

GSMA™

# Mobile investment needs in Europe





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# Executive summary

## Realigning the investment environment in Europe

High-quality mobile connectivity is vital for Europe to achieve its broader digital goals and build a sustainable and prosperous society. However, over the past 15 years, the market and regulatory environment in Europe has been a key factor in mobile network investment per subscriber in the region being consistently lower than in high-income countries outside Europe.

As a result, many European markets are lagging behind in terms of network quality and the deployment of advanced mobile networks. For example, mobile download speeds in Europe averaged 86 Mbps in 2025, compared to 238 Mbps in the Gulf Cooperation Council (GCC) states, 165 Mbps in China and 141 Mbps in North America. In 2024, capex per connection in Europe was €35, compared to €70 for global mobile connectivity leaders.

To quantify the investment required for Europe to meet its 5G goals and regain its global leadership in mobile connectivity, GSMA Intelligence conducted a detailed economic modelling exercise. This found that mobile operators in Europe will need to invest an additional €200 billion over the next decade, in addition to the expected €270 billion required just to maintain the standard technology upgrades and replacement cycle.

Around half of the additional €200 billion will be needed to provide 5G coverage across Europe's main transport routes (roads, rail and waterways). A further €35 billion is required to extend 5G coverage to the entire population (accounting for upgrades to the radio access network for coverage and capacity, and the core network to support 5G standalone), plus €38 billion to build greater network resilience and €28 billion to enable Europe to take full advantage of AI.

To align the investment environment in the European mobile market with that of global mobile leaders, reform is required in at least three major areas:

- **In-market consolidation.** In many European markets, an increase in market concentration would increase investment per operator. Empirical analysis of trends in European mobile markets over the past decade shows a strong and statistically significant link between an increase in operator scale and an increase in investment per operator.
- **Effective spectrum management.** Free-of-charge renewals of existing spectrum licences and reductions in annual fees would result in operators' aggregate costs being nearly €30 billion lower over the 2025–2035 period. Removing annual fees entirely would free up a further €17 billion across Europe over the next decade, which could be reinvested into networks.

- **Addressing asymmetrical regulation.** Europe's operators must currently comply with 34 sets of regulatory obligations, such as quality of service, security requirements and net-neutrality obligations, which increase costs and reduce revenue growth opportunities. These regulations do not apply to other ecosystem companies developing competing digital services, such as over-the-top communications, cloud capabilities and AI. There are also imbalances when it comes to negotiations between these ecosystem players and operators. EU regulation should ensure mobile operators can reach fair agreements for the services they provide, supported by rules that treat comparable services equally.

At the same time, the EU needs to act on its pledge of regulatory simplification – specifically, to streamline sector-specific rules that are no longer essential or justified, particularly where horizontal rules (which apply across all sectors) already ensure compliance, and refrain from introducing new rules that place additional burdens on investing operators.

Together, these reforms would enable mobile operators to grow, stimulating higher investment. As the business case improves, mobile operators would be able to gradually raise mobile capex per capita towards or above the levels seen in North America and East Asia.

Continuing on Europe's current trajectory will leave the region lagging behind other advanced economies in terms of harnessing 5G standalone (and eventually 6G) and the many digital services that depend upon it, such as AI and extended reality applications.



# 01

## Introduction: quantifying the investment imperative



## 1.1. Regaining global leadership in mobile connectivity

High-quality mobile connectivity is a key tenet of the EU's strategy to build a globally competitive digital economy. The European Commission's 5G Action plan and the EU Digital Decade goals call for uninterrupted 5G broadband coverage for all urban areas and major roads and railways by 2025, and for all populated areas to be covered with 5G by 2030. The Commission has also stated that 5G should be at the core of new products, manufacturing processes and business models by the end of this decade.<sup>1</sup>

Explaining the rationale for the proposed Digital Networks Act (DNA), the Commission notes that universal gigabit broadband and 5G in populated areas by 2030 will "enable digital skills development, business innovation (artificial intelligence, cloud), essential e-government/health services. They also make it possible to close the digital divide." The draft DNA continues: "Connectivity is not just access. It is about real-time data exchange, vital for the EU to be able to achieve its broader digital goals and for supporting a truly connected, prosperous society."<sup>2</sup>

However, most European countries are lagging behind global leaders in 5G in the Gulf, East Asia and North America, prompting the Draghi and Letta reports<sup>3</sup> to call for greater investment in digital infrastructure to keep pace with other regions and maintain the competitiveness of European businesses.

A key question is whether operators in Europe have the financial capacity to make the investments required to achieve the EU's 5G targets and ultimately enable the region to build a more competitive digital economy. The rollout of 5G involves significant additional costs over and

above those incurred for 4G, primarily due to the need for more sites and spectrum. Meanwhile, it is not yet clear how much additional revenue operators will gain from 5G. While mobile internet use has increased by a 27% CAGR since 2018, operator revenues have fallen by an average of 3% CAGR over the same period at constant 2018 prices.

As connectivity is fundamental to Europe's digital competitiveness, GSMA Intelligence conducted an economic modelling exercise (detailed in the Technical annex) to quantify the investment required for Europe to meet its 5G goals and regain its global leadership in mobile connectivity. The exercise also considers operators' likely capital spend in Europe over the next decade, given their current financial position.

Before outlining the results of the modelling, this analysis considers the rollout of cutting-edge mobile networks in Europe to date and how this compares to other countries. The research concludes by exploring the potential impact of policy reforms that could improve the investment climate and bring it more in line with the environment in leading mobile markets.

<sup>1</sup> 2030 Digital Compass: the European way for the Digital Decade, European Commission, 2021

<sup>2</sup> Proposal for a Regulation for the Digital Networks Act (DNA), European Commission, 2026

<sup>3</sup> The future of European competitiveness, Mario Draghi, 2024; Much more than a market – Speed, Security and Solidarity, Enrico Letta, 2024

# 02

## Europe trails other regions on 5G



## 2.1 Europe is falling behind on 5G

Since 2015, mobile operators have invested €330 billion in Europe. Much of that has been spent on 5G, which has been rolled out more quickly than any previous generation and covered 93% of Europe's population as of Q3 2025. In terms of market penetration, 5G in Europe has reached 45%, as the region has embraced the new technology more rapidly than it did with 4G and 3G (see Figure 1).

Despite this positive dynamic, the region is no longer a global mobile connectivity leader. Six years after the first

commercial deployment of 3G, Europe had the second highest market penetration globally for 3G (after the developed Asia Pacific region, led by South Korea and Japan). In terms of 4G penetration, Europe only lagged behind developed Asia Pacific and North America. With 5G, Europe has also fallen behind Greater China and the GCC states, as highlighted in Figure 2. Governments, operators and citizens in these 'pioneer' 5G countries have been more proactive in deploying and using 5G, driving greater benefits for consumers, businesses and the wider economy.

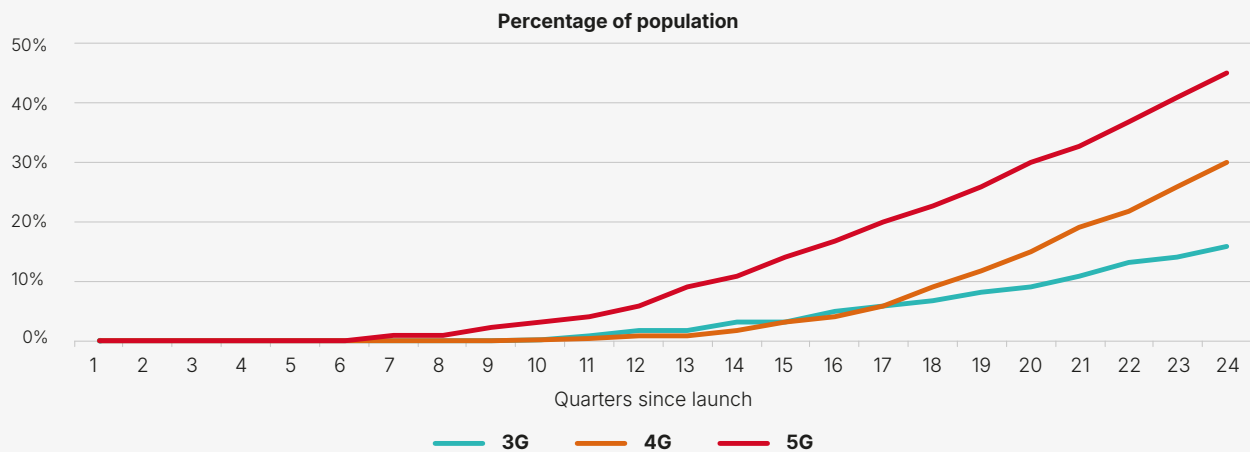
## 2.2 Europe is behind on reliability and capability metrics

To gain a full picture of 5G's progress in Europe, it is important to consider a range of relevant indicators. Mobile is most used in residential and commercial areas and transport links, as well as tourist hotspots. Businesses also require connectivity in specific agricultural and industrial zones. Figure 3 shows the proportion of users with 5G-active devices who spend the majority of their time connected to 5G. In Europe, 60% of consumers with 5G-active devices spend most of their time connected to 5G, which compares well with developed Asia Pacific and the GCC states, as well as Brazil and India. However, this is much lower than the equivalent figures for Greater China and North America, emphasising the need to ensure reliable connectivity outside residential locations.

Europe also lags behind other regions in terms of 5G capabilities. The majority of operators in Europe have launched 5G using non-standalone (NSA) technology, which delivers 5G over a 4G core network. However, a 5G core is needed for many of the most compelling 5G use cases that can help unlock new revenue streams. Network slicing, very low latency and massive IoT capabilities for enterprises can only be delivered with 5G SA, which also supports enhanced network security, quality of service and greater programmability, enabling further opportunities for innovation.

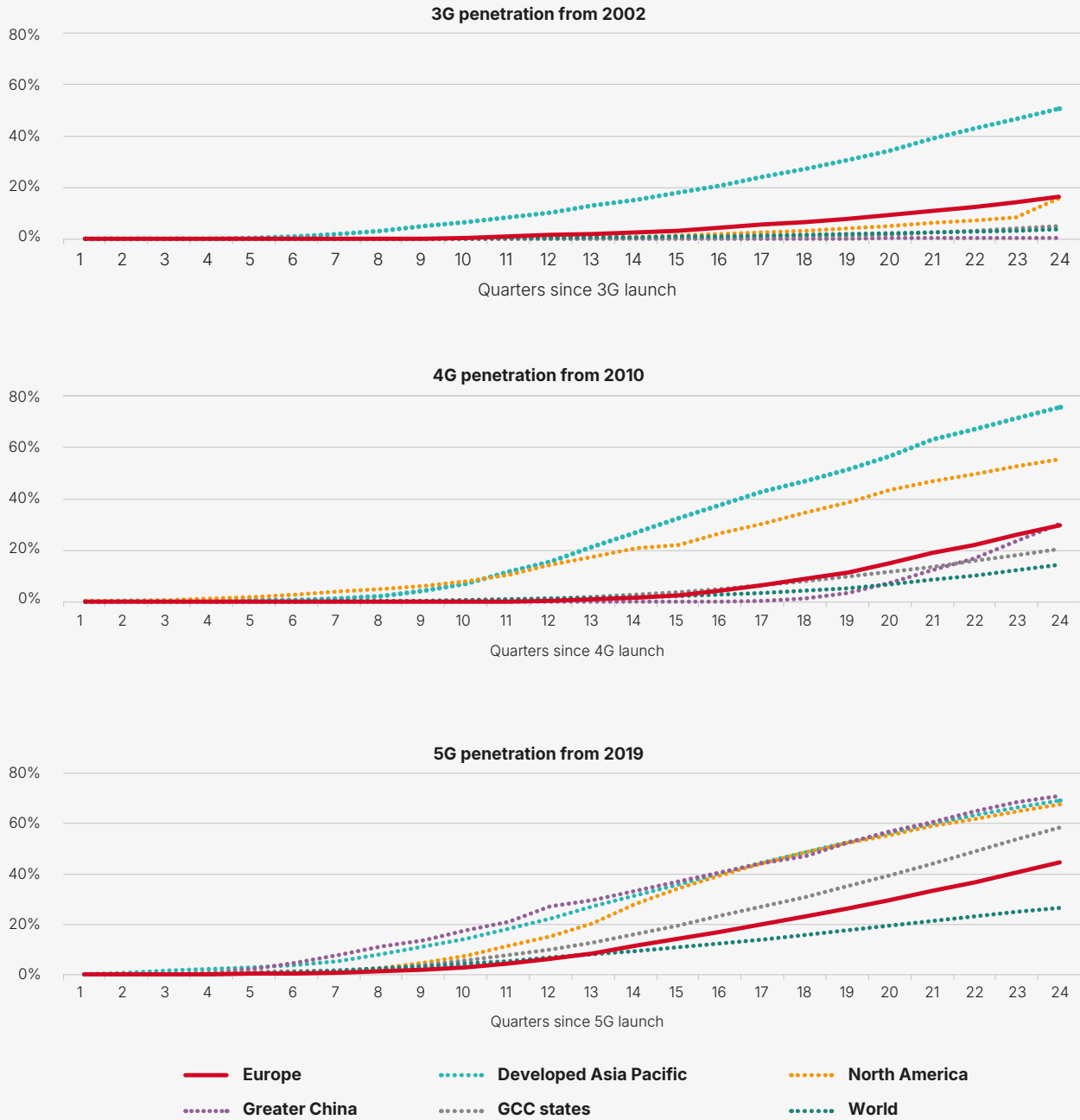
**Figure 1**

Market penetration of 3G, 4G and 5G in Europe since launch



Source: GSMA Intelligence

**Figure 2**  
Market penetration of 3G, 4G and 5G since launch<sup>4</sup>



Penetration is calculated by dividing connections by total population. A 3G/4G/5G connection is defined as a 3G/4G/5G SIM card (or phone number, where SIM cards are not used) that has been registered on the mobile network at the end of the period. Connections differ from subscribers in that a unique subscriber can have multiple connections.

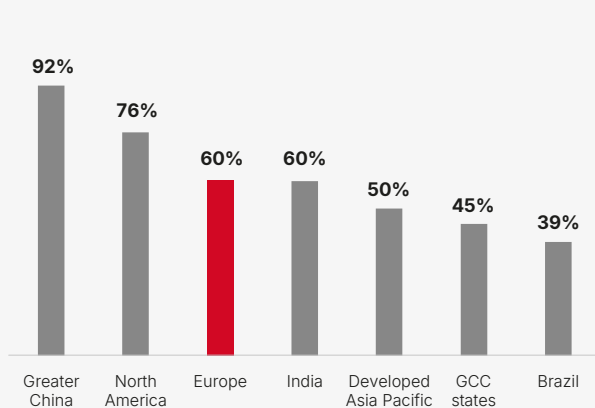
Source: GSMA Intelligence

<sup>4</sup> In this report, Europe refers to the 27 EU countries plus the UK, Switzerland and Norway. Developed Asia Pacific includes South Korea, Japan, Singapore, Brunei, Australia and New Zealand. North America includes the US and Canada. The GCC states include Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the UAE. Greater China includes mainland China, Hong Kong, Taiwan and Macao.

**Figure 3**

How Europe performs in terms of 5G availability and 5G standalone (SA) connections

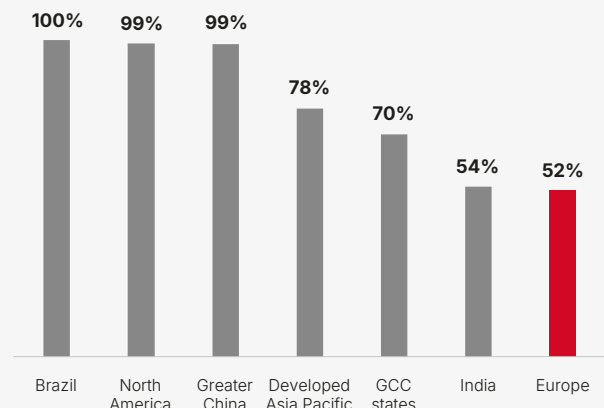
**5G availability by region, 2025**



Note: 5G availability is the percentage of users classified into 5G or 5G roaming. To calculate 5G availability, each user with a 5G-active device is classified into the network generation they spend the majority of their time connected to (i.e. 4G or 5G). A device is considered 5G-active if it is known to have reported 5G service in the past six months. Data is based on samples between January and October 2025.

Source: GSMA Intelligence

**Proportion of 5G connections with a 5G SA network, Q3 2025**



Note: The percentages in the chart refer to the proportion of 5G connections in each region that are with an operator that has deployed 5G SA. It does not reflect 5G SA coverage or adoption.

Source: GSMA Intelligence

Figure 3 also shows the proportion of 5G connections provided over an operator network that have launched 5G SA. On this benchmark, Europe is lagging behind other advanced economies, as well as India. While it is important to note this does not reflect 5G SA coverage or adoption, separate data from Ookla shows the availability of 5G SA remains very low in Europe at around 2%, compared to almost 80% in Greater China, almost 50% in India and 25% in North America.<sup>5</sup> This reflects the relatively low adoption of 5G SA user equipment, including devices and terminals.

European policymakers are aware of the EU's weak position. Published in June 2025, the European Commission's Report on the state of the Digital Decade warns of "a 5G evolution divide in Europe, exposing structural and policy hurdles hampering the regional drift to true 5G SA capabilities." In the draft DNA,<sup>6</sup> published in January 2026, the Commission notes "the EU is lagging behind in high-quality 5G deployment compared to leading world economies. This has negative implications not only for consumers but also for the EU's industrial competitiveness and innovation."

## 2.3 5G networks are slower in Europe

To further consider the quality of networks that consumers and businesses experience, Figure 4 shows the median download speeds across all mobile generations, and median download speeds for 5G. Europe lags behind other regions on both metrics. It is notable that Brazil has faster 5G speeds. This is partly because penetration in Brazil (23%) is lower than in other regions, meaning there is more capacity per user in the 5G network. However, Europe also has slower 5G speeds than North America, the GCC states, Greater China and developed Asia Pacific, even though it also has lower 5G penetration (as shown in Figure 2).

In practice, many consumers may not require extremely high speeds (e.g. above 300 Mbps) for the use cases they engage in. It is more important that they have a consistent level of network quality. Figure 5 shows the proportion of

5G network tests that are above a threshold of 25 Mbps download and 3 Mbps upload. On this metric, Europe is behind most other regions and slightly ahead of India and North America. Crucially, it shows that more than one in five tests in Europe did not meet the aforementioned download and upload requirements.

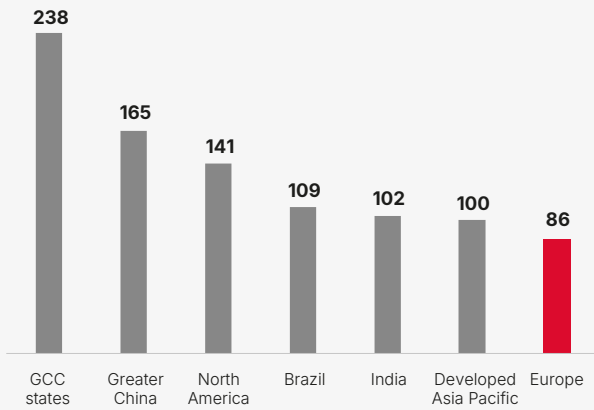
Separate analysis of Ookla Speedtest data shows that when considering all network tests (all technologies, not just 5G), more than 10% did not meet a threshold of 5 Mbps download and 1 Mbps upload. Figure 5 highlights one of the consequences of this. Due in part to the network quality and coverage experienced by European users, average mobile data usage is much lower than in the other geographies considered in the benchmarks, apart from Brazil.

<sup>5</sup> The proportion of Ookla 5G samples that are on 5G SA networks. For further analysis of 5G SA in Europe, see "A Global Reality Check on 5G SA and 5G Advanced in 2026", Ookla and Omdia, February 2026

<sup>6</sup> Proposal for a Regulation for the Digital Networks Act, European Commission, 2026

**Figure 4**  
Europe trails other regions on download speeds

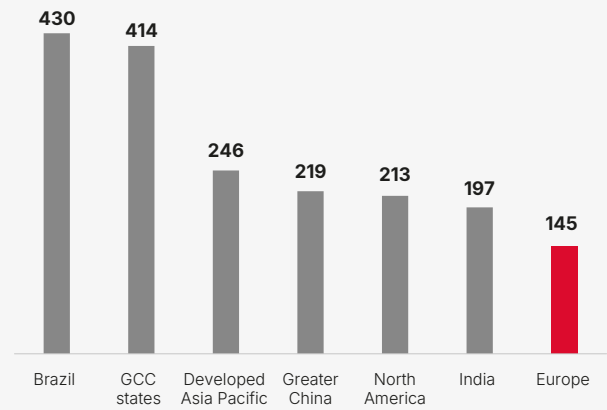
**Mobile download speeds, 2025**  
Mbps



Note: Country-level data was collected on the median download speeds from Speedtest users in the January–October 2025 period. The chart shows population-weighted averages by region.

Source: GSMA Intelligence analysis, based on Speedtest Intelligence data provided by Ookla

**5G download speeds, 2025**  
Mbps

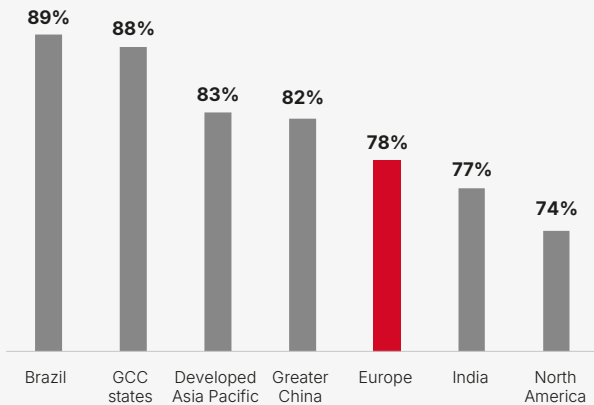


Note: Country-level data was collected on the median 5G download speeds from Speedtest users in the January–October 2025 period. The chart shows population-weighted averages by region.

Source: GSMA Intelligence analysis, based on Speedtest Intelligence data provided by Ookla

**Figure 5**  
Europe is behind on consistency of 5G networks and data traffic per connection

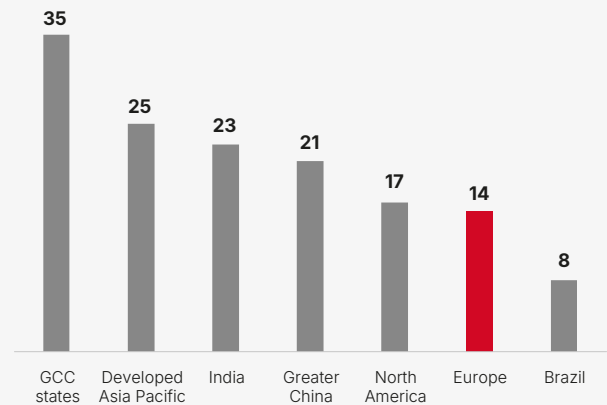
**5G consistency, 2025**



Note: Country-level data was collected on 5G consistency from Speedtest users in the January–October 2025 period. Consistency measures what percentage of a provider's samples equals or exceeds both a download and upload threshold. For 5G, thresholds are 25 Mbps download and 3 Mbps upload. The chart shows population-weighted averages by region.

Source: GSMA Intelligence analysis, based on Speedtest Intelligence data provided by Ookla

**Data traffic per connection**  
GB



Note: The chart shows country averages by region.

Source: GSMA Intelligence

## 2.4 Europe is not investing enough in mobile

The market and regulatory environment in Europe has been a key factor in mobile network investment per subscriber in the region being consistently lower than in high-income countries outside Europe over the past 15 years (see Figure 6).<sup>7</sup> This helps to explain why many European markets are lagging behind on network quality and the deployment of 5G and 5G SA. In 2024, capex per connection in Europe was €35, compared to €70 for the global mobile connectivity leaders.

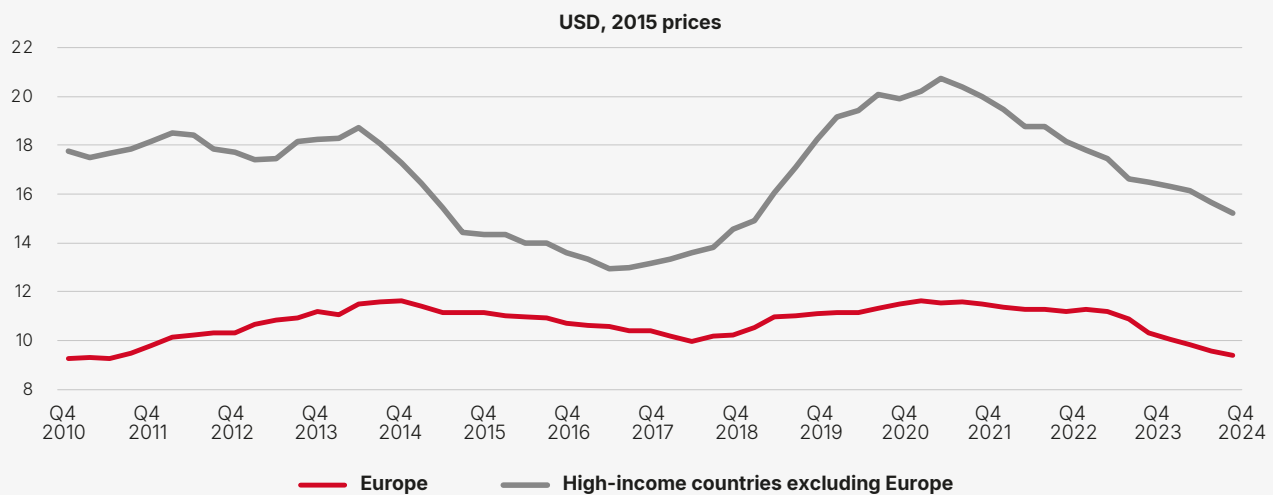
Regional-level analysis can mask variations by country, especially in Europe. The latest GSMA Intelligence 5G Connectivity Index<sup>8</sup> (based on data for Q3 2025)

shows that some countries in Europe – notably, Finland, Denmark and Norway – have advanced 5G markets that are comparable to the leading countries in Asia Pacific, Greater China, the GCC states and the US. Switzerland and Sweden are also not far behind those leaders, but the majority of European markets do not perform as well.

Europe's position in terms of mobile connectivity has been gradually deteriorating over time, leaving the region at a major competitive disadvantage versus other advanced economies. Europe will need to see a step change in investment in connectivity to realise the full potential of mobile digital infrastructure and enrich its digital economy.

**Figure 6**

Capex per connection in Europe is lower than in other high-income countries



Note: Other high-income countries are based on World Bank income classifications. They include Australia, Canada, Japan, South Korea, New Zealand, Singapore, the US and the GCC states. The chart shows average capex per mobile connection in 2015 USD prices, based on a four-quarter moving average.

Source: GSMA Intelligence

<sup>7</sup> An alternative measure of capex intensity is capex as a proportion of revenue. Over the past 10 years, European operators have on average invested more as a proportion of revenue (around 17%) than other high-income countries (around 15%). However, absolute capex per subscriber is a better measure of investment intensity as it is not affected by the fact that ARPU is lower in Europe, which means operators need to invest a higher percentage of revenue to match the levels of leading regions.

<sup>8</sup> The index aggregates all the metrics discussed in this chapter as well as other metrics, such as the number of 5G base stations per capita, quality of experience, adoption of 5G fixed wireless access (FWA), adoption of IoT and deployment of RedCap.

# 03

## Measuring Europe's investment needs



### 3.1 The Digital Decade targets

The EU recognises the importance of mobile connectivity to its global competitiveness. Established in 2022, the EU's Digital Decade targets for 2030 include a goal of 5G coverage for 100% of the population. In December 2022, WIK Consult published a study analysing the likely cost of achieving the Digital Decade targets. The study estimated a total investment need of around €200 billion. Mobile operators would need to invest at least €60 billion between

2021 and 2030 in 5G to achieve the related Digital Decade goals, with an additional €115 billion on fixed networks.

However, mobile operators in the region have already invested €141 billion since 2021 without having yet met the Digital Decade targets, and (as discussed in the previous chapter) the region trails significantly behind global 5G leaders.

### 3.2 Investment required over the next decade

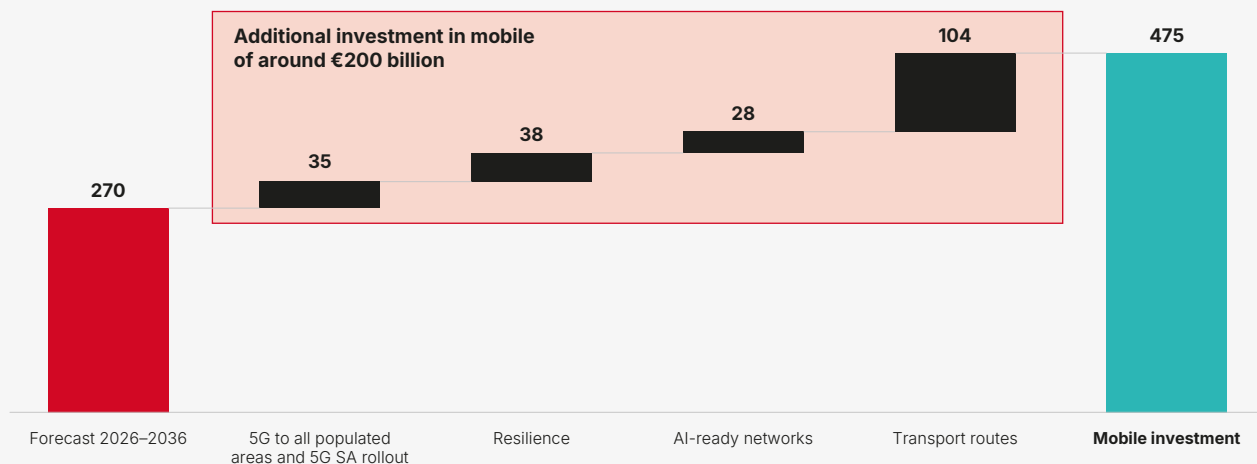
Taking a longer term view, GSMA Intelligence projects that mobile operators will invest €270 billion to maintain the business-as-usual technology upgrade and replacement cycle in Europe over the next decade. That sum would be sufficient to ensure the ongoing operation of networks and the replacement cycle associated with network modernisation, as well as densification to improve quality, coverage and performance.

However, that would not be enough to restore Europe as a global mobile connectivity leader. To achieve that ambition, approximately €200 billion in additional investment is required, taking the total investment to around €475 billion for the next 10 years (see Figure 7). This would bring Europe's annual mobile capex per connection to around €70, in line with the levels observed in leading mobile markets.

**Figure 7**

The investment needed in Europe to become a leader in mobile connectivity

€ billion



Source: GSMA Intelligence

Around half of that additional €200 billion will be needed to provide 5G coverage across Europe's transport routes (roads, rail and waterways). The other €100 billion is required to extend 5G SA coverage to the entire population, build greater resilience and enable Europe to take full advantage of AI.

- **Extending 5G coverage to populated areas.** GSMA Intelligence estimates mobile operators will need to invest €35 billion to extend 5G coverage to all populated areas. This includes the cost of upgrading radio access networks to provide extra capacity, where this is constrained, as well as building out 5G SA core networks. The modelling includes the role of satellite as a backhaul technology in remote and rural areas.
- **Mobile network resilience.** Ensuring critical mobile infrastructure is resilient will cost €38 billion, according to GSMA Intelligence analysis. That accounts for the cost of extending base-station battery life, satellite backhaul, engine-powered/solar generators and further increasing cybersecurity.<sup>9</sup>
- **AI-ready networks.** To enable their networks to fully take advantage of AI, mobile operators will need to invest €28 billion.<sup>10</sup> However, this capital spend will help reduce operating costs through network automation and autonomy, resulting in greater resource optimisation and energy efficiency. It could also enable operators to unlock new revenue streams, mostly in the business-to-business segment.

- **5G coverage for transport routes.** The European Commission has set a target for all transport corridors to be covered by 5G. GSMA Intelligence estimates mobile operators will need to invest up to €104 billion in their radio access networks to meet that goal. Thus, it is of paramount importance that coverage requirements for transport routes (waterways, roads and railways)<sup>11</sup> remain focused on main routes, and that technical implementation where such a requirement applies can be done by mobile operators in the most efficient way, particularly regarding the technology and frequency bands used.

Europe's mobile operators will need to invest €475 billion between 2026 and 2036 to enable the region to keep pace with other advanced economies, such as those in North America and East Asia. As things stand, Europe's operators cannot build a business case to justify that level of investment.

<sup>9</sup> Via hardware and software management (firewalls, encryption and regular patching), active threat-monitoring systems (traps for attackers, vulnerability scans and malware detection), cloud-native and virtualised infrastructures, training programmes for a specialised workforce and participation in threat intelligence sharing platforms to coordinate responses.

<sup>10</sup> Key use cases for AI in telecoms include network maintenance, AI-RAN deployment, energy-saving initiatives and network performance optimisation. Within product sales and marketing, use cases cover customer sales, application development and solution provisioning. In customer care, relevant AI applications include chatbots, spam filtering and tools aimed at improving the overall user experience. Across corporate functions, use cases encompass employee development, operational support (e.g. finance and IT) and energy-efficiency measures. In data centres, key applications focus on OSS/BSS and energy-saving initiatives. AI use cases include research and development, smart infrastructure and additional emerging use cases.

<sup>11</sup> Drawing on national data on transport routes that includes motorway, trunk, primary and secondary roads, rivers and canals and all railways except those in urban areas (such as subways), as they are usually covered already.



# 04

## Regulatory reforms required to drive investment



## 4.1 Breaking free from low returns and lower investment

Under current conditions, very little (if any) of the additional investment discussed in the previous chapter will materialise. Compared to their counterparts in leading regions, operators in European markets make lower returns on investment, impacting their ability to invest in networks. Europe's operator groups have seen a reduction in average return on capital employed (ROCE) from around 10% to less than 7% between 2015 and 2024. This is lower than for operators in other regions (see Figure 8). In some European markets, operators are earning returns that are below their cost of capital.<sup>12</sup>

The low ROCE in Europe reflects the fact that regulation constrains revenue growth opportunities, limiting operator cash flow. As they generate less cash, operators in Europe invest significantly less per capita than counterparts in leading 5G markets.

Breaking free from this vicious circle of low returns and lower investment will require policy reforms that improve operators' ability to invest. Many of these reforms have been identified in the Letta and Draghi reports,<sup>13</sup> covering competition

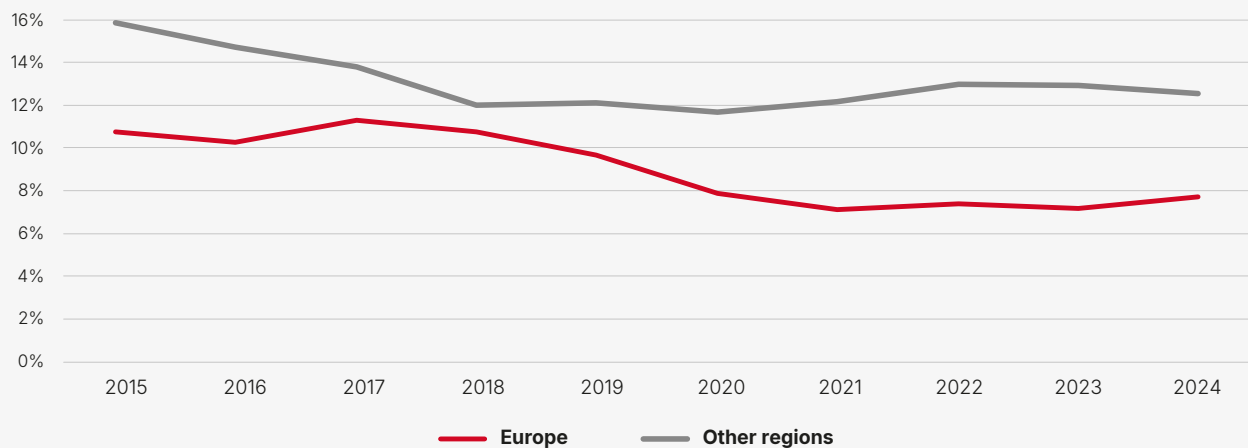
policy, sector-specific regulation and open internet rules, among other topics. The proposed DNA and the review of the European Union's Merger Guidelines provide the EU with an opportunity to implement these reforms.

If the key recommendations in the Letta and Draghi reports are implemented, Europe's mobile operators could improve their ROCE, giving them leeway to step up investment. As their financials are brought in line with international standards, investment per connection levels should rise, helping Europe bridge the gap versus other advanced economies.

To unlock operator investments and bring European investment conditions in line with other leading markets, reform is required in at least three major areas:

- in-market consolidation
- spectrum management
- regulatory asymmetries.

**Figure 8**  
Mobile operators' ROCE in Europe and other regions



Note: Data shows the average ROCE by operator group based on their headquarter location and for the groups where data was available.

Source: GSMA Intelligence elaborations on data from Frontier Economics

<sup>12</sup> See for example State of Digital Communications Report 2025, Connect Europe, 2025, and The future of European competitiveness, Mario Draghi, 2024

<sup>13</sup> The future of European competitiveness, Mario Draghi, 2024; Much more than a market – Speed, Security and Solidarity, Enrico Letta, 2024

## 4.2 In-market consolidation

In almost all European markets today, an increase in market concentration would increase investment per operator. According to GSMA Intelligence's empirical analysis of trends in European mobile markets over the past 10 years, there is a strong and statistically significant link between an increase in operator scale and an increase in investment per operator.

As shown in Figure 9, investment per operator has been significantly higher in markets where there are three mobile network operators than in four-player markets. The horizontal axis in Figure 9 shows the market's score on the Herfindahl-Hirschman Index (HHI), which is widely used to measure market concentration and determine market competitiveness.

The analysis suggests a non-linear 'inverted-U' relationship between average scale and operator investment, with investments increasing with market concentration until reaching an optimal point where investment is maximised (consistent with economic theory).

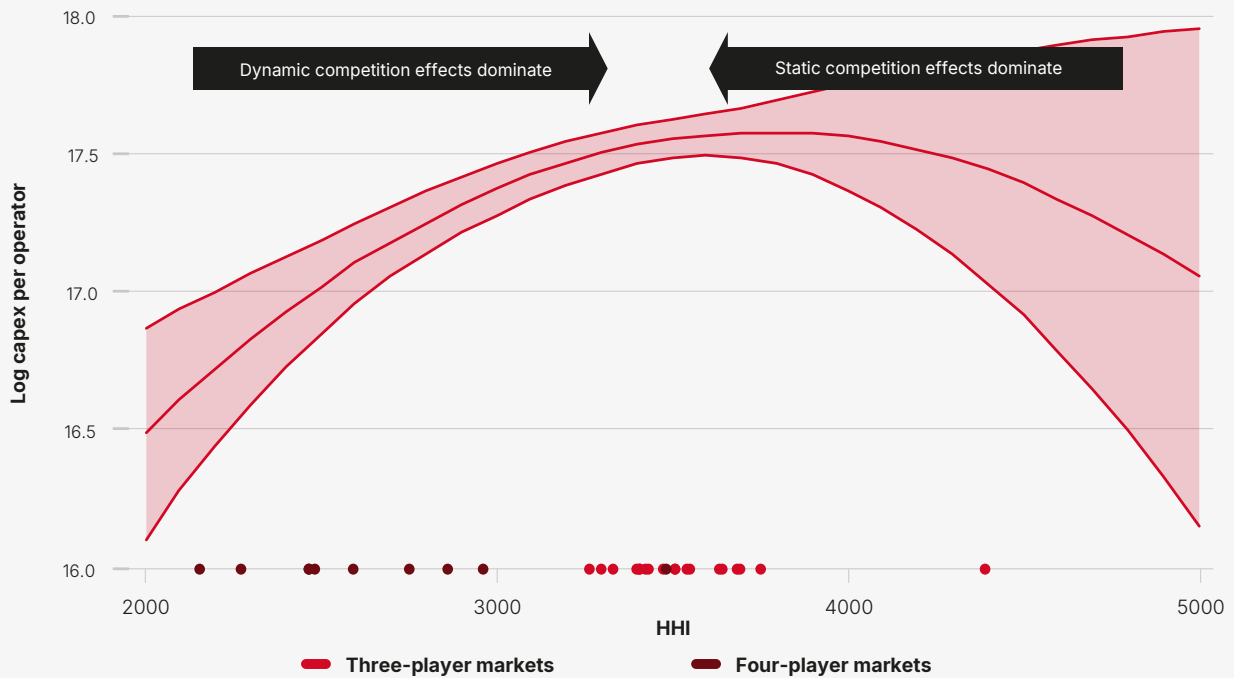
In recent years, total capex per connection in Europe has been significantly higher in three-player markets than in four player markets, as shown in Figure 10. However, this figure has been trending downwards in both sets of markets.

Econometric evidence suggests investment by individual operators is higher in markets with more scale, but the total aggregate investment is unchanged. However, greater investment per operator will bring the quality and strength of European networks and services closer to those experienced by digital leaders.

From 2015, four-player markets in Europe experienced lower investments as a proportion of revenues and per connection, and did not improve service quality as much as in European three-player markets, according to a study published in the Journal of Information Policy.<sup>14</sup>

**Figure 9**

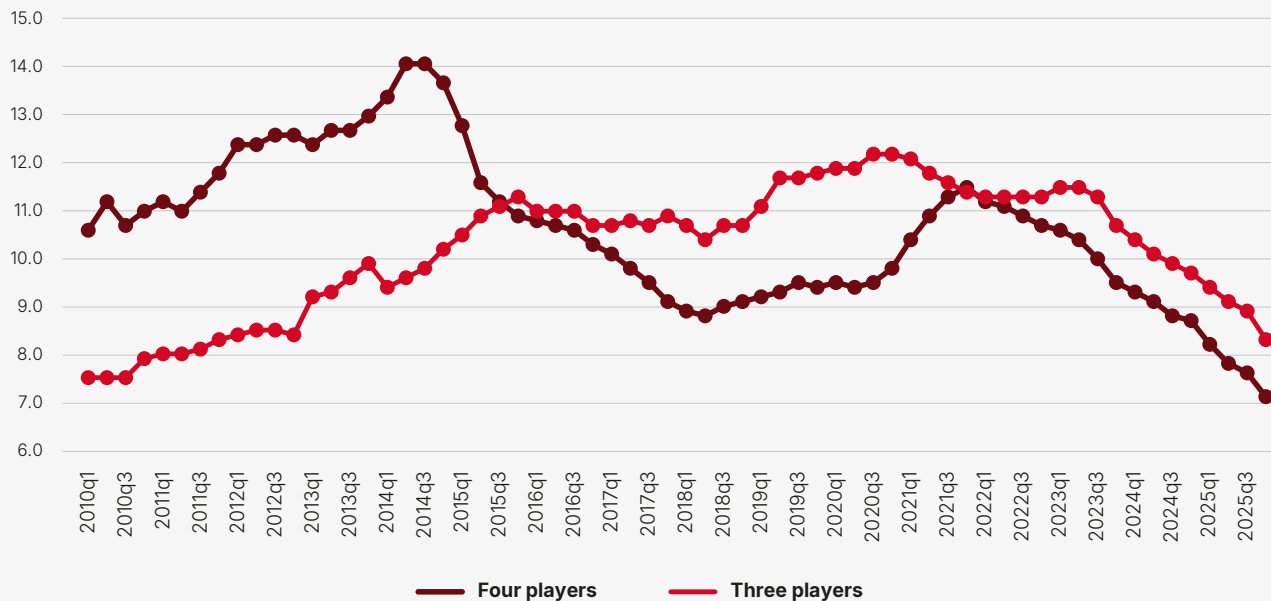
The relationship between investment per operator and HHI score of the market (2011–2021)



<sup>14</sup> The Dynamic Effects of Competition on Investment: The Case of the European Mobile Communications Industry, Journal of Information Policy, 2023

**Figure 10**

Total country capex per connection (USD 2015) for three- and four-player markets in Europe



Source: GSMA Intelligence

### 4.3 Spectrum management

The amount of spectrum available to operators, and the conditions under which they can use that spectrum, impacts the investment needed to deploy radio networks (including the latest technologies), as well as the service quality that consumers and businesses experience (therefore also impacting revenues and returns).

In Europe, the cost of spectrum has almost tripled over the past 10 years (as a proportion of revenue, from 3% in 2014 to 8% in 2024).<sup>15</sup> That step change has been driven by non-market factors, such as high reserve prices, annual fees and auction designs that have limited the amount of spectrum available and therefore artificially increased spectrum costs.

GSMA Intelligence estimates that, on the current trajectory, operators will incur €104 billion in costs<sup>16</sup> related to their existing spectrum over the 2025–2035 period. If operators acquire additional frequencies to support 6G, their investment in spectrum will be even higher.

European spectrum policy requires a significant overhaul to reverse these trends. The EU’s DNA, currently in its draft stage, provides Europe with an opportunity to address the aspects of spectrum policy that have inhibited greater investment and hampered the continent’s digital progress.

Citing the DNA, “the EECC has been unsuccessful in establishing a pro-investment spectrum assignment

framework. Assignment conditions remain fragmented across Member States, continue to enable revenue-oriented auction designs, provide for insufficient licence duration and lack incentives to share spectrum. Limited regulatory predictability and lack of demand affect financial attractiveness of high quality 5G deployment projects to investors.”

To address these issues, Europe’s regulators should increase certainty and investment incentives in their renewal assessments, by:

- applying administrative extensions
- considering indefinite licence durations
- avoiding setting aside spectrum in prime IMT bands
- ensuring mobile operators have at least 2 GHz of mid-band spectrum by 2030 to facilitate the deployment of 6G.

Europe should implement these reforms as soon as possible. Over the next 10 years, more than 500 spectrum licences are due for renewal. Spectrum management policy reforms will improve operators’ ability and incentive to invest, as well as enabling them to more effectively monetise their investments.

<sup>15</sup> These costs exclude the very high costs paid for 3G licences in the 2.1 GHz frequency band, particularly in the UK and Germany. For further details, see Spectrum Pricing and Renewals in Europe, GSMA, 2025.

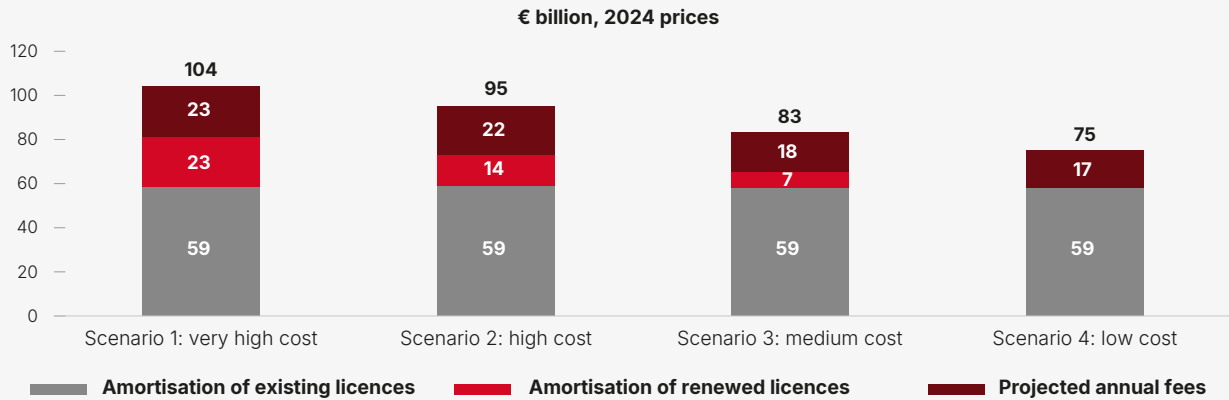
<sup>16</sup> Includes the amortisation of existing licences and renewed licences, together with annual fees. See Spectrum Pricing and Renewals in Europe, GSMA, 2025.

GSMA Intelligence modelling shows that free-of-charge renewals of existing spectrum and reductions in annual fees would result in aggregate costs being nearly €30 billion lower over the 2025–2035 period (see the low-cost scenario in Figure 11). Removing the annual fees entirely would free up a further €17 billion across Europe over the next decade, which could then be reinvested into the network, driving further improvements.

Reducing spectrum-related costs would enable operators to improve the quality of their networks. In the low-cost scenario shown in Figure 11, average network speeds in 2035 would be between 4% and 23% higher than in the very high-cost scenario, according to GSMA analysis.<sup>17</sup>

**Figure 11**

Cumulative spectrum costs in Europe under different renewal scenarios



Note: Excludes cost in countries where reliable data could not be obtained (Bulgaria, Estonia, Latvia, Luxembourg and Switzerland). Scenario 1 (very high cost) assumes renewals are charged at historical prices. Scenario 2 (high cost) assumes renewals are charged based on more recent international price benchmarks. Scenario 3 (medium cost) assumes renewals are priced in line with declining revenue per MHz per connection. Scenario 4 (low cost) assumes free-of-charge renewals. Due to rounding, the total costs may not be equal to the sum of the cost breakdowns.

Source: GSMA Intelligence estimates



## 4.4 Regulatory asymmetries

Mobile operators are currently subject to a range of regulations that impose additional costs and reduce revenue growth opportunities. These include the following:

- Regulation (EU) 2015/2120 on open internet, which lays down net-neutrality rules
- European Electronic Communications Code, which established the detailed requirements for quality of service (QoS) (Article 104)
- Regulation (EU) 2024/2847, the Cyber Resilience Act (CRA), which aims to strengthen cybersecurity across the EU
- Regulation (EU) 2022/612 on roaming, which sets direct price caps for inter-operator tariffs and outlines price-setting rules for retail mobile services.

These regulations (and the associated cost of doing business) do not apply to other ecosystem companies developing competing digital services, such as over-the-top communications, cloud capabilities and AI. The result is an uneven playing field, which reduces the incentives and capacity to invest in developing mobile networks.

Furthermore, operators are subject to sector-specific rules that are no longer essential or justified, particularly where horizontal rules already ensure compliance. For example, the sector-specific approach taken by the ePrivacy Directive, which is more than 20 years old and was last updated in 2009, no longer fits the evolving technological and regulatory environment. It also overlaps with the horizontal GDPR framework, creating unnecessary burdens and stricter data processing rules that limit innovation.

In total, operators are subject to more than 28 European horizontal and sector-specific regulations (notwithstanding national laws), with nearly half overlapping, according to Connect Europe.<sup>18</sup> As a result, operators must comply with 34 sets of regulatory obligations, such as quality of service, security requirements and net-neutrality obligations, which increase their costs and reduce revenue growth opportunities.

One of the biggest regulatory constraints on European operators is the restrictions on monetisation strategies. In any sector, limiting how businesses can monetise their assets will have a detrimental effect on investment and quality. Studies have shown that net-neutrality regulations have a negative impact on investments.<sup>19</sup> This logically follows from the negative impact on revenues and profitability, which in the long run leads to a reduction in capital investment.

To encourage innovation and investment in high-capacity networks, Europe would further benefit from a fairer and more balanced relationship between telecoms operators and other players in the digital ecosystem. The DNA should seek to ensure mobile operators can reach fair agreements for the services they provide.

In general, new rules should treat comparable services equally. Similar services should be subject to similar rules, irrespective of the service provider. For example, key principles ensuring openness in the internet ecosystem should be extended to all relevant players – all those who exercise control over the quality of experience.

At the same time, the DNA should seek to streamline sector-specific rules that are no longer essential or justified, particularly where horizontal rules already ensure compliance.

Such measures would enable mobile operators to grow, stimulating higher investment, as operators tend to maintain a consistent capex/revenue ratio.

<sup>18</sup> A Simplification Agenda for European Telecoms, Connect Europe, 2025

<sup>19</sup> Efficiency and effectiveness of net neutrality rules in the mobile sector: Relevant developments and state of the empirical literature, Wolfgang Briglauer, Christopher Yoo, Telecommunications Policy, Volume 50, Issue 2, 2026

# 05

## Delivering a step change in connectivity



## 5.1 Improving Europe's competitiveness

Continuing on Europe's current trajectory will leave the region lagging behind other advanced economies in terms of harnessing 5G (and eventually 6G) and the many digital services it will enable, such as AI and extended reality applications.

However, with a realignment of the investment environment, the business case for further investment will improve and mobile operators will be able to gradually raise mobile capex per capita towards the levels seen in North America and East Asia.

The increase in capex per connection shown in Figure 12 would enable Europeans to enjoy the many benefits that can be delivered by 5G SA and 6G connectivity, enhanced with AI and greater network resilience. These include:

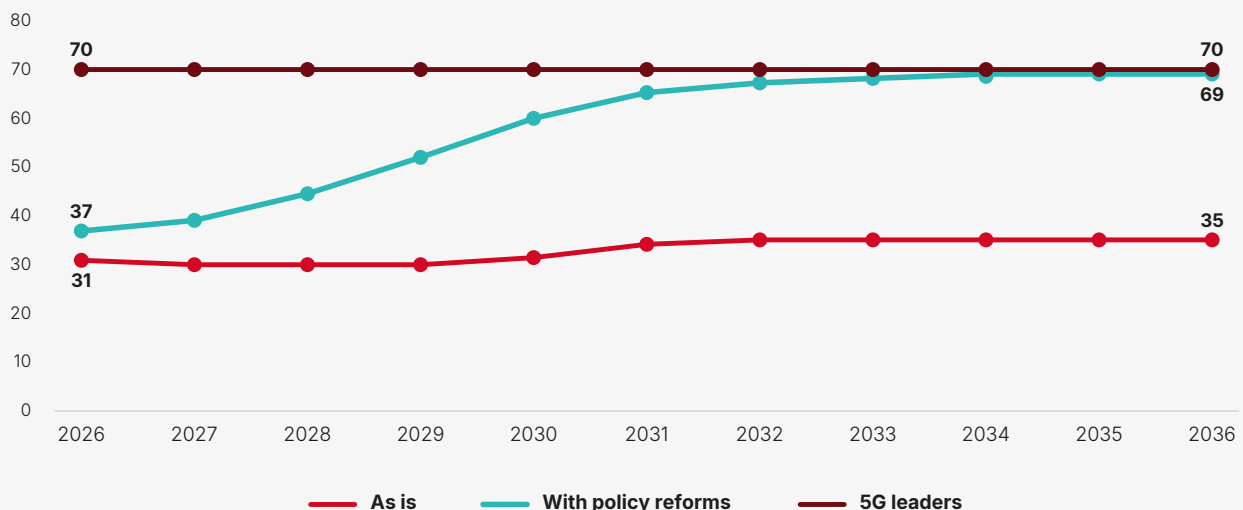
- enhanced security
- increased responsiveness
- faster uplinks
- support for massive numbers of devices
- programmable systems for faster creation of services and network slices
- improved support for the management of service-level agreements.

Many important enterprise use cases, including broader industrial automation, will only be feasible with a 5G SA architecture.

Timely regulatory reform in Europe could deliver a step change in the quality of mobile connectivity. Through a combination of in-market consolidation, better spectrum management and a reduction in regulatory asymmetries, the Europe could dramatically improve the digital services available to its businesses and its citizens. The region could then become much more competitive with other advanced economies.

**Figure 12**

Ten-year forecast for mobile capex per connection (€) in Europe versus 5G leaders



Source: GSMA Intelligence

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