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The Infrastructure Framework of the Digital Economy: Broadband Access, Economic Resilience, And the Digital Divide in the European Union

Arany, László [1] (Hungary)
Popovics, Péter András [1] (Hungary)

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Abstract: The aim of this study is to provide an overview of the infrastructure conditions of the digital economy, with particular emphasis on the undersea fiber-optic cable networks that support global data flows, the economic impacts of broadband internet, and the regional and corporate dimensions of the digital divide observable within the European Union. Today, digital infrastructure cannot be viewed merely as a technological foundation but also as a fundamental prerequisite for economic growth, productivity, employment, business adaptability, and social participation. According to the international literature, broadband internet access is positively correlated with GDP growth, productivity, business dynamism, and economic resilience to crises; however, the intensity of these effects may vary considerably by country, region, firm size, and by demand-side adaptation. The study emphasizes substantial convergence in internet access within the European Union, particularly in Eastern and Southeastern European member states, however, urban–rural disparities, differences by firm size, and access to higher-quality connections continue to indicate structural inequalities. The development of the digital economy therefore cannot be understood solely through the lens of infrastructure availability; it is necessary to also consider actual usage, digital skills, business adaptation, and the socio-economic environment.

Keywords: Digital economy, digital infrastructure, broadband internet, digital divide, digital convergence, economic resilience

JEL Classification: L86; O33; R11

[1] *University of Debrecen, Faculty of Economics and Business, Institute of Economics, Non-independent Department of Agricultural Economics*

INTRODUCTION

A stable, high-capacity, and widely accessible digital infrastructure is a fundamental prerequisite for the functioning of the digital economy. Globalized data flows, online services, e-commerce, cloud-based solutions, platform-based business models, and organizational forms based on remote work all rely on technological back-end systems without which the social and economic impacts of digital transformation cannot be fully realized.

This study examines the relationship between digital infrastructure and the digital economy through a literature review and a synthesizing analysis. The paper pays particular attention to the economic impacts of broadband internet, as well as the regional and corporate characteristics of the first-level digital divide observable in the European Union. The study does not attempt to conduct an empirical causal analysis, but rather aims to systematize, based on relevant international research findings, the factors that determine the economic and social utilization of digital infrastructure.

The main objective of this study is to demonstrate the extent to which the functioning and development of the digital economy depend on the level of development of digital infrastructure, particularly broadband Internet access and global submarine cable networks.

The specific objectives of the study are:

- To demonstrate the global significance of digital infrastructure, with particular regard to the role of undersea optical cable networks in international data flows.
- To systematize the economic impacts of broadband internet based on the international literature, highlighting the effects on GDP, employment, productivity, business dynamism, and economic resilience.
- To interpret the first-level digital divide based on internet access and infrastructure availability.
- Examining digital convergence within the European Union, with particular regard to household internet access, corporate broadband connections, and urban–rural disparities.
- Identifying the remaining structural factors of digital inequalities, particularly in terms of company size, geographical location, technological advancement, and demand-side adaptation.

Global Context

The continuous operation of digital infrastructure, understood in a global context, is a fundamental prerequisite for the existence and development of the digital economy. More than 95% of global, holistic data traffic flows through digital infrastructure based on undersea optical cable systems (Figure 1) (Starosielski, 2015; Ross, 2014). Optical cable technology is a key factor and a systemic pillar of data flow in the modern economy, as it is more cost-effective and significantly faster than satellite technology. Globally, fewer than 300 cable systems carry the vast majority of total internet traffic, thereby forming the backbone of the digital economy and transformation (World Economic Forum, 2016). In their research, Ma & Jiang (2025) used multi-scale network analysis methods to examine the distribution patterns, network structure, and spatial and temporal evolution of global cables at the national and cable landing station levels. Based on their findings, the distribution of global submarine cables is highly uneven, with the United States and Europe serving as hubs of global information flow, featuring dense network connection points, as cable distribution is concentrated in this region. They specifically highlight that even in developed countries, a significant number of cable landing stations are located in peripheral or semi-peripheral positions within the network. A key finding regarding the digital divide is that the core connections of the cable network are formed by a few countries, regions, and cable landing stations, resulting in strong geographic proximity and a clustered structure. In areas and regions with underdeveloped or absent infrastructure, external economic shocks (such as the COVID-19 crisis) further exacerbate existing inequalities (Briglauer et al., 2024; Xiao et al., 2024). It follows that advanced infrastructure is essential for economic and social resilience. In the European Union and other developed countries, the deployment of high-speed, fiber-optic, and mobile broadband internet technology is a key economic policy objective. One of the most extensively researched areas of enterprise-level broadband internet use today is the integration of AI-based HR solutions, which are transforming how organizations operate from recruitment and performance evaluation to administration (Máthé & Boros, 2025). Innovative processes and the alternative work arrangements brought about by digitalization offer new perspectives on employees' employment opportunities (Arany & Popovics, 2024a). Digitalization and the rapidly evolving technological innovations it drives are key drivers of corporate innovation today and are expected to remain so in the future, as they can have a decisive impact on established corporate practices, fundamentally transforming how companies operate and, with that, their business models. The technological revolution, the internet, and the emergence and use of increasingly smart digital devices offer new opportunities for companies to engage with markets, consumers, and business partners in innovative and creative ways (Arany & Popovics, 2024b). Briglauer et al. (2024) conducted a literature review examining the impacts of high-speed broadband internet from social and economic perspectives. The study's main finding is that the socio-economic benefits are substantiated by economic growth, productivity, education, and economic resilience; however, diminishing returns were observed above a certain level of broadband quality. Furthermore, a significant portion of the positive social and economic impacts materializes only when broadband is actually adopted on the demand side, not merely when it is available on the supply side.

The Economic Impacts of Broadband Internet

The multidimensional economic impacts of broadband internet are extensively documented in the literature. Based on a comprehensive synthesis by Briglauer et al. (2024), these impacts can be categorized into four main macro- and microeconomic dimensions: economic growth, employment, productivity, and business dynamism. First, high-speed broadband penetration shows a positive correlation with gross domestic product (GDP) growth (Table 1). Empirical evidence suggests that the spread of both mobile and fixed (FTTx) broadband internet significantly increases GDP per capita. Although these marginal benefits are evident globally, they tend to become more pronounced in developing countries and rural areas, indicating diminishing returns on investment once highly developed (e.g., OECD) nations reach a certain threshold of infrastructure development. Second, regarding labor market dynamics, the expansion of digital infrastructure generally stimulates local employment and reduces the unemployment rate (Table 2). The positive employment effects are particularly noticeable in rural counties and among certain socio-economic groups. At the same time, the literature reports mixed results: the introduction of high-speed broadband internet may lead to short-term job losses or restructuring in certain sectors due to automation and outsourcing, underscoring the critical need for continuous workforce training. Third, at the corporate level, the introduction of ultra-fast internet connections is a key driver of total factor productivity (TFP) and labor productivity (Table 3). Companies using connections exceeding 30 Mbit/s or switching to fiber-optic networks experience significant productivity gains. These benefits can be optimized when technological advancements are paired with complementary investments in digital skills and organizational capital, particularly in the service sector and in manufacturing sectors characterized by a high proportion of routine tasks. Finally, digital infrastructure serves as a catalyst for entrepreneurial activity and regional competitiveness (Table 4). Access to high-speed networks significantly increases the likelihood of new firm creation and the attraction of foreign direct investment (FDI). It is noteworthy that these entrepreneurial spillover effects are strongly correlated with regional human capital, meaning that areas with higher levels of education are in a significantly better position to leverage broadband internet access to boost business dynamism.

First-level digital divide – internet access and sociodemographic characteristics in EU-27

Internet access, or, in other words, internet adoption, can be interpreted as a first-level digital divide according to Haight et al. (2014). A significant proportion (95.36%) of companies operating in the European Union with at least 10 employees will have a fixed broadband internet connection in 2024. Among medium-sized and large companies, the proportion is even higher, covering nearly the entire sample (Eurostat, 2025). Zhong et al. (2020) examine the impact of the internet as a technology on corporate development. According to the authors' findings, the effects of the internet on corporate development are identified through two relevant mechanisms: the company's internal characteristics and external environmental factors. Significant differences in bandwidth are observed across size categories. As shown in Figure 2., the fastest internet connections are found among large firms (36.40%), nearly three times the rate observed among small firms (13.27%). A strong correlation has been identified between the technological infrastructure used and company size (Koutroumpis & Sarri, 2024). To perform more complex digital activities (cloud-based services, big data analysis, online customer relations), the demand for higher bandwidth typically increases as company size grows (Eurostat, 2025; Yang et al., 2022; Chen & Wang, 2023). In the European Union, a catch-up effect is observed during the 2014–2024 period, particularly among the southeastern European member states. In 2024, 94.09% of EU households had internet access; the highest rates were recorded in two Benelux countries, the Netherlands (99.04%) and Luxembourg (98.84%), as well as in the Nordic countries, Finland (97.35%) and Denmark (96.92%) (Figure 3). Digital infrastructure in these countries has been among the most advanced for years, and they exceed the EU-27 average. Among the EU-27 countries, the lowest rates were recorded in Greece (86.89%) and Croatia (88.37%). while Bulgaria and Romania saw very significant growth during the period under review, with nearly 60% of households having internet access in 2014 and the rate rising to over 90% by 2024 (Eurostat, 2025). The literature attributes this phenomenon to a catch-up effect, grounded in the theory of digital convergence. The research by Borowiecki et al. (2021) details the fundamental definitions of digital convergence. The term convergence derives from the Latin word convergere, meaning to come together, to harmonize, or to become similar. In the context of the digital economy, convergence refers to a similarity that can be examined from both economic and technological perspectives; it is characterized by a narrowing of the development gaps under examination, with the result that countries initially at a lower level of development catch up with those at a higher level (Grodzicki & Beck, 2014). When interpreting the economic perspective of digital convergence, two main dimensions must be considered (Borowiecki et al., 2021). The horizontal dimension, which encompasses measures affecting the economy as a whole (Iosifidis, 2002), and the specific dimension, which examines the unique circumstances, barriers, and opportunities of individual countries, sectors, industries, and social groups (Kyriakidou et al., 2011; Hsu et al., 2018). Mitrović (2020) examines the dynamics of digital development in Central and Eastern European countries relative to the EU average. The study demonstrates convergence, while strongly emphasizing that inequalities persist. Andrei et al. (2023) examine the convergence of digitalization across all member states of the European Union during the 2015–2020 period using the DESI index. Their empirical results confirm the theory of convergence, as the level of digitalization among member states is gradually converging. The analyses, conducted using sigma and beta convergence methods, demonstrated that economic development plays a decisive role in reducing digital inequalities. In the sigma convergence analysis, differences in digitalization levels among all EU member states show a decreasing trend. At the same time, spatial data analysis points to spatial autocorrelation in the DESI distribution. The result is based on a spatial lag model, which shows that DESI growth rates are correlated with the initial level of digitalization and the growth rates of neighboring regions. Over the 2014–2024 period examined, an overall strengthening of digital cohesion can be observed, reflecting the success of the structural funds allocated for this purpose. The goal of the Digital Decade program is to ensure that the digital economy and transformation are realized in an inclusive and universal manner, so that opportunities related to digitization and participation in the digital economy are available regardless of settlement type, demographic characteristics, or degree of urbanization. Differences between rural and urban areas have significantly narrowed (Figure 4) but still persist, however, some countries have managed to reduce the gap to a minimal level (Eurostat, 2025). In the Benelux countries, the Nordic member states, and Germany, the difference in internet access between rural and urban households is practically negligible. In these regions, the difference between urban and rural areas is statistically irrelevant. In the Eastern European member states (Bulgaria, Greece, Poland), there is a marked difference in internet access by degree of urbanization. This phenomenon can be classified as a secondary dimension of the digital divide, reflecting the persistence of inequalities in access to infrastructure. Limited access to the digital space in peripheral regions hinders the development of advanced digital services and the spread of e-commerce and remote work. In the Baltic states and Central European member states, there are moderate but empirically demonstrable regional differences. The level of digitalization in urban areas typically exceeds that of rural peripheries; however, the urban-rural dichotomy remains a systemic challenge, particularly in the Member States of Southern and Eastern Europe. de Clercq et al. (2023) conducted a panel data analysis covering 1,348 regions across all European Union member states for the period 2011-2018. The results show that the costs of expanding high-speed networks in rural areas have not yet been recouped, but they also demonstrate increasing returns to scale that become pronounced as full coverage is approached. The main finding of Feurich et al. (2024) is that the lack of coherence between digital infrastructure and the virtual space represents the most significant structural obstacle to bridging the urban-rural digital divide.

SUMMARY

One of the most important prerequisites for the functioning and development of the digital economy is high-quality digital infrastructure. The vast majority of global data traffic flows through undersea optical cable networks, underscoring that the digital economy cannot be understood merely as a virtual space but is strongly tied to physical infrastructures that are geographically unevenly distributed. The spatial concentration of optical cable networks, along with global inequalities in network nodes, result in certain countries and regions playing a central role in digital data flows, while other regions remain in a peripheral position. Based on the literature examining the economic impacts of broadband internet, it can be concluded that the level of digital infrastructure development may be positively correlated with economic growth, productivity, employment, business activity, and resilience to crises. At the same time, research findings do not always present a consistent picture. The extent of the positive effects depends on a country's level of development, the technology under study, companies' digital readiness, the workforce's skills, and whether the infrastructure is actually being utilized. This is particularly important because the mere availability of infrastructure does not in itself guarantee that the benefits of the digital economy will be realized socially and economically. Significant progress has been made in the European Union over the past decade in terms of internet access. By 2024, internet access in households had reached a high level in most EU member states, and a catch-up process is particularly evident in Eastern and Southeastern European countries. This can be interpreted as a sign of digital convergence, indicating that Member States with lower initial levels of development are catching up with more developed countries in certain infrastructure indicators. Despite this convergence, differences persist among Member States, regions, settlement types, and company sizes. In the business sector, internet access is now considered nearly universal in the European Union, particularly among enterprises employing at least ten people. However, bandwidth and connection quality vary significantly by company size. A higher proportion of large enterprises have faster internet connections, which enables them to use more advanced digital services, such as cloud-based systems, big data solutions, online customer relationship management systems, and platform-based business models. In contrast, for small businesses, more limited technological capacity and lower adaptability can further deepen digital inequalities. Urban–rural differences also constitute an important dimension of the first-level digital divide. Although disparities in internet access between urbanized and rural areas have narrowed in many European Union member states, territorial inequalities remain evident in Southern and Eastern European member states. In rural and peripheral areas, deficiencies in digital infrastructure can limit the spread of e-commerce, telework, online services, and digital business models. Therefore, digital cohesion is not merely a technological issue but also an economic development and social policy issue.

CONCLUSIONS

The development of the digital economy is closely linked to the availability, quality, and actual use of digital infrastructure. Global fiber-optic networks, broadband internet connections, and high-speed data transmission systems create the fundamental technological conditions without which the economic and social impacts of digital transformation can only be realized to a limited extent. Based on the literature, broadband internet can have a positive impact on GDP, productivity, employment, business dynamism, and economic resilience; however, these effects are neither automatic nor uniform. One of the study's most important conclusions is that digital infrastructure alone is not sufficient to fully realize the benefits of the digital economy. In addition to supply-side access, demand-side adaptation plays a decisive role—that is, whether households, businesses, and institutions can actually use the available technologies. Consequently, bridging the digital divide cannot be limited to expanding internet access; it also requires developing digital skills, supporting corporate digital transformation, and addressing regional disparities in targeted ways. Significant digital convergence has occurred in the European Union over the past decade, particularly in key indicators of internet access. Despite this catch-up process, however, opportunities for participation in the digital economy remain unevenly distributed. Rural areas, peripheral regions, small businesses, and social groups with lower digital capabilities remain in a more vulnerable position. This suggests that, in addition to developing digital infrastructure, digital inclusion, skills development, and strengthening innovation capacity are also key. Overall, the competitiveness of the digital economy does not depend solely on technological infrastructure, but also on the extent to which the given economic and social environment can utilize it productively. For future research, it may therefore be appropriate to link the examination of the first-level digital divide with second- and third-level digital inequalities, particularly in terms of digital skills, online economic participation, e-commerce activity, and corporate digital business models.

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LIST OF TABLES

Table 1
Gross domestic product

Author(s)	Dataset	Broadband data	Methods	Main results
Edquist et al. (2018)	135 countries; 2002–2014	Adoption; Wireless; ≥256 kbit/s; 3G and 4G	FE; IV	On average, a 10% increase of mobile broadband adoption causes a 0.8% increase in GDP. This economic effect gradually decreases over time. The effect of mobile broadband is smaller in OECD countries than in the rest of the world.
Bahia et al. (2019)	160 countries; 2000–2017	Adoption; Wireless; 2G, 3G, and 4G	FE; IV; GMM	A 10% increase in mobile adoption raises GDP per capita between 0.59% and 0.76%. Mobile has a substantial effect on top of basic wireline broadband and is stronger for countries with a more skilled population.
Briglauer and Gugler (2019)	EU 27 countries; 2003–2015	Adoption; Wireline; FTTx	FE; IV	A 10% increase in FTTx connections leads to an incremental increase in GDP of around 0.02–0.03% in the OLS estimation and 0.02–0.04% in the IV case, controlling for basic broadband.
Katz and Callorda (2020)	159 countries; quarterly data; 2008–2019	Adoption; Wireline; 1–10 Mbit/s; 10–40 Mbit/s; >40 Mbit/s	FE	A 100% increase in download speed for >40 Mbit/s increases GDP by 0.73%.
Briglauer et al. (2021)	Germany; 401 counties; 2010–2015	Availability; Wireline; Average speed level ≥2 Mbit/s to ≥50 Mbit/s	FE; IV	An increase in broadband availability of 1 p.p. increases regional GDP per capita by 0.18%, or 0.31% considering regional externalities across neighboring counties, and rural areas benefit more from broadband availability.
Briglauer et al. (2023a)	32 OECD states; country-level; 2002–2020	Adoption and availability; Wireline and wireless; FTTx; 3G and 4G	FE; IV	A 1% increase in broadband adoption contemporaneously affects GDP per capita in a range of 0.026%–0.034%, while mobile broadband adoption increases GDP between 0.079% and 0.088%. Controlling for adoption, wireline and wireless broadband availability does not show a significant effect.
De Clercq et al. (2023)	1348 EU regions; 2011–2018	Availability; Wireline; ≥30 Mbit/s; ≥100 Mbit/s	FEC	An increase in coverage with broadband ≥30 Mbit/s by 1 p.p. increases GDP growth by 0.09 p.p. This effect is larger in urban areas than in rural areas. Effects exhibit diminishing returns with respect to a higher minimum bandwidth level, ≥100 Mbit/s instead of ≥30 Mbit/s.

Source: Briglauer et al. (2024)

Table 2
Employment

Author(s)	Dataset	Broadband data	Methods	Main results
Bai (2017)	USA; 496 counties; 2011–2014	Availability; Wireline; >1 Gbit/s; 1 Gbit/s–100 Mbit/s; 100 Mbit/s–3 Mbit/s; >3 Mbit/s	FD	Positive effects of broadband speed on employment in the initial publication are found. However, due to an error discovered by Whitacre et al. (2018), the original model specification produced no statistically significant results.
Firgo et al. (2018)	Austria; 2122 municipalities; 2013–2016	Availability; Wireline and wireless; aggregated; Average speed level: <2 Mbit/s to >100 Mbit/s	OLS; FE; SEM	A 100% increase in download speed increases employment measured at the place of work by 0.282 p.p.; the effect on employment growth in rural municipalities is 0.303 p.p., and the effect on urban employment growth is insignificant.
Balsmeier and Woerter (2019)	Switzerland; 447 firms; 2014–2015	Adoption; Wireline; FTTH, FTTC; >100 Mbit/s	FD digitalization; IV bandwidth	A CHF 100,000 increase in investment in digitalization is associated with about 5.8 more jobs for highly educated workers, 4 fewer jobs for mid-skilled workers, and about 2.3 fewer jobs for the low-skilled. Overall, a digital investment of CHF 100,000 created 1.6 jobs. The authors are cautious with their IV estimates.
Nordin et al. (2019)	Sweden; 9200 SAMS areas; 2000–2014	Availability; Wireline and wireless; aggregated; >100 Mbit/s	FE SAMS; IV municipality	An increase of 10% in broadband >100 Mbit/s coverage in the whole sample leads to a 0.1% decrease in employment, whereas splitting the sample between rural and urban areas leads to an increase in employment of 0.098% in rural areas and a decrease in urban areas. FE estimates are robust in the IV model.
Katz and Callorda (2020)	159 countries; quarterly; 2008–2019	Adoption; Wireline; 1–10 Mbit/s; 10–40 Mbit/s; >40 Mbit/s	FE	A 100% increase in average download speed increases employment in all sectors by 0.23%, and by 1.53% in the service sector.
Lobo et al. (2020)	USA Tennessee; 95 counties; 2011–2015	Availability; Wireline and wireless; ≤100 Mbit/s; ≥100 Mbit/s; ≥1000 Mbit/s	FE	Counties with >100 Mbit/s have 0.26 p.p. lower unemployment rates than counties with low broadband speed. Rural counties with >100 Mbit/s have 0.39 p.p. lower unemployment rates than high-speed urban counties.
Fabling and Grimes (2021)	New Zealand; 7500 firms; 2010–2012	Adoption; Wireline FTTH/B; 100 Mbit/s–1 Gbit/s	OLS; IV	FTTH/B adoption has a negative impact on firm employment. This reduction is observed contemporaneously and reaches its peak over a four-year horizon, potentially due to increased outsourcing once FTTH/B is adopted in firms. Negative employment effects are observed, especially in firms with initial low computer intensity.
Campbell (2024)	USA; North Carolina; 5,158,485	Availability; Wireline; FTTx	DiD; DCDH	FTTx availability increases local employment by 2.4 p.p.

Author(s)	Dataset	Broadband data	Methods	Main results
	students; 2011–2019			
Hasbi and Bohlin (2022)	Sweden; 2000 urban areas; 2009–2017	Adoption; Wireline; 7 broadband speed ranges with average download speed of 33 Mbit/s	FE	Overall, there are no significant effects of different broadband speed on median income nor on unemployment. However, high-speed broadband is associated with unemployment reduction for low-skilled workers in big cities. In smaller cities with a high proportion of high-skilled inhabitants there is a negative but small association between broadband speed and income.
Isley and Low (2022)	USA; rural counties; population <20,000; April–May 2020	Adoption and availability; Wireline and wireless; ≥25 Mbit/s	IV	Higher wireline broadband availability and higher wireline broadband adoption led to higher employment rates in rural areas. An increase in broadband availability of 1 p.p. increases the employment rate by 0.368 p.p. The effects subject to wireline broadband show a 0.86 p.p. increase in employment due to a rise in wireline availability.
Abrardi and Sabatino (2023)	Italy; 7485 municipalities; 2019–2020	Availability; Wireline FTTH/FTTC; >30 Mbit/s; ≤1000 Mbit/s	FE; IV	One additional year of access to high-speed broadband connections increases local employment by 1.3 p.p.

Source: Briglauer et al. (2024)

Table 3
Productivity

Author(s)	Dataset	Broadband data	Methods	Main results
Gal et al. (2019)	20 countries; 22 industries; 1.5 million obs.; 2014–2016	Adoption; Wireline; >30 Mbit/s	ECM	A 10-p.p. increase in adoption instantaneously increases TFP growth by 1.4 p.p. After 5 years, this would imply a 5.8% (or 3.5%) higher TFP level for the average firm. The effect is, on average, more pronounced in manufacturing than service firms and more broadly in industries involving a high share of routine tasks.
Dalgic and Fazlioglu (2020)	Turkey; 7000 firms; average no.; 2012–2015	Adoption; Wireline; Firms with >/<100 Mbit/s (0/1)	DiD; PSM	High-speed broadband has a positive effect on TFP. When firms switch to a high-speed connection, the productivity of firms increases by 5.3 p.p.; this rate is even higher in the following period (6.5 p.p.).
Fabling and Grimes (2021)	New Zealand; 6000 firms; max. no.; 2010–2012	Adoption; Wireline; FTTH/B; 100 Mbit/s–1 Gbit/s	OLS; IV	High-speed broadband adoption has positive impacts on multifactor productivity (TFP) over a four-year horizon. Positive TFP and labor productivity effects are most clearly observed in firms that also make complementary investments.
Gallardo et al. (2021)	USA; 3073 counties; 2017	Adoption; Wireline; ≥1 Gbit/s; ≥50	SEM; CEM	No significant results for 50 Mbit/s and 1 Gbit/s on labor productivity – measured as GDP/labor – for the whole sample. An increase of 1% in the population

Author(s)	Dataset	Broadband data	Methods	Main results
		Mbit/s; ≥25 Mbit/s		with access to at least 1-Gbit/s broadband speed decreases GDP per job in rural areas by 0.09%.
Edquist (2022)	116 countries; 2014–2019	Adoption; Wireless; 146 kbit/s–55 Mbit/s	FE; FD	There is no contemporaneous relationship for the total sample, but there is a significant association when a one-year lag of mobile broadband speed is introduced. A 10% increase in mobile broadband speed in the previous period is associated with a 0.2% increase in labor productivity – measured as GDP/labor. The results only hold for non-OECD and low-income countries.
Cambini et al. (2023)	Italy; 3 million firm-year obs.; 2013–2019	Availability; Wireline; FTTC/FTTH; 30 Mbit/s–1 Gbit/s	FE; IV	There is a positive effect of most advanced FTT networks on firm productivity. TFP increases by 2.9% and labor productivity by 3.9%. Services companies benefit the most from advanced broadband technologies, as do firms located in the northwest and south of Italy.

Source: Briglauer et al. (2024)

Table 4
Firm creation and education

Author(s)	Dataset	Broadband data	Methods	Main results
Cambini and Sabatino (2023)	Italy 7799 municipalities 14 industrial sectors 2012–2019	Availability Wireline FTTC/FTTH 30 Mbit/s–1Gbit/s	FE, IV	The exit of small firms increases in magnitude by 1.8% each year since high-speed broadband introduction, particularly for small firms. Firm entry rises only in digital-intensive sectors and in the most developed geographical areas.
Hasbi (2020)	France 5000 municipalities 2010–2015	Availability Wireline FTTx ≥30 Mbit/s	FE Count and negative binomial model	Municipalities with FTTx connections have a 2.7% higher chance of creating new establishments than municipalities without high-speed broadband. There are heterogeneous effects for different sectors of the economy and different education levels.
McCoy et al. (2018)	Ireland 192 urban fields 2002–2011	Availability Wireline xDSL and middle-mile fiber	SEM	Providing a middle-mile fiber broadband available in a region generates an 0.103 (equivalent to 83%) increase in new foreign firms. This effect is higher in regions with higher education levels.

Source: Briglauer et al. (2024)

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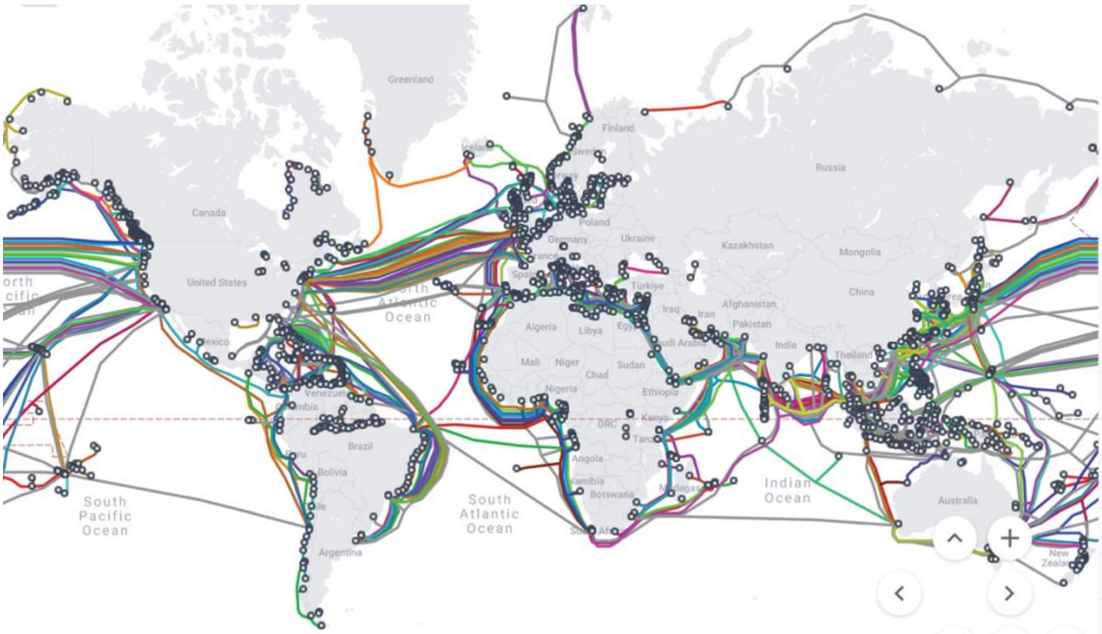
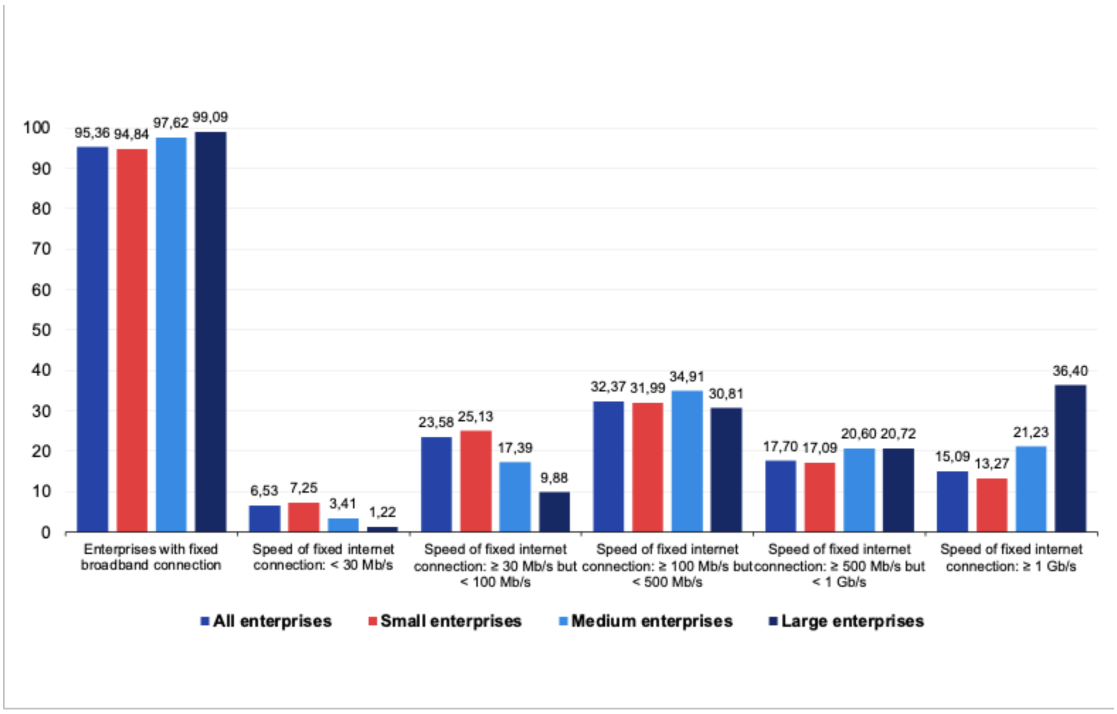


Figure 1
Map of the international optical cable network
Source: https://www.submarinecablemap.com



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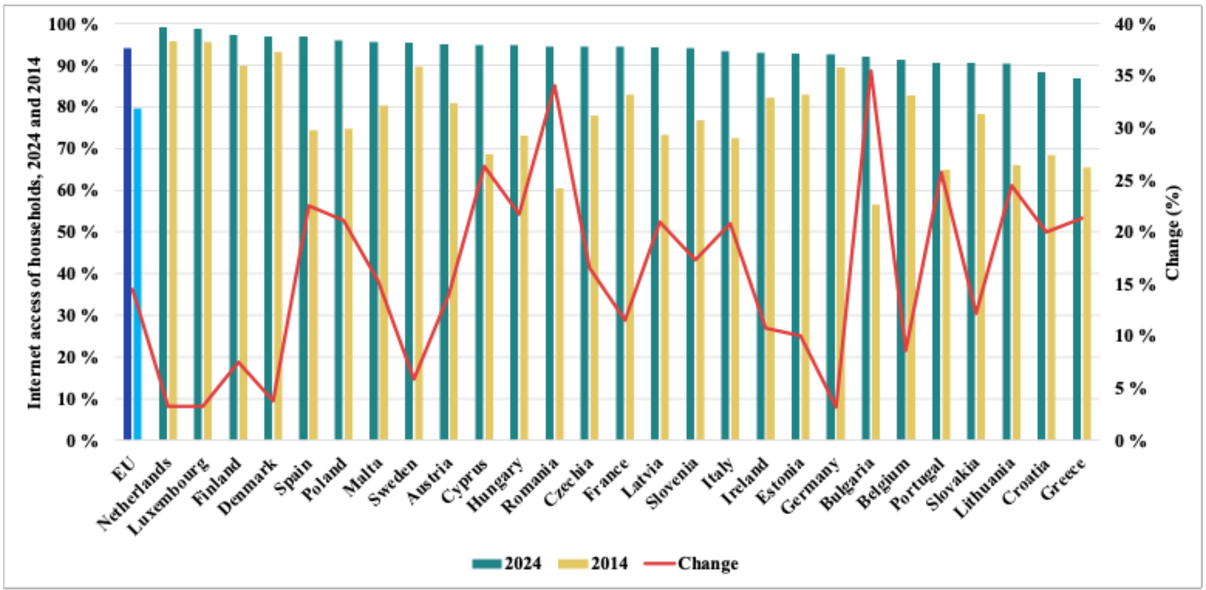

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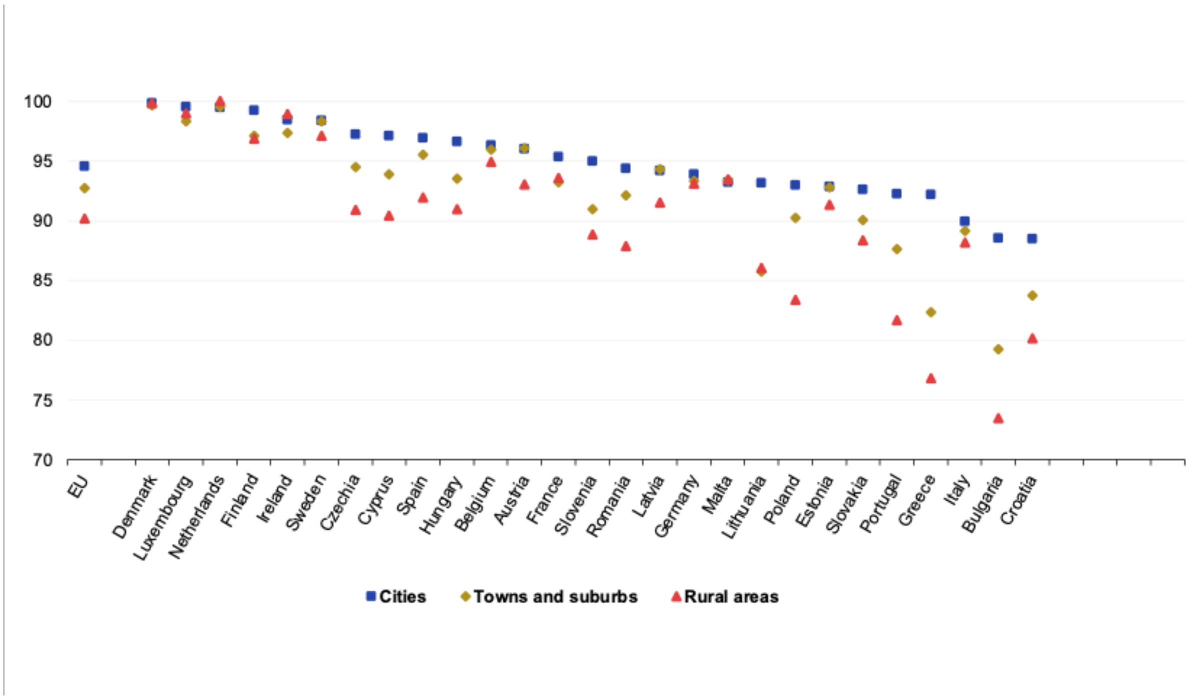
Source: Eurostat (2025)



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Source: Eurostat (2025)