touch bipartisan framework. The FCC specifically proposed to: reinstate broadband services as information service and mobile broadband service as a non-commercial mobile service; re-evaluate the FCC's existing rules and enforcement regime; analyze whether *ex-ante* regulatory intervention is necessary and whether to keep, modify, or eliminate the bright-line conduct and transparency rules; and to eliminate the internet conduct standard and the non-exhaustive list of factors intended to guide application of that rule.[326]

Shortly after the Notice became public, the FCC received more comments than any other rulemaking in its history. Between the Notice's release and the close of the comment period, on August 30, 2017,[327] more than 22 million comments were filed in the FCC's Electronic Comment Filing System (ECFS), with more submissions lodged during the Ex Parte period. Network neutrality proposed change be a highly controversial issue. Attorneys General of New York, California, District of Columbia, Delaware, Hawaii, Iowa, Illinois, Kentucky, Massachusetts, Maryland, Maine, Mississippi, North Carolina, Pennsylvania, Rhode Island, Virginia, Vermont, and Washington sent a letter to the FCC after reports emerged that nearly two million comments submitted in support of the 2017 Order were fake.[328] The FCC denies the plea.

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[325] Restoring Internet Freedom, Notice of Proposed Rulemaking, 32 Fcc Rcd. 4434, 2017 Wl 2292181, 82 Fr 25568, 32 F.C.C.R. 4434, F.C.C. (No. Fcc17-60, Wc17-108) (2017).

[326] Ibid., 7.

[327] Reply comments were originally due on 16 August 2017, but FCC granted a two-week extension.

[328] Available at https://www.mass.gov/files/documents/2017/12/13/FCC%20letter_12-13-2017.pdf. Accessed on 5 January 2018.

On 14 December 2017, FCC re-reclassified broadband internet services, regardless of whether offered using fixed or mobile technologies, as information services, under Title I, reversing the *2015 Internet Open Order*, which reclassified broadband ISPs as common carriers, under Title II of the *Communications Act*.[329]

In the *2017 Restoring Internet Freedom Order*, FCC declared:

> We reinstate the information service classification of broadband Internet access service, consistent with the Supreme Court's holding in Brand X. Based on the record before us; we conclude that the best reading of the relevant definitional provisions of the Act supports classifying broadband Internet access service as an information service. Having determined that broadband Internet access service, regardless of whether offered using fixed or mobile technologies, is an information service under the Act, we also conclude that as an information service, mobile broadband Internet access service should not be classified as a commercial mobile service or its functional equivalent. We find that it is well within our legal authority to classify broadband Internet access service as an information service, and reclassification also comports with applicable law governing agency decisions to change course. (…) we find that economic theory, empirical data, and even anecdotal evidence also counsel against imposing public-utility style regulation on ISPs.[330]

Also, the FCC changed opinion and stated that as an information service, mobile broadband internet access service should not be classified as a commercial mobile service or its functional equivalent. The Restoring the Internet Freedom Order presents the evolution of the broadband Internet access service regulation, since the *Computer Inquiries*,[331] to shield the information service categorization.

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[329] Restoring Internet Freedom, Declaratory Ruling, Report and Order, and Order, 2018 WL 305638, F.C.C. (No. WC17-108) (2018).

[330] Ibid., 7¶ 20.

[331] The 2017 Restoring the Internet Freedom Order asserts that subjecting Internet service providers and other information service providers to the broad range of Title II constraints, would seriously curtail the regulatory freedom that the Commission concluded in Computer II was important to the healthy and competitive development of the enhanced-services industry. It also presents arguments from the 2002 Cable Modem Order, the 2005 U.S. Supreme Court decision in *Brand X Internet Services*, the 2005 Wireline Broadband Classification Order, and the 2007 Wireless Broadband Internet Access Order, all classified broadband Internet access service as an information service.

Regarding the supposed previous virtuous cycle plea, now, the FCC claims that the *2010 and 2015 Open Internet Orders* were “loosely based on the existing economics literature, in some cases contradicted peer-reviewed economics literature, and included virtually no empirical evidence.”[332] In its new rules, the FCC advocates for a holistic view of the markets supplied by ISPs. The virtuous cycle is pushed by both ISPs and edge providers, and regulation must be evaluated accounting for its general impact. The underlying economic model of the virtuous cycle is that of a two-sided market, in which intermediaries behave as platforms facilitating interactions between two different customer groups or sides of the market. The *2010 and 2015 Open Internet Orders*, however, takes the position that innovation advanced by the edge provider drives consumer adoption of internet access and platform upgrades. The FCC points out that participants on each side of the market value the platform’s externalities and network effect. Thus, rather than a single side driving the market, both sides generate network externalities, and the platform provider profits by inducing both sides of the market to use its platform. In this scenario, the FTC would be the watchdog of competition.[333] In this sense, the *Restoring the Internet Freedom Order* asserts:

> In a two-sided market, three potential reasons for Title II regulation arise: the extent to which *ISPs have market power in selling internet access to end users*; the extent to which *ISPs have market power in selling to edge providers access to the ISP's subscribers (end users)*, which seems to primarily be to what the Commission and others appear to be referring when using the term “gatekeeper”; and the extent to which the *positive externalities present in a two-sided market might lead to market failure even in the absence (or because of that absence) of ISP market power*. (…) We note that our reclassification of broadband Internet access service as an information service leaves the usual recourse of *antitrust and consumer protection action* available to all parties. That is, heavy-handed Title II regulation is unnecessary to enforce antitrust and consumer protection laws.”[334]

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[332] Ibid., 45¶ 118.

[333] The FTC has broad authority to protect consumers from unfair or deceptive acts or practices, under 15 U.S.C. § 45(a)(1) and Section 5 of the FTC Act.

[334] Ibid., 46¶¶ 121-122.

FCC Commissioners Mignon L. Clyburn and Jessica Rosenworcel dissented. The first emphatically said "I dissent from this fiercely-spun, legally-lightweight, consumer-harming, corporate-enabling Destroying Internet Freedom Order" in his statement.[335] The FCC's repeal takes effect 60 days after publication in the Federal Register. Federal Register publication does not happen immediately. In 2015, when the *Open Internet Order* was imposed, publication occurred more than six weeks after the FCC vote. Litigants will probably file lawsuits challenging the *2017 Restoring Internet Freedom Order* to reverse it. The New York Attorney General Eric T. Schneiderman already released a statement announcing he will lead a multistate lawsuit to stop the *2017 Order*. According to the U.S. Supreme Court current blueprint, a regulatory agency shall demonstrate its action is not "arbitrary" or "capricious" and, when course dramatically, it must "examine the relevant data and articulate a satisfactory explanation for its action." The aftermath of the *2017 Order* is yet to be known.

[335] Dissenting Statement of Comm'r Mignon Clyburn, WC 17-108, 2017 WL 6404996.

3.3.3. The U.S. Congress and Network Neutrality: Democrats *v.* Republicans

Reactions to *2017 Restoring the Internet Freedom Order* and network neutrality's backlash, legislators in different states across the U.S. began proposing bills to enforce network neutrality principle at the state level. In December 2017, such bills were proposed in Massachusetts, New York, and Washington. The month of January 2018 already saw two other neutrality draft bills being proposed in California [336] In a similar reaction; the U.S. Senate is expected to vote on a draft bill that would make use of the Congress authority to discard the FCC's *2017 Order*. [337] The drafting and enforcement of network neutrality laws are mired in nuance while the ecosystem being legislated is evolving faster than the governing legislation. Network neutrality issue can only be definitively solved via an act of the U.S. Congress. The FCC interprets the Communications Act, but only Congress can permanently clear up confusion in the law. Conflicts are exacerbated by massive lobbying costs, political donations, and agency capture. However, contrary to what some might think, the absence of laws in this regard does not advance freedom and laissez-faire, quite the reverse, it leads to considerable legal uncertainty because courts end up deciding according to rules often created *ad hoc* without a legal standard for making decisions about the internet.

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[336] The first makes it unlawful for ISPs to block or limit internet services, to interfere with or disadvantage customers' access to internet service, or to engage in deceptive or misleading marketing practice. The second regulates business practices to require net neutrality. Available at: http://sd11.senate.ca.gov/news/20180103-senator-wiener-introduce-net-neutrality-legislation-today-california-legislature. Accessed on 10 January 2018.

[337] Available at: https://www.markey.senate.gov/imo/media/doc/CRA%20Net%20Neutrality%20.pdf. Accessed on 10 January 2018.

Chart 2 - Proposed Bills in the U.S. House of Representatives and Senate (1999-2017)

Source: Author's elaboration. Data Available at https://www.congress.gov/
Data gathered in January 2018

Nevertheless, network neutrality debate is not novel to the U.S. Congress. On the contrary, it has been an issue frequently present in the political debate, including presidential interventions and intense legislator activity. As Chart 2 above demonstrates, since 1999, more than fifty bills were related to network neutrality debate, being the early ones directly related to the open access rule. The polemic even exceeds the opposition between Democrats and Republicans. Politicians and voters have positioned themselves as supporters and opponents of network neutrality. In contrast to the Brazilian statutory provision on network neutrality, in the United States, the debate occurs in the regulatory and judicial realms, while the U.S. Congress decides not to decide the issue.

3.4. The Market for Internet Access in the United States: Divide between Information Haves and Have Nots

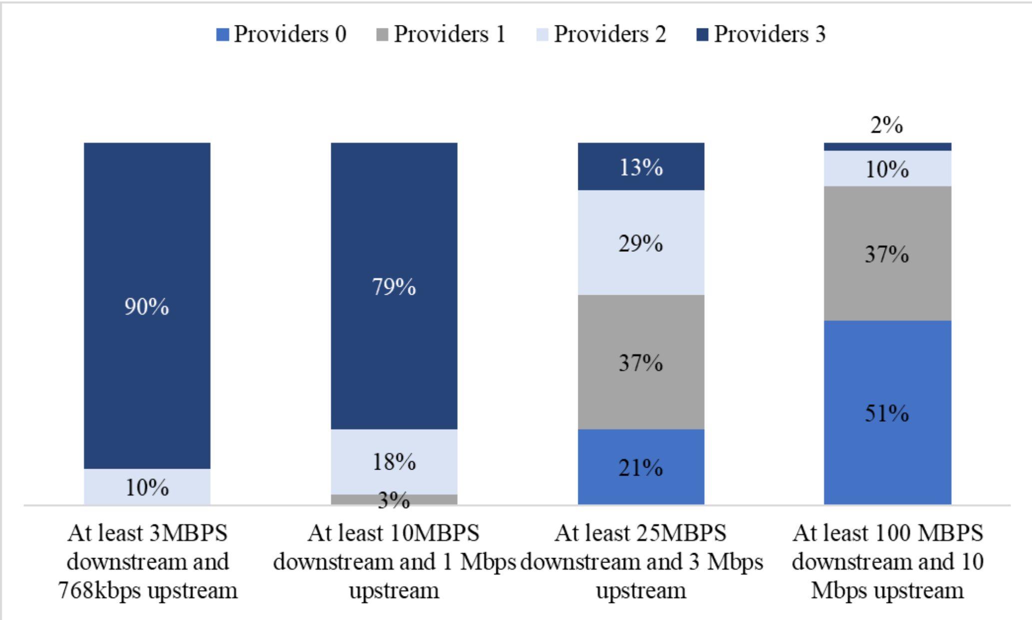
The FCC filed a report in April 2017 describing the status of internet access as of June 2016.[338] According to the FCC, nearly 60% of U.S. households are served by only one ISP offering 25 mbps or better broadband download speeds or have no broadband access at all. Only 13% have more than two broadband options, as Chart 3 below illustrates. According to a Pew Research Center Survey conducted in 2016, only 49% of African Americans and 51% of Hispanics have high-speed internet at home, as compared with 66% of Caucasians. About two-in-ten Hispanics (22%) and 15% of African Americans are "smartphone only" internet users, which means they lack traditional home broadband service but do own a smartphone. By comparison, 9% of Caucasians fall into this category. Smartphones are not the only way those without traditional access options attempt to bridge these gaps. Libraries can play an important role: 42% of black library users say they use libraries' computers and internet connections, compared with 15% of whites.[339]

338 FCC. Internet Access Services: Status as of June 30, 2016. Industry Analysis and Technology Division Wireline Competition Bureau (2017). Available at https://www.fcc.gov/general/iatd-data-statistical-reports Accessed on 20 December 2017.

339 Pew Research Croup Survey (2016). Also, the Survey shows that "[s]mart phones have helped bridge the divide, as they provide internet access to populations previously at a digital disadvantage. Pew reports that, among smart phone owners, "young adults, minorities, those with no college experience, and those with lower household income levels" are more likely to access the internet primarily through their phones." Available at http://www.pewresearch.org/fact-tank/2017/03/22/digital-divide-persists-even-as-lower-income-americans-make-gains-in-tech-adoption/ Accessed on 20 December 2017.

Also, 11% of U.S. adults do not use the internet, according to the Survey. Seniors are the age group most likely to say they never go online. Although the share of non-internet users ages 65 and older decreased by 7 %points since 2016, about a third today do not use the internet, compared with only 2% of 18- to 29-year-olds. Household income and education are also indicators of a person's likelihood to be offline. Roughly one-in-three adults with less than a high school education (35%) do not use the internet, but that share falls as the level of educational attainment increases. Adults from households earning less than $30,000 a year are far more likely than the most affluent adults to not use the internet (19% vs. 2%).

Chart 3 - Percentages of developed census blocks in which ISPs reported the deployment of residential fixed broadband as of June 30, 2016



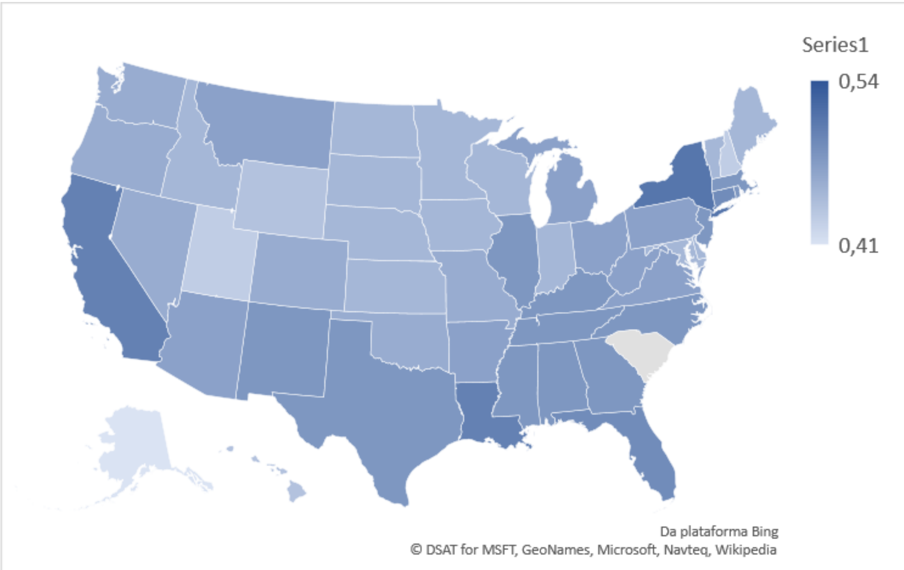
** Satellite service providers report offering Internet access at bandwidths of at least 10 Mbps downstream and 1 Mbps upstream min 99.1% of developed census blocksColumn figures may not sum to 100% due to rounding. Developed census blocks are those with housing units based on the 2010 census.*

Data available at https://www.fcc.gov/reports-research/reports/broadband-progress-reports/2016-broadband-progress-report

Data gathered in December 2017.

For the last decade, the concept of a digital divide has framed people's understanding of technology's relationship to equality and development. In the United States 10 % of the population lack access to the internet (25 Mbps/3 Mbps). Among them, 39 % live in rural areas. By contrast, only 4 % of urban North-Americans lack broadband internet access. Inequalities according to social class and area persist in household internet access. Map 3 highlight the reflection of prolonged socioeconomic inequalities between the U.S. states and the internet access. Inequalities found in other social and economic indicators such as the Gini reflects the lack of internet access, especially between urban and rural areas.

Map 3 - Gini coefficient as a measure of household income distribution inequality for U.S. states in 2016



Source: World Bank. Available at: https://data.worldbank.org/data-catalog/all-the-ginis/ Data gathered in December 2017.

The telecommunications market in the U.S. can be viewed as comprised of three separate categories of services: wireline voice, wireless mobile, and broadband. On the residential side, fixed voice services are primarily dominated by the companies that held local telephone monopolies before the advent of the *Telecommunications Act*, which introduced competition into the sector, and cable video companies that now also provide fixed voice service. Major companies in these categories are Verizon, AT&T, Century Link, Comcast, Time Warner Cable, and Charter Communications. There are four primary nationwide mobile wireless ISPs: Verizon, AT&T, T-Mobile, and Sprint. The mobile wireless market is dominated by AT&T and Verizon Wireless. Together they account for nearly 70 % of the mobile wireless connections. Also, to those nationwide providers, there are numerous regional and local providers across the country, but they have limited reachability. Wired broadband services, including cable, DSL, and fiber, collectively represent 97 % of the fixed broadband market. Cable modem service, including services provided by Comcast, Charter, and Cox, is the most common fixed broadband service, accounting for approximately 59 % of all subscriptions.[340]

While there was much competition among ISPs in the early 1990s, the last 20 years have been defined by massive vertical integration. Not only is competition rare, but it is also decreasing through consolidation.[341] Recent transactions include AT&T-DirecTV, in 2015;[342] Charter-TimeWarner-Bright House Networks, in 2016;[343] Verizon-XO, in 2016;[344] and CenturyLink-Level 3, in 2017.[345] Comcast, AT&T, and Time Warner Cable are now operating with regional monopolies in many locations. The pending AT&T-Time Warner merger is driven by its need for new wireless distribution channels, as Figure 11 illustrates. AT&T wants to sell more video content as a way of backstopping its shrinking wireless service business. TV broadcasters are facing real competition from OTT providers, like Netflix and Amazon. Terrestrial radio stations are feeling competitive pressure from satellite radio like SiriusXM, and from streaming music services, like Pandora and Spotify.

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[340] Regulation and Outsourcing in United States: Overview *in* Communications: Regulation and Outsourcing Global Guide. *Practical Law*, *Westlaw*. Accessed on 5 January 2018.

[341] AT&T and Verizon top the 2017 Forbes Global 2000 list of the world's largest telecom companies. Available at https://www.forbes.com/sites/antoinegara/2017/05/24/the-worlds-largest-telecom-companies-att-and-verizon-top-china-mobile/#349773ca4523 Accessed on 5 January 2018.

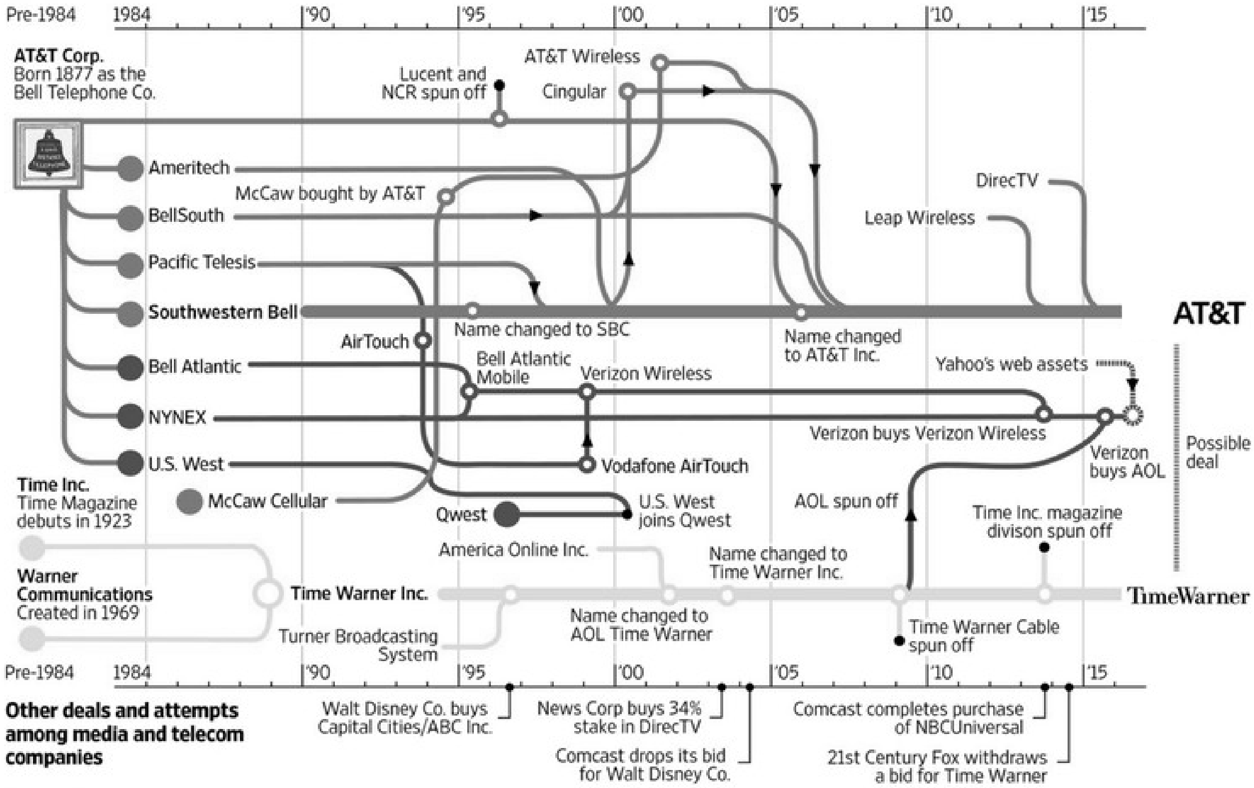
[342] In July 2015, the FCC approved a merger between AT&T and DirecTV, a satellite video provider with about 20 million US subscribers. The FCC imposed many conditions on its approval of the merger, requiring the newly merged entity to increase its deployment of high speed internet access services, and to adopt a program to encourage the adoption of broadband in low-income households by offering discounted services throughout its wireline footprint.

[343] In May 2016, the FCC approved a merger between Charter, Time Warner Cable and Bright House Networks, which resulted in a combined company that is now the second-largest cable operator in the US. The FCC imposed conditions on the approval of the merger, restricting it for seven years from imposing data caps on consumers or charging interconnection fees. The conditions also require Charter to expand its service to two million additional households within five years.

[344] In November 2016, the FCC approved a merger between Verizon, one of the largest wireless telecommunications providers in the US, and XO Communications, which controlled and operated an extensive fiber network. The acquisition extended Verizon's spectrum holdings and will help the company densify its cellular network and deploy 5G technologies. The FCC did not impose conditions on the approval.

[345] In October 2017, the FCC approved a merger between CenturyLink, the third-largest US local landline phone and Internet company, and Level 3, a provider of primarily fiber-based services, including internet backbone and broadband transport. The transaction extended CenturyLink's fiber network and expanded its offerings for business data services customers. As a condition of approval, CenturyLink cannot raise its business data service rates in ten specified markets for five years.

Figure 11 - AT&T and Time Warner Merger and the consolidation in the telecommunication and media industries in the U.S.



Source: The Wall Street Journal

In this context, entities are vertically integrating to secure content (e.g., AT&T's proposed acquisition of Time Warner as a specific play for content) or to secure control of the distribution platform for their content (e.g., NBCUniversal's acquisition of a low-power television station and lease of spectrum rights to serve as the NBC network affiliate in the Boston market, replacing a longstanding independently owned NBC affiliate). The phenomenon goes global. Carriers around the world are in a consolidation push, seeking to grow their subscriber bases through improved service and new features. It is likely a zero-sum game, with power concentrating to the industry's top players. In this market with few ISPs, and many companies seeking profits by promoting their content via their networks, network neutrality protections will only become more critical, not less so. Worsening this scenario, internet firms, like Google and Facebook, are established monopolies or oligopolies in the market for internet search, internet advertising, internet e-mail and other content.[346] Today, U.S. wired market hardly is far from the competition as the *Telecommunications Act* sought to create.

[346] Clark, "Network Neutrality: Words of Power and 800-Pound Gorillas," 704.

CHAPTER 4. NETWORK NEUTRALITY IN BRAZIL: ENDURING ISSUES, EMERGING PRESSURES

In comparison to the United States, Brazil, as well as other developing countries, has a smaller established market of internet-based companies. Therefore, Brazil has a broader understanding of network neutrality debate when compared to the United States. The BRC targets to forward and asserts freedom of expression, interoperability, open standards and technology, protection of personal data, accessibility, multistakeholder governance, and open government data. Under global pressures, Brazil took major steps towards preserving network neutrality.

In this section, we revisit the history of the telecommunications regulation in Brazil and the struggles that preceded the arrival of network neutrality debate. The Brazilian discussion of network neutrality focuses on internet governance principles and the protection of innovation and investment in internet access infrastructure in the last-mile. First, we explore the regulatory challenges for the development of the internet in the Brazilian territory, including the deregulation wave and the PNBL reforms. Second, we explore the main discussions related to network neutrality during the BCR legislative process. Third, we analyze the zero-rating and data caps recent disputes, emphasizing the solutions implemented by the Brazilian authorities. Finally, we exam the internet access market structure in Brazil and the digital exclusion.

4.1. The Development of the Internet in Brazil: Regulatory Challenges

Telecommunications regulation in Brazil starred in 1962 with the enactment of Law No. 4,117 of 1962, the so-called *Telecommunications Code*. The 1962 Code established the National Telecommunications Plan and created a centralizing policy-making body, the National Telecommunications Council, and the state-owned company Empresa Brasileira de Telecomunicações (Embratel), which handle all long-distance connections.[347] In 1972, the

[347] In the economic vernacular, the telecommunications sector is a natural monopoly since it has high fixed costs and low marginal costs that lead to large scale economies. Although different from the private

Brazilian government, profoundly influenced by the push for Import Substitution Industrialization (ISI) policies, created the Telebrás System comprising holding company and more than 20 subsidiaries.

At the beginning of the 1970s, Latin America was profoundly influenced by the U.N. Economic Commission for Latin America and the Caribbean (ECLAC) and its structuralism. ECLAC's foundation is based on the existence of structural differences in the underdeveloped economies, arising from the historical process of international economic expansion.[348] It also criticized comparative advantages in international trade, as well as the support of an economic system based on the center-periphery relationship, and advocated for ISI policies in peripheral countries. For ECLAC's advocates, underdevelopment is not a capitalist phase, but a structure determined by the process of industrial development.[349]

The Second National Developmental Plan (1975-1979) proposed the expansion of the telephone lines and ended up acting as a stimulant for the multinationals in communications. In 1975, Brazil had over 900 radio stations and 64 television stations.[350] Five years later, Brazilians would be astonished by the purchase of Light for over a billion dollars. Light's assets were now converting into passives for the nation because its concessions for Rio de Janeiro and São Paulo would end, respectively in the late 1990s. The growth of the number of telephones also indicates the success obtained with the planning policy for the sector in that period. In 1988, the promulgation of the Federal Constitution maintained telecommunications services under the government control pursuant arguing its strategic importance.

However, in the early 1900s, the sector faced significant crises. At the time, the government should have invested 3,3 billion U.S. dollars in telecommunications, in the year of 1991, it invested only 2,3 billion. Embratel was tormented by decapitalization and a

monopoly that existed at the time in the U.S., the state-owned monopoly model was predominant around the world and intensely advertised by the ITU.

[348] Calixto Salomão Filho, *Monopolies and Underdevelopment: From Colonial Past to Global Reality* (Edward Elgar, 2015), 27.

[349] Calixto Salomão Filho, "Regulação e Desenvolvimento," in *Regulação e Desenvolvimento* (Malheiros Editores, 2002), 34.

[350] Marcelo S. Alencar, "Historical Evolution of Telecommunications in Brazil," *IEEE Foundation*, no. September (2003).

broader crisis of the ISI model, implemented by the previous military government. Also, Brazil was confronted with financial crises, debt loads and restructuring programs pressured by the IMF and other international actors. These transformations reduced Brazil's ability to maintain investment in telecommunications or find new sources of financing to expand services into underserved areas, such as poor neighborhoods or rural areas. The system was worse at the beginning of the 1990s than it was at the beginning of the 1970s.

4.1.1. Telecommunications Reforms in Brazil: Deregulation and Privatization

In the mid-1990s, the commercial internet arrived in Brazil without being able to meet the demand due to lack of capacity of the few backbones available. The Brazilian telecommunications system was facing significant economic and institutional crises. The long-established stated-owned monopoly model became outdated and international pressures started to advocate for market competition. Profoundly influenced by the deregulation movement in the United States and the *1996 Telecommunication Act*, privatizations came as a solution to the lack of resources related to infrastructure's development in Brazil.[351]

The discourse in favor of telecommunications privatizations was strongly influenced by the rise of the "Washington Consensus" and its neoliberal ideas. Latin American governments, including Brazil, was urged to implement pro-market reforms to fit into the new mainstream model and to overcome the economic crisis.[352] In 1995, the Brazilian Congress passed the *Constitutional Amendment No. 8*, which made possible the end of state monopoly in the exploitation of telecommunications services. In parallel, the arrival of the internet in Brazil, the *Standard No. 04 of 1995* was published by the Ministry of Communications, and introduced the concept of the internet as a "value-added" service

[351] Diogo Coutinho, "Entre Eficiência e Eqüidade: A Universalização das Telecomunicações em Países em Desenvolvimento," *Revista Direito GV* 1, no. 2 (2005): 138–39.

[352] Williamson, "What Washington Means by Policy Reform," 8–17.

(VAS),[353] establishing a clear distinction between internet and telecommunications and services.[354]

Also, in 1995, to organize and frame the internet's development with the society participation, the Ministry of Science and Technology, together with the Ministry of Communication, set up the Brazilian Internet Steering Committee (CGI.br). The CGI.br was created via the *Inter-Ministerial Notice No. 147 of 1995*.[355] The idea was to create a multi-sectoral committee with members of different sectors of society, such as government, academia, civil society, and businesses, to discuss and design solutions for extending the internet across the country. CGI.br its functions include fostering the development of internet services in Brazil; recommending technical and operational standards and procedures for the internet in Brazil; coordinating the allocation of internet addresses, the registration of domain names; and the interconnection of backbones; collecting, organizing and disseminating information about internet services. Although the Notice sought to ensure multistakeholder participation, it did not address the formulation of investment policies regarding the expansion and improvement of infrastructure.

Ensuring the privatization plan, the *Law No. 9.472 of 1997*, also known as the General Telecommunications Act (LGT), established a new regulatory framework and initiated the process of deregulation of the state telecommunications holding company Telebrás.[356] The LGT provided the legal structure for telecommunications services, defined the general principles governing these services, and created the ANATEL the regulatory agency responsible for the telecommunications sector regulation, including the granting of

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353 "*Serviço de valor adicionado*" in Portuguese. VAS is the terminology adopted in Brazil and also means "enhanced services," more recurrent in the U.S. literature. VAS is not merely an extension of a basic service, but it adds value to the basic service.

354 *Notice No. 04 of 1995* stated the internet is the "generic name that designates the set of networks, the means of transmission and switching, routers, equipment and protocols necessary for communication between computers, as well as the software and data contained in such computers." Brazil followed the categorization adopted by the U.S. *Computer Inquires*. Such definition was updated only in 2014, by the Brazilian Civil Rights Framework, which states that internet is "the system consisting of the set of logical protocols, structured worldwide for public and unrestricted use, to enable data communication between terminals through different networks."

355 *Notice No. 147 of 1995* also instituted CGI.br and determined its functions. It complemented and modified by subsequent ordinances, such as *Inter-Ministerial Notice No. 183*. In September 2003, the *Decree No. 4829 of 2003* was issued setting out the norms governing the CGI.br and its competences. In 2009, CGI.br *Resolution No. 3* listed principles to guide internet governance and its use in Brazil.

356 "Desafios e Oportunidades do Setor de Telecomunicações no Brasil," 2010, 5.

licenses and authorizations for the exploitation of services. Following, the *Standard No. 04 of 1995*, Art. 61 of the LGT defined internet services as VAS.

Political pressures and concern with social welfare an economic development sought to embed LGT with social goals that included network expansion obligations, the so-called "universalization of services," and the creation of a competitive environment that could benefit consumers' right to choose a service provider. The chosen model followed the principle of competition based on telecommunications infrastructures, influenced by the North-American model, according to which competition would be provided in the supply-side by parallel network infrastructures, that is, each ISP it would have its infrastructure to support the services it offers.

In 1998, the twenty-eight subsidiaries of the monopoly-holding Telebrás System were restructured into twelve companies through the General Concessions Plan. This created eight regional cellular carriers, three fixed-line companies and a long-distance and international operator Embratel. Following the government's shareholdings in the twelve companies were auctioned off.[357] As a result, three incumbent local fixed telephony private concessionaires emerged: Telesp, later renamed Telefonica, covering the state of São Paulo; Tele Centro Sul, later renamed Brasil Telecom, covering the South and Central regions of Brazil; and Tele Norte Leste, later renamed "Oi," covering the North and East regions of the country.

Following the sale, ANATEL announced that it would be issuing four mirror concessions (licenses) to act as competitors to the four fixed-line carriers.[358] The local operators, however, will not be allowed to offer inter-regional or international services until

[357] With its restructuring, Telebrás ceased to have operating income-generating assets, remaining only with funds from financial investments intended to keep it until its final liquidation - which never occurs, since the Brazilian National Broadband Program, implemented in 2010, decided to reactivate Telebrás.

[358] The selling process started with the Band-B licenses auction and the whole country was divided into 10 operational areas. Following, the fixed access companies were grouped by the Brazilian Government in three regions and sold: North-East, Center-South and São Paulo State. The Band A had license to operate cellular spectrum frequencies and was auctioned with the companies, including subscriber base, offices facilities, equipment plant, infrastructure, etc. Finally, the long distance and international operators, incumbent (former Embratel) and mirror was sold to MCI. After the sold out of the incumbents' companies, the fixed access mirror license auction did not attract the interest of many investors. The licenses were sold for an atypical low price.

2002 at the earliest. The recent regulated competition model has provoked a wave of investments for modernization of the infrastructure. National broadcast companies and financial institutions have targeted the transmission of data since the beginning of the 1980s. Other multinationals were also mobilized to enter the commercialization of telecommunication services. Nothing less than sixteen Brazilian states opened competing companies for the implantation of mobile telephony systems in 1992.[359]

Aiming at legitimating the whole idea of privatization and deregulation, the Brazilian Government committed to investing the accumulated resources earned from the telecommunications sector sale on education, healthcare, and welfare, and to implement the concept of universal telecommunications service. However, reconciling universal service goals with the market paradigms was one of the central challenges of that time. One of the problems with the privatization of telecommunication services is that private companies do not have the incentive to offer services in every area in a country. This is one of the reasons for the extended period of state-owned monopoly. Private ownership and market forces were not considered enough to fulfill universal service.[360] Universal service, in this context, was a social policy that aims to spread the use of telecommunications service to the most substantial number of people as possible, due to the social and economic positive externalities. Diverging from the U.S. concept, which threated internet access as universal service, in Brazil, the LGT defines universal service as a right for telephone access to any citizen, regardless of location and social, and economic status.

Under the 1998 fixed telephony concession agreements, concession terms would end on 31 December 2005 and could be renewed for twenty years, if the concessionaires regularly implemented the conditions of the contract.[361] The incumbent operators assumed obligations related to the universalization of fixed telephony, which was named as the

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[359] Alencar, "Historical Evolution of Telecommunications in Brazil."

[360] The definition of "universal services" changed over time. As mentioned before, in the early 20th century, universal service meant the unification of the telephone system so users could reach others and be reached. Even considering different concepts, the natural monopoly rationally applies.

[361] The Brazilian Ministry of Communications restricted foreign ownership in the first privatization auction of state controlled mobile phone operators in mid-1997. Foreign firms thus had to form joint ventures to enter that market.

General Plan for Universalization (PGMU).[362] It was approved by *Decree No. 2,592 of 1998* and established short-run goals, based on enforcement of minimum quantities to be supplied by the new private owners of the privatized regional companies.[363] The PGMU also limited the universalization goals to the incumbent privatized companies to be implemented until December 31, 2005. Most of PGMU's goals were related to individual telephone line subscriptions, installment of public telephones and on building fixed telephony infrastructure in unattractive areas

The PGMU was massively criticized for having technical and economic frailties. Its definition of minimum levels does not differentiate either rich or poor or either profitable or unprofitable areas, dampening the efforts to foster competition and perpetuating social exclusion.[364] Mirror companies remained free from such obligation. Other services, including mobile telephony and data transmission, were not subject to universalization obligations, neither contracted through concessions. Mobile and data services are operating under the authoritarian regime, which imposes lesser state regulation, in accordance to LGT. In 2006, the fixed telephony concessions were renewed for additional twenty years.[365]

In parallel, as part of the telecommunications reform, the "General Guidelines to the Openness of the Telecommunications Sector in Brazil" was published in 1997. The Guidelines stressed the reforms' primary goals were the instruction of market competition and guarantees of universal access to the basic telecommunications service. However, the most sensitive aspect of the universal service policy is its funding. Brazil initiated two programs aiming to widen the scope of universal service to foster internet and other advanced information services. The permanent provisions regarding the funding of the universal

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[362] "*Plano Geral de Metas de Universalização*" in Portuguese.

[363] The Universalization Service Plan established targets for minimum amounts of supply of individual and collective wire terminals by state and toward locations with small population. Every Brazilian state hadtheir own targets. There were also targets for disabled persons, hospitals, and school attendance.

[364] Coutinho, "Entre Eficiência E Eqüidade : A Universalização Das Telecomunicações Em Países Em Desenvolvimento"; Alexandre D. Faraco, Caio Mário Pereira Neto, and Diogo Coutinho, "A Judicialização de Políticas Regulatórias de Telecomunicações No Brasil," *Revista de Direito Administrativo* 265, no. 1998 (2014): 25–44; Alexandre D. Faraco and Diogo Coutinho, "Network Industry Regulation: Between Flexibility and Stability," *Seattle Journal …*, 2012, 721–53.

[365] Concession agreements stated that revision proceedings should be taken in 2010, 2015, and 2020 to establish new conditions, universalization and quality goals, according to the conditions of the time.

service in the LGT are partly based on resources coming from the fiscal budget and partly from the companies.

The *Law No. 9,998 of 2000* set up the Telecommunications Services Universalization Fund (FUST). Companies operating telecoms services under both the public and private regimes must contribute 1% of their gross operating income. This approach creates potential structural distortions: if there are transactions between non-integrated companies, there is an implicit incentive to merge and become a single firm to avoid taxation. However, since this tax will not be applied to transactions between telecommunications companies, it became a value-added tax (VAT).[366] Also, *Law No. 10,052 of 2000* set up the Fund for the Technological Development of Telecommunications (FUNTTEL). All telecoms service providers must contribute to it 0.5% of monthly gross operating income. While FUST would be used to finance social investments, such as telecommunications service providers in the low-profit area, FUNTTEL would be used to boost the national technology development.

In 2001, ANATEL created the multimedia communication service (SCM),[367] by *Resolution No. 272 of 2001*. It considered the license for converged service within the cast of twenty-seven licenses provided under Brazilian regulatory framework. With reduced cost and broader scope, the SCM was designed to increase licensing in Brazil. The LGT also had a significant impact on cable services, but this market did not grow as expected with the market opening. ANATEL remained almost ten years without granting new licenses to cable.[368] It was only with the *Law No. 12,485 of 2011* that the service for conditional access (SAC)[369] was created and boosted this market. Another unsuccessful action to build a national broadband network occurred in 2003 when ANATEL formulated the proposal for digital communication services (SCD).[370]

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[366] César Mattos, "Universal Service in the Brazilian Model of Telecommunications Reform," *Est. Econ.* 32, no. 2 (2002): 225–59.

[367] "*Serviço de comunicação multimídia*" in Portuguese.

[368] Since there is no use of radio frequency spectrum, bidding would not be necessary and licenses could be granted by simple operator's demand.

[369] "*Serviço de acesso condicionado*" in Portuguese.

[370] "*Serviço de comunicação digital*" in Portuguese.

Another discussed topic in the Brazilian telecommunications landscape is the transfer of 150 MHz bandwidth from multichannel multipoint distribution (MMDS) to personal mobile service (SMP) through a decision approved by the *Resolution 544 of 2010*. For ten years, ANATEL delayed the approval of the equipment for the provision of broadband services by MMDS operators. However, design problems and the resistance to new entrants early ruined the discussion. Even though the ANATEL rules are the embryonic origin of network neutrality debate, ANATEL affirms regulations on non-discrimination of data traffic have a more significant concern with competition and isonomy among users, and not necessarily with the preservation of an open internet model. The ANATEL non-discrimination rules are described in Table 1 below.

Table 1 - Consolidation of Non-Discrimination Rules in ANATEL Regulations

(SCM)	**(SMP)**	
Art. 7.º and Art. 8.º	Art. 60	Make the use of the SCM and SMP networks available to *provide VAS in a non-discriminatory manner and at fair and reasonable prices and conditions*
Art. 38, Art. 56, III and Art. 47, VII	Art. 6.º, II	Provide the service on *a non-discriminatory* basis to all users
Art. 68	Art. 35	Offer services at fair, equitable and non-discriminatory prices (may vary according to technical characteristics, specific costs and amenities and facilities offered to users)

Source: Author's elaboration

In 2006, a new PMGU became effective under *Decree No. 7, 769 of 2006*. As the first PMGU, it defined goals related to individual and fixed public telephones and introduced new goals, including the implementation of telecommunications service stations for collective use (PST).[371] The PST should have, at least, one public telephone and one public access terminal for dial-up internet connection, and should have been installed in several urban and rural localities determined by the plan. This new arrangement intended to induce the switched fixed telephone service infrastructure to support internet connection.

[371] "*Telecommunications service stations*" in Portuguese.

In 2008, the Brazilian government altered the PGMU II, through *Decree No. 6,424 of 2008*, to remove the obligation to install PST and add the obligation of building an internet backhaul.[372] After negotiations with the Brazilian government, the concessionaires agreed with the change of universalization goals and signed amendments to the concession contracts. However, by including the backhaul obligation, a new struggle emerged. Incumbents pressure to amend the concession agreement to expressly state the backhaul infrastructure that had been built was a reversible asset.[373] Incumbents claimed uncertainty on whether these assets would be reverted to the government's ownership or not would slow down investments in infrastructure. The assets reversibility stills a problem up until now and is deeply related to network neutrality debate since it influences the incentives companies to have to invest in internet access infrastructure.

During the negotiations that culminated with PMGU II, concessionaires so agreed to participate in a program called "Broadband in Schools," instituted by the *Decree No. 6,424 of 2008*. Designed by a coordination between the Ministry of Education and the Ministry of Communications, it is aimed at connecting to internet access all urban public schools by 2010. ANATEL has been tracking the implementation of actions. Also, in 2008, the government altered the General Concessions Plan through *Decree No. 6,654 of 2008* to allow the merger of two incumbents, which was forbidden at that time. The *Oi-BrT merger* created the most massive telephone operator in the country.[374] Although the concessionaires had been using their wired networks for the provision of broadband services, it was not part of the concession agreements and, therefore, broadband services were not subject to universalization goals.

Additionally, Brazil unsuccessfully tried to increase broadband access through various pulverized programs. In 1999, the Brazilian government launched the Information Society Program, created by the *Decree No. 2,994 of 1999*. The Program included the

[372] The Decree No. 6,424 of 2008 defined "backhaul" as a fixed telephony support network for broadband connection that links access networks to the operator backbone.

[373] Companies would have to return infrastructure's assets to the Brazilian government by the end of the concession in 2025.

[374] In addition to fixed telephony services, concessionaires had also been providing internet connection services using its wired network through DSL technologies. At the time of the merger, Brazil had approximately 10 million fixed broadband lines, out of which 63.7% were provided by Oi and BrT.

expansion of internet access and connectivity, the development of technical training, the incentive to research and development, and the advance of new applications.[375] In 2002, the government made a further attempt by creating the GESAC Program, established by *Administrative Rule No. 256,* which intended to offer access to the internet in remote communities of the country, through satellite.[376] Another failed attempt was the Digital Inclusion Program, instituted by the *Law No.11,196 of 2005*, granted fiscal incentives for sales of microcomputers and enabled the "Citizen Connected - Computer for All Program," established by the *Decree No. 5,542 of 2005*. The later also intended to facilitate the acquisition of computers by the low-income population.

Telecenter operators ("*telecentres"* in Portuguese) were also an alternative policy implemented to increase internet access in Brazil. Telecenters shared the physical infrastructure and provided public access to ICTs, usually in the form of desktop computers.[377] The Telecentro de Informação e Negócios offered internet access for small enterprises. Again, the Brazilian government's efforts were not enough to increase internet access or market competition. Community interest telecoms service providers have the right to use poles, ducts, conduits, and easements owned or controlled by a telecoms service provider or other public interest services, in a non-discriminatory manner and at fair and reasonable prices and conditions. To regulate use, ANATEL and the Agencies of Electric Power (ANEEL) and Petroleum (ANP) issued a *Combined Resolution No. 1 of 1999*, which approved the Joint Regulation for the Sharing of Infrastructure between the Electric Power, Telecommunications and Petroleum Sectors. Despite the *Combined Resolution No. 1 of 1999*, ANATEL submitted the proposed regulation to public consultation, which resulted in *Resolution 274 of 2001*. The objective of this Resolution is to regulate the sharing of infrastructure between telecommunications service providers. It provides, among other things, that sharing will only be denied for reasons of limitation in security, capacity,

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[375] Takahashi, *Livro Verde-Sociedade da Informação no Brasil*.

[376] GESAC provides internet connection mainly through satellite technologies.

[377] Stuart Davis et al., "The Social Shaping of the Brazilian Internet: Historicizing the Interactions between States, Corporations, and NGOs in Information and Communication Technology Development and Diffision," in *The Routledge Companion to Global Internet Histories*, ed. Gerard Goggin and Mark J. McLelland (Routledge, 2017), 130.

stability, reliability, or violation of engineering requisites. Operators, in general, should connect their network with networks deployed by other operators.

The Brazilian privatization of the Telecommunication sector is another hard lesson for Brazil. Despite several attempts, it has failed to universalize internet access and to introduce Brazil into the global market economy. Influenced by international interests, the Brazilian government was a catalyst to the process of economic domination. Due to the high barriers to entry because of high costs for accessing national and international internet backbones, the marketplace witnessed a rapid consolidation into a small number incumbent with nationwide coverage. Besides Oi-BrT, another prominent example of corporate consolidation in the post-liberalization period is Universo Online (UOL). Launched in 1996, the company is one of the largest ISP in Latin America.

Both the LGT and the General Interconnection Regulation (GIR) establish that interconnection between networks is obligatory. The integrated operation is assured at both domestic and international level. Ownership rights over the networks are conditional on the obligation to fulfill a social function. The GIR sets out the general guidelines for interconnection between telecoms ISPs and systems. It includes commercial, technical, and legal aspects, and abides by the limits established by the LGT. It also imposes basic rules for interconnection agreements. The maximum chargeable amounts by way of network remuneration are currently controlled by ANATEL, which is responsible for the price-level restatement of these amounts, from time to time. ANATEL may no longer establish the interconnection rates paid by the providers and the public tariffs to the extent that competition is implemented and secured in the sector.

If any conflict arises from the application or interpretation of the regulations or during the negotiations for an interconnection agreement, either party can refer the dispute to arbitration. Within ANATEL's scope, arbitration is a specific administrative procedure aimed at confirming the interconnection conditions if there is no agreement between the parties. Submitting an issue to arbitration does not exempt the providers and ANATEL from the obligation to perform the interconnection agreements in force. Interruption of activities associated with the agreements is not permitted.

4.1.2. Brazilian National Broadband Program

Since the mid-2000s, the Brazilian government began to engage in practices by which policy design and implementation no longer reflected a purely market-based view of policy reform. However, its authority is now exercised not to intervene by absorption, but to act by market participation and induction. Over the past decade, policymakers in several countries enacted or at least discussed National Broadband Plans which group policies, actions, and goals for broadband. Their common objective is to increase broadband penetration and adoption, and to spread the use of ICT, although they differ on the strategies chosen, particularly on the level of government intervention.

In this sense, the Brazilian government launched, in 2010, the Brazilian National Broadband Program (PNBL, for its acronym in Portuguese), established by the *Decree No. 7,175 of 2010*. The PNBL intended to promote and expand access to broadband internet services, indicating the return of state intervention on the telecommunications sector.[378] Several actions, goals and priorities have been established for achieving the objective of the PNBL, including the recreation of the once defunct state-owned telecommunication carrier, Telebrás, the use of spectrum auctions for wireless broadband services and the agreement between the government and fixed telephony concessionaires to offer fixed broadband connection for lower prices in selected municipalities.

The PNBL assumes that in the telecommunications sector a positive correlation exists in many instances between equality and efficiency resulting from the positive network effect. For this reason, a market for telecommunication services driven only by competition may aggregate a suboptimal pool of users from the standpoint of the potential expansion of positive externalities.[379] The PNBL walked away from what was determined in the LGT and

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[378] This aspect remained most striking after the reactivation of Telebrás, which owns a national network of optical fibers and acts in the market in a complementary way. Decree No. 7,175 of 2010 established the role of Telebrás to act in a complementary manner to the private sector. The rationale is that it would induce an expansion of broadband penetration and a reduction in service rates, as final users in most unattractive or distant localities were served only by small providers. These small providers usually pay very high prices to owners of broadband infrastructure, due to small returns to investment, which imply in high rates to the final user.

[379] Alexandre Ditzel Faraco, *Democracia e Regulação das Redes Eletrônicas de Romunicação. Rádio, Televisao e Internet* (Belo Horizonte, MG: Forum, 2009); Alexandre D. Faraco, "Difusão do Conhecimento e Desenvolvimento: A Regulação do Setor de Radiodifusão," in *Regulação e Desenvolvimento* (São Paulo:

did not impose universal access goals. For this reason, it is possible to affirm that the PNBL is not exactly a national broadband plan itself, but only the first action directed to the definition and implementation of a plan.

The PNBL's actions were structured in four dimensions: infrastructure regulations; policies for production and technology; fiscal and financial incentives; and national network development. Regulations were aimed at increasing competition, expanding service supply, incentivizing entrepreneurship and innovation, reducing service rates to the final user and increasing infrastructure availability. In this sense, ANATEL would be responsible for drafting a new PGMU, with goals for the expansion of backhaul; performing spectrum auctions for wireless broadband and regulating infrastructure sharing among ISPs. ANATEL partially accomplished its tasks the new PGMU, enacted by *Decree 7.512 of 2011*, does not contain goals for the expansion of backhaul. In 2011, the Brazilian government also issued *Decree No 7,462 of 2011* transferring the task of formulating and implementing broadband and digital inclusion policies from the Steering Committee of the Digital Inclusion Program to the Ministry of Communications.

By approving the *Resolution 558 of 2010*, ANATEL decided that radio frequencies in the range of 450 MHz to 470 MHz would be released for the expansion of high-speed internet in rural areas, within the PNBL goals. ANATEL predicted the bandwidth would be used preferably for public companies, such as SERPRO, DATAPREV and, especially, Telebrás. On March 2011, Telebrás forwarded to the Ministry of Communications a formal request to use the 450 MHz band for digital inclusion projects. The objective is to provide internet access in distant areas based on national technology, in partnership with domestic manufacturers of equipment and the development of microchips for 450 MHz radios. However, contrary to the recommendation of ANATEL, the request was denied by Ministry of Communications, and to allocate the 450 MHz to incumbent companies as a deduction of the cost of new universalization goals.

Malheiros Editores, 2002), 87–122; Coutinho, "Entre Eficiência e Eqüidade: A Universalização das Telecomunicações em Países em Desenvolvimento."

At first, the PNBL primary objective was that by 2014, access would be enabled across the country, reaching 40 million households. Afterward, the Ministry of Communications revised this objective to 30 million fixed broadband access points and 60 million mobile broadband access points, including both urban and rural areas, by 2014. Also, the target was to reach one 100% broadband access in government branches and to increase the minimum speed of fixed broadband services. The goal was ambitious. In March 2011, there were only 16 million fixed broadband connections and 28 million mobile broadband connections. In September 2015, the fixed broadband connections amounted to 25.4 million and the mobile broadband connections to 200.5 million.[380] Given this data and the inequality of access, the PNBL has been considered to be a failure.

In parallel, the Brazilian public peering ecosystem counts with over twenty-five IXPs maintained by an overarching project called IX.br.[381] The case of Brazil follows an interesting approach that may inspire other countries, especially in developing regions. Brazilian IXPs are part of an overarching project called IX.br and adopt a non-profit business model managed and fully funded by NIC.br, the CGI.br that takes care of (and financial income from) DNS registry services, IP allocation, in addition to internet development activities funded by the government. The attractive cost proposition for autonomous system added to the open policies of the IX.br business and operational model are the main factors in the leadership of Brazil regarding the amount of IXPs, including the largest one in the city of Sao Paulo. One relevant observation is that autonomous systems peered at IX.br are not allowed to rely on the public IXP as their only internet link. For this reason, to join the free IX.br. Autonomous systems need to prove they already reach the global internet through some transit provider. There are national plans to install new IXPs all over the country, especially in the north, west and central regions where there is a concerning deficit of internet connectivity compared to the south, southeast, and northeast. The goal behind the IX.br

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[380] Available at http://www.telebrasil.org.br/sala-de-imprensa/releases/8022-brasil-fecha-terceiro-trimestre-com-226-milhoes-de-acessos-em-banda-larga . Accessed on 5 December 2017.

[381] Samuel Henrique et al., "An Analysis of the Largest National Ecosystem of Public Internet eXchange Points: The Case of Brazil," *Journal of Communication and Information Systems* 31, no. 1 (2016): 256–71.

expansion plan is to attract ISPs to those isolated areas lacking connectivity by offering the IXP incentives (free co-location, peering opportunities, and so forth).

In September 2012, it was created the Special Taxation of the National Broadband Deployment of Telecommunications Networks to build, expand and modernize telecommunications networks. Among the incentives to the telecommunications industry, the *Law No. 12.715 of 2012* established a federal tax exemption for construction of a satellite to be used in the implementation of the PNBL and market communication between machines. In May 2017, Brazil launched the Geostationary Defense and Strategic Communications Satellite (SGDC). Its primary goal is to allow broadband access to remote areas. Therefore, the PNBL is not restricted to a single document that states policies, actions, and goals. It is made of several documents, such as *Decree No. 7.512 of 2011* and the proposed actions.

In 2015, the *Bill No. 3,453 of 2015* has introduced proposals to alter the LGT. It is considered the most profound reform in the telecommunications regulatory framework in Brazil since 1997. In April 2016, the Ministry of Communications launched a set of guidelines for the review of the regulatory framework centered on two goals: significantly expand the availability of broadband services and create a less rigid regime for telecommunications services. Facing the imminent end of the fixed telephony concession agreements, which are to expire in 2025 and under LGT cannot be renewed, calls for reform has increased. Another time, the assets reversibility had played a significant role.

4.2. The Brazilian Civil Right Framework

The internet regulation in Brazil came about with Draft Bill No. 2,126 of 2011, known as the "Brazilian Civil Rights Framework" (BCR). The BCR emerged in 2009 from the partnership between the Secretariat of Legislative Affairs of the Ministry of Justice and the Center for Technology and Society of the Getúlio Vargas Foundation. Officially, the BCR was based on CGI.br Principles for the Governance and Use of the Internet [382] and

[382] The CGI.br Principles for the Governance and Use of the Internet includes: freedom, privacy and human rights, democratic and collaborative governance, universality, diversity, innovation, network neutrality,

prepared due to the opposition of civil society to *Laws No. 12,735 and No. 12,737 of 2012*, better known as "Azeredo and Carolina Dieckmann Laws," which primary objective was to fight against cybercrimes in Brazil.

The BCR passed through a pioneer legislative process; it was created and discussed on open platforms targeting the rights of internet users. BCR debates focused on allowing internet users to communicate on a digital platform capable of innovation, free access, and collaboration. Its objective was to regulate issues such as freedom of expression, privacy and the guarantee of equal access to the network. Among its central themes, we have ISP responsibility, data protection, and network neutrality.

Although the BCR favors the logic of encouraging innovation, it also advocates the promotion of internet access, as a principle that should discipline the direction of the internet in Brazil. Art. 4 of BCR establishes as one of its objectives the promotion of the right of access to the internet. Also, Art. 7 of BCR conditions the full realization of citizenship rights, such as privacy and freedom of expression, to access the internet. It is also recorded in Art. 27 of BCR that public initiatives to promote digital culture should seek to reduce inequalities, especially among the different regions of the country, to access and use of information and communication technologies, and to promote production and circulation of national content.

In this context, however, some values stand out from others, as is the case of the primacy of the incentive to innovation for the development of the internet. According to Castells:

> Each mode of development also has a structurally determined performance principle that serves as the basis for the organization of technological processes: industrialism is geared towards economic growth, that is, to maximize production; informationalism aims at technological development, that is, the accumulation of knowledge and higher levels of information processing complexity.[383]

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non-liability of the network, functionality, security and stability, standardization and interoperability, and legal and regulatory environments.

[383] Castells, *The Rise of the Network Society: The Information Age: Economy, Society, and Culture*.

The initial Draft Bill was submitted for discussion on 29 October 2009, and like the Peruvian and Colombian law, the Brazilian legislation was not created to address network neutrality principle exclusively. The BCR was shaped to address mainly two specific problems: to guarantee network neutrality and to preserve the internet users' privacy. In this sense, the original bill had three elements: freedom of expression online, protection of privacy and personal data on the web; and network neutrality. By 2010, the BCR was described by the Ministry of Justice as "the Constitution of the Internet" in Brazil. Broadband ISPs were the most significant rivals of the project, which was about to be dismissed in the Brazilian Congress. However, the surveillance activities of the U.S. government revealed by Edward Snowden brought the debate back to the political agenda. Specifically, in Brazil, network neutrality advocates proposed to treat the internet as a public utility, because the telecommunications business tends to reduce the number of providers so that many of them operate almost as monopolies.[384]

Subsequently to five years of debate, on 23 April 2014, Brazil enacted the *Law No. 12,965 of 2014*, providing a general legal framework for the internet use. On 23 April 2014, Brazil passed *Law No. 12,965 of 2014* and provided a general legal framework for the use of the internet within the country. The Brazilian Law was regulated by the *Decree No. 8, 771 of 2016*. The BCR incorporates network neutrality rights, limitation of responsibility for the intermediaries, freedom of expression and guarantees for internet users' privacy. It also established main stakeholders and their responsibilities in the online environment. The Art. 9 of the Law No. 12,965 of 2014 makes specific reference to network neutrality principle:

Pursuant to Art. 9 of BCR, special prices for distinct content are not allowed. However, regarding the exceptions to network neutrality principle itself, the Brazilian law is as unclear as those of the other nation-states analyzed in this paper. Exceptions are not explicitly specified. Art. 9 of the BCR states that discrimination or degradation of the traffic is an aspect that will be regulated by the Executive branch, after consultation with CGI.br and ANATEL. In any case, the law does not mention transitory provisions for traffic shaping,

[384] Ronaldo Lemos, "O Marco Civil Como Símbolo Do Desejo Por Inovação No Brasil," in *Marco Civil Da Internet*, ed. George Salomão Leite and Ronaldo Lemos (Atlas, 2014), 6.

and regarding the specific request of a user to block a site, the law does not mention anything either.

The Art. 9 establishes a general rule ensuring that entities responsible for transmission, switching or routing must process, on an isonomic basis, any data packages, regardless of content, origin and destination, service, terminal or application. Specific cases are allowing discrimination or degradation of traffic have been discussed by representatives of government, the private sector, and civil society. One of the most talked issues has been the offer of free access packets (known as "zero-rating") vis-a-vis network neutrality. Finally, on 11 May 2016, Decree No. 8,771 was enacted prohibiting unilateral practices and agreements between ISPs and CAPs which "compromise the public and unrestricted character of internet access," or promote data and applications packets to the detriment of other offers.

The decree also provides that exceptional hypotheses of discrimination or degradation of network data traffic will only be allowed where there is compliance with "technical requirements deemed essential for the adequate provision of services and applications," namely the handling of web security issues – such as, control over bulk messaging (spams) – and the handling of exceptional cases of network congestion.

4.2.1. The BCR Legislative Process

Under Art. 9 of Law No. 12,965 of 2014, "network neutrality" is defined as the ISPs' duty to grant "equal treatment" to every data packet, regardless of the "content, origin and destination, service, terminal or application." The Law prohibits ISPs from contracting with CAPs for faster delivery of content on the access network for a differentiated price. The Law also constrains the ability of ISPs to integrate with CAPs vertically. Paragraph 3 of Article 9 prohibits blocking of content or applications. Many telecommunication companies did not accept network neutrality proposal, and the Brazilian government faced many pressures and objections from industry lobbyists against the provision.

A specified principle of the BCR is "the preservation and safeguarding of network neutrality." Brazilian proponents seek to uphold this principle through the application of "equal treatment" to all data packets as a key component of regulating the internet. However, an "equal treatment" rule conflicts with the other set of goals and principles of the BCR - that is, promoting access to the internet, protecting the constitutional rights of free speech and the free flow of information, and promoting innovation – as well as with the principle of inclusiveness of the internet. Thus, as a matter of logical consistency, if one is to adhere to the following goals and principles, one cannot give any weight to the notions of "equal treatment" and the preservation of network neutrality.

Brazil's initiative for its inclusion in the new agenda of the internet regulation debate, bringing to the national environment the collective, collaborative rationality presented on the internet. However, it is important to point out that in the public consultations carried out on the Digital Culture and e-Democracy platforms, network neutrality was not one of the three themes most discussed or debated, with few specialists engaged in this issue, with the main contributions sent to ANATEL through Public Hearings No. 45. CGI.br was in favor of the approval of the BCR comprehensively, through Resolution CGI.br/RES/2012/010/P.

On November 7, 2012, the BCR reached the House of Representatives but faced with the various interests involved; its vote was scheduled and postponed several times in the years 2012 and 2013[385]. It was only in September of 2013 that the Federal Government, encouraged by the espionage scandal carried out by the United States government, known as the "Edward Snowden Disclosures,"[386] requested urgency to Congress vote the BCR, based on article 64 of the Federal Constitution.[387, 388]

Throughout the legislative debate, network neutrality has always been set in a broader context, so that the inclusion of principles and objectives in the BCR influences how

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385 The Rapporteur Alessandro Molon took the BCR seven times for vote in the House of Representatives. *In*: http://tecnologia.uol.com.br/noticias/redacao/2013/11/12/camara-adia-marco-civil-daInternet- e- decide-nao-votar-nada-nesta-semana.htm.

386 According to a report by E. Snowden, the NSA spied from Brazilian state-owned companies, such as Petrobras to the President Dilma Rousseff and her advisers. With this, the Federal Government, on the grounds of defense of the citizens' privacy and protection of Brazilian sovereignty, requested urgency in the voting of the BCR.

387 Official Journal of the Union of September 10, 2013. Dispatch no. 391 of the Presidency of the Republic: "Requests the National Congress to grant the emergency regime to the bill that is in the House of Representatives under No. 2,126 of 2011, which 'Establishes principles, guarantees, rights and duties for the use of the Internet in Brazil,' forwarded to the National Congress with Message No. 326, 2011."

388 Lemos, "O Marco Civil como Símbolo do Desejo por Inovação no Brasil."

it is to be interpreted. This work analyzes the most relevant principles and objectives were: protection of human rights, personality development and exercise of citizenship in digital media[389]; preservation of stability, security, openness, interoperability and collaboration in the network; free initiative, free competition and consumer protection; and promotion of the right of access to the internet to all. The answer to these conflicts cannot be a mere exclusion of one principle in favor of another, but a more in-depth hermeneutic investigation must be sought, based on the premise that the BCR is, in fact, a legal system with internal coherence (between its dispositions) and external (considering its locus in the Brazilian legal system).

The legislative history of the BCR's network neutrality specifically changes in the wording initially proposed, demonstrates how the interest groups and government acted to support modifications as a way of understanding the rationality inherent in each of these changes.[390] On April 8, 2010, the Minister of Justice presented the preliminary BCR's bill and published for public consultation in the platform "Cultura Digital." The promoted changes maintained the concept of network neutrality initially proposed, adding the prohibition of discriminations by source and destination and making more restrictive the practices of discrimination and traffic degradation considered exception to the article, adding the idea that a Decree would regulate these practices. The Art. 2nd already brought network neutrality as part of the BCR, while Art. 12 contained the wording that would serve as the basis for the entire discussion of network neutrality in the BCR .[391]

Through the Presidential Message No. 326, dated August 24, 2011, the draft of the BCR was sent to the National Congress, now known as Draft Bill No. 2,126 of 2011. The project then went through a new round of public consultation, through the eDemocracy website, maintained by the House of Representatives. The main contributions were: request for the withdrawal of mention of future regulations on network neutrality; the withdrawal of

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[389] Principles and objectives includes: plurality and diversity; guarantee of freedom of expression, communication and expression of thought; protection of privacy and protection of personal data; promotion of access to information, knowledge and participation in cultural life and in the conduct of public affairs; accountability of agents according to their activities; and promoting innovation and fostering the wide dissemination of new technologies and use and access models.

[390] Appendix 4 illustrates all modifications the rule was submitted during the legislative process.

[391] The sole paragraph of Art. 9 (whose focus was on the access providers' fence to keep records of access to applications) would in future be the basis for the sole paragraph (and, later, § 3) of Art. 9 of the BCR.

the concept of network neutrality and substitution by a duty of transparency and reasonableness; and new wording prohibiting discrimination, but allowing traffic management.

The first substitute for the bill was introduced by Representative Alessandro Molon, rapporteur of the special committee formed to analyze the Draft of the BCR, based on the result of the new public consultation. The new wording underwent profound changes in content: in Art. 3, the mention of the regulation was definitively excluded; in art 9 paragraphs 1 and 2 have been added in an effort to define exceptions to data discrimination, as well as to limit the discretionary power of the specific regulation; and Art. 9 § 3º (former single paragraph) began to make express mention of the blockades. The rapporteur of the special commission presented a new substitute for the BCR, altering copyright provisions. Punctual changes were made in the writing of Art. 9 including the mention of abstention from practicing anticompetitive conduct in § 2, section IV, and the inclusion of the terms transmission, switching routing in § 3, standardizing this wording with the caput wording.

The rapporteur of the special commission presented a new substitute for BCR, changing the provisions relating to privacy and protection of personal data. Regarding network neutrality, there were some changes made in the wording of the provision, including stricter criteria in § 2 and removing the mention of CGI.br, foreseen in § 1º. The fourth substitute presented more technical adjustments regarding language uniformity and explicit reference to network security issues in Subsection III of § 2º. On March 13, 2014, the President of the House of Representatives presented an agglutinative amendment to the BCR, including Paragraph 4 and replacing network neutrality provision with a regime that allowed greater freedom for ISPs to establish different access models.[392]

The WWW inventor Tim Berners-Lee described the Brazilian legislation as “a fantastic example of how governments can play a positive role in advancing web rights and

[392] The full text of the agglutinative amendment is available at http://www.camara.gov.br/Internet/agencia/pdf/Emenda_aglutinativa_N_1.pdf. Accessed on 15 December 2017.

keeping the web open."[393] However, a closed examination of the development of network neutrality debate in Brazil is revealing of the way neoliberalism renews and reconstitutes itself. The BCR's network neutrality arose from international pressures, in the form of an apolitical, culturally neutral principle. However, under the mask of neutrality, consensus building, and multistakeholderism established groups was able to further their strategic interests.

4.2.2. Executive Decree No. 8,771 of 2016

The Executive *Decree No. 8,771 of 2016* was published on May 11 and regulates the BCR (*Law No. 12,965 of 2014*). Among other specific provisions, the Decree addresses data packet discrimination and traffic degradation. Following the BRC legislative processes, the Brazilian Ministry of Justice submitted the draft decree for public consultation in January 2016. For instance, the draft had already evolved from extensive public discussion throughout 2015. The Decree had been taken into effect on 10 June 2016.

According to the BCR's network neutrality principle, those responsible for data transmission, switching or routing have the duty to treat isonomically any data packets, without any distinction, being the discrimination or traffic degradation extraordinary measures. Traffic management practices are possible only under two circumstances: (i) when technical requirements must be satisfied for adequate provision of services and applications; or (ii) when emergency services need priority treatment. Also, the BCR established that reasonableness, fair treatment, and transparency must be guaranteed even in those permitted management practices, without causing injury to users or engaging in the anticompetitive practice.

The Decree 8,771 of 2016 specifically listed all permitted exceptions to network neutrality principle. The "technical requirements indispensable for the provision of internet services" are set out in Art. 5, as follows (i) handling of security and safety issues, such as

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[393] Available at http://www.brasil.gov.br/ciencia-e-tecnologia/2014/04/criador-da-world-wide-web-elogia-marco-civil-da-internet-1/@@nitf_custom_galleria?ajax_include_head=1&ajax_load=1 Accessed on 15 December 2017.

anti-spamming procedures and denial-of-service attacks (DDoS); and (ii) handling extraordinary network congestion. ANATEL was entrusted with inspecting and investigating offenses against network neutrality, following the directives to be issued by CGI.br in this regard. Network management practices based on international technical standards are also permitted, provided that ANATEL regulatory standards and GGI.br guidelines are abided by. Transparency shall govern the adoption of network management practices by way of adequate disclosure. Today, network neutrality in Brazil is a general rule of non-discriminatory treatment with exceptions to preserve security and integrity, mitigate effects of temporary and exceptional congestion, and prioritize emergency services. Similarities with the U.N. IGF Dynamic Coalition on Network Neutrality Policy Statement on network neutrality are not involuntary.[394]

The original draft open for public consultation in 2015 and 2016 listed other permitted traffic management practices, which were eventually removed from the published version for being far-reaching and vague: management of minimum QoS and handling of vital issues for the adequate enjoyment of application based on user experience. Finally, agreements between ISPs and CAPs were expressly prohibited when prioritizing data packages under commercial agreements, favoring applications offered by the ISP itself or its group companies, or jeopardizing in any way the public and unrestricted access to the internet. Prior assessment of such agreements by the competent authority was removed from the Decree's final version. The Decree No. 8,771 of 2016 expressly prohibits "fast-lanes" offerings but does not make clear whether "zero-rating" or "sponsored access" would be an offense to network neutrality.

Following FCC's decision to demise network neutrality in the United States, on 14 December 2017, telecommunications companies in Brazil began requesting to review network neutrality in Brazil. According to Demi Getschko, one of the internet pioneers in Brazil, "[t]he signing of the Brazilian Civil Rights Framework for the Internet in 2014 enshrined important concepts that it was desired to protect by a law (...). Thus network

[394] See Section 2.2.1.

neutrality cannot be changed through by regulation since it is a law."[395] Ensuring network neutrality in Brazil through a statutory provision is one of the main differences concerning the United States, which controls network neutrality through a set of regulations. Also, the U.S. government does not directly interfere in its federations administration, which allows several U.S. states to maintain network neutrality. Changing the BCR requires enormous efforts, since the Brazilian Congress, the Ministry of Science, Technology, Innovation, and Communications, ANATEL, CGI.br, and the President's Office would need to be involved.

4.3. Recent Network Neutrality Disputes in Brazil

The zero-rating practice is made up by offering users data plans that differentiate the conditions of access to specific services on the internet. Through this practice, mobile carrier allows unrestricted access to mobile data to certain services, such as social networking and messaging applications. Although statutory provisions in Brazil regulate the principle of network neutrality, there is controversy regarding its strict enforcement by the Brazilian ISPs, especially by mobile carriers. With the approval of the BCR, zero-rating has become one of the first significant discussions. Proponents of network neutrality are unanimous in stating that the zero-rating violates rules of non-discrimination of data. However, the neutrality rule of the BCR, for example, makes room for the practice to be considered legitimate. Given the importance that the topic has gained in the last months, it will be up to the Decree that will regulate the BCR the determination of the legality or not of the zero-rating.

Zero-rating can occur in two different ways: the carrier selects a specific application so that the traffic generated by access to those applications is not charged to the user and the CAP can directly pay the carrier for the traffic generated by its users (also known as "sponsored access" or "Internet 0800"). Besides Facebook Zero, there are also the initiatives of Wikipedia Zero, Google Free Zone, and Internet.org. The latter aims to promote initiatives that can help reduce the cost of internet access, increase the efficiency of data traffic in

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[395] Getschko, D. Neutralidade da Rede Está Segura no Brasil. Estado de São Paulo, Dec. 18, 2017. Available at: http://link.estadao.com.br/noticias/geral,neutralidade-da-rede-esta-segura-nobrasil,70002124309. Accessed on 15 January 2018.

mobile applications and develop new business models that can help connect people to the internet. The zero-rating raised several questions, highlighting the dichotomy between the perspective that limited access to a few selected contents can reduce internet users' capabilities and the prospect that any free access is beneficial, even if it is limited to one or few applications.

In December 2014, mobile carrier Tim launched a zero-rating plan in partnership with WhatsApp allowing customers to use the app without discount on their internet franchise, while all other applications must respect the 300 Mbps limit. Discussions about a possible violation of network neutrality have sparkled. Similar cases have occurred in Brazil since 2013, as is the agreement of Claro operator with Facebook and Claro and Tim with Twitter. Today, the empirical evidence is still insufficient to establish what are the consequences of zero-rating for the internet and society. The debate had most people at one of two extremes. At one end was the argument that zero-rated content should be banned because it is a violation of network neutrality. At the other end was the argument that zero-rated content is a boon to the poor and unconnected populace in Asia, Africa, and Latin America, the rationale being that having some connectivity, even with minimal content, was better than having no access at all.

Zero-rating practices, based on the provision of sponsored applications provided by their commercial partners, users choice is increasingly oriented towards the platform provided by their mobile operators, because it may otherwise be too expensive or extremely slow to rely on other services. As such, many claims that network neutrality is not exclusively related to the technical discrimination of packets (e.g., blocking, throttling, and other forms of packets discrimination), but also to the economic or price discrimination of applications and services (i.e., sponsored data plans). Although price discrimination was not initially regarded as falling within the scope of network neutrality, it might have a significant impact on the ability for users to access internet service in poor countries. Thus, some authors argue these practices tend to increase digital exclusion, establishing, for providers, cycles of technological dependence and, for users, a differentiation between the internet for the rich and the "internet of the poor."

In the context of mobile communications increasingly online operators are entering into agreements with telecommunication carriers to sponsor the data consumption of their services thus encouraging the use by consumers. While this does not apply in countries where users have access to unlimited internet access at a flat-rate or massive data caps, in other countries where mobile internet prices are very high, or where mobile internet access is subject to limited data caps, zero-rating practices may be very appealing and lead to a situation where mobile users increasingly find themselves interacting exclusively with vertically integrated online environments, rather than within the internet. For this reason, some observers have considered zero-rating as an anti-competitive practice as far as it puts competing services at a competitive disadvantage. Moreover, some authors claim that the practice of zero-rating might encourage mobile operators to set artificially up low volume caps, to profit from sponsored data. Finally, it has also been argued that zero-rating reduce the ability for consumers to choose amongst a variety of competing services, which are longer be judged according to their inherent quality, but rather according to of their market price.[396]

In October 2017, the Administrative Council for Economic Defense (Cade) dismissed an administrative inquiry arising from a denunciation filed by the Federal Public Prosecutor's Office against several mobile network operators for offering zero-rated applications in their data packages.[397] The affected companies were: Claro, Tim, Oi, and Vivo. According to the Public Prosecutor Office, zero-rating deals could fall within several anti-competitive acts provided by the Brazilian Antitrust Act (Law No. 12,529/2011), harming free competition through discrimination to applications and differentiated prices.[398] CADE established that zero-rating does not harm free competition or network neutrality principles for the following reasons: there is no corporate relationship between the mobile operators and applications that do not count towards any data cap in place on the internet access service; the provision of free access to these applications would save the data cap,

[396] Belli, Luca. "Net Neutrality Reloaded: Zero Rating, Specialised Service, Ad Blocking and Traffic Management." Annual report of the UN IGF Dynamic Coalition on Net Neutrality. Rio de Janeiro: FGV Direito Rio, 2016.

[397] Technical Note No. 34/2017/CGAA4/SGA1/SG/CADE.

[398] Technical Note N. 02/2015/MPF in Inquiry No. 08700.004314/2016-71.

and promote access to other application; there is no contractual relationship of exclusivity between mobile operators and applications. Also, CADE considered that a total ban on zero-rating might inhibit the development of governmental and educational sites and applications if the data cap is used. The zero-rating debate touches upon issues of network neutrality, market power, privacy, security and social equity.

A wide variety of data caps and "fair use" policies may be used by operators to implement a specific business model. In general, a data cap will be imposed to support the operator's pricing strategy, so that the price of traffic is based on volume. Data caps are a technical measure that requires monitoring traffic volume and throttling data or charging for extra volume once a pre-defined data cap is reached. Data caps provide a price signal to end users in relation to the cost of their bandwidth consumption. Uncapped packages are available in some markets, but these are rare. Capped and metered packages are the norm. If the cap is reached before the validity period ends, the user can purchase an additional data quantity (thereby temporarily increasing the cap), or pay for what he or she uses additionally on a per-unit basis. This is the business model that mobile operators have used for years around the world. Either way, the usage is metered in the sense that users pay for what they consume. It is not uncommon to find packages that are capped as low as 100 megabytes, sometimes less, and valid for just a day or a few days.

The use of monthly data caps by ISPs has been an issue of public policy debate ever since their introduction.[399] Proponents of data caps usually claim that their purpose is to manage congestion, to increase fairness, and to recover the cost associated with heavy users. On the other hand, opponents of data caps often express skepticism that data caps effectively manage congestion, doubt that broadband ISPs are using data caps to recover the cost associated with heavy users, and claim that broadband ISPs are using data caps to increase profit and to protect incumbent pay-television services.[400] For some, the advantage of caps

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[399] In the 2015 Open Internet Order, the FCC comments about both the potential benefits and harms of data caps, explaining that "[d]ata caps […] can have a role in providing consumers options and differentiating services in the marketplace, but they also can negatively influence customer behavior and the development of new applications." *In* Federal Communications Commission, Protecting and Promoting the Open Internet, Report and Order on Remand, Declaratory Ruling, and Order, 30 FCC Rcd. 5601 (2015), ¶ 82 .

[400] Scott Jordan, "The Effects of Broadband Data Caps: A Critical Survey," *TPRC*, 2017.

generally is what they give price-sensitive users certainty about what they are spending on data since they cannot continue to consume data after the cap is reached unless they consciously top up their mobile credit. Since many data networks follow that 80 % of the bandwidth is used by 20 % of users, metered use makes everyone pay for what he or she consumed, thereby avoiding the majority subsidizing the limited number of high bandwidth consumers. This is important in the Global South, where affordability can still be a challenge and where networks are still being rolled out.

In 2017, Brazil discussed the *Bill No 7.182 of 2017* to alter the BRC and ban the practice of capping data for home broadband internet in Brazil. In 2016, Brazilian ISPs began to implement data caps for home broadband connections. The new pricing scheme got initial support from public officials and became policy in April 2016, when ANATEL suspended the implementation of data caps for three months, but then allowed them after that time, given certain conditions. The Senate proposed and passed the *Bill N. 174 of 2016* in March 2017, and the Consumer Protection Commission in the House of Representatives also approved it on 13 June 2017. In the meantime, ANATEL developed a public consultation to measure the acceptance of the new data capping scheme. The result pointed out that most Brazilians did not approve data caps. The bill is still pending a plenary vote in the House. One of the arguments proponents of data caps advance is that they help with network congestion. Some ISPs in Brazil have argued that the data cap scheme will allow them to manage the network better. However, the correlation between heavy monthly usage and users' contributions to congestion remains unclear. Thus, data caps, which are a form of network management, become part of the broader argument and legal battle over network neutrality.

Access to the internet in Brazil is currently a privilege. Less than half of the Brazilian population has access to the internet. The extent of internet exclusion in Brazil is particularly alarming in some of its poorest and less educated regions, such as the North of Brazil, with around 66 % of the population not having access to the internet.[401] In recognition of the importance of promoting internet access as a means for economic and social inclusion, the

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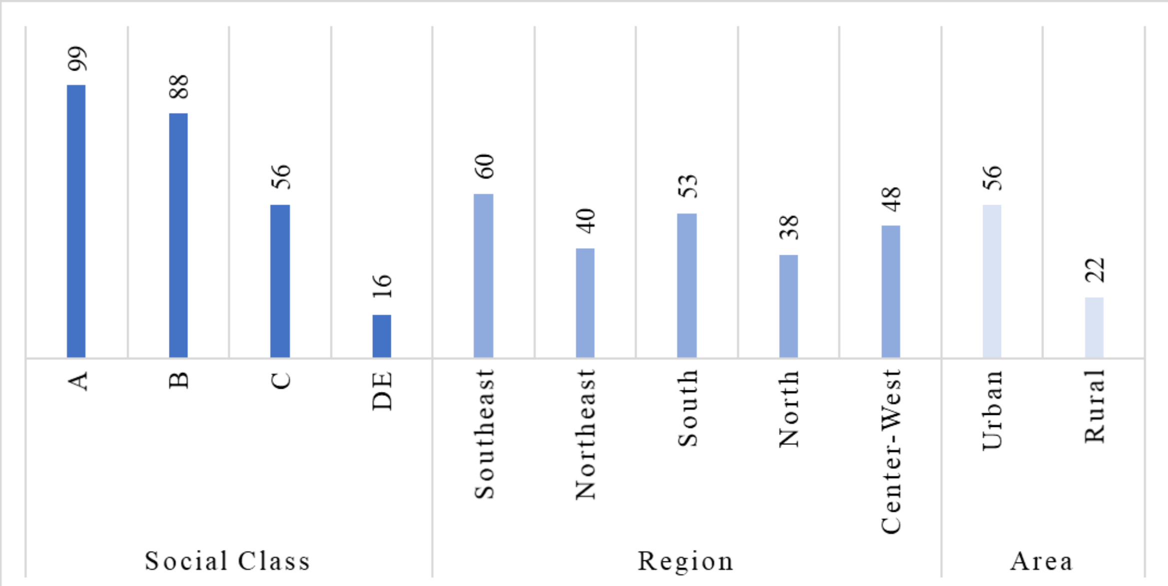
[401] See Section 5.3.2. below.

BRC established that internet regulation in Brazil should rest on the following principles and goals: “the preservation of the participatory nature of the internet,” “promot[ion of] the right of accessing the internet,” and “promot[ion of] access to information, knowledge, and participation in cultural activities and public affairs.” In turn, the convergence of communication onto a single platform has transformed the internet into a general-purpose technology that supports many sectors of the economy. The internet is increasingly becoming a platform for startups to develop and bring to market new products and BCR quickly. Boosting innovation on the internet can play a leading role in economic growth. BCR upholds this potential, stating that internet regulation in Brazil shall have the goal to “promote innovation and encourage the dissemination of innovative technologies and models of use and access.”

4.4. Digital Inequalities in Brazil: Global and Digital Exclusion

According to IBGE, in 2003, 149.9 million of Brazilians had never accessed a computer. In 2014, the numbers decreased to 69.5 million people. The ICT Households Survey, produced by CGI.br, also indicates a continued increase in the proportion of internet users, as well as intensification in the frequency of use by Brazilian internet users. In 2016, for the first time, the proportion of internet users exceeded half the population, reaching 51% – equal to 85.9 million Brazilians. Although the numbers are impressive, digital exclusion remains a problem that should be addressed.

Chart 4 - Household with access to the internet in Brazil -
Percentage of total households in 2015



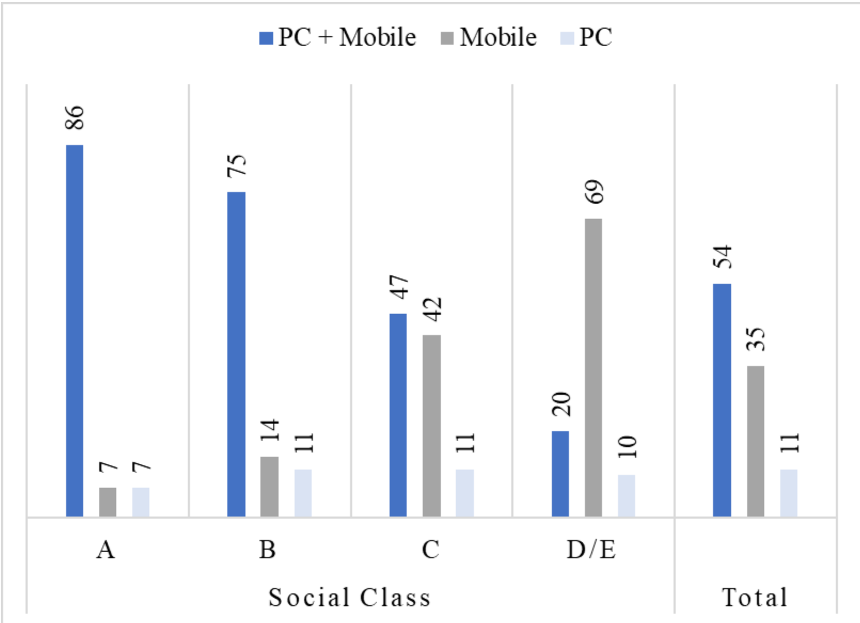
Source: CGI.br/NIC.br, Centro Regional de Estudos para o Desenvolvimento da Sociedade da Informação (Cetic.br), Pesquisa sobre o Uso das Tecnologias de Informação e Comunicação nos domicílios brasileiros - TIC Domicílios 2015. Data gathered in December 2017.

Inequalities according to social class and area persist in household internet access. Chart 4 above presents discrepant data on the proportion of households with internet access in Brazil, by area, region, family income, and socioeconomic class. In Chart 4, the proportion of households with access to the internet is 99 % in class A, 88 % in class B, 56 % in class C, and 16 % in classes D and E. It means the basis of Brazilian social pyramid is completed excluded from the digital reality, demonstrating socioeconomic gaps are also seen as crucial for the analysis of access to internet. In urban areas, the proportion of households with internet access is 56 % while it is 22 % in rural areas, where developing the necessary infrastructure is costlier.

In this regard, broadband service disparities are not random; they track the very same demographic fault lines. The enormous difference in the proportion of households with internet access among different geographical regions should also be considered on the agenda for digital inclusion in the country. The percentages of households with internet access in the Southeast (60 %) and North (38 %), there is an equality challenge to be pursued by internet regulation. In absolute numbers, in turn, the survey found that the Southeast region, which had the highest share of households with internet access, was also the region with the most substantial number of disconnected households: 13.3 million. This highlights the existence of a country regionally divided.

Also, Chart 4 demonstrates the North is the region with the most noticeable lack of service availability. This situation is due to the difficulties the ISPs find to install broadband equipment connecting areas with significant forest and rivers. It makes the internet access more expensive, but individuals of this area are the poorest in Brazil. In the absence of commercial incentives to enlarge internet access in this area, people living there are doomed to be digitally excluded.

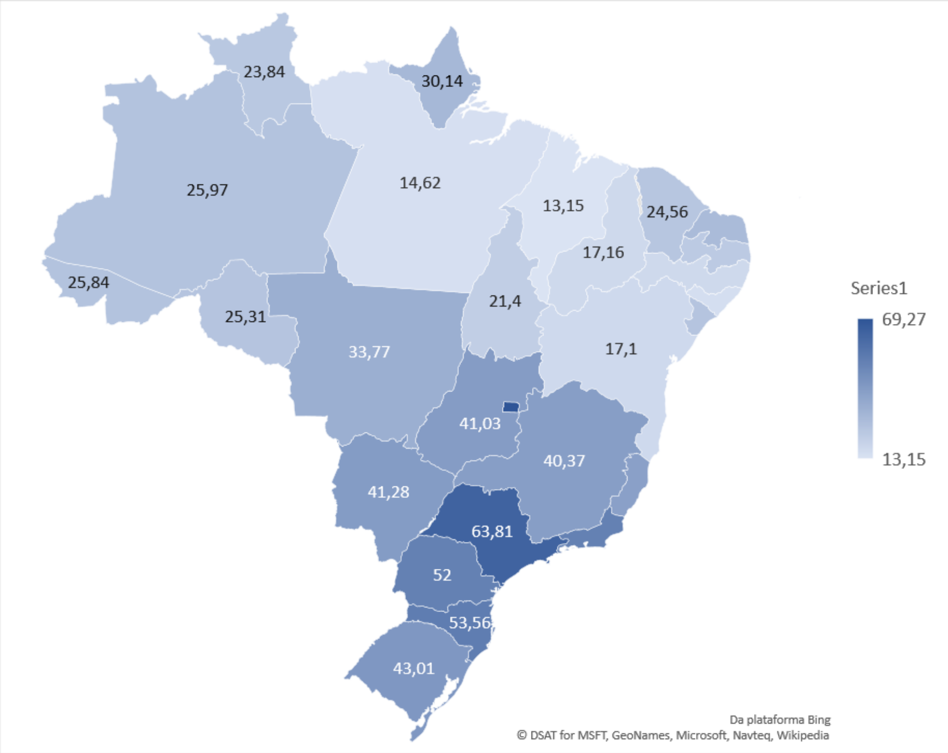
Chart 5 - Proportion of internet users, by device utilized for individual access in Brazil - Percentage of total internet users in 2015



Source: CGI.br/NIC.br, Centro Regional de Estudos para o Desenvolvimento da Sociedade da Informação (Cetic.br), Pesquisa sobre o Uso das Tecnologias de Informação e Comunicação nos domicílios brasileiros - TIC Domicílios 2015. Data gathered in December 2017.

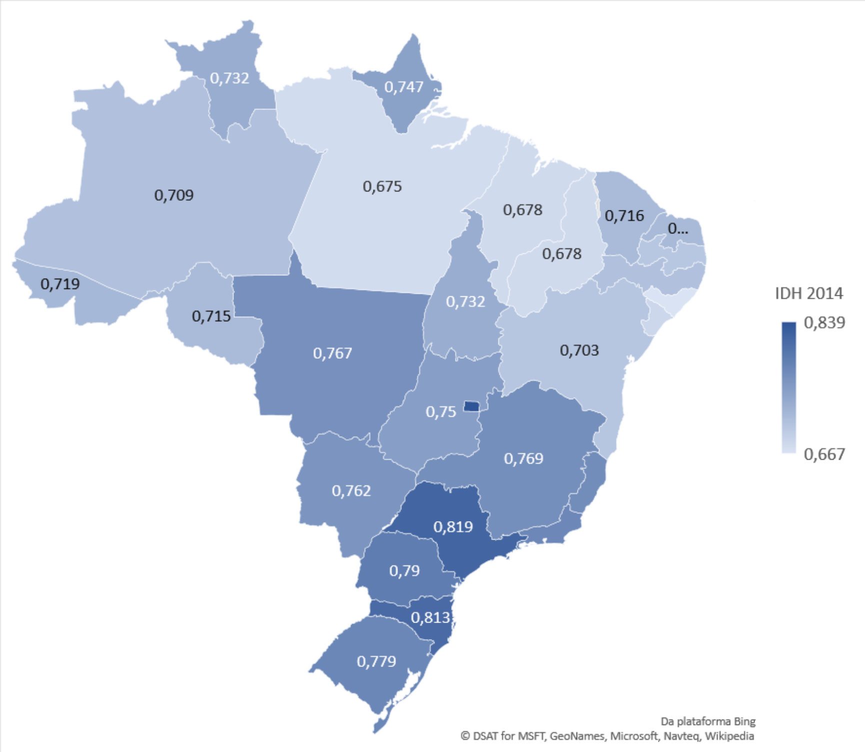
As presented in Chart 5, the absence of household internet connection and mobile phone internet users in the Northern Brazilian region should not be underscored. The evident differences in ICT access, a reflection of prolonged socioeconomic inequalities between the five Brazilian regions, end up reproducing inequalities found in other social and economic indicators such as the Human Development Index (HDI), participation in regional GDP, the rate of functional illiteracy and the rate of network school enrollment for adolescents. The distinct growth rates for internet access among different countries in the region are also found in Brazil, especially between urban and rural areas. The lack of service availability is also an essential element of the Brazilian digital divide, as illustrated in Chart 5. In absolute figures, Brazil has 69.9 million people ten years old or older who have never used the internet. Maps 4 and 5 mirror these discrepancies.

Map 4 - Broadband density access per 100 households in 2017



Source: ttp://www.anatel.gov.br/dados/destaque-1/269-bl-acessos
Data gathered in December 2017.

Map 5 - Human Development Index per Brazilian States in 2014

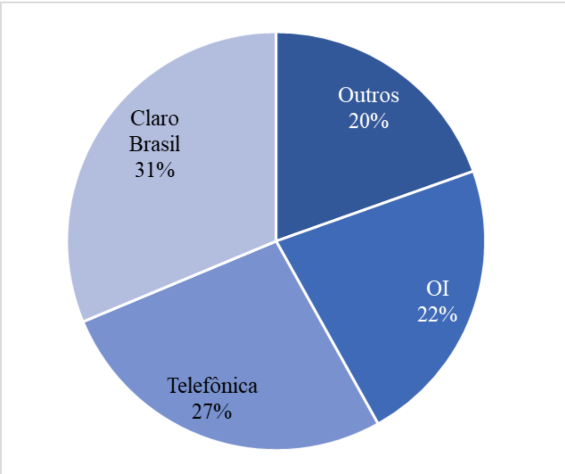


Source: PNUD (Programa das Nações Unidas para o Desenvolvimento), Ipea (Instituto de Pesquisa Econômica Aplicada) e Fundação João Pinheiro. Data gathered in December 2017.

The Brazilian telecommunications market has changed radically over the last 20 years. In 1997, LGT came into force and since then almost all public telecommunication carriers have been fully privatized. Brazil now has robust and detailed sector-specific regulation. ANATEL does not limit itself to fixing prices, assuring quality and universality of goals and establishing market policies, but also has the objective of promoting and guaranteeing free competition, accomplished with Cade. The reality of the market, however, reveals a concentration in large conglomerates of multiple scopes, that is, local incumbent operators currently providing fixed switched telephony, mobile telephony, broadband and pay-tv services, resulting in a high level of market verticalization/concentration. On the other hand, new generation networks, including M2M, OTTs, and IoT, which provide services over internet platforms and are classified as value-added services, are outside regulatory control, and the market in NGNs is consequently more competitive.

However, telecommunication carrier strongly criticizes the lack of regulation of OTTs. OTTs providers use their broadband infrastructure without any fees. OTTS are also not liable to pay for the upgrades to network infrastructure needed to cope with the increase in internet traffic. In response to this, the National Agency of Cinema (ANCINE) and ANATEL are reviewing the regulatory framework, to mitigating the conflict between and balancing the interests of, OTTs and telecoms. ANCINE is considering a new regulatory framework for VoD (video-on-demand), either cable VoD or OTTs, which will include: the imposition of specific quotas that require a certain proportion of content catalogue to be made in Brazil, and the levying of a cash contribution, known as the Contribution for the Development of the National Cinema Industry (CONDECINE).

Chart 6 - Participation of Broadband Service by Economic Group in November 2017



Source: Author's elaboration. Data available at http://www.anatel.gov.br/dados/destaque-1/269-bl-acessos Data gathered in December 2017.

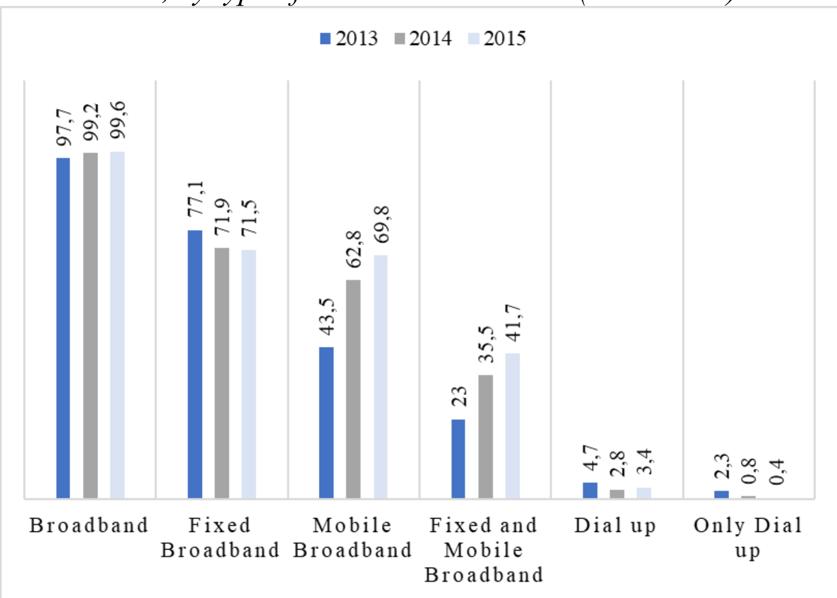
In October 2017, the CADE approved (with restrictions) the acquisition of the corporate control of Time Warner by AT&T in Brazil. In Brazil, the merger will result in a vertical relationship between Sky Brasil, a packing, and distribution company controlled by AT&T Group, and Time Warner, a content programming, and channel licensing company. Therefore, the transaction was conditional on a merger control agreement,[402] which provided several obligations to avoid risks of anti-competitive behavior in the pay-tv market. The companies have committed to comply with several obligations imposed by CADE for a term of five years. The purpose of the merger control agreements to cover all the competition problems highlighted by CADE and prevent the vertical structure resulting from the merger operation from allowing the exchange of sensitive competition information or information

[402] "*Acordo em Controle de Concentração*" in Portuguese.

that may discriminate the agents that do not belong to the same economic group of the companies involved in the merger operation. The Cade's Court judgment was decided from an Antitrust Act standpoint. However, the regulatory impacts of the merger, particularly about the restrictions to verticalization established by the Law No. 12,485/2012 (Pay-TV Law), will be examined by the regulatory agencies ANATEL and ANCINE.

Today, broadband internet access is controlled mainly by three incumbents, as Chart 6 illustrates. Claro, Oi,[403] and Telefônica own together almost 80 % of the market for broadband access in Brazil. This creates an oligopoly, which makes it easier for these businesses to impose rate hikes and charge for data consumption, regardless of whether it benefits people or innovation in Brazil. Broadband is the dominant technology used to access internet in Brazil. As Chart 7 presents, it is followed by mobile broadband and dial-up.

Chart 7 - Percentage of permanent private households using the internet, by type of connection in Brazil (2013-2015)



Source: IBGE, Diretoria de Pesquisas, Coordenação de Trabalho e Rendimento, Pesquisa Nacional por Amostra de Domicílios 2013-2015.
Data gathered in December 2017.

[403] On 29 June 2016, Oi Group (a Brazilian telecommunications group) applied for judicial reorganization (Law No. 11,101 of 2005), which involves the following companies: Oi S.A. Telemar Norte Leste. Oi Movel S.A. Copart 4 Participacões S.A. Portugal Telecom International Finance B.V. Oi Brasil Holdings Cooperatief U.A. The total amount of the debt is BRL 65.4 billion and the debt with the ANATEL is in the amount of BRL20.2 billion. Before the judicial reorganization, Oi and ANATEL had already entered a Term for Adjustment of Conduct (TAC) which, outlined the conversion of BRL 3 billion of debt with ANATEL into investments in its network infrastructure. The TAC still needs to be approved by the Brazilian Account Audit Court and the Public Prosecutor's Office.

The Brazilian reality reveals a concentration in large conglomerates of multiple scopes, that is, local incumbent operators currently providing fixed switched telephony, mobile telephony, broadband and Pay-TV services, resulting in a prominent level of market verticalization and concentration. As Joseph Stiglitz outlines, today's inequalities might be more plausibly linked to the tendency of unregulated markets and monopoly. Stiglitz argues that many sectors in the modern technological era cannot realistically be classified as competitive. According to the author, monopolies could explain the rise in inequality and the uninspiring capital expenditure rates.[404]

By mapping broadband service disparities, we provide inputs to build the agenda for internet regulation. Inequalities reinforce the diagnosis about the need for specific actions to expand access and reduce regional and social disparities. Accomplishing the equally distributed universal access is critical, and we must act on several fronts considering the complexities in the United States and Brazil. In this sense, the digital divide will continuously perpetuate inequalities, no matter how altruistic and innovative some networked users and providers are.[405] Thus, even when networks are open, existing structural patterns of exclusion will determine the ways through which users will access and experience the internet. Broadband service disparities pose a far more dangerous problem that policymakers and scholars have yet to redress.

The inequality that exists regarding digital technologies is a socioeconomic divide. The digital divide also exists across the regions, within a region, and within a country. The distribution of internet bandwidth across the world shows that economically powerful regions enjoy higher bandwidth than economically less important areas. internet bandwidth depends on the capacity of the internet backbones. The availability of bandwidth in a region or a country affects people's access to the internet there. Without access to the internet, people are excluded from the emerging information societies. Although the digital divide

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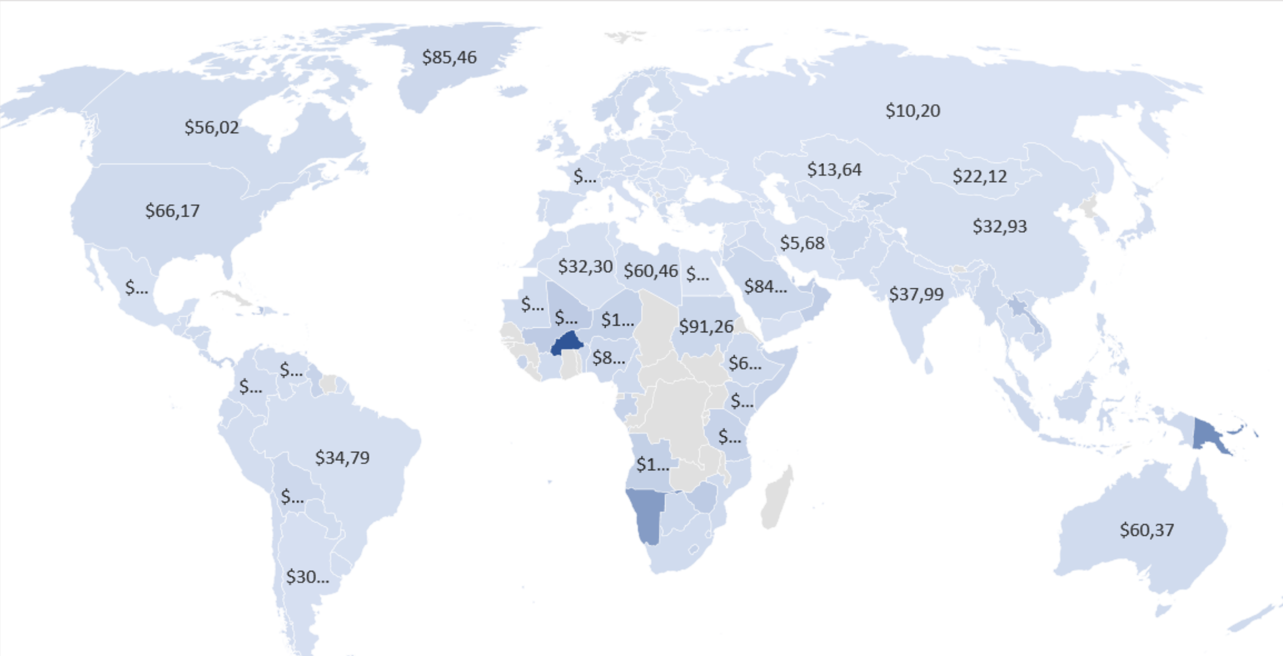
[404] Joseph E. Stiglitz, "America Has a Monopoly Problem - and It's Huge," (2017). Available at https://www.thenation.com/article/america-has-a-monopoly-problem-and-its-huge/ Accessed on 5 January 2018.

[405] Olivier Sylvain, "Network Equality," *Hastings Law Journal* 67 (2016): 443–93.

sounds mere like technological divide, it is a reflection of the existing socioeconomic inequality.

Map 6- The Most and Least Expensive Countries for Broadband - Average cost of a broadband plan per month (U.S. dollars)



Source: Cable.co.uk

This concentration structure also has a direct effect on the consumer. Cable.co.uk, a consumer protection advocacy entity based in the United Kingdom, has developed a recent study on the average price per month for a broadband package up to October 2017. The study found that in the U.S. users should pay nearly USD 66.17 for a broadband package, twice as much as those in Europe or Brazil (see Map 6). The U.S. came in 114th overall. Brazil came in 45th, with an average cost of USD 34.23 per month. Six of the top ten cheapest countries in the world are found in the former USSR (Commonwealth of the Independent States or CIS), including the Russian Federation itself. Within Western Europe, Italy is the cheapest with an average package price of USD 28.89 per month, followed by Germany (USD 34.07), Denmark (USD 35.90) and France (USD 36.34).[406]

[406] Cable.co.uk, "A Global Study of Broadband Pricing." Available at: https://www.cable.co.uk/. Accessed on December 2017.

CHAPTER 5. FRAMING NETWORK NEUTRALITY DEBATE: POWER, TECHNOLOGY, AND INSTITUTIONS

Network neutrality debate, as already described, is a response to political and economic changes that are transforming the internet and its governance arrangements. Defining network neutrality's meaning is a demanding task. In general terms, network neutrality is a non-discrimination principle, which provides that ISPs should treat all internet traffic equally. First, network neutrality concept changes according to the set of policy options, which might be anchored in its technical history, languages, and balance of powers within the information and communications industries. In this sense, "network neutrality" fuzzy interpretations and misconceptions depend on political and economic assumptions. The struggle is not new; it is as old as the communications technologies. Anxieties about broadband management practices have echoed past discussions about telephony, broadcast, and cable regulations.

Second, the term "neutrality" is a deceptively simple phrase hiding a multitude of meanings. It aspires to imply a state of being in which an entity or artifact does not take sides. Nevertheless, technology is never neutral. It is always political and continually expresses and reinforces patterns of domination and hierarchy. The term itself derived from the word *neuter*, which in Latin means "neither" and refers to "non-discrimination" or "equality." Also, ideals of equality embrace a broad spectrum of normative morality, including status and distributional equalities. While the former evokes the ethics of equal status of human beings entitled to political freedoms, the latter recalls to material commitments of social and economic rights. Therefore, the use of "neutrality" in network neutrality coining is not value-free, it has a meaning influenced by the set of ethical values embedded in its political and economic arrangements.

The reappearance of the of network congestion problem made policymakers question how to efficiently allocate existing network capacity and support investment to upgrade networks to the next-generation infrastructure. Traffic management practices arose as a solution to increase network performance and circumventing network congestion. DPI practice is the most common of them and identifies and prioritizes network traffic through the identification of the sender, recipient, and content. The introduction of such practices has opened the door not only to efficiency in network capacity allocation but also to unjustified discrimination and abuses against CAPs and users, including censure and unauthorized surveillance. As traffic management has become more indispensable, the difference between justified practices and discrimination has become subtler. Avoidance of malware, attacks and even preparations for potential attacks; prioritization of different, and continuously evolving, types of messages; improvement of user experience; and many other reasons back the need for traffic management practices. The plea for network neutrality rationally accepts reasonable network management; what it does reject is abuses in management practices to favor ISPs or their allies or to disfavor its competitors unfairly. The problem is in the vague definitions of subjective categories such as "reasonable" and "fair" practices, in the absence of objective.

Because of the need for investments in next-generation of internet access networks, a considerable shift occurred when profits migrated to application and service. As a result, ISPs, which traditionally did not have a presence in application and service markets, began to integrate vertically. This movement brought the attention to ISP's ability to act as gatekeepers, preventing consumers from using the applications of their choice without disclosing what they were doing. Additionally, investments in internet access are also related to bridging the digital divide, to bring the next billion users to the internet. For instance, the dynamics of material inequality exacerbates the disparities between the haves and the have-nots, who are disconnected and unskilled.

The early network neutrality debate was primarily framed as a dichotomous issue. Arguing in this frame, earliest scholarship work positioned themselves either in favor of network neutrality based on the end-to-end arguments that inspired its early architecture, provided a nondiscriminatory foundation that allowed application innovation to flourish or opposed to it.[407] As the discussion matured and following conceptions of the end-to-end

[407] Lemley and Lessig, "The End of End-to-End: Preserving the Architecture of the Internet in the Broadband Era;" Wu and Lessig, "Ex Parte Submission - Federal Communications Commission;" Wu, "Network Neutrality, Broadband Discrimination;" Yoo, "Would Mandating Broadband Network Neutrality Help or Hurt Competition? A Comment on the End-to-End Debate."

arguments were advanced,[408] the scholar's positions became more nuanced, with a stronger emphasis on the contingencies under which network neutrality rules might work and the limits of such policies.[409] The discussion so far has generated a broad range of claims and counterclaims as to the nature of network neutrality problem and the range of solutions. Opponents often claim that network neutrality would imply a prohibition of price differentiation for network services, a mandate to run a dumb network infrastructure, and the establishment of intrusive regulation. On the other hand, many proponents of network neutrality envision a future of severe discrimination against content providers with a significantly lowered innovation rate.

In this section, we frame network neutrality debate, by examining its legal instruments, institutional arrangements, and the connections between instruments and both political and economic outcomes.

5.1. Network Neutrality Legal Instruments

A survey on network neutrality rules around the world demonstrates that policymakers tailor their approach according to the place specifies and interests. Not only there is a significant variation in how the concept is defined and promulgated, but in how it is enforced. Currently, the neutrality rules can be implemented via three legal instruments: legislation, regulation, or soft law. Map 7 below illustrates the instruments adopted by each country. The differing approaches reflect that there no standard process for implementing network neutrality laws.

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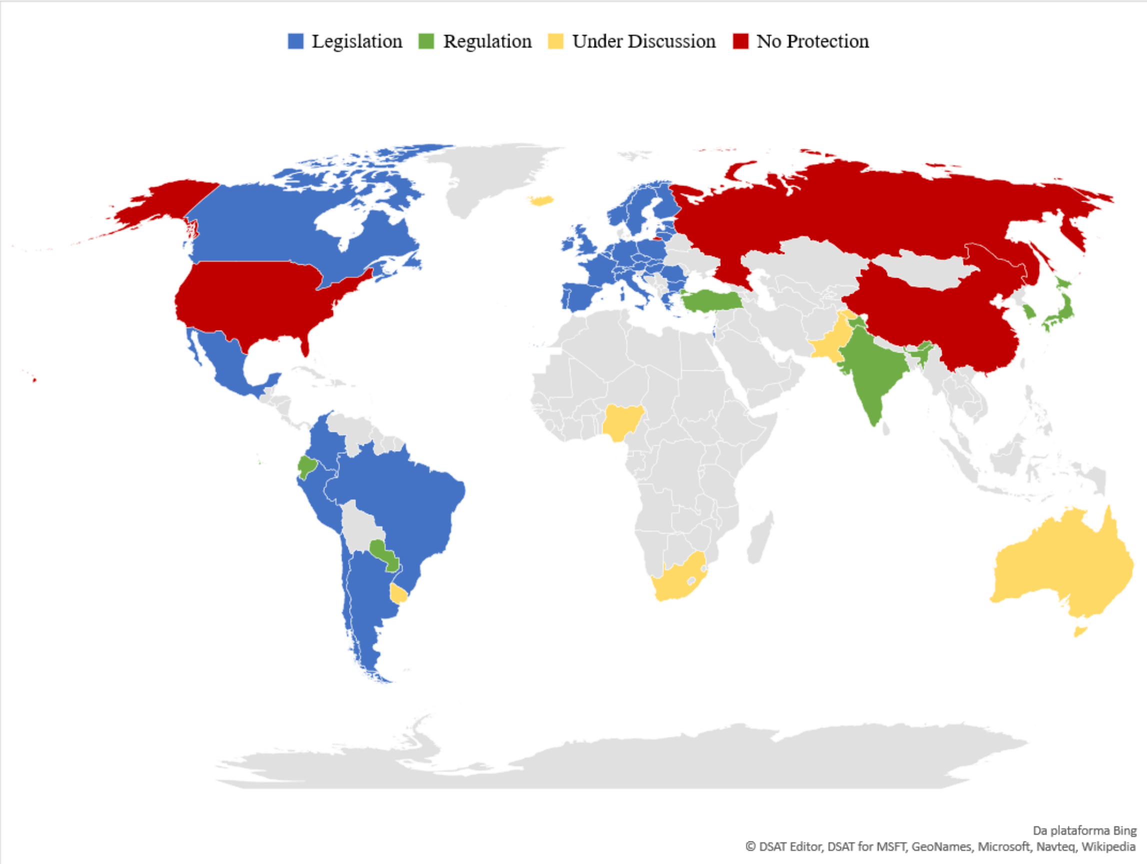
[408] Based on later conceptions of the end-to-end arguments, van Schewick assertes that the internet's nondiscriminatory character was baked into its technical architecture, since ISPs' efforts to treat traffic differentially in the middle of the network would violate end-to-end design. *See* van Schewick, *Internet Architecture and Innovation*.

[409] Rob Frieden, "Assessing the Merits of Network Neutrality Obligations at Low, Medium and Hight Network Layers," *Penn State Law Review* 115 (2011); Barbara van Schewick and Morgan N. Weiland, "New Republican Bill Is Network Neutrality in Name Only," *Stanford Law Review* 67 (2015): 85–99.

Map 7 - Network neutrality around the world in 2018



Source: https://www.thisisnetneutrality.org/ Data gathered in January 2018

5.1.1. Legal Provisions: Principle-Based Statutory and Constitutional Protections

Network neutrality legal provisions are accomplished by enacting or updating a country's communications laws. In Latin America, the legislative approach has been massively adopted, including Brazil in 2014 as part of the BCR, Mexico in 2014 as part of the Constitution, Argentina in 2014, Chile in 2010,[410] Peru in 2012, and Colombia in 2011.

Also, in Canada, network neutrality rule applies under Telecommunications Act and Telecom Regulatory Policies CRTC and consist of a set of internet traffic management principles adopted in 2009. The Canadian rule has been uncontroversial until a recent ruling over mobile video in which the operator challenged the regulator's decision as an unlawful attempt to regulate broadcast service with telecommunications law. While non-

[410] Chile is arguably the first country to have enacted mandated network neutrality obligations into national law, in 2010.

discrimination rules are almost universal, some countries have appended other requirements, including parental controls, protection from malware and viruses, user-requested blocking, transparency, and requirements for privacy, data protection, and network security. The benefit of enacting a legal provision is that abrupt changes are contentious and judicial review is unlikely to occur.

In Europe, the European Union Parliament and the E.U. Council adopted the Regulation EU 2015/2120, which establishes communitaire rules to safeguard equal and non-discriminatory treatment of traffic in the provision of internet access services and related end-users' rights. According to the Regulation, internet traffic must be treated equally, subject to strict and identified public-interest exceptions and the necessary, day-to-day network management of ISPs, enshrining the principle of network neutrality into law. The E.U. legal provision is the result of the adoption of network neutrality as a policy objective and a regulatory principle in 2009. The E.U. rule came into effect in 2016, and the BEREC produced the guidelines for its implementation. Finally, Israel also adopted a network neutrality rule in 2013 and amended it in 2015.

Moreover, the IGF describes network network neutrality as unrestricted and non-discriminatory user access to content, applications, and services "consistent with the full enjoyment of human rights."[411] Human rights aspects of internet governance were first articulated in WGIG and WSIS. In July 2012, the U.N. Human Rights Council adopted a non-binding resolution declaring the right to freedom of expression on the internet. In human rights vocabulary, preserving network neutrality means preserving the power of individuals to make choices about how they use the internet, what information to seek, receive, and impart, from which sources, and through which services. Violations of the neutrality principle that amount to blocking specific information resources or restricting what information internet users can impart over their connection would have severe implications for the right to freedom of expression. The internet governance influence on network

[411] Internet Governance Forum, "Dynamic Coalition on Network Neutrality," http://www.intgov forum.org/cms/dynamic-coalitions/1 330-dc-on-network-neutrality. Accessed on 5 January 2018.

neutrality can be seen an increasing number of countries abandons the self-regulation model and adopts provisions in the form of legal principles.

Different network neutrality legal provisions have benefits and costs. The legislation provides clarity and legitimacy, but simultaneously creates pressure on policymakers to find violations. It should be recognized that law is working if no violations occur after a law is made. However, it can be embarrassing politically, for it may appear that the law was made too hastily or without evidence. As such, there can be political pressure to find a problem to justify the law ex-post. This may have something to do with political reluctance to conduct official investigations before rulemaking, as the case for the rules may not be as strong as some policymakers. Legislations are not bulletproof, but they highlight some of the advantages of soft measures, including the absence of costly litigation.

5.1.2. *Ex-Ante* and *Ex-Post* Regulations

In the discussions about the models of network neutrality regulation, two distinct positions prevail. In the first one, the idea of *ex-post* control prevails, through antitrust mechanisms of case-by-case analysis[412] or the elaboration of soft law regulations that can define good practices, without necessarily preventing ISPs from offering differentiated access plans.[413] In the second, it is defended not only the need to codify the principle of network neutrality, but also a specific *ex-ante* regulation on the subject.[414] The option of *ex-ante* regulation has more ingrained and complex implications than *ex-post* regulation. For this reason, several models with *ex-ante* and *ex-post* elements have been drafted, with the objective of ensuring the most efficient form of network neutrality. Turkey, South Korea in 2013, India in 2016 as part of the solution to the zero-rating discussion, adopted regulatory approaches. In Latin America, Paraguay and Ecuador adopted network neutrality regulations

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[412] Christopher S. Yoo, "Would Mandating Broadband Network Neutrality Help or Hurt Competition? A Comment on the End-to-End Debate," *Journal on Telecommunications & High Technology Law* 3, no. 4 (2004): 23–68.

[413] Christopher S. Yoo, "Beyond Network Neutrality," *Harvard Journal of Law & Technology* 19, no. 1 (2005): 1–77.

[414] Barbara van Schewick, "Towards an Economic Framework for Network Neutrality Regulation," *Journal on Telecommunications & High Technology Law* 5 (2007): 329–92; Wu, "Network Neutrality, Broadband Discrimination."

in 2009 and 2012 respectively. The regulation approach is risky for the telecommunications regulators as it can bring legal challenges that strike down rules and their power altogether.

5.1.3. Self and Co-Regulation

Japan and Norway adopted the soft-law approach. Japan issued its first guidelines in 2006 and in 2007 Ministry of Internal Affairs and Communications strengthened them. Also, Norway established its network neutrality rules in 2009. The guidelines seek voluntary implementation of network neutrality guidelines by private companies. The guidelines have three main sections. First, internet users are entitled to a connection with a predefined capacity and quality. Second, users must be able to send and receive content of their choice, to use services and run applications of their choice, and to connect hardware and use software of their choice — as long as their choice does not harm the network. Third, users must not be discriminated from using any type of application, service, content, or the address of the sender or receiver. Because the guidelines are voluntary, there is no ability for the government to enforce them. The Norwegian guidelines can be seen as an approach that prevents the potential need to require network neutrality by law.[415]

While it may seem on the surface that soft measures have less legitimacy, in practice they have been shown to encourage desirable behaviors and deter network neutrality violations. Soft measures for network neutrality require attention and participation of stakeholders. More generally the ability to deliver desired outcomes without hard measures is the essence of soft power. As such, a key accomplishment of network neutrality movement is that it has changed social norms such that the open internet is a near inviolable political concept. Also, journalists and social media users have effective soft power to "name and shame" practices they do not like. Indeed, sometimes such a collective ability may be more effective over the long run if hard-rules and regulations. Historically, through "naming and shaming," the human rights movement has strengthened and enforced non-binding

[415] Christopher T. Marsden, *Internet Co-Regualtion: European Law, Regulatory Governance, and Legitimacy in Cyberspace*, 1st ed. (Cambridge University Press, 2011).

international principles[416]. So far, the United States, Russia, and China were the countries that open declared to have no laws or regulation on network neutrality.

5.2. Network Neutrality Arrangements

The internet's success has led to attempts to change its basic architecture and design principles. The rapid growth of data flow, a result of the exponential increase in users and applications, has encouraged efforts to manage or discriminate certain types of traffic. These efforts, in turn, have led to the debate over whether governments should step in to limit changes to network architecture. This debate encompasses designing instrumental arrangements and is often referred to as network neutrality debate.[417] Analytical approaches need to simplify to reduce the complexity of real-world relations to tractable problem statements. Therefore, models are sensitive to the specific abstractions used. However, they offer a valuable lens for assessing the relations among players in the internet system and outcomes of alternative arrangements. Taking the normative history of network neutrality in the United States and Brazil, described in Chapters 3 and 4, we analyze the possible network neutrality institutional designs focusing on five specific arrangements that are discussed as alternative forms to safeguard the internet: strict neutrality, no blocking, no paid-prioritization, non-discrimination with exceptions, QoS access tiering constrained by antitrust law. Table 2 below shows the specific arrangements and their sources. It is worth mentioning these arrangements can be used separately or in combination.

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[416] Kennedy, *A World of Struggle: How Power, Law, and Expertise Shape Global Political Economy*.

[417] Network neutrality debate grew in the United States out of concerns in the late 1990s that the vertical integration of cable firms with ISPs would threaten the end-to-end design of the internet.

Table 2 - Network neutrality arrangements in the U.S. and Brazil

Arrangements	Features	Source
Prohibition of blocking	ISPs may not block lawful content, applications, services, or non-harmful devices	2010 FCC Open Internet Order 2015 FCC Open Internet Order
Prohibition of paid-prioritization	ISPs may not charge termination fees from CAPs	2010 FCC Open Internet Order 2015 FCC Open Internet Order
Non-discrimination (with exceptions)	ISPs may not discriminate lawful content, applications, services, or non-harmful devices. Technical requirement and emergency services are exempted	2005 FCC Internet Policy Statement 2010 FCC Open Internet Order 2015 FCC Open Internet Order BRC
QoS tiering constrained by antitrust law	ISPs can differentiate QoS tiers and discriminate among CAPs if they do not violate competition law	2017 FCC Restoring Internet Freedom Order

Source: Author's elaboration.

5.2.1. Strict Neutrality (Absolute Non-Discrimination)

The strict network neutrality arrangement shields that neutrality should be an absolute condition and that ISPs should treat all their network traffic identically without any differentiation or management. This is a perfect theoretical "best-effort" model that seeks to prevent ISPs from using data packet identification techniques. In line with the definition of network neutrality put forth by Tim Wu, "network neutrality is best defined as a network design principle. The idea is that a maximally useful public information network aspires to treat all content, sites, and platforms equally. This allows the network to carry every form of information and support every kind of application."[418] In strict network neutrality, offering separate guaranteed levels of QoS to different content providers is not permitted, even if

[418] Tim Wu, "Net Neutrality FAQ," 2004, http://www.timwu.org/network_neutrality.html.

offered without price discrimination. Neither price discrimination nor exclusive contracts are allowed in this regime.[419]

The main criticism of this model is related to the network architecture boundaries, such as latency and packet-loss, which exist in any commercial network, regardless of the available bandwidth quality.[420] Thus, the strict network neutrality model would only be possible in networks that do not suffer from any congestion. These anomalies hinder the traffic creating technical and economic disincentives to produce applications that depend on it.[421] Even scholars who support neutrality because of its benefits for freedom of speech protections and innovation concede that some forms of differentiation are meaningful in specific situations, although under the watchful eye of the public. As Lessig and Wu pose "[p]ure neutrality is more of an aspiration than a fully achievable design principle."[422] This kind of arrangement has never been historically implemented.

5.2.2. Prohibition of Blocking

The no-blocking rule targets the most severe form of traffic discrimination, which occurs when carriers discard data traffic. As opposed to other traffic management practices, where data packages eventually get delivered, blocking stops the data package from reaching the intended recipient. Blocking might occur to inhibit competition in vertically integrated markets or manage unlawful and undesirable contents, such as virus and spams. However, under the no-blocking rule, a provider must transmit any lawful content. The 2010 FCC Open Internet Order included a no blocking, according to which "fixed broadband providers may not block lawful content, applications, services, or non-harmful devices; mobile

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[419] Nicholas Economides and Joacim Tag, "Network Neutrality and Network Management Regulation: Quality of Service, Price Discrimination, and Exclusive Contracts," *Research Handbook on Governance of the Internet*, 2011.

[420] The network functioning presupposes an intense dynamic of prioritization of data sensitive to network anomalies and congestion, so that the restriction to all types of data management can result in the increased cost to provide internet access services and reduced access to the network; excessive congestion; reduction in innovation investments of CAPs; and creation of monopolistic situations among CAPs. *See* van Schewick, "Internet Architecture and Innovation in Applications."

[421] J. Gregory Sidak, "The Fallacy of 'Equal Treatment' in Brazil's Bill of Rights for Internet Users," *Revista Direito GV* 8, no. 2 (2012): 664–69.

[422] Wu and Lessig, "Ex Parte Submission - Federal Communications Commission."

broadband providers may not block lawful websites or block applications that compete with their voice or video telephony services."[423] Following, the 2015 FCC Open Internet Order exempted mobile broadband providers and disposed of that "broadband providers may not block access to legal content, applications, services, or non-harmful devices, subject to reasonable network management."[424]

5.2.3. Prohibition of Paid-Prioritization or Access Tiering

Paid prioritization, also referred to as paid access tiering, is the optimization of data transfer rates for edge providers in exchange for payment. Paid prioritization creates the possibility of "fast lanes" for big media sites and service providers. A zero-price rule would prohibit ISPs from charging CAPs for the termination of traffic to users. Access tiering is a controversial issue, introduced to network neutrality debate with the 2010 FCC Open Internet Order. When network neutrality debate first flared in the U.S. in the mid-2000s, broadband companies made statements not about blocking *per se*, but about their desire either to charge the services their subscribers used or to enter into exclusive arrangements with CAPs to guarantee faster delivery speeds (also known as "fast-lanes"). This desire has continued to manifest in disputes over the terms by which large content networks, such as Google and Netflix, and large ISPs interconnect and exchange traffic.

Some network neutrality opponents believe OTT giants should have to pay an extra fee for the heavy burden they place on broadband networks. In turn, proponents of network neutrality argue that a fast lane for one CAP would necessarily slow down other, potentially competing sites. It would make ISPs gatekeepers and give them the power to influence free market activities. Besides, smaller edge providers fear that once an established site has been prioritized, it will dominate the competition and stifle innovation.; ISPs would have the incentive to push every innovation towards the fast lane.

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[423] Federal Communications Commission, Preserving the Open Internet Broadband Industry Practices 25 FCC Rcd. 17,905, 2010 WL 5281676, 25 FCCR 17,905, 52 Communications Reg. (P&F) 1, FCC (No. FCC10-201, GN09-191, WC07-52) (2010).

[424] Federal Communications Commission, Protecting and Promoting the Open Internet, Report and Order on Remand, Declaratory Ruling, and Order, 30 FCC Rcd. 5601 (2015).

5.2.4. Non-Discrimination with Exceptions

A non-discrimination rule takes different forms and is placed when there is network congestion. QoS practices involve combining a set of technologies defined by the IETF and IEEE. These technologies are designed to alleviate the problems caused by shared network resources and finite bandwidth. The non-discrimination rule proposes a general rule of network neutrality and specific criteria on data discrimination that are determined by a general rule of reasonability, where socially good discrimination scenarios would be decided by regulatory or judicial authorities. This model was presented as a proposal in the regulatory debate in the United States in 2010 and in Brazil. The main difference between this model and that of unrestrained neutrality previously presented is that this makes explicit the possibility of ISP to inspect and manage the traffic If a user consumes a disproportionate volume of bandwidth, the ISP can temporarily reduce the user's traffic to avoid degradation of the experience of others. The main criticism of the reasonable traffic management model is the range of ISPs' discretion. Among the consequences argue by opponents to this model, the emphasis is placed on legal uncertainty and the disincentive to invest in activities related to ICTs.

Another non-discrimination approach is the isonomic treatment for identical or similar applications and contents, which defends a network neutrality rule that allows isonomic management of traffic between identical and similar applications and contents. It means that traffic management would be authorized in some cases and extended to the same or similar cases. According to this approach, one seeks to differentiate the principle of network neutrality from the principle of equality and to bring it closer to the isonomic principle (treat equals equally and inequalities unequally, as far as inequalities are concerned).

Criticisms are innumerable. Among them, it should be noted that the ISP could create a market distortion by type of content and application since there would be discretion in determining the identical and similar categories (e.g., what criteria ISP would use and what would be the inequality measures of the isonomic treatment?).[425] In this way, inefficient

[425] Goldsmith and Wu, *Who Controls the Internet? Illusions of a Borderless World*.

CAPs could dominate the market due to the existence of preferential access. It would also leave the liberty to CAPs choose the winning and losers categories of applications and CAPs. Therefore, it is argued that even if the technical perspective of the isonomic treatment is essential for network neutrality to be preserved (a different treatment of packages according to their technical requirements), the legal perspective of the isonomic treatment of applications and contents can lead to situations that, in the concrete case, will generate adverse consequences to the navigation experience of the user.

Moreover, the agnostic treatment of traffic management approach proposes a general rule of network neutrality that establishes formally delimited exceptions[426] to allow the management of data traffic in situations where there is a precise social cost.[427] One of the complete exception regime models presented in the academic literature was developed by Barbara van Schewick,[428] who coined the term "agnostic treatment" to refer to her approach. In the approach adopted by the author, a general rule of network neutrality that allows the management of traffic by agnostic criteria, that is, do not use information about the origin, type, content, and destination of the data. The agnostic proposal does not prevent access providers using traffic management and packet identification techniques (e.g., deep packet inspection) to analyze the data flow in their networks and to carry out network infrastructure planning according to the identification of packages. However, the agnostic discrimination rule prevents ISPs from using such information to create specific discrimination between applications based on origin, type, content, and destination.

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[426] It is argued that exceptions should be specifically defined by regulation and result in the lowest possible level of traffic management.

[427] Tim Wu, "Why You Should Care About Network Neutrality," *Slate*, 2006, 5–8.

[428] van Schewick, "Towards an Economic Framework for Network Neutrality Regulation"; van Schewick, "Internet Architecture and Innovation in Applications."

Table 3 - Network neutrality instruments adopted in the U.S. and Brazil

Instruments	Features
U.S. 2005 FCC Internet Policy Statement	General non-discrimination rule Transparency Broadband internet access services are treated as information services (Title I)
U.S. 2010 FCC Open Internet Order	General non-discrimination rule (explicitly prohibits blocking) Transparency Broadband internet access services are treated as information services (Title I). Exempted wireless networks.
U.S. 2015 FCC Open Internet Order	General non-discrimination rule (explicitly prohibits blocking, throttling, and paid-prioritization) Transparency Broadband internet access services are treated as common-carrier (Title II)
U.S. 2017 Restoring Internet Freedom Order	Antitrust and consumer protections Broadband internet access services are treated as information services (Title I)
BRC	General non-discrimination rule with acceptable exceptions related to security and integrity, exceptional congestion, and emergency services Broadband internet access services are treated as information services (Title I)

Source: Author's elaboration.

The non-discrimination rule with exceptions has been widely adopted. The United States and Brazil have considered the approach, as Table 3 presents. The FCC adopted such a rule in the United States. The idea is present in the U.S. regulatory debate since the 2005 FCC Policy Statement. Also, the BCR's network neutrality rule disposes of general non-discrimination rule with acceptable exceptions related to security and integrity, exceptional congestion, and emergency services. According to the Brazilian government:

> The net neutrality aims at preserving the internet's open architecture, maintaining the user's power of choice, the incentives to innovation by application providers, free competition and freedom of speech. The Civil Rights Framework for the Internet determines that Brazilian internet must respect the principle of net neutrality, i.e., that all the information must circulate in an isonomic way, regardless of its content, origin or destination, service, terminal or application. Nevertheless, the Framework itself admits exceptions to this principle, allowing traffic discrimination when that is part of the indispensable technical requisites for the internet's

> operation or the prioritization of emergency services, and these exceptions have to be specified by the decree.[429]

5.2.5. QoS Tiering and Antitrust Overseen

Advocates of QoS tiering believe the problems that network neutrality proponents suggest may occur are the same as problems which that competition law and antitrust enforcement are designed to remedy.[430] With good reason, both the FTC and DOJ have called into question a network neutrality regime and argued that antitrust is up to the task of protecting consumers from vertical contracts that threaten competition. On the other hand, network neutrality proponents argue that antitrust remedies would not adequately protect against the non-economic goals of network neutrality, such as the protection of free speech and civic and democratic participation.[431] In 2017, the FCC adopted the Restoring Internet Freedom Order, which admits QoS tiering vis-à-vis CAPs and end-users as long as no competition or consumer protections are violated.

5.3. Network Neutrality Dimensions Beyond Proponents and Opponents

Network neutrality debate is one of these sporadic opportunities to reflect on the more significant issues of ICTs policy. Because of its overarching nature, it touches a broad range of economic and political concerns. As per Bauer *et al.,* "[i]t addresses a fundamental issue in advanced communications: how to structure the rights and obligations of different stakeholders in the ICT system, particularly among the operators of physical network platforms and providers of content and applications."[432] Thus, political and economic reasons used to argue for and against network neutrality.

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[429] Available at https://participacao.mj.gov.br//marcocivil/civil-rights-framework-for-the-internet-in-brazil/. Access: 20 Jun 2015.

[430] Gerald R. Faulhaber, "Network Neutrality: The Debate Evolves," *International Journal of Communication* 1 (2007): 680–700; Robert W. Hahn and Scott Wallsten, "The Economics of Net Neutrality," *The Economists' Voice* 3, no. 6 (2006).

[431] Rebecca Curwin, "Unlimited Data, but a Limited Net: How Zero-Rated Partnerships Between Mobile Service Providers and Music-Streaming Apps Violate Net Neutrality," *Columbia Science & Technology Law Review* XVII (2015).

[432] Johannes M. Bauer, Jonathan Obar, and Taejin Koh, "Reconciling Economic and Political Goals in the Internet Ecosystem," 2011, 2.

From a broader political perspective, it raises questions related to freedom of speech, privacy, and democratic and civic participation. In turn, from the economic side, network neutrality debate brings issues such as application and services innovation and network investment and innovation incentives. This multiplicity of objectives obscures the debate. Proponents and opponents of network neutrality frequently construct their arguments from diverse, even disconnected, normative frameworks. Aiming at contributing to network neutrality debate from the political economy perspective, we first present the political and economic arrangements presented in network neutrality debate.

5.3.1. Political Dimensions

The original internet design assumes that the only information contained in the packets that are read by the active network equipment is in the headers, not in the payload; this is one formulation of the end-to-end principle. The network is indifferent with respect to the contents and intention of the messages contained in the packets.[433] Knowing more than the protocol may allow ISPs to optimize the performance of the network for or against CAPs and end-users.[434] Accessing the contents of the packets may allow ISPs to know the packets' contents, with potentially profound consequences for privacy and therefore against freedom of speech. In this sense, a network neutrality rule would protect end-users and providers' rights. In 2015, the FCC expressed concern that left unchecked, ISPs could engage in censorship.[435]

The BCR disposes of that freedom of speech is one of the main principles for the internet use in Brazil. However, network neutrality debate's freedom of speech dimension is controversial. The internet is not merely another mass medium for the one-way dissemination of content and information; it is also a platform for the development of new communications tools. As the freedom of speech protection is an enabler of other rights, the

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[433] See Section 1.2. above.

[434] Users' privacy is incidentally affected by network management practices. It means a decrease in privacy because ISP's will have the option to determine the type of media you are accessing as well as logging not only what you access but how often.

[435] Federal Communications Commission, Protecting and Promoting the Open Internet, Report and Order on Remand, Declaratory Ruling, and Order, 30 FCC Rcd. 5601 (2015).

internet is an enabler of varied, diverse media and services that in turn advance the enjoyment of free expression and other rights. In the United States, many scholars link the internet back to the constitutional protection of the freedom of speech as expressed in the First Amendment. they argue that the internet has such unique qualities and a momentous democratic nature that it merits its First Amendment framework informed by participatory-democratic theory.[436] In this sense, users' freedom of speech rights may have to be weighed against constraints on the ISPs' economic incentives and freedom of speech.[437] According to Goldsmith and Wu, "First Amendment reflects universal values and is somehow written into the architecture of the Internet."[438]

Another political dimension of network neutrality debate is the democratic and civic participation. This argument is recurrently built on Jürgen Habermas's notion of a public sphere, seen as an intermediary system between state and society, that is a crucial component of the institutional fabric of modern democracy.[439] Access is guaranteed to all citizens. The misfortune of the public sphere, Habermas argues, is that its core institutions, such as newspapers, became so wildly commercialized that it failed to support the goals of keeping a republic informed and engaged.[440] According to him, while the market helped create the first space for civic engagement, it also constantly threatened to colonize public spheres through privatization. Habermas referred to this phenomenon as the "re-feudalization of the public sphere," a process in which the newly created public space would succumb to commercial pressures and reorganize along power hierarchies. As soon as the internet grows,

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436 Amit Schejter and Moran Yemini, "'Justice, and Only Justice, You Shal Pursue': Network Neutrality, the First Amendment and John Rawls's Theory of Justice," *Michigan Telecommunication Technology Law Review* 14 (2007): 137–74; Jeffrey L. Blevins and Sarah Barrow, "The Political Economy of Free Speech and Network Neutrality: A Critical Analysis," *Journal of Media Law & Ethics* 1, no. 1/2 (2009): 27–48.

437 Christopher S. Yoo, *The Dynamic Internet: How Technology, Users, and Businesses Are Transforming the Network*, *AEI Press* (The AEI Press, 2012); Christopher S. Yoo, "Network Neutrality and the Economics of Congestion," *Georgetown Law Journal* 94 (2006): 1847–1908.

438 Jack Goldsmith and Tim Wu, *Who Controls the Internet? Illusions of a Borderless World*, 1st ed. (New York: Oxford University Press, 2006).

439 Jurgen Habermas, *The Structural Transformation of the Public Sphere: An Inquiry into a Category of Bourgeois Society*, trans. Thomas Burger and Frederick Lawrence (The MIT Press, 1989).

440 Siva Vaidhyanathan, *The Googlization of Everything: And Why We Should Worry* (University of California Press, 2011).

scholars started asking whether it would enable the generation of a "global public sphere," or, in the words of Yochai Benkler, a "networked public sphere."[441]

A similar phenomenon, by analogy, is "enclosure," a process by which private interests overtake common or public lands for the purpose of exploiting the properties to the exclusion of others. The first enclosure movement in England was described by Karl Polanyi when common public land was fenced off and turned into private property.[442] Similarly, in the online context, enclosure systematically removes resources out of the public sphere and replaces a general notion of maximizing the public good with a logic of profit maximization, thus excluding the majority of people and furthering the profits of a minority.

In this context, network neutrality is a tool to protect the network public sphere. The blocking and paid-prioritization prohibition provisions offer a strong safeguard of free speech rights.[443] The internet conveys the promise of inclusiveness as a mass medium not only received by the many but also created by the many.[444] Therefore, access to means of communications should be made available to the broadest number of individuals possible. However, there are also some authors argue that "free-speech concerns provide a poor

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[441] The term "networked public sphere" was introduced by Yochai Benkler to explain the democratic nature of the network economy. The networked public sphere refers to the shift from a mass-media public sphere controlled by a small number of commercial markets to a forum that is accessible to and generated by individuals, "increasing freedom individuals enjoy to participate in creating information and knowledge." *In* Yochai Benkler, *The Wealth of Networks. How Social Production Transforms Markets and Freedom* (New Haven and London: Yale University Press, 2006).

[442] Karl Polanyi, *The Great Transformation: The Political and Economic Origins of Our Time*, 2nd ed. (Beacon Press, 2001). As Zuboff explains, "Karl Polanyi observed that the market economies of the 19th and 20th centuries depended upon three astonishing mental inventions that he called 'fictions.' The first was that human life can be subordinated to market dynamics and be reborn as 'labor.' Second, nature can be subordinated and reborn as 'real estate.' Third, that exchange can be reborn as 'money.' The very possibility of industrial capitalism depended upon the creation of these three critical 'fictional commodities.' Life, nature, and exchange were transformed into things, that they might be profitably bought and sold. '[T]he commodity fiction,' he wrote, 'disregarded the fact that leaving the fate of soil and people to the market would be tantamount to annihilating them.'" *In* Zuboff, "Big Other: Surveillance Capitalism and the Prospects of an Information Civilization,"

[443] Bauer and Obar, "Reconciling Political and Economic Goals in the Net Neutrality Debate," 4.

[444] Amit Schejter and Moran Yemini, "'Justice, and Only Justice, You Shal Pursue': Network Neutrality, the First Amendment and John Rawls's Theory of Justice," *Michigan Telecommunication Technology Law Review* 14 (2007): 155.

justification for limiting BIAS [broadband Internet access services (BIAS)] providers' ability to charge edge providers for access services."[445]

5.3.2. Economic Outcomes

Regarding the economic outcomes of network neutrality debate, scholars who see openness and neutrality as instrumental for innovation frequently imply that it facilitates network infrastructure innovation. The argument rests on that presumption that additional investment is the cheapest way to cope with network congestion, but the specific details of this assertion fail to consider empirical research's.[446] A central argument in favor of network neutrality involves the strong belief that forms of control or discrimination have the potential to hamper network innovation and competition.

Historically, network neutrality aimed at protecting the innovation commons, as coined by Lessig.[447] This innovation commons was layered onto the physical infrastructure that, through regulation, had important commons-like features. Common-carrier regulation of the telephone system assured that the system could not discriminate against an emerging competitor. Also, the internet was designed to treat all packets equally pursuant to the end-to-end principle. In this sense, Lessig and Lemley point out that the end-to-end design principle

> [E]xpands the competitive horizon, by enabling a wider variety of applications to connect and use the network. It maximizes the number of entities that can compete for the use and applications of the network. As there is no single strategic actor who can tilt the competitive environment (the network) in favor of itself, or no hierarchical entity that can favor some applications over others, an e2e network creates a maximally competitive environment for innovation, which by design assures competitors that they

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[445] Johannes M. Bauer, Jonathan Obar, and Taejin Koh, "Reconciling Economic and Political Goals in the Internet Ecosystem," 2011, 2.

[446] Robert Easley, Hong Guo, and Jan Krämer, "From Network Neutrality to Data Neutrality: A Techno-Economic Framework and Research Agenda," *Information Systems Research*, 2017, 1–44.

[447] As Lessig states that "the possibility of a commons at the physical layer is ignored; even the chance to experiment with the commons is denied. Instead, policymakers on the Right and on the Left race to embrace a system of perfect control. So strong is this idea of property, so unbalanced is our understanding of its tradition, that we embrace it fully, without limitation, even when it doesn't yet exist, and even when the asset being assigned a property right is not— as the wires of AT&T's cable or the creative genius behind Disney's Mickey Mouse—something anyone has created." *In* Lawrence Lessig, *The Future of Ideas*.

> will not confront strategic network behavior. The e2e design of the Internet has facilitated innovation.

In Brazil, the BRC was modeled on the CGI.Br Principles for the Governance and Use of the Internet, which included promoting innovation. During the BRC legislative process, the last public hearing addressed network neutrality provision and direct relation to promoting innovation.[448] Thus, the Art. 4 of BCR disposes

> The discipline of the internet use in Brazil aims to promote:
> I – the right of all to access the internet;
> II – the access to information, knowledge and participation in the cultural life and in the handling of public affairs;
> *III - the innovation and stimulus to broad diffusion of new technologies and models of use and access; and*
> IV – the adoption of open technology standards that allows communication, accessibility and interoperability between applications and databases. (emphasis is ours).[449]

In the 2010 FCC Open Internet Order network neutrality rule, reiterated it in its 2015 rules, was based on the internet openness, which drives a 'virtuous cycle' in which innovations at the edges of the network enhance consumer demand, leading to expanded investments in broadband infrastructure that, in turn, spark new innovations at the edge. The logic follows that countries with network neutrality rule should have both higher innovation and network infrastructure investment, as Figure 12 below demonstrates. This standpoint is justified by the following syllogism: unimpeded innovation by application developers will generate more user interest, which, in turn, will induce access providers to invest in infrastructure, which, in turn, will benefit everyone.[450]

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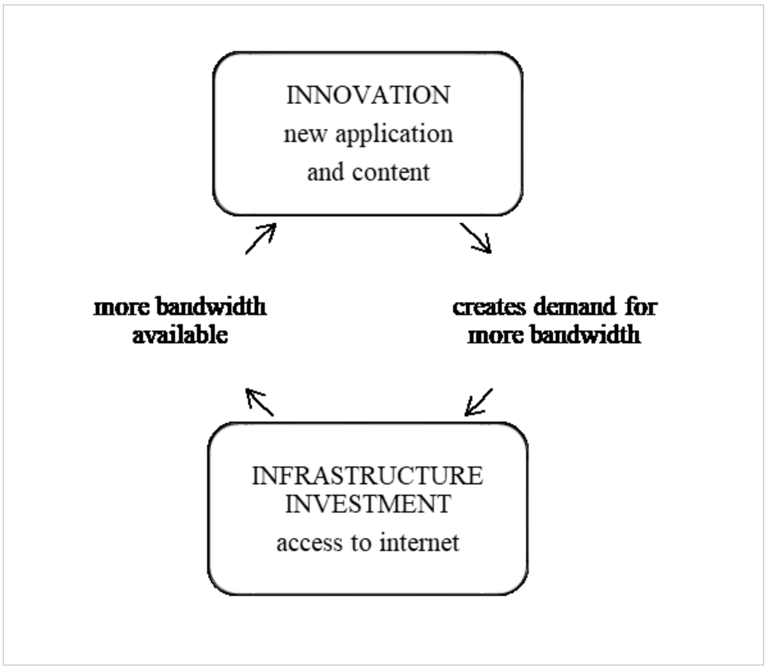
[448] Brazil, "Special Committee Report on Draft Bill No. 5,403 of 2001," 2012.
[449] Free translation from "Art. 4o A disciplina do uso da internet no Brasil tem por objetivo a promoção:
I - do direito de acesso à internet a todos;
II - do acesso à informação, ao conhecimento e à participação na vida cultural e na condução dos assuntos públicos;
III - da inovação e do fomento à ampla difusão de novas tecnologias e modelos de uso e acesso; e
IV - da adesão a padrões tecnológicos abertos que permitam a comunicação, a acessibilidade e a interoperabilidade entre aplicações e bases de dados."
[450] The trickle-down economics has an important influence in this approach. According to it, economic growth and expansion of society's total income is automatic spread to all classes of society, as it "trickles down" the income pyramid. *In* James Cypher and James Dietz, *The Process of Economic Development*, 3rd ed. (London and New York: Roudtledge, 2009).

Figure 12 - The supposed virtuous cycle of internet innovation

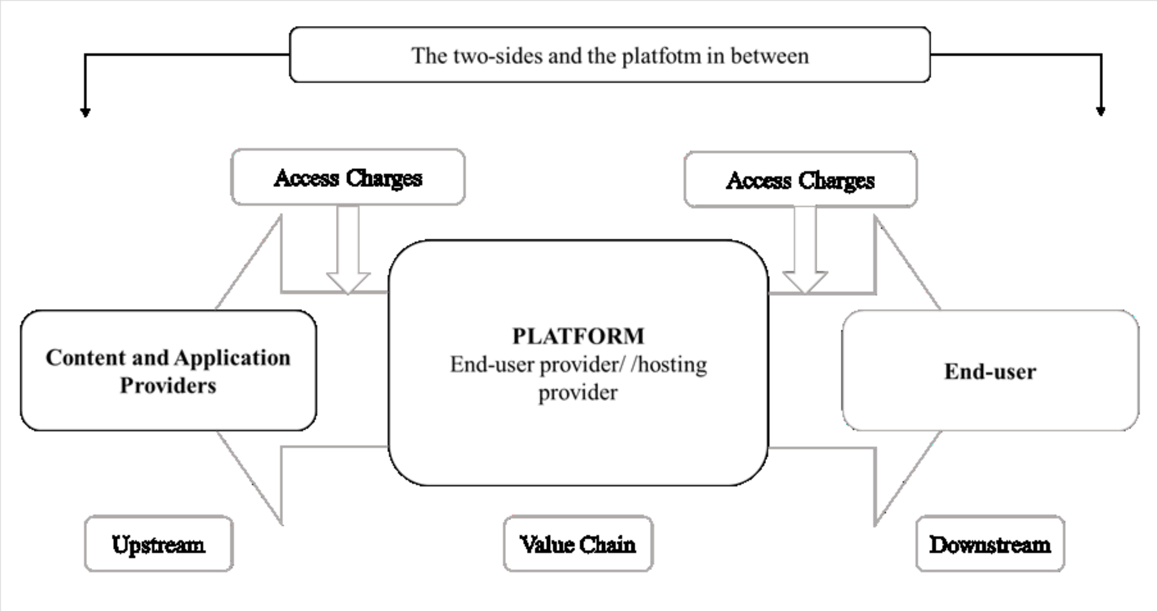


Source: Author's elaboration.

The underlying economic model of the virtuous cycle is that of a two-sided market, as illustrated in Figure 13. A two-sided model of the ISP market as it works as a platform for the supply of CAPs' content and applications on the internet and for the demand of end-users to access to the internet applications and content.[451] Prices imposed on both sides have direct implications on the number of broadband users as well as on the number of active CAPs.

[451] Economides and Tag describe the consequences of " the potential of two-sided pricing on the Internet where a transmission company controlling some part of the Internet (here last mile access) will charge a fee to content or application firms ''on the other side'' of the network which typically did not have a contractual relationship with it. This payment by a content or applications provider would be over and above the traditional one-sided payment to its ISP for providing access and transmission of information packets." *See* Nicholas Economides and Joacim Tag, "Network Neutrality on the Internet: A Two-Sided Market Analysis," *Information Economics and Policy* 24, no. 2 (2012): 92. For more on the issue *see* Amanda Athayde, *Antitruste, Varejo E Infrações À Ordem Econômica*, 1st ed. (Singular, 2017).

Figure 13 - Two-sided Markets



Source: V. Sridhar Rohit Prsad, "The Economics of Net Neutrality," Economic & Political Weekly XLIX, no. 16 (2014): 54

According to Economides, network effects arise as more content and applications make a user's connection more valuable and vice versa. The success of the internet and the abundance of network effects it harnesses are based on the ability of individuals and companies at the edge of the network to innovate without asking permission from network operators.[452] The virtuous cycle of innovation without permission dramatically expands the value of the network as its size grows. Because of these network effects, the value of the internet to users and companies depends crucially on two factors: the number of users that adopt (penetration); and the number of firms that create applications for the internet or make content available on the internet.[453] Thus, the fact that ISPs only charge on one side of the market has helped protect the innovation without permission nature of the Internet and kept barriers to entry low. In this sense, in December 2010, the FCC Chairman Julius Genachowsky affirmed

> In key respects, the interests of edge innovators -- the entrepreneurs creating Internet content, applications and services -- broadband providers, and American consumers are aligned. Innovation at the edge catalyzes

[452] Nicholas Economides, "Why Imposing New Tolls on Third-Party Content and Applications Threatens Innovation and Will Not Improve Broadband Providers' Investment," *Law and Economics Research Paper Series*, 2010.

[453] Ibid.

> consumer demand for broadband. Consumer demand spurs private investment in faster broadband networks. And faster networks spark ever-cooler innovation at the edge.
> A central goal of the proposed open Internet framework is to foster this cycle of massive investment in both the edge and the core of broadband networks, to the benefit of consumers and our economy.

As Olivier Sylvain explains, this model assumes that the spillover effects of innovation by networked elites will eventually spread to everyone else, innovation will trickle down to lay users, irrespective of how its outputs are distributed.[454] Consequently, the distributional factors of the access to the internet are overlooked and indirectly considered. Although the supposed virtuous cycle of internet innovation sounds positive and revolutionary, behind it lies the perversity that perpetuates digital exclusion and increases inequalities in lagging sectors and countries, such as Brazil. The universal access to the internet is not a matter that can be waives, since the digital divide has disastrous consequences for minorities, poor people, and all others who face structural inequalities in other aspects of their lives.

A second strand of the normative discussion is rooted in a sociotechnical analysis of the architecture and associated performance of the internet. Before the term network neutrality became a focus of the debate over the future of the internet, a similar discussion took place regarding the maintenance of the open internet.[455] In the end-to-end architecture, applications and services that are not used by all participants are located at upper layers, often referred to as the "edges" of the network.[456] This modular design in combination with the function of the IP protocol as a "portability layer" provides for a flexible technical architecture in which innovations in the upper layers can build on a standardized, transparent platform.[457] As innovators do not have to incur the transaction and adaptation costs associated with integrated innovations that would require changes in the network layers to

[454] Sylvain, "Network Equality."
[455] See Section 3.1.2.
[456] Saltzer, Reed, and Clark, "End-to-End Arguments in System Design."
[457] van Schewick, *Internet Architecture and Innovation*.

accommodate innovations in services and applications, the space of economically feasible innovation opportunities are expanded.

Modularity and openness are, furthermore, associated with broader benefits related to social and political innovation. Lemley and Lessig express that sentiment, stating that "While the e2e design principle was first adopted for technical reasons, it has important social and competitive features as well." These include an expansion of competition by maximizing "the number of entities that can compete for the use and applications of the network,"[458] the prevention of strategic abuse of control over the network to tilt the competitive playing field, and safeguards for innovators "that they will not confront strategic network behavior."[459] Other authors have stressed the benefits of openness to user-driven innovation and creation and changes in the mode of production. All these authors raise concerns that closed network environments would jeopardize these critical social innovations.

Any internet governance regime also shapes the level and patterns of investment by different players in the ICT system, but it potentially does so in differential ways.[460] The principal argument made by ISPs is that network neutrality would have a chilling effect on their financial incentive to invest in upgrading network infrastructure. ISPs also point out that they incur the full cost of network improvements while CAPs, benefit economically from these improvements without making any contribution of their own, efficiently enjoying a "free ride."[461] According to ISPs, network neutrality negatively affects profits and the reduction in profits directly leads to a reduction in investment for ISPs.[462] This is of great

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[458] Lemley and Lessig, "The End of End-to-End: Preserving the Architecture of the Internet in the Broadband Era," 931.

[459] Lemley, Lessig, and Lemley, "Application for Consent to the Transfer of Control of Licenses MediaOne Group, Inc. to AT&T Corp. CS Docket No. 99-251."

[460] Bauer, "Congestion on the Internet: Operator Responses, Economic Analysis, and Improving the Network Architecture."

[461] Adam D. Thierer, "'Net Neutrality' Digital Discrimination or Regulatory Gamesmanship in Cyberspace?," *Cato Policy Analysis Series*, no. 507 (2004): 28.

[462] "Net neutrality has an unambiguously negative effect on ISP investment. In situations where net neutrality is welfare optimal, it is likely that this is a second-best solution, with ISP investment being below socially efficient levels. Given the constant marginal costs and the network efficiency effects, it seem reasonable to assume that welfare is increasing over the relevant range of investment levels, ceterus paribus. Since investment is therefore socially sub optimal, it is useful to consider possible solutions in order to boost or

importance because of the necessary investment in the next generation network to face current network congestion issues.

prevent a reduction in ISP investment." *In* Thomas McKay, "Net Neutrality and Investment Decisions: Comparison of Norway, the EU and the US" (Univesity of Oslo, 2015).

CHAPTER 6. NETWORK NEUTRALITY CHASTENED: WHAT FUTURE FOR THE INTERNET?

Network neutrality debate is deeply entrenched in structural issues related to economic power and inequality. Thus, understanding how telecommunication policies have been debated and determined and how it affects inequality, concentrated economic power, and economic growth. We emphasize the unequal distribution of power and the arrangements whereby such inequalities are sustained and reproduced. Any big-picture assessment of the internet that disregards the genuine and immediate threat of inequality to self-governance and freedom is going to be flawed from the get-go.[463]

We examine the objectives articulated in network neutrality debate and the specific institutional arrangements advocated by its proponents and opponents. Political and economic dimensions are drawn from different normative foundations and advanced by different stakeholders as alternative visions for the governance of relationships between ISPs and CAPs. However, network neutrality the problem as well as the solution too narrowly, Of the four instruments discussed, some affect predominantly political goals and others predominantly economic goals. None secures all envisioned goals. Following, we present a new normative framework for network neutrality debate, considering what should our media look like if social justice, and not rote commercialism, was our end-goal?

6.1.1. Bridging Political and Economic Goals of Network Neutrality

The following section aims at qualitatively assessing the causality relation between network neutrality arrangements and significant goals, described in the sections 5.2 and 5.3 above, deriving from the framework developed by Bauer and Obar.[464] In political practice, goals and instruments are typically discussed and selected simultaneously. Separating them is, therefore, a requirement for an analytical simplification. First, the prohibition of blocking

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[463] McChesney, *Digital Disconnect: How Capitalism Is Turning the Internet Against Democracy*, 30.

[464] Bauer and Obar, "Reconciling Political and Economic Goals in the Net Neutrality Debate," and Bauer, Obar, and Koh, "Reconciling Economic and Political Goals in the Internet Ecosystem."

goes a long way in safeguarding the political goals of freedom of speech and preserving opportunities to participate in civic and democratic life. On the other hand, no blocking provisions slightly reduce the options available to network operators to address forms of congestion. A prohibition of blocking, therefore, might decrease network incentives for investing in the network next generation, although it increases the incentives of network operators to expand capacity to avoid congestion, benefiting application and services innovation.[465]

Following, the prohibition of paid-prioritization arrangement takes away one instrument to manage network capacity on the downstream side of the market. Under most circumstances, it will reduce the incentives of network operators to invest in network upgrades compared to a situation in which price differentiation is allowed.[466] It also eliminates a means to provide QoS guarantees for applications that are sensitive to congestion. Under most circumstances, prohibiting such charges will reduce the incentives of network operators to invest in network upgrades compared to a situation in which price differentiation is allowed.[467] The paid-prioritization constraint most likely facilitates innovation at the services and application layer, as it reduces the direct costs of gaining access to a network for players at the application and services layer. This will expand the range of economically feasible services and applications. In as far as such lower costs increase the diversity of content and applications, they also might support freedom of speech and civic and democratic participation. However, this is not undisputed. One might argue that the internet fragmentation creates homogenous echo chambers of "like opinions" rather than vibrant dialogue. The scope of this dissertation is not to pursue this exciting issue further. The envisioned hers is the link between paid-prioritization arrangements and political diversity, even if it less robust than many seem to think. Another concern with allowing paid-prioritization arrangements is that CAPs without the funds to pay for priority

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[465] The magnitude of this effect is difficult to gauge. Since network operators have an interest in diverse content and complementary innovation in content and applications that enhances the value of network access, the effect may be small. At the same time, blocking may be instrumental to achieve goals such as information security. Thus, limited exceptions, intended to allow blocking for security and other reasons that do not constrain speech, will likely have to be permitted.

[466] Bauer, Obar, and Koh, "Reconciling Economic and Political Goals in the Internet Ecosystem."

[467] However, if the network operator holds a monopoly position, it might, under certain market conditions, increase the incentives of network operators.

lanes will be relegated to slow best-effort lanes. The incentives of ISPs, in this case, are mixed. They do have incentives to allow access to content if there is a demand among their customers, but small and highly specialized CAPs may suffer from the slow-lane problem, even if a no blocking condition is introduced.

The non-discrimination condition with exceptions is another arrangement option widely considered. In its stricter form, such a model would permit QoS, but ISPs would have to make any such practice available to any requesting party. In other words, exclusive agreements between an ISP and a single CAP or ISP are prohibited. As Bauer and Obar state "in practice, such a rule could be specified as a 'most-favored-nation' clause; conditions offered to one organization would need to be made available to other requesting parties, considering economic and technological criteria that might justify some form of differentiation."[468] The non-discrimination with exceptions arrangement would allow differentiation of service classes while avoiding anticompetitive discrimination, which is relevant concerns. Simultaneously, it would allow premium ISPs and ISPs with specific technical requirements to agree on the specific QoS practices with network operators. Due to the complementarity between network operation and applications, ISPs are interested in a stream of innovations. Nonetheless, there is a potential tension between the non-discrimination with exceptions and the idea of permission-free innovation. Moreover, there is a tension between these arrangements and freedom of speech civic and democratic participation goals if it is combined with differential access of users to information. Either ISPs or CAPs may possibly develop into gatekeepers. To avoid this development, non-discrimination with exceptions arrangements have to be coupled with other instruments such as no blocking provisions.

[468] Bauer and Obar, "Reconciling Political and Economic Goals in the Net Neutrality Debate," 13.

Table 4 - Relations between network neutrality arrangements and overarching goals

	Freedom of speech	Civic and democratic participation	Network investment and innovation	Applications and services innovation
Prohibition of blocking	*positive*	*positive*	*negative*	*positive*
Prohibition of paid-prioritization	*positive*	*positive*	*depends*	*positive*
Non-discrimination (with exceptions)	*depends*	*depends*	*positive*	*positive*
QoS tiering constrained by antitrust law	*negative*	*negative*	*positive*	*depends*

Source: Author's elaboration.

In a more libertarian approach, the QoS tiering only be bounded by antitrust and consumer protections. This arrangement is seen with considerable skepticism by many scholars and advocates motivated by the arguments of the free and open internet. This opposition is often rooted in a perceived conflict between freedom of speech and openness goals and such business practices, rather than in the rigorous economic analysis of the potential effects of differentiation.[469] Table 4 below systematizes the causality relations between network neutrality arrangements and overarching goals. The result is unexpected. None of the four instruments is capable of contributing positively across the range of accepted political and economic goals.

In addition, all network neutrality arrangements described work as guideline easily circumvented in a number of ways. Just as the historical arrangements of non-discrimination were circumvented by "fast-lanes" (see the Netflix-Comcast agreement in section 3.3.2), and other interconnections agreements are developed and introduced into the market, new technological and institutional designs might appear and put network neutrality arrangement in check. Another emergent difficult is related to the enforcement costs of network neutrality

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[469] Bauer, Johannes M., and Jonathan A. Obar. "Reconciling Political and Economic Goals in the Net Neutrality Debate." The Information Society: An International 30, no. 1 (2014): 13

rules. As technology progresses, discriminatory practices become more complicated making effective monitoring and enforcement almost impossible.

6.1.2. Towards a New Framework for Network Neutrality

To go further, we have to go back. The open access disputes are considered network neutrality debate prelude as examined in section 3.1.2 above. The former encouraged competition at the retail level through unbundling and resale arrangements. Its primary was focus based on the social value of the internet, based on principles of universal service, flexible regulation, private investment, and competition. While the Openist privileged an open, competitive, and democratic internet, focusing on structural interventions and consumer empowerment, the proponents of network neutrality shifted their focus to architectural designs and technical arguments, defending the original internet architecture and its end-to-end principles. However, the shift from open access to network neutrality reveals much more than a shift in rhetorical and political strategy. It altered the nature of the proposed interventions. Whereas the open access was based on structural interventions for social and economic, network neutrality replaces it replaced by a behavior rule aiming at nudging private actor into innovation.

Considering the supposed virtuous cycle of internet innovation at the heart of U.S. Open Internet Order and the BCR, explained in section 5.3.2, and the U.S. and Brazilian digital divide, as described in sections 3.4 and 4.4, network neutrality shows evident contradiction and perversity. The idea is that low entry barriers for applications will result in more innovation at the edge, which will increase demand for internet bandwidth, which will expand supply, and this dynamic will ultimately result in cheaper and better consumer broadband.[470] According to the FCC:

[470] van Schewick, "Internet Architecture and Innovation in Applications," Economides and Tag, "Network Neutrality on the Internet: A Two-Sided Market Analysis," Rebecca Curwin, "Unlimited Data, but a Limited Net: How Zero-Rated Partnerships Between Mobile Service Providers and Music-Streaming Apps Violate Net Neutrality," *Columbia Science & Technology Law Review* XVII (2015).

> [T]he Internet's openness continues to enable a 'virtuous [cycle] of innovation in which new uses of the network – including new content, applications, services, and devices – lead to increased end-user demand for broadband, which drives network improvements, which in turn lead to further innovative net-work use.'"[471]

Nevertheless, markets are not yet producing universal broadband access, or affordable access, that can keep up with edge provider innovation. The problem of digital exclusion persists while the innovation conception overlooks digital divide issues and user economic constraint. Olivier Sylvain has characterized the current faith in edge-provider generativity as a sort of "trickle-down" innovation theory that gives insufficient attention to user connectivity gaps.[472] To the extent that the poor are non-users of broadband or light users, we can expect a vicious cycle in which less demand for applications targeted to the needs of the poor and less innovation in those applications.

In the face of the digital divide, the feedback loop described in the supposed virtuous cycle of internet innovation is limited to the top of the social pyramid, increasing inequalities among the digital haves and have-nots. If there are barriers on the consumer side to access, leading to digital exclusion, then the edge providers that target those potential users will not come. The virtuous circle of Internet innovation is a fallacy. The internet not only increases the general welfare of society but also creates opportunities for social integration of users who are structurally excluded.[473] In such scenario, access to the internet, stimulated by equally material universal access, could help repair structural inequalities, reducing discrimination and boosting economic development and social justice. The redistributive effects of universal access policies also play a relevant role in the quest for social and

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[471] 2010 Open Internet Order, 25 FCC Rcd. at 17,910–11, para. 14); Also, Verizon v. FCC: "finding reasonable and supported by substantial evidence the FCC's justification for net neutrality rules that they "will preserve and facilitate the 'virtuous circle' of innovation that has driven the explosive growth of the Internet." *In* Verizon v. FCC, 740 F.3d. 623 (D.C. Cir. 2014). Without convincing empirical evidence, the FCC's case for network neutrality collapses under the weight of a cost benefit analysis, and amounts to the empty assertion that "[w]idespread interference with the Internet's openness would likely slow or even break the virtuous cycle of innovation that the Internet enables, and would likely cause harms that may be irreversible or very costly to undo."

[472] Olivier Sylvain, "Network Equality."

[473] Ibid.

economic development.[474] Any network neutrality arrangement should consider the spread and backwash effects among innovation and network investment, as well as centripetal or centrifugal forces increasing or reducing the role of the internet access in promoting economic development and social justice.[475]

Additionally, Lee and Wu assert that [o]f course, for a given price level, subsidizing content comes at the expense of not subsidizing users, and subsidizing users could also lead to greater consumer adoption of broadband."[476] As Katz criticizes, although the FCC advocates its rules will reduce the digital divide, it seems the Commission shares Lee and Wu's view that edge providers are more deserving than end-users.[477] The regulatory choice to prioritize content and application services is just another form of domination to protect and promote powerful companies. Wu describes "the promotion of network neutrality is no different from the challenge of promoting fair evolutionary competition in any privately-owned environment, whether a telephone network, operating system or even a retail store."[478]

Analyzing and criticizing the Schumpeterian argument in depth is not the scope of this work. However, as Calixto Salomão Filho poses "it is important to emphasize that his conclusions only make economic power gain in relevant." [479] In a Schumpeterian view, large firms are simply smarter, stronger, and better. Schumpeter argued that ''there are superior methods available to the monopolist,'' and that ''monopolization may increase the sphere of influence of the better, and decrease the sphere of influence of inferior brains."[480] Schumpeter believed one should not be worried by monopoly power, because they would

[474] Caio Mário Pereira Neto, "Development Theory and Foundations of Universal Access Policies," *Yale Law School Legal Schorlarship Repository*, 2005, 59.

[475] The adopted vocabulary refers to Gunnar Myrdal's analytic framework for thinking about economic and social dynamics. *See* Gunnar Myrdal, "The Mechanism of Underdevelopment and Development and a Sketch of an Elementary Theory of Planning for Development," in *Asian Drama: An Inquiry Into the Poverty of Nations* (Pantheon, 1968).

[476] Robin S Lee and Tim Wu, "Subsidizing Creativity through Network Design: Zero-Pricing and Net Neutrality," *Journal of Economic Perspectives* 23, no. 3 (2009): 67.

[477] Michael L. Katz, "Wither U.S. Net Neutrality Regulation?," *Review of Industrial Organization* 50, no. 4 (2017): 441–68.

[478] Wu, "Network Neutrality, Broadband Discrimination," Juliana Santos Pinheiro, "Neutralidade de Redes, Instituições E Desenvolvimento" (Federal University of Rio de Janeiro, 2012).

[479] Salomão Filho, *Monopolies and Underdevelopment: From Colonial Past to Global Reality*.

[480] Joseph A. Schumpeter, *Capitalism, Socialism, and Democracy*, 3rd ed. (Harper & Row, 1976).

only be temporary. There would be fierce competition for the market, and this would replace competition in the market and ensure that prices remained competitive. Nevertheless, Stiglitz affirms that today's markets are characterized by the persistence of high monopoly profits.[481] Network neutrality debate shall adopt a new normative framework, one in which monopolies are not taken for granted or even encouraged.

It is important to remember that the Sherman Antitrust Act of 1890 was based on the belief that concentrations of economic power inevitably would lead to concentrations in political power. The origin of the antitrust policy was not based on refined economic analyses. It was about the nature of our society and democracy. But somehow antitrust has been taken over by the neutral and technical discourse, which redefined and narrowed its scope. The truth is that internet governance politics made itself at home in a technocratic world. As James K. Galbraith would argue, the dependency on an impermeable layer of managerial planners and technocrats had rendered antitrust measures ineffective.[482] Network neutrality debate should learn from the evolution of the antitrust policy and avoid falling into similar perils. Therefore, network neutrality debate shall engage into bigger and bridged goals, avoiding the false dichotomy between global markets outcomes and political dimensions, focusing on distributional justice and structural transformation.

Additional criticism might include network neutrality spectrum of morality. There is an ontological difference between equality in technology and the ethics of material equality.[483] The equality in technology can be established through network neutrality since everyone can access it equally. It can satisfy its economic function or can bring equality in an economic sense. The value of equality is invoked in this case to refer to network players and consumers having the same opportunities. Furthermore, equality can emphasize individual status and responsibilities. In this sense, network neutrality has been related to the

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[481] David Kennedy and Joseph E. Stiglitz, "Law and Development Economics: Toward a New Alliance," in *Law and Economics with Chinese Characteristics: Institutions for Promoting Development in the Twenty-First Century*, ed. David Kennedy and Joseph E. Stiglitz (Oxford University Press, 2013); Michael Jacobs and Mariana Mazzucato, eds., *Rethinking Capitalism: Economics and Policy for Sustainable and Inclusive Growth* (Wiley-Blackwell, 2016).

[482] James K. Galbraith, *Inequality and Instability: A Study of the World Economy Just Before the Great Crisis* (Oxford University Press, 2012).

[483] Cheruvalath, "Internet Neutrality: A Battle Between Law and Ethics"; Samuel Moyn, *Not Enough: Human Rights in an Unequal World* (Belknap Press, 2018).

assurance of the equal competition among providers and permeated by the ethics of equality, meaning the state of being equal, that individuals intrinsically have nonnegotiable entitlements.

However, status equality fails to accomplish distributive justice. In this case, network neutrality problem cannot be solved by bringing the concept of equality and non-discrimination into the picture. As Reena Cheruvalath states "[t]here is an ontological difference between the use of the word equality in a 'technical sense' and in an 'ethical sense.' Defining 'technological equality' as 'ethical equality' to ensure non-discrimination invites the fallacy of equivocation."[484] Network neutrality debate political and economic goals are entrenched with the morality of status equality, which means individuals entitlements, such as f freedom of speech and civic and democratic participation envisioned goals.

In the United States, the Communications Act has states objectives, which includes infrastructure investment, competition and interconnection, privacy, and national security. According to its provisions, the FCC is to "make available, so far as possible, to all the people of the United States, without discrimination on the basis of race, color, religion, national origin, or sex, a rapid, efficient, Nation-wide, and world-wide wire and radio communication service with adequate facilities at reasonable charges."[485] In Brazil, the BCR states in its Art. 4 "the right of all to access the internet." The language adopted in the mentioned provisions makes reference to status equality. However, this approach is not enough to bridge lagging and leading sectors and countries and the inequality their relationship causes. Network neutrality debate shall be reframed under the ethics of material equality and distributive justice. In this sense, social justice requires that everything is equally distributed, including the bargaining power in a globalized economy.

After decades, the dark side of the internet rises and wrong lessons have been emerging from this scenario. Internet enthusiasts have doubled down on old strategies

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[484] Reena Cheruvalath, "Internet Neutrality: A Battle Between Law and Ethics," *International Journal for the Semiotics of Law - Revue Internationale de Sémiotique Juridique* 31, no. 1 (2018): 146.

[485] 47 U.S.C. 151.

without reckoning that their attempts to name and shame cannot change behavior. Above all, they have ignored how technology and politics are deeply enrichened and under the mask of neutrality political and economic choices have been made. However, naming and shaming are not enough. The tragedy of network neutrality debate is that it occupied the popular imagination but have so far contributed little of note, merely compressing at the heels of the massive neoliberal interests. Network neutrality debate became part of our moral language while ignoring as the rich seized more power and wealth ever. Thus, network neutrality debate shall be revisited and connected its predecessor’s objectives, the open access, as well as redesigned as an institutional arrangement linked to bigger goals and structural transformation.

CONCLUSION

Few internet governance topics have raised so many controversies as network neutrality debate. History can reframe how

we perceive specific problems, permitting to think anew about what the present denies. By revisiting the development of the internet form its early days to the most recent challenges, we deconstructed widespread myths. First, despite common perceptions, the state intervention is deeply rooted on the internet and one of the reasons such technology succeeded. Regulation created the solid ground that made the commercial internet possible. Historically, the government was extraordinarily proactive and entrepreneurial in the development and commercialization of the internet. Moreover, design principles for the original architecture were impregnated not only with libertarian thought but also with the welfarist tradition. In its turn, far from retarding the economic system, the regulation also had a leading role in the internet's development, fostering innovation and dynamism.

Network neutrality debate arose within the context of traditional telecommunications policy and internet governance. For instance, internet policymaking has been the most controversial issue in supranational communication in recent years. The internet governance reflects the reality of the current coexistence of a state-centered system along with a system of powerful "multi-centered" transnational actors. Focusing on addressing the power struggle in the global internet governance over the technical, institutional, and organizational systems of the internet, the internet governance wars define who controls the internet. In fact, while multistakeholderism may have so far allowed various non-state actors to participate in internet governance processes, it does not necessarily lead to a broader range of views or a more global representation of interests and concerns.

In the United States, several key struggles preceded the emergence of network neutrality concept. Today's FCC Restoring the Internet Freedom Order is the latest iteration of an old debate regarding common carriage obligations aboard telecommunications infrastructure. Network neutrality debate grew out of years of regulatory skirmishes over the extent to which common carriage obligations should apply to data services offered by telephone companies. Deregulatory measures previously taken by the FCC created an environment of distress. The emergence of new digital technologies directly competing with the carriers' telephone or video offerings and the decline in operator competition catalyzed concerns with broadband ISPs' potential to discriminate against sources of content and applications.

The shift from open access to network neutrality reveals the illusion the latter portend. If the United States had left unbundling rules in place, for example, network neutrality would not have to fulfill this goal of controlling market power locally; it could have been done with unbundling instruments, which is much better suited to control market power. In this sense, the reason for the creation of network neutrality is the abandonment of the idea of increasing competition through structural measures and facilities unbundling. Many advocates of network neutrality are fighting to defend openness. However, in this debate, nobody is fighting to guarantee distributive justice.

In Brazil, network neutrality debate is deeply entrenched in structural issues related to economic power and inequality. By revisiting the history of the telecommunications regulation in Brazil, we highlighted the struggles that preceded the arrival of network neutrality debate. Challenges for the development of the internet in Brazil was defined by the regulatory pendulum, in which deregulation and concentration played an important role. Network neutrality debate in Brazil has been framed by global pressures and far too focused on sponsoring innovation at the expense of the distributional objectives of communications law. It is time for policymakers and scholars in developing countries put aside the fallacy of the virtuous cycle of internet innovation, and focus their attention to affirmative action to ensure universal access to the internet and, consequently, equality.

Finally, we re-engage network neutrality debate, subjecting it to a critical analysis about its relation to political and economic goals. The chosen analytical approach allows disentangling value and instrumental rationality aspects and a more informed assessment of the specific policy proposals that are put forward. It also allows assessing existing network neutrality policies, notably whether they implemented a combination of instruments that can influence the system in the desired direction. Although we discussed the models that are currently in discussion or use, other approaches and instrument combinations are theoretically possible. One way of constraining power simultaneously in the internet layers is to create mechanisms for assuring transparency and accountability challenging the need for app approval at all. The primary concern with any such system is that it would itself create a control point in the hands of a single gatekeeping entity, whether public or private. Examining the direction of effects and causality relations can help clarify the ability of single instruments and of combinations of instruments to achieve consented objectives. Its application may facilitate the finding and implementation of relevant policies that safeguard the broad range of legitimate goals raised in the present debate.

Therefore, the internet debate has been far too focused on sponsoring innovation in its regulation at the expense of the distributional objectives of communications law. It is time for policymakers and scholars in developing countries put aside the fallacy of the virtuous circle of internet innovation, and focus their attention to affirmative action to ensure universal access to the internet and, consequently, equality. This work makes a novel contribution to the scholarship by identifying the misconception of the current regulatory framework of network neutrality, based on spillover effects of innovation to society's welfare, where the digital divide remains a stubborn problem. Faintly, this dissertation has attended to produce a theoretical framework for unequal countries, with social and broadband patterns similar to the United States and Brazilian disparities, to redress the internet regulation focus to distributional goals. Unless disparities are addressed directly, internet regulation could worsen existing inequalities in the short and long term.

APPENDICES

APPENDIX 1- FIRST DRAFT OF NETWORK NEUTRALITY RULE PROPOSED BY TIM WU AND LAWRENCE LESSIG

§ 1. General Right to Unrestricted Network Usage. Broadband Users have the right reasonably to use their Internet connection in ways which are not illegal or harmful to the network. Accordingly, neither Broadband Operators nor the Federal Communications Commission shall impose restrictions on the use of an Internet connection except as necessary to:

(1) Comply with any legal duty created by federal, state or local statute, or as necessary to comply with any executive order, warrant, legal injunction, subpoena, or other duly authorized governmental directive;

(2) Prevent physical harm to the local Broadband Network caused by any network attachment or network usage;

(3) Prevent Broadband users from interfering with other Broadband or Internet Users' use of their Internet connections, including but not limited to neutral limits on bandwidth usage, limits on mass transmission of unsolicited email, and limits on the distribution of computer viruses, worms, and limits on denial-of service-or other attacks on others;

(4) Prevent violations of the security of the Broadband network, including all efforts to gain unauthorized access to computers on the Broadband network or Internet;

(5) Serve any other purpose specifically authorized by the Federal Communications Commission, based on a weighing of the specific costs and benefit of the restriction.

§ 2. As used in this section,

(1) ''Broadband Operators'' means a service provider that provides high-speed connections to the Internet using whatever technology, including but not limited to cable networks, telephone networks, fiber optic connections, and wireless transmission;

(2) ''Broadband Users'' means residential and business customers of a Broadband Operator;

(3) ''Broadband Network'' means the physical network owned and operated by the Broadband Operator;

(4) ''Restrictions on the Use of an Internet Connection'' means any contractual, technical, or other limits placed with or without notice on the Broadband user's Internet Connection.

APPENDIX 2 - NETWORK NEUTRALITY RULE IN BRAZIL (LAW NO. 12.965 OF 23 APRIL 2014)

Art. 9. The agent in charge of transmission, switching, and routing must give all data packets equal treatment, regardless of content, origin and destination, service, terminal or application.

§1. Traffic discrimination and degradation will be subject to regulations issued under the exclusive powers granted to the President of the Republic in Art. 84(iv) of the Federal Constitution, for faithful implementation of this Law, after hearing the Brazilian Internet Steering Committee (CGI.br) and the National Telecommunications Agency (ANATEL), and may only result from:

I – technical requirements essential to the adequate provision of services and applications, and

II – prioritization of emergency services.

§2. In the event of traffic discrimination or degradation, as contemplated in §1, the agent in charge must:

I – refrain from causing damage to users, as provided for in Art. 927 of the Law No. 10,406 of 10 January 2002 (Brazilian Civil Code);

II – act in a fair, proportionate, and transparent manner;

III – provide users, in advance, with clear and sufficiently descriptive information on its traffic management and mitigation practices, including network security measures; and mitigation,

IV – provide services on non-discriminatory commercial terms and refrain from anticompetitive practices.

§3. Subject to the provisions of this article, the content of data packets may not be blocked, monitored, filtered or analyzed in Internet connections, either paid or free of charge, or in transmission, switching, and routing.[486]

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t Free translation from *"Art. 9o O responsável pela transmissão, comutação ou roteamento tem o dever de tratar de forma isonômica quaisquer pacotes de dados, sem distinção por conteúdo, origem e destino, serviço, terminal ou aplicação.*
§ 1o A discriminação ou degradação do tráfego será regulamentada nos termos das atribuições privativas do Presidente da República previstas no inciso IV do art. 84 da Constituição Federal, para a fiel execução desta Lei, ouvidos o Comitê Gestor da Internet e a Agência Nacional de Telecomunicações, e somente poderá decorrer de:
I - requisitos técnicos indispensáveis à prestação adequada dos serviços e aplicações; e
II - priorização de serviços de emergência.
§ 2o Na hipótese de discriminação ou degradação do tráfego prevista no § 1o, o responsável mencionado no caput deve:

APPENDIX 3 - NETWORK NEUTRALITY RULE IN BRAZIL (DECREE NO. 8.771 OF 11 MAY 2016)

Art. 3. The equal treatment requirement under Art. 9 of Law No. 12.965 of 2014 must preserve the public and unrestricted character of Internet access and the foundations, principles and objectives of Internet use in Brazil, as provided for in Law No. 12.965 of 2014.

Art. 4. Traffic discrimination or degradation are exceptional measures, in that it may result only from technical requirements that are essential to providing adequate service and applications or

from prioritization of emergency services, and must comply with all the requirements under Art. 9 §2 of Law 12.965 of 2014.

Art. 5. The technical requirements that are essential for the adequate provision of services and applications must be complied with by the agent in charge of transmission, switching or routing activities, within its respective network, and must be intended to maintain the network's stability, security, integrity and functionality.

§ 1. The essential technical requirements referred to above are those resulting from:

I – handling network security issues, such as restriction on sending bulk messages (spam) and controlling denial-of-service attacks; and

II – handling exceptional network congestion situations, such as alternative routes in case of main route interruptions and emergencies.

§ 2. The National Telecommunications Agency (ANATEL) will conduct inspections and investigations of infractions as to the technical requirements set out in this article, taking into consideration the guidelines established by the Brazilian Internet Steering Committee (CGI.br).[487]

I - abster-se de causar dano aos usuários, na forma do art. 927 da Lei no 10.406, de 10 de janeiro de 2002 - Código Civil;
II - agir com proporcionalidade, transparência e isonomia;
III - informar previamente de modo transparente, claro e suficientemente descritivo aos seus usuários sobre as práticas de gerenciamento e mitigação de tráfego adotadas, inclusive as relacionadas à segurança da rede; e
IV - oferecer serviços em condições comerciais não discriminatórias e abster-se de praticar condutas anticoncorrenciais
§ 3o Na provisão de conexão à internet, onerosa ou gratuita, bem como na transmissão, comutação ou roteamento, é vedado bloquear, monitorar, filtrar ou analisar o conteúdo dos pacotes de dados, respeitado o disposto neste artigo."

[487] Free translation from "*Art. 3o A exigência de tratamento isonômico de que trata o art. 9º da Lei nº 12.965, de 2014, deve garantir a preservação do caráter público e irrestrito do acesso à internet e os fundamentos, princípios e objetivos do uso da internet no País, conforme previsto na Lei nº 12.965, de 2014.*

Art. 6. In order to provide adequate Internet services and applications, network management is permitted when it is intended to preserve network stability, security and functionality, and uses only technical measures compatible with international standards developed for the proper functioning of the Internet, subject to compliance with the regulatory standards issued by ANATEL and taking into consideration the guidelines established by CGI.br.

Art. 7. The agent in charge of transmission, switching or routing must adopt transparency measures designed to ensure that users understand the reasons for implementing network management practices that result in the discrimination or degradation referred to in Art. 4, such as:

I – including provisions in service contracts entered into with final users and application providers; and
II – disclosing information on network management practices on their websites, using easily understood language.

Sole paragraph. The information contemplated in this article must contain at least:

I – a description mentioned practices;
II – the effects the adoption of mentioned practices on the quality of users' experience; and
III – the reasons and need for adopting the practices.

Art. 8. Degradation or discrimination due to the prioritization of emergency services may only result from:

I – communications directed to emergency services providers, or communications among emergency service providers, as provided in regulations issued by the ANATEL.
II – communications necessary to warn the population of disaster risks, emergency situations or states of public calamity.

Art. 4o A discriminação ou a degradação de tráfego são medidas excepcionais, na medida em que somente poderão decorrer de requisitos técnicos indispensáveis à prestação adequada de serviços e aplicações ou da priorização de serviços de emergência, sendo necessário o cumprimento de todos os requisitos dispostos no art. 9º, § 2º, da Lei nº 12.965, de 2014.

Art. 5o Os requisitos técnicos indispensáveis à prestação adequada de serviços e aplicações devem ser observados pelo responsável de atividades de transmissão, de comutação ou de roteamento, no âmbito de sua respectiva rede, e têm como objetivo manter sua estabilidade, segurança, integridade e funcionalidade.

§ 1o Os requisitos técnicos indispensáveis apontados no caput são aqueles decorrentes de:

I - tratamento de questões de segurança de redes, tais como restrição ao envio de mensagens em massa (spam) e controle de ataques de negação de serviço; e

II - tratamento de situações excepcionais de congestionamento de redes, tais como rotas alternativas em casos de interrupções da rota principal e em situações de emergência.

§ 2o A Agência Nacional de Telecomunicações - ANATEL atuará na fiscalização e na apuração de infrações quanto aos requisitos técnicos elencados neste artigo, consideradas as diretrizes estabelecidas pelo Comitê Gestor da Internet - CGIbr."

Sole paragraph. Transmission of data in the cases listed in this article will be free of charge.[488]

Art. 9. Unilateral conduct is prohibited, as are agreements made between agents in charge of transmission, switching or routing and applications providers that:

I – compromise the public and unrestricted nature of the Internet and the foundations, principles and objectives of Internet use in Brazil;

II – prioritize data packets by reason of commercial arrangements; or

III – prioritize applications offered by the same agent that is in charge of transmission, switching or routing or by a company within its economic group.

Art.10. Commercial offers and Internet access pricing models must preserve the unity of the Internet and its open, plural and diverse nature, serving as a means to promote human, economic, social and cultural development, and contributing to build an inclusive and non-discriminatory society.[489]

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[488] Free translation from: "*Art. 6o Para a adequada prestação de serviços e aplicações na internet, é permitido o gerenciamento de redes com o objetivo de preservar sua estabilidade, segurança e funcionalidade, utilizando-se apenas de medidas técnicas compatíveis com os padrões internacionais, desenvolvidos para o bom funcionamento da internet, e observados os parâmetros regulatórios expedidos pela ANATEL e consideradas as diretrizes estabelecidas pelo CGIbr.*
Art. 7o O responsável pela transmissão, pela comutação ou pelo roteamento deverá adotar medidas de transparência para explicitar ao usuário os motivos do gerenciamento que implique a discriminação ou a degradação de que trata o art. 4o, tais como:
I - a indicação nos contratos de prestação de serviço firmado com usuários finais ou provedores de aplicação; e
II - a divulgação de informações referentes às práticas de gerenciamento adotadas em seus sítios eletrônicos, por meio de linguagem de fácil compreensão.
Parágrafo único. As informações de que trata esse artigo deverão conter, no mínimo:
I - a descrição dessas práticas;
II - os efeitos de sua adoção para a qualidade de experiência dos usuários; e
III - os motivos e a necessidade da adoção dessas práticas.
Art. 8o A degradação ou a discriminação decorrente da priorização de serviços de emergência somente poderá decorrer de:
I - comunicações destinadas aos prestadores dos serviços de emergência, ou comunicação entre eles, conforme previsto na regulamentação da Agência Nacional de Telecomunicações - ANATEL; ou
II - comunicações necessárias para informar a população em situações de risco de desastre, de emergência ou de estado de calamidade pública.
Parágrafo único. A transmissão de dados nos casos elencados neste artigo será gratuita."

[489] Free translation from: "*Art. 9o Ficam vedadas condutas unilaterais ou acordos entre o responsável pela transmissão, pela comutação ou pelo roteamento e os provedores de aplicação que:*

I - comprometam o caráter público e irrestrito do acesso à internet e os fundamentos, os princípios e os objetivos do uso da internet no País;

II - priorizem pacotes de dados em razão de arranjos comerciais; ou

III - privilegiem aplicações ofertadas pelo próprio responsável pela transmissão, pela comutação ou pelo roteamento ou por empresas integrantes de seu grupo econômico.

Art. 10. As ofertas comerciais e os modelos de cobrança de acesso à internet devem preservar uma internet única, de natureza aberta, plural e diversa, compreendida como um meio para a promoção do

APPENDIX 4 - EVOLUTION OF THE BRAZILIAN LEGISLATIVE PROCESS FOR THE ELABORATION OF NETWORK NEUTRALITY RULE SET FORTH IN LAW NO. 12.965 OF 2014

Versions	Text and Proposed Changes
Draft Bill 8 April 2010	Art. 3 The discipline of Internet use in Brazil has the following principles: (...) IV - preservation and guarantee of network neutrality; Article 9. The agent in charge of transmission, switching, and routing must give all data packets equal treatment, of content, origin and destination, service, terminal or application, being prohibited from establishing, and its prohibited any discrimination or degradation of traffic that does not derives from technical requirements intended to preserve the contractual quality of the services. Paragraph 1. The content of data packets may not be monitored, filtered analyzed or inspect in Internet connections, either paid or free of charge, except for the hypotheses allowed by law.
Draft Law No. 2,126 24 August 2011	Art. 3 The discipline of Internet use in Brazil has the following principles: (...) IV - preservation and guarantee of network neutrality, <u>according to regulation</u>; Article 9. The agent in charge of transmission, switching, and routing must give all data packets equal treatment, <u>regardless</u> of content, origin and destination, service, terminal or application, ~~being prohibited from establishing~~, and its prohibited any discrimination or degradation of traffic that does not derives from technical requirements intended to preserve the contractual quality of the services <u>necessary for the adequate provision of services, in accordance with regulations.</u> Paragraph 1. The content of data packets may not be monitored, filtered analyzed or inspect in Internet connections, either paid or free of charge, except for the hypotheses allowed by law.
Amendments to the 1st Substitute 11 July 2012	Art. 3 The discipline of Internet use in Brazil has the following principles: (...) IV - preservation and guarantee of network neutrality, ~~according to regulation~~; Article 9. The agent in charge of transmission, switching, and routing must give all data packets equal treatment, regardless of content, origin and destination, service, terminal or application ~~and its prohibited any discrimination or degradation of traffic that does not derives from technical requirements intended to preserve the contractual quality of the services necessary for the adequate provision of services, in accordance with regulations.~~

desenvolvimento humano, econômico, social e cultural, contribuindo para a construção de uma sociedade inclusiva e não discriminatória."

§ 1. Traffic discrimination or degradation will be subject to regulations issued Decree, after consulting the recommendations of the Internet Steering Committee in Brazil (CGI.br) and may only arise from:

I - technical requirements essential to the adequate use of services and applications; and

II - prioritization of emergency services.

§ 2 In the event of traffic discrimination or degradation, as contemplated in § 1, the agent in charge must:

I - refrain from causing harm to users;

II - respect free competition; and

III - provide users, in advance, with clear and sufficiently descriptive information on its traffic management and mitigation practices;
§ 3º The content of data packets may not be monitored, filtered analyzed or inspect in Internet connections, either paid or free of charge, except for the hypotheses allowed by ~~law~~ regulation.

Amendments to the 2nd Substitute
7 November 2012

Art. 3 The discipline of Internet use in Brazil has the following principles:

(...) IV - preservation and guarantee of network neutrality;

Article 9. The agent in charge of transmission, switching, and routing must give all data packets equal treatment, regardless of content, origin and destination, service, terminal or application.

§ 1. Traffic discrimination or degradation will be subject to regulations issued Decree, after consulting the recommendations of the Internet Steering Committee in Brazil (CGI.br) and may only arise from:

I - technical requirements essential to the adequate use of services and applications; and

II - prioritization of emergency services.

§ 2 In the event of traffic discrimination or degradation, as contemplated in § 1, the agent in charge must:
I - refrain from causing harm to users;
II - respect free competition; and
III - provide users, in advance, with clear and sufficiently descriptive information on its traffic management and mitigation practices;
IV - refrain from anticompetitive practices.
§ 3º The content of data packets may not be blocked, monitored, filtered analyzed or inspect in Internet connections, either paid or free of charge, or in transmission, switching, and routing, ~~except for the hypotheses allowed by regulation.~~

Amendments to the 3rd Substitute 5 November 2013	Art. 3 The discipline of Internet use in Brazil has the following principles: (...) IV - preservation and guarantee of network neutrality; Article 9. The agent in charge of transmission, switching, and routing must give all data packets equal treatment, regardless of content, origin and destination, service, terminal or application. § 1. Traffic discrimination or degradation will be subject to regulations issued Decree~~, after consulting the recommendations of the Internet Steering Committee in Brazil (CGI.br)~~ and may only arise from: I - technical requirements essential to the adequate use of services and applications; and II - prioritization of emergency services. § 2 In the event of traffic discrimination or degradation, as contemplated in § 1, the agent in charge must: I - refrain from causing ~~harm~~ damages to users as provided for in Art. 927 of the Law No. 10,406 of 10 January 2002 (Brazilian Civil Code); ~~II - respect free competition; and~~ II - act in a fair, proportionate, and transparent manner; III - provide users, in advance, with clear and sufficiently descriptive information on its traffic management and mitigation practices; IV – provide services on non-discriminatory commercial terms and refrain from anticompetitive practices. § 3º The content of data packets may not be blocked, monitored, filtered or analyzed ~~or inspect~~ in Internet connections, either paid or free of charge, or in transmission, switching, and routing.
Amendments to the 4th Substitute 11 December 2013	Art. 3 The discipline of Internet use in Brazil has the following principles: (...) IV - preservation and guarantee of network neutrality; Article 9. The agent in charge of transmission, switching, and routing must give all data packets equal treatment, regardless of content, origin and destination, service, terminal or application. § 1. Traffic discrimination or degradation will be subject to regulations issued ~~Decree~~ ANATEL, and may only arise from: I - technical requirements essential to the adequate provision of services and applications; and II - prioritization of emergency services. § 2 In the event of traffic discrimination or degradation, as contemplated in § 1, the agent in charge must: I - refrain from causing damages to users, as provided for in Art. 927 of the Law No. 10,406 of 10 January 2002 (Brazilian Civil Code); II - act in a fair, proportionate, and transparent manner;

	III - provide users, in advance, with clear and sufficiently descriptive information on its traffic management and mitigation practices, including network security measures; IV – provide services on non-discriminatory commercial terms and refrain from anticompetitive practices. § 3º. Subject to the provisions of this article, the content of data packets may not be blocked, monitored, filtered or analyzed in Internet connections, either paid or free of charge, or in transmission, switching, and routing.
Agglutinative Amendment 13 March 2014	Art. 3 The discipline of Internet use in Brazil has the following principles: (...) IV - preservation and guarantee of network neutrality; Article 9. The agent in charge of transmission, switching, and routing must give all data packets equal treatment, regardless of content, origin and destination, service, terminal or application. § 1. Traffic discrimination or degradation will be subject to regulations issued ~~Decree~~ ANATEL, and may only arise from: I - technical requirements essential to the adequate provision of services and applications; and II - prioritization of emergency services. § 2 In the event of traffic discrimination or degradation, as contemplated in § 1, the agent in charge must: I - refrain from causing damages to users, as provided for in Art. 927 of the Law No. 10,406 of 10 January 2002 (Brazilian Civil Code); II - act in a fair, proportionate, and transparent manner; III - provide users, in advance, with clear and sufficiently descriptive information on its traffic management and mitigation practices, including network security measures; IV – ~~provide services on non-discriminatory commercial terms and~~ refrain from anticompetitive practices. § 3º. Subject to the provisions of this article, the content of data packets may not be blocked, monitored, filtered or analyzed in Internet connections, either paid or free of charge, or in transmission, switching, and routing. § 4 º. Subject to the provisions of the caput, special conditions for the traffic of data packets between the person responsible for the transmission and third parties interested in a different provision of service are allowed, provided that there is no harm to normal data traffic.
Approved Text 23 April 2014	Art. 3 The discipline of Internet use in Brazil has the following principles: (...) IV - preservation and guarantee of network neutrality;

Article 9. The agent in charge of transmission, switching, and routing must give all data packets equal treatment, regardless of content, origin and destination, service, terminal or application.

§ 1. Traffic discrimination or degradation will be subject to regulations issued ~~by ANATEL~~ under the exclusive powers granted to the President of the Republic Art. 84(iv) of the Federal Constitution, for the faithful implementation of this Law, after hearing the Brazilian Internet Steering Committee (CGI.br) and the National Telecommunications Agency (ANATEL), and may only result from:

I - technical requirements essential to the adequate provision of services and applications; and

II - prioritization of emergency services.

§ 2 In the event of traffic discrimination or degradation, as contemplated in § 1, the agent in charge must:

I - refrain from causing damages to users, as provided for in Art. 927 of the Law No. 10,406 of 10 January 2002 (Brazilian Civil Code);

II - act in a fair, proportionate, and transparent manner;

III - provide users, in advance, with clear and sufficiently descriptive information on its traffic management and mitigation practices, including network security measures;

IV – provide services on non-discriminatory commercial terms and refrain from anticompetitive practices.

§ 3º. Subject to the provisions of this article, the content of data packets may not be blocked, monitored, filtered or analyzed in Internet connections, either paid or free of charge, or in transmission, switching, and routing.

~~§ 4 º. Subject to the provisions of the caput, special conditions for the traffic of data packets between the person responsible for the transmission and third parties interested in a different provision of service are allowed, provided that there is no harm to normal data traffic.~~

Source: Author's elaboration.

APPENDIX 5 - PROPOSED BILLS IN THE U.S. HOUSE OF REPRESENTATIVES AND SENATE (1999-2017)

Date	Name	Record	Situation
24/04/1999	Internet Freedom and Broadband Deployment Act of 2001	H.R. 1542	Introduced
05/05/1999	Internet Freedom Act	H.R. 1686	Introduced
01/07/1999	Internet Freedom and Broadband Deployment Act of 1999	H.R. 2420	Introduced
19/10/1999	Internet Freedom Protection Act	S. 1747	Introduced
02/10/2002	Global Internet Freedom Act	H.R. 5524	Introduced
10/10/2002	Global Internet Freedom Act	S. 3093	Introduced
07/01/2003	Global Internet Freedom Act	H.R. 48	Introduced
04/06/2003	Global Internet Freedom Act of 2003	S. 1183	Introduced
10/05/2005	Global Internet Freedom Act	H.R. 2216	Introduced
14/02/2006	Global Internet Freedom Act of 2006	H.R. 4741	Introduced
16/02/2006	Global Online Freedom Act of 2006	H.R. 4780	Introduced
02/03/2006	Internet Non-Discrimination Act of 2006	S. 2360	Introduced
01/05/2006	Communications Opportunity, Promotion and Enhancement Act of 2006	H.R. 5252	Passed House
15/05/2006	Network Neutrality Act of 2006	H.R. 5273	Introduced
18/05/2006	Internet Freedom and Nondiscrimination Act of 2006	H.R. 5417	Introduced
19/05/2006	Internet Freedom Preservation Act of 2006	S. 2917	Introduced
05/01/2007	Global Online Freedom Act of 2007	H.R. 275	Introduced
01/09/2007	Internet Freedom Preservation Act of 2007 (known as the “Snowe-Dorgan” bill)	S. 215	Introduced
12/02/2008	Internet Freedom Preservation Act of 2008	H.R. 5353	Introduced
08/05/2008	Internet Freedom and Nondiscrimination Act of 2008	H.R. 5994	Introduced
06/05/2009	Global Online Freedom Act of 2009	H.R. 2271	Introduced
14/05/2009	The Broadband Conduit Deployment Act of 2009	H.R. 2428	Introduced
31/07/2009	Internet Freedom Preservation Act of 2009	H.R. 3458	Introduced
22/10/2009	Internet Freedom Act of 2009	S. 1836	Introduced
04/02/2010	Internet Freedom Act of 2010	H.R. 4595	Introduced
09/03/2010	Internet Freedom Act of 2010	H.R. 4784	Introduced

25/01/2011	Internet Freedom, Broadband Promotion, and Consumer Protection Act of 2011	S. 74	Introduced
01/02/2011	Internet Freedom Act	H.R. 96	Introduced
17/02/2011	Cybersecurity and Internet Freedom Act of 2011	S. 413	Introduced
06/04/2011	Global Online Freedom Act of 2011	H.R. 1389	Introduced
12/08/2011	Global Online Freedom Act of 2011	H.R. 3605	Introduced
21/09/2012	Global Free Internet Act of 2012	H.R. 6530	Introduced
20/12/2012	Data Cap Integrity Act of 2012	S. 3703	Introduced
04/02/2013	Global Online Freedom Act of 2013	H.R. 491	Introduced
28/02/2013	Global Free Internet Act of 2013	H.R. 889	Introduced
21/02/2014	Internet Freedom Act	H.R. 4070	Introduced
02/03/2014	Open Internet Preservation Act of 2014 (Democrats)	H.R. 3982	Introduced
02/03/2014	Open Internet Preservation Act of 2014 (Democrats)	S. 1981	Introduced
17/06/2014	Online Competition and Consumer Choice Act of 2014	H.R. 4880	Introduced
17/06/2014	Online Competition and Consumer Choice Act of 2014	S. 2476	Introduced
09/09/2014	Open Internet Act of 2014	H.R. 5429	Introduced
19/11/2014	Defending Internet Freedom Act of 2014	H.R. 5737	Introduced
07/01/2015	Online Competition and Consumer Choice Act of 2015	H.R. 196	Introduced
07/01/2015	Online Competition and Consumer Choice Act of 2015	S. 40	Introduced
03/03/2015	Internet Freedom Act	H.R. 1212	Introduced
17/03/2015	Open Internet Act of 2015	H.R. 1409	Introduced
03/04/2015	Global Free Internet Act of 2015	H.R. 1307	Introduced
12/05/2015	Defending Internet Freedom Act of 2015	H.R. 2251	Introduced
16/11/2015	Small Business Broadband Deployment Act of 2016	H.R. 2283	Introduced
24/02/2016	Small Business Broadband Deployment Act of 2016	H.R. 4596	Passed House
25/02/2016	Restoring Internet Freedom Act	S. 2602	Introduced
06/08/2016	Protecting Internet Freedom Act	H.R. 5418	Introduced
06/08/2016	Protecting Internet Freedom Act	S. 3034	Introduced
04/01/2017	Small Business Broadband Deployment Act of 2017	H.R. 288	Passed House
04/01/2017	Small Business Broadband Deployment Act of 2017	S. 288	Introduced
01/02/2017	New Deal Rural Broadband Act of 2017	H.R. 800	Introduced
01/05/2017	Restoring Internet Freedom Act	S. 993	Introduced

07/12/2017	Save Net Neutrality Act of 2017	H.R. 4585	Introduced
19/12/2017	Open Internet Preservation Act of 2017 (Republicans)	H.R. 4682	Introduced

Source: Author's elaboration. Data Available at: https://www.congress.gov/
Data gathered in January 2018
** Bills referring to "net neutrality" or "open internet"*

APPENDIX 6- GINI COEFFICIENT AS A MEASURE FOR HOUSEHOLD INCOME DISTRIBUTION INEQUALITY FOR U.S. STATES IN 2016

State	Gini	State	Gini
DC	0,54	West Virginia	0,47
New York	0,51	Missouri	0,46
Louisiana	0,5	Nevada	0,46
California	0,5	Oklahoma	0,46
Florida	0,49	Oregon	0,46
Connecticut	0,49	Washington	0,46
Alabama	0,48	Colorado	0,46
Georgia	0,48	North Dakota	0,45
Illinois	0,48	South Dakota	0,45
Kentucky	0,48	Kansas	0,45
Massachusetts	0,48	Maryland	0,45
Mississipi	0,48	Maine	0,45
New Jersey	0,48	Minnesota	0,45
New Mexico	0,48	Indiana	0,45
North Carolina	0,48	Idaho	0,45
Rhode Island	0,48	Nebraska	0,45
Tennessee	0,48	Vermont	0,45
Texas	0,48	Delaware	0,45
Arkansas	0,47	Iowa	0,45
Michigan	0,47	Wisconsin	0,45
Arizona	0,47	Hawaii	0,44
Montana	0,47	Wyoming	0,44
Ohio	0,47	New Hampshire	0,43
Pennsylvania	0,47	Utah	0,43
South Caroline	0,47	Alaska	0,41
Virginia	0,47		

Source: World Bank. Available at: https://data.worldbank.org/data-catalog/all-the-ginis/
Data gathered in December 2017.

APPENDIX 7- TOTAL OF AMERICAN URBAN AND RURAL POPULATION WITHOUT ACCESS TO 25 MBPS/3 MBPS SERVICE (%) IN 2016

	All Areas	**Urban Areas**	**Rural Areas**
State	**% of Total Pop.**	**% of Urban Pop.**	**% of Rural Pop.**
United States	10%	4%	39%
Alabama	20%	6%	41%
Alaska	26%	5%	67%
Arizona	13%	8%	63%
Arkansas	25%	7%	48%
California	5%	2%	61%
Colorado	10%	4%	53%
Connecticut	1%	1%	1%
Delaware	3%	2%	10%
Florida	7%	4%	29%
Georgia	9%	4%	25%
Hawaii	2%	0%	22%
Idaho	18%	4%	55%
Illinois	9%	4%	56%
Indiana	17%	5%	52%
Iowa	15%	4%	37%
Kansas	15%	5%	49%
Kentucky	16%	3%	34%
Louisiana	19%	8%	50%
Maine	12%	4%	17%
Maryland	4%	3%	13%
Massachusetts	3%	2%	10%
Michigan	12%	3%	37%
Minnesota	12%	1%	43%
Mississippi	34%	9%	60%
Missouri	20%	5%	61%
Montana	31%	9%	61%
Nebraska	16%	6%	51%
Nevada	8%	5%	65%
New Hampshire	7%	3%	15%

New Jersey	3%	2%	21%
New Mexico	20%	9%	61%
New York	2%	0%	17%
North Carolina	7%	1%	20%
North Dakota	14%	2%	37%
Ohio	8%	2%	31%
Oklahoma	27%	9%	66%
Oregon	10%	5%	37%
Pennsylvania	6%	3%	20%
Puerto Rico	62%	50%	98%
Rhode Island	2%	2%	2%
South Carolina	18%	8%	38%
South Dakota	11%	2%	26%
Tennessee	13%	2%	34%
Texas	11%	5%	46%
Utah	6%	3%	39%
Vermont	17%	2%	27%
Virginia	11%	3%	38%
Washington	3%	1%	14%
West Virginia	30%	10%	48%
Wisconsin	13%	1%	43%
Wyoming	23%	3%	63%

Source: FCC. Data available at: https://www.fcc.gov/reports-research/reports/broadband-progress-reports/2016-broadband-progress-report Data gathered in December 2017.

APPENDIX 8- PERCENTAGES OF DEVELOPED CENSUS BLOCKS IN WHICH ISPS REPORTED THE DEPLOYMENT OF RESIDENTIAL FIXED BROADBAND AS OF JUNE 30, 2016

		At least 3MBPS downstream and 768kbps upstream	At least 10MBPS downstream and 1 Mbps upstream	At least 25MBPS downstream and 3 Mbps upstream	At least 100 Mbps downstream and 10 Mbps upstream
Providers	0			21%	51%
	1		3%	37%	37%
	2	10%	18%	29%	10%
	3	90%	79%	13%	2%

Source: FCC. Data available at: https://www.fcc.gov/reports-research/reports/broadband-progress-reports/2016-broadband-progress-report
Data gathered in December 2017.

APPENDIX 9 - THE MOST AND LEAST EXPENSIVE COUNTRIES FOR BROADBAND - AVERAGE COST OF A BROADBAND PLAN PER MONTH (U.S. DOLLARS)

1	Iran	$5,68	67	Spain	$42,58	133	Myanmar	$76,76
2	Ukraine	$5,21	68	Finland	$42,68	134	Montserrat	$76,09
3	Russian Federation	$10,20	69	Monaco	$43,08	135	Bahamas	$77,10
4	Moldova	$11,02	70	Venezuela	$44,55	136	Botswana	$83,56
5	Syria	$12,15	71	St. Pierre and Miquelon	$45,42	137	Jordan	$78,42
6	Egypt	$12,36	72	Guatemala	$44,34	138	Saint Kitts and Nevis	$78,41
7	Belarus	$12,77	73	Malaysia	$45,93	139	Samoa	$79,02
8	Romania	$13,81	74	Mayotte	$46,71	140	Benin	$81,98
9	Kazakhstan	$13,64	75	Peru	$45,62	141	Nigeria	$80,14
10	Georgia	$17,47	76	Armenia	$47,16	142	New Caledonia	$82,86
11	Serbia	$19,19	77	The Netherlands	$48,83	143	Switzerland	$82,92
12	Poland	$19,80	78	Cyprus	$49,02	144	Bolivia	$81,78
13	Nepal	$19,39	79	Chile	$50,82	145	Norway	$83,36
14	Tajikistan	$19,28	80	Gibraltar	$50,90	146	Saint Helena	$85,24
15	Tunisia	$19,98	81	Austria	$51,29	147	Greenland	$85,46
16	Latvia	$20,06	82	Japan	$50,70	148	Saudi Arabia	$84,05
17	Sri Lanka	$20,18	83	Belgium	$52,42	149	Guam	$85,00
18	Israel	$20,97	84	Colombia	$52,36	150	Kenya	$85,98
19	Saint-Martin (France)	$20,79	85	Portugal	$53,76	151	Maldives	$85,91
20	Slovakia	$22,53	86	Guernsey	$53,98	152	Anguilla	$86,62

21	Mongolia	$22,12	87	Cambodia	$52,89	153	Faroe Islands	$90,41
22	Yemen	$22,70	88	Iraq	$52,42	154	Virgin Islands (U.S.)	$88,01
23	Hungary	$25,34	89	Kuwait	$53,52	155	Liechtenstein	$90,44
24	Uzbekistan	$24,31	90	Philippines	$54,37	156	Belize	$88,49
25	Croatia	$26,26	91	Greece	$56,06	157	French Polynesia	$94,07
26	Turkey	$26,70	92	Canada	$56,02	158	Sudan	$91,26
27	Thailand	$27,00	93	Paraguay	$56,23	159	Djibouti	$97,41
28	Mexico	$26,23	94	Lebanon	$55,24	160	Marshall Islands	$97,45
29	Estonia	$27,95	95	Sweden	$57,72	161	Malta	$100,36
30	Taiwan	$28,00	96	Nicaragua	$55,44	162	Seychelles	$100,20
31	Bulgaria	$29,08	97	South Africa	$63,33	163	Bahrain	$105,21
32	Italy	$29,57	98	Jersey	$58,04	164	Barbados	$105,17
33	Czech Republic	$29,96	99	Grenada	$57,13	165	Lesotho	$124,65
34	South Korea	$30,22	100	Fiji	$58,79	166	Gabon	$112,77
35	Réunion	$30,78	101	Falkland Islands	$58,67	167	Caribbean Netherlands	$110,12
36	Slovenia	$31,53	102	Côte d'Ivoire	$61,24	168	Kyrgyzstan	$112,46
37	Montenegro	$32,64	103	Libya	$60,46	169	Guyana	$114,14
38	Argentina	$30,19	104	Australia	$60,37	170	Panama	$112,81
39	Algeria	$32,30	105	Dominica	$62,11	171	Sierra Leone	$113,40
40	Turkmenistan	$32,17	106	Ecuador	$62,29	172	Tanzania	$115,18
41	China	$32,93	107	Vietnam	$62,58	173	Comoros	$118,11

42	Albania	$33,62	108	New Zealand	$66,29	174	Somalia	$117,00
43	Dominican Republic	$33,01	109	Guadeloupe	$65,67	175	Turks and Caicos Islands	$119,21
44	Germany	$34,88	110	Mauritania	$63,73	176	Niger	$123,22
45	Brazil	$34,79	111	Jamaica	$65,32	177	Micronesia (Federated States of)	$124,87
46	Macedonia	$36,16	112	El Salvador	$65,11	178	American Samoa	$122,59
47	Denmark	$36,74	113	Gambia	$65,59	179	Bermuda	$126,80
48	France	$37,21	114	United States	$66,17	180	Angola	$139,29
49	Mauritius	$36,80	115	Ethiopia	$66,57	181	Virgin Islands (British)	$146,05
50	Bosnia and Herzegovina	$37,57	116	Mozambique	$70,71	182	Oman	$147,85
51	Palestine, State of	$37,88	117	Puerto Rico	$68,37	183	Qatar	$149,41
52	Saint Barthélemy	$38,20	118	Afghanistan	$67,82	184	Antigua and Barbuda	$153,63
53	India	$37,99	119	Honduras	$68,62	185	Vanuatu	$154,07
54	Isle of Man	$38,59	120	Cameroon	$70,88	186	United Arab Emirates	$155,17
55	Azerbaijan	$38,09	121	Lithuania	$71,23	187	Mali	$168,05
56	Bangladesh	$38,59	122	Swaziland	$79,91	188	Zimbabwe	$170,00
57	Singapore	$39,54	123	Costa Rica	$70,05	189	Cook Islands	$179,83
58	Åland Islands	$39,94	124	Ireland	$73,00	190	Cayman Islands	$172,58
59	Morocco	$39,91	125	Saint Lucia	$71,01	191	Haiti	$224,19
60	San Marino	$40,74	126	Hong Kong	$71,15	192	Lao People's Democratic Republic	$231,42

61	French Guiana	$41,35	127	Curaçao	$71,41	193	Brunei Darussalam	$272,79
62	Macau	$40,41	128	Iceland	$72,31	194	Namibia	$495,24
63	United Kingdom	$41,74	129	Trinidad and Tobago	$72,22	195	Papua New Guinea	$595,86
64	Pakistan	$38,94	130	Sint Maarten	$73,10	196	Burkina Faso	$988,37
65	Martinique	$42,09	131	Luxembourg	$77,68			
66	Uruguay	$41,88	132	Indonesia	$71,84			

Source: www.cable.co.uk/media-centre/release/new-worldwide-broadband-price-league-unveiled/
Data gathered in January 2018

APPENDIX 10 - PERCENTAGE OF PERMANENT PRIVATE HOUSEHOLDS USING THE INTERNET, BY TYPE OF CONNECTION IN BRAZIL (2013-2015)

Internet Connection	**2013**	**2014**	**2015**
Broadband	97,7	99,2	99,6
Fixed Broadband	77,1	71,9	71,5
Mobile Broadband	43,5	62,8	69,8
Fixed and Mobile Broadband	23	35,5	41,7
Dial up	4,7	2,8	3,4
Only Dial up	2,3	0,8	0,4

Source: IBGE, Diretoria de Pesquisas, Coordenação de Trabalho e Rendimento, Pesquisa Nacional por Amostra de Domicílios 2015 Data gathered in December 2017.

APPENDIX 11 - HOUSEHOLD WITH ACCESS TO THE INTERNET IN BRAZIL - PERCENTAGE OF TOTAL HOUSEHOLDS IN 2015

State	Broadband density access per 100 households	Broadband Services	% Total
DF	69,27	701.840	2,46%
GO	41,03	927.148	3,25%
MS	41,28	386.201	1,35%
MT	33,77	389.416	1,36%
AL	15,13	159.581	0,56%
BA	17,1	874.667	3,07%
CE	24,56	714.731	2,50%
MA	13,15	262.990	0,92%
PB	22,92	288.323	1,01%
PE	17,24	526.912	1,85%
PI	17,16	167.367	0,59%
RN	29,01	317.960	1,11%
SE	25,42	181.774	0,64%
AC	25,84	61.255	0,21%
AM	25,97	277.742	0,97%
AP	30,14	64.987	0,23%
PA	14,62	349.523	1,22%
RO	25,31	152.329	0,53%
RR	23,84	37.751	0,13%
TO	21,4	110.568	0,39%
ES	39,46	546.469	1,92%
MG	40,37	2.841.731	9,96%
RJ	51,92	3.099.957	10,86%
SP	63,81	9.922.201	34,77%
PR	52	2.029.947	7,11%
RS	43,01	1.803.511	6,32%
SC	53,56	1.339.247	4,69%
Total	**41,19**	**28.536.128**	100,00%

Source: ANATEL. Data available at: http://www.anatel.gov.br/dados/destaque-1/269-bl-acessos
Data gathered in December 2017.

APPENDIX 12 - HUMAN DEVELOPMENT INDEX PER BRAZILIAN STATES IN 2014

Brazil	0,761
Distrito Federal	0,839
São Paulo	0,819
Santa Catarina	0,813
Paraná	0,79
Rio Grande do Sul	0,779
Rio de Janeiro	0,778
Espírito Santo	0,771
Minas Gerais	0,769
Mato Grosso	0,767
Mato Grosso do Sul	0,762
Goiás	0,75
Amapá	0,747
Roraima	0,732
Tocantins	0,732
Acre	0,719
Rio Grande do Norte	0,717
Ceará	0,716
Rondônia	0,715
Amazonas	0,709
Pernambuco	0,709
Bahia	0,703
Paraíba	0,701
Sergipe	0,681
Maranhão	0,678
Piauí	0,678
Pará	0,675
Alagoas	0,667

Source: PNUD. (Programa das Nações Unidas para o Desenvolvimento), Ipea (Instituto de Pesquisa Econômica Aplicada) e Fundação João Pinheiro. Data gathered in December 2017

APPENDIX 13 - PARTICIPATION OF BROADBAND SERVICE BY ECONOMIC GROUP IN NOVEMBER 2017

Economic Group	**November 2017**
ALGAR (CTBC TELECOM)	1,89%
BT	0,08%
CABO	0,39%
CLARO BRASIL	31,08%
NEXTEL	0,00%
NOSSATV	0,00%
OI	22,17%
OUTROS	14,29%
PREFEITURA DE LONDRINA/COPEL	0,75%
SKY/AT&T	1,28%
TELECOM ITALIA	1,44%
TELEFÔNICA	26,63%
Total	**100,00%**

Source: ANATEL. Data available at: http://www.anatel.gov.br/dados/destaque-1/269-bl-acessos Data gathered in December 2017.

APPENDIX 14 - PROPORTION OF INTERNET USERS, BY DEVICE UTILIZED FOR INDIVIDUAL ACCESS IN BRAZIL - PERCENTAGE OF TOTAL INTERNET USERS IN 2015

		PC + Mobile	**Mobile**	**PC**
Social Class	A	86	7	7
	B	75	14	11
	C	47	42	11
	D/E	20	69	10
Total		54	35	11

Source: CGI.br/NIC.br, Centro Regional de Estudos para o Desenvolvimento da Sociedade da Informação (Cetic.br), Pesquisa sobre o Uso das Tecnologias de Informação e Comunicação nos domicílios brasileiros - TIC Domicílios 2015 Data gathered in December 2017.

APPENDIX 15 - GINI COEFFICIENT AS A MEASURE FOR HOUSEHOLD INCOME DISTRIBUTION INEQUALITY FOR U.S. STATES IN 2016

State	Gini
Santa Catarina	0,419
Goiás	0,436
Alagoas	0,438
Mato Grosso	0,445
Rondônia	0,452
Ceará	0,453
Rio Grande do Sul	0,454
Amapá	0,457
Pará	0,459
São Paulo	0,46
Paraná	0,465
Sergipe	0,47
Espírito Santo	0,471
Amazonas	0,476
Minas Gerais	0,478
Mato Grosso do Sul	0,479
Bahia	0,481
Rio Grande do Norte	0,487
Pernambuco	0,492
Acre	0,5
Roraima	0,5
Rio de Janeiro	0,503
Tocantins	0,504
Piauí	0,505
Maranhão	0,506
Paraíba	0,51
Distrito Federal	0,555

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Data gathered in December 2017.

APPENDIX 16 - PERCENTAGE OF PERMANENT PRIVATE HOUSEHOLDS USING THE INTERNET, BY TYPE OF CONNECTION IN BRAZIL (2013-2015)

Internet Connection	2013	2014	2015
Broadband	97,7	99,2	99,6
Fixed Broadband	77,1	71,9	71,5
Mobile Broadband	43,5	62,8	69,8
Fixed and Mobile Broadband	23	35,5	41,7
Dial up	4,7	2,8	3,4
Only Dial up	2,3	0,8	0,4

Source: IBGE, Diretoria de Pesquisas, Coordenação de Trabalho e Rendimento, Pesquisa Nacional por Amostra de Domicílios 2013-2015. Data gathered in December 2017.

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