Why TELCOs' Fair Share Proposal Makes Economic Sense

And it is not rent seeking!

Daniele Condorelli, Jorge Padilla, Andrew Tuffin and Zita Vasas
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In September 2021, Korean internet provider, SK Broadband processed 1.2 trillion bits of data a second so that Netflix's customers could watch *Squid Game* and various other shows in the streaming giant's catalogue; that was 24 times the rate of data that Netflix required in May 2018. Netflix, whose content consumes nearly 14% of global internet traffic, had paid nothing toward the cost of managing the strain that traffic places on the network. And so, SK requested intermediation of regulatory authority and Netflix sued. The Seoul Central District Court ruled that SK had delivered a service provided at a cost and that Netflix should provide something in return. The telecommunications industry and its regulators across the globe are now focussed on that debate: who should pay for maintaining and expanding the quality of internet access?

Quenching the thirst for data

Current and future data needs

Our thirst for data swelled during the pandemic. According to Sandvine, an app and network intelligence company, in 2021 we consumed 3.2 times more data through fixed and mobile networks than we did in 2018 – a compound annual growth rate of 26%. That growth continues post-pandemic. The internet carried 23% more traffic in 2022 than it did in the year before. Video services fuel that demand. And just six companies dominate the provision of content: Google (predominantly YouTube), Netflix, Meta (Facebook and Instagram), Microsoft, Apple, and Amazon. In the first half of 2022, their content generated almost half of all internet traffic.

Rising demand for data will continue. Or at least, consumers, content providers, and governments alike hope it will. Many of the prospects for future growth depend on the internet delivering data in copious volumes at high speed with high-fidelity and low latency. Telehealth, online education, and the expansion of hybrid working all require reliable networks as the foundation they can build on, even if video will likely keep being the main driver of growth. New applications, such as the Metaverse, the Internet of Things, and mission critical services also depend on a step change increase in the capacity and quality of our access to data. Estimates of the economic impact – directly and indirectly – are enormous. 5G alone is expected to underpin new services and generate productivity enhancements across a range of established industries, from improving the detection of defects in manufacturing processes, to reducing waste in agricultural production – in total, Accenture, a consulting firm, estimates it will add €1.0 trillion to European GDP.

The pandemic didn't just emphasise our digital needs placing further pressure on traffic. It emphasised the digital divide. Keen to ensure that no one is left behind, governments have set targets for coverage, as well as the quality, of access to the internet. The European Commission

requires that, by 2030, 5G covers all populated areas in the EU and all European households have access to gigabit broadband.

Significant investment requirements

Serving our data needs will require investment; a lot of it. Leading European telecom operators (telcos) estimate they spend at least €15 billion a year simply to ensure their networks cope with the additional pressure from the large providers of content – such as TikTok, Netflix or Google's YouTube. Meeting future demand requires even more investment. If more people need more data, then networks must provide greater capacity. But supporting modern content isn't only a matter of volume. Increasingly, networks need to understand each application's varied needs, to provide the type of access that consumers and content providers require. For instance, gamers and the sensors monitoring machinery need low latency, whereas a family watching Disney Plus doesn't.

The threat of underinvestment

Underinvestment risks

Despite the benefits, there is growing concern that can't keep up with the investment pace required to develop the networks we need. That might seem surprising. Telcos invest a lot. In Europe, ETNO, an industry association comprising the main incumbent, estimates they invested €56.3 billion on network infrastructure in 2021. Investments made in the past, and still not fully amortised, account for €36-40 billion per year, of which roughly half are traffic related and could have been saved absent the largest content providers' traffic.. But the resources required to sustain surging demand, let alone enable future capabilities, is substantially greater. GSMA, the mobile industry association, assesses that enabling 5G's full potential is estimated to require 2.4 times more capital expenditure over 2020 to 2027 than 2018 capital expenditure levels, and achieving the European Commission's target for 5G coverage by 2030 is estimated to require an additional €150 billion.

Telcos claim that, without financial support from others, they will be unable to invest the sums required to meet the expected growth in demand, as well as the European Union's targets. In 2021, the leaders of 12 European telecom service providers released a joint statement about the need for big tech to help fund network costs. A year later, AT&T and Verizon issued a similar statement on the other side of the Atlantic.

Why positive externalities cause the market to fail

That claim should give us pause for thought. Why would telcos underinvest if their investments Why should telcos underinvests if it generates so much value? That's not how market normally work. If something creates more value than it costs to provide, the invisible hand will figure out a way to produce it.

The answer to this apparent puzzle are positive externalities. Most of us are familiar with *negative* externalities. When companies can impose a cost on others without offering compensation, we get too much of that harm. Pollution tends to be endemic for this reason. *Positive* externalities are less familiar, but they can be just as problematic. When companies provide *benefits* to others without receiving reward, we get too few of those benefits. Companies only invest where they can make a return. To the extent that the benefits their investments would enable aren't reflected in their returns, they won't invest. For that reason, markets fail when there are positive externalities as they do when there are negative ones. Positive externalities are not instances of a free lunch; they cause the market to be under-catered.

Why does telecommunication investment generate positive externalities?

First, telcos invest where they can make a return from selling *access* directly to consumers. The difficulty is that content and access are not perfect complements and consumers' demand for access is relatively *insensitive* to improvements in the *quality* of data access. This compounded with fierce price competition and the generalised used of flat tariffs means that improvements in capacity, speed, and particularly latency don't have a large impact on telcos' own profits. Despite the three-fold increase internet traffic between 2018 and 2021, telco revenues have been relatively flat, which limits their incentive to invest in improvements. HSBC estimates that the average return on invested capital for major listed European telcos fell from around 8% in 2012 to around 5% in 2020 and that many now have returns below their cost of capital.

In contrast, when telcos invest to improve the quality of internet access, it has a significant impact on the demand for content. The success of the 'Big Six' content providers' services depends on the quality of their customers' internet access. If the price of access is high, or its quality is low, consumers cut back on streaming services first. People can't consume premium content without access, but they also need access for other reasons. So, when they economise, they reduce content subscriptions, as their response to the cost-of-living crisis demonstrated. Conversely, if the price of access falls, or its quality improves, demand for streaming services – and other high bandwidth content – increases, which benefits the content providers. The trouble *for content providers*, and consumers more generally, is that telcos don't share in the benefits that greater investment would generate for content providers, so they don't invest enough in enabling that additional growth.

The bigger the externality, the bigger the problem that underinvestment poses. And the externality is likely large. Its size scales with the impact telco's investment has on access quality, the impact better access quality has on the demand for content, and the impact that higher demand for content has on providers' profits. All three conditions appear to be met. Netflix itself states that access to high speed and reliable internet have enabled streaming services to become popular. Future applications depend on next generation infrastructure, such as FTTH (Fiber to the Home) and 5G. And, as of 31 December 2022, Alphabet's (Google's) operating profit margin was 26.5%, Meta's (Facebook's) 22.7% and Netflix's 13.2%.

Underinvestment is a threat to content providers – the ones that currently generate content, and the ones that would use enhanced network capabilities to provide new services in the future. Limited capacity limits subscribers. Limited capability limits opportunities to offer a better product. For instance, as hardware for Ultra High Definition ('UHD') video becomes available, streaming platforms have started to offer enhanced picture quality. But the data requirements for UHD are double the rates High Definition ('HD') needs and nine times larger than Standard Definition ('SD') rates. Although industry analysts, such as Sandvine, expect UHD streaming to result in a tremendous growth in demand and traffic, that depends on whether infrastructure constrains or accelerates that growth.

Why can't the market address underinvestment bilaterally?

Sometimes markets can overcome externalities without regulation. If content providers would profit from telco's investing more in infrastructure, we shouldn't expect them to sit by and lose money. They could negotiate payments to entice the optimum level of investment their businesses require. In essence, they can privately contract to bridge the investment gap that would otherwise go unrewarded and under-provided. That would be the invisible hand at play again!

Content providers have, to some extent, sought to address the strain their services place on capacity, using two levers available to them. Firstly, they can invest in reducing the strain they place

on infrastructure – for instance, by developing more efficient codecs that convey the same content using less data or investing in Content Delivery Networks that distribute content across multiple servers to reduce congestion on particular servers, and route traffic more efficiently. Secondly, they can contribute directly or indirectly to improve access quality by investing in infrastructure. Google, Facebook, Amazon and Microsoft have all invested to a greater or lesser extent in submarine cables worldwide – for example, ensuring that social media users in France could better access the servers they needed in the US.

However, both levers are underutilised. The reason was first explained by Nobel prize winning economist Ronald Coase. He argued that parties could use contracts to internalise any externality, but only under specific conditions. Where those conditions fail, the externality will remain. The telecommunications industry faces three barriers to self-regulation, in particular.

Barrier 1: Free riding (the prisoner's dilemma)

The first barrier is the clearest: content providers can't coordinate to prevent their rivals from free riding on their contributions. When content providers contribute to improve access quality – whether in traffic-reducing practices or improving infrastructure – they don't just benefit their own businesses, they free or provide additional capacity for everyone else as well. It is same principle as changing route to avoid a literal traffic jam: you travel more freely, and congestion eases for those on the highway you avoided. In that regard, bilateral contributions don't *solve* the externality problem; they suffer from it. Each company does best when it avoids contributing itself to improve capacity, but others invest – whether they are telcos or rival content providers.

Of course, when each party pursues its best private strategy, they all invest too little. We shouldn't expect any different. Markets require companies to pursue their own self-interest. When the market functions well, that serves consumers and society's interests. When it doesn't work well, it harms those interests. This problem is popularly known as "the Prisoner's Dilemma": all parties would be better off if they could coordinate their investment decisions, but acting independently they are unable to invest optimally, as each of them has an incentive to reduce its investment, even more so when the others invest.

Barrier 2: imbalanced bargaining power

The prisoner's dilemma is difficult to overcome unless content providers are compelled to contribute. But telcos can't do that unilaterally. They lack the power to bring content providers to the negotiating table. Their main source of leverage is the access they provide. But the Open Internet Regulation prevents European telcos from using the quality of service it provides to discriminate between different types of content provider for commercial purposes.

Even if telcos could leverage access or service quality, it would be unlikely to enhance an individual telco's hand at the negotiating table. Content is highly differentiated, exerting significant brand loyalty from consumers. Internet access is not. A telco that threatened to switch off its consumers' access to YouTube in a commercial stand-off would be more likely to see its customers flee to rival operators, than force YouTube subscribers to switch to other content providers. Ultimately, the *status quo* puts content providers in a strong position. They provide content "over-the-top" – free of any obligation to contribute to the investment their traffic requires.

Barrier 3: Asymmetric information on the investment gap and its impact

Even if telcos and content providers agreed to coordinate, they would still face another substantial barrier: they lack the information they require in practice to trust each other's estimate of what a 'fair contribution' constitutes. Negotiations are relatively straightforward when parties have symmetric access to information. Even if that information is uncertain, they can each assess the associated

risk and trust that they are not being misled. That trust breaks down if one side has better in information than the other.

In this case, telcos and content providers need two specific pieces of information to reach an agreement on what constitutes a fair contribution: the investment required – the *gap* between the amount that telcos would invest anyway, and the additional investment to achieve the access quality that content providers require; and the size of the externality – the impact that additional investment has on content providers' profits. Information on either estimate is likely to be asymmetric: telcos have every incentive to exaggerate the investment gap, and little ability to convince sceptical content providers what is genuinely required; and providers have every incentive to downplay the impact investments have on their profits, and little ability to convince telcos how their large profit margins respond to incremental investments.

The problem with asymmetric information is not that one side gets a bad deal. It is that the two parties fail to freely agree any deal at all, even when there is a price that they would both accept as 'fair', if they had the information that they required to trust each other. Citing another Nobel Prize Laureate, this time George Akerlof, asymmetric information may lead to the collapse of the market option.

The solution: The fair share proposal

Addressing underinvestment requires intervention of some kind. But what kind?

Alternative interventions

We consider two options.

Option 1: direct regulation

One option is direct regulation, but it is unappealing. In principle, a regulator could establish the investment gap required, and the fair contributions telcos and content providers should each make to bridge it. In practice, however, that is a difficult and expensive task. The regulator would need detailed information on how telco's and content providers' profits respond to improvements in investment. They would also need to monitor and enforce the agreement they impose. Of course, the regulator could undertake audits, as they do in typically regulated sectors. But those audits are bound to be costly and may still prove sterile, given the complexity of the information they require.

Option 2: compulsory negotiation, in the shadow of arbitration

A more appealing option is compulsory negotiation, backed by mandatory arbitration whenever the parties fail to agree terms. The Australian government, for instance, recently adopted this approach to address the positive externality that news organisations provide to social media networks that display their content. A similar solution was adopted in France last year.

The approach offers several advantages. The compulsory nature of negotiations substantially mitigates the ability to free ride, as no one can duck contributions entirely. That reduces the competitive threat that would otherwise deter providers from contributing in good faith. In addition, the shadow of arbitration goes some way to check the imbalance in bargaining power and asymmetric access to information. Should the parties disagree, an independent arbitrator will decide, with the ability to compel both sides to produce the information it requires to determine fair contributions for each side. Anticipating that, both sides have a greater incentive to engage openly, and greater reason to trust what their counterparty says.

Lump sum or traffic-related payment

Telcos and content providers could negotiate lump-sum payments contingent on investment in principle, but that is unlikely to be possible or fruitful in practice. When the negotiations unfold, the required investments may be both uncertain and rely on private information, and/or the extent and quality of telcos' investments may be hard to verify when the payments are due.

An alternative is to instruct both sides to negotiate per-unit traffic fees. Traffic can be observed, monitored, and verified. And so, a properly calibrated per-unit traffic fees should provide telcos with the appropriate incentives and solve the underinvestment problem from the perspective of telcos and content providers.

Either solution would increase network capacity and on the quality of access, which would unambiguously benefit consumers. Unlike the lump-sum payments, however, traffic fees will result in lower access prices but higher prices for content. Yet, we expect the net effect to be an increase in consumer welfare because quality adjusted content prices are likely to fall due to the increase in access quality, the demand for content is no more elastic to changes in the price of content than the demand for access is to increases in access prices, and for those consumers consuming large amounts of traffic, quality is likely to trump price.

Cui prodest? This is about the size of the pie not about how it is shared

Solving the market failure that causes underinvestment is in everyone's interest: content providers, those whose services we currently consume, and the ones that new technology may enable in the future; telcos; and most of all, consumers.

Perhaps then it is surprising that content providers have been, publicly, against the fair share proposal. To the extent that it brings forth additional investment – that otherwise holds them and their customers back – that opposition is self-defeating. The fair share proposal does not merely seek to charge companies for a service they currently receive for free. It provides a mechanism for them to incentivise telcos to provide the benefits that would otherwise go under-catered. On that basis, neither does the fair share proposal charge content providers for a benefit that consumers already pay for. Rather, it would reward telcos for generating the additional benefits they would otherwise not provide, as *no-one* pays for them.

As such, content providers will benefit through the increase in demand for their services that bridging the investment gap enables. And consumers will benefit through better quality access and content, paying lower access prices and most likely lower quality-adjusted content prices: or in other words, getting more value for their money.

The devil, of course, is in the detail. Content providers currently face real barriers that deter them from contributing to improve the quality of interest access: they have neither the information to establish a fair contribution, nor the incentive to pay without assurance that their rivals will do the same. Any practical solution to underinvestment must overcome those barriers. Content providers may be sceptical but, in our opinion, there is every reason to think that compulsory negotiation in the shadow of mandatory arbitration would represent such a solution.

There is perhaps one other reason for content providers to hope for an alternative solution. Because investment is so important to economic growth, content providers may expect governments to force telcos to invest even without contributions from content providers, covering the short fall through a combination of regulated targets and funding through tax breaks and subsidies – the other classic remedy for externalities. Neither are ideal from a social perspective. These solutions do not guarantee that the investment gap will be bridged, and they place the required investment fully on

the public purse, rather than on the companies and their consumers, which generate that demand, and directly benefit from the additional services that investing in enhanced internet access will provide. Furthermore, they would not give any incentive to content providers to invest to minimize the traffic-related costs of content.

Jorge Padilla, Andrew Tuffin and Zita Vasas work at Compass Lexecon, an economic consulting firm. Daniele Condorelli is a professor of economics at the University of Warwick. *This essay is based on the report titled "Another Look at the Debate on the "Fair Share" Proposal. An economic viewpoint" by Daniele Condorelli, Jorge Padilla and Zita Vasas, available upon request. Funding from Telefonica is gratefully acknowledged.*