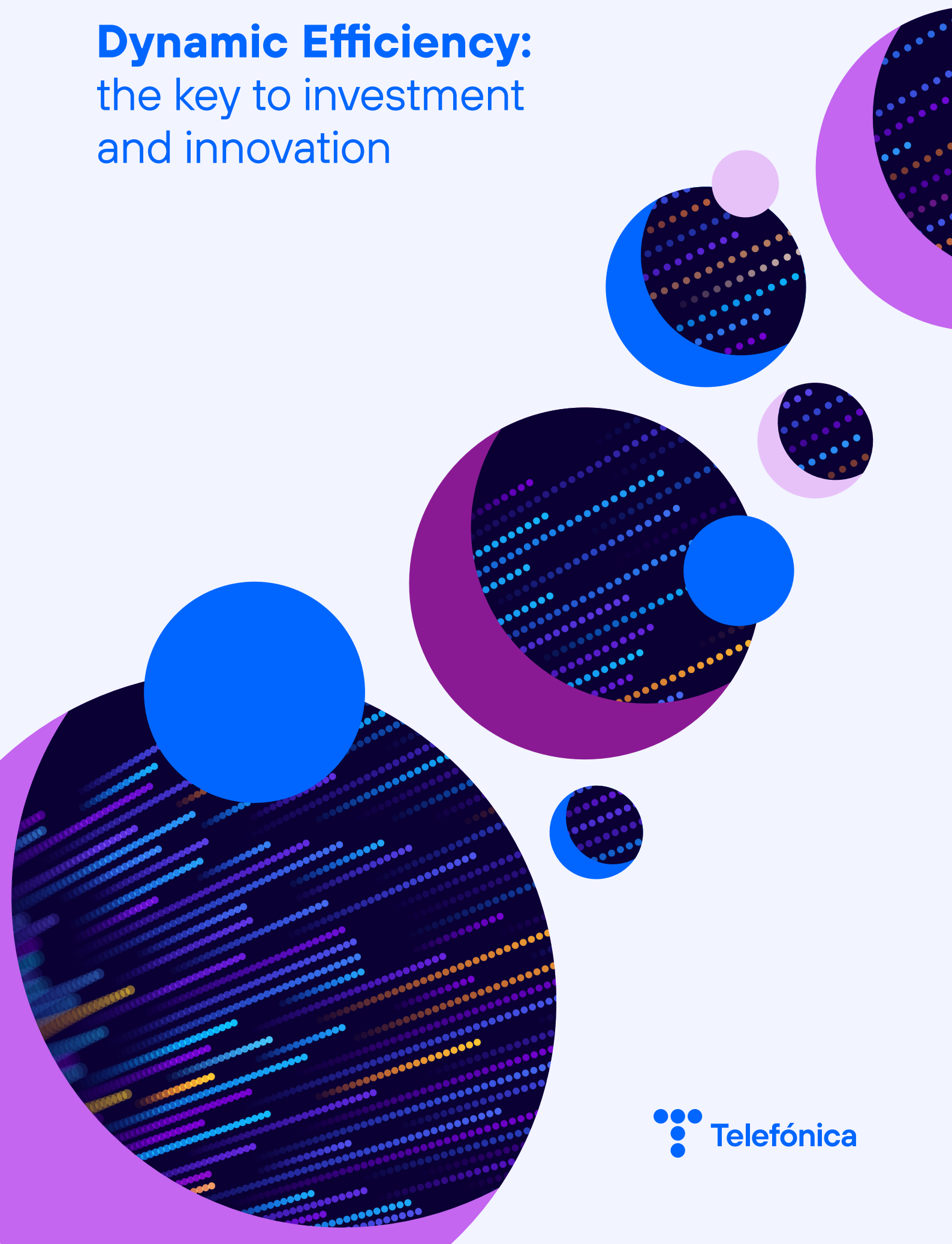


# Dynamic Efficiency: the key to investment and innovation



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## \* **References**

## Executive Summary

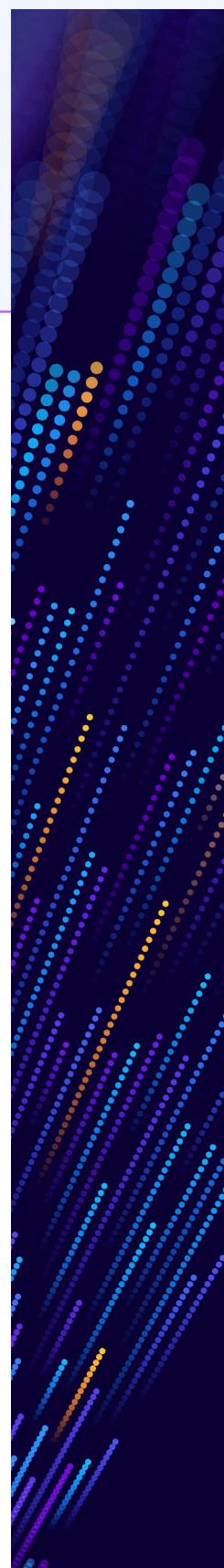
For decades, the European Single Market has been the main engine of growth and economic convergence within the European Union (EU), boosting productivity, deepening economic integration and improving citizens' welfare. Today, however, this cycle of dynamism shows clear signs of stagnation. The EU is currently facing a structural challenge characterised by low growth, declining competitiveness, and a widening technological gap relative to other similar economies.

In order to return to a path of sustained growth, the EU needs a new public policy agenda geared towards dynamic efficiency of the markets. This is understood as the ability of markets to generate innovation, attract investment and adapt to the technological transformations that determine economic progress and long-term well-being.

This need is even particularly pressing in the current context, which differs significantly from the one that led to the creation of the Single Market. Europe is going through a change of era characterised by AI, advanced digitalisation, and growing rivalry between major technology powers that are redefining global competition. To ensure the competitiveness and strategic autonomy of European industries, it is vital to prioritise the development of emerging technologies and to strengthen the resilience of critical infrastructure. In this context, Europe needs a strategic regulatory approach with a long-term vision that promotes investment, innovation and the competitiveness of its businesses and, with it, the well-being of its citizens.

However, both sectoral regulatory frameworks and the current application of competition policy, which often focuses on consumer price as the sole indicator of welfare, may prove insufficient and even counterproductive. Their approach, currently based on static efficiency, risks overlooking strategic considerations that, in the long term, would generate greater well-being through more innovative, efficient and competitive services, supported by stronger companies, and tailored to the needs and preferences of Europeans.

This document argues that administrative, regulatory and competition decisions need to evolve from an approach focused on consumer price as the sole indicator of consumer welfare to one based on dynamic efficiency. It thus proposes strengthening the role of markets as drivers of investment, innovation, strategic autonomy and sustained well-being. Drawing on economic theory and empirical evidence, with a particular focus on the telecommunications sector, this document explores the benefits of this approach and makes recommendations for the European Union to adopt it as a priority in the design of future public policies.





## 2.

### Economic theory of competition: from static efficiency to dynamic efficiency

The concept of competition serves as a compass guiding economic regulation towards more efficient markets and greater social welfare. This section examines how economic theory explains competition in two ways: as static efficiency, concerned with prices, and as dynamic efficiency, concerned with innovation and investment. Understanding the distinction between these two forms and their implications is essential for designing public policies that foster market competitiveness and social welfare. Subsequently, section 2 presents empirical evidence illustrating the functioning of markets under dynamic efficiency, with a particular emphasis on the telecommunications sector.

#### a. Why economic theory on competition is relevant

Economic or market regulation refers to the use of state power to establish certain rules that promote the proper functioning of markets. Regulation is achieved through control over various variables, such as prices, quantity, or the possibility of entering and exiting the sector. Sectoral regulations, such as the Electronic Communications Code, and horizontal regulations, such as competition law, can be used to this end. Consequently, the behaviour of sectors is determined by a combination of market forces and regulations.

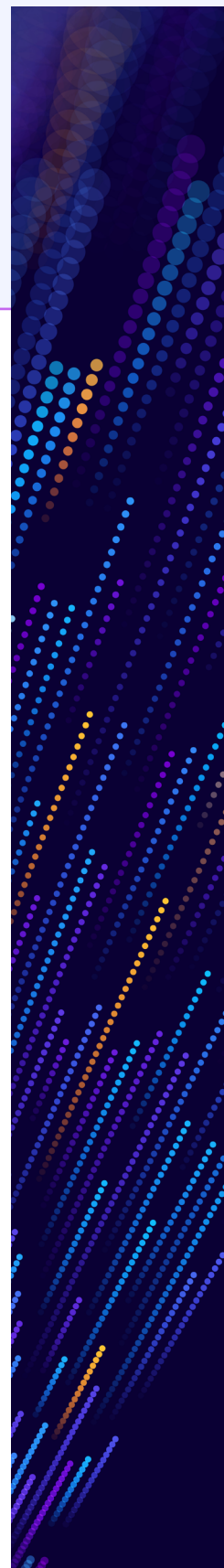
The overarching objective of economic regulation is to enhance social welfare by optimising market functioning to meet consumer demands. This is why economists often say that economic regulation aims to correct so-called 'market failures'.

The existence and identification of market failures is predicated on an implicit conception of the ideal functioning of competition. Only with a clear paradigm of competition can deviations from this ideal be identified, thereby informing regulatory decisions aimed at correcting them.

Therefore, the way in which the functioning of a market is understood is decisive for economic regulation decisions, as these guide the actual market to behave in accordance with the ideal market that serves as a reference.

#### The concept of competition and its strategic relevance

What constitutes the ideal functioning of markets? There is no clear consensus among economists, so there is no single answer. This diversity of approaches means that the choice of the ideal functioning involves a certain degree of interpretation.





Thus, for example, the definition of what is considered an ideal market guides interventions in cases of abuse of dominant position or in the assessment of business consolidations. As will be discussed below, the ideal implicitly chosen by European competition and regulatory authorities usually assumes that competition improves social welfare through lower prices.

Without entering the debate on whether this is really in the best interests of European citizens, it is clear that there may be markets or circumstances when this objective is legitimate. However, it must also be accepted that this objective is not always the most desirable for society.

In the current context, the strategic priorities of the 2024-2029 European cycle focus on boosting business competitiveness, security, resilience and sustainability through initiatives that reduce the gap in innovation and investment and decrease strategic dependencies<sup>1</sup>. It is indisputable that the proper functioning of markets is an essential condition for achieving these objectives. For this reason, the President of the European Commission gave the Commissioner for Competition a mandate to review the Guidelines on the assessment of horizontal and non-horizontal mergers, taking the above referred factors into account<sup>2</sup>.

What remains to be clarified is how the market would ideally function to achieve these objectives. To this end, the following section (section b) describes how authorities currently understand competition. Subsequently, alternative approaches proposed by economic theory are described in section c.

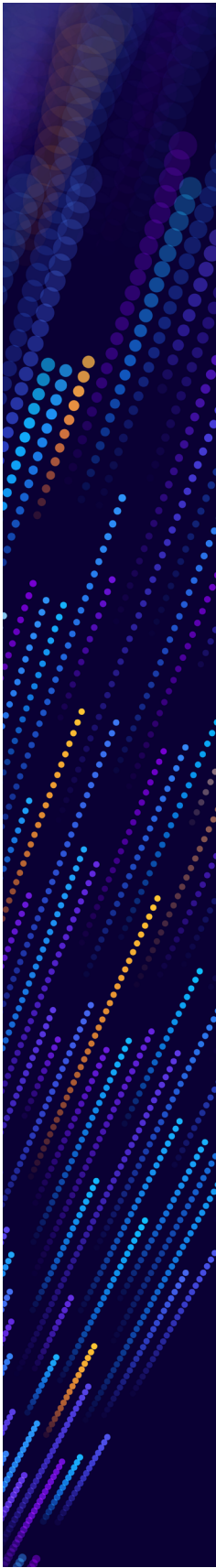
**b. Current paradigm: static efficiency in the market with perfect competition**

Economist and Nobel Prize winner Kenneth Arrow demonstrated that a market in perfect competition optimised the so-called allocative efficiency of resources, so that all existing resources ended up in the uses where they were most valued.

**Figure 1. Assumptions of the perfect competition model according to economic theory**

ATOMISED MARKET	HOMOGENEOUS OR INDIFFERENTIATED PRODUCT	PERFECT INFORMATION	NO TRANSACTION COSTS
Many companies. All are small relative to the total market	Companies only compete on price	Correct, secure and free for everyone (companies and consumers)	No barriers to entry or exit the market

As explained above, to the extent that actual markets deviate from the functioning described in Figure 1, regulatory and competition authorities will consider this as detrimental to social welfare and will tend to take measures to correct it. This will inevitably lead the actual market to function as the desired model.



This explains the attention that authorities pay to market structure, specifically concentration indicators. High market shares imply that the market deviates from the first assumption of many small producers. It is also consistent with their concern about barriers to entry (for example, if large investments are required to enter the market), the elimination of which explains, for example, the access regulation to which the telecommunications market is subject.

However, even a minimal reflection about these assumptions raises doubts as to whether they are really desirable for consumers. That is because the perfect competition model considers inefficient all activities that are contrary to its equilibrium assumptions.

For example, the assumption that products are homogeneous implies that product differentiation derives from market power and therefore inefficient. However, given that individual preferences vary from one individual to another, product differentiation is not only sustainable but also desirable, as evidenced by the assortments available in any shop.

The same can be said when assuming the hypothesis of atomistic companies. This automatically makes oligopolies and any non-atomistic market structure inefficient. However, the atomisation of production units would imply a small size for them, preventing them from achieving significant economies of scale and raising their unit costs, resulting in final prices that are unaffordable for a large part of society<sup>3</sup>.

And given that there is perfect information, innovation ceases to make sense: all consumer needs are already anticipated and satisfied if available resources allow. In this scenario, there is no room for change or progress.

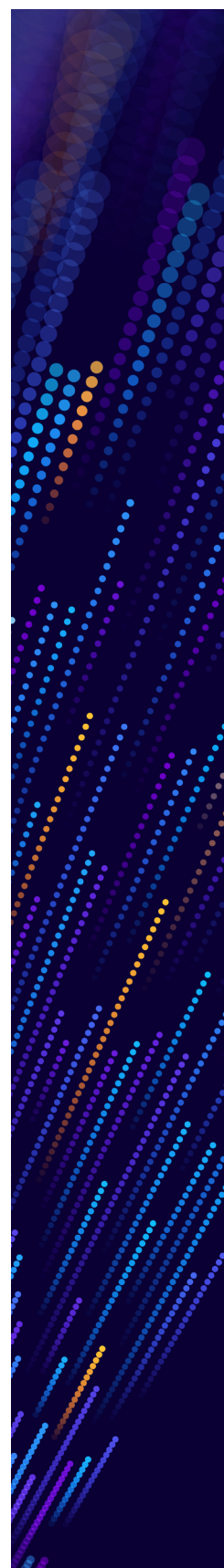
### **When static efficiency is not enough to maximise welfare**

Seeking to make the real market function as the ideal of perfect competition may make sense in certain temporal contexts and industries. However, there are two aspects missing from this model that are highly relevant to the generation of welfare: investment and innovation.

In a market with perfect competition, there is no investment because all investment has already been made. Remember that Arrow optimises the distribution of existing resources to known needs; this implies that there is a starting point, a pie to be distributed optimally among the participants, but nothing is explained about how the pie appeared. The same can be said of innovation: if all the needs and uses of resources are already known, it makes no sense anymore.

As authorities regulate the market to bring it closer to the ideal of perfect competition, investment and innovation in that market tend to disappear, and with them its capacity to generate long-term growth for society. This is the price to pay for achieving the optimal distribution of existing resources.

The relationship between static efficiency and investment has been proven through empirical evidence. Howell (2008)<sup>4</sup> showed, for example, that in New Zealand, although the introduction of regulation in the telecommunications sector improved static efficiency (lower prices in the short term and a greater number of competitors), operators' narrower margins had a negative impact on both investment and innovation in the sector.



### c. Alternative paradigms: in search of dynamic efficiency of the market

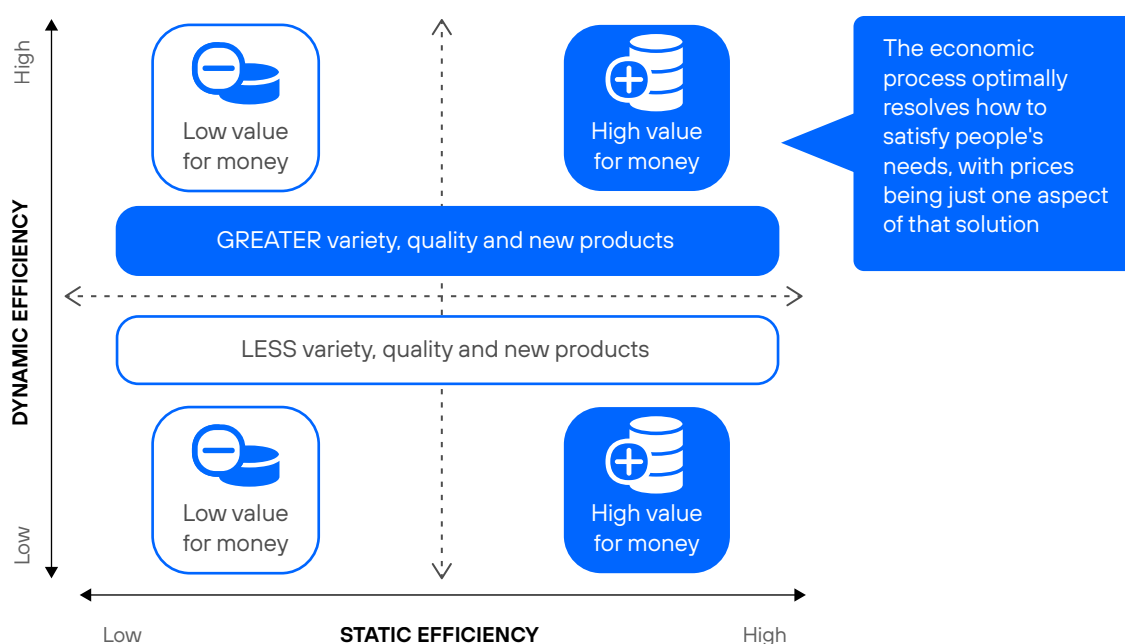
In many contexts, however, it is preferable to focus on the generation of wealth and resources rather than merely on their distribution. If society's needs change, then it is essential to identify them and explore the best possible resources to meet them. In this context, investment and innovation are crucial.

In particular, the competitiveness of companies depends on constant investment and innovation, which allows them to adapt to the changing needs of their customers. This translates into productivity improvements that will sooner or later lead to lower costs and, therefore, lower prices for the services currently provided.

There are various alternative views of competition that conceive it as a dynamic process in which investment, innovation, uncertainty and the passage of time are essential elements. In contrast to the static equilibrium approach, these theories consider it a discovery mechanism, through which individuals obtain information to allocate resources according to their needs through the price system.

Along these lines, Kerber (2023) outlines some alternative theoretical approaches of competition. For Joseph A. Schumpeter, it is a destructive-creative process, where constant innovation replaces the status quo and generates economic progress. Nobel Prize Friedrich von Hayek conceives it as a process of discovery, in which entrepreneurs, guided by market prices, anticipate and satisfy consumer needs through the innovative use of resources. Nelson and Winter describe it as an evolutionary process of selection, similar to Darwinism, in which companies test different ideas and technologies, and only the most efficient or innovative "survive" and consolidate.

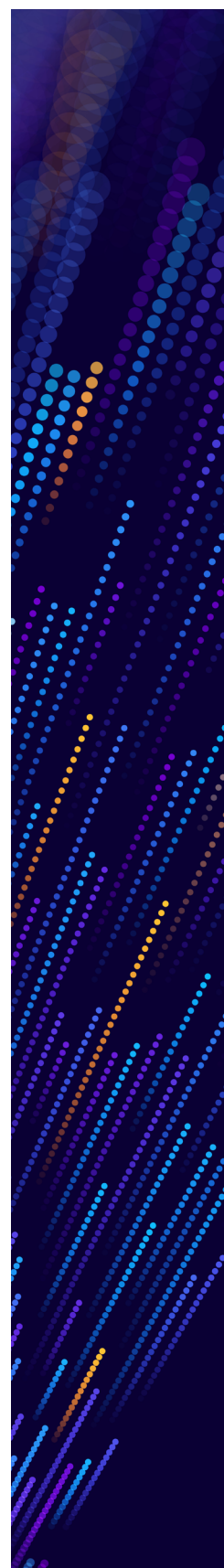
**Figure 2. Static vs. dynamic efficiency: impact on consumers according to De Bijl (2004)**





From this perspective, competition drives companies to innovate, differentiate themselves and respond to new demands. This does not depend on the number of agents, but on the production structure of each sector and the capacity to generate ideas at any given time. To promote dynamic efficiency, authorities must identify and remove the obstacles that limit it.

This is something that seems increasingly necessary in the European Union, as evidenced by the responses to the public consultation launched by the European Commission on the Guidelines on the assessment of horizontal and non-horizontal mergers<sup>5</sup>. Stakeholders from various economic sectors, including telecommunications<sup>6</sup>, are unanimous in their concern about the static approach taken by the authority in its decisions. They are therefore calling for the incorporation of a more dynamic view of the affected markets.



### 3.

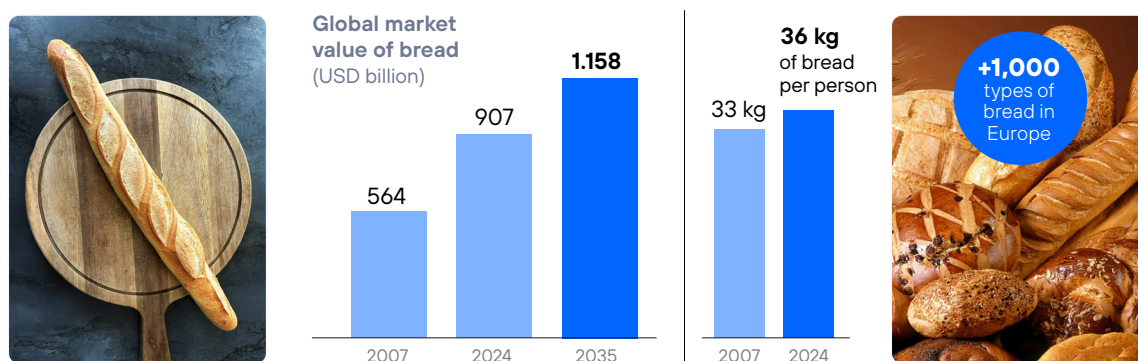
## Dynamic efficiency in the telecommunications sector: empirical evidence and relationship with industrial policy

### a. Connection between dynamic efficiency and social welfare

This dynamic view of competition is essential for investment and innovation to flourish and for social welfare to keep improving. This is challenging to achieve in a market where agents are focused on competing on price, as previously outlined.

Even sectors that appear to be mature or “commoditised” sectors can be drivers of innovation and welfare. One example of this is the bread market, which at first glance might seem to offer little scope for innovation. However, competition is not limited to price, but also encompasses quality, variety, or customer experience. The result of this has been the emergence of artisan bakeries, gluten-free breads, long fermentations, or bakeries incorporating cafés, among others, creating growth and value<sup>7</sup>.

**Figure 3. Potential for innovation and consumer benefits in traditional industries**



**Source:** Indexbox (2024): *World - Bread and Bakery Product - Market Analysis, Forecast, Size, Trends and Insights*. <https://www.indexbox.io/blog/bread-and-bakery-world-market-overview-2024-8/>; Photos Joshua Woroniecki on Unsplash; Mohamed Hassouna on Unsplash.

If this has happened in an old-centuries market that seems not very sophisticated, it is easy to imagine the impact on more complex and technological industries, where continuous investment and innovation can strengthen productivity and open markets, generating value for consumers.

For example, Hausman (1997)<sup>8</sup> estimated, based on adoption and price data between 1989 and 1993, that the introduction of mobile phone service generated a net benefit of approximately \$50 billion per year for US consumers. Similarly, Crandall and Jackson (2001)<sup>9</sup> concluded that universal adoption of broadband Internet connections (ADSL, cable, 3G, satellites and others) by US households could provide consumers with benefits ranging from \$200 billion to \$400 billion per year. Reality has, of course, surpassed these initial estimations.

In this context, market regulation and competition policy should be conceived as instruments to enable innovation, strengthen productivity and generate sustainable long-term value for consumers, ensuring that competitive markets play a strategic role in economic development and well-being.

## **b. Challenges for boosting dynamic efficiency in telecommunications**

To boost the dynamic efficiency of markets, it is essential to understand the structure of production, including investment and innovation cycles.

In the case of telecommunications, the indivisibility of networks is of paramount importance<sup>10</sup>, which means that, in the current context of flat rates, operators require a minimum percentage of customers (*take-up*) in the geographical areas where they operate to be viable and able to invest. This allows us to contextualise the current challenges facing Europe in the field of telecommunications.

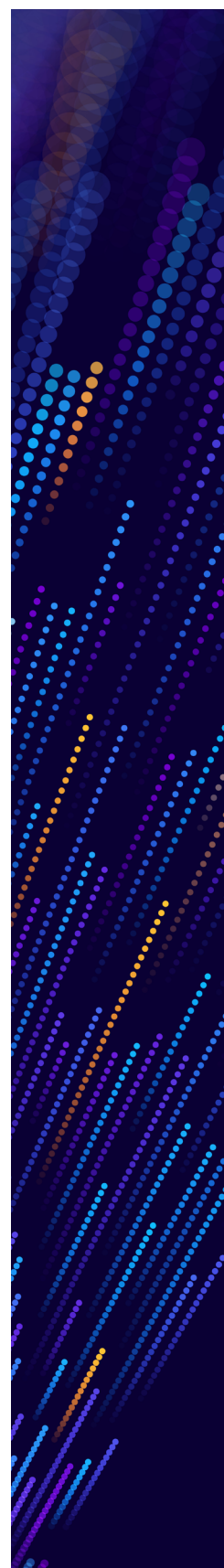
On the one hand, sectoral regulation has focused on facilitating the entry of operators in addition to the former monopolist. To this end, the European Union implemented detailed access regulation, i.e., about the use by third parties of the incumbent operator's network under regulated conditions, which remains in force in most Member States. This type of regulation has focused on the static efficiency of the market, setting the reduction of prices as a synonym for social welfare and facilitating the entry of new players under privileged conditions to achieve this. As a result, many players have entered the market, some of which, as in any sector, are not viable as they have to achieve the minimum *take-up* required by each of them, on the same and unique customer base.

With the same objective of increasing static efficiency, competition authorities have made it difficult for operators to exit the market by consolidating with another. In the European Union, few consolidation operations are approved without conditions, except for the merger between T-Mobile and Tele2 in the Netherlands in 2018. Approved consolidations have required significant remedies, usually structural divestiture remedies, facilitating the artificial entry of new operators.

This pursuit of static efficiency has led the telecommunications market to a challenging situation for operators, in which sectoral regulation encourages the entry of new players, while competition law prevents the exit of those whose expectations are not met<sup>11</sup>.

## **c. Evidence of the impact of a regulatory approach geared towards dynamic efficiency**

This section presents evidence from different telecommunications markets showing how some consolidations, by enabling dynamic efficiency, have generated considerable benefits for consumers. Subsequently, it will be seen that they have also facilitated the achievement of national strategic objectives.



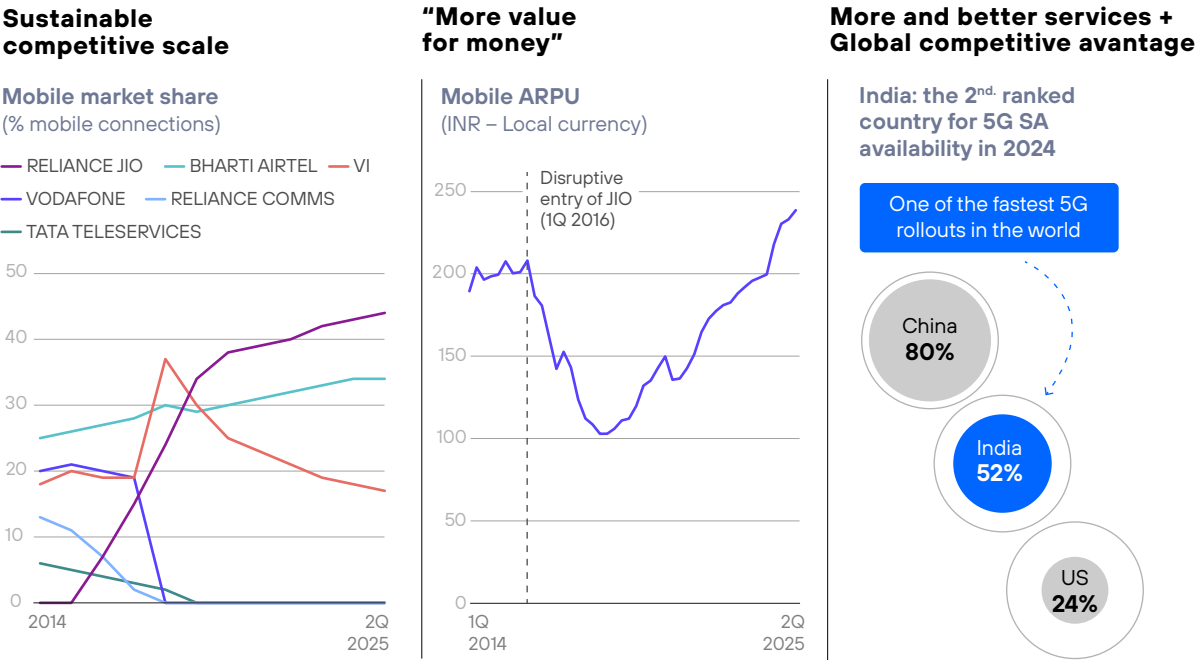


A first illustrative example is **INDIA**. In this market, the disruptive entry of Jio in 2016 profoundly transformed the market by offering unlimited LTE data services at nominal prices, which triggered mobile data consumption to 17 GB per month per user in 2024, with an average annual growth of 62% since 2016<sup>12</sup>. However, this expansion occurred in a context of low average revenue per user (ARPU ~€2) and limited per capita investment (USD 6), putting strong pressure on profitability (~30% capex/revenue)<sup>13</sup>. In response to this situation, there were several consolidations, and the market saw a reduction from more than six operators to just three at the national level in 2020. These three operators accounted for more than 90% of revenues and 80% of the spectrum.

As a result, investment was boosted with an average increase of 13% in per capita investment between 2020 and 2024<sup>14</sup>, accelerating the technological migration to 5G, expanding broadband (with fibre reaching 87% of fixed broadband connections in 2024 vs. 20% in 2017)<sup>15</sup>, and promoting digital inclusion in rural areas (according to data from the regulator, 40% of the 8 million 5G FWA connections as of July 2025 are in these areas<sup>16</sup>). It also generated value for users by developing advanced services, such as IoT applications, edge computing, private industrial networks and converged digital platforms, which integrate connectivity with entertainment, payments, e-commerce and the cloud. India is among the fastest 5G deployment markets worldwide, with 52% 5G standalone availability<sup>17</sup>.

The innovation ecosystem has also been strengthened, with more than 100 laboratories for the development of 5G use cases<sup>18</sup>. In the medium term, the sector is expected to grow at an average annual rate of 15% between 2025 and 2030 and evolve to 6G in the same period<sup>19</sup>.

**Figure 4. Effects of the merger on the dynamic efficiency of the telecommunications sector in India**

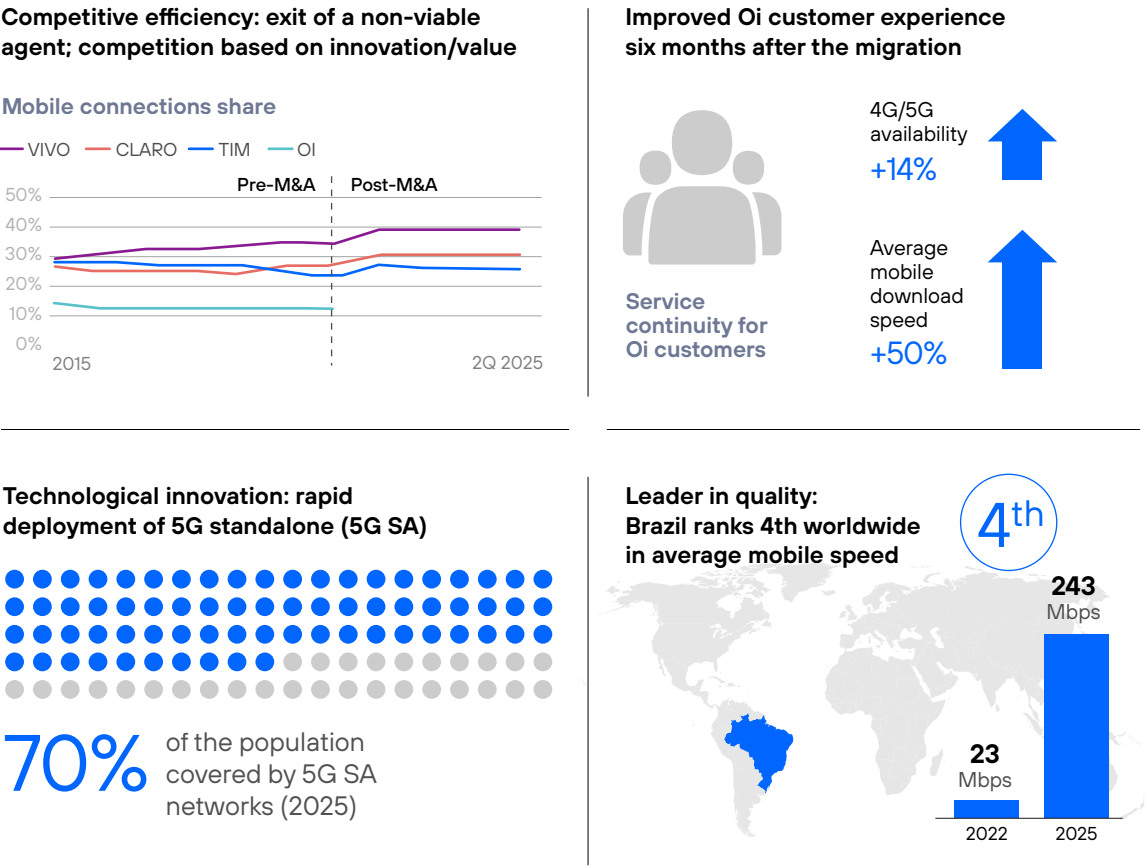


**Source:** Telefónica based on Analysys Mason Datahub (data extracted November 2025); Ookla (2025)

The market in **BRAZIL** is another relevant example. In 2022, the acquisition by Claro, TIM and Vivo of Oi's mobile assets and customer base allowed for the absorption of an operator that was no longer viable, ensuring continuity of service to its users. Beyond this guarantee, migrated users from Oi saw improvements of more than 50% in average download speed and a 14% increase in 4G/5G availability in the six months following the migration<sup>20</sup>. The operation also strengthened the scale and investment capacity of the three main operators, accelerating the rollout of 5G.

Brazil currently leads global mobile network quality rankings. In 2025, it was fourth in the world with speeds above 200 Mbps in 2025<sup>21</sup>, ahead of countries such as South Korea. According to Anatel Brazil's regulator, 94% of households have Internet access and 70% of the population has access to standalone 5G<sup>22</sup>. In fact, the regulator concluded in its September 2025 resolution<sup>23</sup>, that ex ante regulation of spectrum and virtual operators were not even necessary, as effective competition was found to exist.

**Figure 5. Effects of the merger on the dynamic efficiency of the telecommunications sector in Brazil**



**Source:** Telefónica based on Analysys Mason Datahub (data extracted November 2025); Omdia (2025; Opensignal (2022); Anatel (2025); Ookla (2025)

**TAIWAN** offers another significant example. In 2023, two major mergers were approved: Taiwan Mobile with T Star and Far EasTone with Asia Pacific Telecom, reducing the number of operators from five to three. The resulting operators combined their spectrum, achieving a more efficient use and economies of scale<sup>24</sup>.

**Figure 6. 5G spectrum allocation before and after the merger in Taiwan (2023)**

	Pre- M&A		Post- M&A		% mobile connections (2025)
	3500 MHz	28 GHz	3500 MHz	28 GHz	
Chunghwa Telecom	90 MHz	600 MHz	90 MHz	600 MHz	39.2%
Far EasTone	80 MHz	400 MHz	80 MHz	800 MHz	32.5%
Taiwan Mobile	60 MHz	200 MHz	100 MHz	200 MHz	28.2%
T Star	40 MHz	-	-	-	
GT	-	400 MHz	-	-	

Source: Ookla (2023)

Furthermore, consumers benefited directly. Taiwan Mobile noted that through intelligent network analysis and optimisation, it was able to improve coverage by 30% and increase speeds for migrated Taiwan Star users by nearly 30% on 4G and 70% on 5G, ensuring a consistent and higher-quality network experience<sup>25</sup>. By 2025, 5G will reach 97% coverage of the population nationwide (95% in rural areas)<sup>26</sup>. The consolidation also strengthened the competitiveness of operators: competition between the three remaining players remains intense and innovation-driven, especially in advanced 5G enterprise solutions and high-capacity data services. As Taiwan Mobile acknowledges, market consolidation marks the beginning of a new era of “value-based competition”<sup>27</sup>.

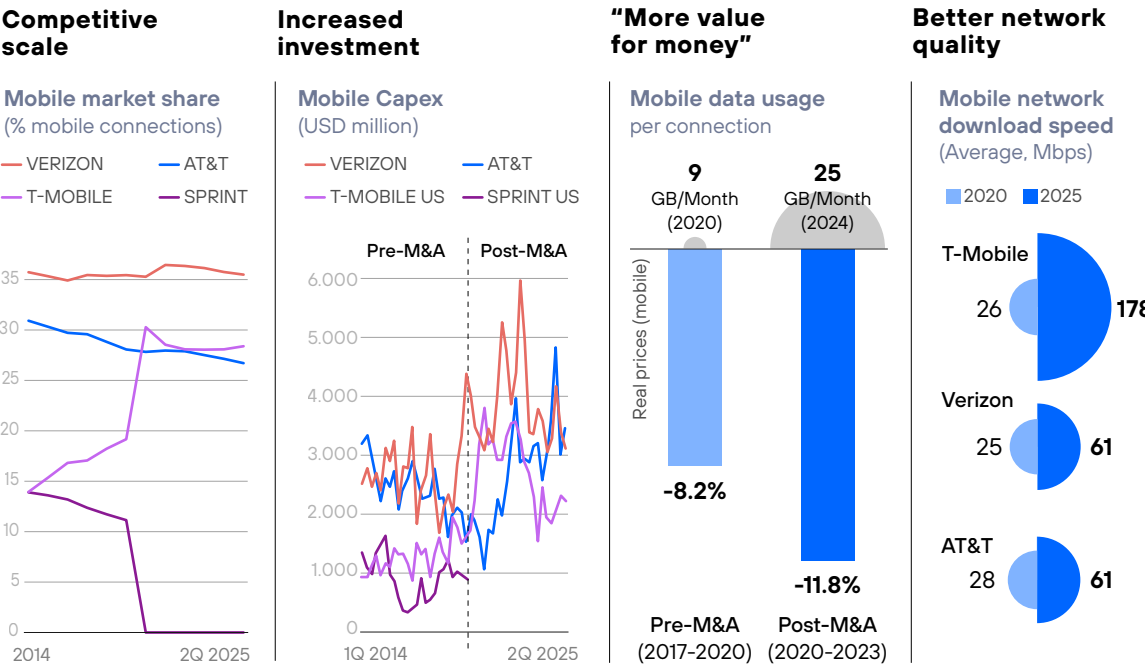




Similarly, in the **UNITED STATES**, a merger between T-Mobile and Sprint was approved in 2020. The remedies imposed by the regulator focused mainly on investment for the national rollout of 5G, which meant that no artificial competitor emerged, contrary to what has been the case in European markets to ensure static efficiency.

As a result, the United States has established itself as the global leader in per capita investment in networks, with an average of USD 256 between 2020 and 2024. In this period of just four years, 5G penetration grew from 4% to 70% of mobile connections, and the country is among the 15 countries with the highest average mobile download speed (172 Mbps in 2025)<sup>28</sup>, with T-Mobile doubling the quality of its networks compared to its competitors. In addition, recent studies (Hazlett and Crandall, 2024)<sup>29</sup> show that prices continued to fall, service penetration increased, and competition remained intense.

**Figure 7. Effects of the merger on the dynamic efficiency of the telecommunications sector in the United States**

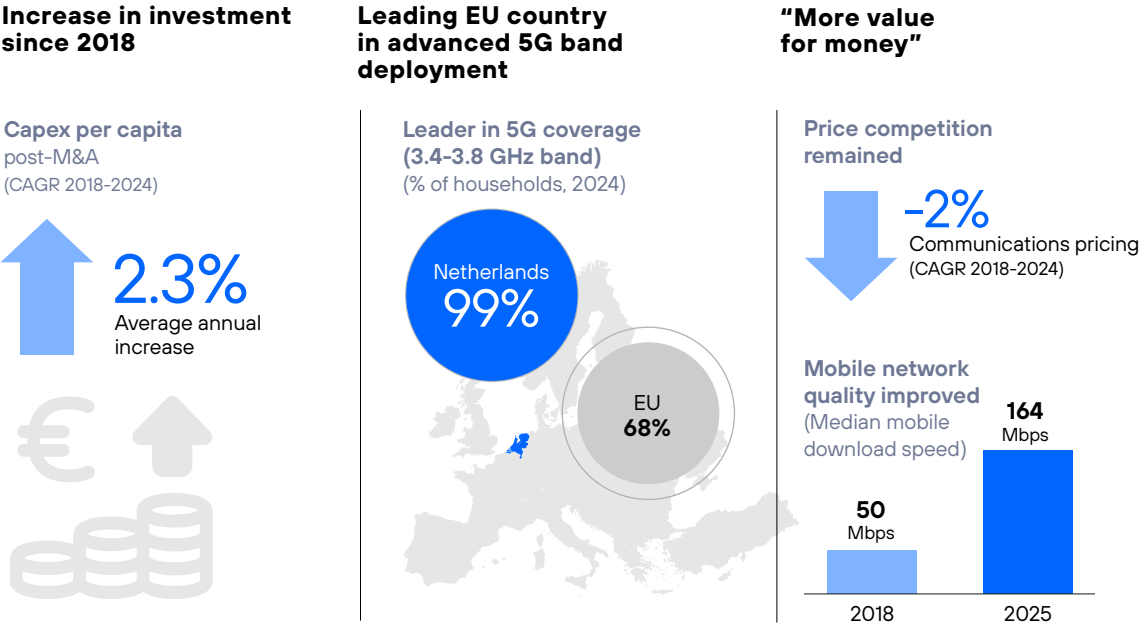


**Source:** Telefónica based on Analysys Mason Datahub (data extracted November 2025); Omdia (2025); Hazlett and Crandall (2024); Ookla (2025)

Even in Europe, where competition authorities have historically focused almost exclusively on the static efficiency of markets, there is evidence of dynamic efficiency in those mergers chosen to be authorised without additional obligations.

This was the case in the **NETHERLANDS**, where the merger between T-Mobile and Tele2 in 2018 was approved without remedies, i.e., without attempting to maintain static efficiency. As a result, there has been a sustained increase in per capita investment and rapid deployment of 5G, leading the country to become the EU leader in the deployment of the 3.4-3.8 GHz mobile network (advanced 5G)<sup>30</sup>. Consumers now obtain greater value from a rivalry that balances price with innovation, reflected in better service quality and technological development<sup>31</sup>.

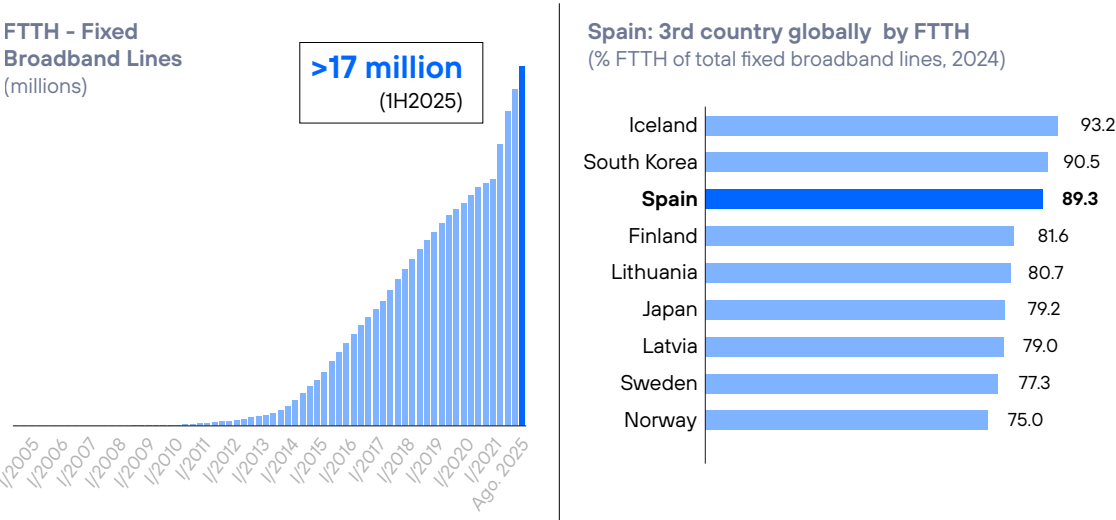
**Figure 8. Effects of the merger on the dynamic efficiency of the telecommunications sector in the Netherlands**



**Source:** Telefónica based on Omdia (2025); European Commission, [DESI](#) (2025); Eurostat (2025); [Ookla](#) (2025)

Something similar happened in **SPAIN** when, in 2009, the CNMC betted on dynamic efficiency by not imposing regulated access to Telefónica's network for speeds above 30 Mbps. As a result, alternative operators had to compete by rolling out their own fibre networks, rather than solely on price for providing services, as they had been doing before by using the incumbent's network in regulated conditions. As a result, the Spanish market is one of the world leaders in fibre optic deployment, ranking third in the world according to the OECD<sup>32</sup>, with two or three competitive accesses in some households, something that does not occur in any other country around the world.

Figure 9. Effects on the dynamic efficiency of the telecommunications sector in Spain



Source: Telefónica based on CNMC (2025); [OECD](#) (2025)

Evidence shows that when authorities focus on the dynamic efficiency of markets, the benefits for consumers and society multiply in all relevant dimensions: investment grows, quality increases, innovative products appear, and even the prices of existing products fall as they are displaced by others more in line with consumer preferences. This has been observed in the case of bread, and as evidence shows, in multiple telecommunications markets.

**d. Dynamic efficiency as an enabler of industrial strategy**

Once the capacity of dynamic efficiency to generate wealth has been established, it is the turn of industrial policies. Focusing the authorities' actions on improving the dynamic efficiency of markets is also crucial for industrial policies to be effective. This is reflected in Sauri et al. (2023), for whom competitive markets are essential for achieving long-term strategic objectives, such as technological sovereignty, industrial resilience and global competitiveness, which the EU aspires to achieve.

The examples described in the previous section for the United States and Taiwan are illustrative in this regard. In the United States, the telecommunications market has enabled the objectives of its *National Strategy to Ensure the Security of 5G Technology* (2020)<sup>33</sup> to be met without any significant disruption to the sector.

In Taiwan, the national 5G+ strategy set the goal of positioning the country as a globally leading advanced 5G industrial ecosystem and a leader in the transition to 6G. As we have seen, these objectives are being achieved in part thanks to the greater dynamic efficiency of the market, promoted by an enabling environment.



# 4.

## Recommendations

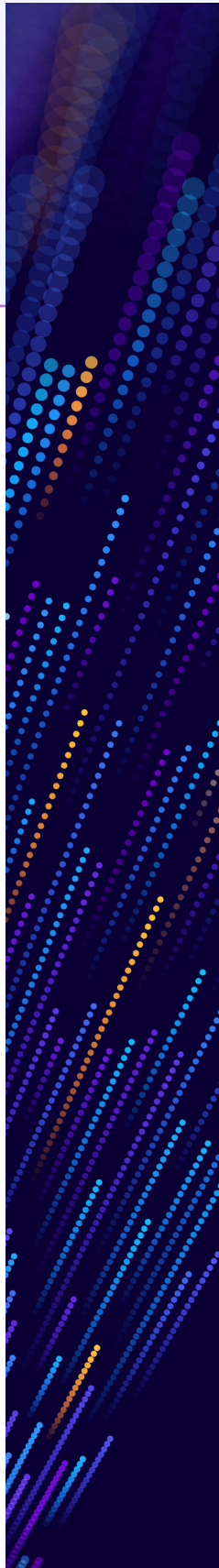
In light of economic theory and empirical evidence, a greater emphasis on dynamic efficiency would enable the European Union to strengthen its investment capacity, accelerate its technological and competitive development, and advance its strategic objectives, thereby enhancing consumer benefits.

Prioritising a dynamic efficiency approach requires a rethinking of competition policy and the various sectoral regulations to promote investment and innovation, ensuring both consumer welfare and the long-term competitiveness of the European Union.

Therefore, regarding **horizontal mergers**, Telefónica proposes that dynamic market efficiency be taken into account at all stages of the transaction analysis. This involves:

- a. Conducting an in-depth analysis of the affected sector structure of production so that its characteristics inform all phases of the decision
- b. considering whether the transaction creates sufficient conditions to compete in all dimensions of consumer welfare, not just in terms of prices,
- c. if necessary, imposing measures that encourage investment and innovation rather than merely creating a privileged player.

In terms of **sectoral market regulation**, Telefónica proposes conducting an impact analysis on the dynamic efficiency of the measures to be established, to avoid the artificial creation of competitors and prevent possible negative effects on investment and innovation.

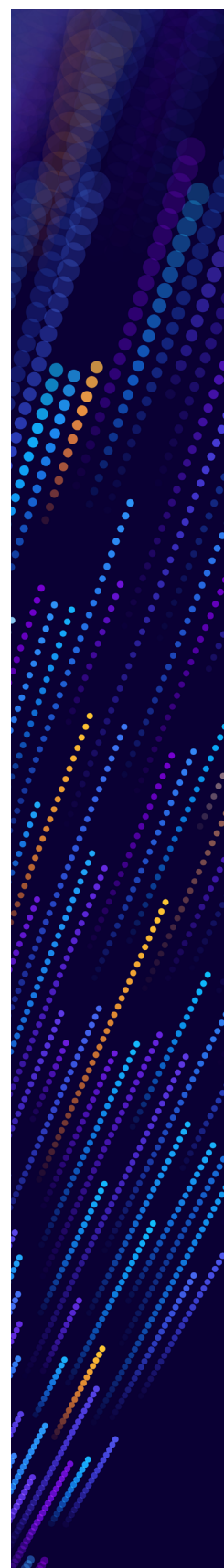




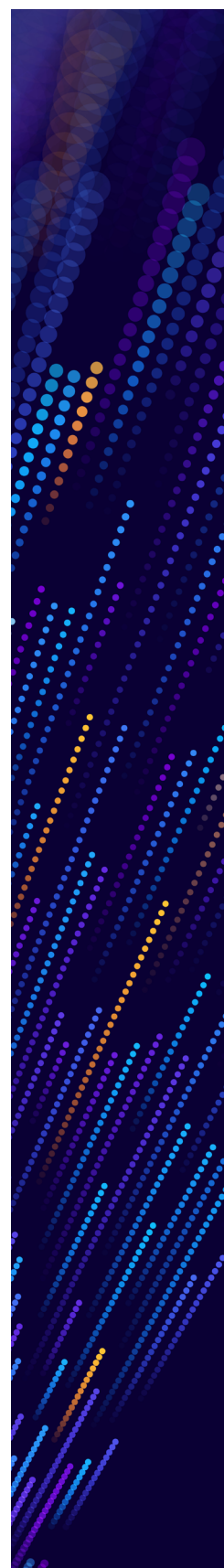
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3. For example, the pre-industrial wheat market featured a huge number of tiny farms operated solely by the physical effort of their owners and the help of a plough. Thus, it can be considered a market fairly close to the perfect competition model. However, it was unable to provide bread to large sections of the population. This situation should be compared with the current one, in which wheat is available to all sections of the population, yet production takes place on a much smaller number of heavily capitalised farms.
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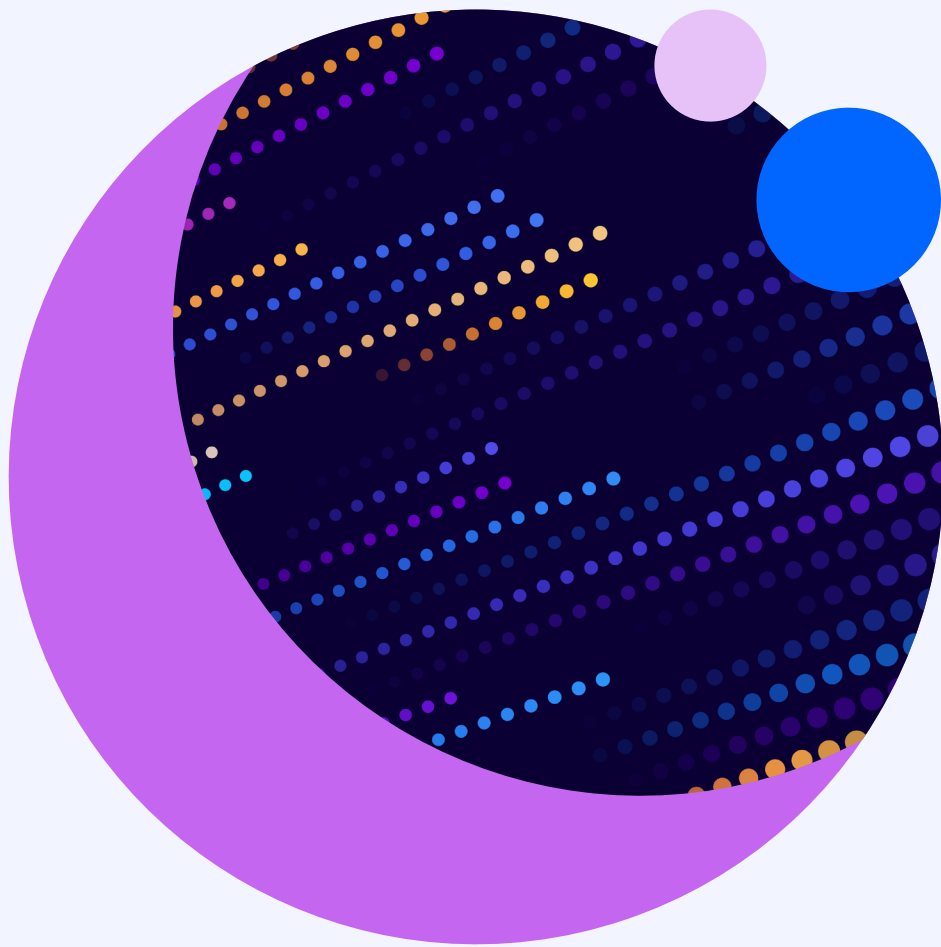
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