

# THE ECONOMIC FOOTPRINT OF RAILWAY TRANSPORT IN EUROPE

STUDY FOR THE COMMUNITY OF EUROPEAN  
RAILWAY AND INFRASTRUCTURE COMPANIES (CER)



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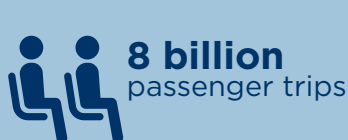
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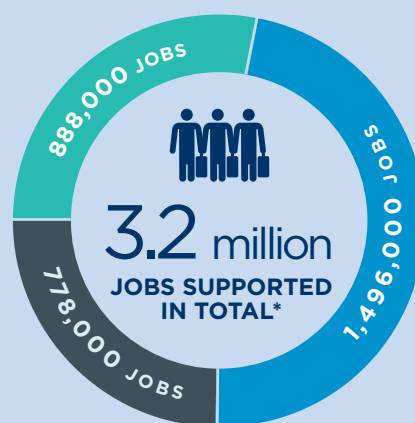
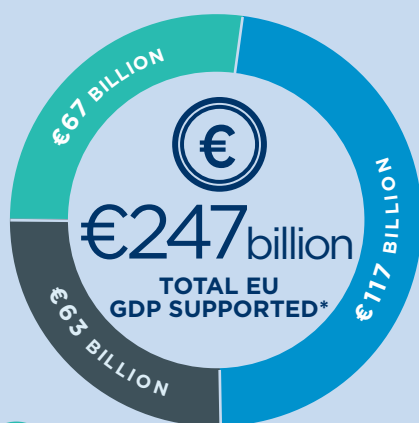


# THE ECONOMIC FOOTPRINT OF RAILWAY TRANSPORT IN EUROPE

KEEPING EUROPE MOVING: RAILWAYS AS THE TRANSPORTATION BACKBONE



TRACKS TO PROSPERITY: HOW RAIL FUELS ECONOMIC GROWTH AND JOBS IN THE EU



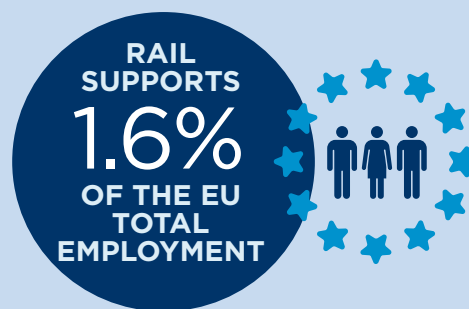
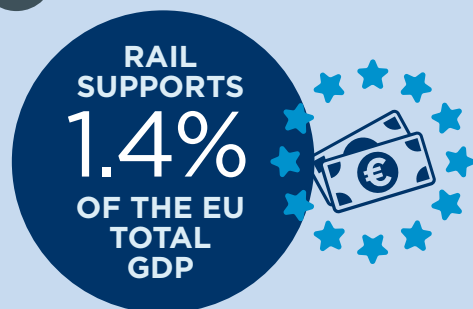
**Direct impact:** Railway transport sector employs staff and generates GDP.



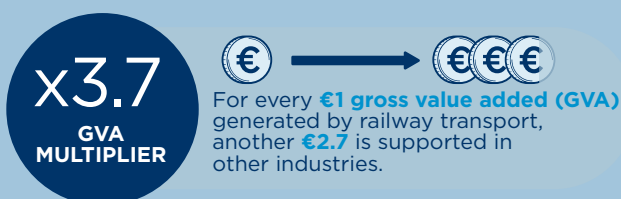
**Indirect impact:** Railway transport sector spends money with suppliers. They use other suppliers in turn. This supports jobs and GDP across the European supply chain.



**Induced impact:** Employees in railway transport and their suppliers spend their wages, which supports GDP and jobs throughout the wider economy.



RAIL'S RIPPLE EFFECTS THROUGHOUT THE EU ECONOMY



Supported industries include:



**Business sector services**  
(e.g., technical testing & analysis or R&D)



**Wholesale & retail trade**  
(e.g., wholesale of machinery and equipment)



**Construction**

**Note:** All data refer to 2023. GVA measures how much value an industry or business contributes by taking the total value of its output and subtracting the cost of the inputs it uses. \* Sums may not add up to totals due to rounding.

# EXECUTIVE SUMMARY

This study aims to assess the economic importance of railway transport by providing a comprehensive analysis of the economic footprint of railway transport in Europe. We analyse how the railway sector's activities contributed to GDP (gross domestic product) and supported jobs across the EU in 2023.

## RAILWAY TRANSPORT GREATLY BOOSTS EUROPEAN GDP AND EMPLOYMENT

**Railways are at the heart of Europe's transport system, serving as a vital backbone for both passenger and freight movement across the continent.** With a network spanning 201,000 kilometres, they handle around 8 billion passenger trips annually, while also offering sustainable freight services for key industries (Eurostat, 2025a). In addition to their strategic importance in connectivity and sustainability, railways significantly contribute to the European GDP and employment.

**In 2023, railway transport contributed a total of €247 billion to the GDP of the EU countries.** For context, this is equivalent to 1.4% of the EU's total GDP in 2023, and exceeds Greece's 2023 GDP of €225 billion, the 16th largest economy in the EU (Eurostat, 2025b; 2025c). With a GVA of €117 billion, railway transport's supply chain (indirect effect) accounted for almost half of the sector's total impact. The railway transport sector itself generated a further €67 billion of GVA (direct effect). Through the last channel (induced effect), €63 billion of GVA was supported, accounting for a quarter of the total impact. This channel measures the economic activity stimulated by the wage-funded consumption of employees of railway transport companies and their suppliers. Overall, we estimate that for every €1 of GVA generated directly by railway transport, a further €2.70 was stimulated in other sectors within the European economy.



201,000 km

Total length of railway lines



€247bn

Total contribution to EU GDP

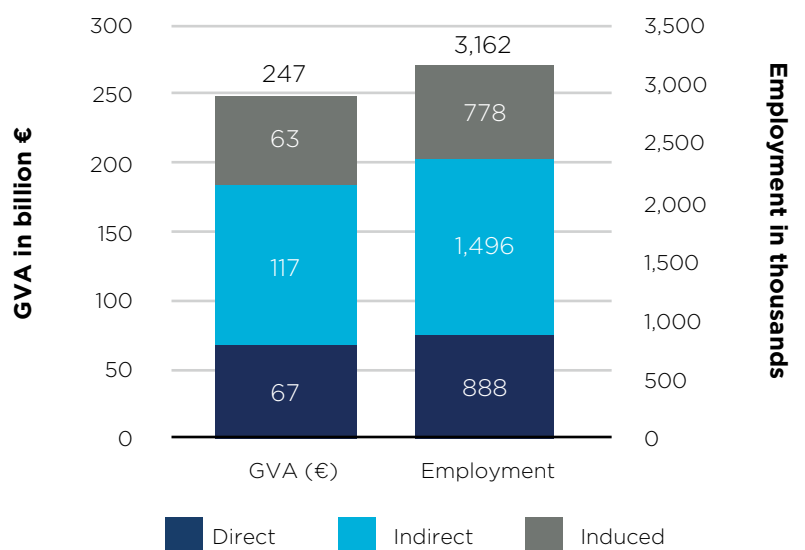
### Railway transport supported a total of around 3,162,000 jobs across the EU in 2023.

This is equivalent to 1.6% of the EU's total employment and exceeds the total employment in Ireland in 2023, which was 2,571,000 jobs (Eurostat, 2025d). As with GVA, a significant number of jobs were supported by railway transport's supply chain, totalling around 1,496,000 jobs. The wages paid by the railway transport sector and its suppliers helped to support an additional 778,000 jobs, making up about 25% of the total impact. Direct employment accounted for 28% of all jobs supported, at 888,000 jobs. This means that for every person employed directly by the railway transport sector, another 2.6 jobs were supported in its supply chain and through wages paid.

### Railway transport's purchasing activities supported the most significant amount of GVA and jobs in companies offering business services like marketing and R&D.

Moreover, the sector supported economic activity among wholesalers and retailers, for example in the machinery and equipment sector, as well as construction firms. Economic activity was also stimulated in typical consumer industries, such as the real estate and human health and social work sectors. These are supported when employees of the railway transport sector and its suppliers spend their wages in these sectors, e.g., by renting an apartment or paying for childcare (Eurostat, 2025a).

### Split of railway transport's GVA and employment effects within the EU, by channel



Source: Oxford Economics based on Eurostat (2025b)



# 3,162,000

Total supported jobs  
in EU

## RAILWAYS PROVIDE MORE JOBS THAN WATER AND AIR TRANSPORT COMBINED

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**The rail transport sector is one of the most important contributors to the European economy across transport sectors.** It directly generated €67 billion for the EU GDP, which is more than the air transport sector. While it did not surpass the water transport sector in terms of GDP contribution, the rail sector excels in job creation. With 888,000 employees, the rail sector provided as many jobs as the air and water transport sectors combined, highlighting its vital role in creating employment opportunities (Eurostat, 2025a).

## RAILWAY TRANSPORT PROVIDES WIDER BENEFITS TO THE EU

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**Railways are vital for Europe's industrial competitiveness.** They offer secure and efficient transport for key industries such as manufacturing, energy, and defence. They are crucial for moving heavy and high-value goods across borders and play a central role in European security policy, as emphasised by the EU's Military Mobility Initiative. The 2024 Draghi Report on EU Competitiveness highlights the importance of a well-connected, high-speed rail network for boosting industrial competitiveness, advocating for increased EU funding to expand the network (European Commission, 2024a). Studies, for instance Alotaibi et al. (2022), show that railway investments lead to GDP growth, job creation, and reduced regional disparities. Furthermore, the European rail supply industry is highly research-intensive, contributing significantly to innovation and productivity across sectors (European Rail Supply Industry Association, 2024). This underscores the strategic importance of investing in rail infrastructure for long-term economic benefits.

**Railways drive the green transition of Europe's transport sector.** As the greenest mode of transport, railways are central to the EU's strategy for the green transition. The Sustainable and Smart Mobility Strategy emphasises that a modal shift to rail is essential to achieving climate neutrality. Railways—especially electrified lines—are much more energy efficient than



road transport and emit less CO<sub>2</sub> (Community of European Railway and Infrastructure Companies, 2022). Moreover, a European high-speed rail network could reduce CO<sub>2</sub> emissions in the EU by up to 10% (Weber et al., 2022). With rail transport accounting for only 2% of the estimated cost of negative externalities in transport—such as congestion, noise, climate change, and air pollution—it demonstrates why rail is key to the EU's efforts to decarbonise and modernise its transport sector.

## STRENGTHENING RAILWAYS FOR A SUSTAINABLE FUTURE

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**Recognising railways' importance, European policymakers have developed the Sustainable and Smart Mobility Strategy (SSMS).** It aims to significantly increase rail's share in passenger and freight transport. This strategy includes ambitious goals like doubling high-speed rail traffic by 2030 and tripling rail freight traffic by 2050, underscoring a commitment to a greener, more resilient transport network (European Commission, 2021).

**However, despite these ambitious goals, rail freight transport has remained largely unchanged over the last decade,** with a slight decrease of -0.2% in tonne-kilometres recorded from 2013 to 2023. On a brighter note, rail passenger transport has shown steady growth, boasting a 15% increase since 2013, and international travel reached record highs in 2023. Although passenger transport dropped sharply during the pandemic, it quickly recovered and surpassed pre-pandemic levels by 2023. Nevertheless, rail's overall share in the transport sector has shifted little, with passenger transport remaining at 8% and freight transport on land decreasing from 19% to 17% since 2013 (Eurostat, 2025a).

**To achieve the strategy's objectives, it is essential to further support the railway sector** through investments and policy measures. This will ensure that railways play a pivotal role in Europe's sustainable transport future and continue to strengthen the competitiveness of the European economy.

# SECTION 1: INTRODUCTION



**Railways play a vital role in Europe's transport system, not only by facilitating the movement of people and goods but also by significantly contributing to European economies. This study aims to assess the economic importance of railway transport by providing a comprehensive analysis of the economic footprint of railway transport in the EU.**

We analyse how the railway sector's activities contribute to GDP and support jobs across the EU, with a focus on 2023, the year for which the most recent data are available. To provide a comprehensive assessment, we consider the direct, indirect, and induced impacts of the railway transport sector. While the direct impact relates to the direct economic contributions of railway transport, the indirect impact captures the effects throughout the supply chain and across EU Member States. The induced impact comprises the effects that are stimulated when the wages paid by railway companies and the businesses in the railway transport sector's supply chain are spent in the wider economy.

This study is structured as follows. In section 2, we provide some background information on recent developments in railway transport in Europe. We also discuss the wider, long-term economic, and environmental benefits of railway transport, which go beyond the effects that can be quantified in this study's footprint analysis. In section 3, we present the main results on the economic footprint of railway transport in the EU. In section 4, we conclude. Finally, the methodological appendix offers a more detailed discussion of our methodology.

## SECTION 2: BACKGROUND

A photograph of a train driver from a side profile, looking out the front window of a locomotive. The driver is wearing a light blue shirt and a watch. The dashboard is filled with various controls, including levers, buttons, and digital displays. The view through the window shows a blurred green landscape, indicating the train is in motion.

In 2023, railways met 390<sup>1</sup> billion tonne-kilometres of freight transport demand on the EU's territory, compared to 391 billion tonne-kilometres in 2013.

With a network spanning 201,000 kilometres and around 8 billion passenger trips by rail within the EU in 2023, railways form the backbone of Europe's transport system (Eurostat, 2025a). This averages out to more than 17 train journeys per person in the EU that year. In addition to passenger travel, the railway system offers reliable, efficient, and sustainable freight transport services that support key European industries.

## STAGNATING SHARE OF RAIL IN PASSENGER AND FREIGHT TRANSPORT

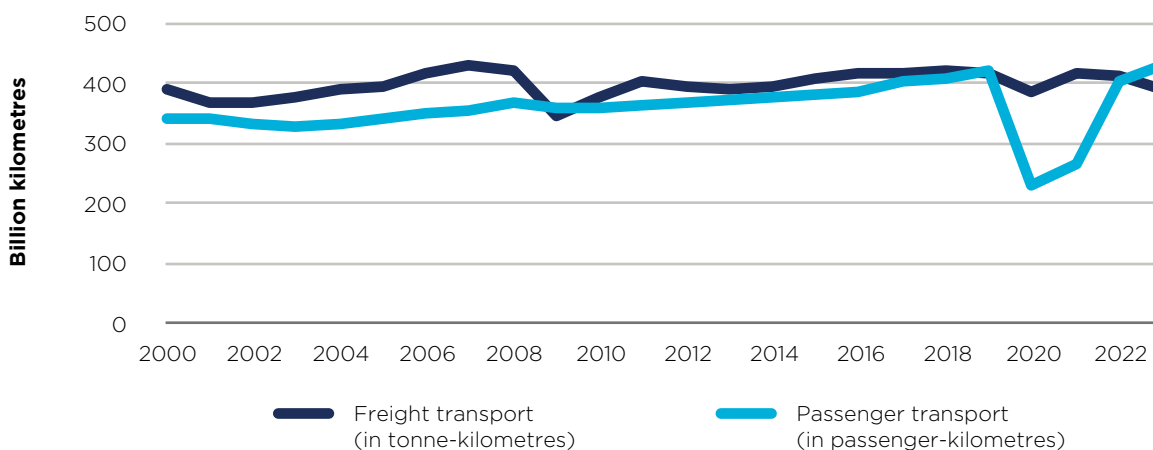
The SSMS of the European Commission highlights the importance of increasing the share of rail in both passenger and freight transport. The SSMS was partly formulated in response to the stagnation of rail freight transport over the last two decades (Figure 1). In 2023, railways met 390<sup>1</sup> billion tonne-kilometres of freight transport demand on the EU's territory, compared to 391 billion tonne-kilometres in 2013. Rail freight transport experienced declines during the financial crisis and the Covid-19 pandemic, but it recovered quickly. Most recently, from 2022 to 2023, freight transport declined again.

The goods most commonly transported in terms of tonnes in 2023 throughout the EU were metal ores and other mining and quarrying products at 16%, followed by the goods coal, lignite, crude petroleum, and natural gas at 12% and coke and refined petroleum products at 10%. Basic metals and fabricated metal products, except machinery and equipment, contribute to 9% of the total

transported goods. This highlights the railway's role in transporting heavy goods (Eurostat, 2025a).

However, the rail freight sector currently faces the challenge of declining bulk transport, driven by deindustrialisation and Europe's energy transition. Over the past decade, the transport of coal, lignite, crude petroleum, and natural gas has fallen by 42%, while transport of chemicals has declined by 32% and of coke and refined petroleum products by 22% (Eurostat, 2025a). In contrast, intermodal rail freight—combining rail with road or sea transport—has gained momentum. This shift is propelled by growing consumer markets and global sourcing trends that demand flexible and efficient logistics solutions. Intermodal rail freight transport grew by 88% over the last decade, underscoring its role in facilitating the modal shift from road to rail in the future (International Union of Railways and UIRR, 2024).

Fig. 1: Development of railway transport within the territory of the EU countries



Note: Transport by tram, metro or light train is excluded.

Source: Oxford Economics based on European Commission (2024b) and Eurostat (2025a)

1 Figure includes estimates for Belgium from Regulatory Body for Railway Transport and Brussels Airport Operations (2023). Figure without Belgium is 378 billion tonne-kilometres of freight transport in 2023.

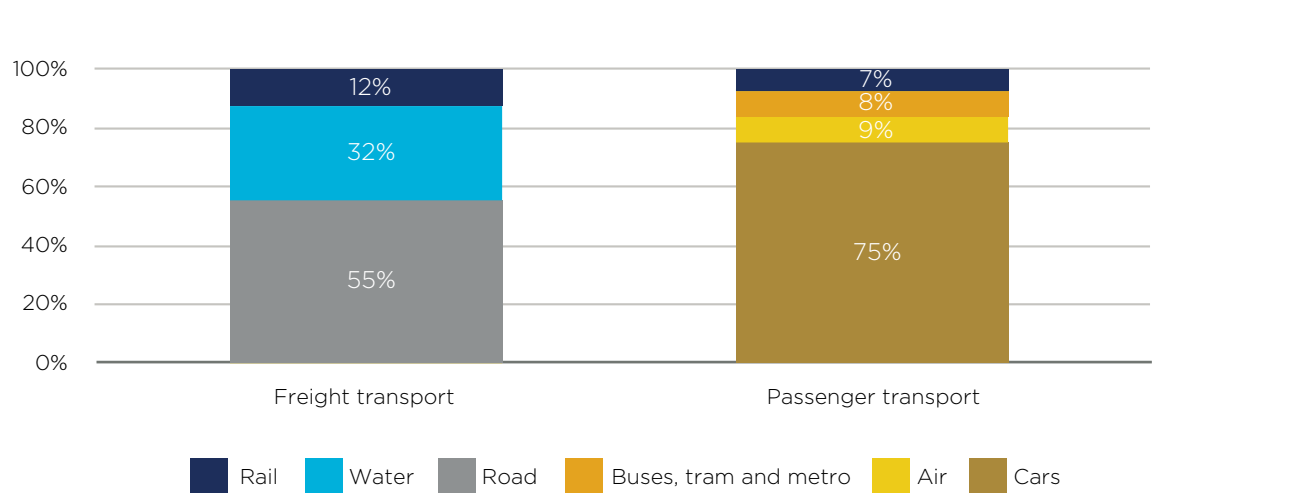
By contrast, rail passenger transport has grown slowly but steadily over the last decades, experiencing only a temporary drop during the Covid-19 pandemic. In 2023, a total of 429 billion passenger-kilometres were travelled across the EU countries, representing a 15% increase over the last ten years. Although passenger transport dropped sharply during the pandemic, it quickly recovered and surpassed pre-pandemic levels by 2023. Of these, 22 billion passenger-kilometres (5.2%) were for international destinations (Eurostat, 2025a). This represents an unprecedented peak in international passenger transport among the EU Member States.

Rail carried more passenger-kilometres, but its modal share in domestic and intra-EU passenger travel has barely changed over the past decade (Figure 2). In both 2012 and 2022, rail held a 7% share. Cars account for 75% of EU's passenger transport, followed by planes at 9%. In freight transport, rail's share is higher—12% in 2022—but

still short of the EU's target. In fact, it declined from 14% in 2012. Road freight once again accounted for most of the transport (55%), while water transport, including inland waterways and intra-EU maritime transport, handled the remaining 32%.

Over the past decade, the EU railway network has remained broadly stable in length, with only minor adjustments in total kilometres of lines. At the same time, train traffic has grown, pushing traffic intensity from about 17,300 train-kilometres per line kilometre in 2013 to 18,700 in 2022 (European Commission, 2025; Eurostat 2025a). This 8% increase demonstrates that infrastructure is being used more intensively, even without major network expansion. Furthermore, in the longer run the EU's rail network has significantly shrunk—contracting by about 6% since 1990—highlighting not only the need to safeguard and upgrade existing lines, but also the opportunity for rail to capitalise on new infrastructure to meet future demand (European Commission, 2024b).

Fig. 2: Modal split of domestic and intra-EU transport in 2022



Note: Modal split without pipelines. The percentages do not add up to 100% due to rounding.  
Source: Oxford Economics based on European Commission (2024b)

## FACILITATING THE MODAL SHIFT TO RAIL

Given the recent stagnation in the share of railway transport, efforts to increase railway transport must be intensified to achieve the ambitious goals formulated in the SSMS. A functioning railway infrastructure is one important prerequisite for a shift to rail, and significant regeneration and modernisation efforts are required in many

European countries. Another key driver of the modal shift to rail is the expansion of the European high-speed rail (HSR) network. Designed to connect major urban centres, HSR facilitates business, tourism, and regional development by providing efficient and competitive alternatives to air and road travel. HSR offers rail speeds of 200 km/h or more

(from 250 km/h on new lines), making it a viable alternative to air and road travel. As of 2023, the EU boasts 27,052 kilometres of high-speed railway lines with a rail speed equal to or greater than 200 km/h, a 37% increase since 2013 (Eurostat, 2025a). The EU's commitment to expanding and modernising high-speed rail is underscored by its forthcoming High Speed Rail Master Plan, due for publication in the autumn of this year. This plan was explicitly requested in the Commissioner mission letters and is identified as a strategic priority in Enrico Letta's "Much More Than a Market" report on the future of the Single Market (Letta, 2024).

The SSMS further emphasises the role of technological innovation to facilitate the modal shift to rail. These technological innovations like the European Rail Traffic Management System (ERTMS) or Digital Automatic Coupling (DAC) improve safety and enhance operational efficiency. While the railway sector is exceptionally innovative—leveraging AI-driven maintenance, modular interlocking systems, and satellite-enhanced signalling—the implementation of innovative technologies faces severe challenges due to stringent safety standards, long investment cycles, and complex standardisation procedures.

## RAILWAYS ARE KEY FOR EUROPE'S INDUSTRIAL COMPETITIVENESS

Railways are essential for providing secure, efficient, and high-capacity transport for key industries in the EU, underpinning both economic activity and strategic resilience. For sectors such as manufacturing, energy, and especially defence, rail offers reliable logistics for moving heavy, sensitive, or high-value goods across borders quickly and safely.

The rising importance of the defence sector has brought renewed focus to the railways' role in enabling the rapid and coordinated movement of military personnel, equipment, and supplies—capabilities that are now central to European security policy. The EU's Military Mobility Initiative exemplifies this shift: it aims to remove infrastructural and regulatory bottlenecks, ensuring that the rail network can support the swift deployment of troops and materiel in response to crises.

The recently published and widely discussed Draghi Report on enhancing European competitiveness also highlights the crucial role of a well-connected, high-speed rail network in strengthening industrial competitiveness across Europe (European Commission, 2024a). Therefore, the report calls for reinforced EU funding to achieve the goal of tripling the existing HSR network. The conclusions of the report are further supported by a broad academic literature on the long-term economic benefits of railway investments. Several studies show that railroad investments raise GDP and create new jobs (Alotaibi et al., 2022; Alstadt et

al., 2012; Rodrigues et al., 2024). These gains flow partly from stronger agglomeration economies—railways compress travel times, letting firms cluster, share knowledge, and draw on larger labour pools (Kasraian et al., 2016; Graham, 2007). Better accessibility also widens residential land supply, boosts house values near stations, and helps narrow regional disparities (Galushko et al., 2024; Debrezion, 2006).

In the realm of innovation, firms in the European rail-supply industry devote close to 4% of annual turnover to R&D, marking it as one of the EU's most research-intensive sectors (European Rail Supply Industry Association, 2024). EU-funded programmes such as Shift2Rail and Europe's Rail have recently produced hundreds of new prototypes and solutions, further reinforcing the sector's knowledge base. A prominent example is ERTMS, which was developed in Europe, but still needs to be fully deployed, and is being introduced worldwide, thereby contributing to greater safety and interoperability. Academic studies confirm that rail-related R&D generates sizeable positive spillovers: the construction of high-speed lines, for example, stimulates patenting and can raise productivity well beyond the transport sector itself (Wang & Cai, 2020; Sun et al., 2023; Bottasso et al., 2023).

Together, these studies show that rail infrastructure has significant long-term economic benefits—making it a strategically compelling area for public and private investment.

## RAILWAYS DRIVE THE GREEN TRANSITION OF EUROPE'S TRANSPORT SECTOR

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As the greenest mode of transport, railways are also central to the EU's strategy for driving the green transition in the transport sector, as outlined in key strategic documents such as the European Green Deal and the SSMS. The SSMS sets a target of a 90% cut in transport emissions by 2050, emphasising a modal shift to rail and inland waterways as essential to achieving climate neutrality.

Railways—especially electrified lines—are significantly more energy efficient than road transport, particularly for freight and long-distance passenger travel. According to an overview by UIC and UNIFE, in 2022, 88% of passenger train kilometres and 90% of reported freight train kilometres in Europe were already electrified, resulting in some of the lowest greenhouse gas and pollutant emissions of any transport mode (Europe's Rail, 2024).

Rail freight emits 80% less CO<sub>2</sub> and is up to seven times more fuel-efficient than road transport, underscoring its role as a low-carbon, energy-efficient transport solution (Community of European Railway and Infrastructure Companies, 2022; Ritchie, 2023). It is estimated that a European high-speed rail network could reduce the EU's CO<sub>2</sub> emissions by up to 10% (Weber et al., 2022). Furthermore, the deployment of smart energy management and energy-saving technologies—such as regenerative braking, lightweight rolling stock, and advanced power supply systems—has been shown to deliver significant energy savings and enhance the sector's environmental performance even further.

Overall, all forms of rail transport combined account for just 2% of the estimated cost of negative externalities (i.e., indirect costs to third parties, such as congestion, noise, climate change, and air pollution). In comparison, road transport accounts for 93% of external costs, while air transport accounts for 4% (International Union of Railways and CER, 2012).

These findings highlight why rail is central to the EU's efforts to decarbonise and modernise its transport sector.





## SECTION 3: THE ECONOMIC IMPACT OF RAILWAY TRANSPORT IN THE EU

### 3.1 MEASURING RAILWAY TRANSPORT: A SHORT METHOD INTRODUCTION

We assess the economic impact of the railway transport sector on the EU's economy using a standard analytical framework known as an economic impact assessment. This involves quantifying the three economic impact channels, namely the direct, indirect (supply chain), and induced (wage expenditure) channels (Figure 3):

- The **direct impact** relates to the direct economic contributions made in the EU through transporting passengers and freight by rail, and through providing and maintaining railway infrastructure. More information can be found in the FAQs in the Methodological Appendix.
- The **indirect impact** refers to the economic activity and employment generated within the railway transport sector's supply chain. This includes spending on railcars, electricity, marketing, and logistics, as well as infrastructure investments by commissioning construction firms. As these third-party suppliers in turn have their own suppliers, railway transport stimulates economic activity throughout its entire EU supply chain. Crucially, our model incorporates trade feedback to account for the railway transport's trade-intensive supply chain. For instance, if EU-based company A buys goods from Indian supplier B, which then purchases items from EU-based supplier C, the economic activity of supplier C is included in the assessment.
- The **induced impact** comprises the wider economic benefits arising from the wages paid by railway companies and the businesses in the railway transport sector's supply chain. A part of these wages is spent in the consumer economy, for example in restaurants, thereby stimulating additional economic value throughout the EU economy.

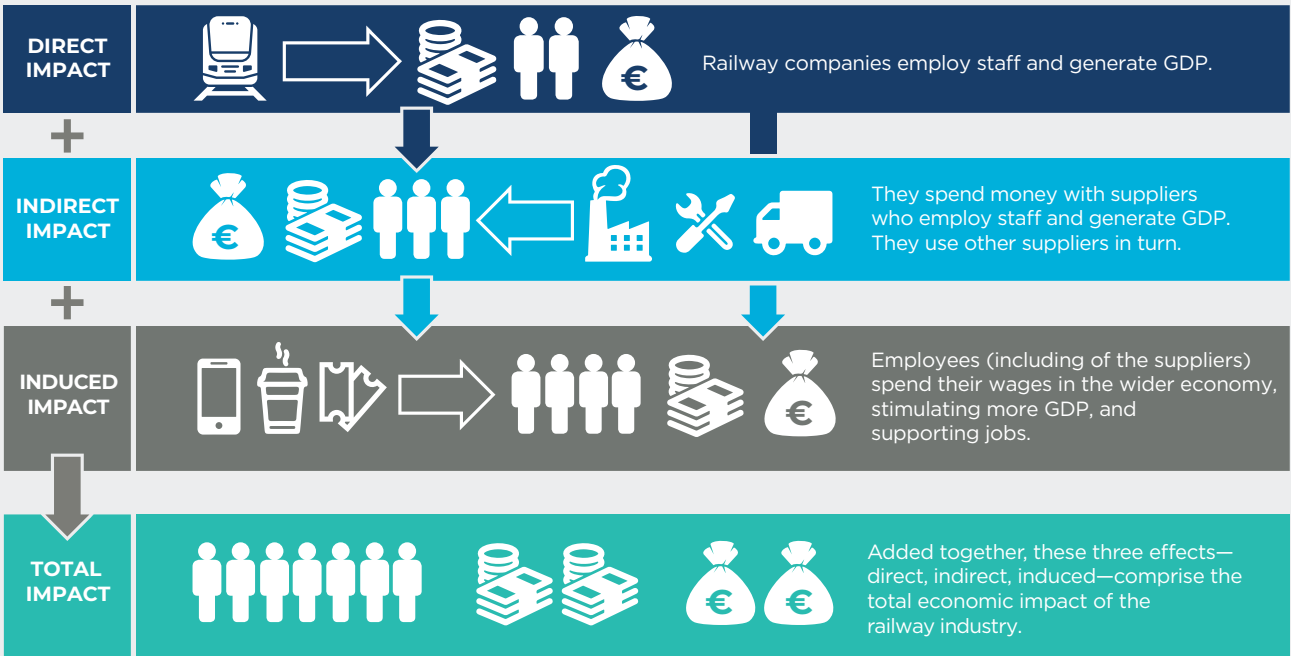
The three channels of impact sum up to the **total economic impact** of the railway transport industry.

The analysis was based solely on publicly available data, with the Structural Business Statistics from Eurostat (2025b) being the primary source. Therefore, it was necessary to define the railway sector in terms of the statistical classification of economic activities in the European Community (NACE).<sup>2</sup> Data on revenue, number of employees, etc. at the EU level are mostly available at the four-digit level of NACE codes. As there is no single NACE sector that adequately represents the railway transport sector, we developed a bespoke sector definition including three sectors at the four-digit level:

- **NACE Code H49.10:** Passenger rail transport, interurban
- **NACE Code H49.20:** Freight rail transport
- **NACE Code H52.21:** Service activities incidental to land transportation

2 The abbreviation NACE stands for "Nomenclature statistique des activités économiques dans la Communauté européenne".

Fig. 3: Channels of impact



Source: Oxford Economics

### 3.2 THE CORE ECONOMIC FOOTPRINT OF EU RAILWAY TRANSPORT

This section describes the economic contribution of European railway transport across the three channels of impact. We measure the economic impact in terms of gross value added (GVA) and employment, capturing the effects in 2023.

#### 3.2.1 DIRECT IMPACTS

Railway transport makes a substantial contribution to the GDP and employment of the EU countries through its own operations. In 2023, it contributed €67 billion in GVA to the EU economy. To put this in context, this is equivalent to 10.8% of the EU's entire transportation and storage sector (NACE code H) and 0.4% of the EU's total GDP in 2023 (Eurostat, 2025b; 2025c).

In addition to its GVA contribution, the railway transport sector directly supported 888,000 jobs across EU in 2023. This equates to 8.4% of the EU's entire transport and storage sector (NACE code H) and 0.4% of the total EU employment (Eurostat, 2025b; 2025d). Furthermore, the railway transport sector in the EU plays a crucial role in

providing employment opportunities for young people by offering numerous apprenticeship positions—reaching up to 8% of the staff of rail companies (European Commission, 2019).

The average GVA generated per job in the railway sector was €76,000, which is broadly in line with the average productivity in EU of €79,000 in 2023 (Eurostat, 2025e). However, the rail sector continuously improves its productivity over the years and furthermore enhances productivity across other industries by enabling efficient transportation, thereby supporting economic growth more broadly (Bottasso et al., 2023). Over the last decade, European railway transport has increased its productivity by 9.4%, rising from €69,000 GVA generated per job in 2013<sup>3</sup> (Eurostat, 2025b).

Fig. 4: Railway transport's direct impact on the EU economy in 2023



Source: Oxford Economics based on Eurostat (2025b)

<sup>3</sup> Numbers are expressed in nominal units.

### 3.2.2 INDIRECT IMPACTS DUE TO SUPPLY-CHAIN SPENDING

To operate, railway transport companies procure goods and services from suppliers across the EU and the rest of the world. Procurement spending in the railway transport sector typically includes the purchase of rolling stock, fuel, electricity, and IT systems. Investment spending on projects such as rail network expansion is also taken into account. As these suppliers also procure goods and services, the industry stimulates economic activity throughout its entire supply chain.

Through this indirect channel of impact, railway transport stimulated an estimated €117 billion of GVA within EU countries. Additionally, railway transport’s spending on goods and services supported an estimated 1.5 million jobs in other sectors. This indirect employment impact

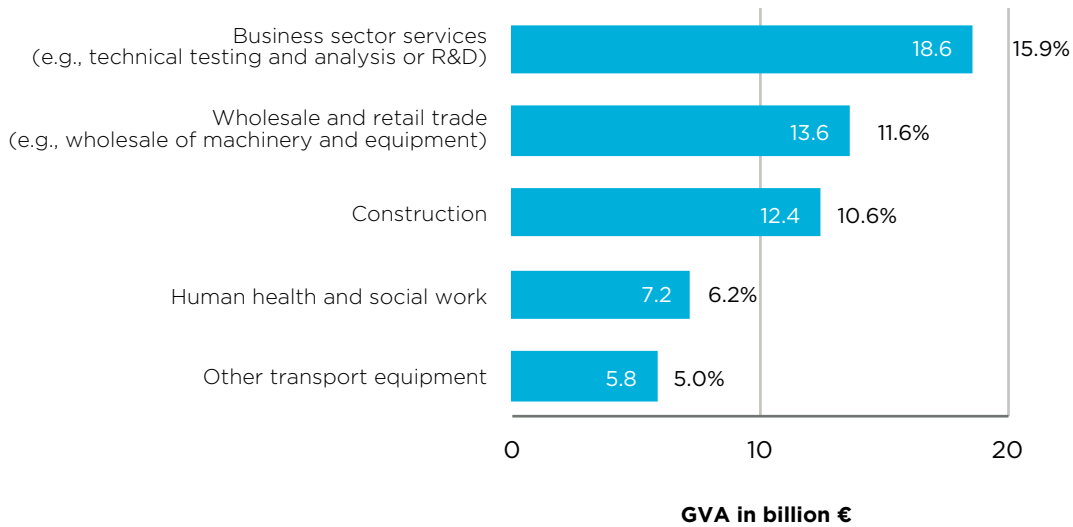
is comparable to the total employment of companies that supply electricity, gas, steam, or air conditioning (NACE code D) within the EU countries (Eurostat, 2025b).

The most significant GVA contribution was stimulated in business sector services at €18.6 billion GVA. This accounted for 15.9% of total indirect GVA. The business services sector is comprised of various service sectors (specifically, NACE sectors 69 to 82). These service sectors include R&D, marketing, legal and accounting services, as well as technical testing of rail infrastructure. Additionally, railway transport stimulated GVA contributions across wholesaler and retailer (€13.6 billion or 11.6%) and construction firms (€12.4 billion or 10.6%). From the wholesale and retail trade sector, the railway transport sector procures machinery and equipment for trains, for instance.

Fig. 5: Railway transport’s indirect impact on the EU economy in 2023



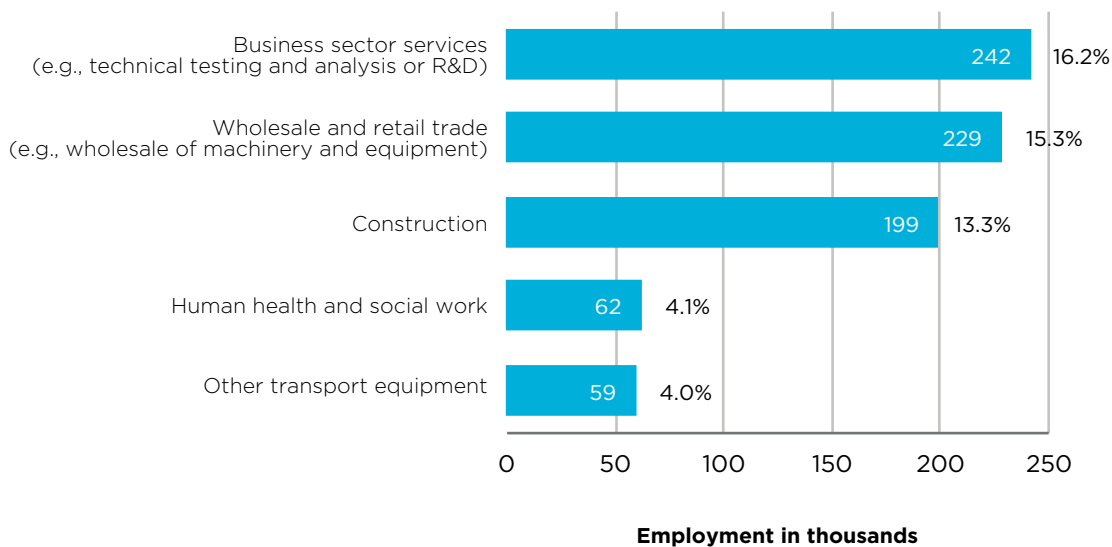
Source: Oxford Economics based on Eurostat (2025b)

**Fig. 6: Railway transport's indirect contribution to GVA in the EU countries by sector in 2023**

Source: Oxford Economics based on Eurostat (2025b)

Not only did spending by the railway transport sector stimulate GVA across various sectors along its value chain throughout the EU, but it also supported jobs in these sectors. The top three sectors in terms of supported jobs are equivalent to those in terms of GVA contribution: business

sector services such as research and development, marketing, and technical testing with 242,000 jobs supported (16.2%); wholesale and retail trade with 229,000 jobs supported (15.3%); and construction with 199,000 jobs supported (13.3%).

**Fig. 7: Railway transport's indirect contribution to employment in the EU countries by sector in 2023**

Source: Oxford Economics based on Eurostat (2025b)

### 3.2.3 INDUCED IMPACTS DUE TO SPENDING ON WAGES

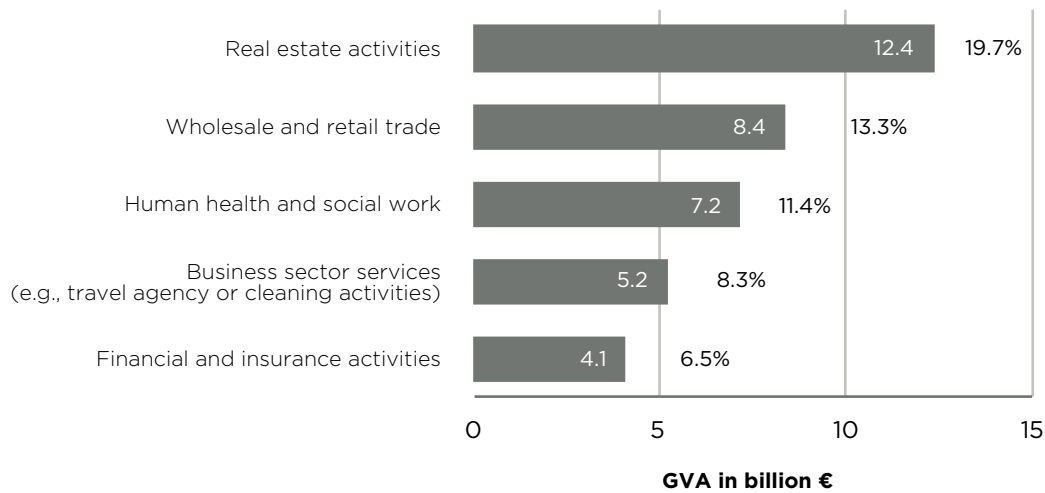
The European railway transport sector paid wages and salaries as well as employer social contributions. Some of these wages, along with those paid to employees in the supply chain, were spent in the consumer economy, creating further economic activity worldwide. We estimate that the railway transport sector supported €63 billion GVA through wage-funded consumption spending in the EU in 2023. Furthermore, railway transport supported 778,000 jobs through this economic impact channel.

Wage-funded consumption spending supported GVA across different sectors throughout the EU countries. Most of this impact was concentrated in typical consumer sectors of the economy, such as real estate (€12.4 billion), wholesale and retail trade (€8.4 billion), and human health and social work (€7.2 billion).

Fig. 8: Railway transport’s induced impact on the EU economy in 2023



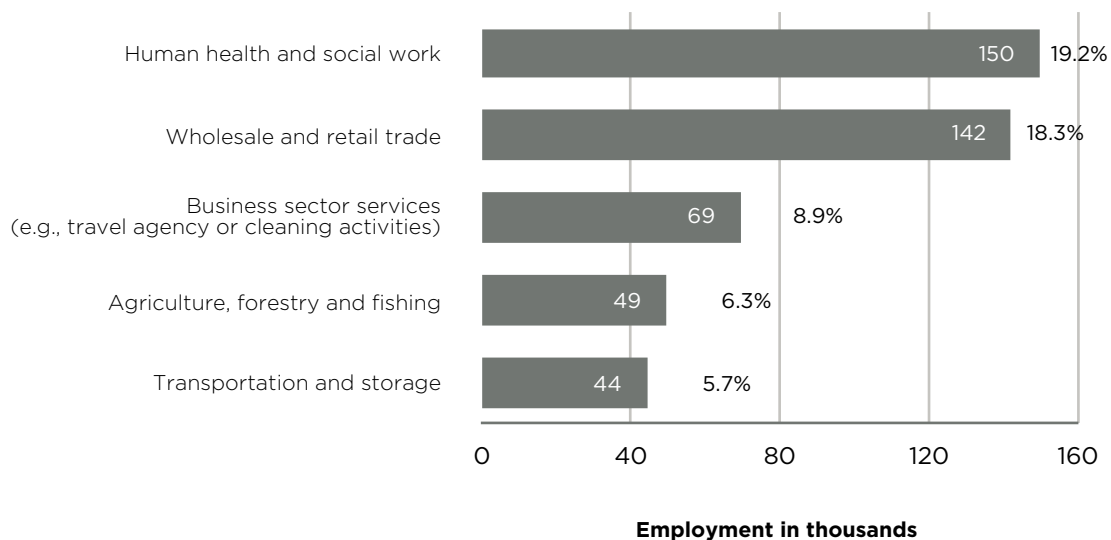
Source: Oxford Economics based on Eurostat (2025b)

**Fig. 9: Railway transport's induced contribution to GVA in the EU countries by sector in 2023**

Source: Oxford Economics based on Eurostat (2025b)

The spending of wages by employees of the railway sector and its suppliers leads to the creation of further economic activity. This also includes supporting jobs in those sectors where these wages are spent. Consumption by railway sector and supplier employees mainly supports

typical consumer and labour-intensive sectors. Of the supported jobs, 19.2% (or 150,000 jobs) were in human health and social work. An additional 18.3% (or 142,000 jobs) were in wholesale and retail trade and 8.9% (or 69,000 jobs) in business sector services.

**Fig. 10: Railway transport's induced contribution to employment in the EU countries by sector in 2023**

Source: Oxford Economics based on Eurostat (2025b)

3.2.4 THE TOTAL ECONOMIC FOOTPRINT

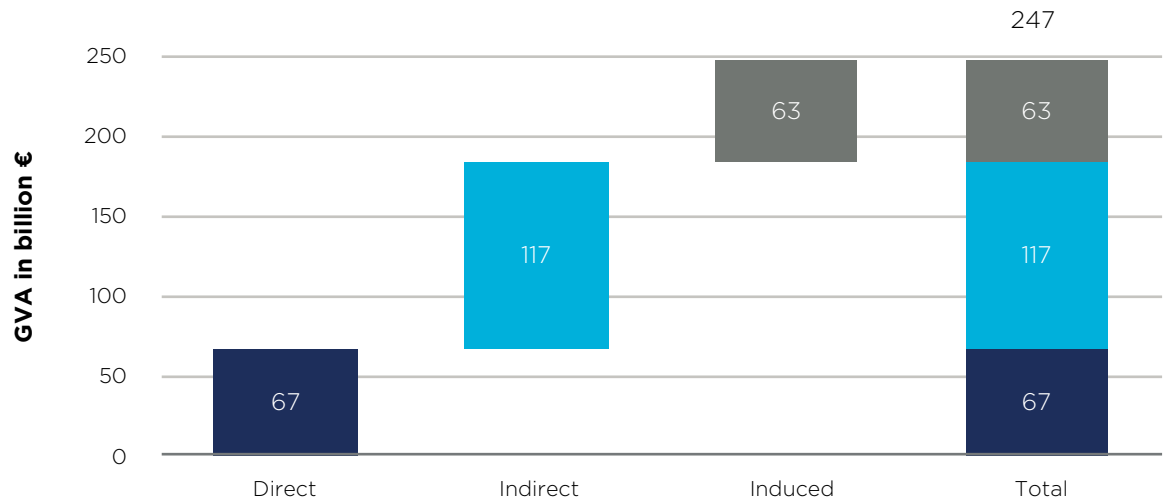
Across all three channels of impact, we estimate that the railway transport sector supported a total contribution of €247 billion to the GDP of the EU countries in 2023. For context, this is equivalent to 1.4% of the EU’s total GDP in 2023 and exceeds Greece’s 2023 GDP of €225 billion (Eurostat, 2025b; 2025c), Greece thereby being the 16th largest economy in the EU.

The main contributor to the total effect is the indirect channel which covers the railway transport sector’s supply chain. With a supported GVA of €117 billion, the indirect effect accounts for around 47% of the sector’s total impact. The second largest contributor to the total supported GVA is the railway transport sector itself with a direct effect of €67 billion GVA. This represents 27%

of the total stimulated GVA. Economic activities stimulated by wages paid by the railway transport sector and its suppliers (induced effect) account for a further 25% of the total impact, supporting a GVA of €63 billion<sup>4</sup>.

The GVA multiplier is used to assess the extent to which a particular industry stimulates economic activity across the entire economy. It is measured as the ratio of the total GVA supported by the industry to its own direct contribution to GDP. In 2023, the GVA multiplier for European railway transport was 3.7. This suggests that for every €1 of GVA generated directly by the railway sector, a further €2.70 was supported in other sectors. This substantial multiplier effect underscores the railway sector’s significant role in stimulating economic activity throughout the EU.

Fig. 11: Contribution of railway transport to GDP in the EU countries



Source: Oxford Economics based on Eurostat (2025b)

Furthermore, we estimate that railway transport supported around 3,162,000 jobs across the EU countries in 2023. This is equivalent to 1.6% of EU’s employment and exceeds the total employment in Ireland in 2023, which was 2,571,000 jobs (Eurostat, 2025d).

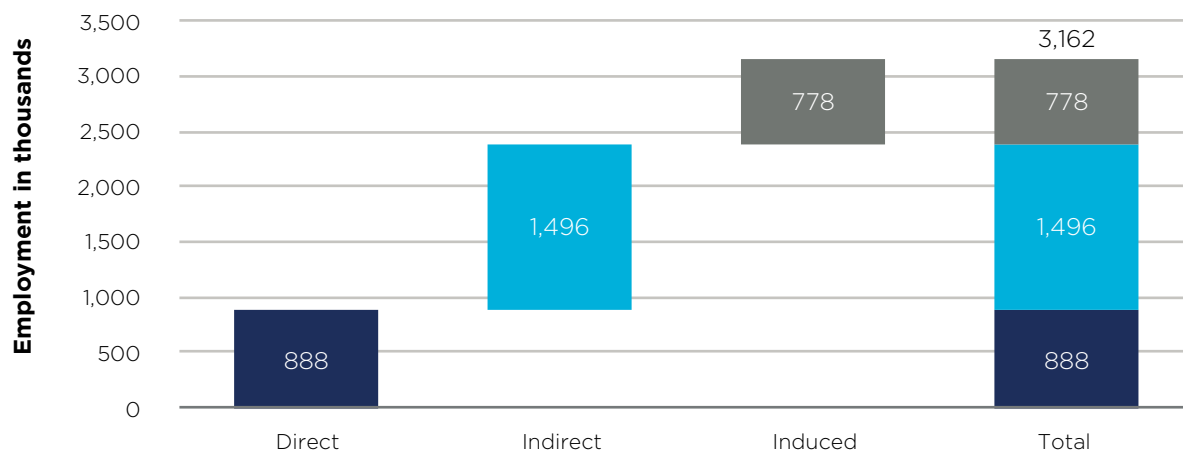
Around 47% (1,496,000) of these jobs were supported through the railway sector’s supply

chain (indirect effect). This highlights the importance of the sector’s procurement impact on the European economy. Another 28% (888,000) were directly employed by the railway transport sector, while 25% (778,000) were supported through wages and salaries paid (induced effect).

The employment multiplier shows how many jobs the railway transport sector supports across the entire economy, compared to the number of jobs it provides directly. In 2023, the employment multiplier for the railway sector was 3.6. This means that for every job created directly by the railway transport sector, an additional 2.6 jobs are supported in other industries across the EU countries. This demonstrates the important contribution that railway transport makes to employment throughout the European economy.

Furthermore, the economic impact results can be compared to a previous economic impact study, which measured the direct and indirect impacts of railway transport in Europe in 2012 (Ecorys and CER, 2014).<sup>5</sup> In 2012, the sum of the direct and indirect contribution to GDP was estimated at €143 billion, compared to our estimated impact of €184 billion in 2023. This marks an increase of 29%. Similarly, we find that the combined direct and indirect impact on employment increased slightly by 5% from 2.3 million supported jobs in 2012 to 2.4 million supported jobs in 2023.

**Fig. 12: Contribution of railway transport to employment in the EU countries**



Source: Oxford Economics based on Eurostat (2025b)

<sup>5</sup> Please note that the comparability of the results is limited by the differences in the methodologies used by the studies.

### 3.3 COMPARING THE ECONOMIC FOOTPRINT ACROSS TRANSPORT INDUSTRIES

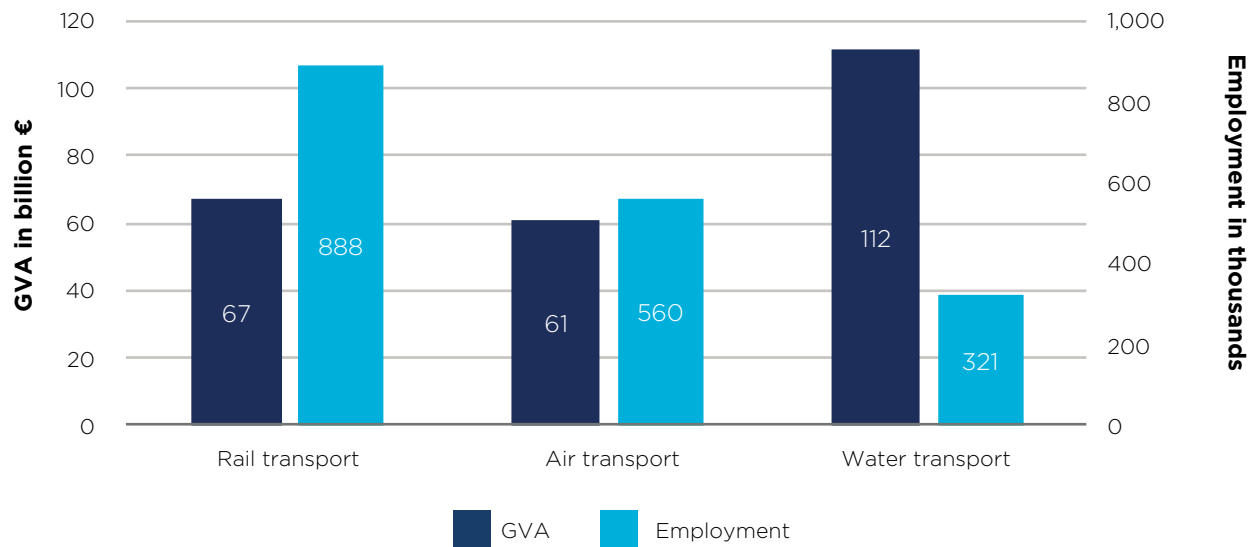
In this section, we compare the direct GVA and number of jobs generated by the railway transport sector to those generated by two other transport sectors: air transport (NACE code H51.10 including passenger air transport, H51.21 including freight air transport and H52.23 including service activities incidental to air transport) and water transport (NACE code H50 including inland, sea and costal passenger and freight transport, and H52.22 including service activities incidental to water transport). The indirect and induced channels are not taken into consideration. Each transport sector includes both national and international passenger and freight transport within the EU, along with corresponding service activities. Thus, we take into consideration all activities from companies based in the EU that operate within the corresponding transport sector.

In 2023, the rail transport sector generated a GVA of €67 billion, which was higher than the GVA of €61 billion generated by the air transport sector. However, it contributed less to GDP than the water transport sector with €112 billion GVA. A prior economic impact study found that the railway sector was the largest contributor to GVA in 2011 (Ecorys and CER, 2014). The substantial rise in shipping rates in 2021 could explain the increase

in GVA generated by the water transport sector. This increase was driven by rising demand and decreasing effective shipping capacity (UNCTAD, 2022).

The employment in the railway sector is the largest compared to the air and water transport sectors. At 888,000 jobs, the rail sector employs roughly as many people as the two sectors combined.

Fig. 13: GVA and employment for rail, air, and water transport within the EU



Source: Oxford Economics based on Eurostat (2025b)



# SECTION 4: CONCLUSION



**Railways are an essential part of Europe's transport system, supporting passenger travel and freight logistics. European railways are pivotal for Europe's industrial competitiveness and the green transition in transport. Rail freight enhances supply-chain resilience by connecting factories, ports, and markets, reducing logistics costs and supporting strategic autonomy across the Single Market. As rail transport is much more energy efficient and emits much less CO<sub>2</sub> than road transport, a modal shift from road to rail is key for substantially reducing energy consumption and decarbonising the transport sector.**

The EU's rail transport sector makes a substantial contribution to GDP through direct, indirect, and induced channels. Directly, it contributes to the EU economy by transporting passengers and freight across the continent and by providing crucial infrastructure. These activities account for over 10% of the GVA within the entire EU transport sector. Railway transport also stimulates further contributions to GDP through indirect channels by purchasing goods and services from a broad network of suppliers, especially from companies in business sector services, wholesale and retail trade, and construction. The induced impact arises from the spending of wages by railway employees and those in its supply chain, which benefits consumer-oriented sectors such as real estate activities, wholesale and retail trade, and human health and social work.

In 2023, the total economic footprint of the railway transport sector was substantial at €247 billion, exceeding Greece's GDP and supporting 3,162,000 jobs—more than Ireland's total employment. Compared to other transport sectors, rail generated more GVA than air transport and employs more people than both air and water transport combined. The industry's GVA multiplier of 3.7 indicates that for every €1 contribution to GDP generated directly by the industry, an

additional €2.70 is supported in other sectors. Similarly, its employment multiplier of 3.6 shows that for each job in rail transport an additional 2.6 jobs are supported in the EU economy. These figures further emphasise the critical role of the railway transport sector in stimulating economic activity across Europe.

European railway transport offers many wider benefits beyond its short-term economic impacts. By reducing transport times and improving transport quality, it enhances innovation and competitiveness, supporting business growth and boosting productivity. The railway sector leads the way in R&D investment, generating positive spillover effects across various industries. Furthermore, railways are crucial for defence mobility, facilitating the rapid and efficient movement of military resources across Europe. Overall, the railway sector is a vital pillar of the EU, due not only to its direct economic impact, but also to its impact along the entire value chain. It makes a significant contribution to bolstering Europe's resilience and competitiveness. It plays a key role in ensuring seamless mobility across the continent, thereby promoting economic integration and sustainable development.

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# METHODOLOGICAL APPENDIX

## ESTIMATING THE DIRECT EFFECT OF RAILWAYS IN THE EU

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The estimation of the direct impacts was based on Eurostat (2025b). The analysis included the following NACE sectors:

- **H49.10:** Passenger rail transport, interurban,
- **H49.20:** Freight rail transport,
- **H52.21:** Service activities incidental to land transportation

Sector H52.21 covers all service activities related to land transportation, which indicates that we might slightly overestimate the effect of the railway transport sector. This is because data at a more detailed level (5-digit NACE sectors) was not available on Eurostat. However, it should be noted that this is consistent with a previous economic impact study conducted in 2014, thus improving the comparability of the results over time (Ecorys and CER, 2014). To estimate the missing data points for 2023, we employed a multifaceted approach that considered trends in individual indicators and their interrelationships. For example, in instances where GVA figures were unavailable, we utilised revenue trends to approximate GVA, ensuring a robust estimation grounded in the available data.

## ESTIMATING THE INDIRECT AND INDUCED EFFECT OF RAILWAYS IN THE EU

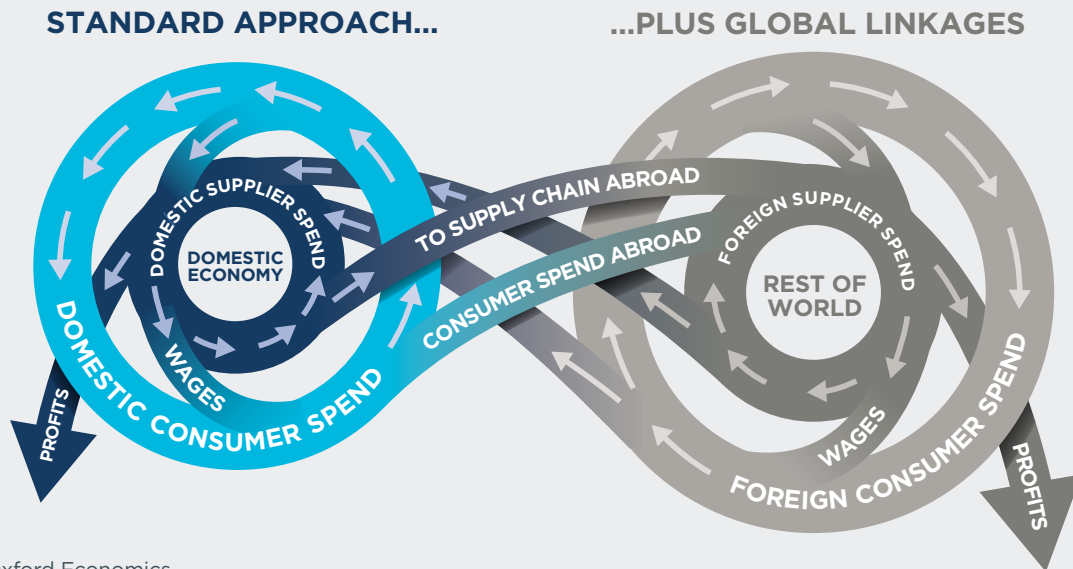
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We used input-output modelling to estimate the indirect and induced impacts. This method was first developed by Wassily Leontief, who won a Nobel Prize for his work in 1973. It is based on national accounts data specifying how much each industry in a given country buys from other industries in the same and other countries each year (input-output tables).

Oxford Economics' Global Sustainability Model is based on this technique and captures supply chain spending across more than 180 countries. This enables us to estimate the impact of the global operations of the railway transport sector on a specific location—a fundamental advantage over a single-country model that does not capture international trade. It also allows us to account for international supply chains and trade feedback (Figure 14). The data underlying the model were sourced from the OECD.

To estimate the indirect and induced impact of railway transport in the EU, we used Eurostat (2025b) data on the purchases of goods and services, the investments, and the cost of employment. To account for the specific regional economic structures of each EU country, a separate vector was created for each. Furthermore, we prepared a vector of the cost of employment by country based on Eurostat (2025b) data. The Global Sustainability Model then calculates the estimated impacts.

Fig. 14: Oxford Economics' Global Sustainability Model



Source: Oxford Economics

Table 1: Overview of the Sectors in the Global Sustainability Model

| NACE code | Sector name                                              |
|-----------|----------------------------------------------------------|
| 01-03     | Agriculture, forestry, and fishing                       |
| 05-06     | Mining and extraction of energy-producing products       |
| 07-08     | Mining and quarrying of non-energy-producing products    |
| 09        | Mining support service activities                        |
| 10-12     | Food products, beverages, and tobacco                    |
| 13-15     | Textiles, wearing apparel, leather, and related products |
| 16        | Wood and products of wood and cork                       |
| 17-18     | Paper products and printing                              |
| 19        | Coke and refined petroleum products                      |
| 20-21     | Chemicals and pharmaceutical products                    |
| 22        | Rubber and plastic products                              |
| 23        | Other non-metallic mineral products                      |
| 24        | Basic metals                                             |
| 25        | Fabricated metal products                                |

Table 1: Overview of the Sectors in the Global Sustainability Model (*continued*)

| NACE code    | Sector name                                                               |
|--------------|---------------------------------------------------------------------------|
| <b>26</b>    | Computer, electronic, and optical products                                |
| <b>27</b>    | Electrical equipment                                                      |
| <b>28</b>    | Machinery and equipment, nec                                              |
| <b>29</b>    | Motor vehicles, trailers, and semi-trailers                               |
| <b>30</b>    | Other transport equipment                                                 |
| <b>31-33</b> | Other manufacturing; repair and installation of machinery and equipment   |
| <b>35-39</b> | Electricity, gas, water supply, sewerage, waste, and remediation services |
| <b>41-43</b> | Construction                                                              |
| <b>45-47</b> | Wholesale and retail trade; repair of motor vehicles                      |
| <b>49-53</b> | Transportation and storage                                                |
| <b>55-56</b> | Accommodation and food services                                           |
| <b>58-60</b> | Publishing, audiovisual, and broadcasting activities                      |
| <b>61</b>    | Telecommunications                                                        |
| <b>62-63</b> | IT and other information services                                         |
| <b>64-66</b> | Financial and insurance activities                                        |
| <b>68</b>    | Real estate activities                                                    |
| <b>69-82</b> | Business sector services                                                  |
| <b>84</b>    | Public admin. and defence; compulsory social security                     |
| <b>85</b>    | Education                                                                 |
| <b>86-88</b> | Human health and social work                                              |
| <b>97-98</b> | Private households with employed persons                                  |

Source: Oxford Economics

## FREQUENTLY ASKED QUESTIONS (FAQS)

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### What does “gross value added” mean?

Gross value added (GVA) refers to the value created by a sector’s own activities. It is calculated by subtracting intermediate inputs from the production. GVA can be derived from the sum of profits and labour costs.

Unlike revenue, GVA captures the true value added by an activity. Consider the following simplified example:

- Company A generates a revenue of €100 and incurs intermediate inputs worth €80 from its suppliers. Therefore, this company’s GVA would be €20.
- Company B generates a revenue of €100 and incurs intermediate inputs worth €50 from its suppliers. Thus, company B’s GVA would be €50.
- Although both companies have the same revenue, Company B contributes more than twice as much to GDP with a GVA of €50 compared to Company A’s GVA of €20.

In the context of national accounts, GVA indicates the company’s, industry’s, or sector’s contribution to the overall income of the economy, i.e., the GDP. To achieve this, the business perspective must be translated into economic logic. If income were determined by summing up all company revenues, many outputs would be counted twice. This double counting is avoided by only considering newly created value, which is particularly sensible in a highly specialised economy. The greater the degree of specialisation, the more likely it is that aggregated company revenues and actual created value will diverge.

### What does “supported jobs” mean?

In our study, we use the term “supported jobs” to describe the level of employment supported by the economic activities of the sector of interest. This refers to the gross effect rather than the net effect, since we cannot be sure whether these jobs would have existed without the sector’s economic activities.

For example, when the sector of interest procures products or services from a supplier, it supports some of that supplier’s jobs. However, since the supplier may have accepted other contracts without the sector of interest, utilising their employees for these, we cannot speak of (newly) created jobs.

### What do the direct, indirect, and induced effects mean?

The **direct effect** includes the gross value added and employment within the companies in the analysed sector. It provides insight into the number of employees in the sector and the amount of gross value added generated. For example, if a railway company purchases trains, carriages, or locomotives, this creates value added that contributes to GDP and supports jobs.

The **indirect effect** captures the economic impact arising from the sector’s demand for intermediate inputs (goods and services). It shows how jobs and gross value added are stimulated along the supply chain. Returning to our example, this would include the economic activity of the companies that produce trains, carriages, or locomotives.

The final channel relevant to calculating the total effect is the **induced effect**. This captures the impacts resulting from the spending of income generated both directly and indirectly (including both capital and wage income). For instance, the induced effect includes the value added stimulated when employees spend their wages on things like restaurants meals or rent. In our example, this could be a railway company employee buying a salad for lunch, for instance.

### What do multipliers mean?

Multipliers demonstrate the extent to which the indirect and induced economic effects exceed the direct effect. Together, these effects are referred to as the “multiplicative effect”. In simple terms, a multiplier expresses the size of the economic impact that is not directly related to the sector of interest.

Technically, it is calculated using the following formula:

$$\text{Multiplier}_j = \frac{\text{Total effect}_j}{\text{Direct effect}_j}$$

In terms of employment, for example, the employment multiplier is 3.6. Therefore, for every person employed directly in the railway transport sector, an additional 2.6 jobs were supported elsewhere in the EU economy. Similarly, this multiplier can be calculated for gross value added. The higher the multiplier, the greater the sector’s activities impact the economy, which goes beyond the direct economic effect.

## QUALITY ASSURANCE

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To ensure the analysis was of the highest quality, all parts of the study were subjected to Oxford Economics’ rigorous quality assurance process. This includes double-checking for consistency and plausibility, preparing and processing the data, modelling, and generating the report. The review is conducted by at least two experienced staff members who were not involved in the project’s execution or meetings with the client.

# OXFORD ECONOMICS

## **September 2025**

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The modelling and results presented here are based on information provided by third parties, upon which Oxford Economics has relied in producing its report and forecasts in good faith. Any subsequent revision or update of those data will affect the assessments and projections shown.

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