Network Fees and the Digital Inclusion in Brazil: An Analysis of the Conexis Proposal

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Executive Summary

Regulatory authorities have been discussing in many countries the sustainability of telecommunications networks. The debate on the adoption of a network fee associated with the data traffic generated by the use of Value-Added Services (VAS) by fixed and wireless broadband subscribers has recently resurfaced in Europe and other countries, including Brazil, although recent developments in Europe have so far toned down the discussions.[1] Proponents of the adoption of a network fee in Brazil argue that this intervention is necessary to avoid a congestion in the system as well as to obtain resources to expand the access to digital services in the poorer and less populated regions of the country.

Brazil has experienced an intense massification of fiber optic broadband networks in the last 10 years. But differently from other countries, the main drivers of investment in optic fiber network growth in Brazil are the small Internet Service Providers (ISPs), while national Communication Service Providers (CSPs) focus their investments mostly on development of fixed broadband infrastructure in big and medium cities, and in the deployment of wireless connectivity countrywide.

A concrete proposal for the establishment of a network fee was recently unveiled as part of a proposal submitted by Conexis Brasil Digital in Anatel's Public Consultation No. 26/2024. Conexis, representing the largest CSPs in Brazil, argues for a network fee regime to offset the alleged market failure that threatens the sustainability of the system.

In this paper we assess this proposal. Through a detailed analysis of Brazil's broadband market, small ISPs' growth, and national CSPs' investment behavior, this paper reveals the conceptual and methodological flaws in the Conexis proposal, warning of its negative impact on competition and innovation.

In addition, we add an annex with an analysis of the South Korean case, where a fee was introduced in 2016. While there are differences between what has been proposed in Brazil and what happened in South Korea, their experience shows how a regulatory measure that undermines the competition among ISPs stifles innovation and hinders broadband expansion efforts.

The key findings of our assessment are:

1. **Flawed Economic Rationale:** Conexis bases its argument on the assumption of what they see as a market failure, stating that CSPs are not sufficiently compensated for their infrastructure investments, while VAS providers benefit from

[1] An example: https://www.reuters.com/breakingviews/european-telcos-new-deal-hopes-face-reality-check-2024-03-01/

the networks. However, the proposal fails in demonstrating the existence of a market failure, or even the relationship between the alleged market failure and the end users demand for VAS. The proposal also lacks economic grounding when it is analyzed through the lenses of traditional institutional economics theories, and transparency regarding key financial data on the CSPs' Return on Invested Capital (ROIC) and on the real impacts of the proposal on CSPs yearly revenues. Moreover, the assumption that VAS providers should bear the cost of network traffic is misaligned with how the digital ecosystem operates, as VAS providers already invest in infrastructure (e.g., Content Delivery Networks – CDNs and distributed sites) reducing the demand for network investments, as well as the transmission costs for ISPs and CSPs.

2. **Regulatory Framework Misalignment:** The proposal is incompatible with Brazil's General Telecommunications Law (LGT). Under the LGT, CSPs in the private regime are expected to operate without guaranteed returns, bearing the risks of their investments. The suggestion to introduce a network fee undermines these principles by shifting telecom business risks to VAS providers, creating an pernicious subsidy scheme that would make CSPs dependent on VAS providers, and keen on artificially generating traffic demand for securing extra rents.
3. **Small ISPs as Key Players in Universal Broadband Access:** The analysis demonstrates that small Internet Service Providers (ISPs) have been crucial in expanding high-speed broadband, especially in underserved regions of Brazil. Unlike national CSPs that focus investments on profitable urban centers, small ISPs have pioneered fiber optic deployments throughout the interior of Brazil, reaching remote, peripheral and rural areas. But as we show in section 4, these small providers would not benefit from the proposed intervention. Regulatory measures supporting competition, rather than network fees, have been instrumental in fostering innovation and bridging the digital divide.
4. **Financial and Competitive Disparities:** The financial simulation outlined in Section 7.2 shows that implementing the proposed network fee would disproportionately increase the earnings of large CSPs while further marginalizing small ISPs. Most revenues from the fee would flow to national operators, who already prioritize profitability and shareholder dividends over reinvestment in infrastructure. Empirical data (Section 7.2) shows that larger operators have not significantly increased their investments in underserved areas, further contradicting Conexis' claims that the network fee would spur necessary infrastructure development.
5. **In addition, the international experience available to date does not favor this type of intervention.** As shown in the Annex, the South Korean experience with the sender pay rule of 2016 essentially made the network resources scarcer within the country by making the network operators more reluctant to host the heavy senders, directly stifling innovation, and incentivizing the network operators to maximize their profit by investing less on building out the network upward and last-mile.

Our main conclusion is that the network fee proposal presented by Conexis is based on flawed economic arguments and is likely to result in harmful market distortions. Rather than encouraging equitable growth and fostering infrastructure investment, it risks concentrating market power among a few large players, undermining the progress in the provisioning of fast, cheap, and high-quality Internet services to Brazilian consumers,

deepening the digital divide. Policymakers should instead focus on regulatory measures that promote competition and innovation, ensuring continued investment in broadband expansion across all regions of Brazil.

1. Introduction

The regulatory environment related to the relationship between Communication Service Providers (CSPs) and Value-Added Service (VAS) has been under intense discussion in recent months. After a long period of a symbiotic relationship between these two providers of crucial services for digital transformation of the society, a debate has re-emerged in Europe aimed at mobilizing regulatory authorities to reassess the remuneration model of telecommunications networks, especially in relation to the data traffic generated by the massive use of VAS by fixed and wireless broadband subscribers. Spearheaded by European-based CSP associations like ETNO and GSMA, this debate has gained prominence in other countries, including Brazil, although recent developments in Europe toned down the discussions. [2] One of the justifications for the adoption of a network fee in Brazil would be to obtain resources for the expansion of the access to digital services.[3]

However, several questions can be raised about the relevance of the envisaged solution in a country like Brazil, with a socioeconomic and regulatory context entirely different from Europe. In fact, a key characteristic of the Brazilian landscape is precisely the fact that there are two tiers in the provision of broadband in Brazil, one from a few companies operating at national level but concentrated in large cities and the other led by thousands of small providers who have been responsible for extending broadband to small cities and sparsely populated areas in the country.

Recently, the Brazilian Telecommunications Regulatory Agency – Anatel – carried out Public Consultation No. 26/2024 regarding the possible publication of regulations on the duties of large users of telecommunications. Within this context, according to Brazilian legislation, VAS providers are included since the General Telecommunications Law – LGT qualifies them as users of telecommunications networks.

The present work seeks to shed light on the likely effects of a network fees regime on the competitive dynamics of the connectivity market in Brazil, and its potential impact for the expansion of internet access. Evidence is provided showing that a network fee regime would not bring more investments to network expansion and modernization, while it would artificially create huge asymmetries between a few national, and thousands of local/regional CSPs that are universalizing optic-fiber, high-speed broadband in Brazil.

Conexis Brasil Digital, an association that represents the largest CSPs in Brazil and hereafter referred simply as Conexis, has proposed in Anatel Public Consultation No. 26/2024 the adoption of a network fee regime with the aim of compensating CSPs for an alleged market failure that would be risking telecommunications sector sustainability [1]. Over the next chapters, we present an assessment of this proposal, showing its serious conceptual and design flaws, as well as the likelihood that its adoption would harm competition in the market and the deterioration of the quality of networks in Brazil that its adoption would bring. We also add an analysis of the recent experience of South Korea, that reinforces some of our arguments, in particular how a regulatory measure that undermines the competition among ISPs stifles innovation and hinders broadband expansion efforts.

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[2] An example: https://www.reuters.com/breakingviews/european-telcos-new-deal-hopes-face-reality-check-2024-03-01/

[3] See https://www1.folha.uol.com.br/opiniao/2024/02/o-brasil-deveria-criar-uma-taxa-de-rede-de-internet-para-as-big-techs-sim.shtml

2. The network fee proposal presented by Conexis

Conexis Brasil Digital presented to Anatel a proposal that aims to create a network fee regime in Brazil targeting large technology companies – VAS Providers, such as Meta, Google, Netflix, TikTok, among others. The proposal seeks to address what Conexis considers an economic imbalance in the telecommunications sector, where operators would be continuously investing in network infrastructure to deal with data traffic demand surge without proper remuneration. [1]

According to Conexis, CSPs would be bearing the costs of maintaining and expanding networks alone, while large VAS providers would be benefiting from these networks' investments without a fair contribution. In summary, Conexis' proposal would mean the imposition of a Network Fee to be paid by VAS providers in the following terms:

- **Fee due by large VAS:** As proposed, the payment of a fee would be due by all large users (VAS providers) whose share in data traffic on CSPs' network exceed 5% of the total traffic. According to the proposal, the VAS providers subject to this fee would be: Meta, Alphabet, Netflix, Akamai and Tik Tok. According to the proposal, the network fee would be calculated based on i) an assessment of the revenues necessary to fill and alleged economic gap between the ROIC of each CSP and the Weighted Avarage Cost of Capital (WACC) of the telecommunications market; and ii) the volume traffic attributed to each VAS provider, calculated through accurate measurements of the traffic exchanged with large VAS providers. The document details that these traffic measurements would be made at the main points of the network, such as edge routers and CDNs.
- **Model Based on Free Settlement, with regulatory interventions if needed:** Conexis suggests that the network fee be freely negotiated and agreed upon between CSPs and large VAS providers, but with the possibility of Anatel's intervention in case of divergences. In case that bilateral agreements between CSPs and large VAS providers are not met, a regulatory intervention would follow to assure that CSPs receive a fee from VAS providers. In this model, Anatel would have the role of mediator and, if necessary, arbitrator, determining the amount of the fee and the conditions for its payment.

Furthermore, Conexis structures its proposal based on three main arguments that would justify the creation of the network fee regime: i) the pressure on infrastructure and insufficient return on investment, ii) unfair competition with small ISPs and tax challenges, iii) limitations to properly pricing telecommunications services due to the low income of their end users.

2.1. The alleged pressure on infrastructure and insufficient returns on investment

One of the pillars of Conexis' argument is the accelerated growth of data traffic in telecommunications networks. The document highlights that, with the massification of streaming services, social networks and other digital platforms (some of them provided by the CSPs themselves), the volume of traffic on CSPs' networks would be growing exponentially. This alleged continuous increase, according to Conexis, would require large and permanent investments in the expansion and modernization of network infrastructures, especially in fiber optics and 5G. AIA's Paper 1 and Paper 3 already have shown that data traffic demand is reducing its rate of increase along the years, and that public stakeholders have substantially contributed to covering network costs in Brazil. Furthermore, Conexis argument hinders the fact that wide adoption of VAS also increases traffic on ISPs networks as well, although these operators have been handling this natural growth without further disruption.

However, Conexis claims that CSPs' investments are not being properly rewarded in the financial return obtained by the operators. According to the document, there is a growing mismatch between the ROIC of operators and the WACC needed to finance these investments. This creates, according to Conexis, a situation of "unsustainability" for operators, who, despite being forced to continue investing to maintain and expand the capacity of their networks, are unable to obtain sufficient financial returns to cover these costs. The report falls short, however, in estimating CSPs' cost savings with CDNs installed in their networks by VAS providers. Section 5 analyses further flaws on Conexis' argument, already extensively discussed in AIA's Paper 2.

2.2. Competition with small ISPs and tax issues

Another point highlighted by Conexis is the competition between large operators with small Internet Service Providers (ISPs). These small companies operate in a more agile and competitive way, often with a lower tax burden and lower operating costs. Conexis argues that this competition is uneven, since small ISPs benefit from regulatory asymmetries that allow them to operate at lower costs, while large operators are responsible for maintaining large-scale, more expensive and complex networks. This argument, however, has been extensively rebuked by Anatel in recent years.

In addition to competition with small ISPs, Conexis also points to the high tax burden as a factor that contributes to the financial imbalance in the sector. The document points out that Brazil has one of the highest tax burdens on telecommunications services in the world, which, according to Conexis, affects the ability of operators to reinvest in their networks and, at the same time, reduce their operating costs.

The combination of these factors – competition with smaller ISPs and high taxation – would aggravate the alleged difficult economic situation of CSPs, forcing them to seek new financial compensation mechanisms, such as a network fee. While reinforcing the point that the allegedly unsustainability of large CSPs nothing has to do with the level of investments needed to accommodate the intensive use of VAS but with competitive and taxation issues, the proposal makes clear, though, the large CSPs' intention to, through a network fee regime, create more favorable conditions that allow them winning the competitive run against small ISPs. Section 6 of this paper will further discuss this argument.

2.3. Limitations to properly pricing telecommunications services

Conexis also suggests in its proposal that one of the reasons for the alleged unsustainability of the sector, and that would justify the imposition of a network fee regime, is the low income of the Brazilian population, what would be an obstacle for the proper price setting of telecommunications services. The proposal argues that operators face difficulties in adjusting the prices of their services to cover rising infrastructure costs, since a significant increase in prices would alienate a significant portion of the population, especially in regions with lower purchasing power.

This situation, according to the document, would create a dilemma for operators. On one hand, there is the need to increase prices to compensate for investments in infrastructure. On the other hand, there is the impossibility of charging higher prices due to the income limitations of most consumers. Thus, Conexis argues that a network fee would help solve this equation, allowing operators to be compensated by large industrial users (VAS providers), without passing on the burden directly to end consumers.

Although it is not in the scope of this report an in-depth analysis of this argument, it is important to understand that market conditions like purchasing power affect all stakeholders in the telecommunications sector and even in the larger digital ecosystem. For example, the price of a monthly Netflix subscription in Brazil is about half of the price charged in the U.S.,

and double the price charged in Argentina.[4] Thus, charging on VAS providers the burden of the limited Brazilian market revenues generation prospects would double-penalize content providers, who are already having to accommodate such limiting conditions on the pricing schemes of their own services

3. An analysis of the Conexis network fee proposal through the lens of the traditional economic theory

When evaluated through the lens of economic theory the network fee proposal presented by Conexis appears deeply flawed. There is no characterization of market failure. Market failures occur when there is an inefficient allocation of resources, distorting competition. Signs of market failure are stagnant or decreasing growth graphs or loss of quality. These factors are not occurring, quite the opposite.

This section analyses the Conexis network fee proposal through the lens of the economic theory and argues that the imposition of network fees would distort the market, lead to inefficient outcomes, and fail to address the actual challenges facing the digital ecosystem.

3.1. The supposed Free Rider problem

A key argument recently used by Conexis in favor of network fees is that VAS providers are "free riders" benefiting from network infrastructure without contributing to its costs. In classical economic theory, the free rider problem occurs when individuals or entities consume a good without paying for it, leading to underinvestment in the provision of that good (Varian, 1992) [10]. Proponents of network fees claim that content providers generate significant traffic and profit from ISPs' infrastructure investments, without contributing financially to the upkeep of those networks.

However, this interpretation of the free rider problem is misleading in the context of the telecommunications sector. Content providers are not passive consumers of network services; they are active contributors to the ecosystem. Companies like Meta, Google, Netflix, TikTok and Amazon invest billions of dollars in content delivery networks (CDNs), data centers, codec enhancement, and even in undersea cables to optimize the delivery of their services (Schulzrinne, 2014 [11]). These investments reduce the load on ISPs by bringing data closer to the end user, improving efficiency, and reducing the likelihood of congestion. A recent study from IX.br reports traffic increases in regional traffic exchange points after investments made by VAS providers to build local CDNs, reducing the need for local ISPs to pay for data transmission to carry their traffic until national IXPs.[5]

Moreover, content providers are central to the value proposition of the internet. Consumers do not subscribe to high-speed internet plans simply to access an empty network; they subscribe to access the vast array of services provided by these platforms. In this sense, content providers are creating the demand that justifies consumer payments to ISPs. As Coase (1960) [8] highlighted in his seminal work on social costs, market participants often negotiate private agreements to manage shared resources. Content providers and ISPs already negotiate peering arrangements and transit agreements to ensure efficient traffic flow. These agreements represent a market-based solution to the allocation of costs.

The free rider problem, as traditionally understood, involves actors benefiting from a resource without contributing to its provision. In this case, however, content providers contribute significantly to the digital ecosystem, both through their infrastructure investments and by driving consumer demand for internet services. ISPs are already compensated for their

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[4] Data retrieved from the price comparison website Visual Capitalist in October 22nd, 2024.
[5] See IX.br report for Fortaleza-CE's IXP.
https://forum.ix.br/files/apresentacao/arquivo/1932/Apresentacao%20Julio%20Sirota.pdf

investments in network infrastructure through the fees paid by consumers, who subscribe to access the very content that these providers offer. As such, network fees would amount to a form of double charging—forcing content providers to pay for access to a network that consumers have already financed through their subscription fees.

3.2. Potential Consequences of Network Fees on Innovation and Competition

The introduction of network fees would have significant negative consequences for innovation, competition, and consumer welfare. The internet has historically been an open platform, enabling content providers of all sizes to compete on a level playing field. Imposing network fees would disrupt this dynamic, disproportionately harming smaller companies and start-ups of telecommunications and content provision.

As Joseph Schumpeter argued in his theory of "creative destruction," innovation is driven by the constant process of new firms entering the market and challenging established players. The imposition of network fees would stifle this process, creating barriers to entry for new companies that might offer disruptive services or technologies. For example, network fees could incentivize CSPs to prioritize the content of paying partners, leading to anti-competitive behavior. They would also have incentives for slowing down or degrading the service of content providers that refuse to pay the fees, undermining the principle of net neutrality. This would create a two-tiered internet, where only those who can afford to pay are given fast, reliable access to consumers, while smaller companies are left with slower, less reliable service.

From a consumer perspective, the introduction of network fees would lead to higher prices and reduced quality of service. Content providers may pass the additional costs onto consumers, in the form of higher subscription fees. This would exacerbate existing inequalities in access to digital services, disproportionately affecting lower-income consumers who may already struggle to afford internet access. The social effects of the Conexis' proposal will be further explored later in this report.

A more appropriate framework for understanding the internet is to view it as a quasi-public good. Public goods, as defined by Samuelson (1954) [12], are non-excludable and non-rivalrous, meaning that one person's consumption of the good does not reduce its availability to others, and people cannot be excluded from using it. While internet access is excludable in the sense that CSPs can charge for it, the internet exhibits many characteristics of a public good, particularly in terms of the positive externalities it generates.

Access to the internet enables individuals to participate in economic, educational, and social activities, creating benefits that extend beyond the individual user. These positive externalities justify policies that prioritize universal access and the open exchange of information, rather than policies that impose additional costs on certain actors within the system. Network fees, by treating bandwidth as a private commodity to be sold, would undermine the broader societal benefits of an open internet.

3.3. Main takeaways

In conclusion, the Conexis network fee proposal misapplies traditional economic concepts like the free rider problem, leading to flawed and inefficient solutions for the telecommunications sector. The imposition of network fees on content providers does not address the core, claimed issues of overuse or congestion. Instead, it introduces economic distortions that unfairly shift costs onto one group of stakeholders, potentially discouraging innovation and competition, and disproportionately burdening smaller players in the digital ecosystem. These unintended consequences could lead to a more fragmented, two-tiered internet that undermines the principles of fairness, access, and innovation that have fueled the digital economy to date.

Moreover, the misunderstanding of the free rider problem further exacerbates the issue. Content providers are not passive consumers of network services, but active participants in driving both the demand and infrastructure investments needed for the digital economy. By mischaracterizing them as free riders, the proposal ignores the significant contributions these providers make, including their investments in content delivery networks and other infrastructure that alleviates strain on CSPs. The real solution lies in the market-based mechanisms already in place, such as peering arrangements and private negotiations, which ensure that both VAS providers and CSPs contribute with infrastructure investment. Rather than imposing additional fees that could stifle competition and innovation, regulators should focus on fostering collaboration, promoting technological advancements, and ensuring that the internet remains benefiting society at large.

4. Analysis of the Proposal in the Face of LGT and Interconnection Regulation

4.1. What the current legal framework say

The General Telecommunications Law (LGT), sanctioned by Law No. 9,472 of 1997, is the main regulatory framework for the telecommunications sector in Brazil. The LGT establishes the principles that must guide the provision of telecommunications services in Brazil, dividing them into two regimes: public and private. Large operators of fixed and mobile broadband, such as those represented by Conexis, operate in the private regime, which provides greater freedom of operation and economic flexibility, but also implies that these companies must assume the risks inherent to the business, with no guarantees of financial return.

One of the central points of the LGT is that operators operating under the private regime do not have guarantees of return on investment, since they are subject to competitive market dynamics. This principle is clearly outlined in several articles of the LGT, which are fundamental to understanding the limitations and responsibilities of operators.

Some are mentioned:

> *"Article 127. Telecommunications services will be provided in the private regime* ***without guarantee of continuity and universalization****, observing the adequate exploitation of the service,* ***under competitive conditions.****"*
> *"Article 129. The exploitation of services in the private regime shall subject the providers to the rules of this Title, granting them the right to freedom of prices, ensuring the broad freedom of agreement between the interested parties, subject to the provisions of this Law." (****Free Translation; emphasis added****)*

These articles show that, in the private regime, operators do not have guarantees of profitability, or even continuity, being obliged to operate under competitive conditions. In other words, any attempt to impose regulation that aims to protect operators from financial challenges or ensure a return on investment (such as the Conexis Network Fee proposal [1]) goes against the LGT.

They also point out that providers in the private regime are free to establish their prices and commercial agreements, but are subject to market rules, without regulatory interference to ensure the financial viability of their operations. The Network Fee suggested by Conexis, by trying to transfer costs to VAS providers, violates this premise, insofar as it tries to institute a financial protection mechanism that is contrary to the risk model inherent to the private regime.

It is evident that Conexis' proposal to create a Network Fee to guarantee financial compensation to large operators contradicts the principles of the LGT. The legislation is clear in determining that, in the private regime, companies must operate with pricing and trading freedom, but fully assuming market risks.

By proposing a Network Fee to solve an alleged imbalance between ROIC and WACC, Conexis is mistakenly trying to shift infrastructure costs risk to large VAS providers while protecting itself from the risks inherent in the telecommunications business. However, the LGT does not grant operators the right to transfer risks to third parties to ensure their financial return. On the contrary, the law requires operators to adjust to market dynamics and to seek, through innovation, efficiency and competitiveness, solutions to their financial challenges.

In addition, the proposal distorts the concept of regulation under the LGT, which was not created to protect market companies, but rather to ensure that services are provided efficiently, fairly and under conditions of free competition.

In addition to the LGT, the General Interconnection Regulation (RGI), approved by Anatel's Resolution 693/2018, regulates the way different telecommunications service providers connect their networks and exchange data. Interconnection is the principle that allows interoperability between networks of different operators, ensuring that users of one network can communicate with those of another. The interconnection model is essential for the efficient functioning of the telecommunications market and is one of the pillars that sustains competitiveness in the sector.

The RGI defines that interconnection must be carried out between CSPs. However, the relationship between Value Added Service (VAS) providers, such as large content platforms, and telecommunications operators is not characterized as traditional interconnection between telecommunications networks, as VAS are not, technically, telecommunications service providers. The RGI does not provide for the imposition of tariffs or fees on the exchange of data between CSPs and VAS, leaving these relationships to be resolved through private commercial agreements, such as peering agreements.

The Conexis' network fee proposal, therefore, does not fit the definition of interconnection regulated by the RGI, since VAS providers are not telecommunications service providers. The attempt to apply a regulatory model for the interconnection of telecommunications networks in a relationship between CSPs and VAS providers is, from a legal and regulatory point of view, inadequate and does not find support in Anatel's guidelines.

Also, the Conexis proposal errs by confusing economic concepts. The characterization of the relationship between telecommunications service providers, end users and VAS providers as a two-sided market is actually a big mistake. Also, the interpretation given by Conexis to the thesis "Value-added Services and the Future of Telecommunications" authored by Prado (2023), is fallacious, as it derives its market concept from a two-sided perspective without properly understanding all the other arguments presented by the author, including those regarding indirect network effects. Actually, CSPs and VAS providers have symbiotic, traditional wholesale relationships typical in value chains, which in some cases can be classified as peering relationships.

It is crucial to address evidence through indirect network effects rather than "forcing" the market in terms of two sides. Cross-transfers of money or price regulation will not lead to more affordable conditions and could distort competition in the telecommunications sector. Any regulatory intervention, especially involving pricing, must be justified with appropriate, evidence-based reasoning. Such Network Fee proposal mechanisms will promote discriminatory practices and will result in the disruption of the BGP routing logic, thereby subjecting Brazil to an increased dependency on international routes and a significant rise in

transportation costs, distorting the optimization of networks as they exist today. Furthermore, this approach violates both Art. 3(3) and Art. 3(1) of the Open Internet Regulation, and, in Brazil, infringes on Arts. 3 and 9 of the Marco Civil da Internet (12.965/2014). BEREC's submission to the Consultation aligns with this assessment (Appendix 4, pp. 14-15), reinforcing its findings in both the October 2022 and May 2023 consultations.

On the international scene, the peering model between CSPs and VAS providers has historically been governed by **voluntary commercial agreements**. Peering is the process by which two networks exchange traffic directly with each other, usually without exchanging money, when the volume of traffic between them is balanced or advantageous to both parties. When there is a traffic imbalance, firms can choose to establish a paid peering agreement, in which one network compensates the other for the volume of additional traffic generated.

The peering model has naturally evolved with the growth of the internet, encouraging infrastructure expansion without the need for direct government regulation. However, the regulation of paid peering is rare even in more regulated markets, such as Europe, the imposition of peering fees between telecommunications operators and content providers is extremely uncommon and considered, in most cases, detrimental to innovation and to the free growth of the Internet. [13]

Technology companies, such as Google, Meta, and Amazon, often invest in CDNs and other forms of their own infrastructure, in order to reduce the volume of traffic on telecommunications networks and improve the efficiency of data flow. These investments not only mitigate operators' costs, but also bring direct benefits to the consumer, improving the quality and speed of content delivery.

Finally, on the global stage, the peering model is based on private agreements, with bilateral negotiations between telecommunications companies and content providers. The attempt to create a regulatory fee on data traffic contradicts the prevailing practice in the international market, where peering has developed voluntarily and efficiently, without the need for excessive regulation.

Conexis' proposal shows that the alleged problem that CSPs intend to attack is not directly related to the interaction between CSPs and VAS providers. While no data is provided to support such a claim that demand for content has increased the need for investments without proper return, the justifications presented focus much more on characteristics of the telecom market structure in Brazil, marked by strong competition with small ISPs, high taxation, and limited space for revenues generation due to the low-income of Brazilian population. This healthy competition, which has contributed to bringing quality internet to all parts of the country, is the result of more than 10 years of Anatel's work promoting competition regulation that encourages investment and expansion of networks. At this point, the large CSPs, in the aforementioned proposal, indicate that their real problem is competitiveness with small ISPs.

The contributions of small ISPs and large CSPs to consultation no. 26 on users' duties go on opposite directions. Only the large CSPs defend the Conexis proposal. As an additional example, the contributions to the consultation on the PGMC[6] further reinforce this panorama, of large telecoms bothered by competition with smaller providers.

5. Analysis of Conexis' argument of a market failure in the telecommunications service provision

In the previous section, we presented Conexis' proposal and its argumentative flaws. Now, evidence will be discussed that demonstrates that this proposal is based on mistaken conclusions in relation to the existence of a market failure. In addition, it will be shown that

[6] PGMC is the General Competition Framework approved by Anatel.

the large CSPs in Brazil are actually reducing their investments while increasing the distribution of dividends, which directly contradicts the argument that the sector faces a market failure or a situation of economic unsustainability.

5.1. Increasing revenues of broadband-related services

In the document presented, Conexis supports the thesis that, in real terms, the revenues of the telecommunications sector in Brazil are declining. However, a careful analyses of the revenues of CSPs, using the same data provided by Conexis, shows that the observed drop is not related to the market segment object of this discussion. The network fee thesis presented by Conexis is related to the relationship between the Telecommunications sector and the Internet environment, represented by services that provide network connection, especially the Personal Mobile Service (wireless voice and broadband mobile services) and the Multimedia Communication Service (fixed broadband).

However, the data presented by Conexis include Fixed Telephony[7] and Pay TV, services that have been gradually replaced due to changes in society's consumption preferences. It is not appropriate here to discuss the reasons for these changes or to establish a causal relationship between these declining telecommunications services and the issue in question. Figure 1 illustrates the evolution of these revenues, duly decomposed by telecommunications service, highlighting the distinction between declining services and those directly relevant to the current discussion.

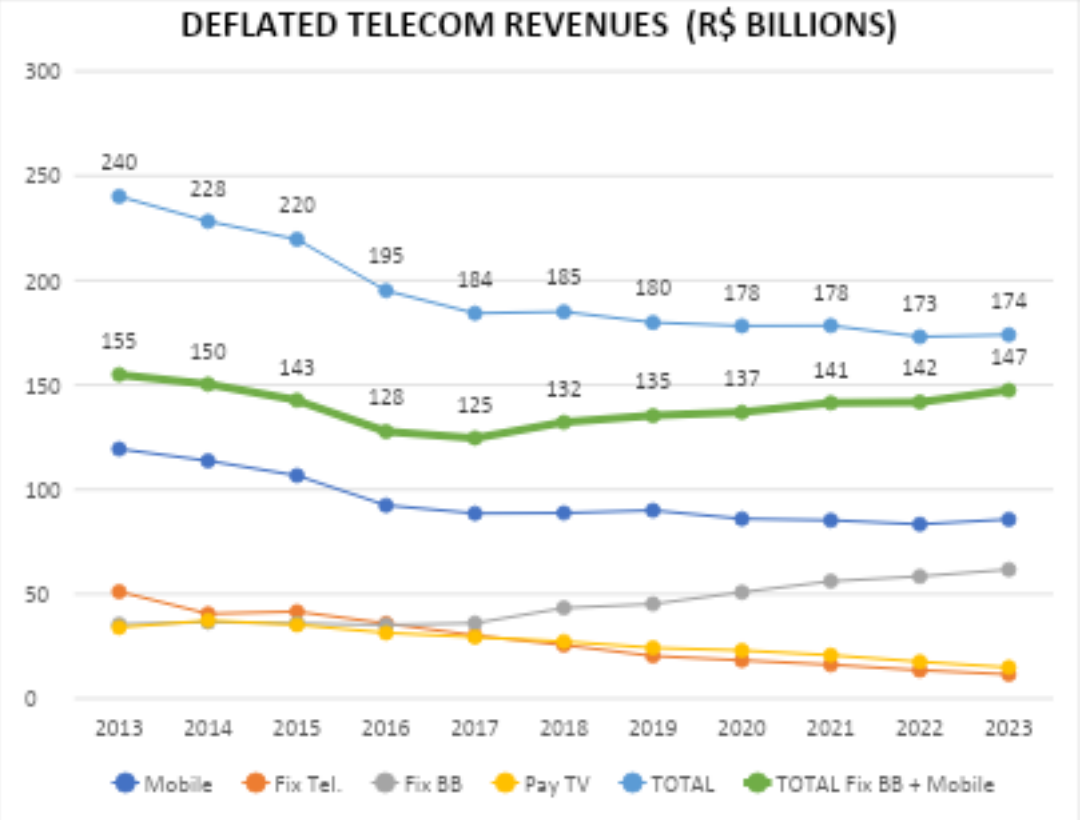

Figure 1 - Deflated annual revenues of telecommunications services from 2013 to 2023

The figure clearly illustrates that, when we look only at services related to the internet environment (lines dark blue and gray, and their combination in line green), **there has been a**

[7] This service has become unsustainable along the years due to decreasing demand for traditional voice services, culminating with settlements (some of them yet under negotiation) to terminate public telephony concessions in Brazil in 2025.

real growth trend since 2018. The decrease observed before 2018 is exclusively due to the decrease in Mobile Telephony revenue, resulting from regulatory changes.[8] Thus, there is no evidence to support the claim of a decline in revenues in the telecommunications sector caused by an alleged market failure, as suggested by Conexis.

5.2. Problems with ROIC vs. WACC comparison

The argument made by Conexis about the difference between WACC and ROIC involves a serious methodological misunderstanding. WACC refers to the cost of capital that a company needs to pay to finance its operations, considering all sources of financing, such as debt (loans, debentures) and equity (shares, reserves). On the other hand, ROIC measures the return generated by the capital that has been invested in the business, excluding non-operating debt. It is an efficiency indicator, which demonstrates how much profit the company can generate from the invested capital.[9]

The comparative analysis presented by Conexis, based on an average between ROIC and WACC, is inadequate. The correct approach would be to calculate the WACC individually for each company, taking into account its level of indebtedness and specific context, and only then compare it with its respective ROIC to assess any possible loss of value. On this point, however, it is important to stress that even in a case where the individual WACC of CSPs were above their ROIC, it is not straightforward to conclude that the problem is on the side of the ROIC. As already shown in AIA's Paper 2, the ROIC of large CSPs in Brazil is adequate when compared to other capital intensive, infrastructure sectors. The Conexis' proposal reports an even higher ROIC. On the other hand, the WACC of a firm is highly dependent on both endogenous and exogenous factors, like its level of debt, future operational prospects and commercial strategy, as well as Brazil's macroeconomic and political context, which have been bouncing back and forth in Brazil along the last decade, affecting interest rates and stock prices. So, before concluding that a gap between CSPs' WACC and ROIC means that there is a market failure in the telecommunications sector, one should more carefully analyze the WACC of the sector. Unfortunately, one could not find this analysis in the Conexis proposal.

Actually, the WACC suggested by Conexis lacks clear justification, as the document does not present sources or objective bases that justify the number used. It is not clear whether the amount was calculated before or after inflation, or whether it was considered before or after taxes. The inclusion of a hypothetical value, without basis, leads to the arbitrary conclusion that CSPs are losing value due to an alleged WACC higher than the ROIC obtained by the companies. Even if Conexis had used the sectoral WACC calculated by Anatel, there would be a methodological inconsistency, since the cost of capital calculated by the regulator serves as a reference for the agency's economic regulation, and not to justify the conclusions that Conexis presents.

5.3. Historical Investments and Dividends of Large CSPs

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[8] Until 2012, mobile operators recorded artificially high mobile interconnection rates (known as Valor de Uso de Rede Móvel– VU-M), kept high by Anatel as a way to encourage the expansion of services. This policy was gradually changed, once the expansion objective had been achieved, resulting in a decline in mobile revenues from the reduction of the unit values of the VU-M, as defined by Anatel.

[9] In addition to the comparison with the WAAC, the Conexis proposal makes several references to the fact that the ROIC of SVAs is higher than the one of CSPs, suggesting some sort of "unfairness". In this respect, the Ministry of Finance of Brazil, in the public consultation process, stated very clearly that "…this fact does not appear to generate a causal link that corroborates the adoption od compensatory measures from one sector to another." (See Parecer SEI 1544/2024/MF).

Brazil has experienced an intense massification of fiber optic broadband networks in the last 10 years. According to Statista[10], the quantity and share of optic fiber broadband connections in Brazil is similar to most OECD countries. Brazil has today 71,3% of connections in fiber, same level found in Norway and New Zeeland, and more than Portugal and France. But differently from these other countries, as seen in the previous section, the main drivers of investment in optic fiber network growth in Brazil are the small ISPs, while national CSPs focus their investments mostly on development of fixed broadband infrastructure in big and medium cities, and in the deployment of wireless connectivity countrywide, with subsidies of the Federal government given through spectrum auctions.

Moreover, another important aspect that deserves further analysis to inform the network fee debate is the historical response of national CSPs' CAPEX levels to variations in their companies' main financial indicators. Figures 2, 3, and 4 show historical financial figures of Vivo, TIM, and Claro, respectively, consolidated from their publicly available balance sheets, all in millions of Brazilian Reais (R$) and deflated by the official inflation index (IPCA).

Vivo's real investments have shown a downward trend along the years, while there is a consistent growth in its EBITDA, EBITDA Margin and Dividends distributed (see Figure 2). These figures, combined with the results previously shown suggest that the company is increasingly profitable, and prioritizes return to shareholders over increasing investments to serve new areas.

TIM Brasil, although a predominantly wireless broadband company, has a relevant fiber optics fixed broadband operation, especially in highly populated municipalities, that reaches more than 800,000 fixed BB subscribers by 2023. Its behavior, shown in Figure 3, demonstrates a significant improvement in its financial performance over the last 10 years, along with a growth in its dividend distribution to shareholders.

Meanwhile, a slightly decreasing trajectory of its real CAPEX is observed, showing no correlation between EBITDA and CAPEX figures. Finally, Figure 4 portrays a similar pattern for CLARO. Although there is no public data from the company regarding the issuance of dividends, as it is a privately held company in Brazil, we can observe an increasing real EBITDA along the years, and at the same time a decreasing trend on real CAPEX.

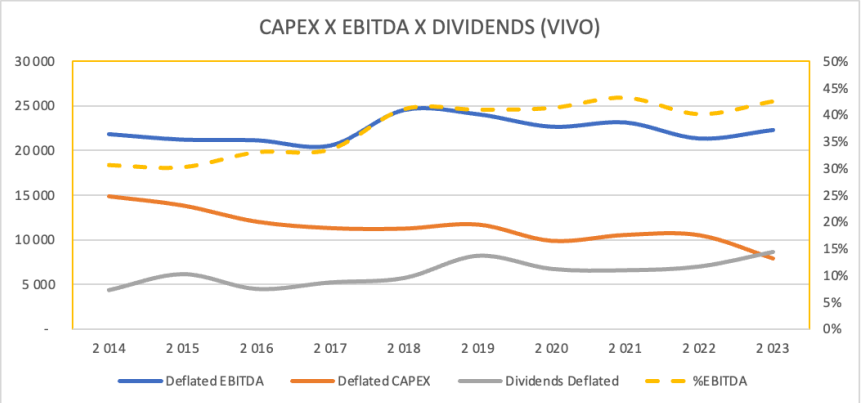

Figure 2 - CAPEX X EBITDA X Dividends (Vivo)

[10] Available at https://www.statista.com/statistics/604623/share-of-fibre-connections-in-broadband-oecd/

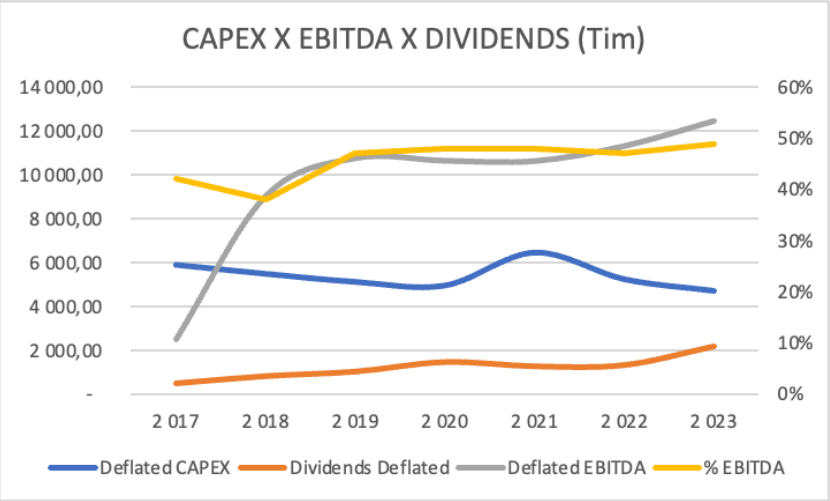

Figure 3 - CAPEX X EBITDA X Dividends (Tim)

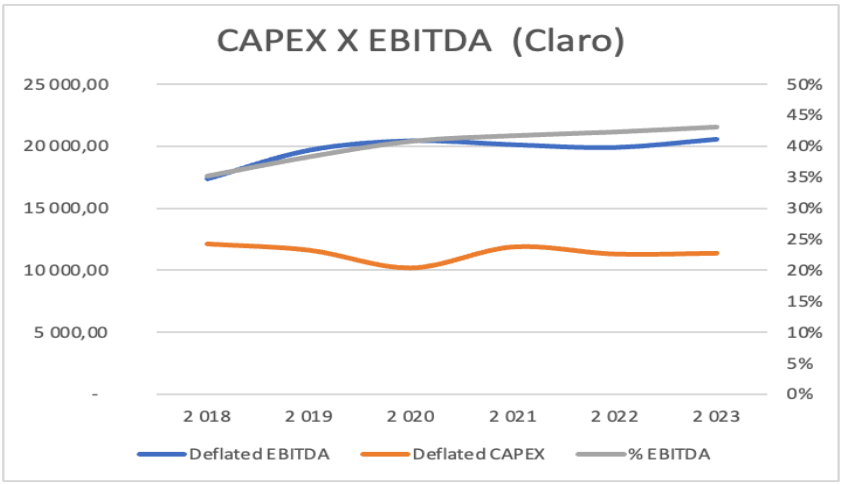

Figure 4 - CAPEX X EBITDA (Claro)

Another way to demonstrate what we observe in the graphs is by analyzing the correlation between these variables. Clearly the variables EBITDA, EBITDA margin and Dividends distributed show a positive correlation with each other. On the other hand, if we compare the CAPEX of each of these companies with these profitability variables, we find a negative correlation. [11]

Table 1 - Correlation between large CSPs' operational results

	Vivo	Tim	Claro
Correlation EBITDA x Dividends	0,402	0,646	not available
Correlation EBITDA x Margin EBITDA	0,669	0,360	0,898
Correlation CAPEX x EBITDA	-0,217	-0,171	-0,609
Correlation CAPEX x Dividends	-0,670	-0,415	not available

[11] The debate in the literature about the relationship between profitability and investments suggests that the correlation is not expected to be high, given the "spiky" or "lumpy" nature of the decisions to invest. See, among others, Winberry (2021).

The analysis of empirical data from national CSPs in Brazil suggests, therefore, that when companies' revenue grows and their margins improve, there is no guarantee of a direct impact on investments. Following this rationale, the adoption of a network fee regime in Brazil as proposed by Conexis might imply greater profit margins for these companies, and dividends distribution for their (mostly foreign) shareholders, with little or no impact on investment increase towards service universalization. Two reasons support this claim based on our data analysis. First, these big firms barely invest in network expansion towards small cities, where connectivity is mostly lacking. Second, their financial figures in last years show no correlation between their EBITDA and investment levels.

Therefore, there is no characterization of market failure. Market failures occur when there is an inefficient allocation of resources, distorting competition. Signs of market failure are stagnant or decreasing growth graphs or loss of quality. These factors are not occurring, quite the opposite.

6. Small ISPs as the main drivers of digital inclusion in Brazil

The broadband market in Brazil is very competitive. In fixed broadband, and according to Anatel, the country reached 49.6 million fixed broadband connections in Ago/2024, of which 37.5 million were Optic Fiber connections. This growth in recent years finds its main determinant in the development of small ISPs, which have been investing intensively to grow their fully optic-fiber-based networks from a few thousand ten years ago to approximately 27 million in 2024.

According to Anatel's Resolution No. 694/2018, a small ISP is considered to be the group holding a national market share of less than 5% in each retail market in which it operates. In turn, Anatel's Act No. 6539/2019[12] declared small ISPs those which do not belong to Telefônica, Claro and Tim economic groups. Small ISPs have contributed significantly to reducing the shortage of access to quality fixed broadband services in Brazil. Over the past 4 years, this group of providers has expanded the stock of fixed broadband accesses by more than 15 million[13], bringing digital connectivity to regions far from urban centers, as well as to low-income peripheral regions. The combination of entrepreneurial capacity, regional knowledge, efficient absorption of network deployment technology and service provision, as well as the free peering practice among ISPs and VAS providers in the IXPs contributed to the accelerated expansion of these market agents, even in the presence of strong obstacles to access capital and financing.

Naturally, this growth has also historically depended on favorable regulatory measures. These companies generally have a more accessible tax regime, are not obliged to comply with various Anatel regulations, such as quality and consumer rights regulatory frameworks, and have access to national CSPs infrastructure in a regulated manner.[14] Small ISPs, despite limited investment capacity due to challenges accessing credit, have been successful with rapid growth across the country, including leading the deployment of fiber optic networks across the country. According to Anatel, the Brazilian ICT regulator, more than 8,000 small ISPs[15] that voluntarily report their fixed broadband accesses already account for 54.4%[16] of the fixed broadband market in the country, after an increase of 900% in their fixed broadband subscribers since 2015, against an 120% increase among national providers

[12] Information available in https://www.gov.br/anatel/pt-br/regulado/prestadoras-de-pequeno-porte.
[13] Information available in https://informacoes.anatel.gov.br/paineis/acessos.
[14] https://ctcp.org.br/blog/abrint-destaca-assimetria-regulatoria-para-pequenos-em-encontro-da-uit/
[15] ANATEL Dados. Retrieved on February , 2024.
[16] ANATEL Dados. Retrieved on February , 2024.

in the same period.[17] According to data collected by Anatel in 2024, a small ISP was the market leader in almost 5,000 out of 5,570 Brazilian municipalities. Figure 5 provides the evolution of market share of national vs. small ISPs from 2015 to 2023.

The small ISPs have also assumed a leadership role in municipalities with less than 500,000 inhabitants, particularly in interior regions where the lack of networks is more severe. Figure 6 presents the distribution of market shares of small and national ISPs in groups of municipalities of different sizes. It shows that small ISPs lead fixed broadband market in medium and small cities. For example, 95% of the fixed broadband subscribers of municipalities with less than 30,000 inhabitants (focus of this Program) were served by small ISPs.

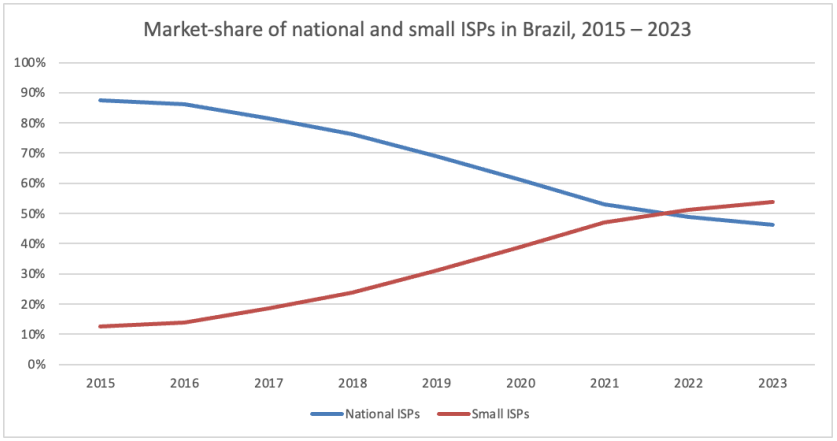

Figure 5 - Market-share of national and small ISPs in Brazil, 2018 – 2023[18]

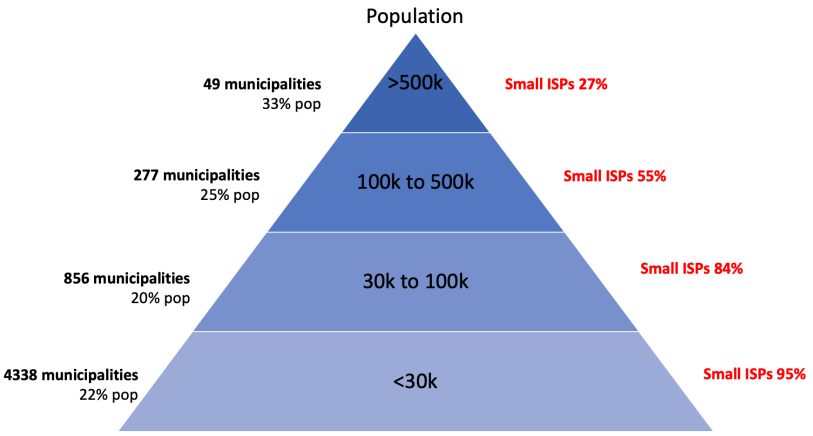

Figure 6 - Market share of small ISPs in groups of municipalities of different population sizes – 2023[19]

This extract of information provides a perspective on the uniqueness of the Brazilian market, very different of the European context dominated by big, national CSPs. Among countries with a high population, it is certainly the country with the largest number of fixed broadband service providers, and the level of expansion of these services by this group certainly makes small ISPs the main driver of investment in broadband expansion in Brazil.

On the other hand, Brazil currently has three national CSPs, Telefônica Brasil SA (Vivo), Tim Brasil SA (Tim) and Claro Telecom Participações SA (Claro). Other large groups

[17] Anatel. https://informacoes.anatel.gov.br/paineis/acessos.
[18] Available at Anatel. https://informacoes.anatel.gov.br/paineis/acessos.
[19] Source: Teleco, with data from Anatel. https://informacoes.anatel.gov.br/paineis/acessos.

also operate in Brazil in different segments, however, due to their size, these companies differ substantially from small ISPs and are clearly the groups with the greatest economic power operating in Brazil. They operate nationally in fixed broadband, mobile services, and pay TV. A preliminary analysis of these three economic groups show that they grow their user base predominantly in more populated areas. Figure 7 presents their average growth in municipalities of different population tiers. This analysis provides a clear view of how these companies build their business model basically in large centers, and they have not focused on advancing their investment frontier towards new areas. The opposite of what small ISPs are doing.

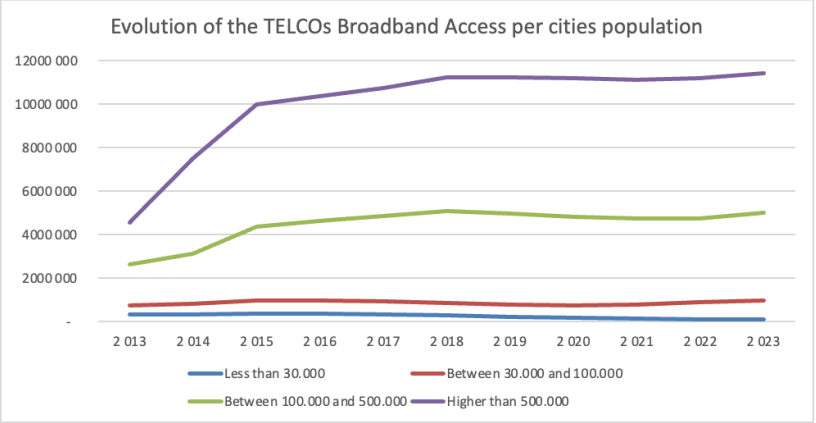

Figure 7 - Evolution of the Big Telcos Broadband Access per cities population (all technologies) [20]

Figure 8 makes a comparison between the evolution of cities covered with Fiber-to-the-Home technology by small ISPs and by national CSPs. It can be seen an expressive coverage growth of small ISPs towards new cities. In 10 years, small ISPs went from less than 300 cities covered with fiber optics to more than 5.000, while national CSPs went from around 700 cities to around 1200. If we compare this number only with cities below 100,000 inhabitants, we see that national CSPs went from around 300 to around 600, while Small ISPs started from 200 to around 4.800.

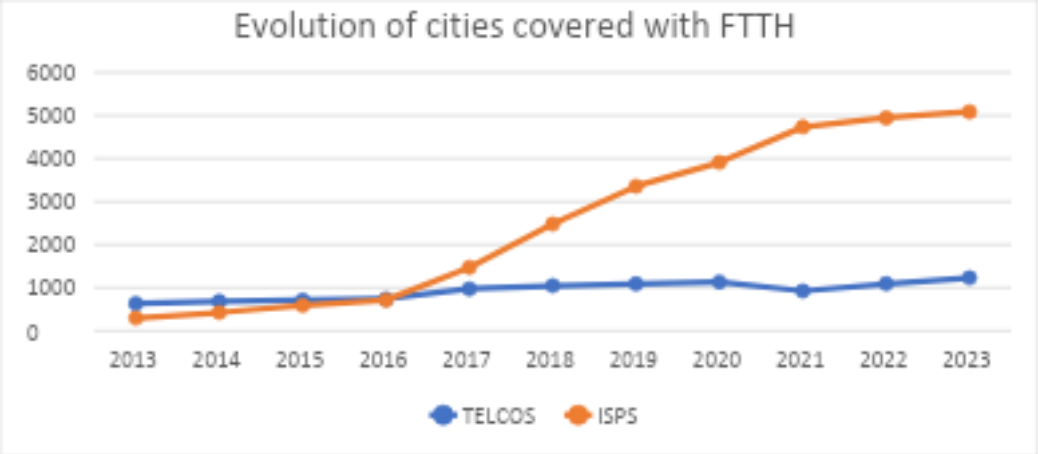

Figure 8 - Evolution cities covered with FTTH

The information provided so far make a clear case for the low relevance of national CSPs on the development of digital connectivity high-capacity networks to the countryside of

[20] Data from Anatel Dados, available in https://www.gov.br/anatel/pt-br/dados.

Brazil. Figure 9 illustrates this even more precisely. Anatel usually divides Brazilian municipalities according to competitive categories. There are four categories, in which Category 1 is the most competitive and attractive municipalities, while Category 4 is non-competitive municipalities[21], with challenging socioeconomic conditions, and lack of infrastructure. We can observe a consistent growth trend in the presence of small ISPs in the least competitive cities of Brazil, while national CSPs curve remain almost constant.

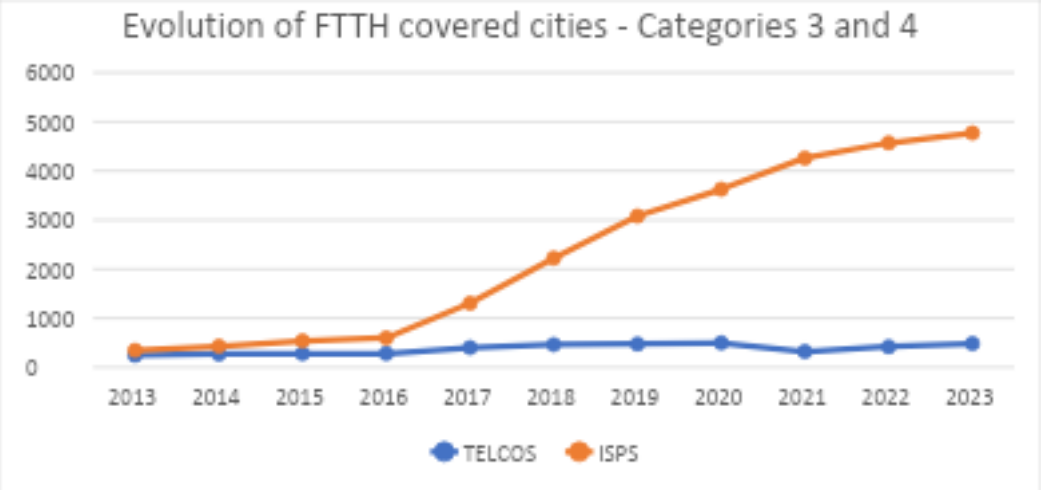

Figure 9 - Evolution of FTTH covered cities - Categories 3 and 4

This analysis allows us to confidently conclude that the optic fiber broadband expansion in Brazil is occurring because of intense investments by small ISPs. Even facing obstacles to access adequate credit conditions, these firms have been developing a cost-efficient business model to deploy optic fiber networks in areas of low economic attractiveness, while national CSPs mainly maintain their investments oriented to more attractive and profitable, already served areas.

Finally, it is important to highlight the social role of small ISPs on expanding fixed broadband in small municipalities in Brazil. While large telcos prioritize covering the richest cities in the country, small ISPs focus on service expansion among the poor population in the countryside. For example, the per capita GDP of cities of at least 100,000 inhabitants in Brazil, where big telcos are heavily present, is 58% greater than the per capita GDP of smaller municipalities, where small ISPs dominate. Also, in the Northeast region of Brazil, one of the poorest and highly populated ones, small ISPs have 97% of market share in cities with less than 100,000 inhabitants, and 61% in bigger cities, what reinforces the thesis that while big CSPs focus their business where big profits are (the richest areas of the south and southeast of Brazil), small ISPs are the motor of social inclusion in the telecommunications sector.

7. Effects of a network fee regime on competition in the telecommunications sector

The previous sections were dedicated to analyzing the proposal presented by Conexis from different perspectives. Its complete legal inconsistency in light of the LGT was verified, its improprieties in light of economic theory, and the real situation of companies in Brazil was presented, large CSPs' increase in distribution of dividends and reductions in investments

[21] Anatel evaluates the municipalities based on criteria like GDP, HDI, number of existing infrastructures, market share, among others. The classification of categories are a) Competitive – Category 1; b) Potentially Competitive - Category 2; c) Little Competitive - Category 3; d) Non-Competitive - Category 4.

were reported, and some important pitfalls of the proposal were revealed, like the false claim regarding the alleged drops in revenue.

This section aims to make a quantitative analysis of what would happen in the case of implementation of the Conexis network fee proposal. First, it is important to highlight that there is a set of information not available in Conexis' publicly available proposal. Data such as traffic and the alleged gap between ROIC and WACC are not available in a transparent manner, which significantly hinders quantitative debate. However, as will be seen below, it is perfectly possible to conclude with quantitative arguments that the adoption of the Network Fee proposal presented by Conexis brings serious distortions to the Brazilian competitive environment.

7.1. Financial Simulation of the Conexis Proposal with Publicly Available Data

This section provides a financial simulation of the network fee model proposed by Conexis. The simulation assumes certain conditions for both fixed and mobile broadband services in Brazil to assess the economic impact of this proposal.

Although the Conexis document states that "the Fair Share proposal is not based on the sector's profitability deficit but aims to correct market failures by aligning revenue and costs across the value chain," it is evident that much of the proposal is centered in increasing the ROIC of large CSPs. To understand the potential financial impact of this proposal, we simulate how a 1% increase in ROIC for a national operator with both mobile and fixed broadband services could affect its EBIT (Earnings Before Interest and Taxes) in the second quarter of 2024.

Brazilian Mobile and Fixed Broadband Operator	Before Conexis Proposal	After Conexis Proposal
EBIT (US$ MM/2Q/2024)	*1.801*	2.093
Invested Capital - (US$ MM/2Q/2024)	21.319	21.319
Taxes (%)	27%	27%
ROIC (%)	6,2%	7,2%

Source: Operator Financial Data – 2Q/2024

The adoption of the Conexis proposal would result in an EBIT increase of US$ 292 million for this operator, reflecting a 16,2% growth over its financial result in 2Q/2024.

The next step is to calculate how much VAS providers would pay in network traffic fees under this proposed model. To do this, we use public data from **Anatel** on monthly data consumption per user for both fixed and mobile broadband services (as of 1Q/2024). Multiplying these figures by the number of mobile and fixed broadband users from the same operator (as of **2Q/2024**) will generate the total data traffic in GB/month or Exabytes/month

Brazilian Mobile and Fixed Broadband Operator	2Q24	Data Consumption (GB/user/month)	GB (000)/ month	Exabytes/ month
Mobile Broadband Users (000)	100.949	5,36	541.084	0,54
Fixed Broadband Users (000)	6.875	290	1.993.816	1,99

Source: Anatel

According to the Conexis proposal, only individual VAS providers with traffic accounting for more than 5% of total network usage will be charged, excluding public CDN's. Below is the breakdown of access network traffic for major VAS providers.

Access Network Traffic		
ISP	Fixed Broadband	Mobile Broadband
Meta	20%	48%
Alphabet	19%	15%
Netflix	*11%*	3.50%
Akamai	13%	5.20%
Tiktok	2.3%	5.56%
Other VAS	*35%*	23%

Source: Conexis network fee proposal

Under this traffic distribution, **50% of fixed broadband traffic** (cursed to Meta, Alphabet, and Netflix) and **69% of mobile broadband traffic** (cursed to Meta, Alphabet, and Tiktok) would be subject to the network fee. This results in a total chargeable traffic volume of **1.37 Exabytes per month** summing both mobile and fixed broadband traffic.

Brazilian Mobile and Fixed Broadband Operator	(%) of Charged Traffic	Monthly Charged Traffic (GB 000)	Monthly Charged Traffic (Exabytes)
Mobile Broadband User Traffic	68.56%	367,179	0.37
Fixed Broadband User Traffic	50%	996,908	1.00

Source: Conexis study and Anatel

Differentiating Charges for Fixed vs. Mobile Broadband

The Conexis document suggests applying distinct charges for fixed and mobile networks due to differences in operational characteristics. To calculate this, the ARPU (Average Revenue Per User) and number of users of each service is used to distribute the operator's EBIT between mobile and fixed broadband. The resulting charges are then divided by the chargeable traffic of individual VAS with more than 5% market share, reaching an average value of **US$ 0.218/GB for mobile traffic** and **US$ 0.017/GB for fixed traffic**.

	ARPU (US$)	**Revenue / Month (US$ 000)**	**(%) of Total Renenue**	**Average EBIT/Month (US$ 000)**	**Monthly Charged Traffic (GB 000)**	**Charged Traffic (US$/GB)**	Charged Traffic/ User/ Month (GB)	Total US$/ user/month paid by all +5% OTTs
Mobile Broadband User	5,30	534,540	82%	80,113	367,179	0.218	3,67	0.79
Fixed Broadband User	16,73	114,997	18%	17,235	998,901	0.017	145.00	2.51

Source: Operator Data 2Q/2024, Conexis study and Anatel. Conversion rate: US$/BRL: 5,59

As the calculations suggest, for generating the US$ 292 million quarterly in network fees needed to raise our hypothetical operator's ROIC in 1%, VAS providers altogether would have to pay **US$ 0.79/month per CSP mobile user, and US$ 2.51/month per CSP fixed broadband user**.

7.2. Financial Simulation of Market Impacts of Conexis Proposal

Building on the results of the previous chapter, the proposed network fee has the potential to significantly alter the dynamics of Brazil's telecommunications sector, with smaller ISPs facing notable disadvantages. Larger operators would gain disproportionate benefits from the network fees paid by VAS providers.

To further investigate this hypothesis, an additional analysis was performed using data from the previous chapter's simulation of the Conexis proposal, alongside official access figures for fixed and mobile broadband published by Anatel for the end of **2Q/2024**.

For the **Mobile Broadband Market**, the total number of accesses in **2Q/2024** was **261.141 million**, distributed among the **3 Large National Mobile Operators** and **Regional Mobile Operators and MVNO's ISPs**. The shares are represented in the table below:

Mobile Operators Segments	Market Share (%)
3 Large National Mobile Operators	96.2%
Regional Mobile Operators and MVNO's	3.8%

Source: Anatel

By multiplying the **US$ 0.79** paid by VAS providers per user/month by the number of mobile broadband users in each group, the total monthly payments received by operators are calculated as follows:

Mobile Broadband Market Share (2Q/2024)	Market Share (%)	Subscribers (000)	Total US$/ user/month paid by VAS providers	US$ (000)/ Month paid by VAS providers
3 Large National Mobile Operators	96.2%	251,243	0.79	199,388
Regional Mobile Operators and MVNO's	3.8%	9,898	0.79	7,855

Source: Anatel

For mobile operators alone, more than **US$ 207 million/month** would be paid, totaling more than **US$ 2.5 billion/year** to raise the ROIC by 1% only, with the 3 large providers receiving **96% of this amount**.

For the **Fixed Broadband Market**, the total number of accesses in **2Q/2024** was **49.359 million**, distributed among the **3 Large National Broadband Operators**, **7 Regional ISPs**, and **10,000+ Small ISPs**. The shares are represented in the table below:

Fixed Operators Segments	Market Share (%)
3 Large National Operators	44.2%
7 Medium Regional ISP's	15.7%
+10.000 Small ISP's	40.2%

Source: Anatel

Similarly, multiplying the **US$ 2.51** paid by VAS providers per user/month by the number of fixed broadband users in each group provides the total monthly payments received by operators:

Fixed Broadband Market Share (2Q/2024)	Market Share (%)	Subscribers (000)	Total US$/ user/month paid by OTTs	US$ (000)/ Month paid by OTTs
3 Large National Broadband Operators	44.2%	21,793	2.51	54,631
7 Medium Regional ISPs	15.7%	7,749	2.51	19,425
+10000 Small ISPs	40.2%	19,819	2.51	49,683

Source: Anatel

For fixed operators, more than **US$ 123 million/month** would be paid, totaling more than **US$ 1,5 billion/year**, with the 3 large providers receiving **44.2%** of this amount.

There is a clear overlap between the groups that operate both mobile and fixed broadband services in Brazil, meaning that many of the same companies dominate in both sectors. Due to this overlap, for simplicity and clarity, we have consolidated all payments—both for mobile and fixed broadband—into a single table. This approach ensures a more streamlined analysis, allowing for a comprehensive view of the total payments received by operators from VAS providers, without redundancy between the two categories.

Market Segment	(%) paid by OTTs
2 Large National Mobile and Broadband Operators + 1 National Client Co Operator + 1 National Mobile Operator + Client Co Operator	77%
Regional Mobile Operators and MVNO's	2%
7 Medium Regional ISPs	6%
+10000 Small ISPs	15%

In the scenario described above, Brazil's large CSPs are projected to receive around **77%** of the total payments made by VAS providers.[22]

If **US$ 4 billion** is distributed annually, **77%** of that—approximately **US$ 3 billion per year**—would go directly to the largest fixed and mobile operators, further boosting their revenue. In contrast, smaller ISPs, which often rely on partnerships with VAS providers to offer competitive pricing, would be left with only **15%** of the total payments.

This assumes, optimistically, that the fees charged to VAS providers (in US$/Gigabyte) by both fixed and mobile broadband operators would remain uniform, regardless of company size.

[22] This proportion considers the use of publicly available data. The public proposal made available by Conexis contains a series of assumptions whose lack of data availability and methodological clarity prevent a more accurate proportion. However, considering that the Conexis text points to the use of references from companies with more disparate profitability conditions than the reference used in this text, it is quite likely that the 77% proportion found here is even higher.

However, based on experience in similar markets, such as **content cost negotiations in pay TV**, smaller operators typically receive less favorable terms than larger players. Larger telecom companies possess greater bargaining power, allowing them to negotiate more lucrative deals. As a result, the actual distribution of fees is likely to be even more skewed in favor of the large operators, surpassing the estimated **77%** share calculated in this model.

7.3. Calculating total network fees to be paid by each VAS provider

Multiplying the chargeable traffic distributed per VAS provider by the US$/GB network fee for fixed and mobile services, the following estimated monthly payments per VAS provider is expected for raising the ROIC of our hypothetical operator by 1%.

VAS Provider	Total Monthly Network Fee in US$ (for raising ROIC in 1% for the a hypothetical operator)
Meta	63,083,698
Alphabet	24,013,827
Netflix	3,709,952
Akamai	-
Tiktok	6,525,857
Other OTT´s	-
Total	97,333,333

Now, extrapolating these values for the entire fixed and mobile broadband market, and adding other two different scenarios of ROIC increase of 3% and 5%, one could have a better picture of the magnitude of the impact of the Conexis proposal.

VAS Provider	Total Yearly Network Fee in US$ (for raising ROIC in 1% for the entire market)	Total Yearly Network Fee in US$ (for raising ROIC in 3% for the entire market)	Total Yearly Network Fee in US$ (for raising ROIC in 5% for the entire market)
Meta	2,335,078,589	7,005,235,766	11,675,392,943
Alphabet	1,108,353,399	3,325,060,197	5,541,766,995
Netflix	326,670,960	980,012,880	1,633,354,800
Akamai	-	-	-
Tiktok	201,681,053	605,043,158	1,008,405,263
Other OTT´s	-	-	-
Total	**3,971,784,000**	**11,915,352,000**	**19,858,920,000**

The Conexis proposal mentions progressive charging mechanisms and incentive factors, which were not factored into the simulation. This exclusion was due to the lack of

clarity in the publicly available version of the document regarding how these mechanisms would be applied. To maintain the accuracy of the current estimates, it was decided to omit these elements from the simulation, but their inclusion could significantly improve the hypothetical operator's financial outlook.

7.4. Discussion on market impacts

The implementation of the Conexis proposal is expected to have far-reaching effects on the competitive landscape of Brazil's telecommunications sector. These effects will impact market structure, pricing, and the long-term dynamics of the industry.

The disproportionate distribution of network fees under the Conexis proposal would significantly strengthen the market power of the largest telecommunications operators. With more financial resources at their disposal, these operators could further invest in infrastructure upgrades, aggressive marketing campaigns, or geographic expansion, thereby entrenching their dominance. In contrast, smaller ISPs, lacking comparable capital, would struggle to keep pace with these investments. Over time, these disparities would likely erode the competitiveness of smaller ISPs, reducing consumer choice and further consolidating the dominance of large national operators in both fixed and mobile broadband markets.

One of the most profound impacts of the Conexis proposal is the increased risk of accelerated market consolidation. Assuming US$ 4 billion is distributed annually without factoring in potential market share growth or ARPU increases, at least 77%—or roughly US$ 3 billion—would flow directly to the largest fixed and mobile operators for each 1% increase in ROIC.

This substantial revenue boost could fuel acquisitions, allowing larger operators to absorb smaller regional ISPs, further consolidating market power among a few dominant players. If we assume that all this revenue is used to acquire smaller fixed broadband operators at an approximate cost of R$ 2,000 per subscriber (or US$ 358), this could result in an additional 8.6 million customers falling under the control of the largest operators in Brazil per year.

Using the current market figures from 2Q/2024, this consolidation would dramatically alter the competitive landscape of Brazil's fixed broadband sector. With the network fees of 1 year, a handful of large national broadband operators could control 61.4% of the market, leaving smaller ISPs with only 38.6%, a stark contrast to the more diverse market structure that exists today.

2 Large National Mobile and Broadband Operators + 1 National Client Co Operator + 1 National Mobile Operator + Clent Co Operator	61.4%
Medium Regional ISP's + Small ISPs	40.3%

This scenario would represent a significant shift, concentrating the market among just three or four national broadband operators, thereby squeezing out smaller ISPs.

The network fee, though designed to balance revenue and costs for telecom operators, could eventually be transferred to consumers in the form of higher subscription fees. If VAS providers decide to offset these additional costs by passing them down to end users, Brazilian consumers may face increased expenses for accessing digital content and services. This could impose a heavier financial burden, particularly on low-income households, potentially limiting access to essential online services. As a result, the implementation of this fee could unintentionally deepen the digital divide, exacerbating inequalities in access to technology and information, and hindering efforts to achieve broader digital inclusion in the country.

Smaller ISPs have traditionally played a vital role in driving innovation and providing differentiated services to niche markets. By catering to specific regional or community needs, these operators have often introduced innovative pricing models, customer service strategies, and technology solutions to enhance quality that large operators have been slower to adopt. However, if the Conexis proposal leads to a contraction of the small ISP sector, this source of innovation could be significantly diminished.

In a more consolidated market, there is a risk that large operators may focus primarily on high-margin urban areas, where the return on investment is highest, potentially neglecting rural or underserved regions. This could lead to a deterioration in service quality for some consumers, particularly in areas where small ISPs currently offer better or more reliable services.

If the network fee is implemented, large telecommunications companies may prioritize enhancing shareholder returns over network expansion (they do not operate under a regulated market). This could take the form of increasing dividends or repatriating profits to their parent companies abroad. Given their dominant market position, these operators may not feel the same urgency to reinvest in improving infrastructure, particularly in less profitable rural regions. Instead of using the additional revenue to expand broadband access or upgrade services, the focus may shift toward short-term financial gains, potentially slowing down efforts to improve connectivity and service quality across the country.

7.5. Further reflection of the present quantitative analysis

Section 6 has underscored the pivotal role played by small Internet Service Providers (ISPs) in catalyzing the widespread adoption of fixed broadband services, particularly in underserved regions of Brazil. Against this backdrop, the proposed implementation of a network fee regime by national CSPs warrants critical scrutiny, as it has far-reaching implications for market dynamics and competition within the telecommunications sector.

Drawing upon Michael Porter's seminal work on competitive forces [3], it becomes evident that the relative bargaining power of suppliers plays a pivotal role in shaping commercial relationships. In the context of the telecommunications sector, where small ISPs operate alongside national CSPs, a clear imbalance in bargaining power emerges.

The bargaining power of suppliers is a key concept in the competitive analysis of an industry or market. Refers to the ability of suppliers to impose favorable conditions on purchasing companies in a commercial relationship. When suppliers have high bargaining power, they can impose higher prices, reduce the quality of products or services, or impose unfavorable payment terms, which can negatively affect the profitability of purchasing companies.

An important factor that influences the bargaining power of suppliers is the relative size of the supplier in relation to its customer. The smaller the size of the supplier compared to its customer, the lower its bargaining power in the commercial relationship. This is because smaller suppliers often have fewer resources, less production capacity, and less market influence compared to their larger customers. As a result, they may have less leeway to impose favorable terms on purchasing companies and may be more susceptible to accepting the terms offered by them.

In addition to relative size, other factors can influence the bargaining power of suppliers, such as the availability of substitutes for the products or services offered by them, the differentiation of the supplier's products or services, the importance of the supplier's products or services to purchasing companies, and how concentrated is the market structure.

Small ISPs, despite their instrumental role in expanding broadband access, possess significantly lower bargaining power compared to their larger counterparts, which is a

function of several variables like traffic, network externalities, other related services, the use of other infrastructures (data centers, CDNs, etc.). This power asymmetry might exacerbate during negotiations over network fees, as small ISPs lack the resources and market influence to assert favorable terms. Furthermore, the proposal's focus on large VAS providers further compounds this imbalance, privileging national CSPs at the expense of smaller stakeholders. Transaction costs render negotiations between thousands of ISPs and VAS providers impractical, favoring a select group of large and national ISPs in fee negotiations. Consequently, the proposed regime risks disproportionately burdening small ISPs, artificially altering their conditions to compete with national CSPs.

The likely outcome of this asymmetrical negotiation process is a disproportional reward placed upon national CSPs, undermining the principles of regulatory asymmetry that have historically fostered small ISPs growth.[23] Such a regulatory measure represents a significant departure from the pro-competition ethos that has underpinned Brazil's telecommunications policy, potentially stifling innovation and hindering broadband expansion efforts.

Therefore, it is to be expected that the findings in section 7.4 would be even more damaging in relation to network-level competition in Brazil.

8. Conclusions

The regulatory landscape governing interactions between CSPs and VAS providers has recently gained significant attention, particularly in Europe and now in Brazil. This renewed focus has led to critical evaluations of proposed changes, specifically a network fee regime being advocated by national CSPs. By examining Brazil's broadband market evolution, investment patterns, and the contrasting strategies of small ISPs and national CSPs, this paper brings forward key insights necessary for understanding the potential implications of such regulatory changes.

In Anatel Public Consultation No. 26/2024, Conexis Brasil Digital, representing the largest CSPs in Brazil, proposed the adoption of a network fee regime. According to Conexis, this regime is aimed at addressing an alleged market failure that is claimed to make the current competitive environment unsustainable. However, as demonstrated in this analysis, the proposal is fundamentally flawed both in its conceptual underpinnings and in its potential outcomes, which include a collapse in competition and a degradation of network quality across the country.

The report analyzes Conexis' network fee proposal, its legal and economic flaws and consequences to telecommunications market dynamics and innovation. It is demonstrated that the proposal misidentifies the issue it seeks to resolve, as it highlights a potential sustainability problem, yet to be proven by CSPs with data, that is not related with the interaction between telecom companies (CSPs) and technology platforms (VASs). Instead, it would be rooted in the competitive structure of the telecom market in Brazil, where small ISPs have been instrumental in delivering high-quality internet services nationwide. This healthy competition has flourished thanks to over a decade of regulatory efforts by Anatel, designed to promote investment and expand broadband access across the country.

Secondly, the report shows with strong numeric evidence that there is no market failure or sustainability problem in the Brazilian fixed and mobile broadband market. Revenues and dividend distribution by national CSPs have been increasing in real value, as

[23] The important role played by Anatel's asymmetric regulatory approach on the development of small ISPs was recognized by one of the major associations of small ISPs in Brazil, ABRINT, in a report presented for the ITU in 2020. See https://www.abrint.com.br/sala-de-imprensa/contribuicao-da-abrint-e-destacada-pela-uit-em-genebra

so. Meanwhile, networks investments of those big companies are decreasing, signaling that the “high pressure for investment increase due to the high demand of traffic driven by VAS providers” argument is no more than an ungrounded justification for large CSPs intent to extract extra rents from another market to gain some competitive advantage against small ISPs.

It is also shown that the rise of small ISPs has been critical to the spread of fiber optic networks, which have brought broadband to diverse socio-economic regions throughout Brazil. These smaller players have demonstrated an ability to expand their networks despite limited financial resources, showcasing the role that competition and innovation play in reducing connectivity gaps. Their success illustrates the importance of regulatory frameworks that nurture competition rather than stifle it.

Furthermore, it is demonstrated through a comparative analysis that the investment strategies of small ISPs and national CSPs have been significantly different. While small ISPs have concentrated their efforts on extending their networks into underserved areas specially in the poorest regions of the country, national CSPs have focused their investments in densely populated urban areas of the richest cities. Data suggests that national CSPs are more inclined to prioritize shareholder returns over reinvestment in network expansion, further contradicting Conexis' claims of a market failure.

This report also addresses, with a quantitative analysis, concerns regarding the potential impact of a network fee regime on market competition. If adopted, such a regime would disproportionately strengthen the position of national CSPs, undermining the crucial role of small ISPs in promoting universal access and digital inclusion. By tilting the regulatory framework in favor of large incumbents, this proposal threatens to undo years of progress in fostering a competitive environment that has been essential to Brazil’s broadband growth.

In conclusion, the network fee regime proposed by Conexis presents significant conceptual flaws. Its implementation would distort competition and kill the business innovation led by small ISPs and that is responsible for the wide spread of optic fiber networks in Brazil, thus hindering the progress of digital infrastructure. The proposal risks creating an unbalanced market dynamic that favors large incumbents at the expense of smaller, innovative ISPs that drive inclusive connectivity. Regulatory decisions moving forward must ensure that the competitive landscape is preserved and that investments continue to prioritize network expansion and quality. Failure to do so would stifle innovation, as shown by the recent example of South Korea, presented in the annex, as well as deepen digital inequalities, and impede the goal of achieving equitable, nationwide meaningful and universal connectivity for all Brazilians.

Annex: The South Korean experience with the sender pay rule

A1 Introduction

The South Korean experience shows how a regulatory measure that undermines the competition among ISPs stifles innovation and hinders broadband expansion efforts. To state the conclusion first, the 2016 rule that required the big three CSPs to engage in paid peering based on the net amount of traffic sent reduced the competition among them, increasing the transit fees that domestic content providers pay to the CSPs for internet access, to an unprecedented level of several times other major markets.

In response, domestic VASs intentionally degraded their services to contain their cost, losing out of competition with foreign VASs, and their innovation was hampered by the internet access fees. The big three CSPs extended the rent-seeking behavior to increase the peering fees that they have charged on small to midsize overseas VASs delivering data (or CDNs doing it for them) directly to South Korea. In response, the SME VASs and CDNs delivered the traffic to Korea not from within Korea but from Hong Kong or Japan, causing substantial latency for the users in Korea. Some overseas VASs, facing the choice between irrationally high peering fees and irrationally high latency, withdrew from the Korea market entirely or intentionally degraded their services, hurting not only consumers but also hurting the 'hub' status of South Korea, and reducing the incentives for the subsea cable operators to land there. The last effect created the vicious cycle of increasing the transit fees that the Korean CSPs pay to the higher tier CSPs and thereby putting an upward pressure on the transit fees that they charge to their customers.

Starting 2016, the big three CSPs also tried to charge the peering fees at the rate comparable to the increased transit fees based on the throughput, on the large overseas VASs that they originally peered with settlement-free, ending up with such disputes as KT v. Facebook (2017) and later SKB v. Netflix (2020). In the meantime, the network investment decreased even while the return on investment increased. The South Korean ISP market was already highly concentrated before 2016 and the new sender pay rule deepened the concentration since the suddenly increased transit fees were charged to the lower-tier, usually SME, CSPs as well. Both the number of ISPs and the market share of SME ISPs decreased. As concentration deepened, the quality of service suffered. True 5G frequency (28GHz) was returned to the government because none of the licensees (the big three ISPs).

The advertised speed was not provided. Public WIFI is also non-functional. In the meantime, the big three Korean CSPs' advertising expenditure increased to a record level, increasing the number of end-users who then will generate the incoming traffic from VASs of all countries and all sizes contributing to the big three's maximum profit via the sender payment.

A2 The Market in South Korea

South Korea's CSP market competition, consisting of consumer broadband, VAS dedicated lines, and wireless, has changed over time as follows:

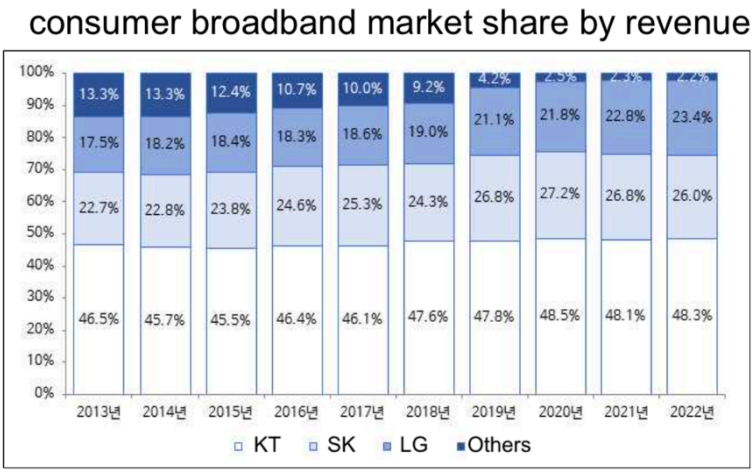

Figure 1 Korea Information Society Development Institute (KISDI), 2023 Telecommunication Market Competition Report, broadband retail market share by revenue, page 207

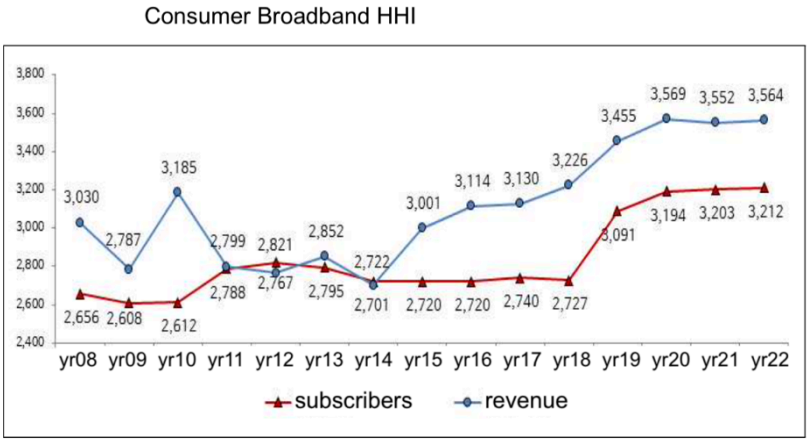

Figure 2 KISDI, 2023 Telecommunication Market Competition Report, broadband retail market HHI by revenue(blue) and by subscribers (red), page 214

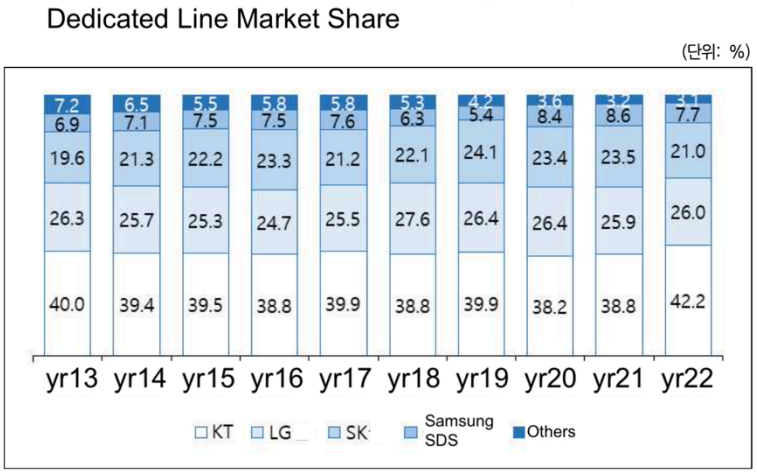

Figure 3 KISDI, 2023 Telecommunication Market Competition Report, VAS dedicated line market by revenue, page 389

The HHI of the VAS dedicated line market remains very high at 2966 (2015) □ 2945 (2016) □ 2814 (2017) □2841 (2018) □ 3077 (2019) □ 2687.58 (2020) □ 3127 (2022).

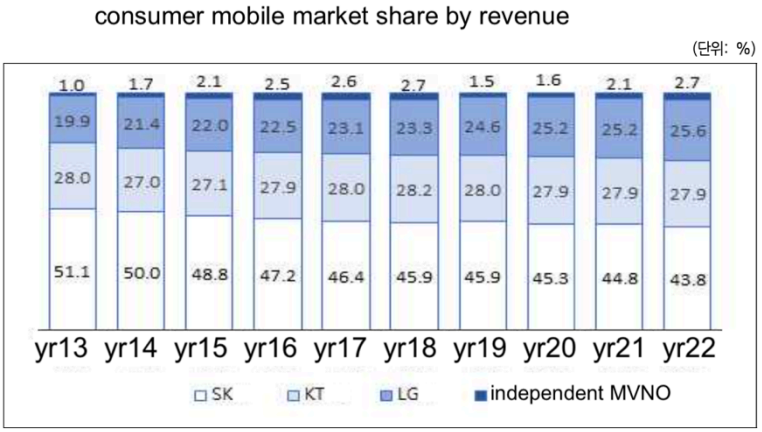

Figure 4 KISDI, 2023 Telecommunication Market Competition Report, wireless market share by revenue, page 83

consumer mobile HHI by revenue

'18년	'19년	'20년	'21년	'22년
3,327	3,336	3,315	3,253	3,162

Figure 5 KISDI, 2023 Telecom Competition Report, wireless HHI by revenue, page 103

A3 Impact of Sender Pay Rule

Starting January 2016, the new Interconnection Notice promulgated by the Ministry of Science, ICT, and Future Planning went into effect,[24] which required all CSPs "of the same tier" to pay for the amount of net traffic sent to the other CSP(s) at the government-set rate. The reason for adopting the notice was that the previous settlement-free peering among CSPs "prevented the service providers from collecting returns on their investment in improving the network"[25] and that "the traffic-based method could relieve the financial burden of internet users".[26] The Notice also authorized the ministry to classify all CSPs into higher tier and lower tier and required the lower tier to pay to the higher tier, regardless of the net traffic sent. Again, the idea was that the higher tier CSP presumably has greater coverage and should be compensated for the network buildout.

The opposite happened for the supply-side internet users, VASs. As the "sender" had to pay the receiver, hosting popular contents became financially burdensome for CSPs. The competition to host popular content providers on their network disappeared.[27] Immediately, CSPs demanded higher fees for hosting (i.e., providing internet access to) VASs.[28] The

[24] Article 46, Notice, Standard of interconnection between electronic communication facilities
[25] Korea Information Society Development Institute, *The Trend of Korea Internet Interconnection*, page 59
[26] Ibid., page 60
[27] Korea Information Society Development Institute, 2023 Telecom Competition Report, page 281.
[28] E-Daily, "Amended Interconnection Rules are a Feast for ISPs and a Cost for Startups", October 2016, available at https://www.edaily.co.kr/news/read?newsId=01994246612810624&mediaCodeNo=257 on November 1, 2027 (Korean)

transit fees in Seoul became 8.3 times that of Paris and 4.8 times New York (figure 6)[29] which continued for a few years to reach 8 times London and 10 times Frankfurt.[30] In particular, video-based VASs were hit hard as the internet access fee charged on the most successful VASs Naver and Kakao were already as high as 10% and 30% of the operating profit while the most successful video VAS Afreeca 100%.[31] Despite the shiny outer surface, the Korean startup environment has not been productive. Many startups leave Korea for the Silicon Valley for the reason of the high transit fees.[32] Others degraded their services to reduce the fees.[33] An industry organization of startups has specifically demanded abolition of the sender pay rule.[34] The ministry tried to dissuade the complaints with a new rule that snoozes the payment obligation unless and until the traffic sent exceeds the traffic received by 80% (i.e., no settlement below 1:1.8) but it does not remove the CSPs' disincentives in hosting VASs, which is the origin of the high prices.

[29] Abu Saeed Khan, LIRNEasia (2017), https://www.unescap.org/sites/default/files/Breaking%20the%20barriers%20of%20Broadband%20in%20Asia-Pacific%2C%20LIRNEasia.pdf

[30] Miller, J. (2021). "2021 Global Pricing Trends in 20 Minutes". Telegeography. Retrieved from: https://blog.telegeography.com/2021-global-pricing-trends-in-20-minutes.

[31] Donga-Ilbo, "High Network Fees Bankrupt Domestic Video Platforms", February 2019, available at www.donga.com/news/article/all/20190216/94153216/1

[32] Hankyung, "Korean Startups Leave Korea because of high network fees", January 15, 2020, available at: https://www.hankyung.com/article/202001159819j

[33] Kyung Sin "KS" Park and Michael R. Nelson, "Afterword: Korea's Challenge to the Standard Internet Interconnection Model," in *The Korean Way With Data: How the World's Most Wired Country Is Forging a Third Way*, edited by Evan A. Feigenbaum and Michael R. Nelson (Washington DC: Carnegie Endowment for International Peace, 2021), 73–75, https://carnegieendowment.org/2021/08/17/afterword-korea-s-challenge-to-standard-internet-interconnection-model-pub-85166.

[34] iNEWS24, "Startup network fees must be lowered", April 10, 2019, available at: https://www.inews24.com/view/1170617

Figure 6: Figure 6 Abu Saeed Khan, LIRNEasia (2017), https://www.unescap.org/sites/default/files/Breaking%20the%20barriers%20of%20Broadband%20in%20Asia-Pacific%2C%20LIRNEasia.pdf

Figura 6: Figure 6 Abu Saeed Khan, LIRNEasia (2017), https://www.unescap.org/sites/default/files/Breaking%20the%20barriers%20of%20Broadband%20in%20Asia-Pacific%2C%20LIRNEasia.pdf

As transit prices increased substantially relative to the world's average, the big three CSPs increased the peering fees charged to the foreign VASs or their CDNs to a level comparable to the recently increased transit fees. Foreign VASs of course do not purchase transit from Korean CSPs and only peer with them for access to the user devices only in Korea. However, the argument was that the service provided to Korean VASs were not much different from what was provided to foreign VASs because, due to linguistic isolation, most of the B2C traffic from Korean VASs are consumed domestically. Of course, this reasoning wags the dog because, if true, it is a compelling reason to lower the transit fee charged to Korean VASs since the Korean CSPs' cost of providing transit will be substantially lower than the locations where local contents are consumed globally. At any rate, according to the CDN provider Cloudflare, while bandwidth costs (compounded over transit prices and peering prices) dropped around the world, South Korea stood as the only country in which the prices were rising due to the reduced competition and the high unit price set by the government (figure 7).[35]

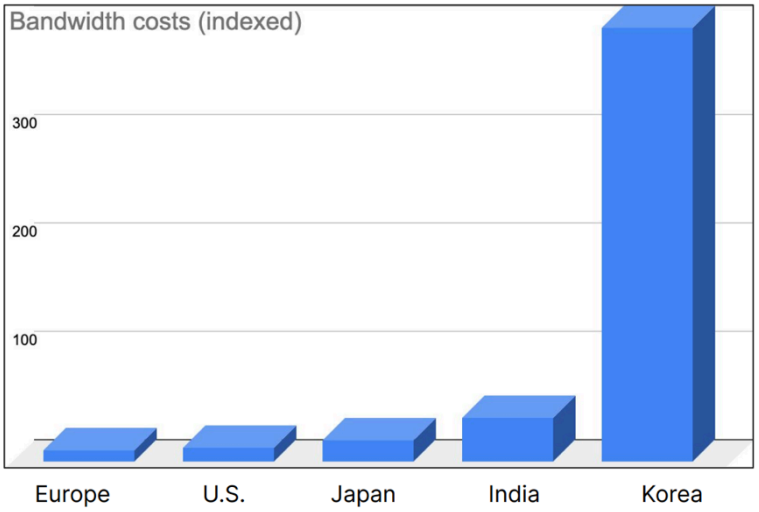

Figure 7 Cloudflare, November 2021, available at https://opennet.or.kr/wp-content/uploads/2021/11/Alissa-Starzak_Cloudflare.pdf

Cloudflare, delivering traffic from many websites to many countries around the world, could not afford to peer with big 3 Korean CSPs and therefore was forced to drop the data in nearby hubs from which the big 3 Korean CSPs pick up through leased cables or Tier CSPs. As a result, the latency in 2019-20 in South Korea was the worst among the OECD countries (figure 8).

[35] Nitin Rao, "Bandwidth Costs Around the World", 17 Aug 2016 by. Available at: https://blog.cloudflare.com/bandwidthcostsaroundtheworld/

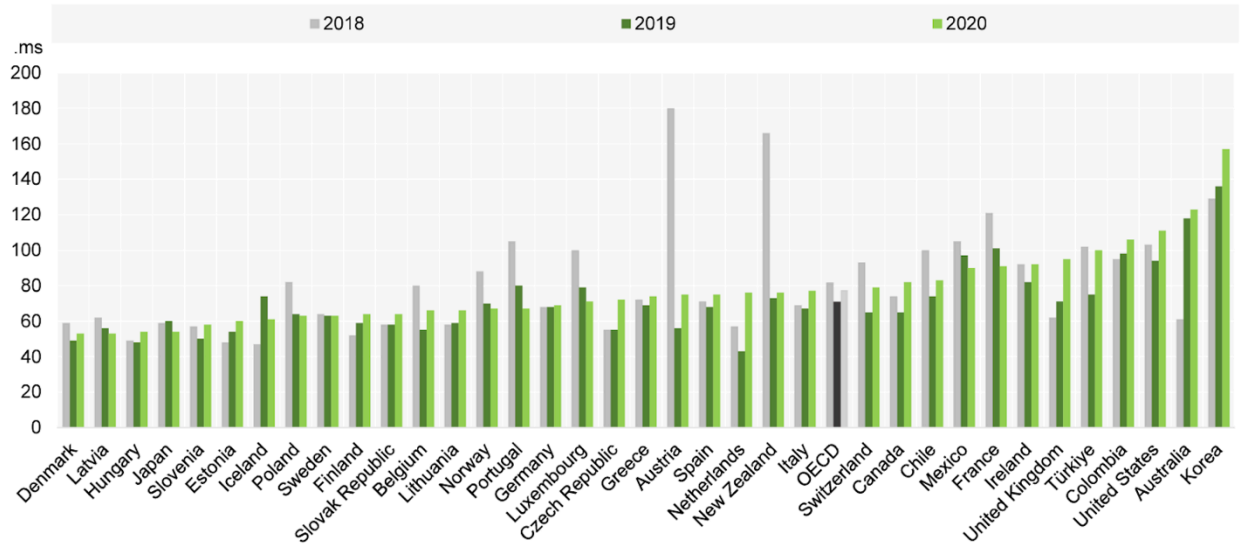

Figure 8 BROADBAND NETWORKS OF THE FUTURE, OECD DIGITAL ECONOMY PAPERS, July 2022 No. 327, page 50

Game platforms or video platforms cannot afford to endure such latency. The world's most popular game platform Twitch withdrew from the Korea market (i.e., stopped peering with the big three CSPs) in late 2022, citing "network fees 10 times more expensive in Korea than in most other countries".[36]

The big 3 CSPs then began to shift the financial burden of the sender payment under the 2016 rule to the big techs with whom they peered settlement-free. The previous peering relationship was a win-win because, if CSPs do not peer with the big techs, they must receive the traffic through the higher tier CSPs and have to pay more for their own transit. The big techs also could save on their transit fees in the US where their main servers are located and satisfy their users with the no-latency access.

Since the rule change in 2016, the big 3 CSPs were incentivized to stop peering with the big techs because the CSP peering with a big tech had to keep sending traffic to other CSPs so that the data reach the other CSPs' customers who desire to access the big tech's contents. In 2017, KT began demanding compensation from Facebook because, as KT was hosting Facebook's cache server to peer, much traffic traveled to other big CSPs, especially the market leader, the SK group, resulting in huge amounts of money to be settled with the SK group. Facebook, instead of paying KT, decided not to peer with KT for the traffic headed toward SKT and dropped off the traffic in Hong Kong and Tokyo where Korean CSPs could pick it up through private leased lines or higher tier ISPs. As a result, the SK group's customers suffered substantial latency in using Facebook. The country's telecom regulator Korean Communications Commissions tried to fine Facebook for acting "against the consumers' interest" but the Korean courts cancelled the penalty, stating that data transportation is the CSPs' responsibility.[37]

Also, in 2018, SK Broadband began to demand money from the previously settlement-free peering partner, Netflix. Netflix filed a suit against SK Broadband, seeking a declaratory judgment that they do not owe money to SK Broadband. The lower-level court ruled against Netflix, stating that network connection is not for free but also that Netflix may

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[36] AP News, "Twitch says it's withdrawing from the South Korean market over expensive network fees", December 6, 2023, available at https://apnews.com/article/south-korea-twitch-network-fees-fcbd14738fcdc911069f82f76cb62afa

[37] Joongang Daily, "Seoul Court Cancels Facebook Fine", August 22, 2019, available at: https://koreajoongangdaily.joins.com/2019/08/22/industry/Seoul-court-cancels-Facebook-fine/3067104.html

be able to compensate SK Broadband in kind by providing cache servers, branded as "Open Connect Appliances" or OCA.[38] The implication is that SK Broadband can save money by getting the data from the in-country cache servers offered by Netflix.

The big 3 CSPs also began lobbying for a law directly obligating all VASs to pay 'network usage fee'. As the unprecedented term is used, domestic VASs are deemed already paying the fees since they are already paying transit fees to receive internet access from the big 3 CSPs. So are the SME overseas VASs or their CDNs since they are in a paid peering relationship with the big 3 CSPs. The law is targeted at the big techs that were originally welcomed into the big 3 CSPs' data centers free of charge. The bill failed to pass after Open Net, a local digital rights organization, ran a petition drive for net neutrality that attracted about 280 thousand signatures in October 2022.[39]

A4 Profit

In the meantime, the operating profit of the big 3 CSPs increased substantially from KRW 674.8 billion in 2015 to KRW 868 billion in 2022(figure 9).

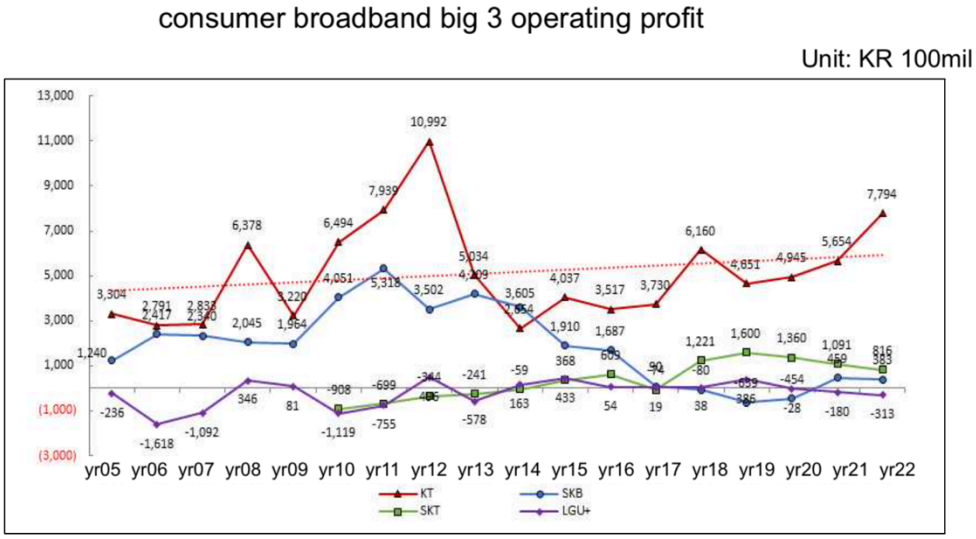

Figure 9 Operating Profit of big 3 ISPs (wired broadband), 2023 KISDI Telecommunication Market Competition Report, Page 232

The self-reported rate of profit does not seem to be too high at 10% in 2022 (figure 10) but the critiques argue that the operating profit is reduced by the generous accounting rule of depreciation of the network assets, and that if EBIDTA margins is compared, Korean companies' profit rates are either higher or at least equal to the profit rates of AT&T or Verizon (figure 11).[40]

[38] Chambers & Partners, "Korean court ruling over a network usage fee dispute between Netflix and SK Broadband. ", July 4, 2021, available at: https://chambers.com/articles/korean-court-ruling-over-a-network-usage-fee-dispute-between-netflix-and-sk-broadband

[39] See www.opennetkorea.org

[40] Mediaus, "Korean mobile carriers' profit rates are really lowest in the world?" August 24, 2017, available at https://www.mediaus.co.kr/news/articleView.html?idxno=100045

mobile big3 operating profit rate

	yr13	yr14	yr15	yr16	yr17	yr18	yr19	yr20	yr21	yr22
operating profit (KRW Trillion)	2.95	2.09	3.03	3.86	3.64	2.83	0.33	1.91	1.64	2.69
operating profit rate (%) = operating profit/ revenue	11.0	7.7	11.3	14.5	14.8	12.1	1.4	8.0	6.4	10.1

Figure 10 Self-reported Operating Profit Rate of big 3 CSPs, 2023 KISDI Telecommunication Market Competition Report, Page 145. Although the table says "mobile big 3", it refers to the overall operation including wireless and wired. The big 3 wired CSPs are identical with the big 3 wireless CSPs.

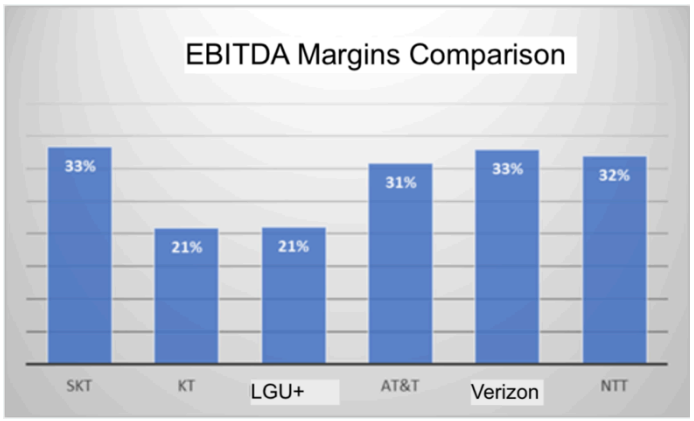

Figure 11 EBITDA margins of Korea-US CSPs, available at Mediaus, "Korean mobile carriers' profit rates are really lowest in the world?" August 24, 2017, available at https://www.mediaus.co.kr/news/articleView.html?idxno=100045

The big 3 CSPs distribute dividends on the publicly held shares at a much higher rate than the average and have steadily increased since the sender pay rule has been instituted. The rates such as 6.8, 5.5, and 5.5 for instance in 2022 (figure 12)[41] are much higher than the market average of 2.72%.[42]

Mobile Big 3 Annual Dividends Yield (단위 : %)

Year	2018년	2019년	2020년	2021년	2022년
SK	3.6	3.7	4.1	5.7	6.8
KT	3.6	4.0	5.3	5.9	5.5
LGU+	2.3	2.8	3.7	3.9	5.5

Figure 12Big 3 Mobile Carriers' Yearly Dividend Yield, available at News 1, "Public company dividends highest in 5 years, restoring value to shareholder", April 17, 2024, https://www.news1.kr/finance/general-stock/5387608

A5 Network Investment

The CSP's incentive to invest in the network becomes weaker under a market that allows paid prioritization because an increase in the network capacity reduces the relative value of prioritized contents, which the Korean economists call "rent extraction effect".[43] The sender pay rule instituted among CSPs in 2016 have created the price increase which ended

[41] Sisa Journal, "SKT, KT, LGU+ upping dividend expectations, holding stock prices", November 1, 2023, available at: https://www.sisajournal-e.com/news/articleView.html?idxno=304735
[42] News 1, "Public company dividends highest in 5 years, restoring value to shareholder", April 17, 2024, available at: https://www.news1.kr/finance/general-stock/5387608
[43] Jeong-Yoo Kim, Seung J. Noh, "Reexamining Net Neutrality in a Queuing Model", Journal of Korean Society of Industrial and Systems Engineering Vol. 47, No. 3 : 1-7, September 2024 https://doi.org/10.11627/jksie.2024.47.3.001

up prioritizing the contents willing to pay the delivery prices, and the big 3 CSPs lagged behind in network investment, not just last-mile but also upstream.

In 2018, the big 3 CSPs each bought a license for 28 GHz frequencies to build 5G networks, but they failed to meet the rollout targets. By May 2023, the South Korean government cancelled licenses.[44]

Also, the consumer broadband was tested in the third quarter of 2023 by an independent firm and showed that Korean networks were placed 26th in the world.[45] The country's standing has continuously dropped from 2nd place in 2019 to 4th in 2020 and 7th in 2021. The country's ICT promotion agency, the National Information Society Agency's report in August 2022 also showed Korea's high-speed internet speed marked 210.72 Mbps then, ranking 19th in the world. What is more important, the big 3 CSPs are not providing the sufficient upstream capacity for the whole country. South Korea is already surrounded by sea or an enemy on all four sides, and the subsea cable is a very important element of the country's internet strategy. However, the country is prominently isolated in the topography of the global subsea network (figure 14)[46] for a reason (in fact, the vertiginously high transit fees in Korea are the product of not only the 2016 sender pay rule but also of the isolation.) The reason is that the big 3 CSPs have for decades refused to participate in a neutral internet exchange point (IXP), suppressing incentives to land in South Korea for subsea cable operators who always look for "hubs" to maximize their coverage (figure 13).[47]

Public Peering Exchange Points

Filter

Exchange ASN	IPv4 IPv6	Speed RS Peer
AMS-IX 4766	80.249.209.129 2001:7f8:1::a500:4766:1	10G ○
DE-CIX Frankfurt DE-CIX Frankfurt Peering LAN 4766	80.81.192.170 2001:7f8::129e:0:1	10G ○
Equinix Los Angeles 4766	206.223.123.44 2001:504:0:3::4766:1	20G ○
Equinix Palo Alto 4766	198.32.176.102 2001:504:d::66	20G ○
LINX LON1 Main 4766	195.66.224.147 2001:7f8:4::129e:1	10G ○
NYIIX 4766	198.32.160.49 2001:504:1::a500:4766:1	20G ○
SIX Seattle MTU 1500 4766	206.81.80.131 2001:504:16::129e	30G ○

Private Peering Facilities

Filter

Facility ASN	Country City
Equinix Los Angeles (LA1) 4766	United States of America Los Angeles
Equinix Palo Alto (SV8) 4766	United States of America Palo Alto
Equinix Seattle (SE2/SE3) 4766	United States of America Seattle
Equinix Singapore (SG1) 4766	Singapore Singapore
Flexential - Portland/Hillsboro 2 (PDX02) 4766	United States of America Hillsboro
HKCOLO - Sino Favour Centre 4766	Hong Kong Hong Kong
MEGA-i (iAdvantage Hong Kong) 4766	Hong Kong Hong Kong

[44] Telecoms.com, "South Korea cancels SKT's 28 GHz 5G licence", May 25, 2023, available at: https://www.telecoms.com/5g-6g/south-korea-cancels-skt-s-28-ghz-5g-licence

[45] Korea Times, "Korea's internet speed ranking falls to 34th: report", January 4, 2023, available at: https://www.koreatimes.co.kr/www/tech/2024/11/129_342912.html

[46] See Winston Qiu, 'Complete List of Google's Subsea Cable Investments', Submarine Cable Networks: Insights, 9 July 2019, www.submarinenetworks.com/en/nv/insights/complete-list-of-google-s-subsea-cable-investments (accessed 13 April 2025). For all subsea cables, compare the number of international subsea cables connected to South Korea to those connected to other countries in www.submarinecablemap.com (accessed 13 April 2025)

[47] KT, one of the big three, has joined no IXP in Korea. The situation is similar for the two other big 3s. Available at www.peeringdb.com/net/23(accessed13April2025).

Figure 13 List of peering exchange points (IXPs) that KT, one of the big three, has joined. Available at www.peeringdb.com/net/23(accessed13April2025). Note that there is none in Korea. The situation is similar for the two other big 3s.

As a result, "[t]here is a conjecture that new submarine cable projects such as Google's Apricot, Facebook's Echo as well as Bitfrost will no longer land in Korea for these reasons."[48]

Figure 14 A map of Google subsea cables, 2021. Note there are only 2 cables landing in Korea.

The topographical isolation increases the transit fees that Korean CSPs pay to the higher tier CSPs, which in turn puts an upward pressure on the transit fees that they themselves charge on the domestic VASs. As they then try to extract peering fees at comparable rates from foreign VASs, less and less foreign VASs will have incentives to install points of presence in South Korea, further reducing the possibility of subsea cables landing, completing a full vicious cycle.[49] Also, as their contents are served in Korea through leased lines or Tier 1 CSPs, Korean CSPs will have to bear the cost of lease or transit. Even if any of the big 3 CSPs want to build themselves, the lack of central marketplace where all networks exchange traffic will be a negative factor.

The South Korean experience with the sender pay rule of 2016 essentially made the network resources scarcer within the country by making the network operators more reluctant to host the heavy senders, directly stifling innovation, and incentivizing the network operators to maximize their profit by investing less on building out the network upward and last-mile. The same thing can happen in Brazil where the market is not very much concentrated. VASs charged the sender pay will intentionally degrade their services to suppress the data traffic sent into Brazilian CSPs.

More and more foreign or domestic VASs relevant to Brazil will establish their presence not in Brazil but offshore, increasing the cost of Brazilian CSPs bringing the contents home, who then will try to recoup from whichever VAS has stayed in Brazil, to the point of hampering their innovation. More and more Brazilian digital talent will leave the country, seeking a more friendly network environment. In the meantime, CSPs now given the legal possibility for more exploitation of their incumbent position will be focused on maximizing their profit by making the bandwidth scarcer and increasing the demand for

[48] Karl-Heinz Neumann, et al., "Competitive conditions on transit and peering markets: Implications for European digital sovereignty", WIK-Consult, February 28, 2022, page 37.
[49] See Michael Kende, David Abecassis, "IP interconnection on the internet: a white paper", May 21, 2020 for a fully analysis.

receiving traffic, i.e., increasing the number of their customers who will pull the traffic from the paying VASs and generate more “network usage fees” to be billed to the senders.

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