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# European telecommunications market – challenges in times of transformation

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Author: Ignacy Święcicki
Cooperation: Marcin Karolak
Substantive editor: Paweł Śliwowski
Editing: Jakub Nowak, Małgorzata Wieteska
Graphic design: Anna Olczak
Typesetting and page makeup: Tomasz Gałązka
Polish Economic Institute
Aleje Jerozolimskie 87
02-001 Warsaw


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**EUR 37 bn**

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# Key findings

- **Telecom market reforms will be one of the most important topics in the new term of the European Commission**. Recent recommendations have been coming from the Commission itself as well as have appeared in two reports on the future of the EU – the Letta Report and the Draghi report. The proposed course of action is to support the consolidation in the European market with the aim of enabling the emergence of large, pan-European telecoms operators. This report addresses these proposals from a Polish perspective and shows the weaknesses of the presented diagnosis and the resulting shortcomings in the recommended actions. The authors of the report also discuss the specifics of the Polish telecommunications market, which makes it possible to determine the effects of the proposed changes, also in the context of empirical research.

- **The telecommunications markets in EU countries mostly offer a high level of services at affordable prices. At the same time, the structure of the market varies greatly from one country to another – it is therefore difficult to speak of a single European market**. The success of countries that are world leaders in communications (e.g. Denmark, Sweden) suggests that the current regulatory framework does not create a significant barrier to the development of telecommunications services. **What is certainly a problem, however, are the differences in regulations in force in individual countries** – as a result of different implementation of the directives – limiting the benefits of entering new European markets.

- **Telecom operators' revenues in Europe have been characterised by stagnation or decline in recent years. The situation is different in the USA**. The stagnation of European telcos can be seen especially against the background of US technology companies, whose revenues have increased by more than 300 % in recent years. European companies seem to have missed out on the development of the internet and applications, as well as new business models, and have therefore lost their leading position in technology and innovation. This has also been largely hindered by EU regulations restricting, for example, the use of user data (on which many modern platforms have based their business models).

- **Without a change in the business model and, above all, without broadening the scale of their operations (e.g. through greater cooperation with industry in 5G private networks and the use of industrial data, IT services, etc.), telecoms will become just another utility – a stable, heavily regulated industry, far from creating disruptive technologies**. At the same time, it is important to remember that only EU companies provide their services worldwide, something that telecom operators from other regions have not achieved.

- **The targets set for the EU digital decade strategy may also be contributing to the perpetuation of the telecoms industry's problems**. Given the use of services and data, and the applications available, it seems that providing 1 Gbps speeds in every household and 5G coverage throughout the EU are redundant targets – they generate significant investment costs, with little additional return and no real need for this type of capability. From an economic point of view, it seems that **more emphasis should be placed on the development of 5G industrial applications** (which also requires increasing the level of digitisation of companies), and from a user point of view – more emphasis is required on transmission inside buildings (e.g. WiFi networks) and along communication routes.
- The Polish telecommunications market is characterised by high availability (mobile services), low prices, a high share of fibre-optic lines compared to the EU average and significant market fragmentation (fixed services). **Possible consolidation of telecommunications operators could bring adverse effects – higher prices (e.g. by levelling up to the European average) and lower interest in investment in areas without modern communications**. On the other hand, high competition (e.g. in cloud computing and data processing centres) and the low level of digitalisation of companies in Poland may be a barrier to the entry of telecommunications operators into new markets (in which development prospects should be sought).

# Introduction

**The European telecommunications market is at a difficult juncture. On the one hand, its value in relation to GDP is declining, while on the other, there is an ongoing need for investment in the maintenance and development of networks, without which modern societies cannot function. The pressure to invest is also motivated by international competition, including with the US or China, in which, according to the European Commission and some experts, the EU is lagging behind. At the same time, it is a highly regulated market with few innovative companies, whose role has been undermined by global digital platforms over the past 20 years.**

The discussion about regulation, differences between sectors or the need to harmonise rules in the EU has been going on for years, but recently more documents have emerged with proposals for change in these areas. Both the European Commission's *White Paper* (2024a) as well as Enrico Letta's report *Much more than a market* (Letta, 2024) and Mario Draghi's report *The Future of European Competitiveness* (Draghi, 2024) point to the need for reforms aimed at consolidating market players and transferring more competences from the national to the European level. These ideas have a chance of being translated into concrete legislative proposals in the current term of the European Commission (2024-2029).

Arguments for and against the proposed changes can be identified at the level of the entire European Union, but from our perspective, the most important is the impact they could have on the Polish market, the situation of Polish consumers and businesses operating in the country. The specifics of the Polish market should be taken into account, both factors directly related to telecommunications (high level of competition, low prices, good quality of services, e.g. increasing QoS parameters of mobile Internet access services, such as bandwidth or lower latency) and structural issues (general level of economic development, population distribution, general level of digitisation, etc.).

This report addresses these issues – starting from the characteristics of the Polish market, the authors refer to broader trends, proposed regulatory solutions and arguments presented in the discussions. The report is further complemented by a SWOT analysis of the Polish market.

# Economic situation of the telecommunications sector

**The value of the European telecom market in 2023 was EUR 277 bn, only 6.1 % more than in 2017 (EUR 261 bn)**. Around 64 % of that is revenue from consumer services – a share that is declining at a very slow pace (ETNO, 2024). **The capitalisation of European telecom companies fell by 41 % between 2015 and 2023**, to USD270 bn.[1] Against this backdrop, the different situation overseas is well illustrated, where the total capitalisation of telecom companies amounted to EUR650 bn and grew by 20 % between 2015 and 2023. At the same time, the value of this market or the rate of change taking place is at least an order of magnitude smaller than that of technology companies (platforms, hardware providers or content providers). The capitalisation of the five largest technology companies (Alphabet, Amazon, Apple, Meta, Microsoft) is USD 8.7 trillion and has increased by 357 % since 2015 (Draghi, 2024), and these figures do not include recent rise in Nvidia market capitalization.

**When looking at changes in the value of the sector, it is worth noting that there has been a disconnect between growing data consumption and revenues**. While the amount of data transmitted over the networks is constantly growing (although the rate of growth is slowing down), as a result of the operators' pricing policies, their revenues are not growing. In 4G networks the dominant model is to offer essentially unlimited data packets, thus enabling increasing consumption without increasing costs on the user side (this is particularly evident in fixed networks, although the available packets in mobile networks also often exceed what can be used for current consumption). When comparing electronic communications networks to other utilities, it can be seen that this is essentially an exceptional situation. On the other hand, if current trends continue, i.e. the growth rate of data traffic is heading towards zero, investment in networks will be directed much more towards their maintenance rather than development.

# Low innovation

**The telecoms sector is characterised by a low level of innovation, inferior to companies in the IT sector, for example**. What may seem an anecdote here is the story of Telecom Italia, a company which in 1998 had plans to take over Apple (www9), and which is now worth 1/500th of what the US giant is.

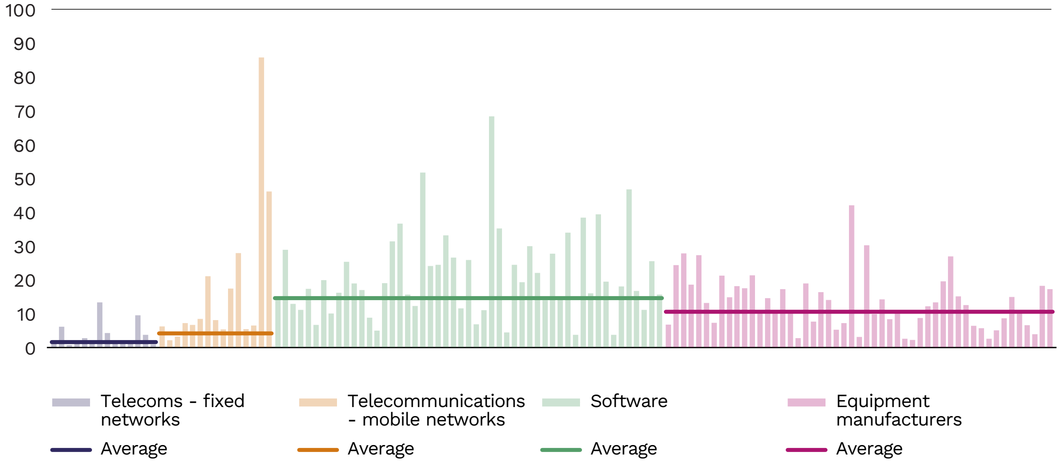
[1] This figure does not include T-Mobile US, a subsidiary of Deutsche Telekom.

In the 1990s, telecoms seemed to be the centre of the modern economy, then lost this role – perhaps due to regulation or corporate and historical reasons.

WIPO data shows that telecommunications is the only technology sector where the number of patent applications has declined – when comparing 2021 to 2005. The total number of applications more than doubled over that period to reach more than 3.4 mln. Telecommunications, with around 57,000 applications, has a share of 1.7 %, compared to around 4.1 % in 2005. The fastest growth over the period was in patents in IT-enabled management methods (11 % on average, albeit from a low base), computer technologies and digital communications (comprising primarily internet technologies).

Similar conclusions can be drawn from an analysis of R&D spending. According to JRC data (Nindl et al., 2023), **the largest telecommunications companies (29 companies worldwide) spent EUR 18 bn on R&D in 2022. This is less than the largest technology companies: Google spent EUR 37 bn in the same year, Meta EUR 31 bn, Microsoft EUR 25.4 bn, and Apple EUR 24.6 bn**. It is also important to note that, of all the telecoms, the highest on the global list of 2,500 companies spending the most on R&D is NTT (a Japanese company) – in 36th position with EUR 5.7 bn in spending. The highest ranked European telco – Telekom Italia – spent EUR 955 mln and is in 231st position.

**Figure 1. Ratio of R&D expenditure to sales revenue for 2022, depending on the main activity of a company (%)**




Note: The chart includes companies classified as telecommunications, software development, and hardware manufacturing, from the list of the top 2500 companies worldwide in R&D spending.

Source: prepared by PEI based on JRC data (Nindl et al., 2023).

The low level of R&D and innovation spending also translates into the attractiveness of telcos as workplaces for engineers and top-level professionals. Some operators consider it a significant barrier to attracting and retaining talent.

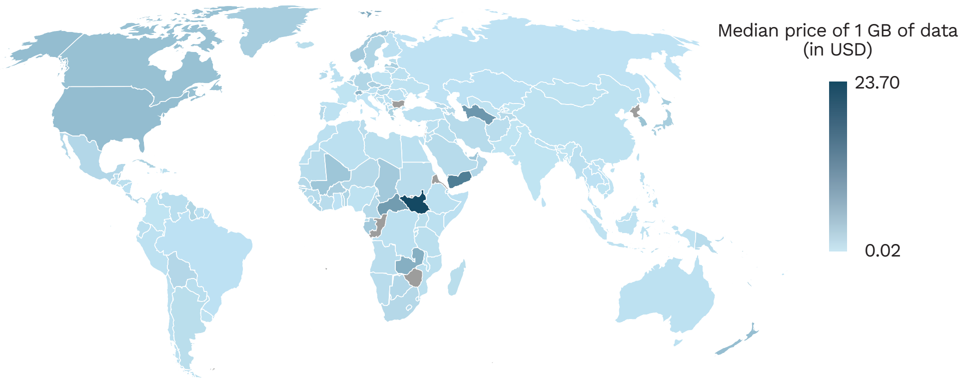
**Low innovation may also translate into slow entry into new business areas. According to ETNO (2024), 82 % of revenues come from *core services*, 12 % from pay-TV and 6 % from other services**. Without the development of the latter segment, telcos' revenues will stagnate or trend downwards – in voice, messaging or data services, no additional revenues could be generated from higher quality (for the reasons mentioned above), and competition in the pay-TV segment is eroding this source (for example, rights to sporting events are increasingly being bought by content providers, e.g. the broadcast of the recent Olympic Games on the Max platform or Amazon's purchase of part of the rights to *Premiership League* matches). Market changes, service convergence and consumer choices mean that **traditional telecom operators must create new services or come to terms with their role as an important, albeit economically increasingly insignificant, utility sector**.

# Competition and price levels

The fragmentation of the telecoms market in the EU, as pointed out in the Letta and Draghi reports, could also be seen to be a positive consequence of competition working. Since the privatisation of state-owned telcos in Europe in the late 1990s, the activities of the European Commission and national regulators have been aimed at increasing competition in national markets by facilitating the entry of additional operators. In fixed networks, this was done through legal regulation of access to infrastructure (the so-called investment ladder), in mobile networks through ring-fencing of radio spectrum resources for companies entering the market, preferential cost conditions (as in Poland) or the need to sell part of the resources (e.g. radio spectrum) in the case of mergers and acquisitions.

**The effect of increased competition is significantly lower prices for services in Europe compared to other developed regions of the world**. In the field of mobile services, Poland ranks 27$^{th}$ in the world in terms of the lowest price per 1 GB of uploaded data (3$^{rd}$ in the EU), Latvia, the most expensive EU country in this ranking, ranks 197$^{th}$ in the world, Japan 201$^{st}$, and the United States 219$^{th}$, with the average price per 1 GB of data being almost twice as high as in Latvia and 16 times as high as in Poland. The situation is similar for fixed-line broadband – the average price for Poland gives it 38$^{th}$ place in the world, while Belgium, the most expensive country in the EU, ranks 146$^{th}$, and the United States 155$^{th}$ (cost 11 % higher than in Belgium, 3.6 times higher than in Poland) (www10, as of 09.2023). At the same time, the connection speeds offered in the US are in many cases higher than in Europe: after this adjustment, the US is still more expensive than 10 EU countries (including Poland) but cheaper than Denmark, Slovenia, Sweden or Germany (the most expensive country in the EU after converting the price per 1 Mbps).[2]

**Map 1. Median price of mobile internet (1 GB of data) worldwide in 2023 (in USD)**




Source: prepared by PEI based on the data from cable.co.uk.

[2] Cable.co.uk analysts converted the offer price into 1 Mbps of connection speed.

# Selected trends affecting the telecommunications market

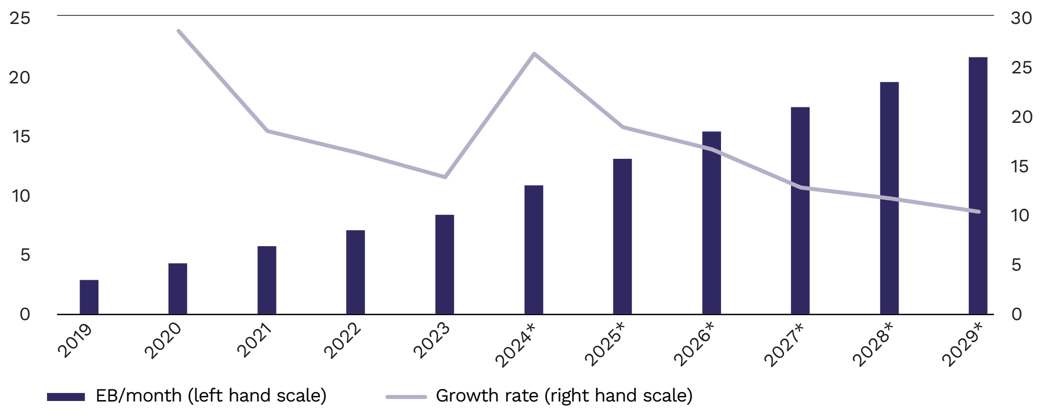
## Evolution of infrastructure – role of cloud and *hyperscalers*, *content delivery networks*, submarine cables

**The telecommunications infrastructure now encompasses a much wider range of equipment and solutions than in the first decade of the 21st century, when the European regulatory framework for the telecommunications market was established**. Above all, the volume of data traffic, the importance of content, as well as data centres and cloud computing have increased significantly. Much of the network traffic is generated by companies that did not yet exist at the beginning of this century – this traffic largely passes through private networks (content delivery networks), and only at the end does it go to the public networks of telecom operators. Equally important are the huge data centres enabling cloud computing, the so-called *hyperscalers* – here the US providers play a decisive role. Google Cloud Platform, Microsoft Azure and Amazon Web Service (AWS) account for around 65 % of the European cloud market (Draghi, 2024). Thus, a significant amount of traffic passes through private networks regulated differently from the public networks of telecom operators (not meeting the definition in Article 2 of Directive 2018/1972). This trend is important insofar as it creates strong dependencies between telecom operators and content providers, on the one hand leading to discussions about the sharing of infrastructure construction costs (so-called *fair share*), and on the other hand leading to the need for telecoms themselves and a large part of European companies and institutions, to rely on infrastructure (cloud computing) provided by US players.

An extremely important role is also played by technology companies in the layer of infrastructure that connects the continents – submarine cables. On the one hand, it is estimated that the four largest companies – Google, Meta, Microsoft and Amazon – account for 71 % of all data transmission via this route (up from 10 % a decade ago). On the other hand, these companies are increasingly investing heavily in infrastructure themselves, being major shareholders in almost a quarter of investments in submarine cable systems in the last five years (Kang, Jacob, 2024). This raises implications on a number of fronts – from competition with telecom operators, to the issue of content control, to the dependence of strategically important infrastructure on a narrow group of companies. The problem has also been highlighted by the European Commission (2024a).

**Technological developments are also resulting in a steady increase in the amount of data transferred, as well as in the speed and quality of the connections offered**. A good illustration of these trends is the increase in mobile traffic. In 2023, 8.3 exabytes of data were transmitted in Western Europe, almost three times as much as in 2019. However, the rate of growth is gradually slowing down, from around 28 % in 2020 to 14 % today and a projected 10 % in 2029. A similar trend is taking place in Poland, where 9.5 petabytes of data were sent over mobile networks last year, two and a half times more than in 2019, but as much as 74 times more than a decade ago. Such an increase – for which the data consumption of individual users (and only to a small extent the increase in their number) is basically solely responsible – is triggered by technological change (3G-4G-5G) and an increase in the intensity and quality of online content, above all videos. At the same time, Poland is also seeing a deceleration in growth – in recent years, growth per user has been around 20 %, compared to over 100 % a decade ago. This trend is important, as it affects telecom operators' investment decisions and their financial situation.

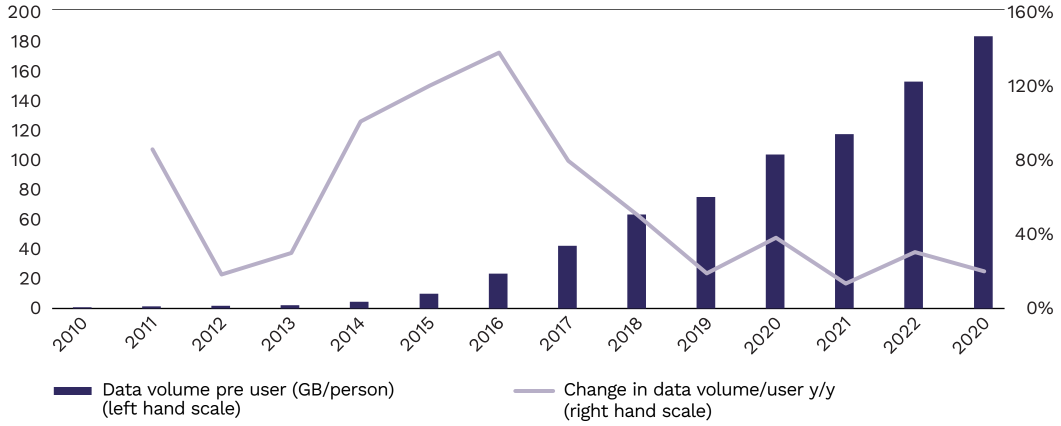
**Figure 2. Network traffic in Western Europe and growth rate**




Note: * denotes a forecast.

Source: prepared by PEI based on Ericsson data.

**Figure 3. Overall data transfer per user in Poland and growth rate**




Source: prepared by PEI based on UKE data.

Increasing Internet coverage and intensity of use has been accompanied by technological advances and widespread availability of modern communication technologies. *The Digital Agenda for Europe* – a digital development strategy adopted by the European Commission by 2020. – envisaged 30 Mbps access for all households. Subsequently, the Communication *Towards a Gigabit Society* set a target of 100 Mbps access by 2025, and the *Road to the Digital Decade* programme set a target of 1 Gbps for all households and full 5G network coverage. In doing so, the fixed network target is to be met primarily through fibre-to-the-home (FTTH) networks. Technological change combined with political targets is an important trend as it creates investment pressure for operators and conditions and directs public funding.

**The goals set for the digital decade also raise questions about the feasibility of actually using such advanced connectivity and therefore the ability of operators to achieve a return (Święcicki, 2024)**. For current home applications (streaming, gaming, web browsing), a 50-100 Mbps connection should be sufficient. Netflix recommends a speed of 15 Mbps for watching 4k video (www11), so a 50 Mbps connection should be sufficient for watching three such broadcasts simultaneously. Of course, the signal inside the building is subject to dispersion or attenuation, so the actual speed for the end device is lower than that achieved on the access link – but this should steer towards the development of WiFi networks or signal enhancement techniques inside buildings, rather than increasing the speed of the links that carry the signal. Similarly, with the capabilities of 5G – while there are no doubts about their use in certain specific locations or for certain applications, a good-quality LTE network should be sufficient for general, seamless connectivity. Venues such as stadiums or train stations (very large number of simultaneously operating devices) or factories and industrial sites (many devices, potentially large data volumes, need for reliability) will benefit from 5G capabilities, but many myths and unrealisable expectations have grown up around this technology (Webb, 2024). The financial difficulties of telecom operators are to some extent related to the need to meet these targets – they are forced to purchase equipment, new spectrum resources and invest in networks, while the new technologies do not deliver the expected increase in revenue.

# Decoupling infrastructure from services

**Another extremely important development is the separation of the infrastructure layer from the service layer**. In telecommunications, this is happening in at least two areas – in mobile networks, more and more of the passive infrastructure (i.e. masts or towers) is being transferred from operators into the hands of specialised companies. In fixed networks, on the other hand, wholesale companies are being set up to offer data transmission to retail operators – either as new companies or based on infrastructure spun off from the incumbent operator. In Poland, such examples are the resale of infrastructure by Play and Polkomtel to Cellnex and the creation by Orange and T-Mobile of NetWorks, which is responsible for the development of their infrastructure. In fixed networks, on the other hand, competitions from POPC allowed companies such as Nexera to grow.

**While from an accounting point of view the separation of infrastructure frees up cash, strategically it allows to focus on the core business of the company, which determines the competitive advantage (quality of service and customer service). From the point of view of development goals and economic development strategies it means greater availability of capital for investment, but also increased competition in the retail market**. The positive impact on investment is due to the reduction in duplication of infrastructure – for example, in mobile networks in Poland, four similar pieces of infrastructure were developed in parallel. Also, the amendment of the regulations on permissible electromagnetic field values by bringing these standards in line with those in force for many years in European Union countries has made it possible to use passive infrastructure more efficiently and to increase the number of transmitters on a single site. Leaving the passive infrastructure to an external entity reduces this inefficiency. Increased competition, in turn, results from lower costs of entering a new market or extending the reach of an offer.

The average number of operators using a tower owned by an independent entity is 2.1, compared to 1.3 for a tower owned by a telecom operator. This shows the scale of the reduction in duplication of telecom infrastructure (EY, 2024).

There are approximately 500,000 mobile mast sites in Europe and the share of independent tower operators is growing rapidly – from 13 % in 2014 to 39 % in 2023. According to market data (EY, 2024), Poland is one of the countries with the highest proportion of passive infrastructure in the hands of independent operators – 58 % (including Cellnex and NetWorks). Considering the comparison with the US, there is still room for change – in the US about 90 % of towers are owned by independent operators. This may also be one of the reasons behind the faster development of 5G or better mobile network coverage – it is cheaper for an independent operator to roll out coverage than for several MNOs (Mobile Network Operators – ed.) operating separately.

The trend of decoupling infrastructure from services is extremely important for the telecoms industry, as well as for meeting EU targets, for several reasons:

- the resale of infrastructure allows funds to be freed up for other activities, including investment,
- the reduction of duplicate infrastructure reduces the costs of network construction and development, especially in rural and deficit areas. EY (2024) estimates the savings for setting up a single, typical point of presence at 46 %,
- the end user gets a potentially wider range of services – competition increases, which promotes the quality and availability of services,
- the barrier to entry is lowering, which may favour the entry of new players – including those outside the existing infrastructure operators.

# Changes proposed by the European Commission, Enrico Letta and Mario Draghi

## European Commission White Paper

The European Commission, in its *White Paper* presented in February 2024 (European Commission, 2024a), identifies the technological challenges facing the European economy. These include the development of autonomous cars, advanced health services, the expansion of the use of the Internet of Things, industrial applications of 5G or smart agriculture. To enable their development and realise their economic potential, higher investments in telecommunications networks are needed, according to the Commission. They will also help the development of services based on AI or Web 4.0, which in turn can respond to major societal challenges. The Commission also notes the radical changes that are taking place in the area of infrastructure and the ways in which it is used – above all the increasing use of cloud computing, edge computing or the virtualisation of network functions in general.

In this context, **the availability of modern networks, above all fibre and 5G (*stand-alone*, SA), is a key condition for the EU to remain competitive vis-à-vis the US and China, treated as benchmarks in technological development**. This justifies the Digital Decade targets (e.g. 100 % of EU households with access to a fibre network, 10,000 climate-neutral edge nodes or 100 % coverage of the EU territory with 5G networks) (European Commission, 2021; Decision..., 2022). However, the EC also identifies areas that require additional attention, such as 5G *stand-alone* networks (where the entire architecture is based on 5G standards, unlike most current networks where the core is based on 4G technologies) or private industrial networks.

The document also points to the need to switch from copper to fibre. This would be to improve the quality of service provided to end-users and reduce the carbon footprint (fibre networks use less energy than copper).

Finally, the Commission stresses the importance of global trends, including in particular the decoupling of infrastructure from services and the move towards *a* NaaS (Network-as-a-Service) model, where different actors can provide services on the same infrastructure and the traditional boundaries between, for example, *content application providers* and telecom operators disappear.

The EC cites increased investment as a potential solution, estimating the so-called investment gap (i.e. the total amount of money that must be spent on infrastructure development in the coming years to achieve the goals of the digital decade) at more than EUR 200 bn, as well as harmonisation of rules for the allocation of radio spectrum resources at EU level and regulatory changes. **In the latter area, it is primarily a matter of making it easier for telecom operators to operate across borders and bringing the regulations currently in place for them closer to those for content providers**.

The European Commission also points to a number of areas where changes can help raise funds to bridge the investment gap – including, among others, changes in banking regulations, support for demand for modern technologies and solutions from business, and state participation as a guarantor of investment (guarantees or junior co-investment). **These directions are important insofar as they show possibilities for capital mobilisation other than interfering with market competition or creating new *fair share***.

Furthermore, in outlining scenarios for further action, the Commission points to the need for regulatory changes. The changes would concern the levelling of competition rules (argued on the basis of changes in network architecture, convergence of services) changes to the financing of universal service (broadening the catalogue of financial contributors), changes to the authorisation of telecommunications activities (two-tier regulatory regime) and greater harmonisation in the allocation of radio spectrum.

## Results of the EC consultation on the future of the telecommunications market

Between February and April 2023 the European Commission held an open consultation on the future of the electronic communications sector and its infrastructure (www1). The aim was to gather information on technological change, the fairness of rules for consumers, barriers in the single market and also the relationship between telecom operators and content providers.

Participants in the consultation point to a number of technological changes that will affect the telecoms sector – primarily network virtualisation, artificial intelligence, open networks and edge computing solutions. Above all, these changes mean a much greater role for software – the specialist hardware used will be less important.

Telecommunications operators' views on the availability of capital for new investments varied. Both the high cost of capital (which outweighs the return on investment) and the ease of raising new funds were cited. The financial theme also manifested itself among the sector's challenges – shrinking margins and lack of investment incentives were contrasted with the rising costs of providing cyber security, the need to attract staff with the right skills or replacing equipment from high-risk suppliers.

Among the challenges and trends affecting network architecture and operations, the emergence of independent infrastructure operators was mentioned first, followed by the emergence of vertically integrated network managers, network slicing services and the emergence of private local area networks.

**When asked about the evolution of business models, operators indicated that in the next 10 years their model will still be based on revenue from connectivity services**, but they will need to find better ways to monetise their infrastructure.

Finally, when considering the barriers that persist in the single market, they (primarily telecom operators) pointed to regulatory issues (e.g. lawful interception, data storage, cyber security and breach notification obligations) and the lack of harmonisation in the radio spectrum. In contrast, according to some national regulators, there are currently no significant barriers to consolidation between countries.

At the same time, however, **there was a theme pointing out that a merger of operators operating in different countries would not provide such significant benefits as consolidation within a given market – i.e. a reduction in competition in a given market. Only as a next step, an improvement in the financial situation resulting from an increase in the scale of operations would allow expansion into other EU markets**.

Radio spectrum harmonisation also emerged as a factor that could support the development of the European market, primarily through greater spectrum efficiency (especially border areas), improved coverage, and also bring savings to operators, e.g. in the form of lower equipment acquisition costs.

# Enrico Letta's Report

Enrico Letta's report (2024) deals with all issues related to deepening the single market, so there are far fewer references to telecommunications than in the *White Paper*. The author mainly addresses three issues: market consolidation, the transfer of some of the competences of national regulators to the EU level and greater harmonisation of radio spectrum rules (including, inter alia, issues of preparing selection proceedings).

**From the point of view of this report, the first area in which Letta makes clear the need for operators to scale up is key. The aim is to improve the financial situation of European operators, which, according to the author, is currently unstable** (Letta, 2024, p. 52), and to enable them to compete with global players.

Interestingly, Letta points out that infrastructure is inherently local (due to legislative, demand or technical considerations) and services can be easily scaled.

The issues of regulatory change and the transfer of more competences to the EU level appear in both Letta and Draghi (cf. next subsection), as does the call for changes in the harmonisation of radio spectrum. In both cases, the main changes would concern access by services to transmitted content (lawful interception), and both reports also call for facilitation of cross-border activity, either with some form of 'passport' or '28th regime'. On the issue of radio spectrum, harmonisation of the timing of auctions (selection procedures) and their conditions is proposed (Draghi even mentions the possibility for the EC to veto national decisions in this respect, in particular the conditions of selection procedures (auctions), if they do not comply with the adopted guidelines). Most importantly, however, the issue of extending the duration of rights to use radio spectrum is emphasised, as well as the move away from treating auctions as a mechanism for generating revenue for the state budget – instead of focusing on the amount of the one-off fee and the fee for the right to use frequencies, more consideration could be given to such issues as the size of the investment.

# Mario Draghi's Report

*The Future of European Competitiveness* (Draghi, 2024), published in September 2024, also addresses the telecoms market, basically repeating the arguments and proposed solutions from the EC *White Paper* and the Letta Report. The starting point is to point out that there are many more telecom operators in Europe than in the US or China. Low prices for consumers are responsible for the lower investment rate, and regulation and competition policy are responsible for the fragmentation of the market.

**Draghi recommends regulatory and competition policy changes to complete the integration of the digital single market in telecommunications and to facilitate the merger of operators between countries**. He points to the need to prepare pan-European auctions of radio spectrum resources, the extension of frequency reservation periods, and the harmonisation of cyber security rules (access to communication content). In competition policy, the report calls for greater consideration of the importance of innovation and investment commitments, as well as the imposition of remedies in the form of investment plans (instead of infrastructure divestment). It also calls for treating the EU as a one market for competition policy examination purpose, rather than national markets.

In the relationship between operators and content and service providers, he points to the need to apply the same rules for the same services and to create conditions and solutions for agreements that will allow very large internet platforms to share infrastructure costs (so-called *fair share*).

**Box 1. Proposed changes to the management of radio spectrum in the EU – proposals from the European Commission, the Letta Report and the Draghi report**

1) White paper *How to master Europe's digital infrastructure needs?* – Proposals of the European Commission (2024a)
   a) planning at EU level of sufficient available spectrum for future use; the creation of a roadmap on spectrum availability for 6G technology, binding on member states, is mentioned as an example in this context,
   b) strengthening EU-level coordination of auction planning, including time compatibility, in member states; existing spectrum allocations have stretched over more than a decade, e.g. 5G,
   c) considering the possibility of creating a more uniform system of frequency allocation in the EU; it is pointed out here that the voluntary peer-review mechanism provided for in the EECC has not worked; it is proposed to design common coordinated technical conditions for the use of frequencies and common tendering or auctioning obligations,
   d) a change in the role of CEPT, which should continue to act as an expert on technical matters for the EC, while EU Member States should have a separate body representing them at the ITU, e.g. at WRC deliberations.

2) *Much more than a market* – Enrico Letta's Report (2024)
   a) removing administrative and regulatory obstacles to achieve a unified spectrum regulatory framework in the EU,
   b) the creation of a single regulatory authority at EU level and the subsequent regulation of spectrum issues at two regulatory levels (EU NRA and national NRA),
   c) Member States should retain sovereignty over their frequency resources, while harmonised frequency assignments and criteria need to be created,
   d) earmarking of frequency resources above 6 GHz (millimetre band) for IMT systems, with a common regulatory framework for frequency earmarking and auctioning.

3) *The future of European competitiveness* – Mario Draghi's Report (2024)
   a) the new 'EU Telecoms Act',
   b) harmonisation at EU level of spectrum licensing, including for satellite communications; as a first step, harmonisation of the process of releasing new frequency bands for 6G,
   c) the introduction of a Commission veto right over auctions that do not comply with the harmonised rules,
   d) development of formats for pan-European spectrum auctions with less restrictive obligations and frequency assignments or longer periods (at least doubled),
   e) limiting the spectrum of caps on holdings only if a dominant position (more than 50 % market share) is achieved in order to preserve competition and choice for consumers and businesses,
   f) Release of new spectrum resources for 5G, 6G and additional allocations for WiFi.

Source: prepared by PEI based on: European Commission (2024a); Letta (2024); Draghi (2024).

# Commentary on the demands of the Letta and Draghi reports

The basic assumption **made in both reports is the uniformity of the European telecommunications market**. The predominant analysis is based on the comparison of statistics at the level of the whole community and the creation of recommendations responding, in the opinion of the authors, to common problems. Meanwhile, **the available data shows a different reality – in Europe, telecommunications markets are largely national, with individual countries achieving very different results, despite operating within the same regulatory framework**. There are countries in Europe with 100% 5G network availability (Netherlands, Denmark, Malta, Cyprus) and those with 33% (Romania) (European Commission, 2024b). The leader in terms of transmission speeds is the Netherlands (133.4 Mbps on mobile networks), with Ireland clearly lagging behind (41 Mbps) (www2). The bands earmarked for 5G were already allocated by Germany in 2015, while Poland is delaying some bands (e.g. 700 MHz) until today. The monthly cost of internet access varies from around EUR 15.85 (Slovakia) to EUR 43.98 (Greece) (UKE, 2024). Such a different situation proves that it is possible to build highly developed telecoms markets, with advanced infrastructure, within the current regulatory framework, but this requires the right approach to resource and process management, not necessarily greater centralisation and consolidation of the sector.

**In this context, the call for telecom consolidation is incomprehensible. Intra-country mergers will reduce competition and probably raise prices (cf. Annex 1)**. At the same time, it is not clear whether and how they would translate into accelerated infrastructure development. The results of the research described later in the report show that there is no clear relationship between the level of market concentration and the amount of investment. **At the same time, the significant income disparities between EU countries may aggravate the situation of less wealthy countries**. On the one hand, raising and harmonising prices across the EU will mean significant increases in service prices for them. On the other hand, the prospects of lower revenues may result in reduced investment in such countries and a prioritisation of investment in the wealthier regions of the EU.

It is worth referring to comparisons with the United States, where the median in the state with the highest earnings (Massachusetts) was 62 % higher than in the one with the lowest (Mississippi). Including the District of Columbia (an outlier in terms of population income) yields a difference of 125 % (www3). In Europe, depending on the measure chosen, the differences ranged from 168 % (for purchasing power parity) to almost 420 % (in nominal terms). In other words, median wages in Denmark were more than five times higher than in Bulgaria, if we take into account the conversion of income into euro at the prevailing exchange rates (Eurostat data). Including Luxembourg in the calculation, we get a difference of more than 7 times (and 3 times for purchasing power parity) The median income in Poland (in 2023, per person in the household) was 3.8 times lower than in Denmark.

In contrast, as indicated in the European Commission's *White Paper* (2024a) from a competition policy perspective, there are in principle no barriers to consolidation between countries. Telecommunications markets are dealt with on a country-by-country basis. At the same time, as both the consultation responses and the *White Paper* point out, **the problem is that the potential benefits of such a merger are limited by the lack of harmonisation of national rules, including in the areas of security, consumer protection or radio spectrum**.

The documents in question emphasise the need to strengthen the competitiveness of the European telecommunications sector in competition with corporations from other regions of the world. **However, it should be noted that firstly, it is the European telcos that are venturing into other markets**, e.g. T-Mobile (a subsidiary of Deutsche Telekom) is the market leader in the US, Telefónica is present in South America (although it should also be noted that it has reduced its presence there in recent years), and Orange in Africa. Secondly, global players are increasingly present in Europe, as evidenced by the recent acquisition of TIM infrastructure by the US fund KKR (www5) or the investment of the Mexican billionaire, Carlos Slim, in BT (www6). Hutchison-owned companies (based in Hong Kong) also have an increasingly strong presence in Europe – under the 3 (Three) brand they operate in Austria, Denmark, Ireland, Sweden and the UK.

**Taking these examples, it can be seen that competition in the infrastructure layer in Europe between players from Europe and other continents, although still at a moderate level, is becoming more intense**. The decoupling of infrastructure from services (about which more later in the report) is encouraging this trend, attracting, among other things, large foreign investment funds. Yet another area of competition is data centre and cloud infrastructure and submarine cables – also more on this later in the report.

**Much more important for the position of the telcos, however, is the competition with global platforms (e.g. Meta or Google)**, which have taken over the bulk of messaging traffic, part of the voice traffic, but above all have created business models that take advantage of the increasingly better and widespread access to the internet and the almost unlimited use of user data. **Here, direct competition can take place at the service layer, but is hampered by divergent regulation**. Telecommunications operators are subject to a much broader range of obligations regarding the services they provide (such as the difference between communication services that do not use numbers and communication services that use numbers – that is, in simple terms, between sending SMS and communicating via WhatsApp or Messenger), but, above all, they have had a much more limited ability to use user data during the emergence of new services (here, the competitive conditions have not been levelled by the amendment of the ePrivacy Directive – work on the ePrivacy Regulation has stalled, and it is possible that the project will be withdrawn altogether).

In turn, competing with global service platforms **requires a change in the regulatory approach (level playing field) and business model. It seems that the first step to meet operators'** needs (in line with their demands made e.g. in consultations conducted by the EC) **would be to strengthen the single market, through partial deregulation, harmonisation of regulations between countries** (bearing in mind that very efficient markets have been created under the current rules) and **equalisation of burdens between operators and other service providers or infrastructure owners** – which would translate into a better situation for them and perhaps open the way to increasing the scale of operations. However, **the key to strengthening the sector is to expand operations and go beyond the current business model**, which is based almost exclusively on telecom services. Hints as to where specifically such activities are to be directed can be found in the Draghi report (where there is a strong emphasis on the development of practical AI applications), but also in the hopes attached to 5G – especially when it comes to the development of private 5G networks in industry or selected services. While the promises to date of the revolution that 5G was supposed to bring have not materialised, it still seems possible to develop revenue-generating services in some areas. Yet another area is IT services, related to the digitalisation of businesses. However, these areas are often already a field of intense competition, including from the largest global platforms.

**The main challenge for the competitiveness of telecoms is that in today's economy, these companies are no longer leaders in innovation – cutting-edge technologies are developed elsewhere**. This makes it all the more difficult to agree with the call for consolidation of the telecommunications market in Europe. On the one hand, voices are raised about the necessary facilitation of the merger of telecommunications companies between countries (Draghi and Letta Reports) – here, however, there are fewer regulatory barriers. On the other hand, voices presented in consultations by company associations emphasise the importance of consolidation within countries (e.g. DigitalEurope, 2024), which would probably translate into higher prices. **What is missing, however, both in the key policy documents and in the narrative of the industry representatives themselves, is a reference to the deeper lying causes of stagnation in the European telecoms market, and therefore the solutions to these causes**.

## Situation in the EU and other regions of the world

Significantly, in the document the Commission refers to the financial situation of European telecom operators. The rationale for change, whether regulatory or through market interference, is the argument of lower revenues and lower levels of investment in Europe, compared to major partners.

**Table 1. Selected indicators characterising the conditions in the telecommunications markets in the EU and selected countries (in EUR)**

| Indicator | EU | USA | Japan | South Korea |
|---|---|---|---|---|
| ARPU from fixed services in 2022 | 22.8 | 58.6 | 24.4 | 13.1 |
| ARPU from mobile services in 2022 | 15.0 | 42.5 | 25.9 | 26.5 |
| Capital expenditure (CAPEX) *per capita* in 2022 | 109.1 | 240.3 | 270.8 | 113.5 |

Source: prepared by PEI based on: ETNO (2024).

When comparing the values in Table 1 between regions and countries, significant differences can be observed. The level of ARPU, i.e. average monthly revenue per user, is clearly lower in Europe than in the US and comparable with Korea and Japan. At the same time, the level of investment *per capita* is lower in Europe than in other countries, which may be related to lower revenues as well as to a different market structure, natural conditions or user needs and expectations. The fact that the highest level of investment is achieved in Japan means that the relationship between income and investment may not be straightforward.

**In this context, it is worth recalling again that Europe is not homogeneous. Differences in the cost of services can vary by up to three times**. Such large differences can be found in mobile ARPU (EUR 17 in Finland, EUR 5.5 in Poland) and slightly smaller differences in fixed access (EUR 44 in Greece, EUR 15.9 in Slovakia) (UKE, 2024).

**It is also worth comparing these values with the effects, i.e. indicators to measure infrastructure development**. The table below shows the differences in 5G network development, number of users and download speeds between regions. While the European Union has the highest number of 5G base stations per population, in terms of the number of users or quality (measured in terms of download speeds), the entire continent is lagging behind the USA or South Korea and ahead of Japan. In the case of download speeds, it is worth noting the significant differences between countries – Denmark is one of the global leaders here, while Ireland is clearly lagging behind.

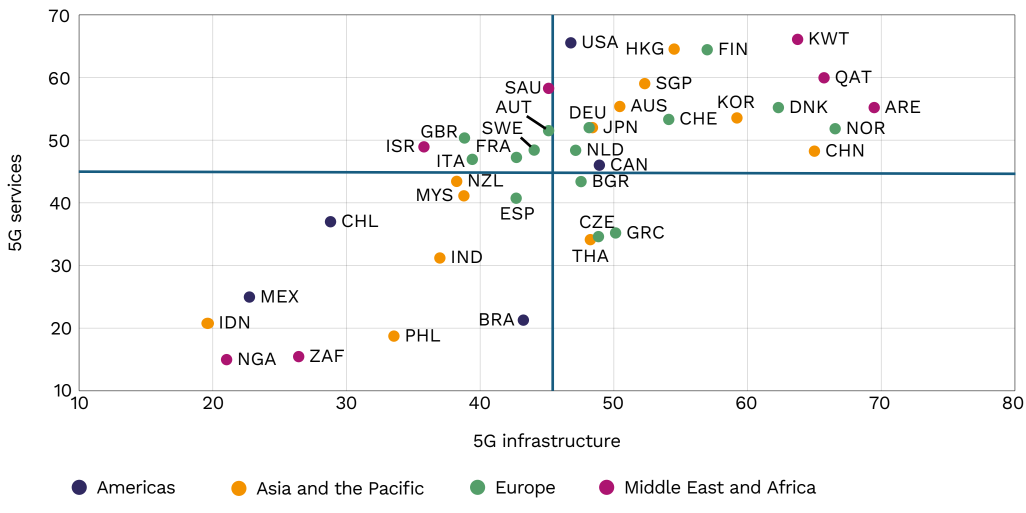
**Table 2. Selected infrastructure quality indicators in the EU and selected countries**

| Indicator | EU | USA | Japan | South Korea |
|---|---|---|---|---|
| Number of 5G base stations/100,000 inhabitants | 103.0 | 51.0 | 118.0 | 593.0 |
| Number of 5G users /100,000 inhabitants (in thousands) | 29.9 | 54.8 | 21.1 | 57.9 |
| Mobile data download speeds (Ookla data) | 147 Mbps (Denmark)<br>109.1 Mbps (Finland)<br>39.8 Mbps (Ireland) | 114.9 Mbps | 45.2 Mbps | 140 Mbps |

Source: prepared by PEI based on 5G Observatory and Ookla data.

**In contrast, the summary prepared by the GSMA (2024) clearly shows significant disparities between EU countries in terms of infrastructure development** (horizontal axis in Figure 4), with the US trailing Germany, Bulgaria, Denmark, Finland and the Netherlands. In contrast, France, Italy, Sweden, Austria, Spain, Greece and the Czech Republic lag behind. At the same time, The USA is ahead of all EU countries included in the comparison in terms of the development of services (vertical axis). These figures correlate to some extent with the values in the table above, with perhaps better availability and service coverage influencing the number of users of 5G technology, in which the US is ahead of the EU.

**Figure 4. Country performance in the 5G connectivity index (data for Q2 2024)**




Source: prepared by PEI based on GSMA data.

Looking at both global and European data, one can see that **the relationship between the size of the market, the scale of telecom operators and the quality of infrastructure or services is not clear-cut**. In Europe, the best infrastructure is found in small countries, including some with a dispersed population structure (e.g. Finland or Denmark, although they have a relatively high level of urbanisation). In contrast, an example of a country with a low GDP and low population density and a low level of urbanisation, but which is nevertheless at the forefront of countries with the greatest infrastructure coverage, is Romania. This may be an indication that the individual characteristics of a country or region are responsible for the development of infrastructure and may help to overcome the lack of economies of scale.

Finally, it is also worth recalling data on the size of individual operators and their global presence. In this category, **European telecoms are significantly ahead of their US rivals, but behind companies from China or India, with which, however, due to the sheer size of the market, they cannot compete in this category**. There is not a single US operator in the top ten, and there are only two in the top twenty. European telcos Vodafone, Telefónica and Deutsche Telekom are ranked 6th, 8th and 10th respectively.

**Table 3. A selection of the world's largest mobile network operators**

| Name | Country of origin | Number of subscribers (mln) | Number of markets (countries) | Continents | Place in terms of number of users |
|---|---|---|---|---|---|
| China Mobile | China | 997.4 | 3 | Asia | 1 |
| Bharti Airtel | India | 620 | 19 | Asia, Africa, Europe (Guernsey, Jersey) | 2 |
| Vodafone | United Kingdom | 323 | 18 | Europe, Australia, Africa, | 6 |
| América Móvil | Mexico | 311 | 25 | Asia (India) | 7 |
| Telefónica | Spain | 299 | 13 | South America, Europe, North America | 8 |
| MTN Group | South Africa | 288 | 21 | Europe, South America, Africa (Sudan) | 9 |
| Deutsche Telekom | Germany | 256 | 15 | Africa, Asia | 10 |
| AT&T | USA | 217 | 2 | Europe, North America | 13 |
| Verizon | USA | 143 | 3 | North America | 19 |

Source: prepared by PEI based on: Wikipedia [accessed: 06.08.2024].

The differences between markets can be illustrated by the stock market performance of individual companies and aggregate indices. When analysing aggregate measures, it is important to bear in mind that stock market indices for the telecoms sector cover a much wider range of companies than just telecom operators – in Europe, for example, there are also equipment companies (Nokia or Ericsson).

While the indices measuring the aggregate market situation of telecom operators show a weaker situation for companies in Europe than in the US, in both cases the telecoms have performed significantly worse than the overall market, or the indices of the largest companies. The STOXX index (www7) for European telecoms has achieved a 10.7 % return over five years compared to 13.9 % for the US index. In contrast, the change in the value of the index over the last 10 years was 17 % for the European index and 88 % for the US index. By contrast, it is worth bearing in mind that *blue-chip* indices gave a return (for Europe and the US respectively) of 66.2 % and 135.7 % over 5 years, and their value over the decade increased by as much as 114 % (Europe) and 381 % (US). So while the difference between telecoms on both continents is significant, there is actually a gulf between telecom companies and the largest listed companies.

The availability of capital and the high cost of raising funds for investment (ETNO, 2024) are raised in the arguments of some telecom operators. However, the situation in this area does not differ from the US market – despite the larger scale of US operators. In Europe, the cost of capital (so-called WACC, *weighted annual cost of capital*) was 6.59 % for telecom service providers and 5.88 % for wireless services. In the USA, the respective figures are 6.98 % and 5.56 %. It is worth noting, however, that the WACC calculated for the entire market is higher in Europe than in the USA – i.e. in comparison to the economy as a whole, telecoms in Europe can count on better availability of capital than in the USA (www8). In addition, as the authors of the CERRE report (Feasey et al., 2024) point out, the differences in return on assets between operators operating in different countries can be as much as four times and the cost of raising capital twice as high.

# Polish telecommunications market – characteristics

**The value of the Polish telecommunications market in 2023 was PLN 43.2 bn. This value was PLN 2.5 bn higher than a year earlier**. The fixed-line internet access segment grew the fastest (8 %), and the mobile telephony segment was invariably the largest (PLN 15.3 bn, up 6.3 %) (UKE, 2024). While the trend of market value growth is positive, it should be noted that the growth rate is lower than inflation or nominal GDP growth. This means that the share of the telecommunications market in the total GDP is decreasing all the time.

The Polish telecommunications market stands out from other EU countries in terms of structure, prices and geography. **There are currently four infrastructure operators on the mobile market, with similar market shares (measured by number of users)** (30.1 % share held by the leader, Play, and 19.7 % by fourth-place T-Mobile). The share of users using operators outside the main four is only 3.3 %. In none of Europe's largest markets is the MVNO share so small. The equal split between the main operators is also a rarity – a similar situation in the largest markets only occurred in Spain, before this year's merger between Orange and MasMovil. **At the same time, the fixed access market is extremely fragmented**. The five largest fixed broadband operators have a market share of 57.6 % (in terms of users) and 48.5 % (in terms of revenues). In Germany, the three main operators have a combined market share of around 80 % (www17). In many other countries, the market is also more concentrated. In Poland, on the other hand, there are more than 2,800 telecom entrepreneurs, of which more than 99 % are small and medium-sized companies (UKE, 2024).

The second noteworthy fact about the Polish market **is the low level of service prices**. According to a report by UKE (2024), Poland has some of the lowest prices for telecommunications services in Europe. Fixed Internet access is cheaper only in Hungary, Latvia and Slovakia. In contrast, the cost of mobile services in Poland is the lowest (average monthly revenue per user – ARPU) or the third lowest (according to an analysis of available offers) (UKE, 2024; cable.co.uk). **However, when you look at this statistic in comparison to average earnings, you can see that telecom services in Poland are not**

**actually that cheap**. In such a comparison, in terms of the cost of fixed-line internet access, Poland ranks 16th in the EU, and in terms of the cost of mobile data, 8th (Eurostat and cable.co.uk data). The average price of a fixed-line access subscription is about 109 % of the average hourly wage, and the cost of 1 GB of mobile data transfer is about 2 %. In the cheapest countries, it is 73 % (fixed-line internet in France) and 0.3 % (1 GB of mobile data in Italy), respectively. At the same time, it is worth noting that while in the case of internet access, countries more expensive than Poland are comparable in terms of wealth (with the exception of Belgium), in the case of mobile data Poland has lower prices in relation to wages than the Netherlands, Belgium, Germany or Sweden.[3] This indicates that competition in the mobile services market in Poland provides consumers with very low prices not only in nominal terms, but also in the context of the country's level of development and wealth.

Based on aggregate household expenditure, Poland is also among the top EU countries, with total expenditure in 2022 equivalent to 1.2 % of GDP, with nine countries spending more. The EU-27 average was 0.9 %.

**Poland's specific geographical and structural conditions should be highlighted. The percentage of urban population here is one of the lowest in the EU, and buildings in rural areas are relatively dispersed**. Estimates prepared for the update of the National Broadband Plan indicate that the costs of connecting households in areas with the most dispersed development may be as high as PLN 11,000. At the same time, these costs increase non-linearly with more and more dispersed development. For approximately 83.5 % of households, the costs do not exceed PLN 5,000, while for the last 2.7 %, they already exceed PLN 20,000. Of these 2.7 %, the cost of connecting the 35,000 most remote households or those in the most difficult neighbourhood from an investment point of view is as much as PLN 64,000 per household.

Similarly, the telephone network, which is the basis for the development of fixed Internet access, was less developed in Poland than in Western European countries. This meant higher network construction costs, greater investment due to the need to lay new cables rather than simply upgrading existing ones.

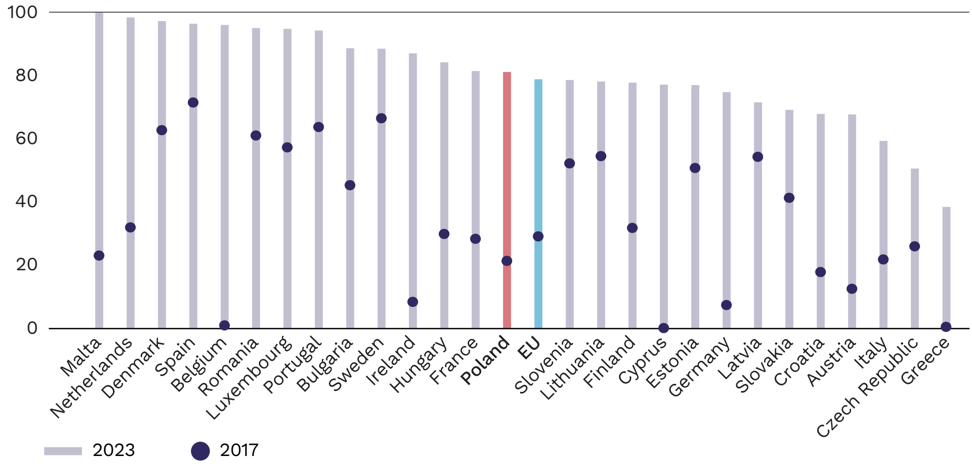
**On the other hand, when looking at the quality and development of mobile networks, one must take into account the neighbourhood of countries outside the EU**. According to ITU (International Telecommunication Union) rules and EU law, the allocation of radio spectrum also requires international coordination and agreements in Poland, including with countries that are not always friendly to Poland. The importance of these geopolitical considerations was highlighted in the process of European harmonisation of frequency bands intended for 5G technology, in particular the 700 MHz band. Due to the inability to make international agreements, the development of mobile networks using these frequencies in the north and east of Poland will be significantly hampered. This should be taken into account when analysing the possibility of deepening the harmonisation of EU regulations on the management

[3] In the case of an analogous analysis performed for ARPU, Poland ranks 10th in the EU, ahead of Finland, Spain and Slovenia, among others.

of frequency resources and the formulation of indicators for the development of network infrastructure.

Despite significant progress in recent years in terms of infrastructure development, particularly in the construction of fixed networks, Poland still has some catching up to do with the leaders in terms of synthetic indicators of electronic communications market conditions.

**Figure 5. Percentage of households in EU countries within reach of very-high capacity networks**




Source: prepared by PEI based on Eurostat data.

One synthetic indicator is the GSMA's Mobile Connectivity Index, which combines data on infrastructure, affordability, consumer readiness and content and services. In the latest edition – from 2023 – Poland is ranked 24th, while in previous editions, the highest position was 19th. Interestingly, in terms of affordability, Poland made steady progress, moving from 26th to 10th place in the EU between 2016 and 2022. In the last year, Poland dropped to 21st place in this category, mainly due to the increase in mobile device prices noted in the GSMA data, but it is not clear whether this change is permanent or a one-off anomaly in the data.

# SWOT

A better view of the Polish telecoms market can be provided by a SWOT analysis that brings together the strengths and weaknesses of the market (partly described above) and shows possible links and directions of development.

**Table 4. SWOT analysis for the telecommunications market in Poland**

| Relevant factors | Positive | Negative |
|---|---|---|
| Internal | Strengths:<br>• high competition in the market – low prices and high call quality,<br>• the substantial public funds invested in infrastructure and the experience of their allocation in previous years,<br>• there are integrated operators in the retail market (3 out of 4),<br>• strong wholesale market (Światłowód Inwestycje, Polski Światłowód Otwarty, Nexera, Fiberhost, Tauron),<br>• tower companies and operator cooperation (Cellnex, NetWorks),<br>• ownership structure – not only funds established companies,<br>• the involvement of companies from outside the telco market in building infrastructure, such as Microsoft and Equinix,<br>• relatively broad access to fibre and significant progress in VHCN coverage | Weaknesses:<br>• delays in radio spectrum allocation,<br>• declining (relatively) market value,<br>• low level of digitisation of companies (low demand for new telecommunications solutions),<br>• scattered development (significant numbers of residents in areas that are not economically viable at all for network construction),<br>• ownership structure – no state-owned entities,<br>• a heavily regulated market reduces innovation (mentally and regulatorily),<br>• lack of innovation in the telco market (price competition),<br>• low level of robotisation and automation in industry -> low demand for industrial 5G,<br>• low presence in innovative projects (e.g. CEF digital – 1 project) |
| External | Opportunities:<br>• trend of unbundling infrastructure from services – freeing up resources for development, changing financial conditions,<br>• entry of telecoms into new business areas,<br>• learning from the experiences of other countries (e.g. on private networks; frequency management),<br>• consolidation of the telco market – absorption of small players and their internal consolidation, | Threats:<br>• dominant participation of foreign equity groups – dependence on investment and innovation decisions of headquarters,<br>• adverse regulatory developments at EU level – including, inter alia, consolidation in the telecommunications market,<br>• delays in 5G deployments in Europe (e.g. 26 GHz),<br>• the difficult financial situation of the telecoms – the burden of regular and periodic frequency charges, |

| | | |
|---|---|---|
| | • significant share of industry in the economy – opportunity to develop private networks, Industry 4.0,<br>• popularising satellite access as the ultimate solution to the problem of white spaces,<br>• a new digitalisation strategy, programmes and activities aimed at improving the digitalisation of SMEs and enhancing the digital competences of Poles,<br>• impact of DMA on the competitive position of telecoms vs. BigTech (e.g. greater interoperability of services) | • entry of non-European players into European markets – KKR, UAE at PPF telekom, Carlos Slim,<br>• low demand for high bandwidth connections,<br>• lack of market interest in the 26 GHz band – delayed use of this band for innovative services,<br>• lack of full international coordination of the 700 MHz band – idem,<br>• no possibility to build FWA in POPC,<br>• regulatory uncertainty and change – no change; adverse change,<br>• high interest rates make it difficult to raise capital and reduce the relative return on investment,<br>• high competition in potentially value-adding markets for telecoms (cloud – here established BigTech, adtech, data spaces, digital identity),<br>• the entry of new players, e.g. *hyperscalers*, thanks to new trends, including *towercos*,<br>• pressure to replace copper cables with fibre optic cables |

Source: prepared by PEI, own development.

## SWOT summary

**The telecommunications infrastructure is an example of the success of EU spending and regulation. Poland has wide access to modern networks and an extremely competitive market, which offers very good conditions for consumers**. Compared to other EU countries, we are above average in the coverage of fibre-optic networks and very high-capacity networks. In both cases, significant improvements have been made in recent years, reflecting the good use of EU funds. **At the same time, we are now facing a new opening: on the one hand, to new access technologies (due to the impossibility of covering the whole country with fibre); to ensure demand and maintenance of the network; to create new infrastructure elements – cloud, quantum computers, private networks in enterprises**. In this context, the low level of digitisation of companies and the still high labour costs may hamper the development of telecoms through insufficient demand for new solutions. The combination of the telecoms' difficult financial situation, price-based competition and – in some areas – insufficient demand for the highest bandwidths, may require coordinated public and private action. These should focus on building awareness of the benefits of digital tools within companies, supporting testing and research activities in the use of modern connectivity.

An opportunity to increase the amount of funds for investment and to expand the field of activity of telecoms (which have been complaining for years about stagnating revenues) is the trend of separating infrastructure from services (in Poland visible in mobile networks – Cellnex – and fixed networks – Polski Światłowód Otwarty, Światłowód Inwestycje, Fiberhost, etc.) and cooperation between operators (NetWorks). Added to this is the growing importance of software (some operators even indicate that this will be the main differentiator of service quality between companies) – both for network management and for adding value in sectors where telecoms could expand their business. Here, however, the sector may face two barriers – strong competition from technology companies (attractive in terms of R&D intensity) and the problem of ensuring adequate salaries (www18). However, telecoms have limited ability to enter new business areas and the low level of digitisation of companies is not conducive to expansion in this direction. **The risk also comes from the gaining popularity of the thesis that the consolidation of telecom operators in the EU should be approved – for the Polish market this could rather mean an increase in prices, with a questionable impact on the quality of the available infrastructure**.

## Conclusions of the SWOT analysis

When considering the relationship between the strengths and weaknesses of the current market and the opportunities and threats coming from outside, two levels need to be separated. Firstly, how the SWOT factors described above respond to short-term challenges, limited to the telecommunications market. In this aspect, the telecommunications market has a service, or subordinate, role to other sectors of the economy.

Secondly, how these same factors respond to wider trends and changes in the technological sphere in Europe and globally. In this aspect, the telecoms market and the operators operating in it need to undergo a fundamental transformation, enter new areas and business models, and significantly increase their innovativeness in order to compete with the leaders of technological change.

## SWOT and the current state of the market

Looking only at the current state of the telecoms market, the importance of strong competition and the constantly improving quality of infrastructure should be emphasised. **Telecoms operating in Poland have built strong foundations, and the gradual development of networks towards fibre optics and 5G will gradually translate into increasing use of lines with the highest capacity**. Despite delays in the assignment of radio spectrum resources allocated for 5G networks, operators were able to launch this type of service using other resources – such networks did not offer the full range of capabilities, but they allowed the demand for the new technology to be explored and, in a way, consumers to become accustomed to it.

**The telecommunications market seems to reflect wider phenomena in the area of digitisation and new technologies – in particular a certain 'insularity' of Polish digitisation**. This phenomenon can be observed among both individual and business users. In the former case, it is worth noting that in Poland about 85 % of people declare regular use of the Internet and this value has stabilised after some acceleration during the pandemic, but is significantly lower than the EU average (90 %). However, this difference is entirely due to lower internet use in older age groups, while younger people (i.e. those under 35) use the internet statistically the same as their EU peers. The same is true for some uses – for example, digital banking services, considered to be a Polish speciality, are very popular among the under 44s, while in the older cohorts Poland clearly lags behind the EU average (as a result, it also lags behind in measures for the population as a whole). In turn, surveys among companies indicate that while large companies are at a similar level of use of modern digital technologies as companies in other EU countries, small and medium-sized enterprises stand out significantly. From the market's point of view, this means that there is limited potential to extend the reach of services to consumers, but rather to look towards deepening the offer, i.e. offering more advanced services to those who regularly use the Internet. For companies, on the other hand, a huge challenge is to increase their overall level of digitalisation. Action in this area may be an opportunity for the development of the telecommunications market (provided it goes beyond the narrowly understood provision of connectivity), but it is also part of Poland's broader development goals. Here, however, telecoms face action from companies in other areas – especially so-called BigTech, who often have their own offer for businesses.

**The interaction between market forces and state and regulator intervention in the market** is also noteworthy. On the one hand, there is synergy and a complementary effect between these activities, as in the case of the procedure for designating areas of intervention with public funds (e.g. POPC, which are targeted at areas without adequate infrastructure and elude the investment plans of operators). On the other hand, public authorities are learning to use tools such as, for example, investment obligations. In this context, it is also necessary to point out the low flexibility of POPC rules, which do not allow the use of fixed wireless access (FWA) solutions to provide end-user access. It is estimated that connecting a single household using FWA technology can cost up to 50 % less than an FTTH link, with a lower environmental load. Such a link does not provide performance equal to fibre optic links, particularly in terms of scaling and upload speeds (www19). At the same time, however, speeds in the order of 100 Mbps seem adequate for most, if not all, consumer applications available today.

The progressive consolidation of the market, as well as the trend towards unbundling of infrastructure and services (in both mobile and fixed networks), is also conducive to improving the quality of services, by improving the financial situation and increasing the scale of operators.

From this point of view, consolidation of European operators, which is recommended by recent reports devoted to restoring competitiveness in the EU (Letta, 2024; Draghi, 2024), could also have a negative impact on Poland. **Such a solution could increase prices on the Polish market, it could also negatively affect investments in areas already difficult in this respect** – from the point of view of operational decisions, the purchasing power of consumers or users in many regions of the EU is higher than in Poland, and from the point of view of strategy, decisions made at the headquarters located outside Poland could take less account of local conditions.

## SWOT and long-term challenges

**In the longer term, it is important to look at the Polish market in terms of opportunities and threats coming from outside and concerning the broader role that telecoms could play in the digital economy**. As mentioned in earlier chapters, telecom operators are lagging behind in terms of innovation vis-à-vis companies developing hardware or software, and without a fundamental transformation their role will be limited to a public utility service. In doing so, it is worth emphasising that the transformation challenge for telcos is not new – similar theses were reiterated a decade ago (Citi, 2016), and arguably even earlier However, telcos did not respond adequately then, and today quite a few observations remain valid, although the situation and chances of reversal are significantly smaller. A market in which roles and shares are roughly divided, which gives stable revenues is not conducive to innovation – there is less competitive pressure. At the same time, the exhaustion of simple ways of attracting new customers could lead to such activities – distinctive, innovative services can serve to take customers away from competitors. It seems, however, that these would have to be services outside the telecommunications area, diversifying the revenue sources of telecommunications operators in some way.

Delays in the allocation of spectrum resources for mobile communications, including 5G networks, are clearly not conducive to such a telecoms transformation. It should be noted at this point that in the consultation (www20) conducted by UKE, operators have spoken out against the rapid allocation of the 26 GHz band – in theory suitable for industrial applications or the Internet of Things. This may hinder the exploitation of the opportunity of a significant industrial share in the Polish economy.

**There is currently a lot of competition in the markets potentially in the field of interest of telecoms, which could become an additional source of revenue and at the same time contribute to improving the innovation of the Polish economy**. The two largest cloud computing providers have opened their large computing centres (so-called Regions) in Poland. In turn, all entities can apply for the use of bandwidth allocated by the UKE for private 5G networks; access is not limited to mobile network operators. The development of private and industrial 5G networks also requires competence in IT or system integration – there are specialised entities in these industries as well.

# ANNEX. The impact of competition on prices and network quality – a literature review

**A key argument put forward by supporters of consolidation of the European telecommunications market is the beneficial impact of consolidation on the amount of investment in telecommunications infrastructure**. Thus, the European Commission's actions impeding the merger of telecoms would hamper innovation in Europe and keep it behind the US, China or Korea, which are quicker to implement some of the latest solutions. However, it should be noted that the impediments mentioned (i.e. decisions by the Competition Directorate blocking mergers) concern mergers within a single country (which would reduce the number of operators from four to three – such a situation occurred in Denmark in 2015 and the UK in 2016, or far-reaching obligations to transfer part of the assets to another entity, as in Spain) and not acquisitions of operators in other countries.

In its decisions, the European Commission relied on studies showing the potential harm to consumers due to less competition – in the form of higher telecoms prices. This effect, in the Commission's view, was strong enough to raise objections to mergers (e.g. in the Netherlands or the UK). A recent example of this is the merger between Orange and MasMovil in Spain, which was admittedly approved by the European Commission, but one of the EC's highlighted objections was the negative impact on prices – they would increase by 10 % in the absence of remedies.

In response, there have been several studies examining the relationship between changes in the number of operators and service prices or network quality or investment levels. These studies mostly concern mobile networks.

**Box 2. Selected aspects of the relationship between investment and market concentration**

- Operators argue that the need to facilitate mergers in the telecoms markets with low revenues (measured e.g. by ARPU) and the low profitability of the telecoms market in Europe, is expected to inhibit investment. A merger of operators can result in increased revenues and profits even without an increase in prices for end-users – thanks to the elimination of duplicate processes and greater efficiency in the use of infrastructure, as pointed out in the study by Genakos, Valetti, Verboven (2017).
- A smaller number of operators may reduce the total volume of investment but increase the value of the investment incurred by each operator. The average size of the network (measured, for example, by the number of users or infrastructure stock) is larger with a lower number of operators – hence each operator must invest more in network maintenance and development. However, this does not automatically mean better quality, here a more important indicator is the amount of investment per some fixed unit, e.g. number of inhabitants or number of users.
- Network quality is a parameter that is difficult to measure – it is most often determined by transmission speed, delay, delay variation, country coverage. The network quality perceived by the user also depends on the spectrum resources used by the operator, spectrum efficiency and network density.
- Fewer operators and the associated higher service prices may lead to a reduction in demand, which in turn may translate positively into network quality (lower congestion).
- At the same time, a smaller number of operators favours the concentration of radio spectrum resources, which can lead to its better use – wider bandwidth or, for example, the use of *carrier aggregation* techniques. Thus, when operators merge, there are synergy effects – the merged network is more than the sum of the networks of the merging operators.
- The relationship between the level of competition and the level of investment can be arranged in three ways. Some studies indicate that firms with larger market shares, making higher profits, have adequate resources to cover investment costs. In this view, less competition favours investment and innovation. Another strand points to the incentive to invest that firms operating in an intensely competitive environment have. They invest to gain an advantage in the market, to stay ahead of the competition or simply to stay in the race (when competitors undertake investments).
- The relationship between the level of market concentration and investment can take the shape of an inverted U. This means that when there is too much competition or too much market concentration, investment is lower than in an intermediate situation. Some theoretical studies and the results of some econometric models point to such a relationship. The difficulty with such a relationship is to determine at which point of the curve a particular market is located – whether increasing concentration will move it closer to the optimum or the opposite.

Source: prepared by PEI based on: Ofcom (2020).

# Empirical studies

**The results of empirical studies undertaken in recent years do not give a clear answer as to the impact of mergers on the telecommunications (mobile) market on the direction of price changes and the quality of services offered**. It is also difficult to indicate a situation in which a merger would take place on a market similar in structure to the Polish one – hence conclusions from other countries must be treated with caution if they are to be applied to the situation in our country.

The European Commission's (2017) *ex-post* analysis of the merger in the Austrian market (T-Mobile/tele.ring, downsizing from 5 to 4 operators) shows that in this case no price increase took place. However, the Commission emphasises that the approval of the merger was subject to important obligations, including the transfer of part of the radio spectrum resources and the location of base stations to operators with smaller market shares. In the same document, the Commission also describes the effects of the merger in the Netherlands (T-Mobile/Orange, reduction from 4 to 3 operators). In this case, the results of the econometric analysis indicate a potential price increase, compared to the control group countries and especially in the more intensive user group. However, this analysis did not include the impact of the merger on network investment or changes in service quality.

In contrast, an analysis of the 2010 merger of T-Mobile and Orange in the UK. (reduction from 5 to 4 operators) conducted for the European Commission (2017) indicated a decrease in prices after the merger and no impact on investment. Here, too, the merger was subject to obligations for, among other things, the resale of part of the radio spectrum holdings – as in the case described earlier, the analysis does not allow to separate the effect of the merger and the effect of strengthening other operators through the acquisition of additional spectrum or favourable network sharing agreements.

An example of the uncertainties and analytical and interpretative difficulties involved in assessing the impact of mergers on key market parameters is the analysis of the Hutchison/Orange merger in Austria in 2012 (reduction from 4 to 3 operators) (GSMA, 2017) and the broader overview of investment and network quality in mobile markets presented by the GSMA (2020) together with Ofcom's analysis (2020). The GSMA highlights the positive effects of mergers on network quality in both its studies. In addition to qualitative data (trends indicating better network performance and faster network development in markets with 3 operators), they also present a quantitative analysis. For the merger in Austria (GSMA, 2017), the authors point to faster network development, higher download and upload speeds, as well as improved network quality in the other operators that were not involved in the merger. Ofcom (2020) disputes these results, pointing to the limitations of the methodology used by the GSMA. In the calculations presented in their paper, the UK regulator's analysts indicate that the level of investment (measured for the country as a whole) is lower in more concentrated markets. This in itself does not necessarily imply a lower quality of service, but further analysis indicates that there is no effect of improved network quality, in markets with lower levels of competition.

The Hutchison/Orange merger in Austria is perhaps the most studied telecom operator merger in Europe in terms of its impact. A significant number of studies point to price increases following this merger, at least in the short to medium term. Such an effect is indicated by 4 of the 7 studies reviewed in Fruits et al. (2019). Two others indicate a decrease in prices, and one did not address this issue. The authors of the review also point to a number of caveats that can be made against individual studies and to important methodological differences that make it difficult to draw clear conclusions (e.g. different definitions of price levels, different approaches to including MVNOs, different time periods). They conclude that **the review of the impact of empirical analyses of concentration on price levels is "conclusively inconclusive"**.

**A comprehensive review of studies on the effects of mergers in mobile markets also yields ambiguous conclusions** (Padilla et al., 2023). On the one hand, the authors summarise studies on three mergers that resulted in a change in the number of operators from 4 to 3, and add their own study for two further mergers (in total, there were 7 examples of this type of merger in the EU between 2010 and 2023[4]). The empirical studies give inconclusive results, but in two examples (Germany, Ireland) only two such studies are available (BEREC, 2018; Ofcom, 2020), which generally indicate no impact on prices (apart from a short-term impact on some baskets) and on investment levels. However, the results of the authors' own study indicate that in these cases the price per GB of data transmitted fell faster than before the merger, which would be expected to indicate better conditions for users (better quality-adjusted price parameter). The authors also analyse two mergers that have not been analysed in the previous literature – in Italy and in the Netherlands. They assess the impact of market change on the price of 1 GB of transmitted data. In the first case, they conclude that the merger had no effect on the change in price per 1 GB, in the second case that the price decrease was slower than before the merger.

Analysis of the comprehensive index prepared by the GSMA (Network Performance Index), Padilla et al (2023) shows that countries with mergers reducing the number of operators from 4 to 3 have improved their position over the years. When analysing these results, it is important to note, first of all, the very simplistic methodology of the price/quality ratio study (no consideration of external factors or comparison group) and the lack of in-depth analysis of the change in the GSMA index (beyond showing the change in countries' positions).

At the same time, **the authors also point to a number of methodological problems with the studies on the impact of mergers on prices or network**

[4] In the Netherlands, Austria, Italy, Germany and Ireland, mergers ended with Commission approval (in some cases subject to additional obligations), while in Denmark merger plans were abandoned and in the UK a merger was blocked. Two further proceedings, in Spain and the UK, were still pending at the time of the cited study.

**quality discussed** in **their paper** – primarily relating to elements included in the price of a service (price per 1 GB, price of a bundle, price of 1 minute of calls, price of a device purchased together with a subscription, etc.) or measures of network quality (transmission speed, network coverage, speed of network development). An additional difficulty is the exponentially increasing volume of data transferred (which makes it difficult to compare offers and service baskets over time).

The same authors also present 17 studies on the aggregate assessment of the impact of changing concentration levels on telecom market parameters. Here, too, the results are inconclusive. **Some of the results of the studies show an increase in prices after the merger, some show no effect. Some of the results indicate that higher concentration is associated with an increase in quality, others indicate an inverted U-shaped relationship and others indicate no significant effect**.

It should be noted here that the methods adopted in most studies to assess price levels relate to a comparison with a control group. Thus, an effect referred to as a 'price increase' may be equivalent to a fall in prices in the control group that was not reflected in the country under study.

Mention should also be made of an important study by Genakos, Valetti, Verboven (2017), conducted on a database containing data for OECD countries. The authors obtain results according to which **greater concentration in markets leads to higher prices for end-users**. Specifically, for a merger from 4 to 3 operators, with symmetric operator shares, prices increase by 16.3 % and for an asymmetric merger (smaller companies merge) by 4-7 %. In the context of the general trend of falling prices, the authors point out that this change corresponds to a rollback of 8-9 quarters. Investment at the operator level is higher, but the effect at the level of the overall economy is ambiguous. This study is relevant because Tomasso Valetti served as chief economist of the EC Directorate-General for Competition from 2016 to 2019 and influenced decisions on telecom operator mergers during that time.

Last year, in a report summarising 25 years of competition policy in the European Union, the Directorate for Competition (European Commission, 2024c) reached similar conclusions. Increased market concentration, according to the findings cited by the authors, leads to higher prices and the effect on investment is unclear. According to some measures, countries with more operators have higher levels of investment (although this may be due to duplication of some infrastructure elements), while according to others the effect is not statistically significant. Commenting on comparisons with the United States (higher levels of revenue and higher investment), the authors instead emphasise that it is not so much the investment itself that is key, but the ultimate quality of service available to the user.

In addition to the general impact of mergers, it is worth noting a few aspects emerging from the research that may be relevant to the Polish market:

- MVNO presence: in Poland, MVNOs have a very limited reach, in contrast to some of the other markets covered by the studies described above. The entry of a new MVNO into the market is also one of the remedies applied by the EC (e.g. in the case of Austria or Spain). MVNO activity is generally associated with greater competitive pressure and price reductions (not least because such operators have lower operating costs), but in Poland this type of model has not taken off so far – this raises doubts about whether it will work in the future;

- Market symmetry – some studies suggest that **mergers have a positive effect on market performance if they increase the symmetry of market shares** (e.g. if two weak players merge, allowing them to match the top two or three). Similarly, if operators with poorer network parameters merge – the new entity may have a chance to establish competition or leapfrog it, which mobilises all players in the market for new investments. In Poland, with the current market structure, a merger in the mobile market would lead to the emergence of a dominant player.

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## The Polish Economic Institute

The Polish Economic Institute is a public economic think tank dating back to 1928. Its research primarily spans macroeconomics, energy and climate, foreign trade, economic foresight, the digital economy and behavioural economics. The Institute provides reports, analyses and recommendations for key areas of the economy and social life in Poland, taking into account the international situation.

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