

Fair share for network sustainability

A necessary condition to meet European Digital Decade goals



Digital Public Policy, Regulation and Competition – Position Paper

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Executive summary

The Digital Decade gives Europe an important opportunity to gain digital leadership

In 2021, the European Commission presented the European Digital Decade 2030, a vision of a human-centric and sustainable digital society to empower citizens and businesses. The telecom sector is ready to deliver the digital infrastructures Europe needs. Aligned with policymakers, the sector shares a commitment to unlock the full potential to maximize its contribution to achieving the goals of the Digital Decade. But to do so, the industry needs policies that create the right environment for the sustainability of network investment, policies that foster a more balanced digital ecosystem.

Why is the EU telecom sector calling for a fair share for network sustainability now?

European telecoms face significant investments to increase the capacity of national broadband networks and to meet the digital objectives for Europe settled by the European Commission and fully supported by the telecom industry. However, several challenges threaten the ability of telecom operators to keep pace with the investments needed to address traffic demand and to meet these targets: 1) the financial situation of the EU telecom sector has been weakening over the last decade; 2) the high market competitiveness, due to regulation focused on reducing prices, limits the operators' ability to recover increasing costs; 3) the bargaining power asymmetries in the digital ecosystem have grown in recent years, limiting telcos' ability to charge for services provided to large traffic originators.

The EU telecom sector paradox in a global data market: a source of concern

While telecom revenues are declining, Internet traffic is expanding rapidly, by 35% per year and more than 50% for mobile data. Only six large global digital platforms drive this growth, generating more than half of the total Internet traffic. This translates into higher costs for EU network operators that cannot be recovered, as revenues remain unchanged. Decoupling traffic from revenues reflect the industry's difficulty in monetizing new investments required to address increasing demand. As a result, many European operators now have returns on investment below their cost of capital. Under these conditions, the telecom sector faces increasing challenges in maintaining the pace of investment and the sustainability of the EU digital ecosystem, which relies on it.



A concern heightened by huge asymmetries in bargaining power in the digital ecosystem

On the Internet, exploiting both sides of the market is a standard practice (e.g., app developers and end customers; advertisers and end customers). However, the telco sector operates, so far, only in one-sided markets getting payments for the use of the networks only from end customers and not from large traffic originators or content providers. Today, operators' sole means of recovering their network investments are declining revenues from broadband connectivity and other end-customer services. In contrast, digital platforms generate revenues both from end-users (e.g., through subscription fees) and service providers (e.g., through advertising revenues or platform usage fees). Other players in the Internet value chain, in particular telecoms, become increasingly vulnerable to unilateral decisions by large digital platforms in the negotiation of contractual terms. Network operators are today unable to agree with large traffic originators on fair and reasonable conditions for the traffic conveyance service.

Time is now for a legislative proposal addressing bargaining power asymmetries in the digital ecosystem. Otherwise, the Digital Compass targets will not be reached by 2030 nor beyond

The objectives of such regulation should be to remedy the asymmetric bargaining power between large traffic originators (LTOs) and network operators, like other legislations such as the Digital Markets Act that imposes obligations upon identified gatekeepers, to promote investment and end-user benefits. It should ensure that large traffic originators pay a fair and reasonable price for the services provided to them incentivising them to deliver the traffic in a more efficient way. The legislation should guarantee that LTOs exceeding a certain traffic threshold, negotiate fair conditions for the traffic conveyance service provided by telecom operators; and propose a dispute resolution mechanism in case that agreements are not reached on commercial terms, managed by a competent authority, whose decision is binding on both parties. To this end, the European Commission should adopt a regulation and, if deemed necessary, provide further guidance for the dispute resolution process. A sanction regime shall also be developed for the cases of infringement.

Net neutrality & fair share: a well-matched couple

The fair share proposal is fully compliant with net neutrality obligations. The purpose of the operators is to strengthen the sustainability of network investments addressing increased traffic demand from large traffic originators (LTOs). Fair share payments do not involve anyhow a differentiated traffic management or unequal treatment of LTOs traffic. It is fully abiding with Open Internet Regulation and aligned with Net Neutrality principles.



01

Why is the telecom sector calling for a fair share now?

In 2021, the European Commission presented the European Digital Decade 2030, a vision of a human-centric and sustainable digital society to empower citizens and businesses. Aligned with policy makers, the sector shares a commitment to unlock the full potential to maximize its contribution

to achieving the goals of the Digital Decade. But to do so, the industry needs policies that create the right environment for the sustainability of network investment, policies that foster a more balanced digital ecosystem.

The telecom sector paradox in a data market

In this context, on July 18, 2022, European and national associations¹ representing companies bringing ultrafast digital connectivity in all Member States, released a [joint statement](#), in which they expressed their strong commitment to meeting the goals of the European Digital Decade 2030, including the roll out of “gigabit connectivity for all and 5G everywhere by 2030.” However, they also stressed the need for this responsibility “to be shared collectively by the entire digital ecosystem”.

Concretely, they called for European policy “to help ensure that big tech companies contribute their fair share to growing the EU Internet ecosystem, especially in the context of continuous data traffic increases”. In line with this position, in September 2022, the CEOs of Europe’s leading telecom operators have [called](#) on EU authorities for a strong

legislative initiative to effectively address the issue.

These statements reflect a growing underlying concern in the European telecommunications sector about its ability to maintain the pace of investment over the long term and thus the sustainability of the European digital ecosystem under current conditions.

The sector is facing a paradox. While data traffic is growing rapidly (at a compound annual rate CAGR of 35% in 2011-2022 and above 50% for mobile data), operators’ revenues are declining (at a -3% CAGR) (see Figure 1). This decoupled trend shows the telecom industry’s difficulty in monetizing new investments required to address increasing demand, which is critical, especially in Europe.

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Figure 1: Decoupled revenues from traffic growth put pressure on margins:
Internet traffic is rapidly increasing while telecom revenues decrease



Source: Telefonica based on Analysys Mason Datahub (Data retrieved October 11-2022)

NOTE: fixed and mobile revenues for UK and EU24 (excl. Cyprus, Malta and Luxembourg) Mobile Data traffic for US and EU24 Member States (excl. Cyprus, Malta and Luxembourg); Fixed data traffic for: Austria; Finland; France; Germany; Ireland; Italy; Spain; Sweden; UK; Poland; Romania

This is of particular concern. While traditional European telecom services have been under deflationary pressure during the last 10 years², the digital ecosystem has been transformed into a data market. A data market that has been supported by the continued telecoms' investments efforts to expand network capacity, coverage, and ensure

quality of service. And the pace of investment is critical to continue supporting the digital era ahead. By way of example, even a modest use of the metaverse could drive a further 37% CAGR over the next decade, to a 20-fold increase in current data usage³.

Bargaining power asymmetries in the digital ecosystem

The good news that a growth forecast of this magnitude, with the consequent network upgrades, would bring to any market, is overshadowed by the fact that only telecommunications operators are bearing the cost of the necessary investments, in an increasingly unsustainable market. Operators receive revenues from broadband connectivity and other services to end customer, i.e., from just one side of the market where this unique source of revenue is declining, while the other side of the market, large traffic originators or content providers, benefiting from networks do not contribute to the service received. As a result, many European operators now have returns on investment below their cost of capital, jeopardising future investments. And telecom markets high fragmentation in European member states is further weakening operators' investment capabilities⁴.

In contrast, global digital platforms (over-the-top or OTTs) based on data-driven business models and not being in charge for investing in networks to cope with increasing traffic demands, benefit from operating in two-sided markets. OTTs enjoy a dual source of revenue from users (i.e. in the form of subscription fees, premium services, massive data collection etc.); and service providers (e.g., through advertising revenues or platform usage fees).

Furthermore, they leverage their market power in one side of the market (supply side) to extend their services to retail markets, adjacent to the original ones (e.g., free digital communication services). New competitive dynamics are further narrowing the traditional telecommunications revenue field in an unlevel-playing-field.

This market imbalance is leading to worrying asymmetries related to traffic flows, (market and bargaining) power and value creation. According to [Axon⁵](#), only a small number of large digital platforms, i.e. only six, are responsible for more than half (57%) of the data traffic flowing over the Internet, of which video streaming, social networks and gaming already account for more than 70% of Internet traffic. This is increasing high-bandwidth data traffic on which the revenue generation of large traffic originators is based. An investment pressure that [Frontier⁶](#) estimates at between 36 and 40 billion euros additional per year, understood as the total network costs that operators incur to deliver this fixed and mobile traffic attributable to these OTT in Europe, for which these large data traffic originators do not bear any cost.

This situation is backing large traffic originators' dominant positions and increasing their bargaining power, without advantaging users, while the EU Digital Declaration calls for adequate frameworks so that all market actors benefiting from the digital transformation assume their social responsibilities for the benefit of all Europeans.

This is leading to an unbalanced distribution of the value created by the digital ecosystem. As analysed by [GSMA and Kearney⁷](#), in 2020 online service providers account for almost 60% of the total revenue created by the Internet value chain, while telecom operators account for only 15%. Large traffic originators generate the highest value, in contrast to the relatively low value collected by telecom operators (see figure 2).

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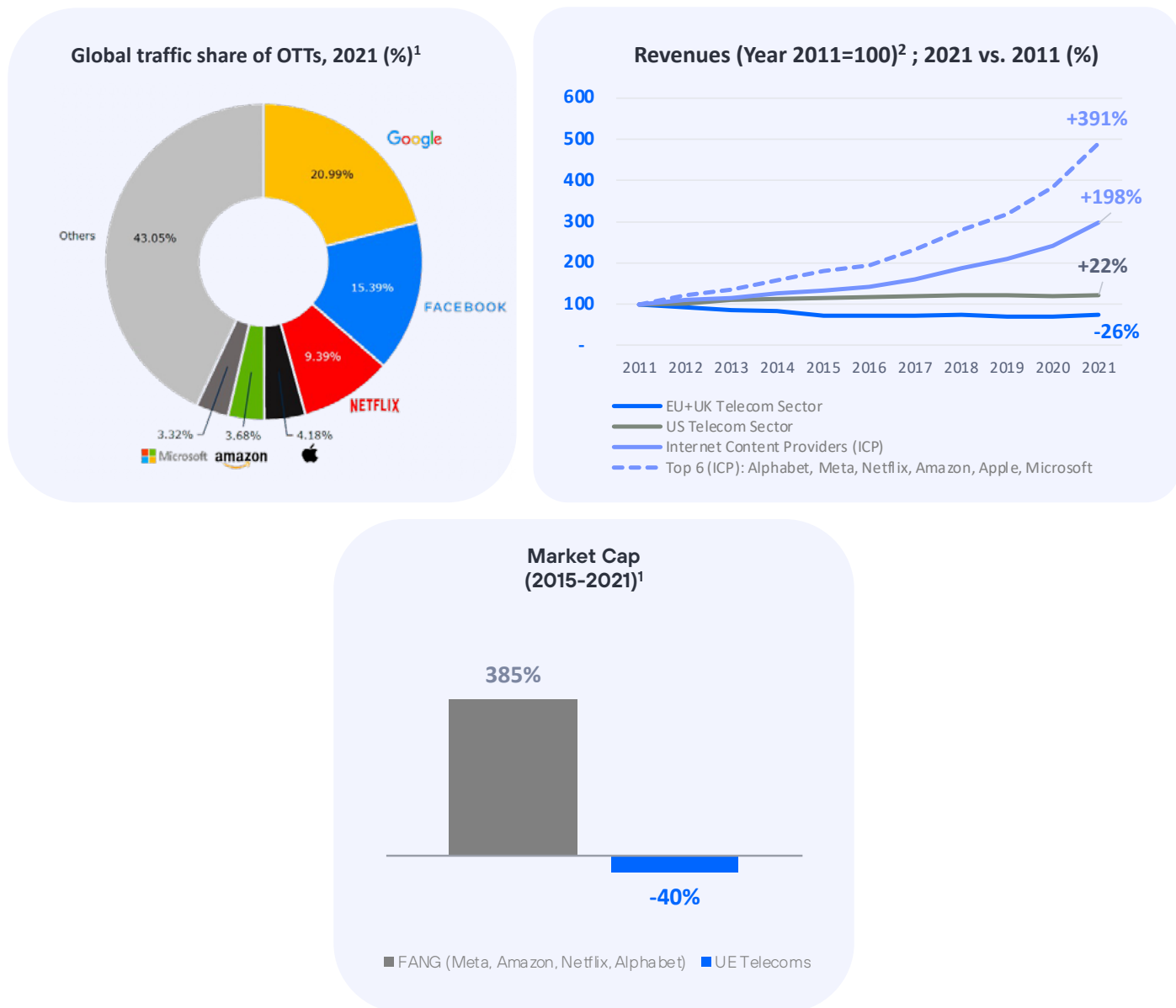
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Net neutrality & fair share: a well-matched couple

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The fair contribution: not only a European debate

Figure 2: Declining revenues in the European telecommunications sector and the imbalance in the distribution of value call into question the sustainability of network investments



Source: 1) Telefónica based on Axon, 2022; 2) Telefónica based on Omdia, "Communications Provider Revenue and Capex Tracker – 1Q22". Released August 2022.

As the internet value chain, [the internet architecture has evolved](#)⁸, increasing the bargaining power of a few companies.

Despite the shift, Internet traffic interconnection models that were established between Internet Service Providers with balanced traffic patterns, are still based on agreements made in the 1990s,

on a hierarchical internet architecture that bears little resemblance to today's. The construction of the Internet was initially based on symmetrical data traffic exchange among equal peers. Internet Service Providers at the same level exchanged data by applying compensation mechanisms. And if they were not at the same level, the lower-

level networks paid to the upper tier-level transit providers for the transport of their data, according to the amount of traffic exchanged.

This is not the case anymore, as new video content led to increased need of capacity and triggered the introduction of CDNs (Content Delivery Networks) flattening Internet topology. This was followed by big platforms creating their own international transit networks and CDN services, exacerbating the flattening of Internet interconnection, avoiding internet transit, and imposing a free peering profiting of their unbalanced bargaining power.

These companies became a new "category" not initially envisaged in the Internet interconnection model: they ceased to be Internet users and became special operators with no access network

or national backbone, but with an unrestricted market power, forcing free peering. The latter is a payment mechanism established for parties with similar traffic requirements (i.e. symmetrical traffic flows) and similar network costs, favouring carrying traffic for free. However, large traffic originators produce asymmetric traffic flows and enjoy a different cost structure, without access or national backbone networks.

The evolution of the digital ecosystem is backing dominant positions in the data market and asymmetries in bargaining power. Players in the Internet value chain, including telecoms, increase their vulnerability to possible unilateral decisions in the negotiation of contractual terms by large traffic originators.

The need to address market asymmetries to meet the EU investment challenge

As a time where the European Digital Decade 2030 target that all European households are covered by a Gigabit network by 2030, and all populated areas covered by 5G and 10,000 edges nodes built and available, investments in connectivity infrastructure become crucial. However, Europe departs with an investment deficit estimated of 300 billion euro to upgrade fixed infrastructure to gigabit speeds and to a full 5G deployment⁹.

Several challenges threaten the ability of telecom operators to keep pace with investments to

address traffic demand and to meet targets: 1) the financial situation of the EU telecom sector has been weakening over the last decade (see Figure 3); 2) the high market competitiveness, due to regulation focused on reducing prices, limits the operators' ability to recover increasing costs; 3) the bargaining power asymmetries in the digital ecosystem have grown in recent years, limiting telcos' ability to charge for services provided to large traffic originators.

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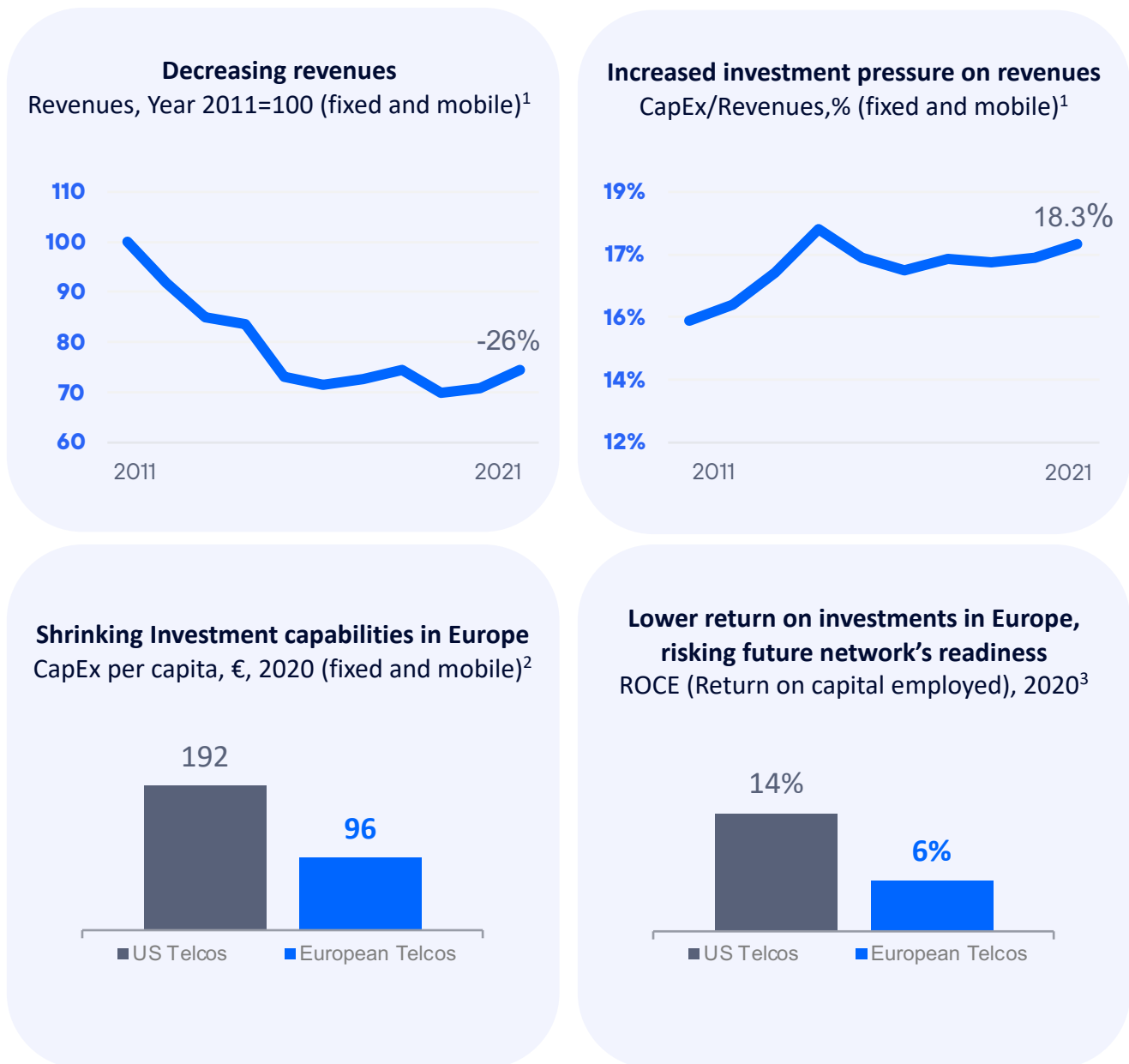
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Figure 3: The financial situation of the European telecommunications sectors, which is key to meeting the investment challenge, is deteriorating



Sources:

1) Telefónica based on Omdia, "Communications Provider Revenue and Capex Tracker - 1Q22". Released August 2022.

2) ETNO, "The State of Digital Communications 2022". February 2022. <https://etno.eu/library/reports/104-state-of-digi-2022.html>

3) Major Telcos in France, UK, Germany, Belgium, Spain, Italy, The Netherlands, Sweden. JP Morgan, 2020.

To boost investments in Europe and meet the connectivity goals, market imbalances must now be addressed. As GSMA states¹⁰:

“All segments of the internet ecosystem should have the opportunity to make fair returns in a competitive marketplace. Industry leaders, stakeholders and policymakers need to engage in dialogue where this is not the case, to ensure that regulatory asymmetry, market distortions or other factors do not limit this ability, and that the right incentives for digital infrastructure investment are in place to support the long-term growth of the ecosystem. Different approaches may be appropriate in different markets to address any market imbalances; however, the ultimate goal is nevertheless the same: to deliver and sustain digital connectivity – for everyone – for decades to come”.

Commissioner for Internal Market, Thierry Breton, positions “only a resilient EU infrastructure – based on sustainable business model – can bring all Europeans into the #DigitalDecade”²². Telecom operators will only undertake investments if they receive fair and proportionate returns on investments.

Under the current one-sided market model, without the possibility of recovering costs from the wholesale

side due to bargaining power asymmetries, the only way to increase revenues would require higher payments from end customers. However, the fairest option would be for agents that benefit from the growth in connectivity and traffic to contribute to the economic sustainability of network deployments. That is, to make large traffic originators responsible for the costs injected into telecommunications networks for their large volume of traffic by paying for the service received from operators. This would give operators access to new sources of revenue, while encouraging collective responsibility.

Hence, a regulatory solution is needed to rebalance the unfair bargaining power asymmetry, ensuring that large data traffic originators pay a fair and reasonable price for the traffic conveyance service received from telecom operators so that traffic costs are not decoupled from revenues for network operators.

A European solution, levelling the playing field would also contribute to securing the needed network investments, to ensure that Europe's Digital Compass 2030 connectivity targets are met in time and as such, strengthen Europe's infrastructure as the main driver for its digital (and green) transformation.



02

Which is the proposal of the European telecom sector?

The telecom sector shares the vision and goals to provide the digital infrastructures that will make Europe move forward. However, it needs policies that promote a balanced digital ecosystem to ensure the sustainability of network investments.

The relationship of network operators with large digital platforms shows a bargaining power imbalance. And despite this reality, there are indications of authorities, having been more

focused on the conduct of operators than of content providers. As indicated below, the fair share proposal is fully compliant with net neutrality rules and an individual operator cannot credibly consider the possibility of not carrying the contents of a digital platform if no payment is agreed. In a competitive market it would be unbearable in terms of reputation, customer switching and revenues.

Telefónica believes that time is critical for a new legislative proposal

The objectives of such regulation should be to remedy the asymmetric bargaining power between large traffic originators (LTOs) and network operators, to promote investment and end-user benefits, like other legislations such as the Digital Market Acts that imposes obligations upon identified gatekeepers. The aim is ensuring that large traffic originators to pay a fair and reasonable price for the services provided to them and to incentivise them to deliver the traffic in a more efficient way. Otherwise, the Digital Compass targets will not be reached by 2030 nor beyond.

This is consistent with the EU Digital Declaration's call¹² for:

"... adequate frameworks so that all market actors benefiting from the digital transformation assume their social responsibilities and make a fair and proportionate contribution to the costs of public goods, services and infrastructures, for the benefit of all Europeans".

In concrete, it is necessary a legislation at European

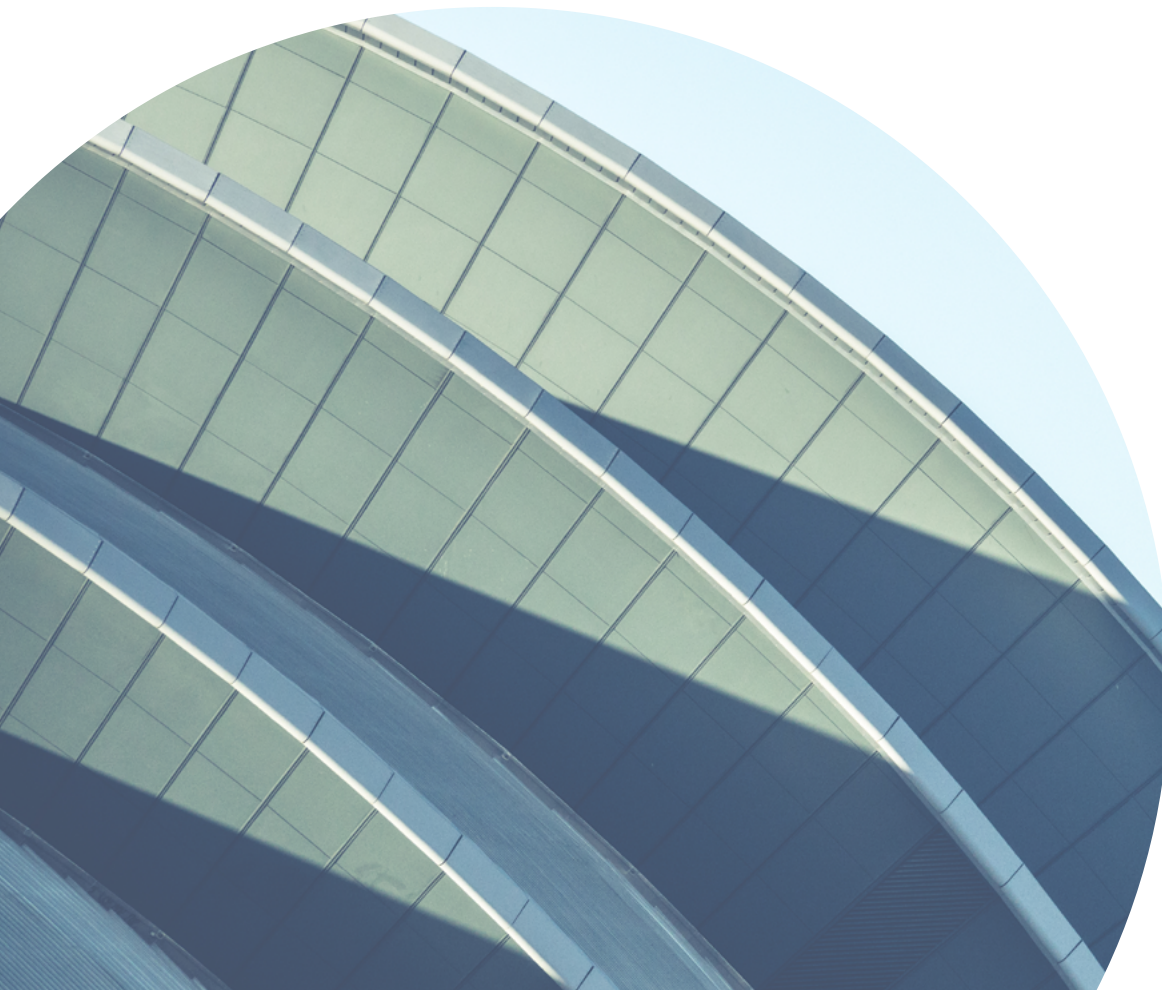
level that implements a right for providers of public electronic communication networks to demand large traffic originators to negotiate and conclude commercial agreements, including a fair and reasonable price, for the delivery of their traffic through the networks of operators to end users. And large data traffic originators should have the obligation to attend the request of negotiation. LTOs and network operators should negotiate in good faith to reach mutual agreement.

Only large traffic originators should be subject to the obligation, i.e., a company that originates and delivers IP traffic to end users and exceed a certain threshold (e.g., 5% of network operator bandwidth at a peak hour). Intermediaries, such as commercial Content Delivery Networks (CDNs), international carriers, etc., should not be subject to the obligation. However, traffic conveyed via such intermediaries should be considered towards the calculation of the applicable threshold to the large traffic originators.

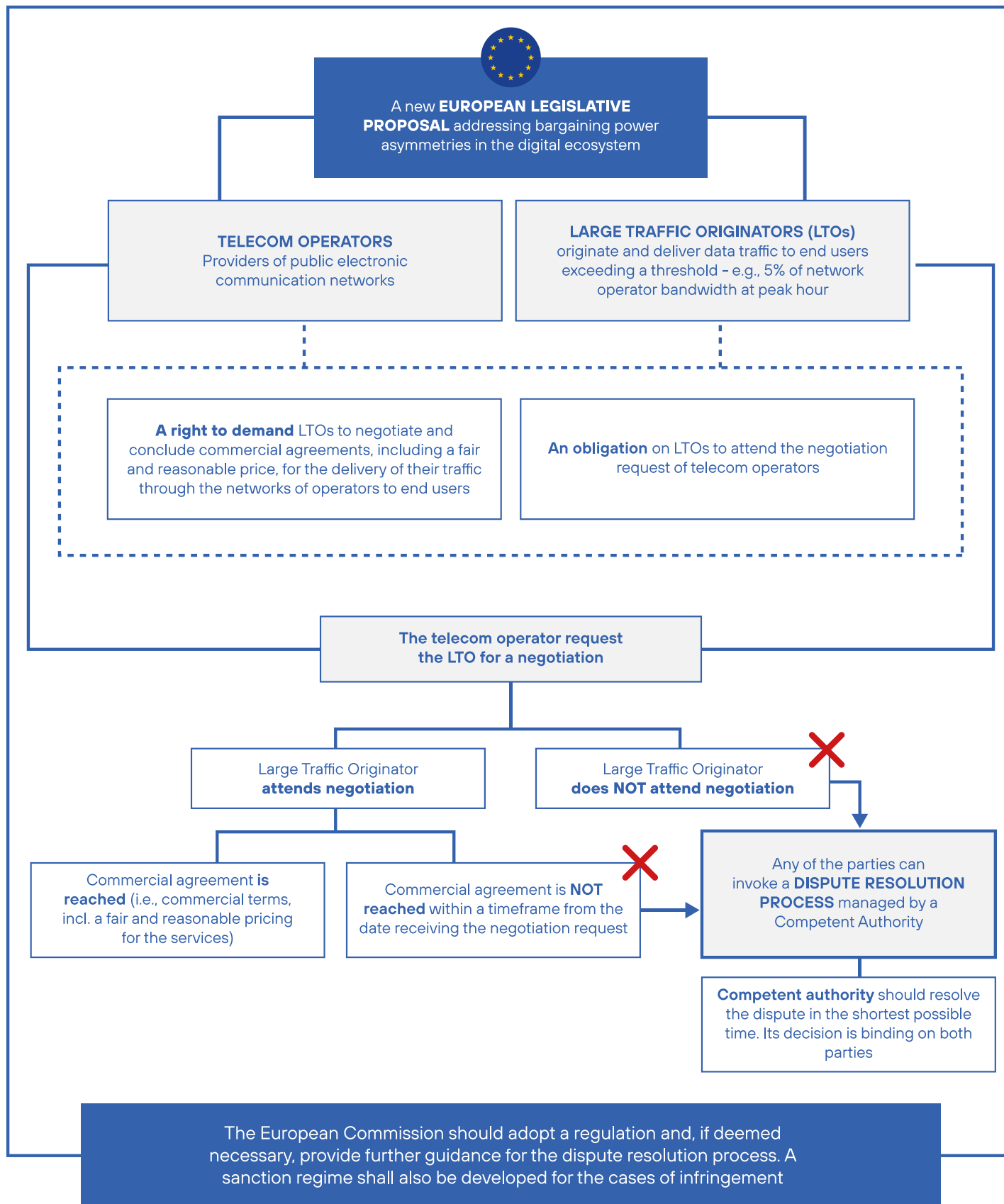
In case the request to negotiate is not attended or an agreement is not reached within a timeframe from the date receiving the negotiation request, any of the parties could invoke a dispute resolution process. The dispute resolution process should be managed by a Competent Authority.

The authority should resolve the dispute in the

shortest possible time and its decision is binding on both parties. To this end, the European Commission should adopt a regulation and, if deemed necessary, provide further guidance for the dispute resolution process. A sanction regime shall also be developed for the cases of infringement.



FAIR SHARE FOR NETWORK SUSTAINABILITY: THE PROPOSAL OF THE TELECOM SECTOR FOR EUROPE



03

Net neutrality & fair share: a well-matched couple

The fair share proposal is fully compliant with net neutrality obligations and does not offer unequal treatment to data traffic of large content providers. Operators are committed to a truly open Internet. An open Internet that allows all players in the Internet value chain to offer the best services to users, and where no player holds and exploits its bargaining power preventing an end-to-end open Internet: digital neutrality in practice, protected by market competition or enforced where required.

Some companies are claiming that the operators' call for a new policy on a fair share for network sustainability would undermine net neutrality and the ability of consumers "to enjoy all lawful content and applications available on the internet". Yet, the operators' proposal does not, in any way, threaten or challenge the regulation and principles of net neutrality. On the contrary, [Net Neutrality and Fair Share are a well-matched couple](#)¹³.

The net neutrality rules aim to protect end-users' rights to access and deliver information, content, services and apps of their choice by securing the operators equal treatment of traffic, where discriminatory approaches, blocking or throttling content are not allowed.

And while the Open Internet Access Regulation was adopted in Europe to discard any potential

anti-competitive discriminatory behaviour on the part of operators, the policy may be having the unintended consequences of widening the imbalance of bargaining power with internet big platforms, restricting the flexibility to reach agreements to limit their demand on network capacity or the flexibility of the operators to offer new proposals to end-users.

But that said, how could a fair and proportionate contribution from large data originators to network sustainability, based on traffic, interfere with Open Internet principles? Is a negotiation and a contribution from these stakeholders to network sustainability, in a two-sided market, undermining these principles? Does the principle of "net neutrality" mean that "end users of content are responsible for the cost of their network access, not content providers"?

The aim of the operators' demand is not to offer an unequal treatment of data traffic from these large platforms, but to help sustain the investment in the network caused by the increased traffic from these players. It's about opening the door to a supervised fair retribution model, when one of the negotiating parties, defined as gatekeeper platform in the European Digital Markets Act, enjoys an excessive bargaining power, in an unlevel-playing-field.



04

The fair share contribution: not only a European debate

The debate on fair contributions to network sustainability is not a debate of EU operators against large US content platforms, but a global debate that started in Asia and spread to the US and Europe to sustain network investment and deployment.

The Internet market conditions have changed worldwide and the bargaining power of platforms and large content providers has expanded in recent years. This is preventing a balanced market

negotiation that ensures the sustainability of all participants in the Internet value chain for the benefit of users and it is resulting in a market failure that different regions are trying to address. In Europe, operators welcome the consultation by the European Commission, laying the groundwork for a strong legislative initiative to effectively address the issue, which is urgently needed and support a timely calendar.

Broadband fair share debate in South Korea

The fair share debate raised in 2019 when a South Korea broadband operator demanded network usage fees from a large content provider for carrying data traffic-heavy entertainment service to Korean users¹⁴. After months of unsuccessful attempts at negotiation, the operator filed a complaint with the regulator, requesting negotiation and asking the content provider to bear part of the network costs of its services, which imposed massive traffic and system burdens¹⁵. The operator felt powerless to negotiate a fair solution or even to initiate negotiations. And letting the content provider connect its platform's appliances to the network for free, was not the solution for most data traffic, nor costless for operators (e.g., energy, space, connectivity, intra-network increased data traffic, etc.)

In response, in April 2020, the content provider filed a suit in the Korean District Court seeking confirmation that they were not "obliged to negotiate" network use fees, nor to pay any such fees. The content provider claimed that they didn't use the operator's network and that, "according to

net neutrality principles, content providers are not responsible to pay network costs, but end-users are". The district court decision of June 2021 rejected the arguments from the large content provider on both counts ruling the obligation to negotiate and pay the operator for network usage¹⁶. In particular, the court mentioned that the large content provider was receiving a service of economic value from the operator, which is a separate and independent issue from the operator's contract with end-users.

"Such an arrangement, where a service provider receives payment from parties at both ends of its service, is not uncommon these days (compare credit card companies)" said the court.

The court also alleged that the Korean operator incurred in large expenses to upkeep consistent connectivity for the users, whereas it did not evidently enjoy an offsetting increase in profits. And while the content provider had paid to US operators network fees, the demand from the Korean operator of compensation had been rejected¹⁷. This decision has been appealed and is still on trial.

As a result of this issue, the Korean National Assembly is proposing several bills requiring large content platforms to contribute to network costs countering large platforms market power¹⁸.

"Global content providers generate huge traffic and

earn a high profit using local networks but continue to refuse to pay network fees with great bargaining power in the market," Rep. Jun Hye-sook of the ruling Democratic Party said during a seminar in Seoul (Jan. 2022)

The approach to arbitration in Australia and opening debate in India

In Australia, to address market imbalances, the Australian News Media Bargaining Code (NMBC)¹⁹ is designed to facilitate commercial negotiations by correcting the asymmetry in bargaining power between the digital platforms and third-party news providers. The rules compelling tech digital gatekeepers to pay for news content online allow Australian government-appointed arbitrator to set fees if Big Tech companies and news publishers fail to find a common ground over copyright. Under Australia's binding so-called "final-offer arbitration",

the parties must negotiate in good faith. But if a deal can't be struck between them, they have to present their offers and defer to an arbitrator to choose one. The goal is to encourage tech giants and news publishers to reach an agreement before being compelled to go for this last resort procedure. The Telecom Regulatory Authority of India (Trai) and department of telecommunications are finalising the contours of a new regulatory regime to be applied to social media intermediaries who may have to pay a carriage charge to the telecom service providers²⁰.

The debate on fair contribution in the US

In the US, the fair contribution debate is also further advanced and deep conversations are held about digital equity and fair contributions from large content providers to realise shared connectivity goals. The FCC has signalled an interest on looking ways for big tech companies to help finance the construction and maintenance of telecom networks. In September 2021, FCC Commissioner Brendan Carr[i] outlined a new approach to funding the federal government's efforts to close the digital divide.

"Big Tech has been enjoying a free ride on our Internet infrastructure while skipping out on the billions of dollars in costs needed to maintain and build that network. Indeed, one study shows that the online streaming services provided by just five companies—Netflix, YouTube, Amazon Prime, Disney+ and Microsoft—account for a whopping 75 percent of all traffic on rural broadband networks. The same study shows that 77-94 percent of to-

tal network costs are related to adding capacity or otherwise supporting the delivery of those streaming services. Ordinary Americans, not Big Tech, have been footing the bill for those costs".

He added:

"There is growing global recognition — across Europe, Asia and South America — that Big Tech companies should be required to contribute a fair share to support the networks and digital divide efforts that allow them to realize unprecedented revenues".

And said he was "pleased" that EU and U.S. officials are considering changes that would require major technology companies to contribute a bigger share toward building faster communication networks, since they "benefit tremendously" from the infrastructure and "generate the lion's share of network traffic" in the two regions²².

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² The harmonized index of consumer prices (HICP) of European communications is 29 pp below the general price evolution for the period 2011-2021 (general HICP +14% since 2011; communications HICP -15%), and in contrast to the positive price evolution in other sectors as well (e.g.: transport or electricity HICP have increased by about 15%). Telefonica based on Eurostat, 2022. <https://ec.europa.eu/eurostat/web/main/data/database>

³ Credit Suisse. Metaverse: A guide to the Next-Gen internet. March 2022. <https://www.credit-suisse.com/media/assets/corporate/docs/about-us/media/media-release/2022/03/metaverse-14032022.pdf>

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¹¹ Thierry Breton, Commissioner of Internal Market, European Commission. Twitter: <https://twitter.com/ThierryBreton/status/1579504131001446400>

¹² EU Digital Declaration: <https://ec.europa.eu/newsroom/dae/redirection/document/82703>

¹³ Telefónica. September 2022. <https://www.telefonica.com/en/communication-room/blog/net-neutrality-fair-share-a-well-matched-couple/>

¹⁴ In November 2019 SK Broadband (SKB), a major internet service provider (ISP) and subsidiary of leading mobile carrier SK Telecom, filed for adjudication with the Korea Communications Commission (KCC) against Netflix Services Korea Ltd. and Netflix Inc. (together, Netflix), claiming that Netflix was obligated to negotiate and pay fees to SKB.

¹⁵ SK Broadband said Netflix's traffic on its network rose to 1,200 gigabits per second (Gbps) as of September 2021 from 50 Gbps in May 2018 in an explosive growth amid the popularity of Korean-language drama series, such as "Squid Game."

¹⁶ Korean court ruling over a network usage fee dispute between Netflix and SK Broadband. <https://chambers.com/articles/korean-court-ruling-over-a-network-usage-fee-dispute-between-netflix-and-sk-broadband>

¹⁷ According to Netflix filings with the U.S. Federal Communications Commission in 2014, Netflix was at the time paying terminating access fees to ISPs in the U.S. such as Comcast, AT&T and Verizon, including in a content transmission structure with Comcast that appeared similar to the SKB arrangement.

¹⁸ Korean wireless players up voice for laws to force multinationals to pay higher network fees <https://pulsenews.co.kr/view.php?-year=2022&no=905608>

¹⁹ Australian Competition and Consumer Commission. <https://www.accc.gov.au/focus-areas/digital-platforms/news-media-bargaining-code/news-media-bargaining-code>; Australian Government, Federal Register of Legislation, <https://www.legislation.gov.au/Details/C2021A00021>; SSRN, 2022. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4116964

²⁰ Financial Express. October 2022. <https://www.financialexpress.com/industry/otts-may-have-to-pay-access-charge-to-telcos/2729958/>

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